

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY		SHEET NO.
CRP	REFUGIO		1

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

**STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION**

**PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT**

FEDERAL AID PROJECT
PROJECT NO. F 2B24(083)
CSJ: 0447-04-018

**REFUGIO COUNTY
SH 202**

NET LENGTH OF ROADWAY = 700.00 FT. = 0.133 MI.
NET LENGTH OF BRIDGE = 725.00 FT. = 0.137 MI.
NET LENGTH OF PROJECT = 1,425.00 FT. = 0.270 MI.

DESIGN SPEED = 65 MPH
GUIDELINES: RDM (JULY 2020) CH 3, SEC 3
FUNCTIONAL CLASS: MAJOR COLLECTOR
ADT: 1,135 (2021) 1,589 (2041)

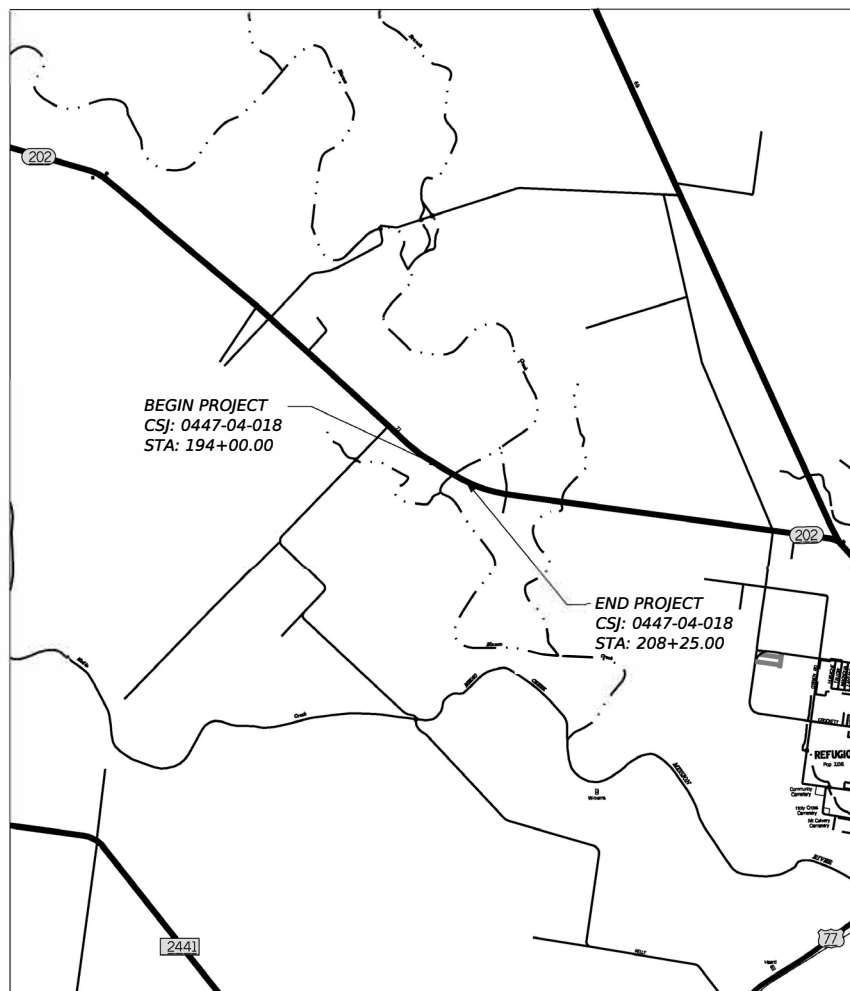
NO RAS REVIEW REQUIRED

REDUCED SPEED ZONE REQUESTED

LIMITS: BLANCO CREEK STR 29 ON SH 202 TO 3.2 MI W OF US 183

FOR THE CONSTRUCTION OF: BRIDGE REPLACEMENT

CONSISTING OF: REPLACE BRIDGE AND APPROACHES



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

SCALE : NOT TO SCALE

FINAL PLANS

LETTING DATE: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED & 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

Jacobs
1999 BRYAN ST, SUITE 1200
DALLAS, TX 75201-3196
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation
© 2024 by Texas Department of Transportation; all rights reserved

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, OCTOBER 2023)

RECOMMENDED FOR LETTING: 3/13/2024
DocuSigned by:
Paula Sales-Evans, P.E.
DISTRICT DIRECTOR OF TRANSPORTATION
59754503 PLANNING & DEVELOPMENT

APPROVED FOR LETTING: 3/13/2024
DocuSigned by:
Valente Alvarez
DISTRICT ENGINEER
303F64E8A9B44E0...

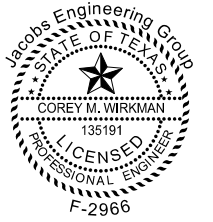
DATE: \$DATE\$ DATE TIME: \$TIME\$
FILE: \$FILE\$ DOCUMENT NAME

INDEX OF SHEETS

DW: BDG
 CK: JB
 DW: BDG
 CK: CW

SHEET	DESCRIPTION
<u>I. GENERAL</u>	
1	TITLE SHEET
2	INDEX OF SHEETS
3	TYPICAL SECTIONS
4, 4A	4E GENERAL NOTES
5, 5A	ESTIMATE & QUANTITIES
6	7 QUANTITY SUMMARIES
8	SUMMARY OF SMALL SIGNS
<u>II. TRAFFIC CONTROL</u>	
9	TRAFFIC CONTROL NARRATIVE
10	TRAFFIC CONTROL TYPICAL SECTIONS
11	TRAFFIC CONTROL ADVANCE WARNING SIGNS
12	TRAFFIC CONTROL PHASE 1
13	TRAFFIC CONTROL PHASE 2
14	15 TRAFFIC CONTROL TEMPORARY SHORING
<u>TRAFFIC CONTROL STANDARDS</u>	
16	* ABSORB (M)-19
17	* SLED-19
18	* BC(1)-21
19	* BC(2)-21
20	* BC(3)-21
21	* BC(4)-21
22	* BC(5)-21
23	* BC(6)-21
24	* BC(7)-21
25	* BC(8)-21
26	* BC(9)-21
27	* BC(10)-21
28	* BC(11)-21
29	* BC(12)-21
30	* CSB(1)-10
31	* CSB(1)-10
32	* TCP (2-2)-18
33	* TCP (2-3)-23
34	* TCP(2-8)-23
35	* WZ (BRK)-13
36	* WZ (STPM)-23
37	* WZ(RS)-22
38	CRASH CUSHION SUMMARY
<u>III. ROADWAY</u>	
39	41 ROADWAY SURVEY CONTROL
40	42 ROADWAY HORIZONTAL ALIGNMENT DATA
43	44 ROADWAY PLAN & PROFILE
<u>ROADWAY STANDARDS</u>	
45	* BED-14
46	* GF(31)-19
47	* CRP-GF(31)MS-19
48	49 * GF(31)TRTL3-20
49	* JS-14
50	* SGT(10S)31-16
51	* SGT(12S)31-18
51A	* SGT(15)31-20
51B	* SGT(15)31-20
<u>IV. DRAINAGE</u>	
52	DRAINAGE AREA MAP
53	DRAINAGE HYDROLOGIC DATA
54	55 DRAINAGE HYDRAULIC DATA
55	56 DRAINAGE CROSS SECTION LAYOUT
56	58 DRAINAGE SCOUR DATA SHEET
57	58 DRAINAGE SCOUR DATA SHEET
<u>DRAINAGE STANDARDS</u>	
NONE	
<u>V. BRIDGES</u>	
<u>BLANCO CREEK BRIDGE</u>	
59	60 BRIDGE LAYOUT
60	62 TYPICAL SECTIONS
61	64 BORE LOGS
62	65 ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS
66	67 ABUTMENT NOS. 1 & 9
68	69 INTERIOR BENT NOS. 2, 3, 5, 6, & 8
69	71 INTERIOR BENT NOS. 4 & 7
70	71 FRAMING PLAN (SPAN NOS. 1-3)
71	72 FRAMING PLAN (SPAN NOS. 1-3)

SHEET	DESCRIPTION
<u>V. BRIDGES (cont.)</u>	
<u>BLANCO CREEK BRIDGE (CONT.)</u>	
73	FRAMING PLAN (SPAN NOS. 4-6)
74	FRAMING PLAN (SPAN NOS. 7-8)
75	IGND
76	210.00' PRESTRESSED CONCRETE GIRDER UNIT (SPAN NOS. 1-3)
77	375.00' PRESTRESSED CONCRETE GIRDER UNIT (SPAN NOS. 4-6)
78	140.00' PRESTRESSED CONCRETE GIRDER UNIT (SPAN NOS. 7-8)
79	87 EXISTING BRIDGE PLANS
<u>BRIDGE STANDARDS</u>	
88	* BAS-A
89	* CSAB
90	* IGD
91	* IGEB
92	* IGMS
93	* IGSK
94	* IGTS
95	* MEBR(C)
96	* NBIS
97	* PCP
98	* PCP-FAB
99	* PMDF
100	101 * SEJ-M
101	102 * SRR
102	103 * T223
103	106 * T223
104	107 * T223
105	109 * T223
106	110 * T223
107	111 * T223
108	112 * T223
109	113 * T223
110	115 * T223
<u>VI. UTILITIES</u>	
116	S.U.E. PLAN SHEET
<u>VII. TRAFFIC ITEMS</u>	
117	119 TRAFFIC ITEMS SIGNING, PAVEMENT MARKING & DELINEATION LAYOUT
<u>TRAFFIC STANDARDS</u>	
120	* D & OM(1)-20
121	* D & OM(2)-20
122	* D & OM(3)-20
123	* D & OM(4)-20
124	* D & OM(5)-20
125	* D & OM(6)-20
126	* D & OM(VIA)-20
127	* PM(1)-22
128	* PM(2)-22
129	* PM(5)-22
130	* SMD(GEN)-08
131	* SMD(SLIP-1)-08
132	* SMD(SLIP-2)-08
133	* SMD(SLIP-3)-08
<u>VIII. ENVIRONMENTAL</u>	
134	135 EPIC
135	137 SW3P
136	139 ENVIRONMENTAL SW3P LAYOUT
<u>ENVIRONMENTAL STANDARDS</u>	
140	* EC(1)-16
141	* EC(2)-16
142	* EC(3)-16



* THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Corey M. Wirkman, P.E. 03/21/2024
 Signature of Registrant Date

Jacobs

1999 BRYAN ST., SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 202

INDEX OF SHEETS

SHEET 1 OF 1

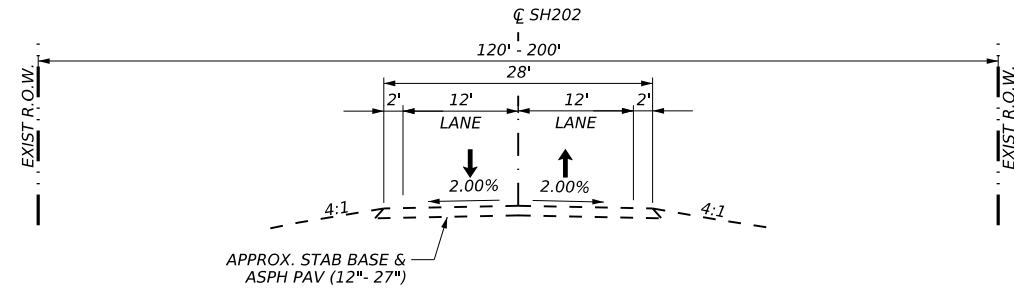
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	2

DATE: 10/4/2022 10:58 AM
 FILE: c:\pw\workdir\txdot\ms49792\TXDOT_CE_Sheets.cel

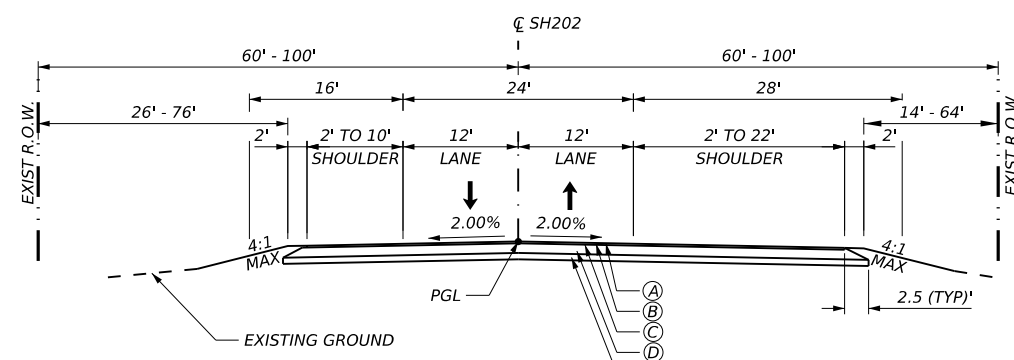
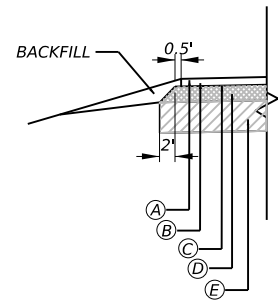
LEGEND

- (A) TOP COURSE SURFACE TREATMENT
ASPH (AC-15P, HFRS-2P, OR CRS-2P)
APPL RATE: 0.32 GAL/SY
AGGR (TY-PB GR-4 SAC B)
APPL RATE: 110 SY/CY
- (B) BOTTOM COURSE SURFACE TREATMENT
ASPH (AC-10, CR-2, OR HFRS-2)
APPL RATE: 0.39 GAL/SY
AGGR (TY-PB GR-3 SAC B)
APPL RATE: 85 SY/CY
- (C) PRIME COAT (MC-30)
APPL RATE: 0.20 GAL/SY
- (D) 14" FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)
- (E) 8" MOISTURE CONDITION SUBGRADE EMBANKMENT (FINAL) (DENS CONT) (TY C)

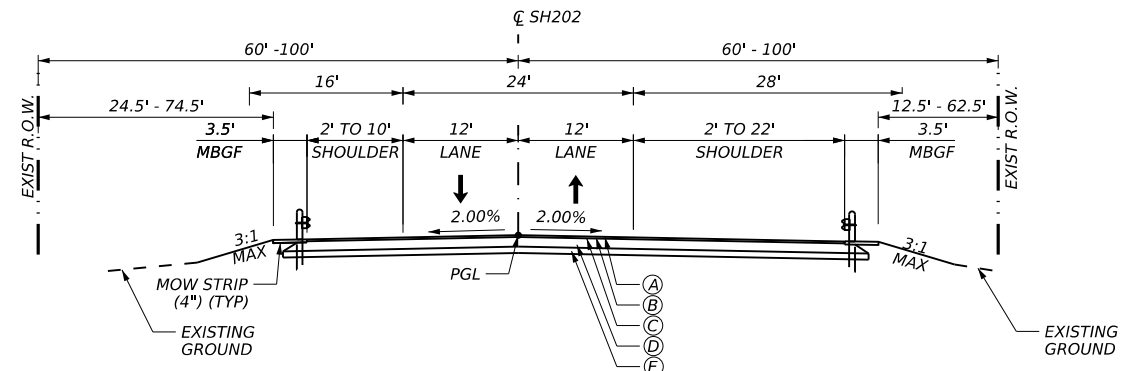
- NOTES:**
1. PAVEMENT LAYER THICKNESS AND MATERIAL ARE PRELIMINARY ONLY. IT WILL BE UPDATED BASED ON APPROVED PAVEMENT DESIGN.
 2. SEE BRIDGE LAYOUT FOR BRIDGE STATION LIMITS.



SH202 - EXIST TYPICAL SECTION
 STA 194+00 TO STA 197+53.35
 STA 204+23.85 TO STA 208+25

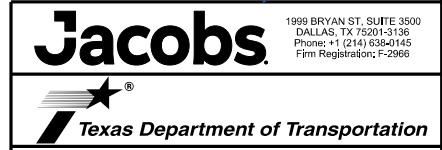
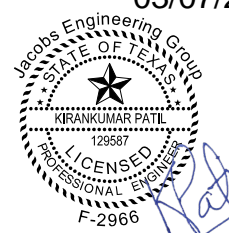


SH202 - PROPOSED TYPICAL SECTION
 STA 194+00 TO STA 196+89
 STA 204+54 TO STA 208+25



SH202 - PROPOSED TYPICAL SECTION WITH MBGF
 SEE PLANS FOR MBGF LOCATIONS

03/07/2024



SH 202		TYPICAL SECTIONS	
SCALE: N.T.S.		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	3	

Highway: SH 202

GENERAL NOTES:

Find, for your information and convenience, tools such as forms, software, materials, and various other information provided by the Department at <https://www.txdot.gov/business.html>. Please note that these tools are updated periodically and your attention is directed to the latest edition.

In the event of a called evacuation, emergencies, impending adverse weather or as directed, do not perform any work without written authorization. The District reserves the right to suspend all work in support of evacuations or emergencies occurring from other parts of the state. Any work performed, other than work directed by the Department, is unauthorized work in accordance with Item 5.

Sweep, clean and remove any construction waste, surplus materials or debris from the roadway and right of way at the end of each day unless otherwise approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Asphalt application season will be established in accordance with Item 316.4.4 Adverse Weather Conditions or as directed by the Engineer.

Cut existing pavement using a saw or other approved method to ensure a neat transverse and/or longitudinal line to assure a smooth tie-in with new pavement. Cut to a minimum depth of the final lift thickness. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Promptly pick up and properly dispose of paper and other materials used for pavement joints.

Stencil the National Bridge Inventory (NBI) number on each bridge and bridge class culvert. Use 3" letters or numbers. Use stain and color as approved. Paint will not be permitted. Locate the NBI number on the outside beam immediately adjacent to the abutment on the downstream end, on the outside headwall upper right-hand corner, or as directed. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

All pavement markings shall be in accordance with the latest edition of Texas MUTCD.

Contractor questions on this project are to be addressed to the following individual(s):

Robert Isassi, P.E. Robert.Isassi@txdot.gov
Chandler Williams, P.E. Chandler.Williams@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

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>

Highway: SH 202

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.

ITEM 2

It is recommended that prospective bidders examine the specified work locations with the Engineer to view the nature of the work, the need for close coordination with the various utilities, traffic control considerations, and other factors influencing the prosecution of the work.

ITEM 5

Field verify all dimensions and notify Engineer prior to initiating any work.

Verify the locations of utilities, underground or overhead, shown within the limits of the right-of-way. Adhere to OSHA Standards when working within the vicinity of overhead power lines. Coordinate with the utility companies and notify the Engineer of any possible conflicts. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Overhead power may need de-energizing during portions of the project. Notify AEP Texas, Alan Gomez, adgomez@aep.com, 361-881-5532, to coordinate the outages.

The 811 call services for a utility location does not include TxDOT facilities. Provide notification to the District Traffic Signal Shop by email at CRP_Utility_Locate@txdot.gov or call 361-739-6044 when planning, drilling, or excavating in areas where existing TxDOT underground utilities exist. Visual evidence of TxDOT underground utilities in the area include illumination poles, ground boxes, flashing beacons, traffic signals, etc. This notification must be provided 48 hours in advance of performing the work, but no earlier than 72 business hours before the work will commence. Drilled shaft locations or excavation areas must be staked prior to the notification so that the underground utilities can be located in relationship to the proposed work.

Notify the Engineer immediately of utility conflicts in accordance with Item 5.6. Refer to Item 4.5 for consideration of differing site conditions.

The responsibility for the construction surveying on this contract will be in accordance with Item 5.9.1, "Method A".

Highway: SH 202

This project was developed using 3D design software and tools. A proposed 3D model of the project In Extensible Markup Language (XML) and 3d PDF format is available upon request. These models are specifically intended to aid the contractor in preparing bids and in the use of automated machine guidance equipment for the project construction. If discrepancies are found, numerical dimensions in the cross-sections and plan sheets govern over the 3D model.

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

Inspection at Precast Concrete Fabrication Plants is as follows: TxDOT's Materials and Pavements Section will inspect any precast units at commercial fabrication yards and staging areas. The Area Engineer will inspect all other precast units.

For Department-furnished material, contact the Engineer or his designated representative to request material a minimum of one workday prior to pick up. Load material with contract personnel. Materials are to be stored in a safe location outside TXDOT property or right-of-way, unless otherwise approved. Use material furnished by the Department only on the project(s) intended. Return any unused material as soon as possible.

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit an 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 work performed for Item 7.2.4, "Public Safety and Convenience" will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Highway: SH 202

The total disturbed area for this project is 2.4acres. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer.

Establish uniform perennial vegetative coverage with a density of at least 70% of the native background vegetative cover to achieve final stabilization.

Comply with the Texas Aggregate Quarry and Pit Safety Act for waste areas or material source areas resulting from this project.

No significant traffic generator events identified.

ITEM 8

Prepare the progress schedule using the Critical Path Method (CPM). Submit (2) two 11" x 17" hard copies and an electronic file of the original or updated progress schedule. Submit the original progress schedule seven (7) days before the Preconstruction Conference.

Submit an updated progress schedule as directed to show proposed major changes, changes affecting compliance with the contract requirements, or changes affecting the critical path/controlling item of work.

Working days will be computed and charge in accordance with Article 8.3.1.4, "Standard Workweek".

Work above traffic is not allowed.

Notify the Engineer at least 48 hours in advance of weekend or nighttime work.

ITEM 9

Monthly progress payments will be made for items of work completed by the 28th day of each month. Any work completed after the 28th will be included for payment in the subsequent monthly progress estimate.

Highway: SH 202

Submit signed request for compensation of material-on-hand (MOH), including any requests from subcontractors, suppliers, or fabricators for MOH, at least two (2) working days prior to the end of the month on the Departments approved forms.

ITEM 100

Coordinate all right of way preparation activities with the project’s Storm Water Pollution Prevention Plan (SWP3) and Environmental Permit Issues, and Commitments Sheet (EPIC) or as approved.

Prune trees and shrubs as directed. Use accepted pruning practices in accordance with Item 192 and as defined by the National Arborist Association. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 110

For earth cuts, manipulate and compact subgrade in accordance with Item 132.3.4.2, “Compaction Methods, Density Control”.

ITEM 132

Use embankment material with a plasticity index (PI) ranging from 10 to 25. Blend or treat approved materials to achieve the desired PI and pulverize the material so that 100% passes the 3 inch sieve. Retest materials as borrow sources change or when the material changes significantly. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Obtain approval to incorporate existing salvaged asphaltic surface and flexible base materials in the surface layer. If approved, incorporate existing materials no larger than 2 inches in the surface layer. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The estimated quantities for embankments adjacent to culverts and bridges were calculated using the average-end-area method.

Highway: SH 202

ITEM 164

Restore and seed areas not shown in the plans disturbed by the Contractor’s operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Notify the Engineer of the unavailability of any seed mix. Make changes to the seed mix as approved.

Use a tacking agent of 50% SS-1 and 50% water and apply the agent at a rate of 0.10 gal/sy or as directed. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer’s recommendations when approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 166

Furnish and apply slow-release nitrogen fertilizer with a rate of 60 pounds of nitrogen per acre.

ITEM 168

Distribute water to only those areas shown in the plans or as directed. Excessive overspray will not be permitted.

Water all areas of the project to be seeded or sodded every two (2) days for 90 days or as directed. Apply water in a manner to ensure adequate moisture but not to erode the soil in-place. During periods of adequate moisture, mechanical watering may not be required as approved. Upon final stabilization, the Engineer may require to continue watering as specified for a period not to exceed 30 days.

The Basis of Estimate below establishes the approximate quantity of water required to complete the 90-day watering cycle:

Rate	Water (Gal/Acre/Day)	Area (Acre)	Total Gallons (Min)
0.25 inch/week	1961	1	88,245

ITEM 247

For Table 1, “Material Requirements” a minimum plasticity index (PI) of 4 is required for Ty A Gr 1-2 Flex Base.

When requested, stake with blue tops, at 100-foot intervals, the lines and grade shown in the plans.

ITEM 302

Provide aggregates with a minimum surface aggregate classification (SAC) of "B" unless otherwise shown. The SAC for sources on the Department's Aggregate Quality Monitoring Program (AQMP) is listed in the Department's Bituminous Rated Source Quality Catalogue (BRSQC). SAC requirements apply to aggregates used on all final roadway surfaces, including shoulders.

For precoated aggregate Type PB crushed gravel will not be used.

ITEM 310

Use MC-30 at a rate of 0.20 gallons per square yard or as directed.

A minimum prime coat curing period shall be determined by the Engineer during (option: "prior to") the preconstruction meeting. This curing period may be revised by the Engineer throughout the duration of the project pending weather and observed performance.

ITEM 316

Do not place surface treatment on exposed concrete structures unless directed.

Furnish a distributor equipped with a working hand hose.

Material rates shown are for estimating purposes only. Adjust actual rates based on the material used, the existing condition and type of roadway surface, and as approved.

When using asphalt emulsion, a minimum 24-hour curing period is required before placing any subsequent asphalt courses.

Remove vegetation and blade pavement edges prior to surfacing operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Broom and clean sealed sections of roadway and all adjacent paved surfaces, including the gutter line, of any surplus aggregate before opening to traffic or as directed.

A vacuum sweeper will be required for this project. This shall be considered subsidiary to Item 316. Vacuum sweeper must perform a test strip before use.

ITEM 400

Compact each layer to meet the density and consolidation of the adjacent undisturbed material.

ITEM 420

Set a Department-furnished brass disk on all bridge abutments and culvert headwalls as directed. The work performed will not be measured or paid directly, but will be subsidiary to pertinent Items.

Bent concrete will be a plans quantity item.

Place longitudinal construction joints at the lane line for bridge approach slabs. These construction joints will be subsidiary to Item 420.

ITEM 421

The Engineer will provide strength-testing equipment for acceptance testing.

Furnish on-site curing facilities. The curing facility should include an adequate water supply and be able to adequately maintain a water temperature of 69.8 to 77 degrees Fahrenheit.

Furnish test molds for cylindrical concrete specimens measuring four (4") inches in diameter by eight (8") inches in length.

ITEM 422

Power-wash the surface of the precast panels before placement of concrete deck concrete to the satisfaction of the Engineer.

ITEM 427

Provide a rub finish for Surface Area II unless otherwise directed.

ITEM 432

Saw cut the existing riprap to ensure a neat transverse and/or longitudinal line to assure a smooth tie-in with new riprap. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items. Use Cap Option A for the joint between the face of the abutment and riprap as shown on the standard sheet "Stone Riprap (SRR)".

ITEM 496

This bridge has been adopted through the Historic Bridge Program. Steel beams shall be salvaged during bridge demolition and stored on site for bridge adoptee, or in location designated by Engineer. Steel support crosses shall be salvaged and extra care shall be taken in breaking welds in order to keep steel supports intact.

Contractor shall provide a demolition plan to engineer for approval.

The structure(s) to be removed have surface coatings which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations.

Coordinate and identify the locations where the structure(s) will be cut at least 30 days prior to the demolition of the structure(s). If the surface coatings contain hazardous materials, the Department will arrange by separate Contract for the removal of a 4 inch wide strip around bearing attachments, at the anchor bolts, and as approved. Provide traffic control for the paint removal operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Notify the Engineer no later than 30 calendar days prior to the demolition of the structure(s) for coordination with the Texas Department of State Health Services.

Provide for approval a method of removal to prevent any materials from falling into water or traffic. The method used and work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 500

"Materials on Hand" payments are not considered when determining partial payments.

ITEM 502

Furnish additional barricades, signs, and traffic handling as directed. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Attach stop/slow paddle to a staff with a minimum length of 6 feet to the bottom of the sign.

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.

All items marked as optional on all traffic control standards shall be required unless otherwise approved by an Engineer.

ITEM 504

No field office will be required for this project.

ITEM 506

Designate in writing a Contractor Responsible Person (CRP) for implementing, maintaining, and reviewing environmental requirements.

ITEM 540

Mixing of wood post types and shapes will not be permitted at the same location.

Type II Galvanization coatings will be used.

Backfill area behind concrete mow strip using existing soil to the slope shown in the plans and cross-sections. Payment for backfilling is part of Item 132 Embankment.

ITEM 658

Furnish round delineators and object markers except when wing channel posts are shown in the plans.

SPECIFICATION DATA

UNIT WEIGHT ESTIMATES

ITEM 247: FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS) ----- 135 LBS/CF
ITEM 247: FL BS (RDWY DEL)(TYA GR5) ----- 135 LBS/CF

BASIS OF ESTIMATE

ITEM 275: CEMENT TREAT (NEW BASE)(10") ----- 42 LBS/SY
ITEM 310: PRIME COAT ----- 0.20 GAL/SY

COMPACTION REQUIREMENTS FOR BASE COURSE

ITEM 247: FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS) OR (TYA GR5)(FNAL POS)
DENSITY ----- 100% MIN.
LIFTS ----- ALL

SURFACE TREATMENT DATA

TWO COURSE SURFACE TREATMENT (MULTI-OPTION)

FIRST COURSE

ASPHALT TYPE ----- AC-10, CRS-2, OR HFRS-2
AVERAGE ASPHALT RATE ----- 0.39 GAL/SY
AGGREGATE RATE ----- 1 CY/90 SY
AGGREGATE TYPE ----- PB
AGGREGATE GRADE ----- 3 OR 3S, SAC-B

SECOND COURSE

ASPHALT TYPE ----- AC-15P, CRS-2P, OR HFRS-2P
AVERAGE ASPHALT RATE ----- 0.32 GAL/SY
AGGREGATE RATE ----- 1 CY/115 SY
AGGREGATE TYPE ----- PB
AGGREGATE GRADE ----- 4 OR 4S, SAC-B



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0447-04-018

DISTRICT Corpus Christi
HIGHWAY SH 202

COUNTY Refugio

CONTROL SECTION JOB				0447-04-018		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00091580			
COUNTY				Refugio			
HIGHWAY				SH 202			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	14.250		14.250	
	110-6001	EXCAVATION (ROADWAY)	CY	983.000		983.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	6,212.000		6,212.000	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	6,629.000		6,629.000	
	168-6001	VEGETATIVE WATERING	MG	75.000		75.000	
	247-6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)	CY	1,620.000		1,620.000	
	260-6002	LIME (HYDRATED LIME (SLURRY))	TON	97.000		97.000	
	260-6073	LIME TRT (SUBGRADE)(8")	SY	4,165.000		4,165.000	
	310-6009	PRIME COAT (MC-30)	GAL	770.000		770.000	
	316-6001	ASPH (MULTI OPTION)	GAL	1,500.000		1,500.000	
	316-6222	AGGR(TY-PB GR-3 SAC-B)	CY	46.000		46.000	
	316-6224	AGGR(TY-PB GR-4 SAC-B)	CY	34.000		34.000	
	316-6413	ASPH(AC-15P, HFRS-2P OR CRS-2P)	GAL	1,230.000		1,230.000	
	400-6005	CEM STABIL BKFL	CY	153.000		153.000	
	403-6001	TEMPORARY SPL SHORING	SF	961.000		961.000	
	416-6004	DRILL SHAFT (36 IN)	LF	4,020.000		4,020.000	
	420-6013	CL C CONC (ABUT)	CY	63.800		63.800	
	420-6029	CL C CONC (CAP)	CY	199.700		199.700	
	420-6037	CL C CONC (COLUMN)	CY	216.800		216.800	
	422-6001	REINF CONC SLAB	SF	42,050.000		42,050.000	
	422-6015	APPROACH SLAB	CY	89.900		89.900	
	425-6035	PRESTR CONC GIRDER (TX28)	LF	3,127.680		3,127.680	
	425-6039	PRESTR CONC GIRDER (TX54)	LF	3,361.500		3,361.500	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	785.000		785.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	16.000		16.000	
	450-6006	RAIL (TY T223)	LF	1,498.000		1,498.000	
	454-6018	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	LF	230.000		230.000	
	496-6011	REMOV STR (BRIDGE 500 - 999 FT LENGTH)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	9.000		9.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	172.000		172.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	172.000		172.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,644.000		1,644.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,644.000		1,644.000	
	508-6001	CONSTRUCTING DETOURS	SY	625.000		625.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	1,090.000		1,090.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	970.000		970.000	

DISTRICT	COUNTY	CCSJ	SHEET
Corpus Christi	Refugio	0447-04-018	



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0447-04-018

DISTRICT Corpus Christi
HIGHWAY SH 202

COUNTY Refugio

CONTROL SECTION JOB				0447-04-018		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00091580			
COUNTY				Refugio			
HIGHWAY				SH 202			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	1,090.000		1,090.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	175.000		175.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	952.000		952.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000		2.000	
	545-6028	CRASH CUSH ATTEN (INSTL) (S) (TL3)	EA	2.000		2.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	4.000		4.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	4.000		4.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	18.000		18.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	4.000		4.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	4.000		4.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	970.000		970.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF	24.000		24.000	
	666-6225	PAVEMENT SEALER 6"	LF	2,900.000		2,900.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	2,848.000		2,848.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	2,848.000		2,848.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	36.000		36.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	5,697.000		5,697.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6086-6001	PORTABLE TRAFFIC SIGNAL	MO	6.000		6.000	
	6185-6002	TMA (STATIONARY)	DAY	2.000		2.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	32.000		32.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

DISTRICT	COUNTY	CCSJ	SHEET
Corpus Christi	Refugio	0447-04-018	

SUMMARY OF SIGNING ITEMS			
LOCATION	644 6030	658 6014	658 6062
	IN SM RD SN SUP & AM TYS80 (1) SA (T)	IN STL DEL ASSM (D-SW) SZ (BRF) CTB (BI)	IN STL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
	EA	EA	EA
SH 202	4	18	4
PROJECT TOTALS	4	18	4

SUMMARY OF PAVEMENT MARKING ITEMS					
LOCATION	666 6225	666 6343	666 6347	672 6009	678 6002
	PAVEMENT SEALER 6"	REF PROF PAV MRK TY I (W) 6" (SLD) (100 MIL)	REF PROF PAV MRK TY I (Y) 6" (SLD) (100 MIL)	REFL PAV MRKR TY II-A-A	PAV SURF PREP FOR MRK (6")
	LF	LF	LF	EA	LF
SH 202	2,900	2,848	2,848	36	5,697
PROJECT TOTALS	2,900	2,848	2,848	36	5,697

SUMMARY OF EROSION CONTROL ITEMS						
LOCATION	164 6001	168 6001	506 6002	506 6011	506 6038	506 6039
	BROADCAST SEED (PERM) (RURAL) (SANDY)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	MG	LF	LF	LF	LF
SH 202						
SHEET 1	2,680	30	82	82	798	798
SHEET 2	3,949	45	90	90	846	846
PROJECT TOTALS	6,629	75	172	172	1,644	1,644

Jacobs

1899 BRYAN ST., SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2986

Texas Department of Transportation

SH 202

QUANTITY SUMMARIES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY		SHEET NO.
CRP	REFUGIO		7

DW: KM CK: KP
 DW: KM CK: KP
 CK: KM

GENERAL

1. THE CONTRACTOR SHALL PLACE AND MAINTAIN ALL SIGNS, BARRICADES, PAVEMENT MARKINGS AND OTHER WORKING DEVICES AS SHOWN IN THESE PLANS IN ACCORDANCE WITH THE "TEXAS MANUAL ON UNIFORM CONTROL DEVICES" AND ALL APPLICABLE STANDARDS. THE SIGNS, BARRICADES AND WARNINGS SHOWN SHALL BE CONSIDERED A MINIMUM AND ADDITIONAL SIGNS, BARRICADES OR WARNING DEVICES DEEM NECESSARY BY THE ENGINEER OR DICTATED BY FIELD CONDITIONS SHALL BE PROVIDED IN ACCORDANCE WITH ALL APPLICABLE STANDARDS AND "THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES." ADDITIONAL SIGNS OR BARRICADES WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE BID ITEM "BARRICADES, SIGNS AND TRAFFIC HANDLING."
2. MAINTENANCE OF THE SIGNS, BARRICADES AND TRAFFIC CONTROL DEVICES SHALL BE DONE ON A REGULAR BASIS AND IS THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL CLEAR AND REMOVE ALL SURPLUS AND DISCARDED MATERIALS FROM SITE AFTER COMPLETION OF PROJECT.
5. TEMPORARY SW3P CONTROL MEASURES SHALL ONLY BE PLACED IN AREAS WHERE SOIL DISTURBANCE IS EXPECTED TO OCCUR WITHIN TWO WEEKS.
6. TEMPORARY SW3P CONTROL MEASURES SHALL BE REMOVED IN EACH AREA WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS APPROVED BY THE ENGINEER WHERE APPROPRIATE.

TRAFFIC CONTROL NARRATIVE

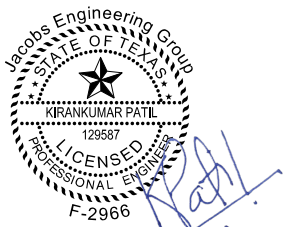
PHASE 1:

1. INSTALL PROJECT ADVANCE WARNING SIGNS AND PROJECT SIGNS IN ACCORDANCE WITH THE TEXAS MUTCD AND BARRICADE AND CONSTRUCTION STANDARDS AS DIRECTED. CONSTRUCTION SPEED LIMIT SHALL BE LOWERED TO 45 MPH. SEE ADVANCE WARNING SIGNS PLANS.
2. PLACE CTB AND TRAFFIC CONTROL SIGNS AS SHOWN IN PLANS AND STANDARDS. CONSTRUCT TEMPORARY AND PERMANENT PAVEMENT ACCORDING TO PLANS.
3. INSTALL TEMPORARY SHORING AND CONSTRUCT NEW BRIDGE AS SHOWN IN BRIDGE PHASING PLANS.

PHASE 2:

1. MOVE/INSTALL CTB AND TRAFFIC CONTROL SIGNS AS SHOWN IN PLANS AND STANDARDS. USE TCP (2-8)-18 FOR LONG TERM , ONE LANE TWO WAY TRAFFIC CONTROL WITH TRAFFIC SIGNALS.
2. DEMOLISH EXISTING BRIDGE AND CONSTRUCT NEW BRIDGE WITH APPROACHES AS SHOWN IN THE PLANS.
3. REMOVE CTB AND INSTALL PERMANENT PAVEMENT MARKINGS.
4. OPEN LANES TO TRAFFIC.

03/07/2024



DATE: 3/7/2024 4:19 PM
 FILE: c:\pw_workdir\jacobs-amer-transp\dms85055\SH202TGN.dgn

Jacobs 1999 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fm Registration: F-2966

Texas Department of Transportation

SH 202

TRAFFIC CONTROL
NARRATIVE

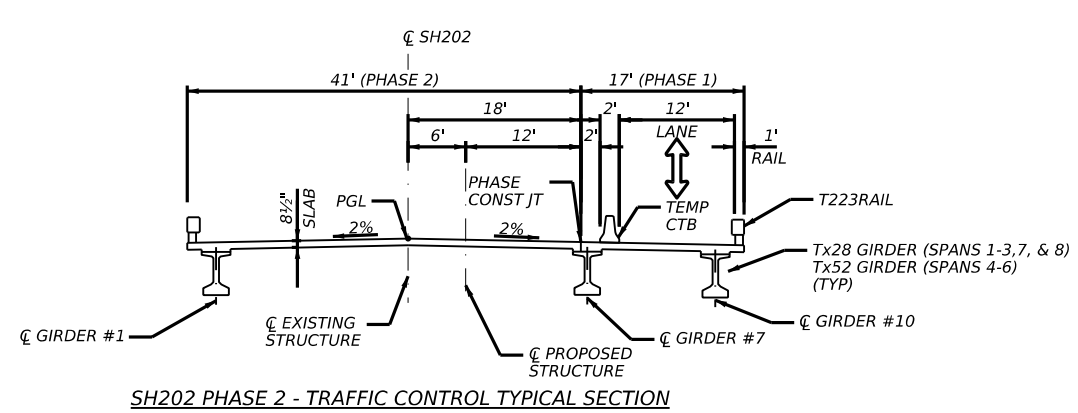
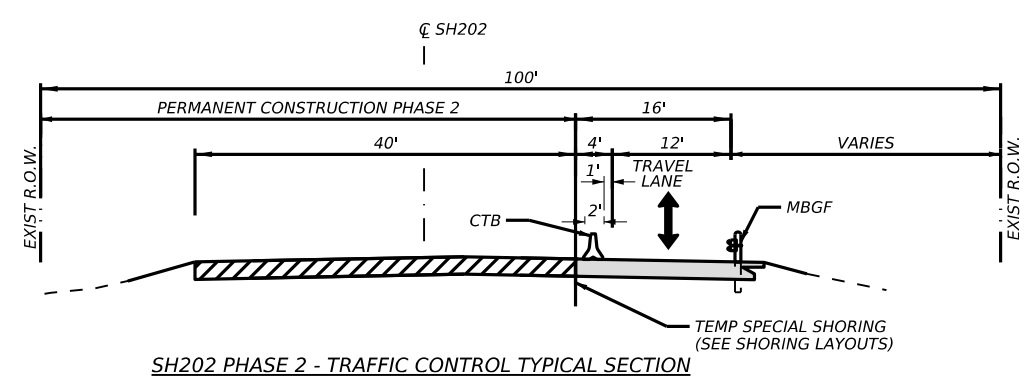
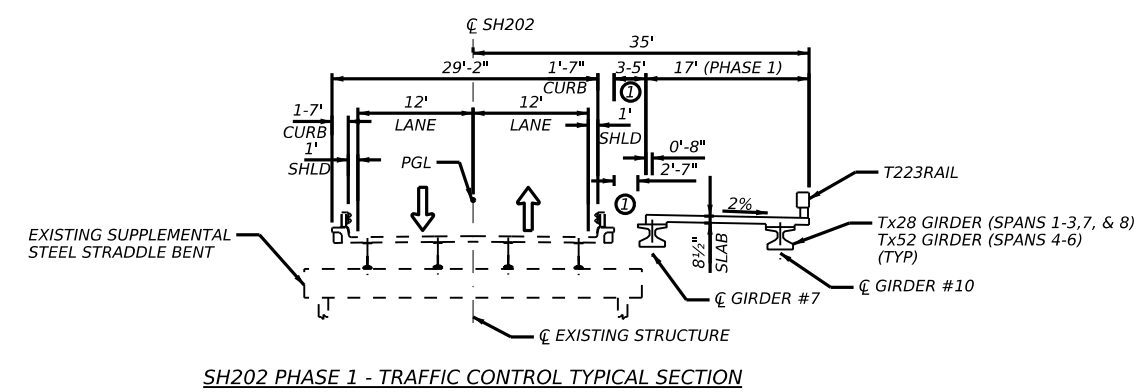
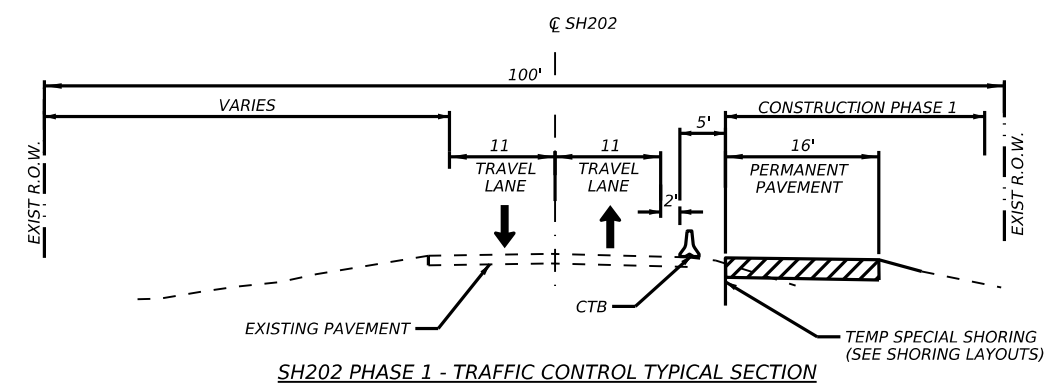
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	9	

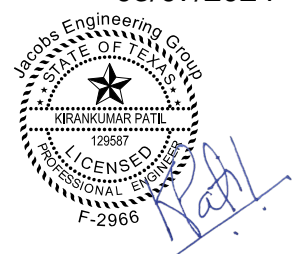
DW: KM CK: KP
 DW: KM CK: KP
 CK: KP

LEGEND

- EXISTING PAVEMENT
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- PERMANENT CONSTRUCTION IN THIS PHASE



03/07/2024



Jacobs
 1999 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fm Registration: F-2966

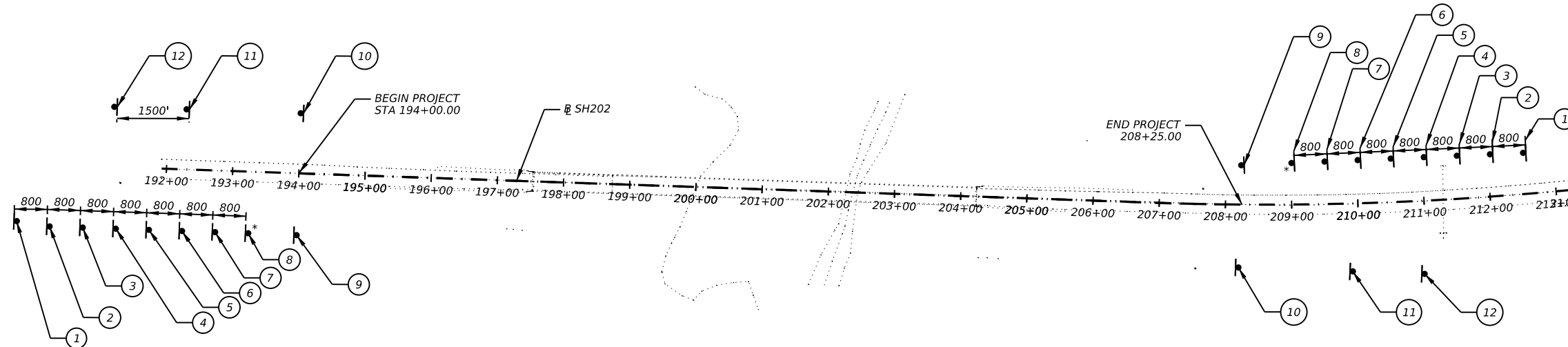
Texas Department of Transportation

SH 202
TRAFFIC CONTROL
TYPICAL SECTIONS

SCALE: N.T.S. SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	10	

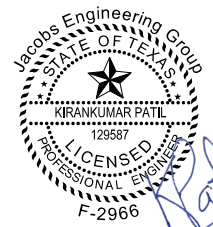
DATE: 3/7/2024 4:12 PM
 FILE: c:\pw_workdir\jacobs-amer-transp\dms85052\SH202TYP01.dgn



* SEE STANDARD TCP (2-8)-23 TO PLACE ADVANCE WARNING SIGNS FOR TRAFFIC SIGNAL CONTROLLED ONE LANE TWO WAY OPERATION.

- 1 OBEY WARNING SIGNS - STATE LAW
R20-3T
48"X42"
- 2 STAY ALERT - TALK OR TEXT LATER
G20-10T
60"X48"
- 3 BEGIN WORK ZONE
TRAFFIC FINES DOUBLE
R20-9TP 36"X30"
R20-5T 36"X36"
R20-5aTP 36"X18"
- 4 SPEED LIMIT 55
CW3-5
36"X36"
- 5 SPEED LIMIT 55
R2-1
30"X36"
- 6 SPEED LIMIT 45
CW3-5
36"X36"
- 7 SPEED LIMIT 45
R2-1
30"X36"
- 8 ROAD WORK AHEAD
CW20-1D
48"X48"
- 9 BEGIN ROAD WORK NEXT 6 MILES
NAME ADDRESS CITY STATE CONTRACTOR
R16-8 60"X30"
G20-6T 60"X42"
- 10 END ROAD WORK
G20-2
48"X24"
- 11 END WORK ZONE
G20-2bT
48"X24"
- 12 SPEED LIMIT 65
R2-1
30"X36"

03/07/2024



Jacobs
Texas Department of Transportation

1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

SH 202

**TRAFFIC CONTROL
ADVANCE WARNING SIGNS**

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY		SHEET NO.
CRP	REFUGIO		11

DW: KM CK: KP DW: KM CK: KP

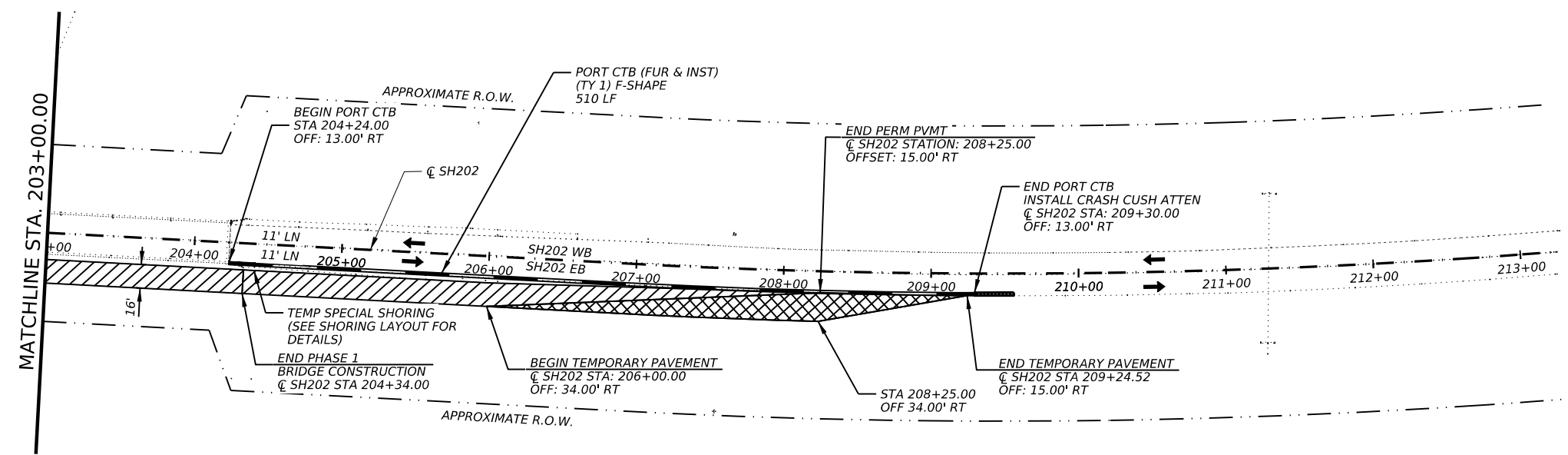
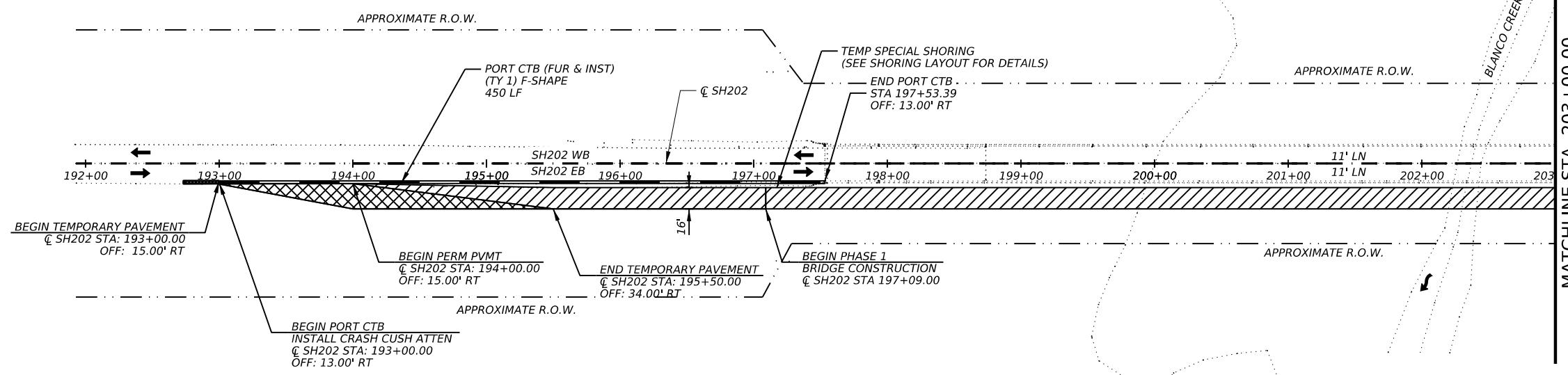


LEGEND

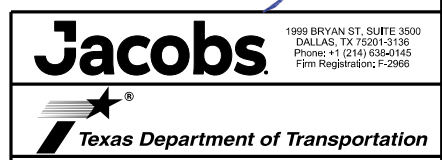
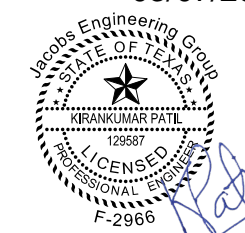
- PERMANENT CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- TEMPORARY CONSTRUCTION THIS PHASE
- TEMPORARY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC FLOW
- CHANNELIZING DEVICES/BARRIER
- SIGN
- TYPE III BARRICADE
- TEMPORARY TRAFFIC SIGNAL

NOTES

1. REFER TO TCP (2-8)-18 (45 MPH) FOR ADDITIONAL INFORMATION.
2. SEE BRIDGE PLANS FOR DETAILED BRIDGE CONSTRUCTION PHASING.



03/07/2024



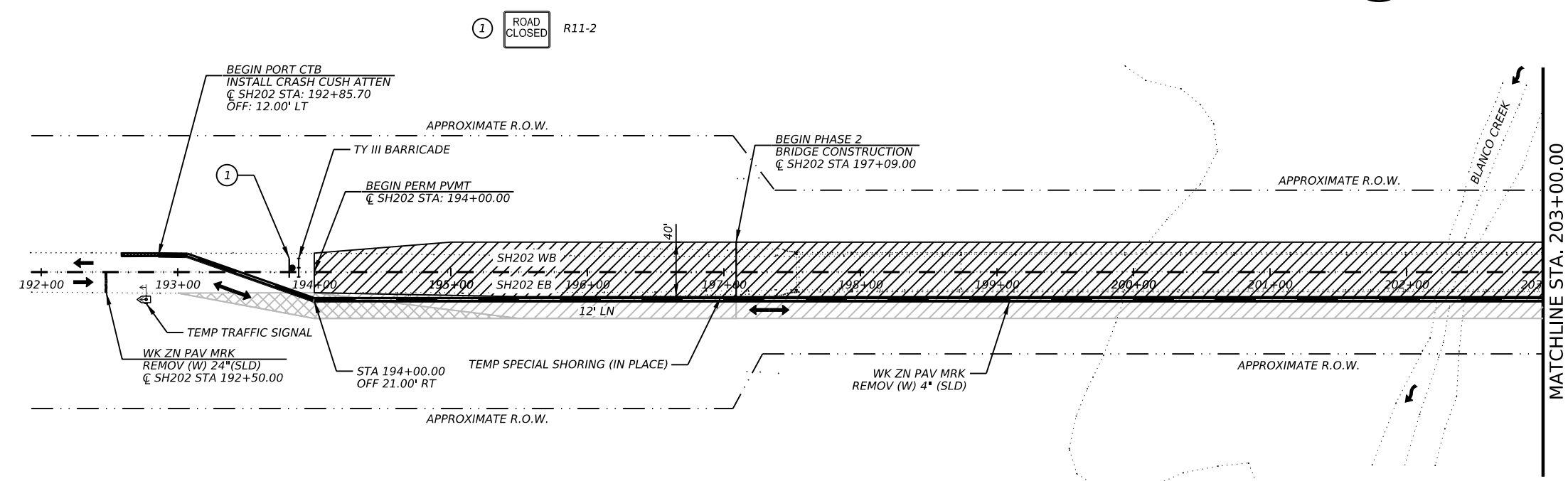
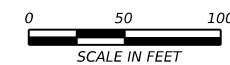
SH 202
TRAFFIC CONTROL
PHASE 1

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	12	

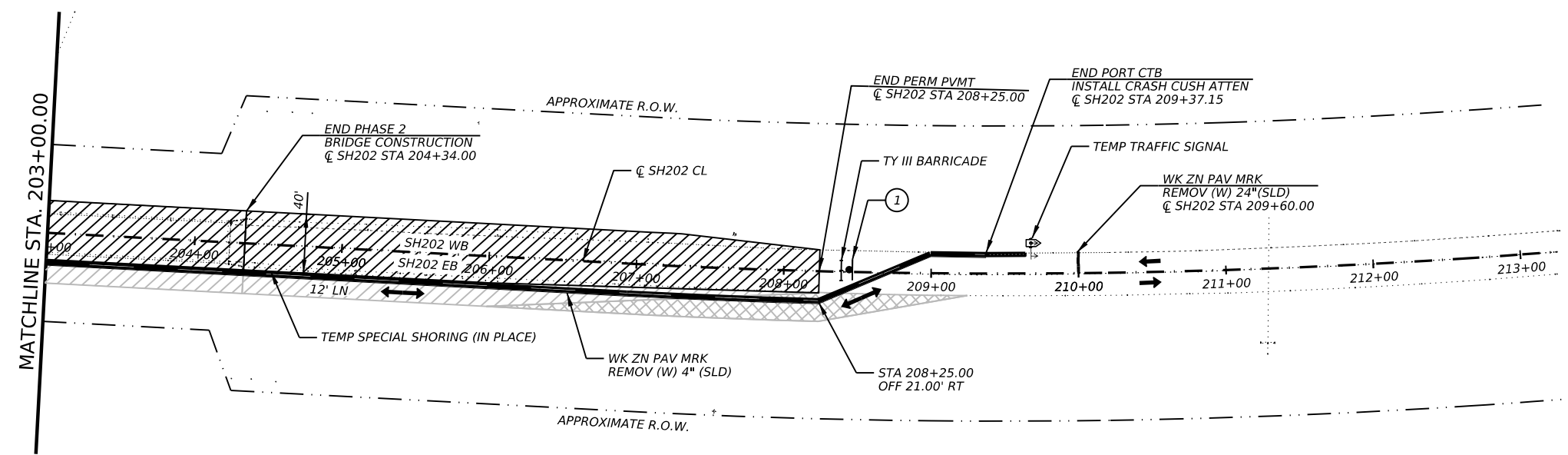
DATE: 3/7/2024 4:38 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms85054\SH202TCP01.dgn

DW: KM CK: KP
 DW: KM CK: KP
 DW: KM CK: KP

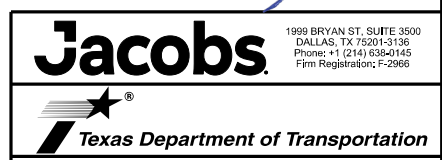


- LEGEND**
- PERMANENT CONSTRUCTION THIS PHASE
 - PERMANENT CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY CONSTRUCTION THIS PHASE
 - TEMPORARY CONSTRUCTION PREVIOUS PHASE
 - TRAFFIC FLOW
 - CHANNELIZING DEVICES/BARRIER
 - SIGN
 - TYPE III BARRICADE
 - TEMPORARY TRAFFIC SIGNAL

- NOTES**
1. REFER TO TCP (2-8)-18 (45 MPH) FOR ADDITIONAL INFORMATION.
 2. SEE BRIDGE PLANS FOR DETAILED BRIDGE CONSTRUCTION PHASING.



03/07/2024



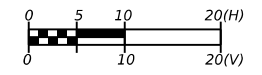
SH 202
TRAFFIC CONTROL
PHASE 2

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	13

DATE: 3/7/2024 3:47 PM
 FILE: c:\pw\workdir\jacobs-amer-trans\p\dms85054\SH202TCP02.dgn

DW: KL
 CK: KP
 DW: KL
 CK: KP
 DW: KL
 CK: KP

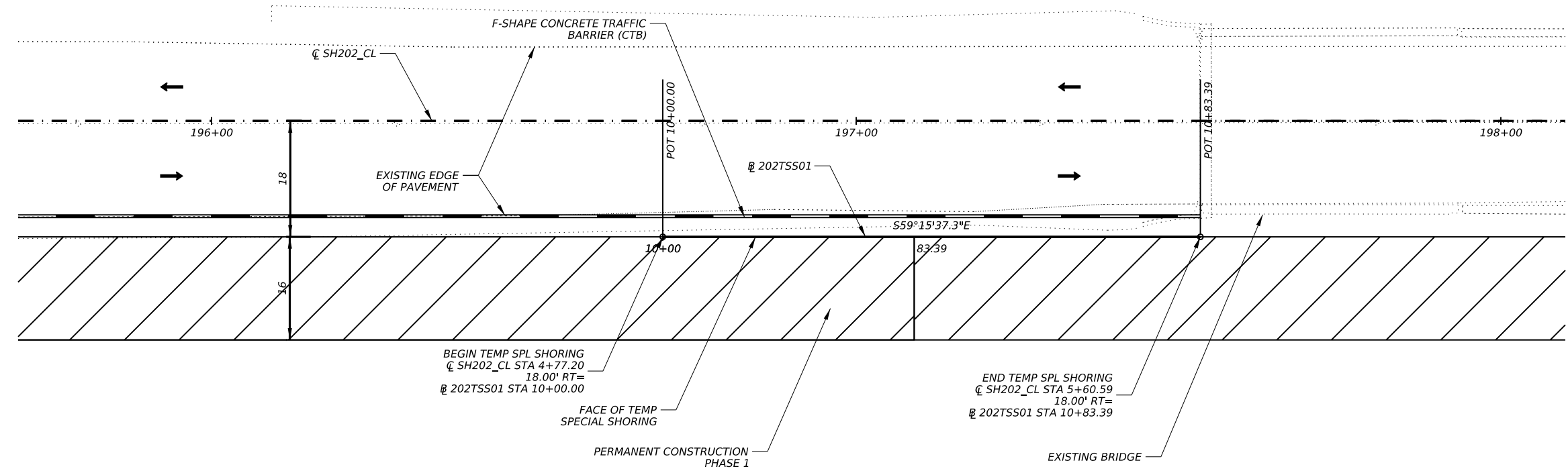


LEGEND

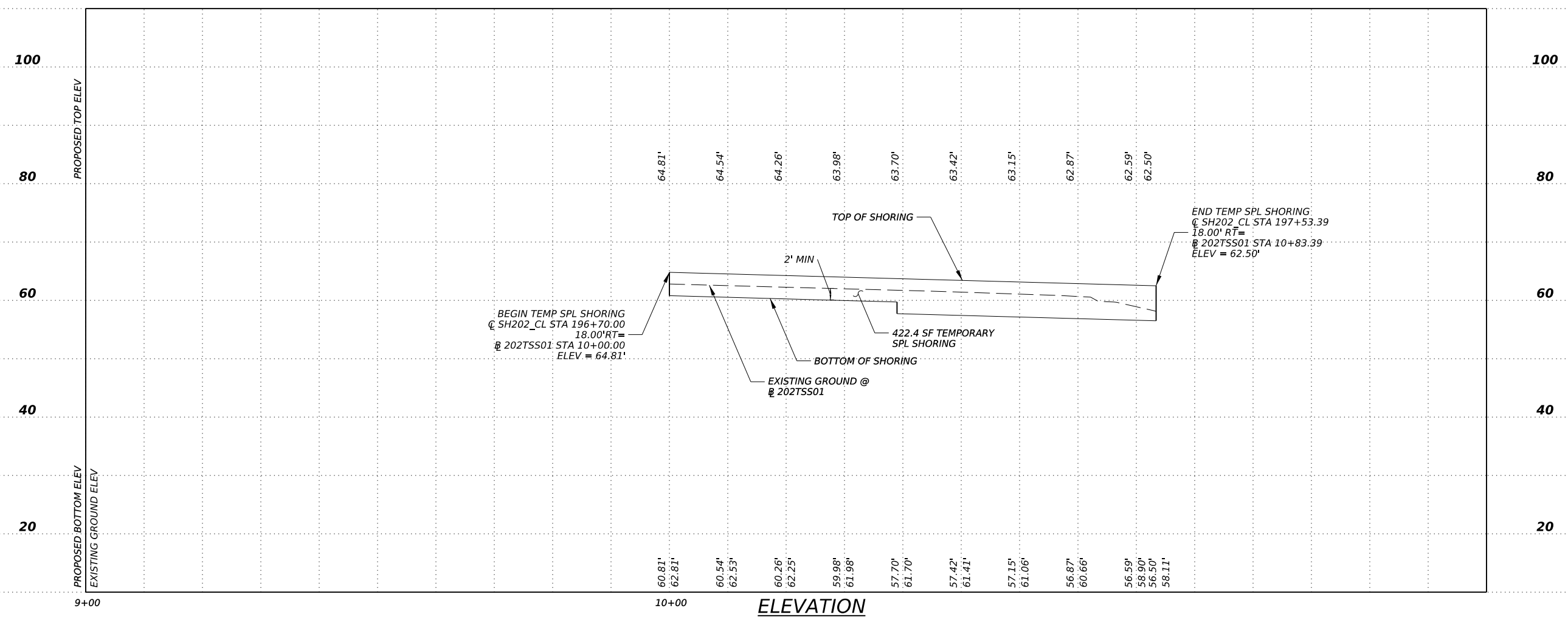
- PERMANENT CONSTRUCTION
- CHANNELIZING DEVICES / BARRIER
- DIRECTION OF TRAFFIC

NOTES:

1. SEE BRIDGE PLANS FOR DETAILED BRIDGE CONSTRUCTION PHASING.
2. TEMPORARY SPECIAL SHORING MEASUREMENT IS PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL PROVIDE TEMPORARY SPECIAL SHORING DESIGN INCLUDING BOTTOM OF WALL ELEVATIONS AS APPROVED BY THE ENGINEER.



PLAN



ELEVATION

DATE: 3/7/2024 3:39 PM
 FILE: c:\pw\workdir\jacobs-amer-trans\p\dms58582\SH202TWP01.dgn

03/07/2024

Jacobs
 1899 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fax: Registration: F-2966

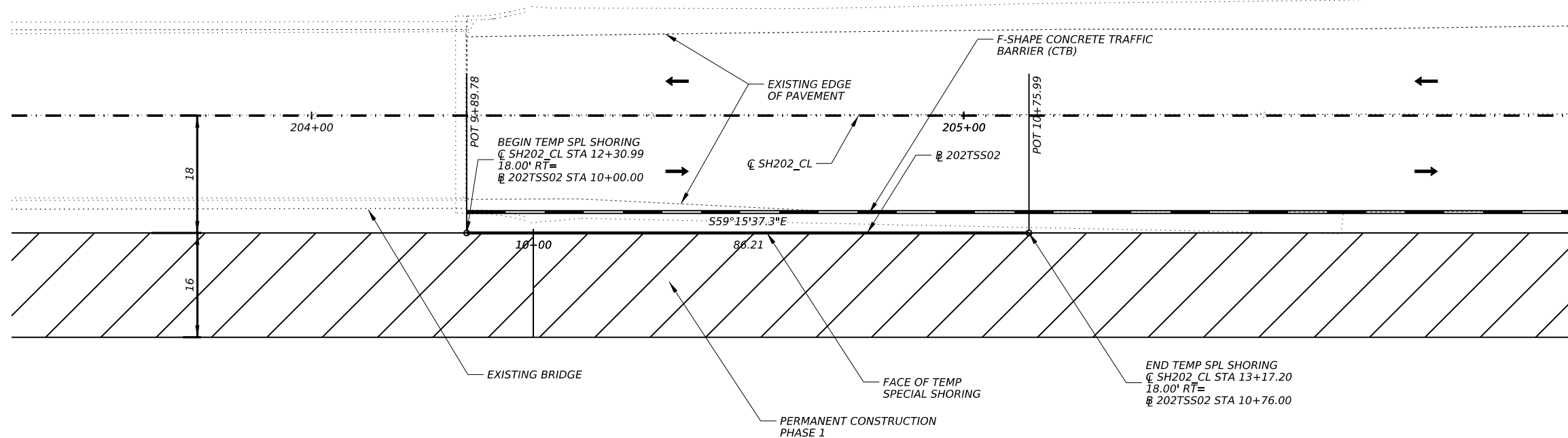
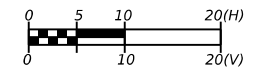
Texas Department of Transportation

SH 202
TRAFFIC CONTROL
TEMPORARY SHORING

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	14	

DW: KL
 CK: KP
 DW: KL
 CK: KP



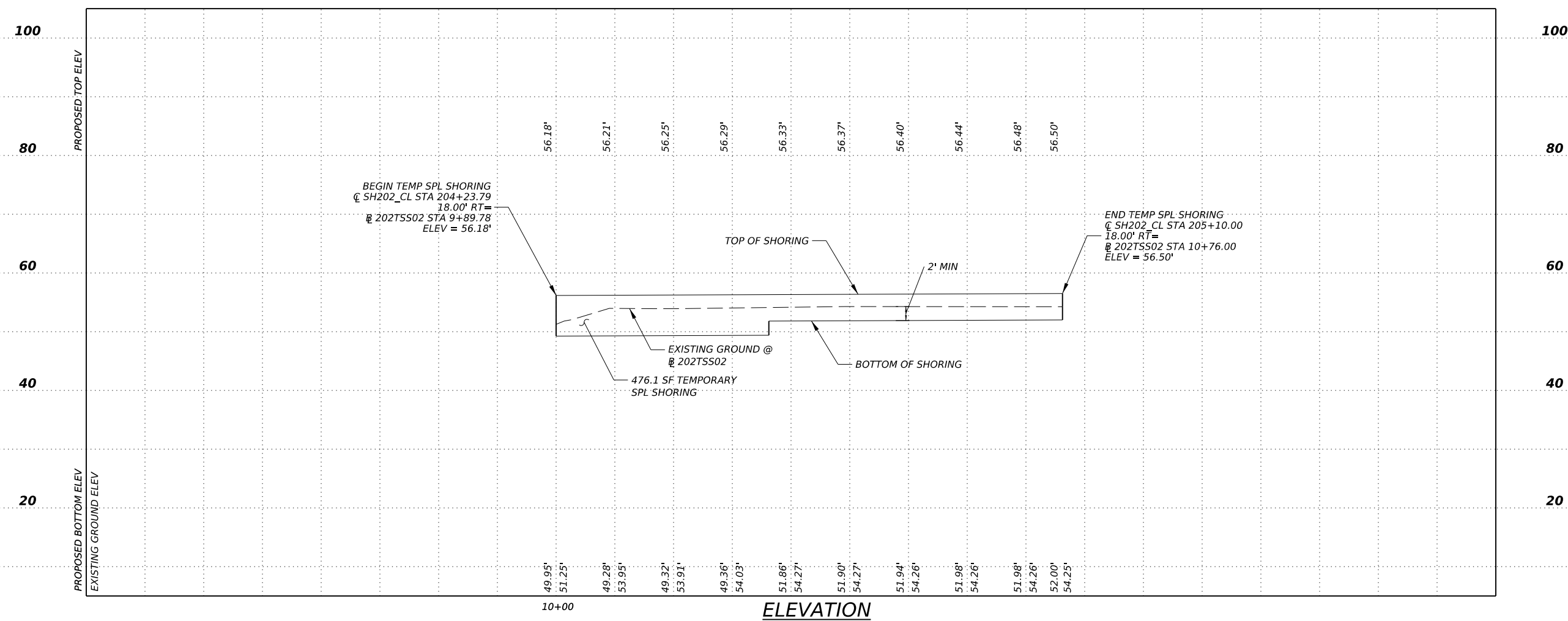
LEGEND

- PERMANENT CONSTRUCTION
- CHANNELIZING DEVICES / BARRIER
- DIRECTION OF TRAFFIC

NOTES:

1. SEE BRIDGE PLANS FOR DETAILED BRIDGE CONSTRUCTION PHASING.
2. TEMPORARY SPECIAL SHORING MEASUREMENT IS PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL PROVIDE TEMPORARY SPECIAL SHORING DESIGN INCLUDING BOTTOM OF WALL ELEVATIONS AS APPROVED BY THE ENGINEER.

PLAN



ELEVATION

DATE: 3/7/2024 3:41 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58582\SH202TWPP02.dgn

03/07/2024

1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

SH 202

TRAFFIC CONTROL
TEMPORARY SHORING

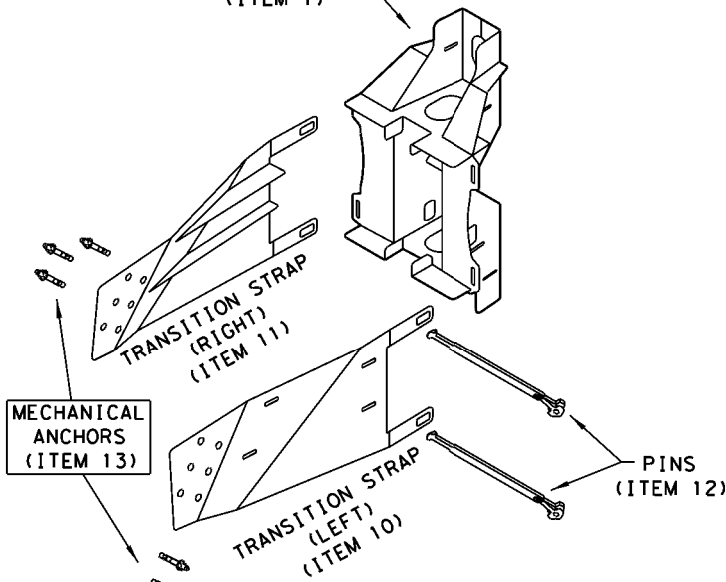
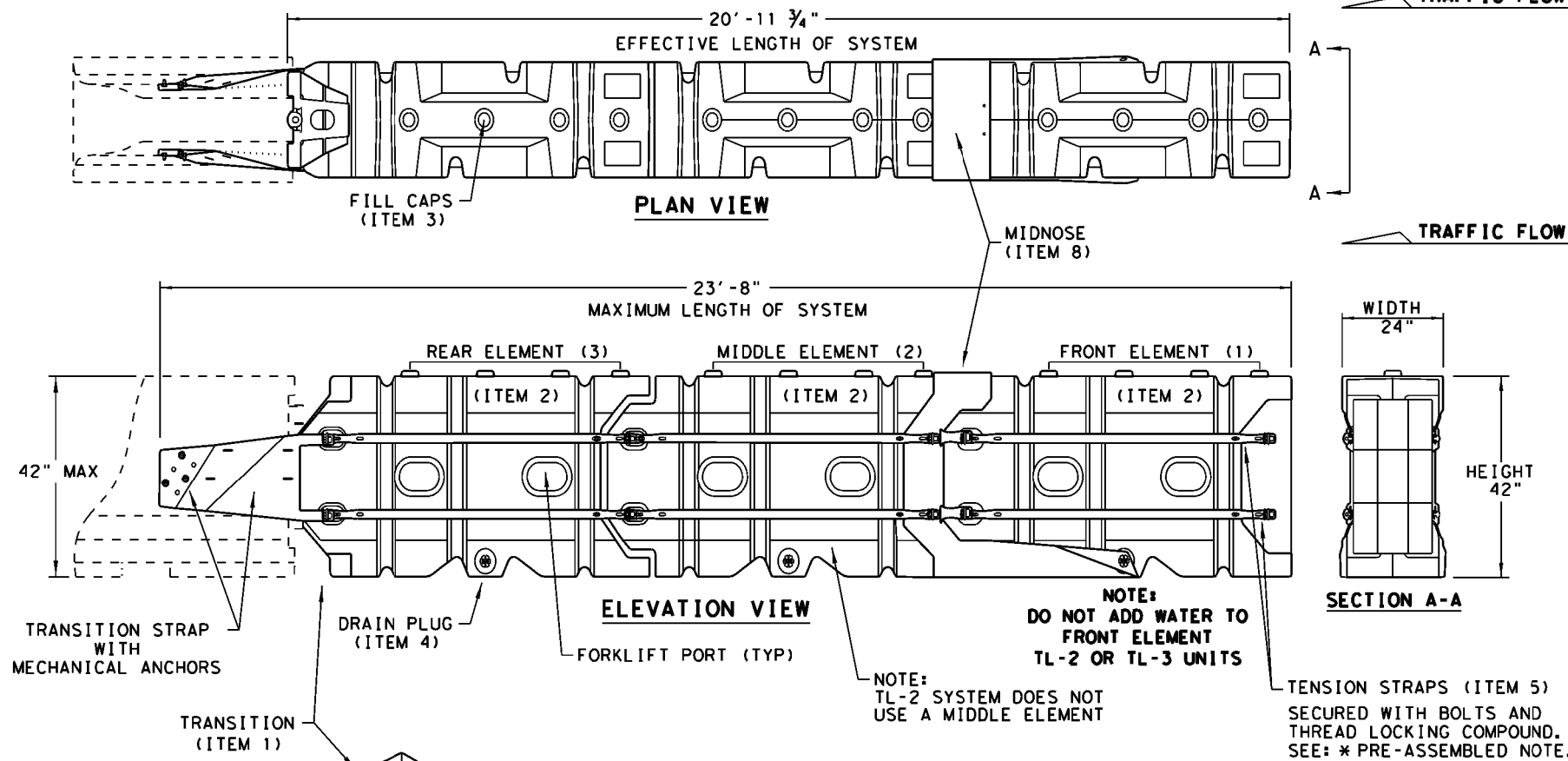
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	15	

DISCLAIMER: THE USE OF THIS STANDARD IS COVERED 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:
FILE:

SYSTEM SHOWN - ABSORB-M TL-3

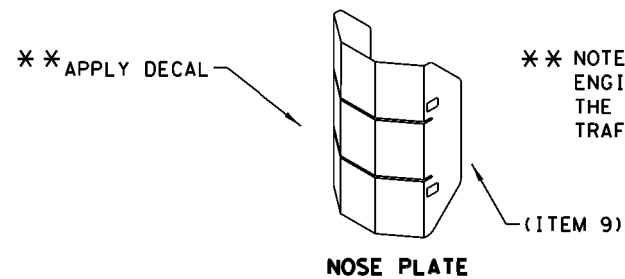


THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14' - 7 3/4"	17' - 4"
TL-3	3	20' - 11 3/4"	23' - 8"

NOTE: CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.



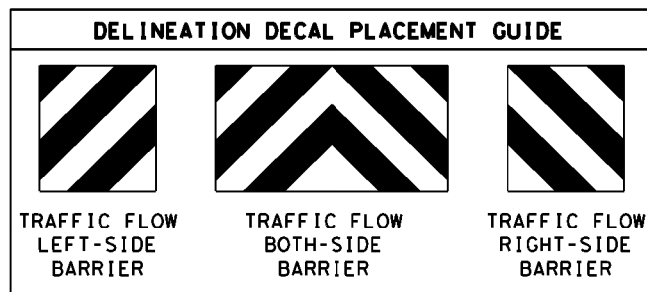
NOTE: APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

GENERAL NOTES

- FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
- THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
- THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
- MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
- THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
- THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
- DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION - (GALV)	1	1
2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
3	BSI-4004598	FILL CAPS	8	12
4	BSI-4004599	DRAIN PLUGS	2	3
5	BSI-1809053-00	TENSION STRAP - (GALV)	8	12
6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE - (GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND) - (GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND) - (GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

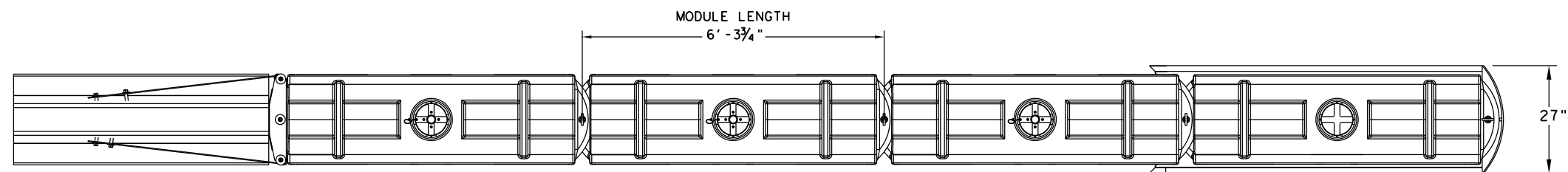
* COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY



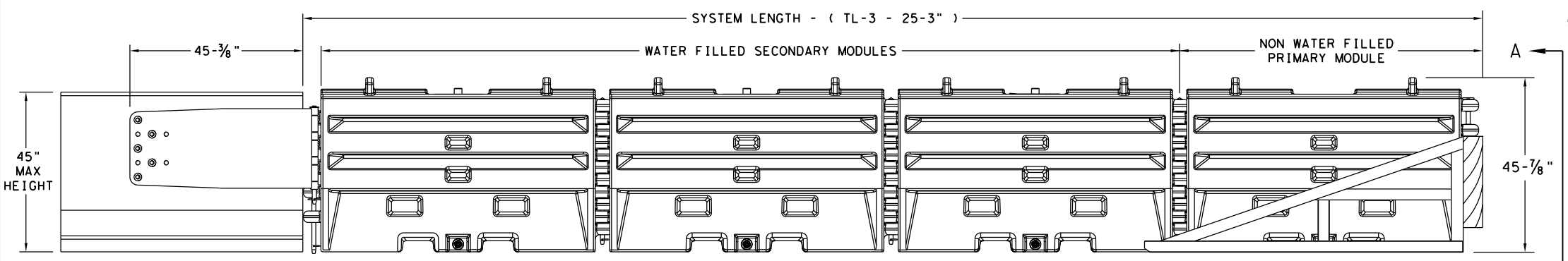
SACRIFICIAL

		Design Division Standard	
LINDSAY TRANSPORTATION SOLUTIONS CRASH CUSHION (MASH TL-3 & TL-2) TEMPORARY - WORK ZONE ABSORB (M) - 19			
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2019	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	DIST: CRP	COUNTY: REFUGIO	SHEET NO.: 16

DISCLAIMER: 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.



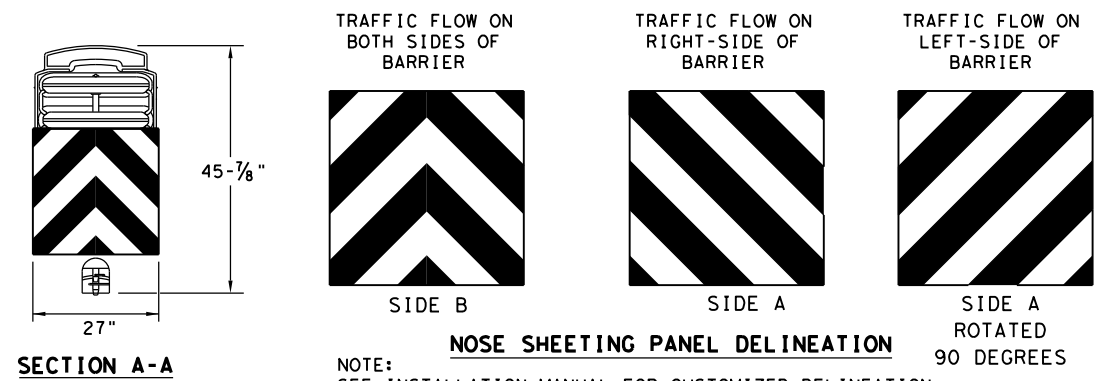
PLAN VIEW



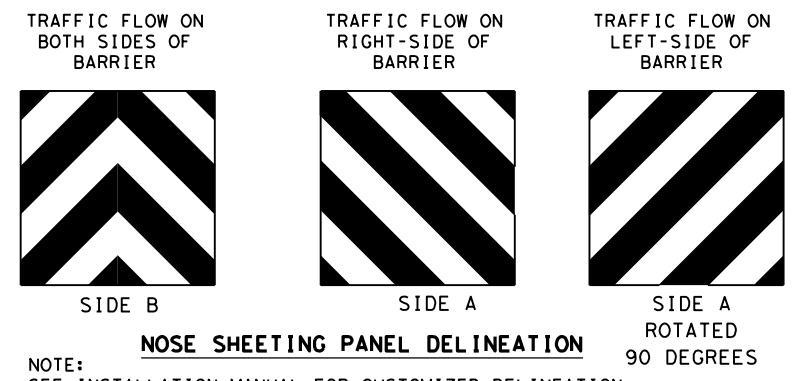
ELEVATION VIEW

GENERAL NOTES

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:
 - CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
 - STEEL BARRIER
 - PLASTIC BARRIER
 - CONCRETE BRIDGE ABUTMENTS
 - W-BEAM GUARD RAIL
 - THRIE BEAM GUARD RAIL



SECTION A-A

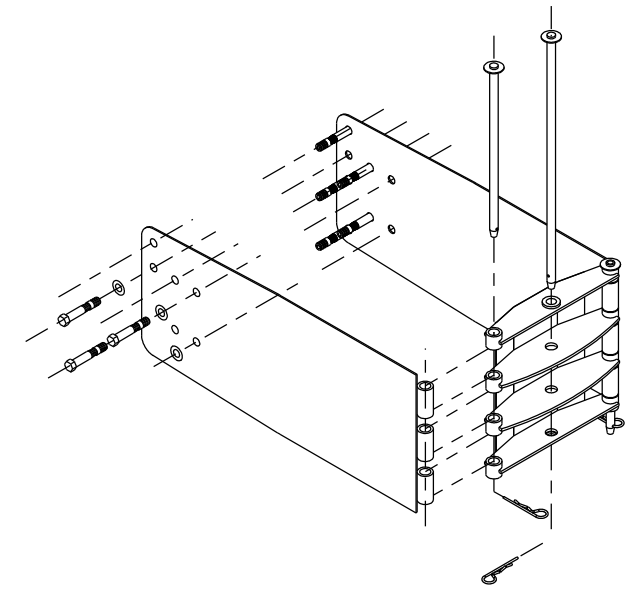


NOSE SHEETING PANEL DELINEATION

NOTE: SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25' 3"

BILL OF MATERIAL		
PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE: SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Design Division Standard

SLED CRASH CUSHION TL-3 MASH COMPLIANT (TEMPORARY, WORK ZONE) SLED-19

FILE: s1ed19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	17	

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:
 FILE:

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).

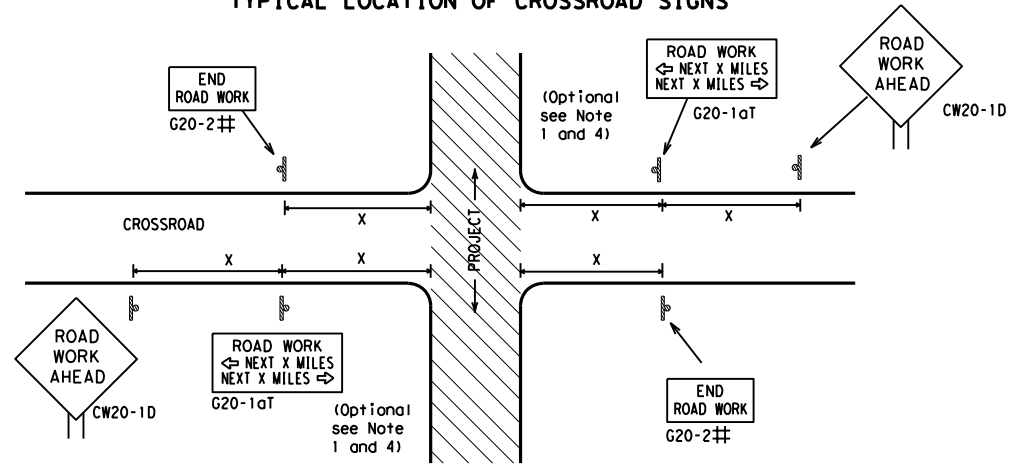
<p>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov</p>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)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

SHEET 1 OF 12

 Texas Department of Transportation		 Traffic Safety Division Standard	
<p>BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS</p> <p>BC (1) -21</p>			
FILE:	bc-21.dgn	DN:	TxDOT
© TxDOT	November 2002	CR:	TxDOT
REVISIONS	CONT	SECT	JOB
4-03 7-13	0447	04	018
9-07 8-14	DIST	COUNTY	SH 202
5-10 5-21	CRP	REFUGIO	SHEET NO. 18

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.

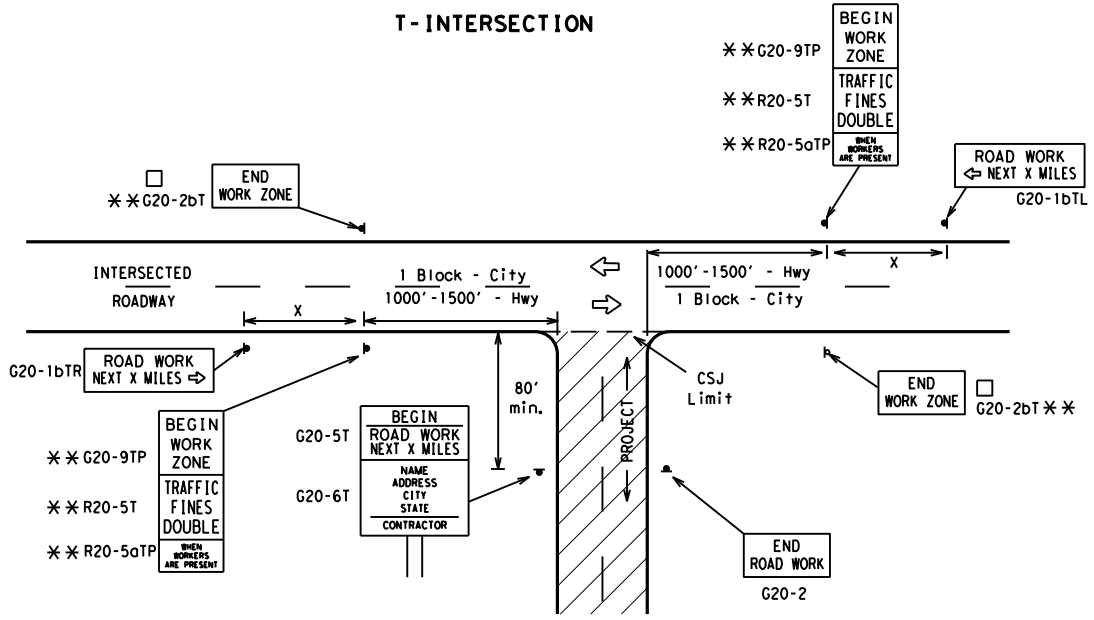
TYPICAL LOCATION OF CROSSROAD SIGNS



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	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
*			*	* ³

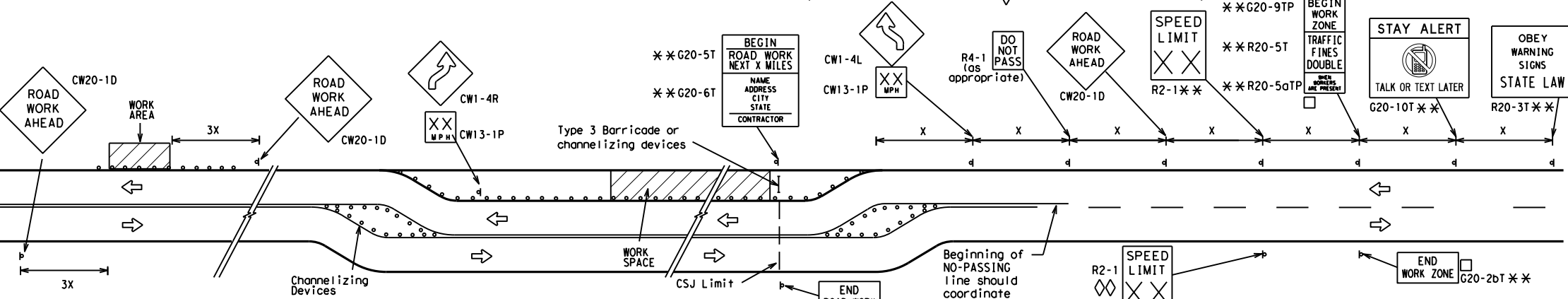
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

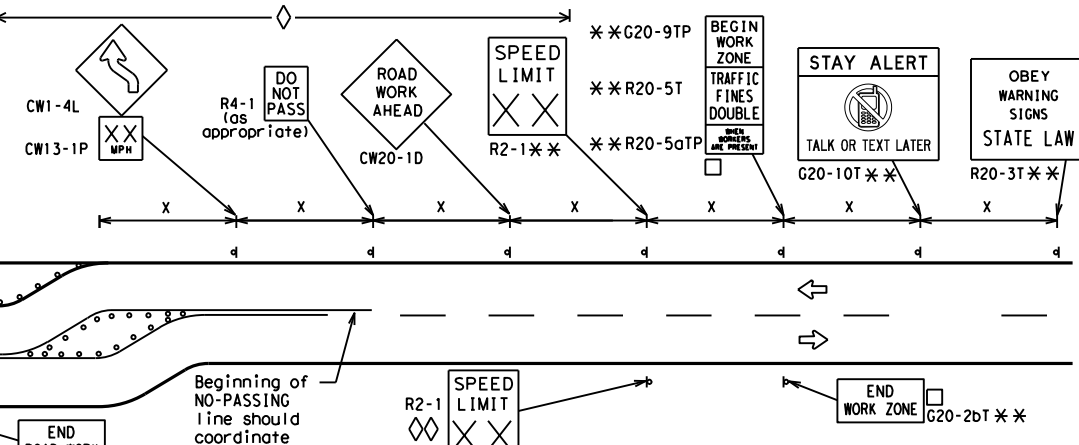
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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

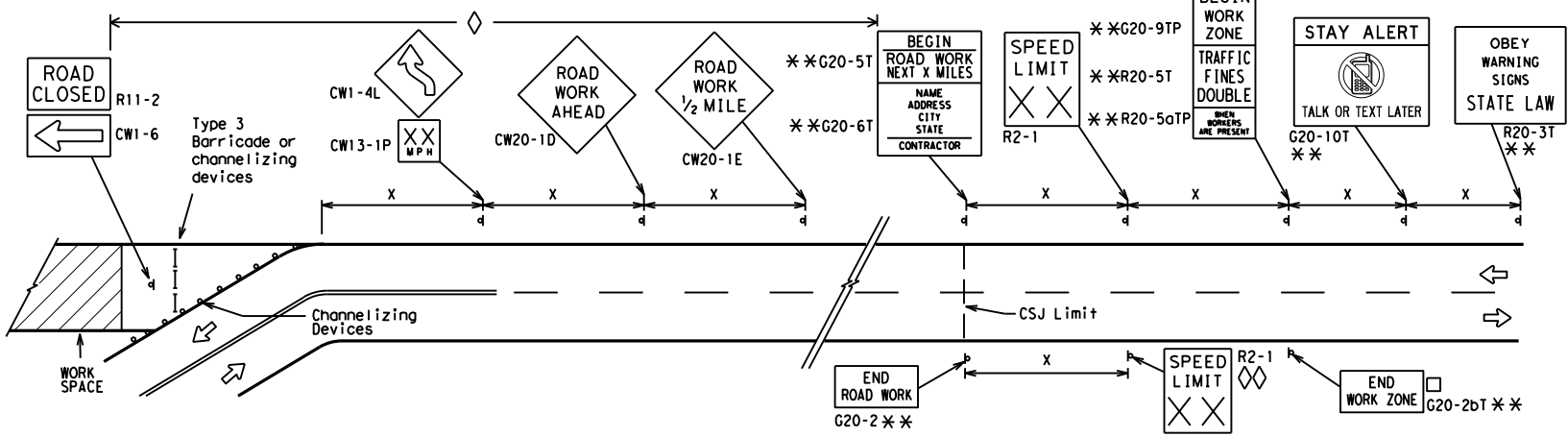


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF 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

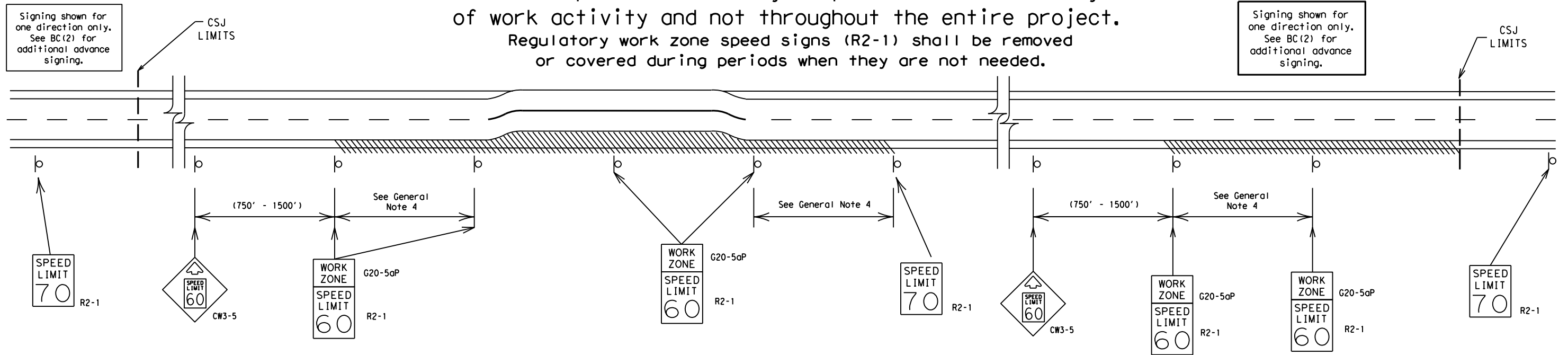
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	REFUGIO	19	

DATE: FILE:

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.

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:
FILE:

SHEET 3 OF 12



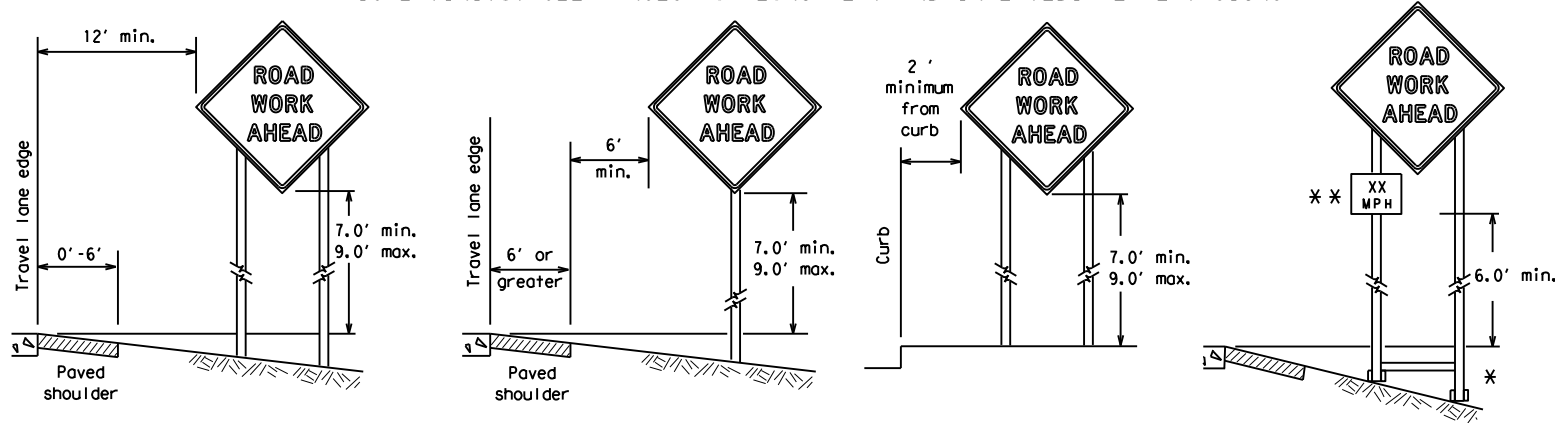
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

FILE:	bc-21.dgn	DW:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0447	04	018	SH 202				
9-07	8-14								
7-13	5-21	DIST	COUNTY	SHEET NO.					
		CRP	REFUGIO	20					

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.

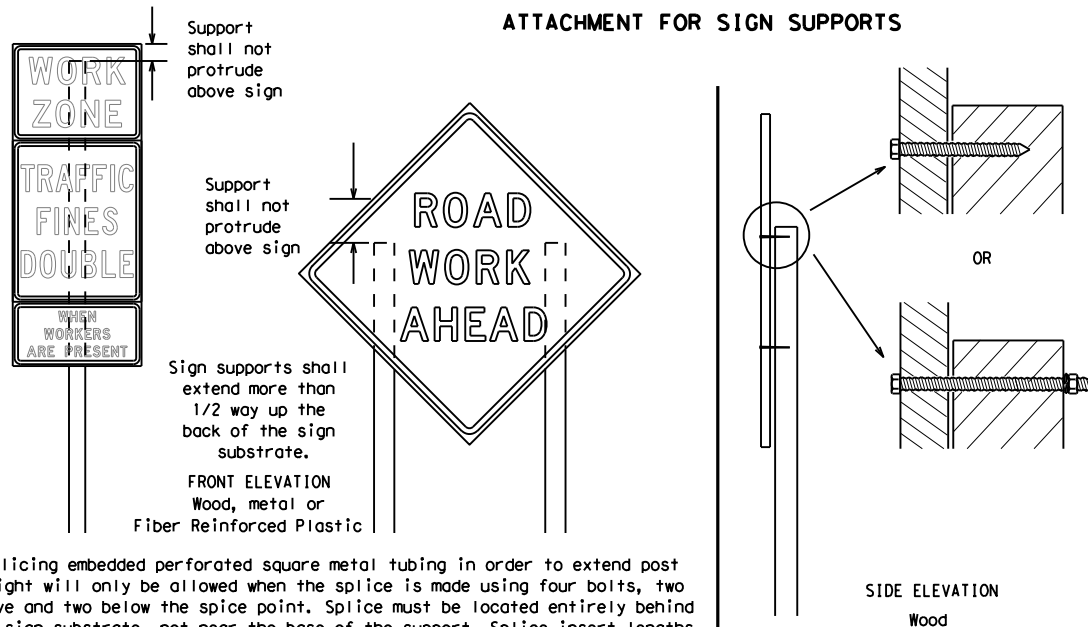
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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



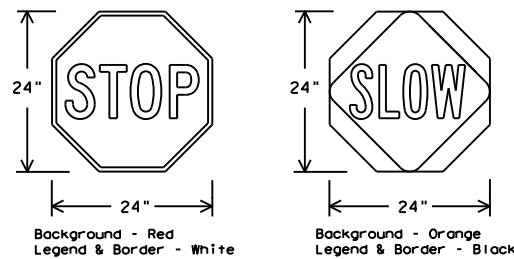
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflective when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. 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

1. 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.
2. 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.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. 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.
5. 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 CWZTC 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.
6. 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

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. 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.
5. 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.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTC) 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.
7. 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.
8. 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.
9. 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)

1. 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.
 - a. Long-term stationary - work that occupies a location more than 3 days.
 - b. 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.
 - c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - d. Short, duration - work that occupies a location up to 1 hour.
 - e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. 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.
2. 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.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. 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.
5. 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

1. 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

1. 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 CWZTC lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. 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

1. 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).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. 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

1. 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

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. 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.
3. 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.
4. 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.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. 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 CWZTC list.
7. 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.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. 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.

SHEET 4 OF 12



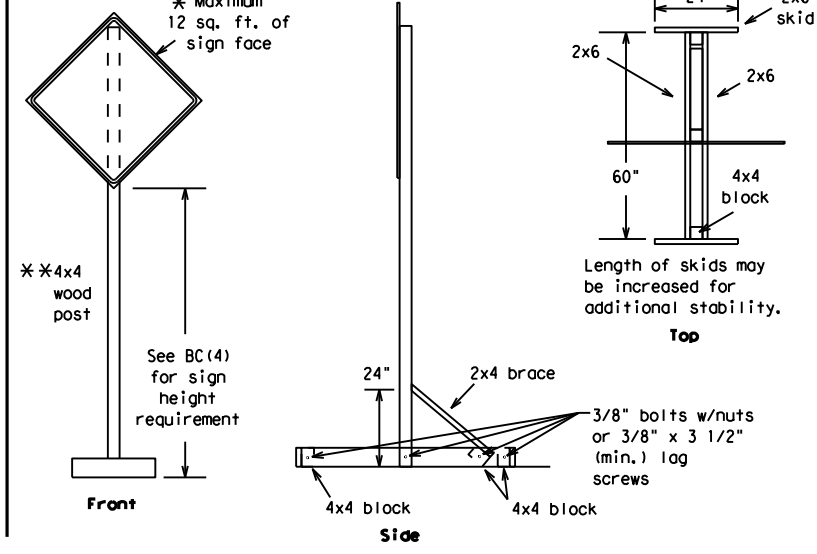
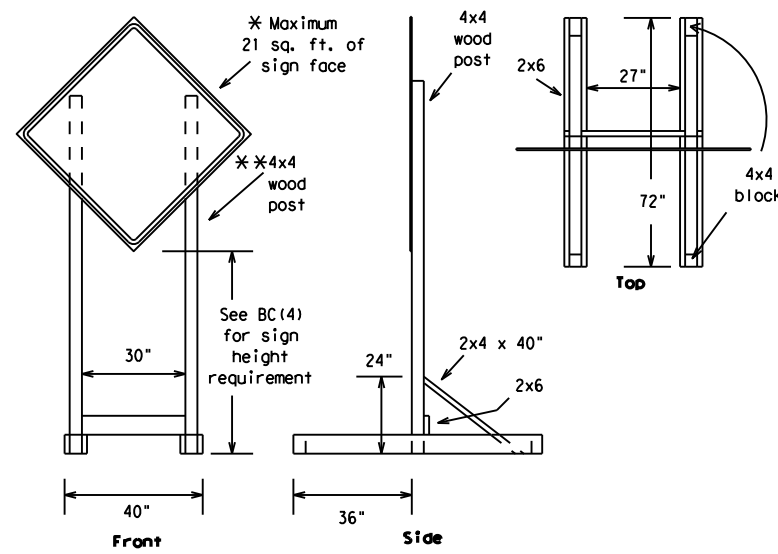
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	REFUGIO	21	

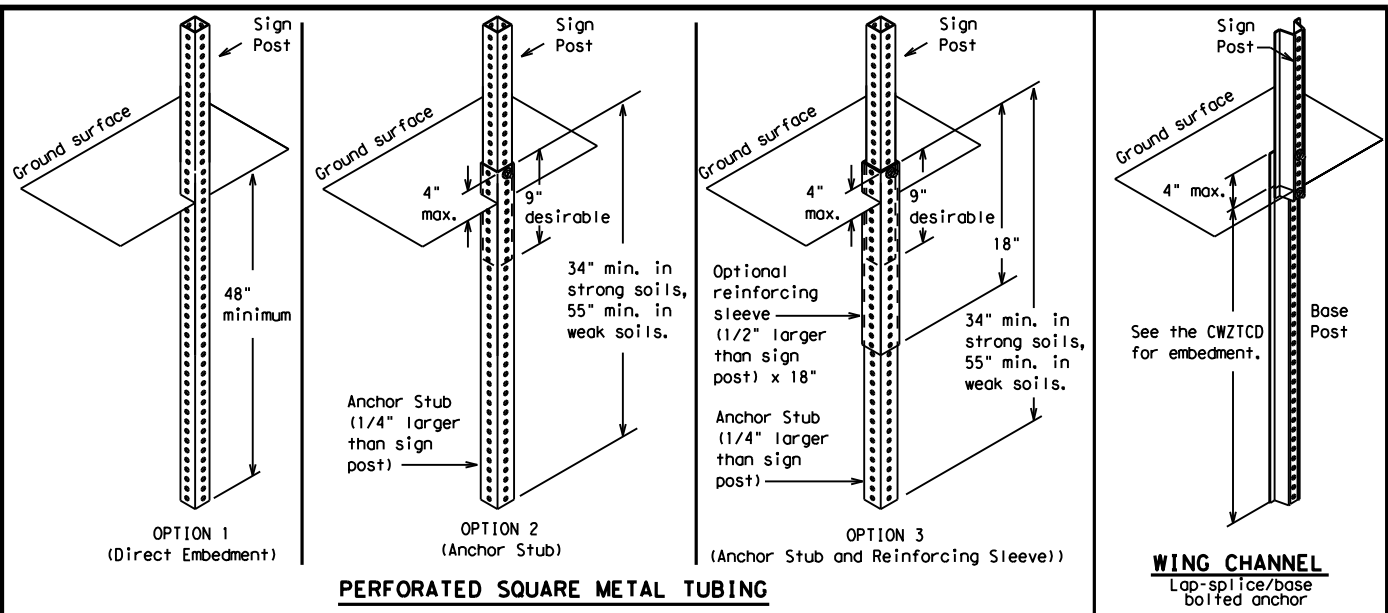
DATE: FILE:

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.



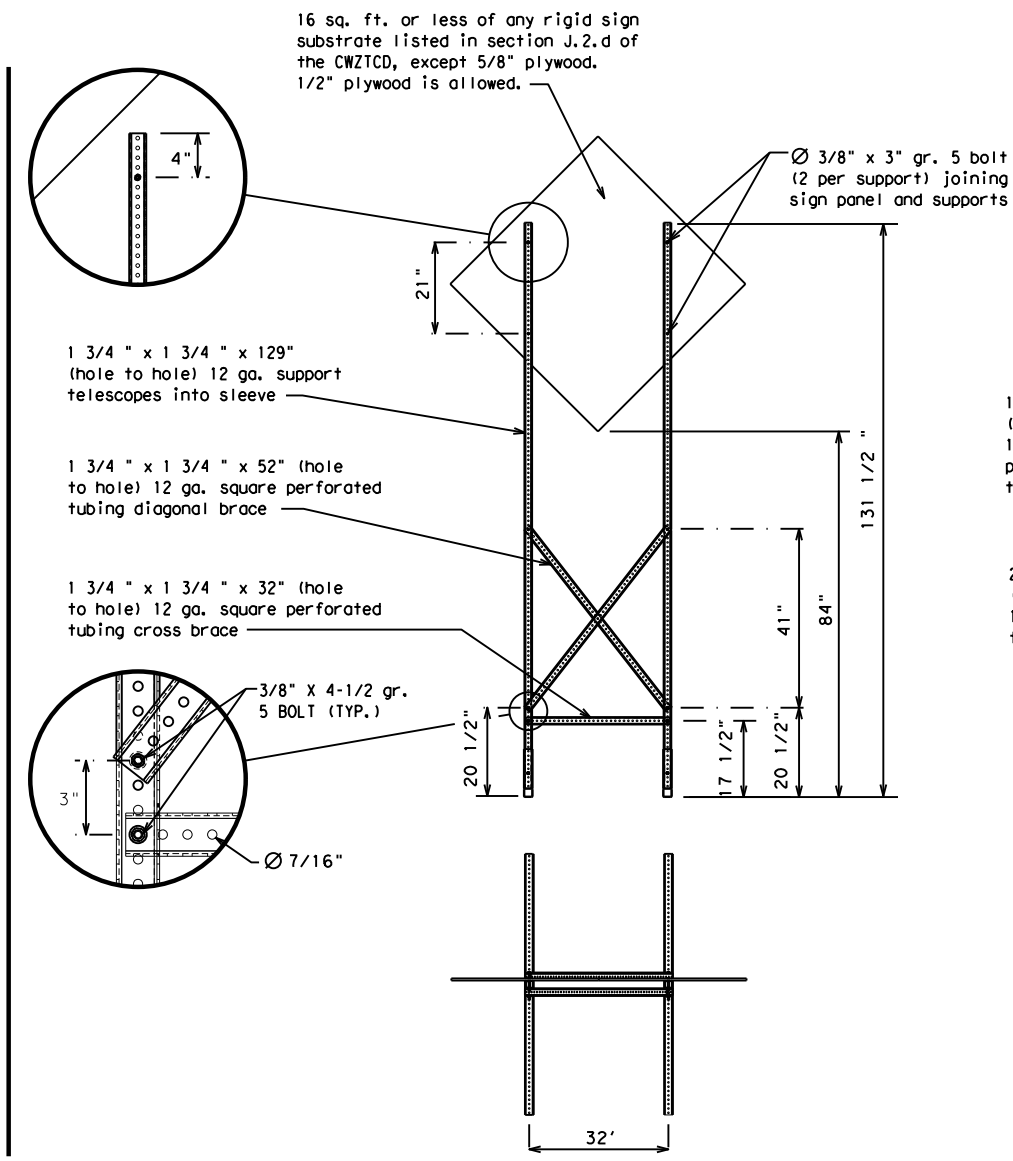
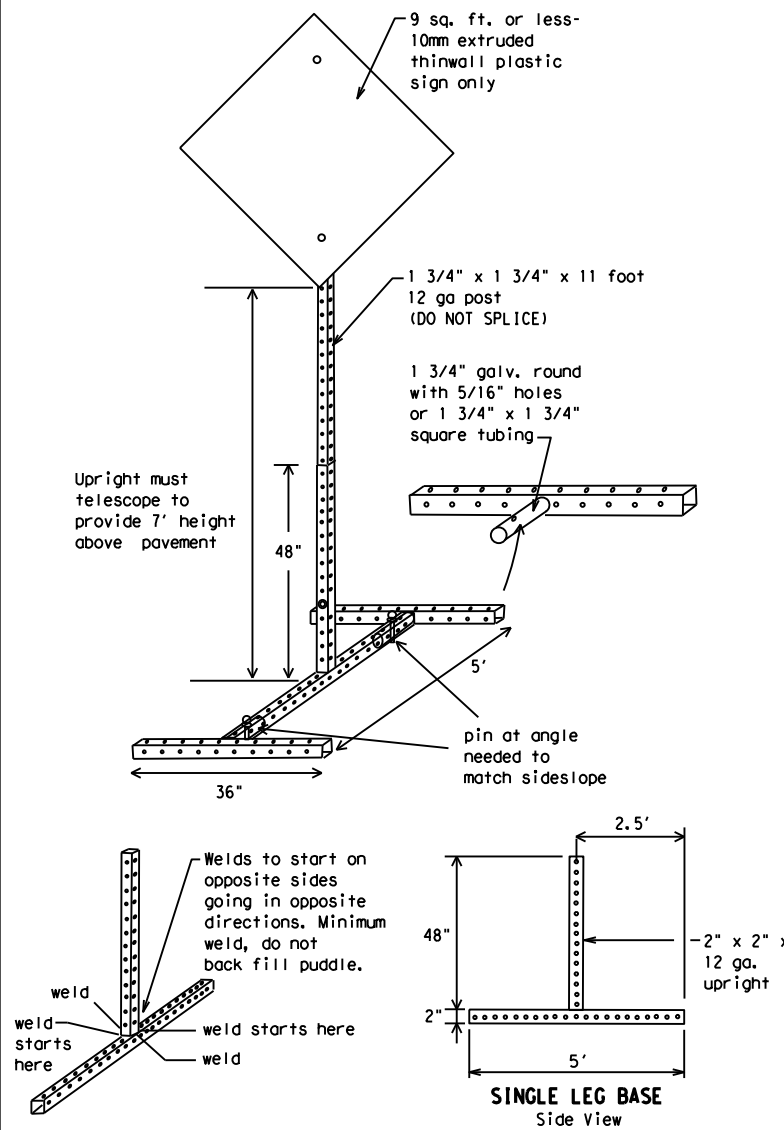
SKID MOUNTED WOOD SIGN SUPPORTS

* 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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	REFUGIO	22	

DATE:
FILE:

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.

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	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	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

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

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.

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



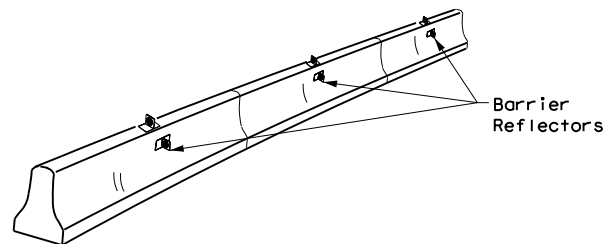
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	REFUGIO	23	

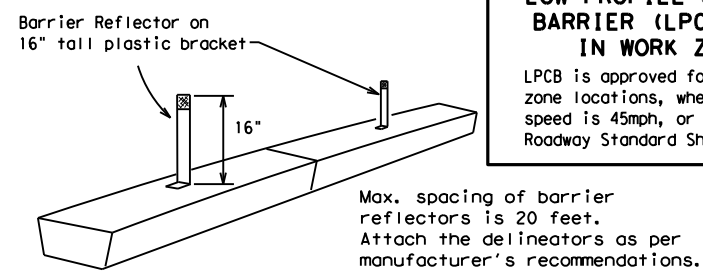
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

- 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.



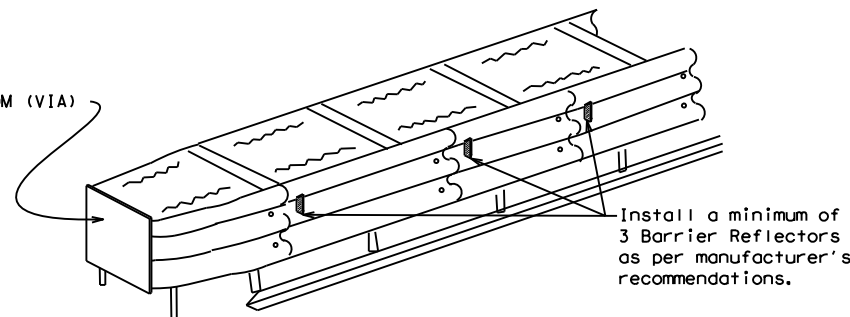
CONCRETE TRAFFIC BARRIER (CTB)

- 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.

LOW PROFILE CONCRETE BARRIER (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

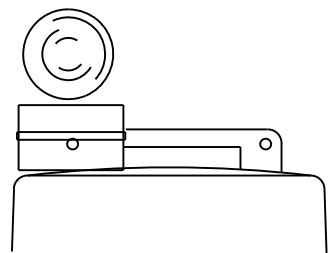
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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

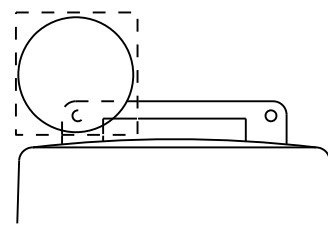
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.

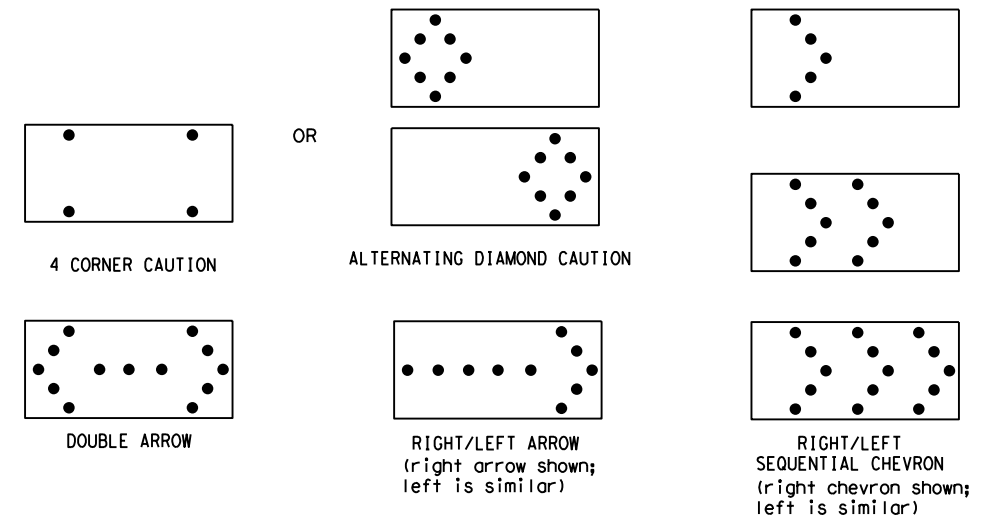


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

DATE:
FILE:

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.

Texas Department of Transportation
 Traffic Safety Division Standard

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

BC (7) -21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
	0447	04	018	SH 202
REVISIONS				
9-07 8-14				
7-13 5-21				
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	24	

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: FILE:

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:

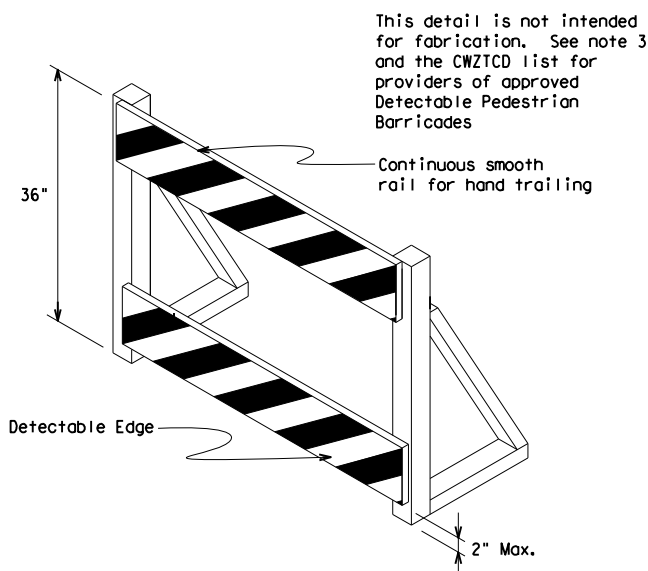
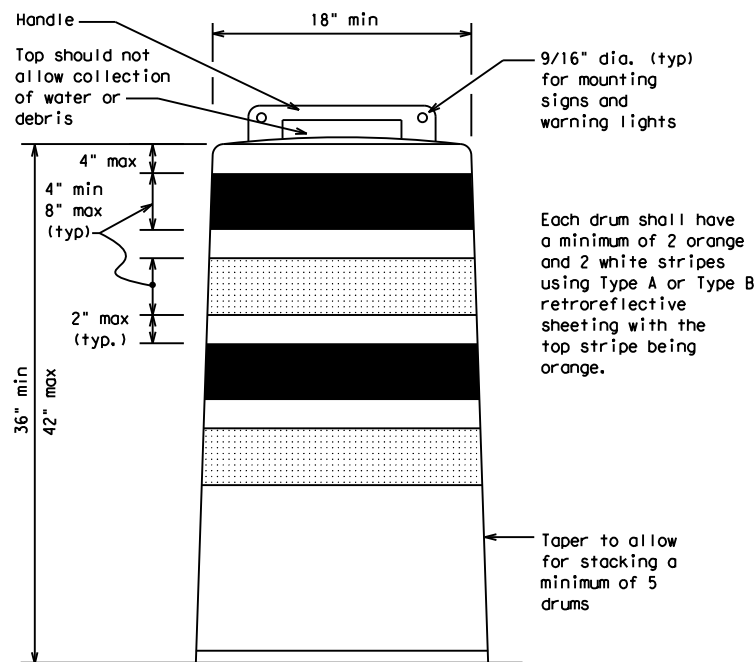
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

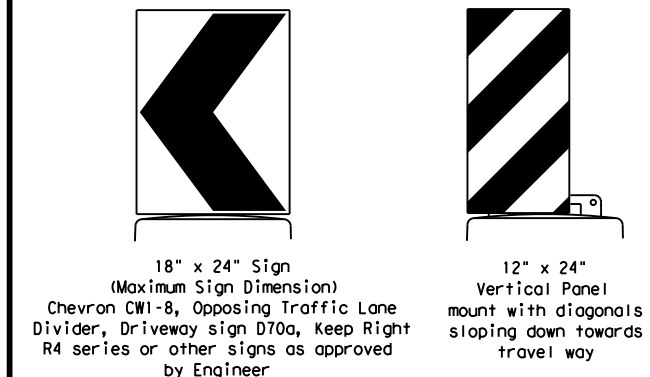
BALLAST

- 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.



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.



Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

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.

SHEET 8 OF 12

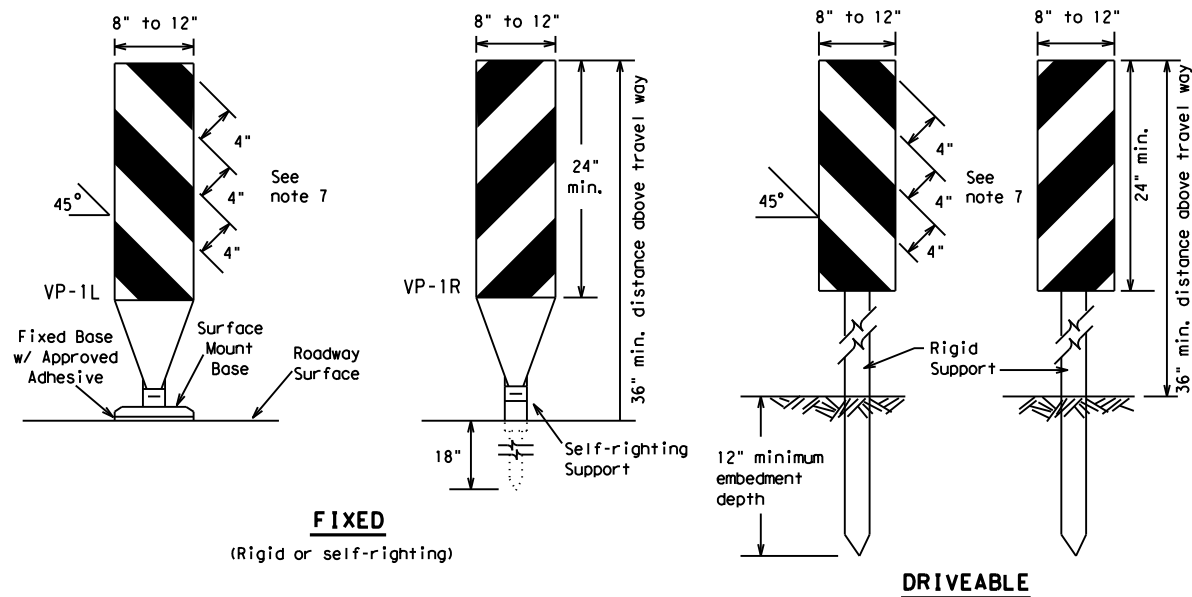


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

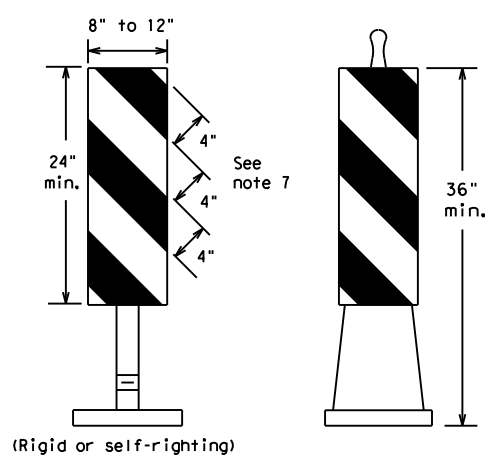
FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CR:	TxDOT
© TxDOT	November 2002	CONT:	0447	SECT:	04	JOB:	018	SH:	202
REVISIONS		DIST:	COUNTY:		SHEET NO.:				
4-03	8-14	CRP:	REFUGIO		25				
9-07	5-21								
7-13									

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.



FIXED
(Rigid or self-righting)

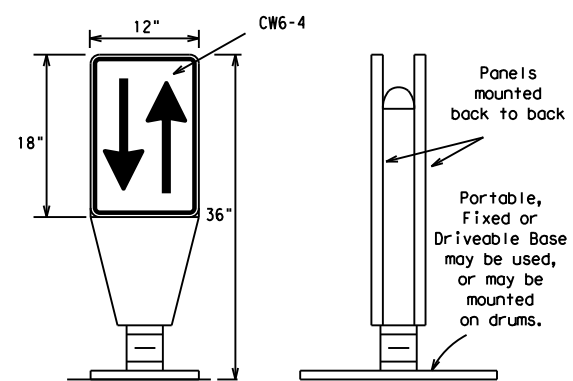
DRIVEABLE



PORTABLE

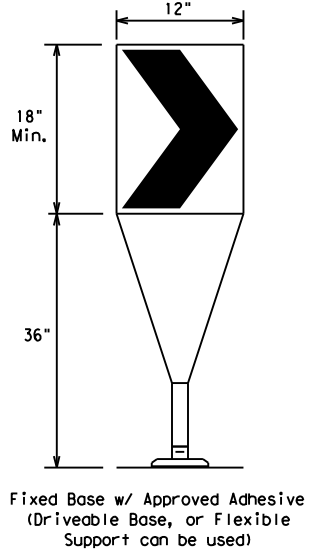
VERTICAL PANELS (VPs)

- 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.



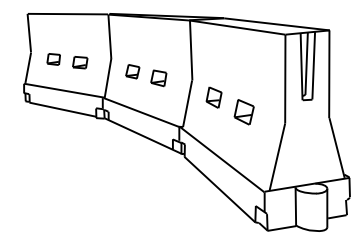
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD 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.



- 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 should 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 * *			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'

* * * 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

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	REFUGIO	26	

DATE: FILE:

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.

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.



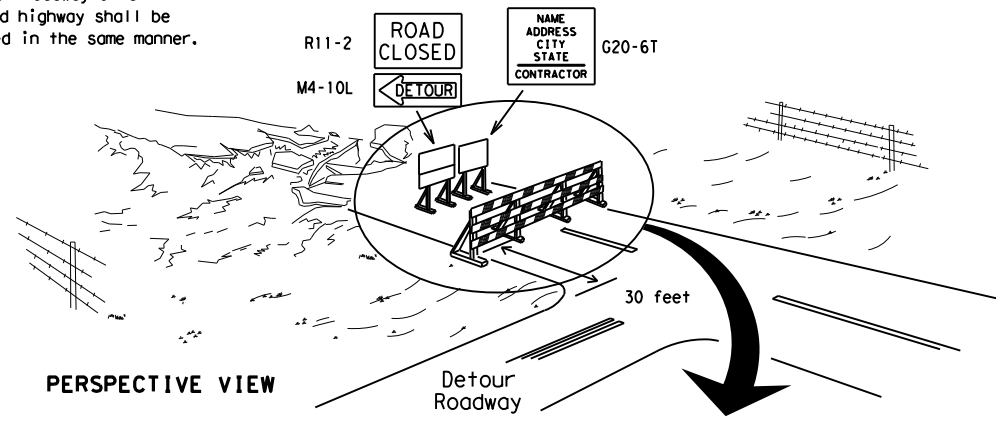
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

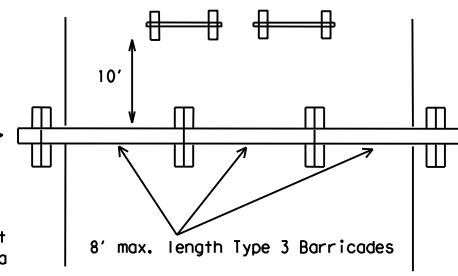
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

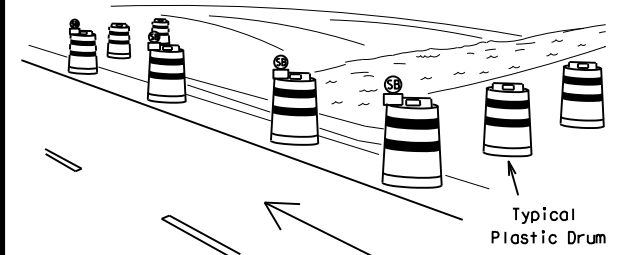
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



PLAN VIEW

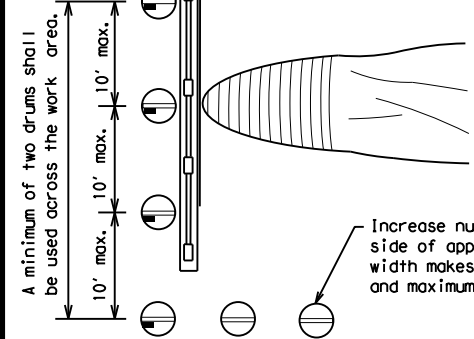
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

These drums are not required on one-way roadway



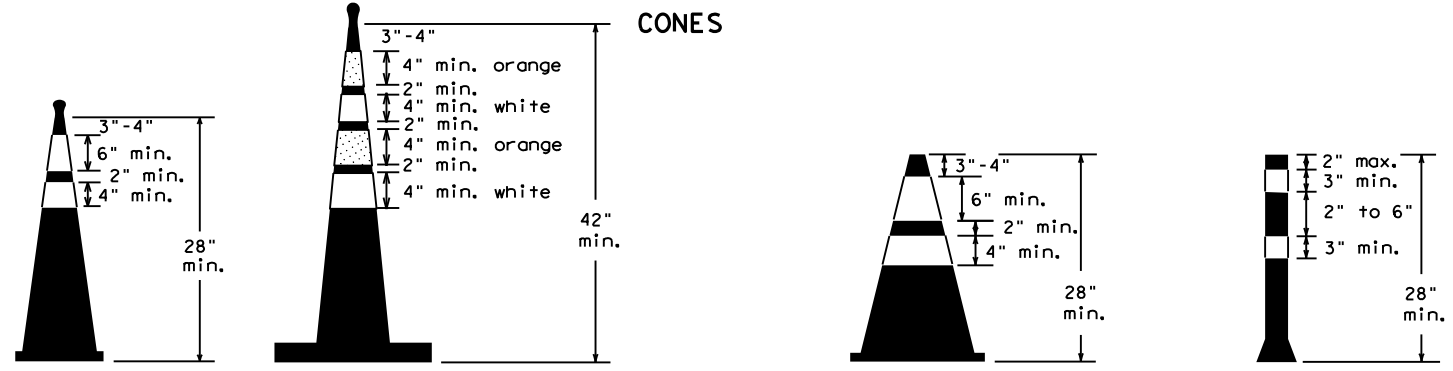
PLAN VIEW

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

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

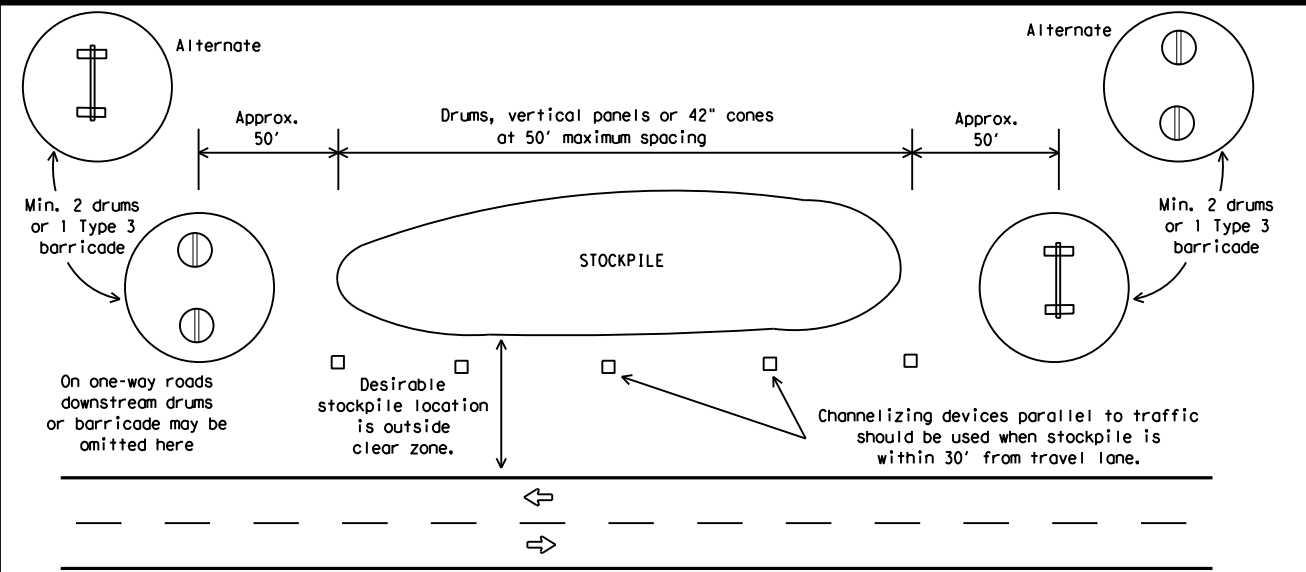
1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	REFUGIO	27	

DATE: FILE:

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.

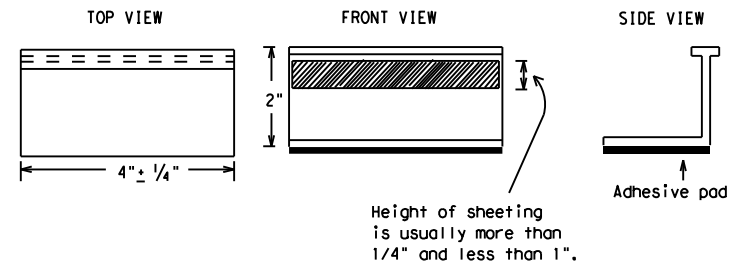
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 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).

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:
FILE:

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

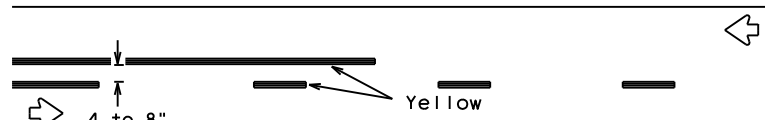
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	CRP	REFUGIO	28	
11-02 8-14				

105

PAVEMENT MARKING PATTERNS

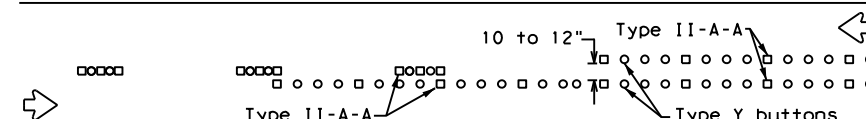


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

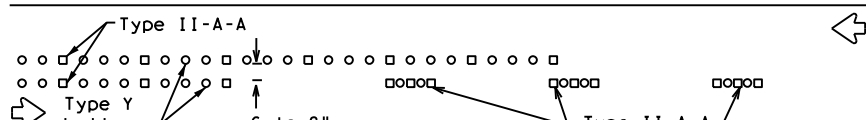


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.



RAISED PAVEMENT MARKERS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN B

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



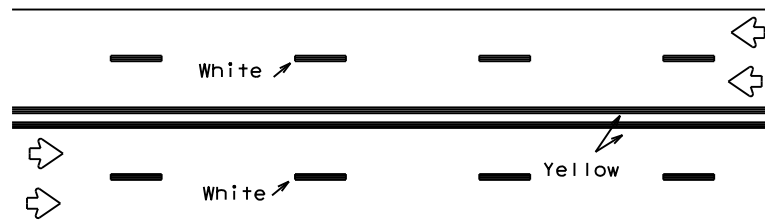
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



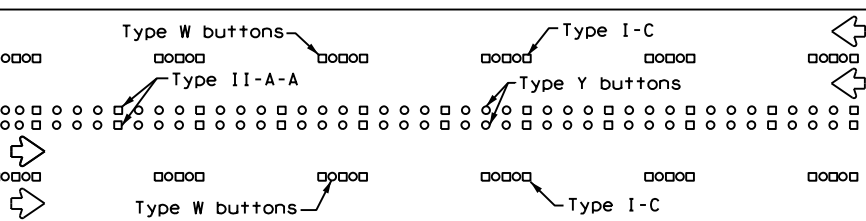
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



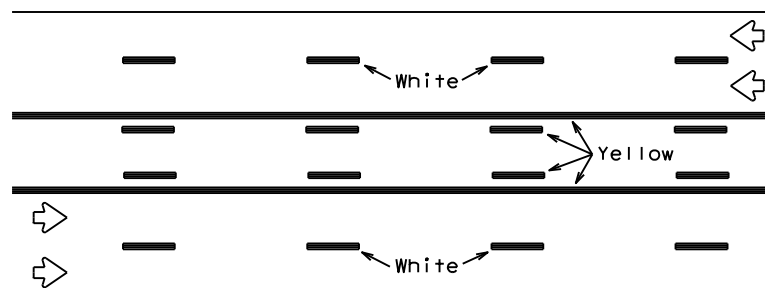
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



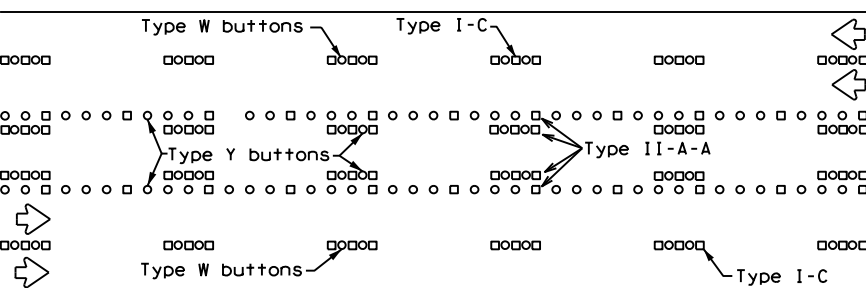
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

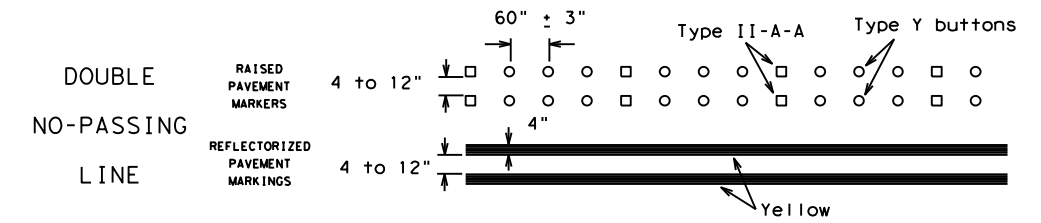
Prefabricated markings may be substituted for reflectORIZED pavement markings.



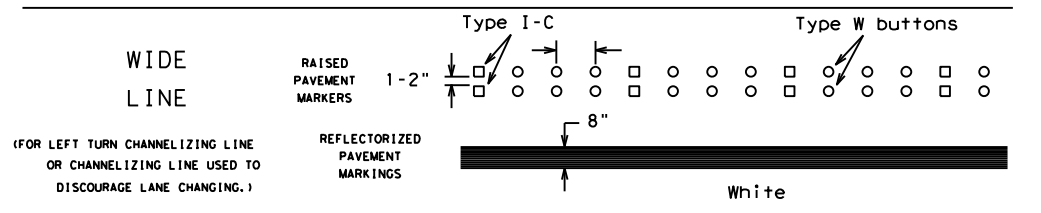
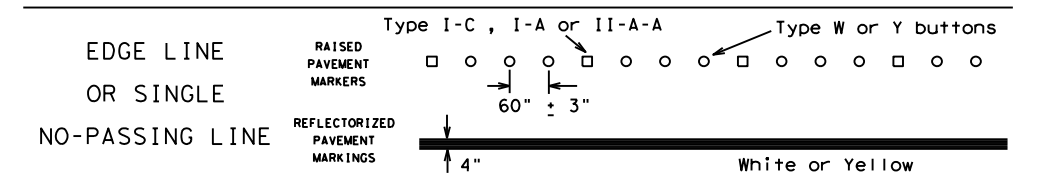
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

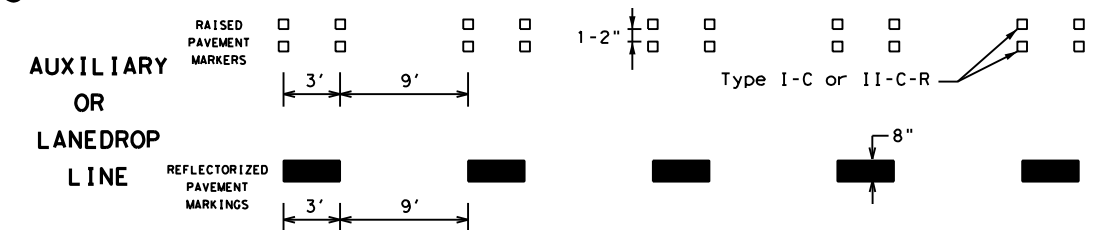
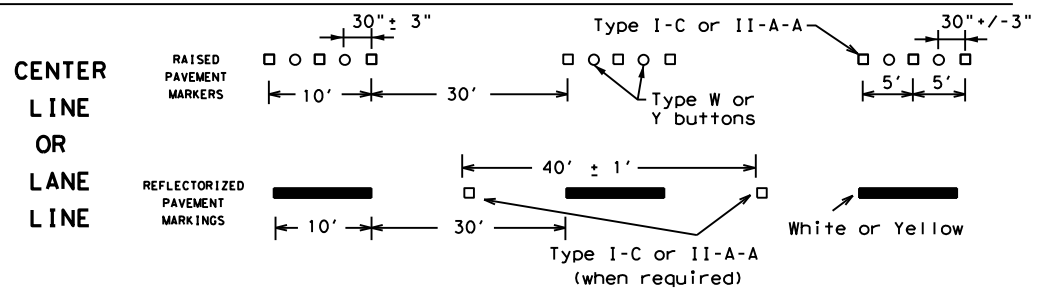
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

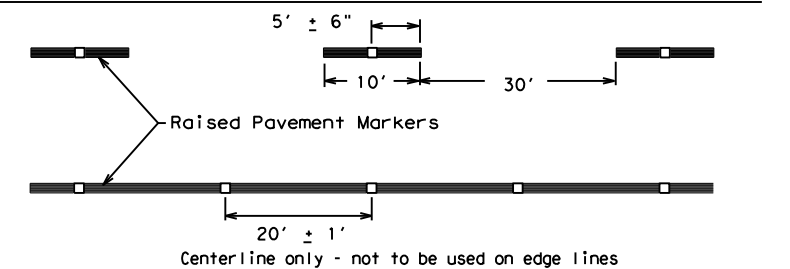


BROKEN LINES



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	OW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	CRP	REFUGIO	29	
11-02 8-14				

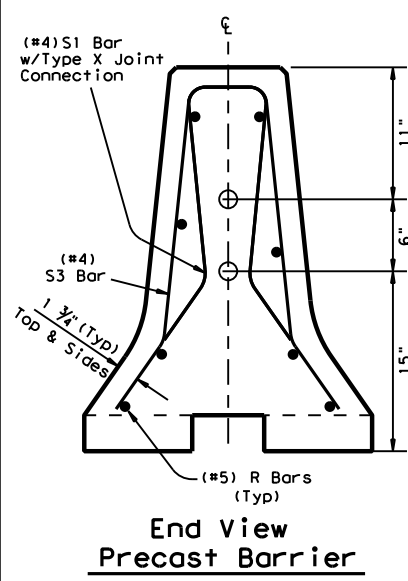
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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.

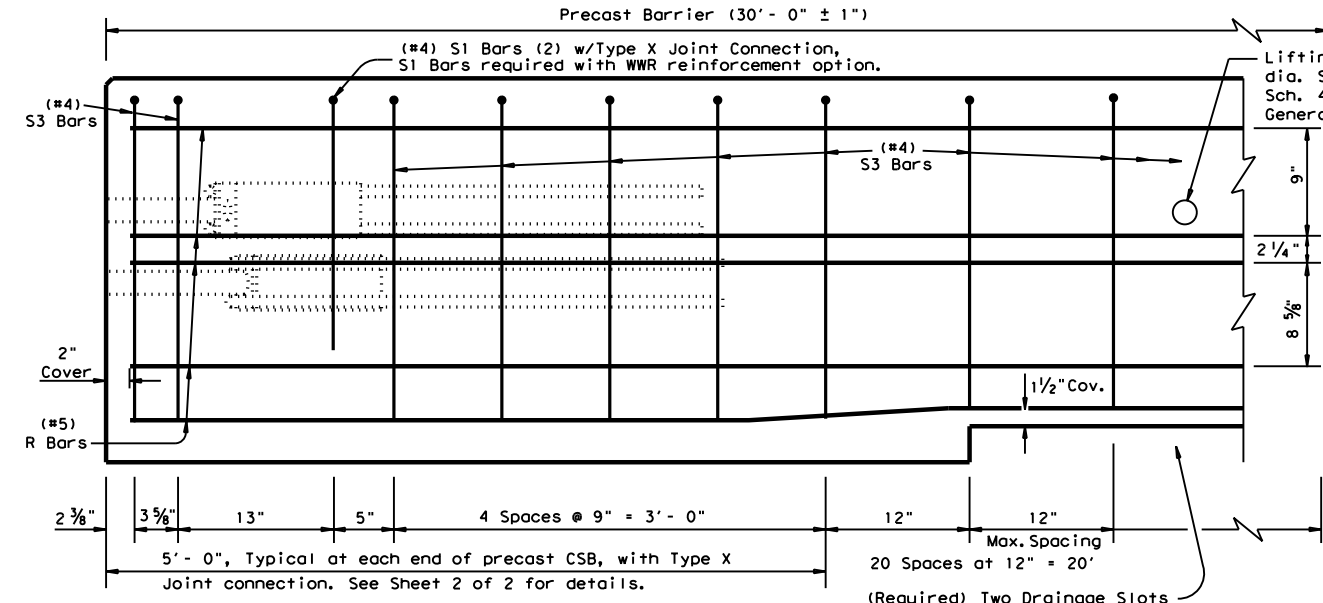
DATE: FILE:

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.

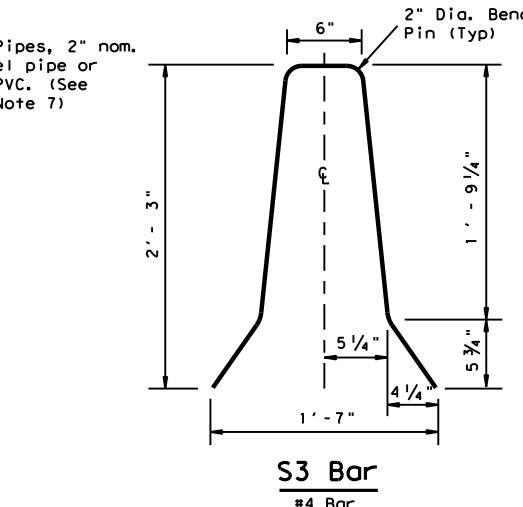
DATE:
FILE:



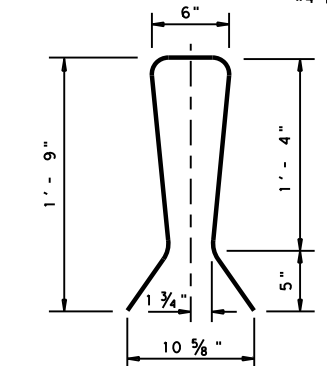
End View Precast Barrier
See sheet 2 of 3 for Joint connection Type X



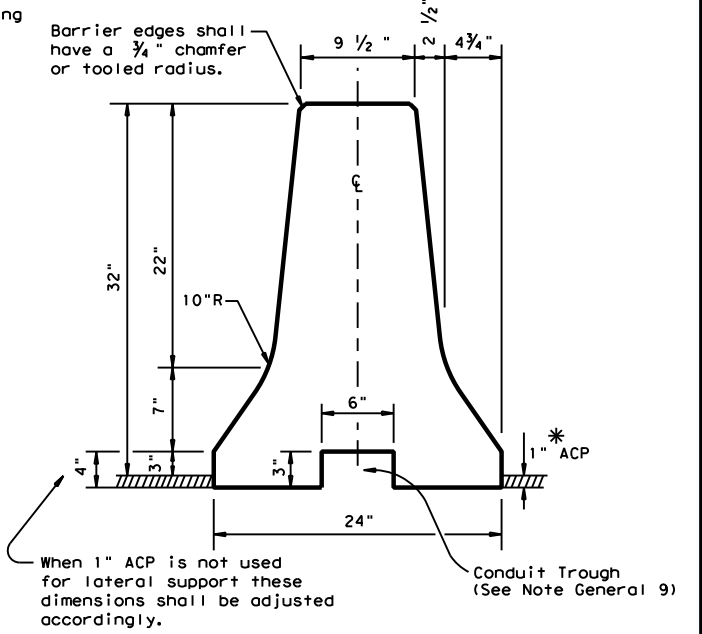
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)
Showing reinforcement for Joint Type X



S3 Bar
#4 Bar



S1 Bar
#4 Bar (2)
(Joint Type X)



Concrete Safety Barrier

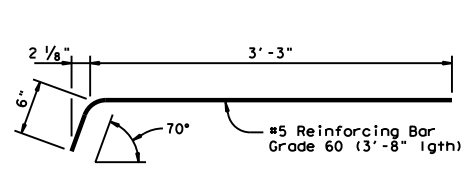
Barrier edges shall have a 1/4" chamfer or tooling radius.
When 1" ACP is not used for lateral support these dimensions shall be adjusted accordingly.
Conduit Trough (See Note General 9)

GENERAL NOTES

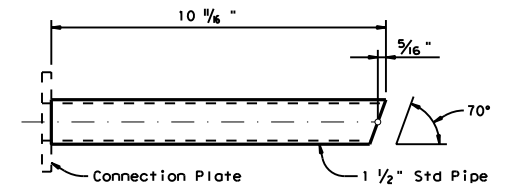
- Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
- Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
- Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
- All precast barrier edges shall have a 1/4" chamfer or tooling radius.
- All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
- All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
- Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
- Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
- Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.

SHEET 1 OF 2

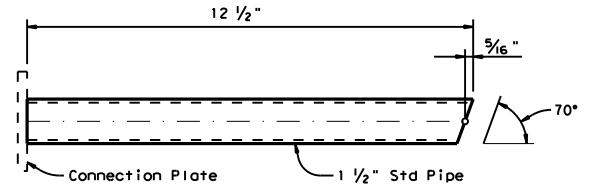
		Design Division Standard	
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) CSB(1)-10			
FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD
© TxDOT December 2010	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	DIST: CRP	COUNTY: REFUGIO	SHEET NO.: 30



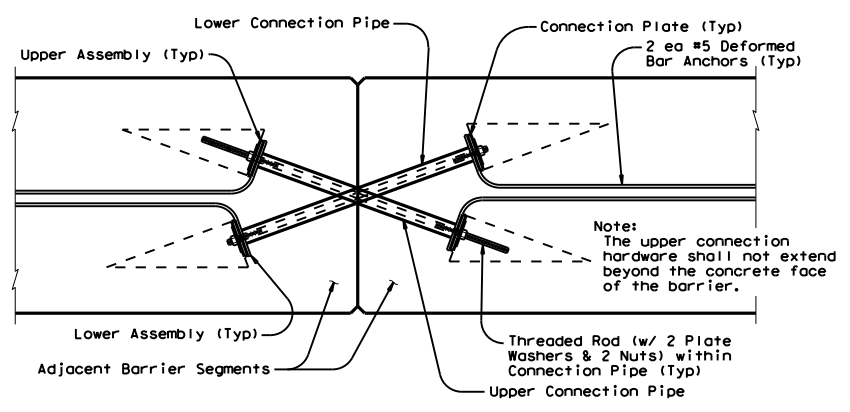
DEFORMED BAR ANCHOR DETAILS
Two (2) Bars required per assembly. Eight (8) required per joint.



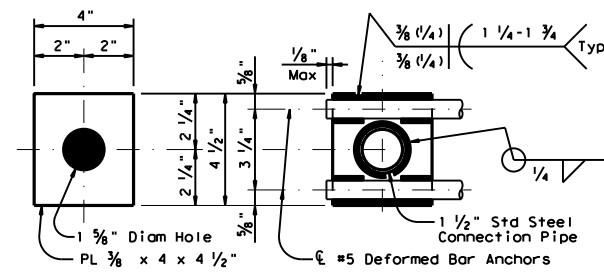
UPPER CONNECTION PIPE DETAILS
One (1) Steel Pipe required per Upper Assembly. Two (2) required per joint.



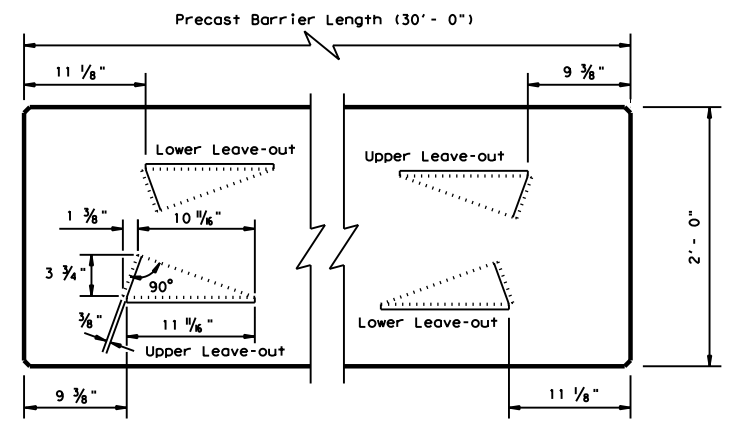
LOWER CONNECTION PIPE DETAILS
One (1) Steel Pipe required per Lower Assembly. Two (2) required per joint.



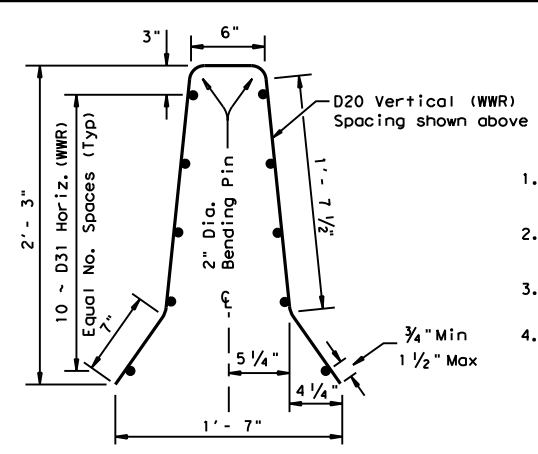
TYPE X JOINT INSTALLATION DETAIL
Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.



CONNECTION PLATE DETAILS
One (1) Plate required per assembly. Four (4) required per joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.

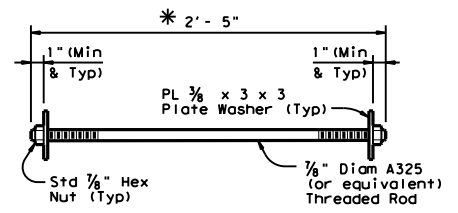


BARRIER PLAN AT END JOINTS



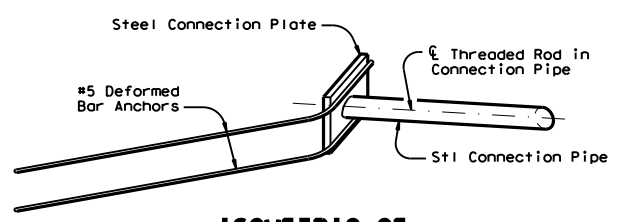
Welded Wire Reinforcement (WWR) Option for Bars R and S3
(WWR) General Notes

- Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
- Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
- All reinforcement shall comply with Item 440, "Reinforcing Steel."
- Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



CONNECTION BOLT OR THREADED ROD DETAIL
Two (2) Threaded Rods (or Equivalent Hex Hd. Bolts) (w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per joint.

* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

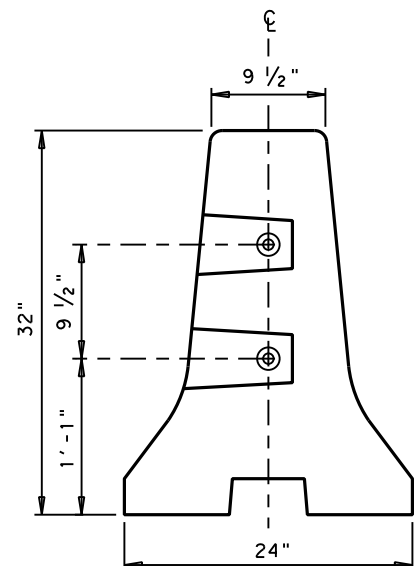


ISOMETRIC OF TYPICAL WELDED ASSEMBLY

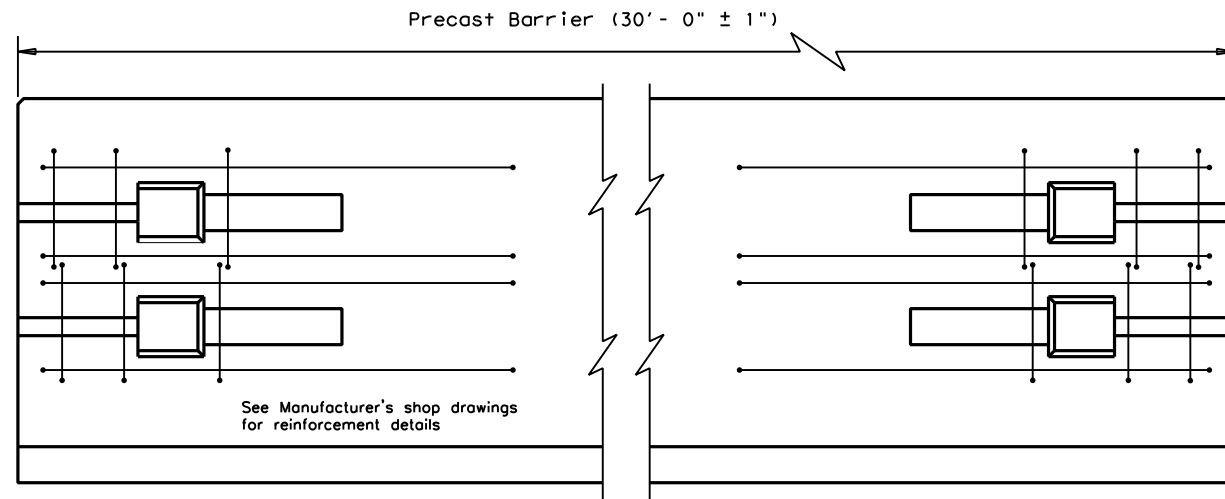
Four (4) [2 Upper & 2 Lower] Assemblies required per joint.

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

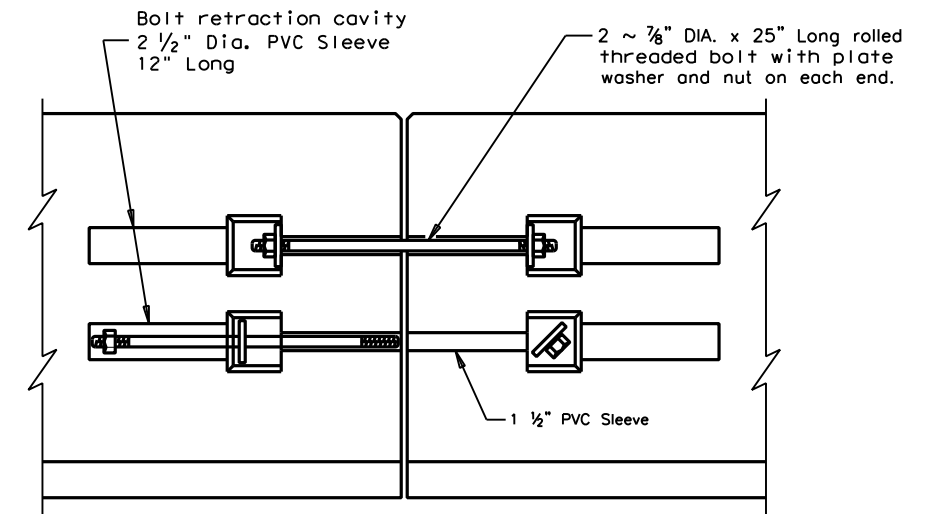
DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

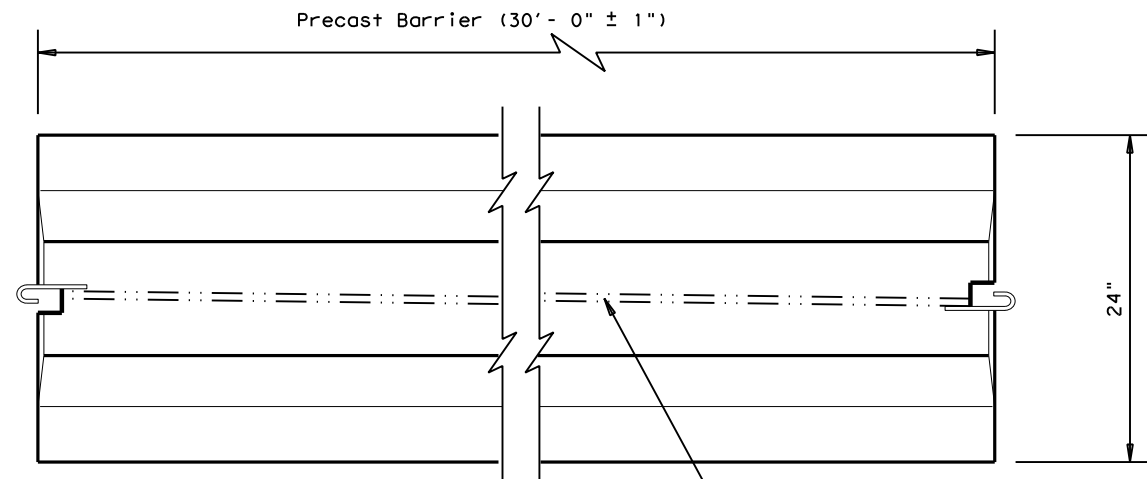


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

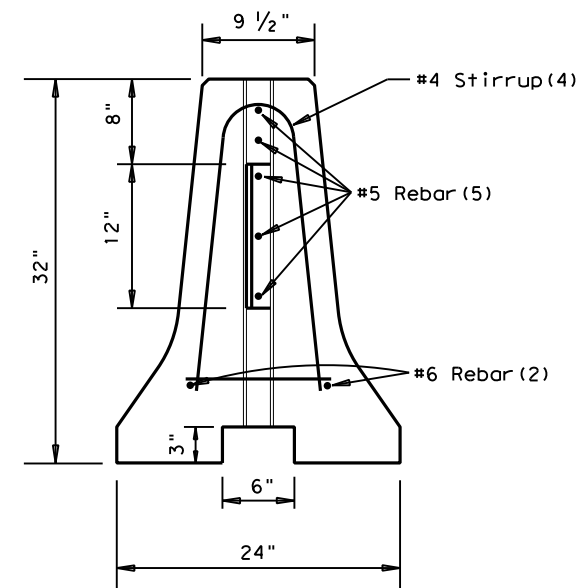


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)

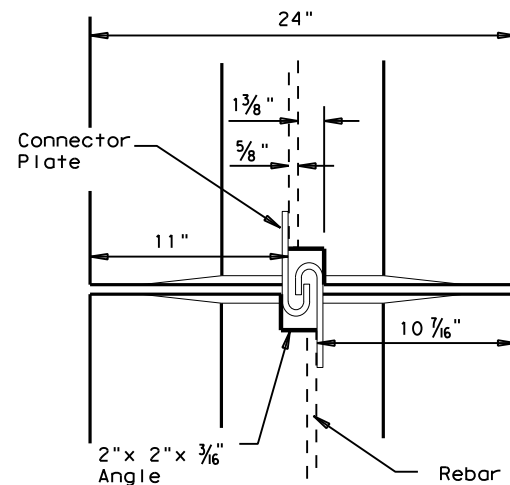


TOP VIEW
PRECAST (CSB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)



VIEW FROM ABOVE
J-J HOOK CONNECTION

Proprietary Joint Connections (CSB)

Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

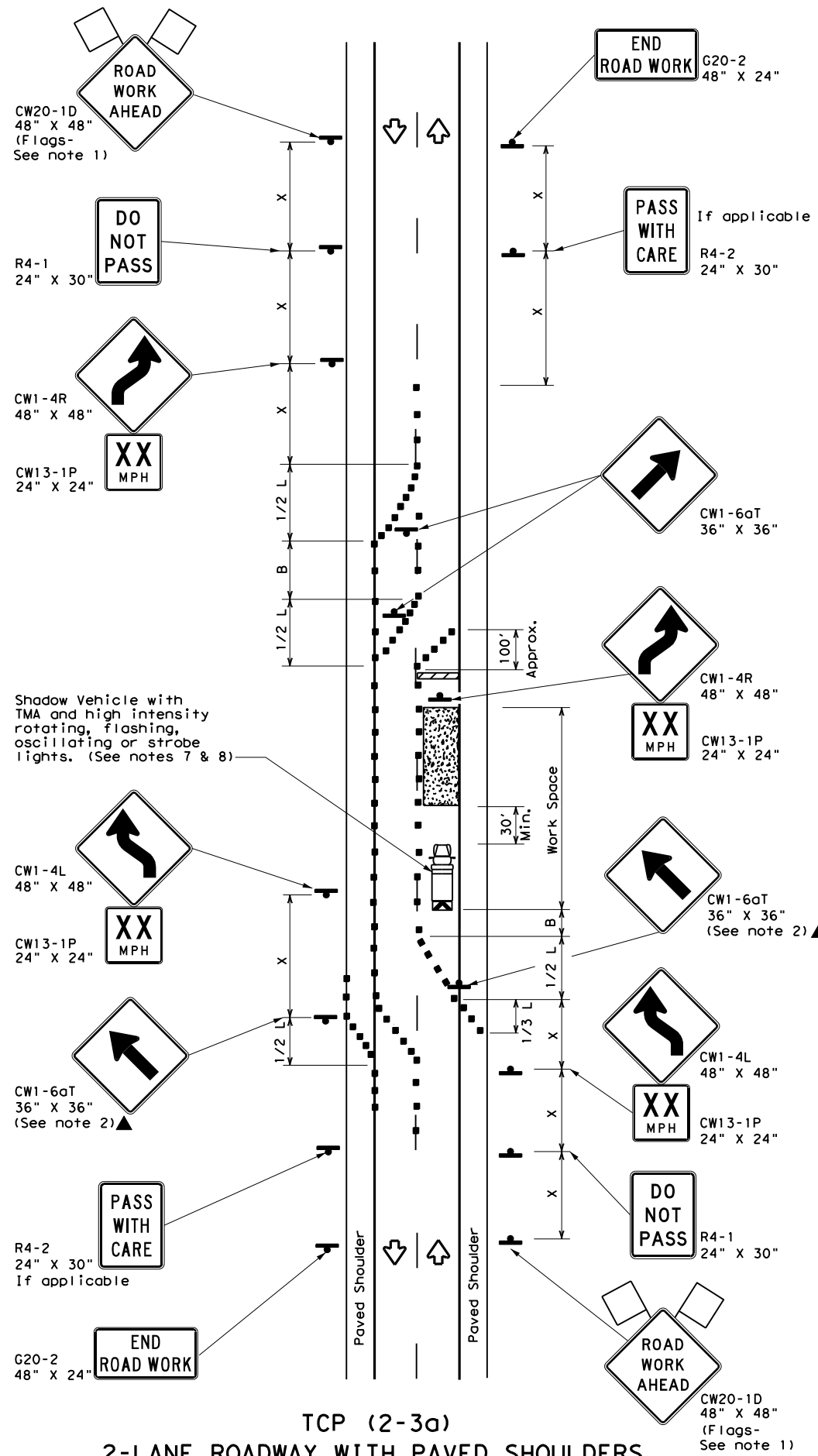
SHEET 2 OF 2

		Design Division Standard	
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) CSB(1)-10			
FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD
© TxDOT December 2010	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	DIST: CRP	COUNTY: REFUGIO	SHEET NO.: 31

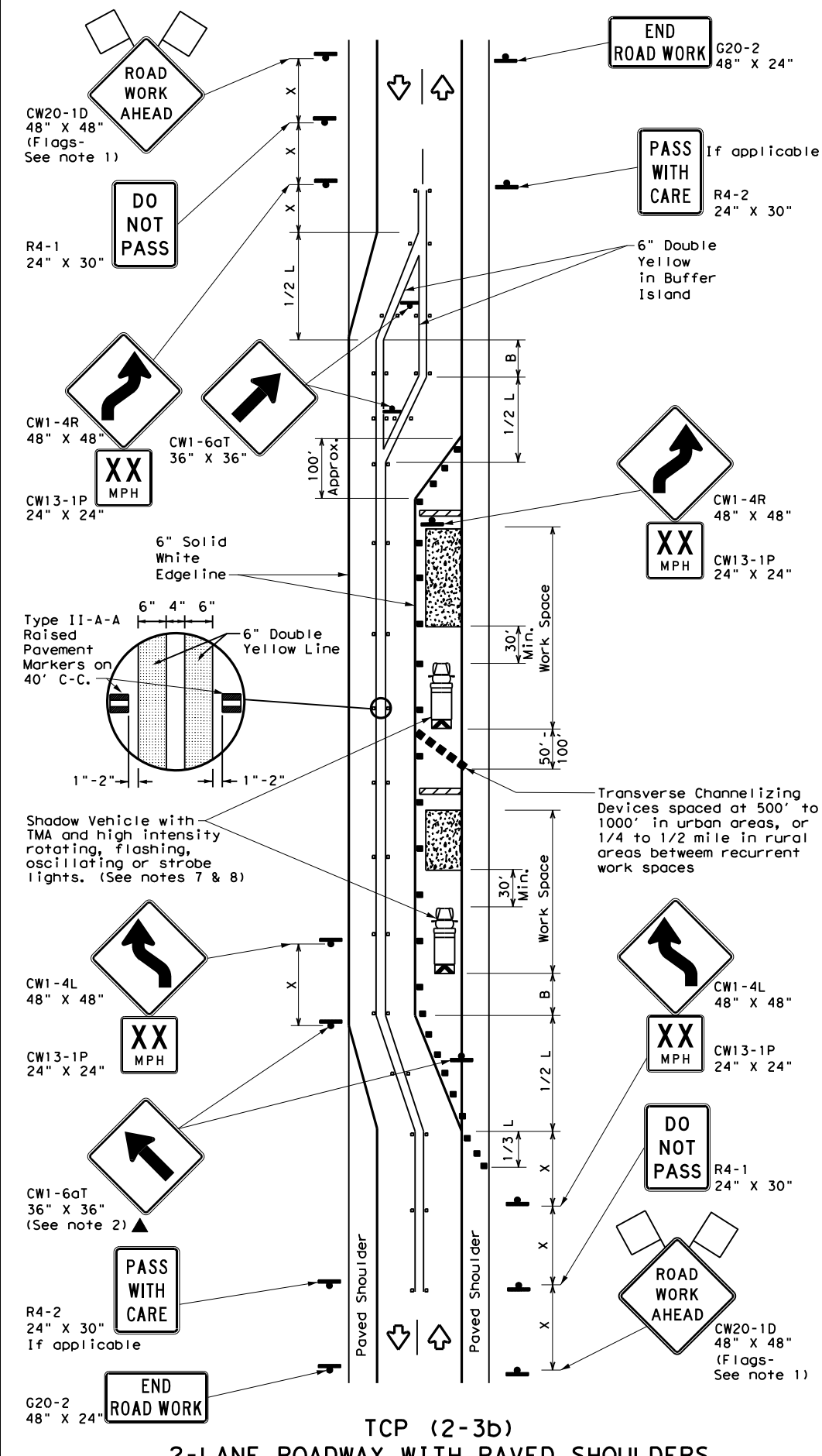
DATE:
FILE:

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: FILE:



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS
ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓
				TCP (2-3b) ONLY

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
 - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement marking shall be removed for long term projects.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

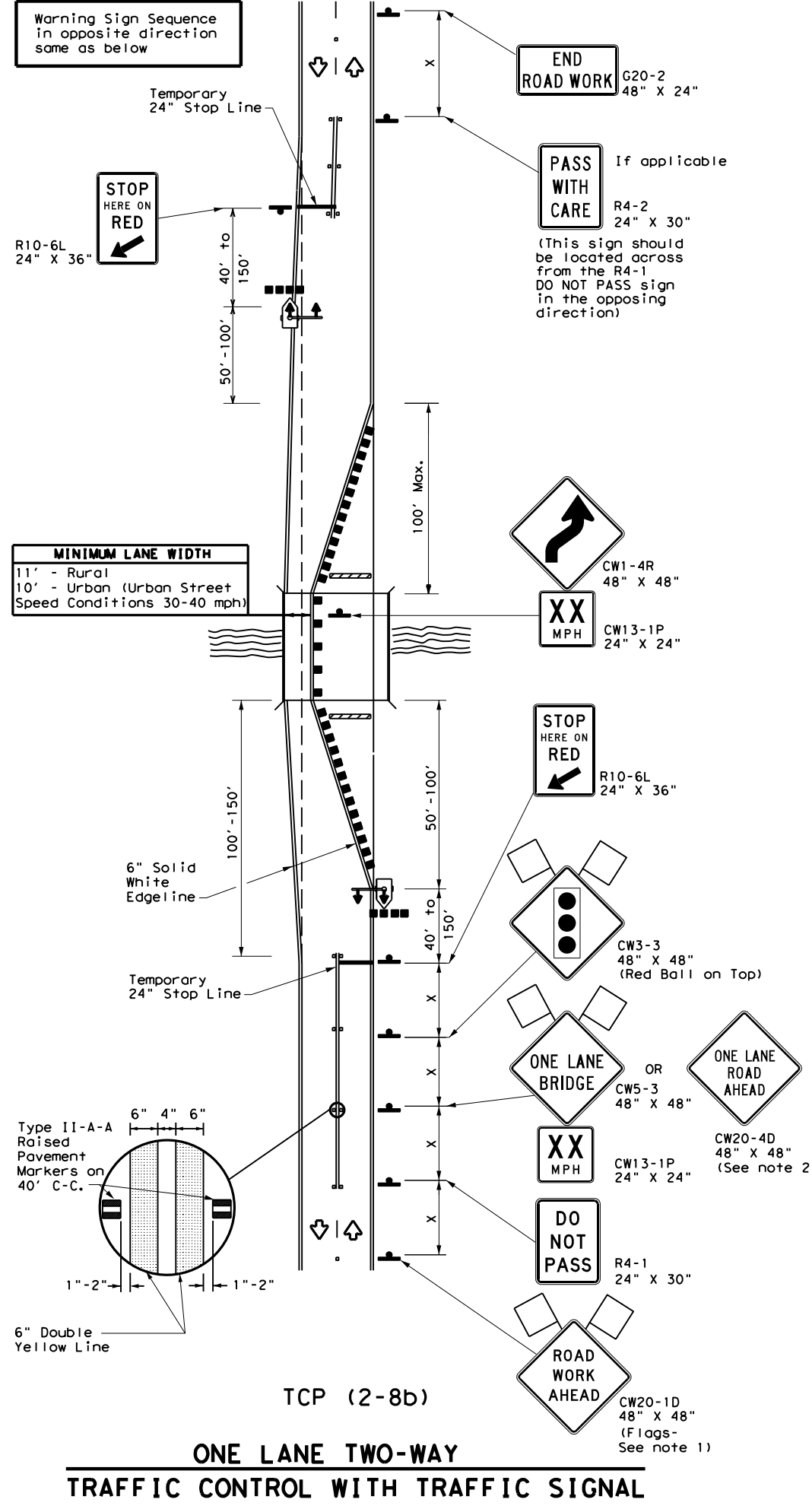
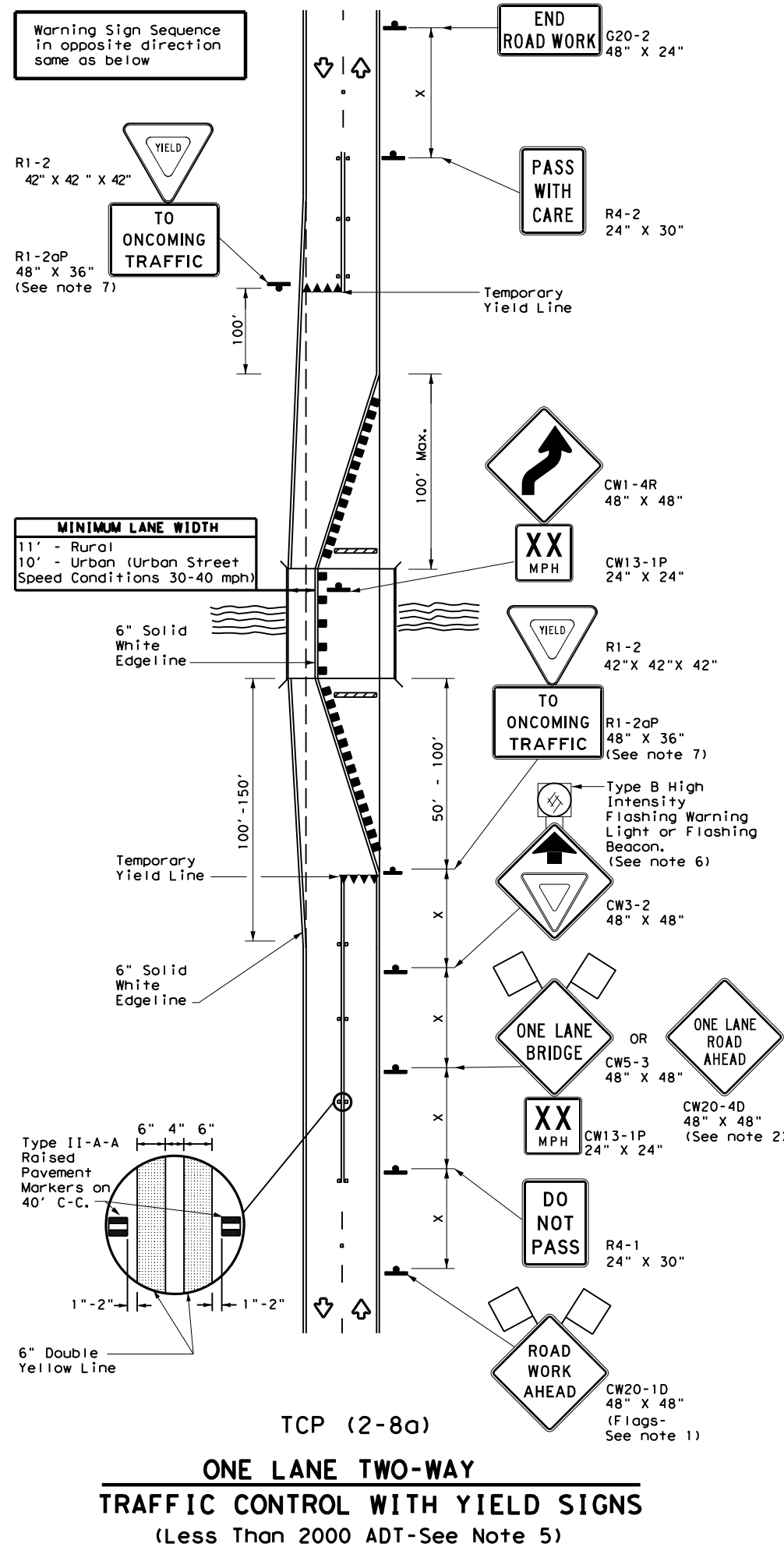


**TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS**

TCP (2-3) - 23

FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
12-85 4-98 2-18	DIST	COUNTY	SHEET NO.	
8-95 3-03 4-23	CRP	REFUGIO	33	
1-97 2-12				

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.



LEGEND

	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60	L = WS	600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75	L = WS	750'	825'	900'	75'	150'	900'	540'	820'

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
 - Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
 - For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
- TCP (2-8a)**
- Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
 - If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
 - The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.
- TCP (2-8b)**
- A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
 - Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Texas Department of Transportation
Traffic Safety Division Standard

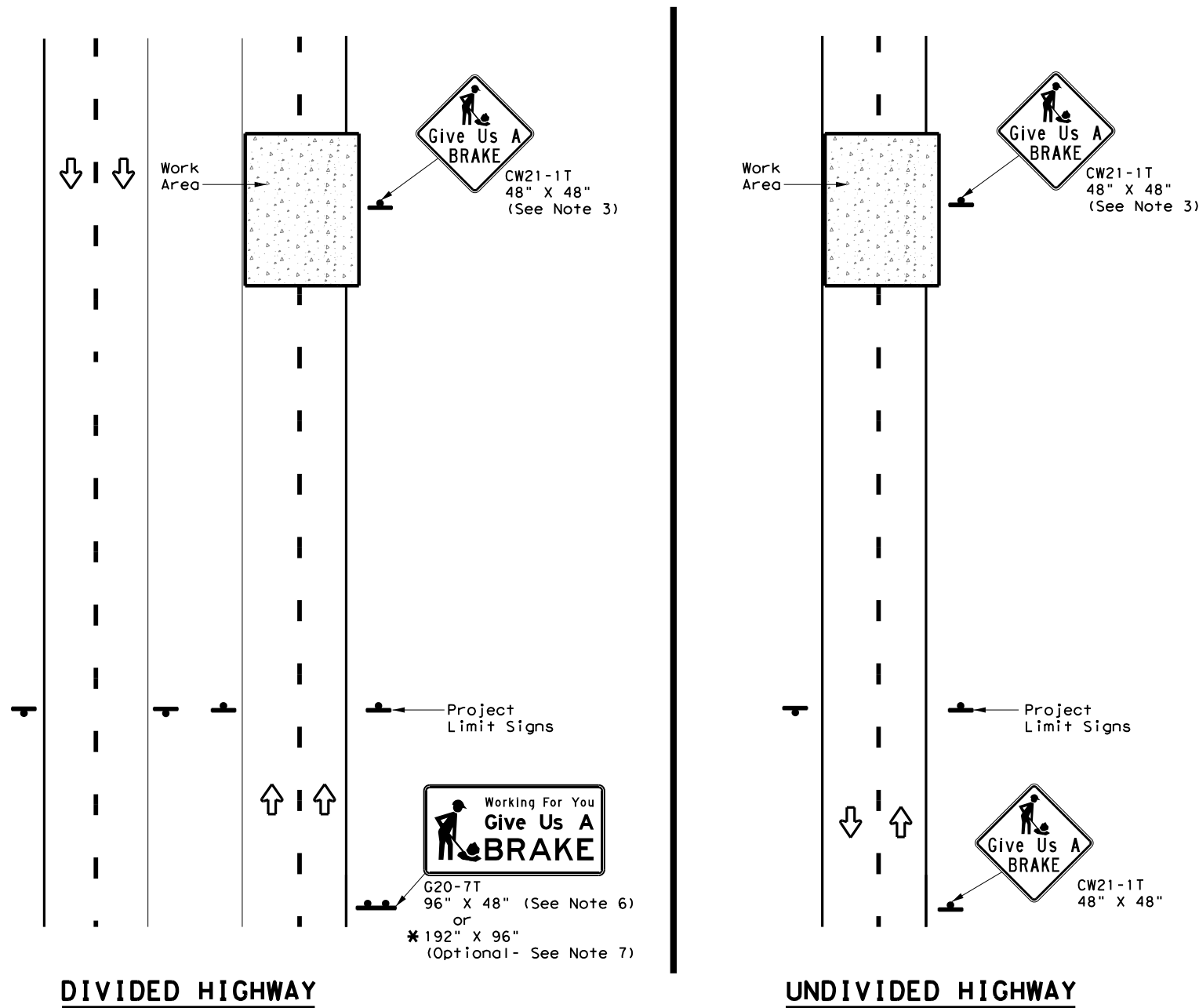
TRAFFIC CONTROL PLAN
LONG TERM ONE-LANE
TWO-WAY CONTROL

TCP (2-8) -23

FILE: tcp2-8-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
12-85 4-98 2-18	DIST	COUNTY	SHEET NO.	
8-95 3-03 4-23	CRP	REFUGIO	34	
1-97 2-12				

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:
FILE:



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B _{FL} or C _{FL}	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B _{FL} or C _{FL}	128	W8x18	16 17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B _{FL} OR TYPE C _{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

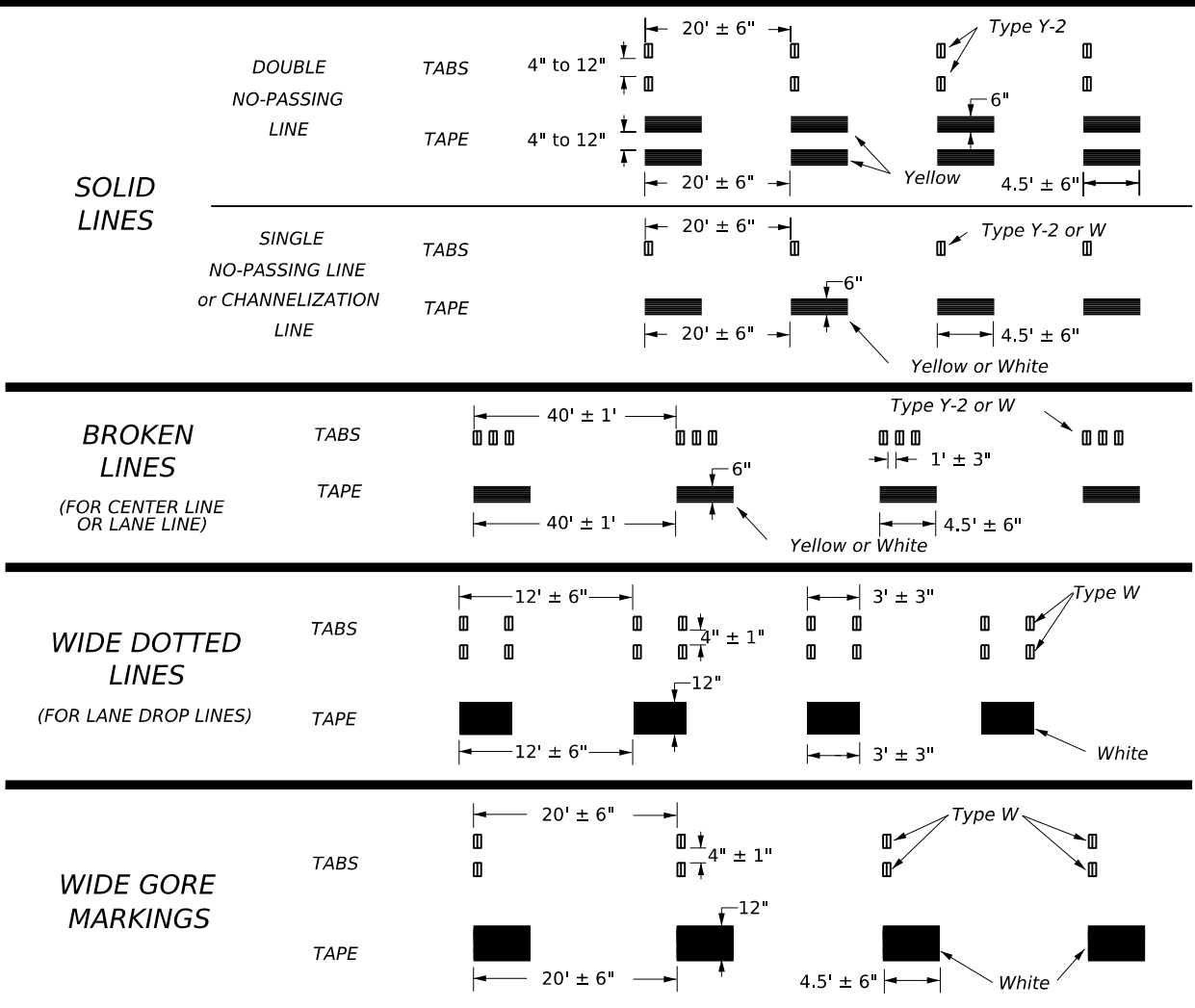
GENERAL NOTES

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
 Item 636 - Aluminum Signs
 Item 647 - Large Roadside Sign Supports and Assemblies.
 Item 416 - Drilled Shaft Foundations
- 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.

				Traffic Operations Division Standard	
WORK ZONE "GIVE US A BRAKE" SIGNS					
WZ (BRK) - 13					
FILE:	wzbrk-13.dgn	DN:	TxDOT	CK:	TxDOT
©TxDOT	August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS		0447	04	018	SH 202
6-96	5-98	7-13	DIST	COUNTY	SHEET NO.
8-96	3-03	CRP	REFUGIO		35

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.

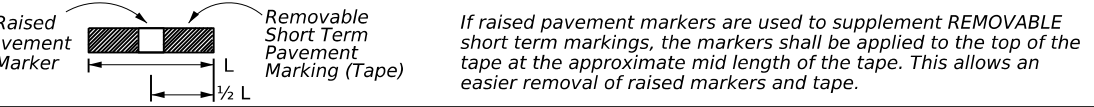
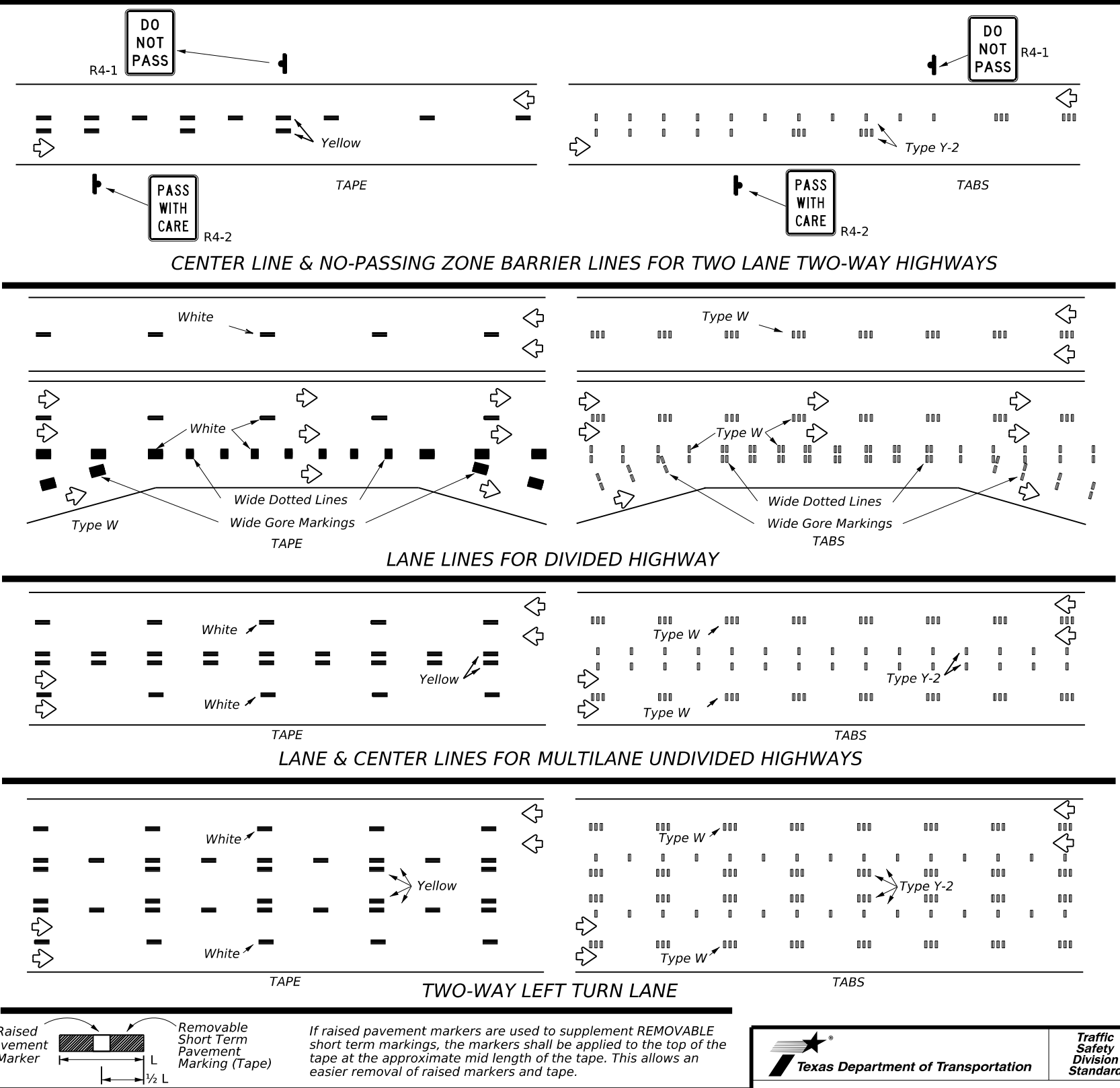
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



- NOTES:**
- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
 - Short term pavement markings shall NOT be used to simulate edge lines.
 - Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
 - Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
 - No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
 - For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
 - For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
 - For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

- TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)**
- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
 - Tabs shall meet requirements of Departmental Material Specification DMS-8242.
 - When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
 - No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



- PREFABRICATED PAVEMENT MARKINGS**
- Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
 - Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Construction-Grade Prefabricated Pavement Markings."
- RAISED PAVEMENT MARKERS**
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.
- DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)**
- DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzsstpm-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONTRACT NO: 0447	SECTION: 04	JOB NO: 018	HIGHWAY: SH 202
REVISIONS:	DATE:	DIST:	COUNTY:	SHEET NO.:
4-92	7-13	CRP	REFUGIO	36
1-97	2-23			
3-03				

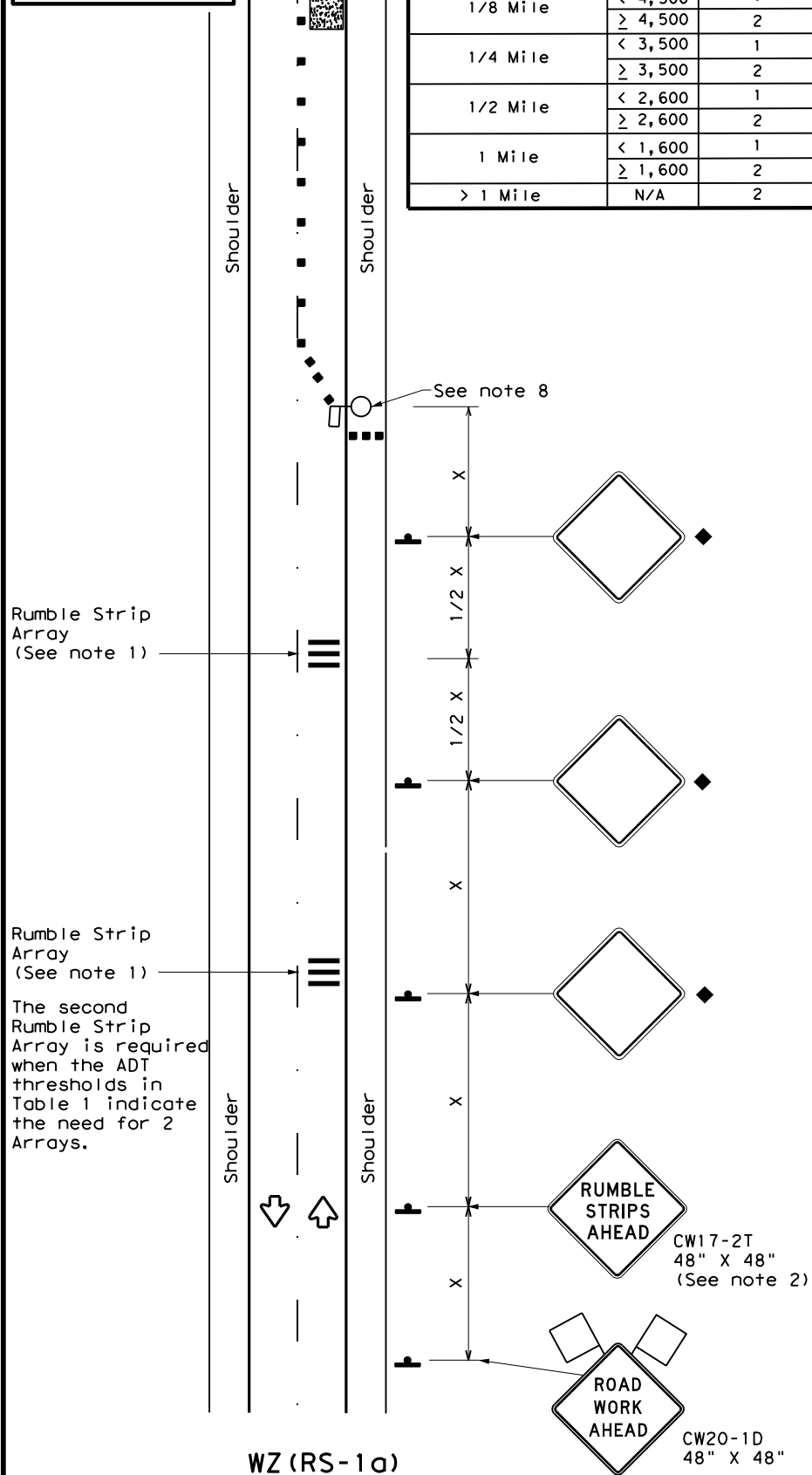
111

DATE: FILE:

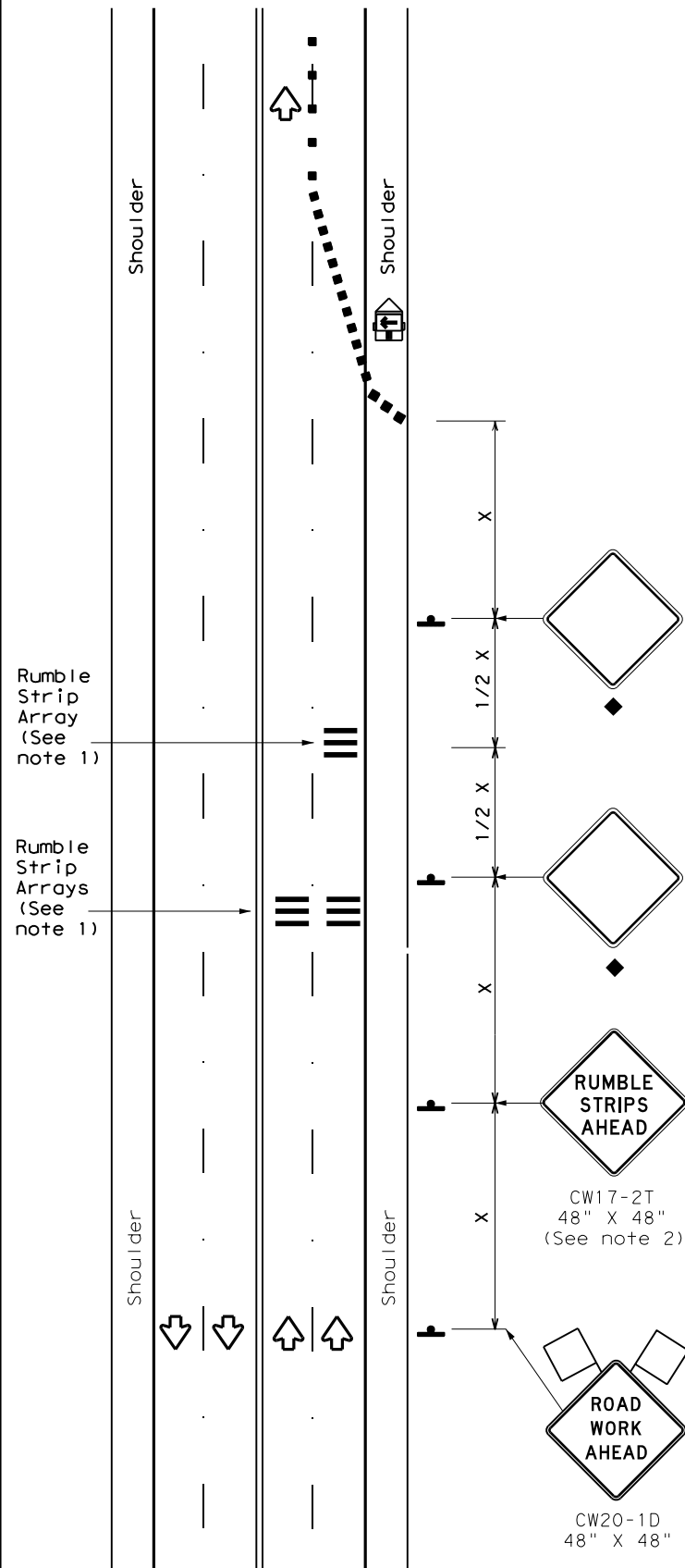
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

Warning sign and rumble strip sequence in opposite direction is same as below.

Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

- Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
- The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD" sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
- Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
- Remove Temporary Rumble Strips before removing the advanced warning signs.
- Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
- Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
- This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
- The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
- Replace defective Temporary Rumble Strips as directed by the Engineer.
- Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS/2 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

Texas Department of Transportation Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	CRP	REFUGIO	37	

DATE: FILE:

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.

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION												
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE / RESET		L	L	R	R	S	S			
															MOVE/RESET	FROM LOC. #	N	W	N	W	N	W			
1	PHASE 1	10	SH 202	193+00	TL-3	UNI	EXIST PVMT	--	PRECAST CTB	--	--	--	1	--	--	--	--	--	--	X	--				
2	PHASE 1	10	SH 202	209+30	TL-3	UNI	EXIST PVMT	--	PRECAST CTB	--	--	--	1	--	--	--	--	--	--	X	--				
3	PHASE 2	11	SH 202	192+85	TL-3	UNI	EXIST PVMT	--	PRECAST CTB	--	--	--	--	1	1	1	--	--	--	--	X	--			
4	PHASE 2	11	SH 202	209+37	TL-3	UNI	EXIST PVMT	--	PRECAST CTB	--	--	--	--	1	1	2	--	--	--	--	X	--			
												TOTALS	2	2	2										

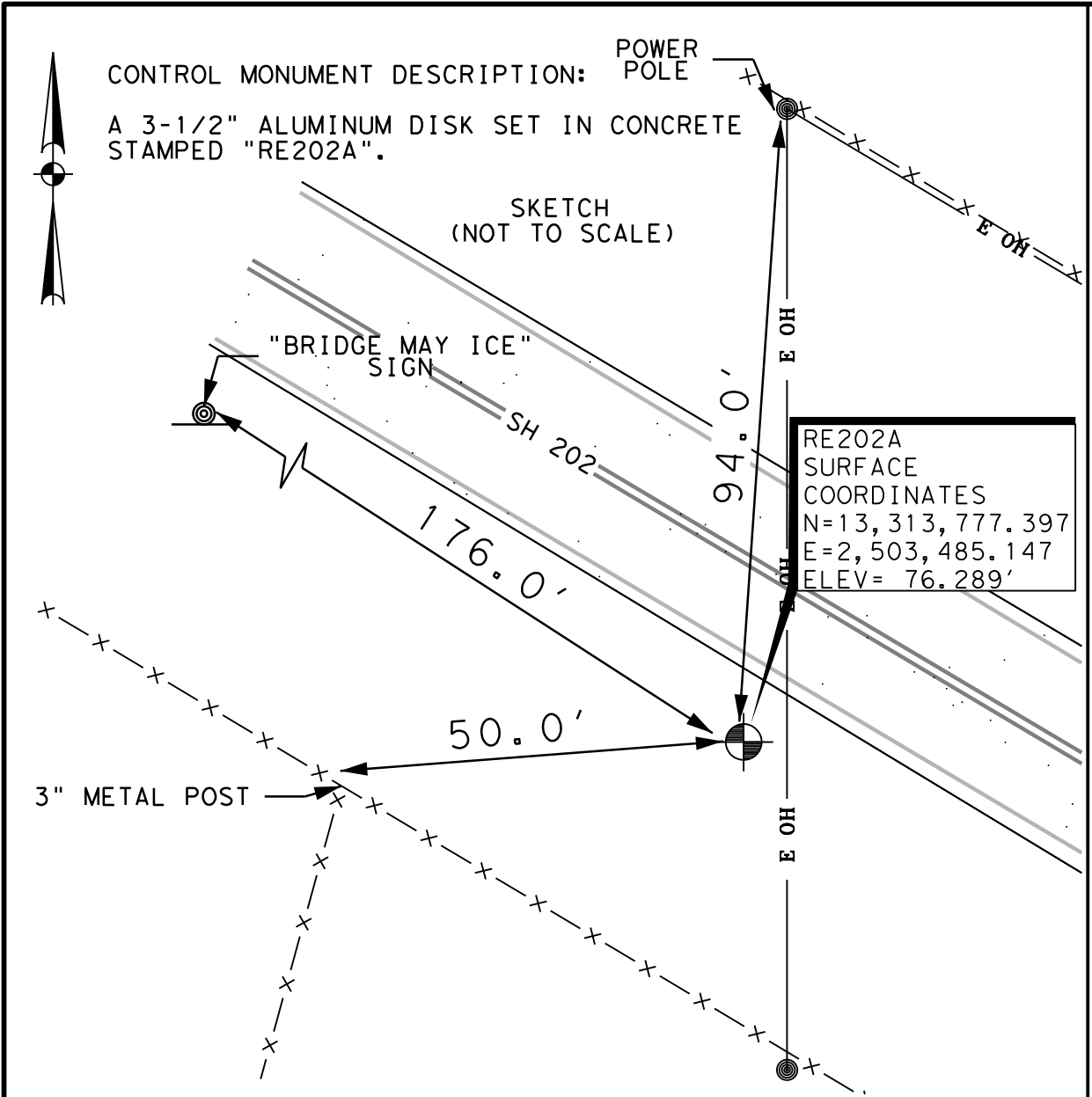
LEGEND:
 L=LOW MAINTENANCE
 R=REUSABLE
 S=SACRIFICIAL
 N=NARROW
 W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
<http://www.dot.state.tx.us/insdot/orgchart/cmd/cserve/standard/rdwylse.htm>

CRASH CUSHION SUMMARY SHEET

FILE: CCSS.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB
REVISIONS	0447	04	018
	DIST	COUNTY	
	CRP	REFUGIO	
	FEDERAL AID PROJECT		SHEET NO.
	F2B24(083)		38

10/4/2022 3:19:13 PM RETANAP J:\JOB\WJNS202-36-9\DP5090 MA#2 TXDOT Corpus District Br\docs\700 CADD\713 Survey\713.4 Control Surveys\WJNS202 CONTROL.dgn



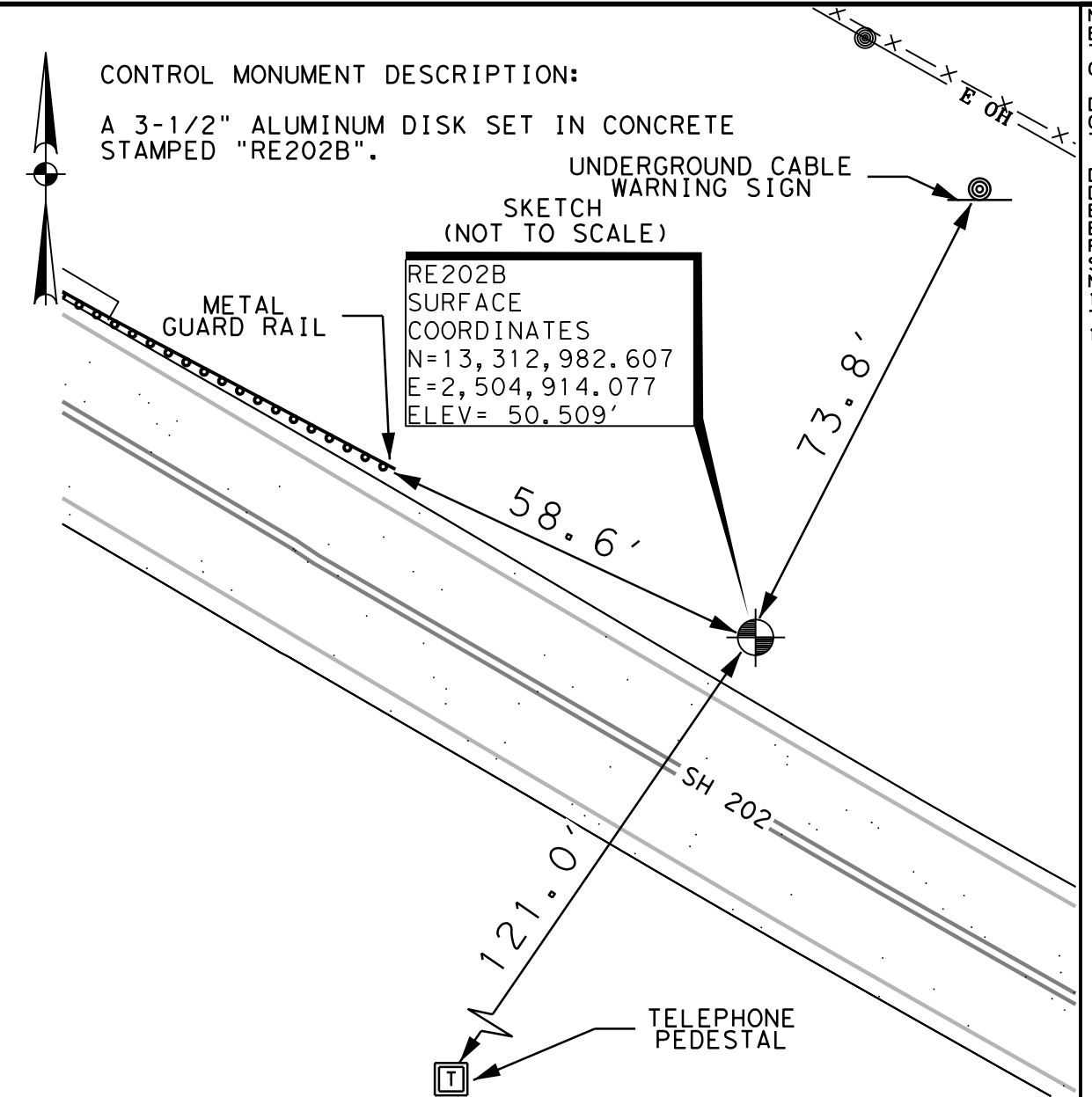
RE202A

APPROXIMATE LOCATION:

A 3-1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "RE202A" LOCATED IN THE SOUTH RIGHT-OF-WAY OF STATE HIGHWAY 202, APPROXIMATELY 3.4 MILES WEST OF U. S. HIGHWAY 183, APPROXIMATELY 50.0 FEET NORTHEAST OF A 3-INCH METAL CORNER POST, APPROXIMATELY 94.0 FEET SOUTH OF A WOOD POWER POLE, AND APPROXIMATELY 176.0 FEET SOUTHEAST OF A "BRIDGE MAY ICE" SIGN.

US SURVEY FEET
 TEXAS SOUTH CENTRAL ZONE 4204
 NORTH AMERICAN DATUM OF 1983 (NAD83)
 GEOID 18 MODEL
 DATE SET: SEPTEMBER 12, 2022
 TXDOT SURFACE ADJUSTMENT FACTOR: 1.00000000

GRID NORTHING:	13,313,777.397
GRID EASTING:	2,503,485.147
SURFACE NORTHING:	13,313,777.397
SURFACE EASTING:	2,503,485.147
NAVD88 ELEVATION:	76.289'



RE202B

APPROXIMATE LOCATION:

A 3-1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "RE202B" LOCATED IN THE NORTH RIGHT-OF-WAY OF STATE HIGHWAY 202, APPROXIMATELY 3.1 MILES WEST OF U. S. HIGHWAY 183, APPROXIMATELY 121.0 FEET NORTHEAST OF A TELEPHONE PEDESTAL, APPROXIMATELY 73.8 FEET SOUTHWEST OF AN UNDERGROUND CABLE WARNING SIGN, AND APPROXIMATELY 58.6 FEET SOUTHEAST OF A METAL GUARD RAIL.

US SURVEY FEET
 TEXAS SOUTH CENTRAL ZONE 4204
 NORTH AMERICAN DATUM OF 1983 (NAD83)
 GEOID 18 MODEL
 DATE SET: SEPTEMBER 12, 2022
 TXDOT SURFACE ADJUSTMENT FACTOR: 1.00000000

GRID NORTHING:	13,312,982.607
GRID EASTING:	7,135,987.007
SURFACE NORTHING:	13,312,982.607
SURFACE EASTING:	7,135,987.007
NAVD88 ELEVATION:	50.509'

NOTES:
 BEARING BASIS BEING GRID NORTH, TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NAD83 (NAD83 (2011 ADJUSTMENT) EPOCH 2010), DETERMINED BY GPS OBSERVATIONS, CALCULATED FROM THEIR TXDOT REAL TIME NETWORK (RTN) STATION REFUGIO (TXRF). ALL COORDINATES AND DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY THE TXDOT COUNTY WIDE SCALE FACTOR OF 1.0000000. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AS DETERMINED BY THE TXDOT REAL TIME NETWORK (RTN) GEOID 18.



Mark E. Keeton 10/04/2022
 MARK E. KEETON DATE
 RPLS NO. 6790

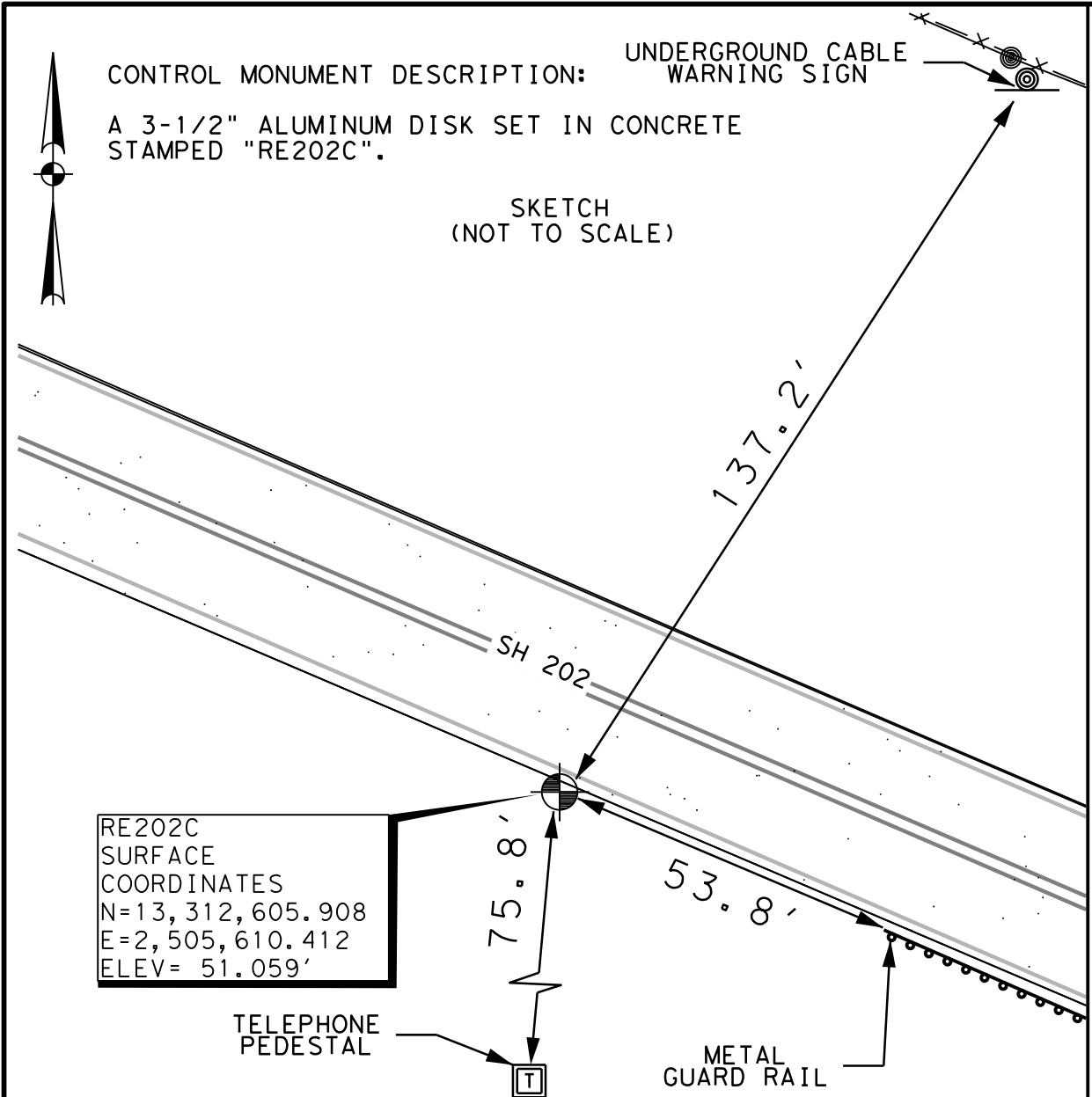
REVISIONS	BY	DATE



SURVEY CONTROL

FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.		SHEET NO.
				40
STATE	DISTRICT	COUNTY		HIGHWAY NO.
TEXAS	16	REFUGIO		
CONTROL	SECTION	JOB		
0447	04	018	SH 202	

10/4/2022 3:18:10 PM RETANAP J:\JOB\WJNS202-36-9\DP5090 WA#2 TXDOT Corpus District Br\docs\700 CADD\713 Survey\13.4 Control Surveys\WJNS202 CONTROL.dgn




RE202C
APPROXIMATE LOCATION:
 A 3-1/2" ALUMINUM DISK SET IN CONCRETE STAMPED "RE202C" LOCATED IN THE SOUTH RIGHT-OF-WAY OF STATE HIGHWAY 202, APPROXIMATELY 3.0 MILES WEST OF U.S. HIGHWAY 183, APPROXIMATELY 75.8 FEET NORTH OF TELEPHONE PEDESTAL, APPROXIMATELY 137.2 FEET SOUTH OF AN UNDERGROUND CABLE WARNING SIGN, AND APPROXIMATELY 53.8 FEET NORTHWEST OF A METAL GUARD RAIL.

US SURVEY FEET
 TEXAS SOUTH CENTRAL ZONE 4204
 NORTH AMERICAN DATUM OF 1983 (NAD83)
 GEOID 18 MODEL
 DATE SET: SEPTEMBER 12, 2022
 TXDOT SURFACE ADJUSTMENT FACTOR: 1.00000000

GRID NORTHING: 13,312,605.908
 GRID EASTING: 2,505,610.412
 SURFACE NORTHING: 13,312,605.908
 SURFACE EASTING: 2,505,610.412
 NAVD88 ELEVATION: 51.059'

NOTES:
 BEARING BASIS BEING GRID NORTH, TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NAD83 (NAD83 (2011 ADJUSTMENT) EPOCH 2010), DETERMINED BY GPS OBSERVATIONS, CALCULATED FROM THEIR TXDOT REAL TIME NETWORK (RTN) STATION REFUGIO (TXRF). ALL COORDINATES AND DISTANCES SHOWN ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY THE TXDOT COUNTY WIDE SCALE FACTOR OF 1.0000000. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AS DETERMINED BY THE TXDOT REAL TIME NETWORK (RTN) GEOID 18.




 MARK E. KEETON
 RPLS NO. 6790
 DATE 10/04/2022

REVISIONS	BY	DATE



SURVEY CONTROL

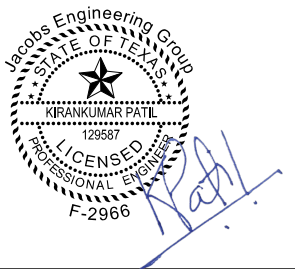
SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.	
		41	
STATE	DISTRICT	COUNTY	HIGHWAY NO.
TEXAS	16	REFUGIO	
CONTROL	SECTION	JOB	
0447	04	018	SH 202

Alignment Name: SH202CL
Alignment Description:

	Station	Easting	Northing
POT	191+92.800 R1	2503550.1580	13313766.1100
PC	206+94.466 R1	2504840.8390	13312998.5520
Tangential Direction:	S59°15'37.314"E		
Tangential Length:	1501.666		
PC	206+94.466 R1	2504840.8390	13312998.5520
PI	209+98.303 R1	2505101.9860	13312843.2490
CC		2507294.2990	13317124.1460
PT	213+01.330 R1	2505380.6320	13312722.1150
Radius:	4800		
Delta:	07°14'38.059" Left		
Degree of Curvature (Arc):	01°11'37.183"		
Length:	606.864		
Tangent:	303.837		
Chord:	606.46		
Middle Ordinate:	9.588		
External:	9.607		
Tangent Back Direction:	S59°15'37.314"E		
Radial Direction:	S30°44'22.686"W		
Chord Direction:	S62°52'56.343"E		
Radial Direction:	S23°29'44.627"W		
Tangent Ahead Direction:	S66°30'15.373"E		
PT	213+01.330 R1	2505380.6320	13312722.1150
POT	213+22.765 R1	2505400.2890	13312713.5700
Tangential Direction:	S66°30'15.373"E		
Tangential Length:	21.434		

03/07/2024



Jacobs 1899 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 202

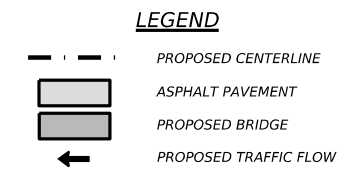
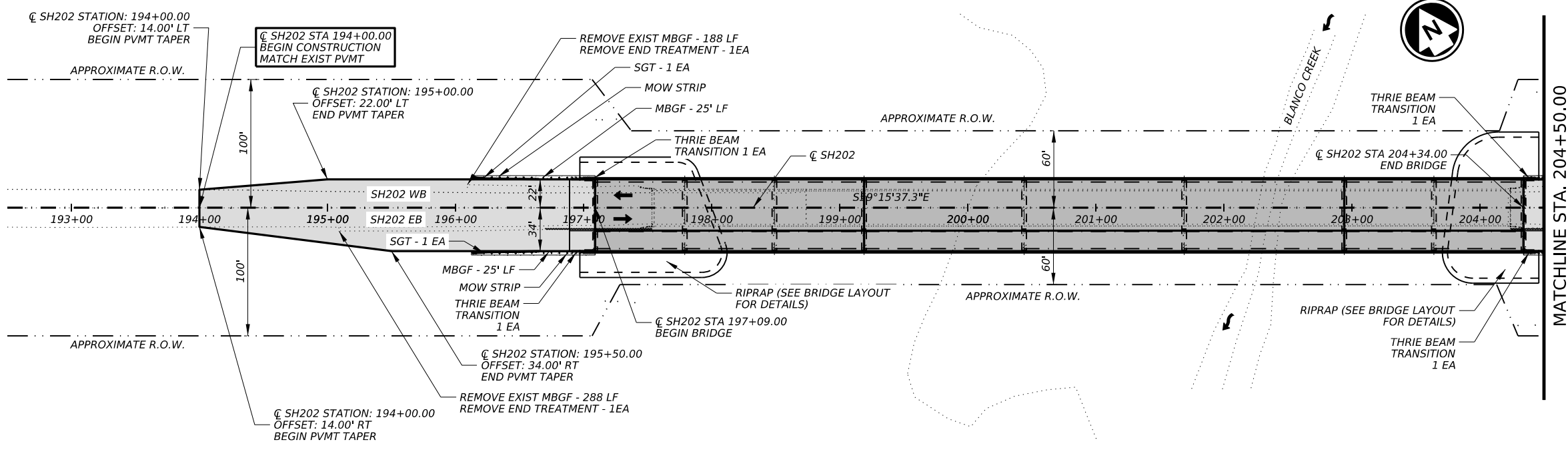
ROADWAY

HORIZONTAL ALIGNMENT DATA

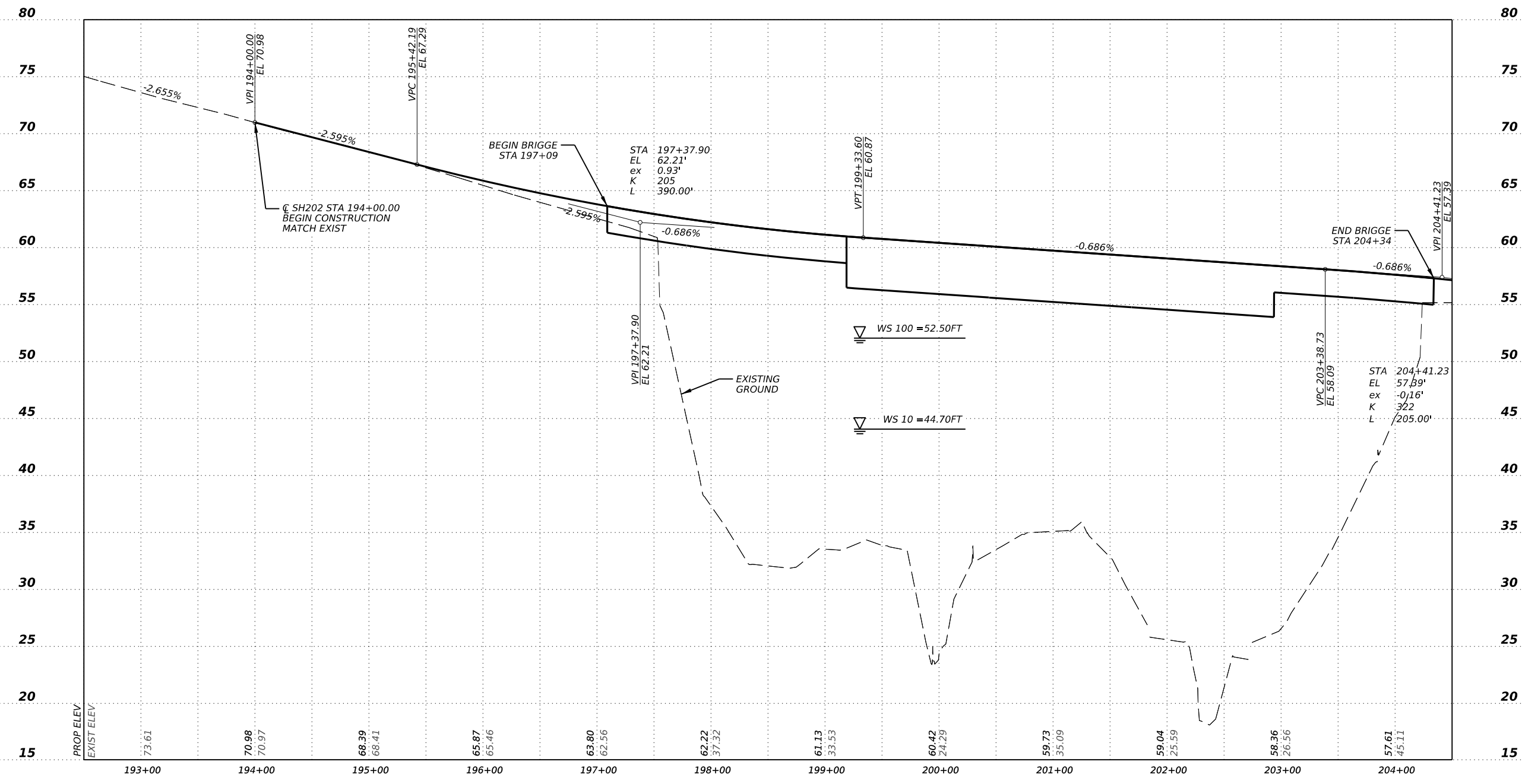
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	42	

DW: KM CK: KP
 DW: KM CK: KP
 DW: KM CK: KP



- NOTES:**
- SEE "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ADDITIONAL INFORMATION REGARDING HORIZONTAL ALIGNMENTS.
 - SEE TYPICAL SECTIONS FOR MORE INFORMATION REGARDING PAVING SECTION.



DATE: 3/7/2024 6:55 PM
 FILE: c:\pw\workdir\jacobs-amer-trans\p\dms58535\SH202 RPPM01.dgn

03/07/2024

Jacobs

Texas Department of Transportation

SH 202

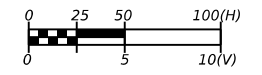
ROADWAY

PLAN & PROFILE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	43	

DW: KM CK: KP
 DW: KM CK: KP
 CK: KP

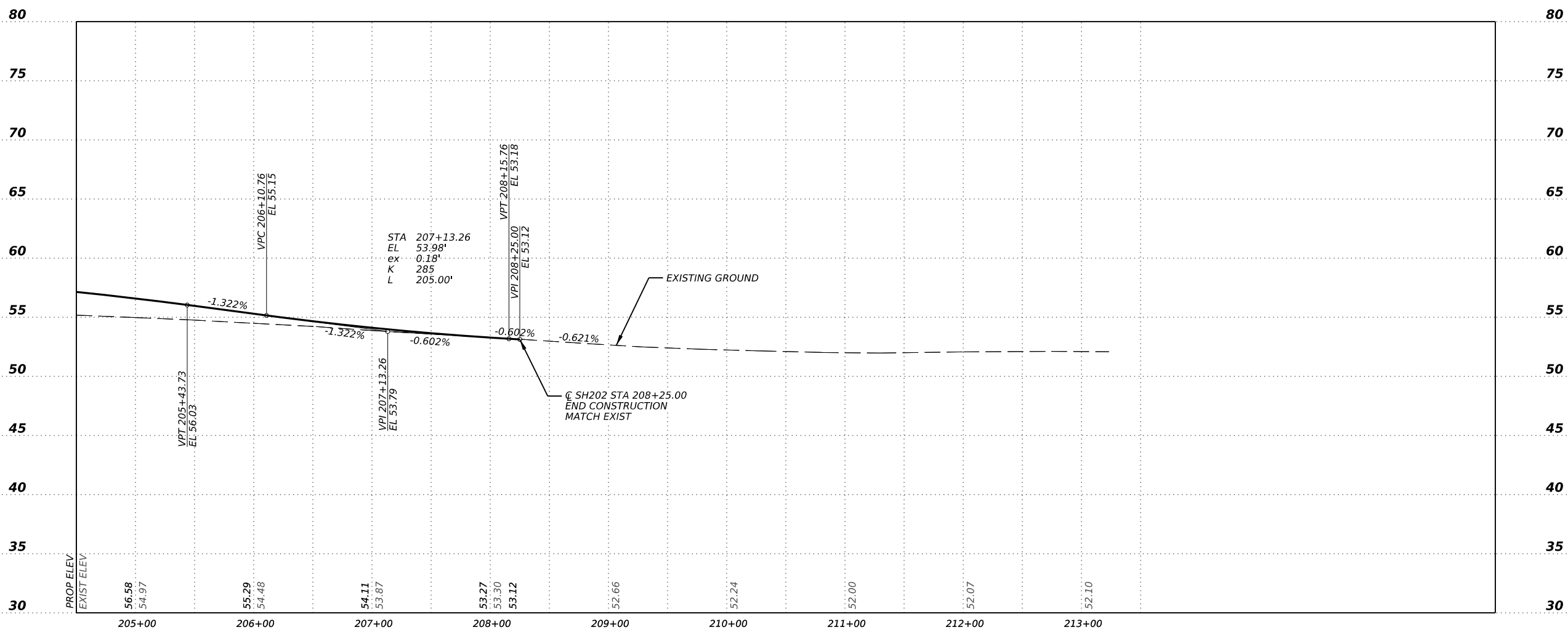
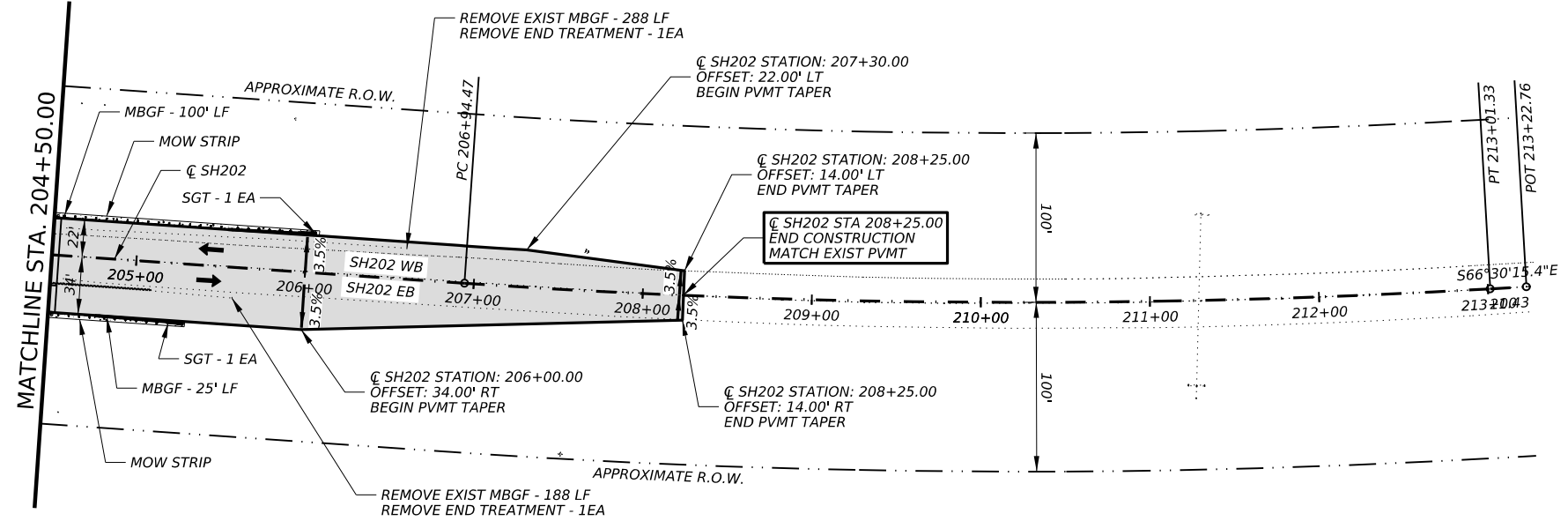


LEGEND

- PROPOSED CENTERLINE
- ASPHALT PAVEMENT
- PROPOSED BRIDGE
- PROPOSED TRAFFIC FLOW

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ADDITIONAL INFORMATION REGARDING HORIZONTAL ALIGNMENTS.
2. SEE TYPICAL SECTIONS FOR MORE INFORMATION REGARDING PAVING SECTION.



DATE: 3/7/2024 6:56 PM
 FILE: c:\pw\workdir\jacobs-amer-trans\p\dms58535\SH202 RPPM02.dgn

03/07/2024

1899 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

SH 202

ROADWAY

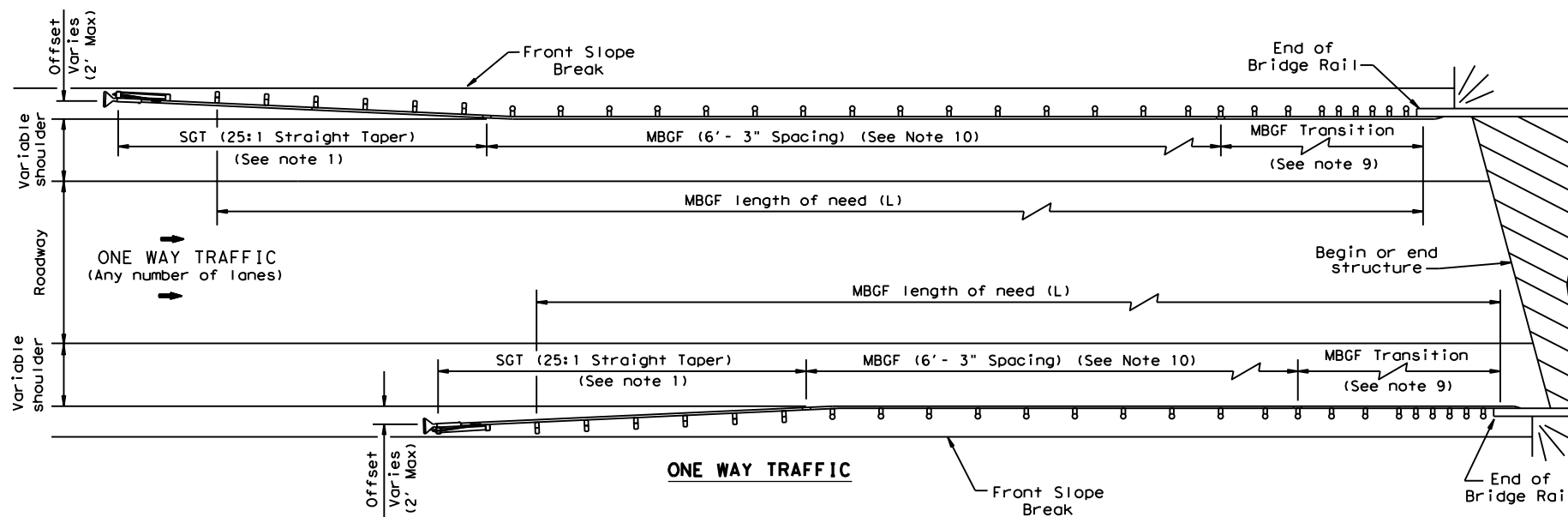
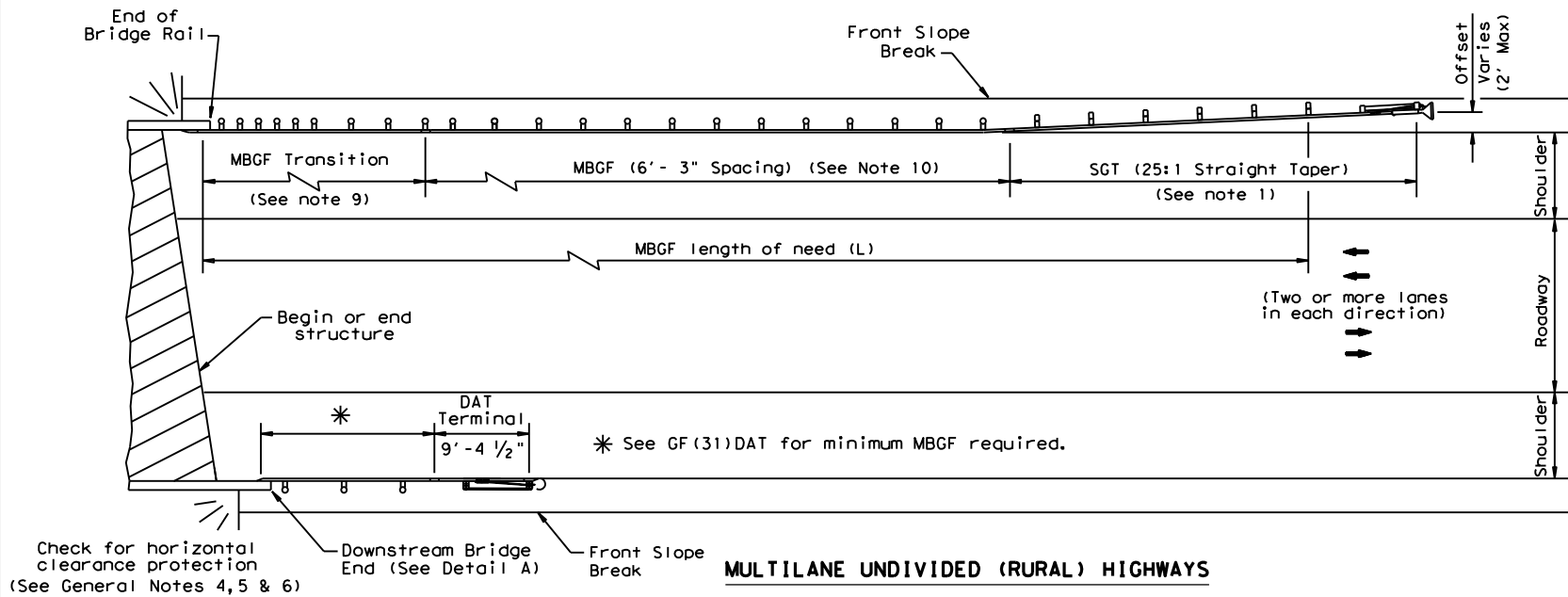
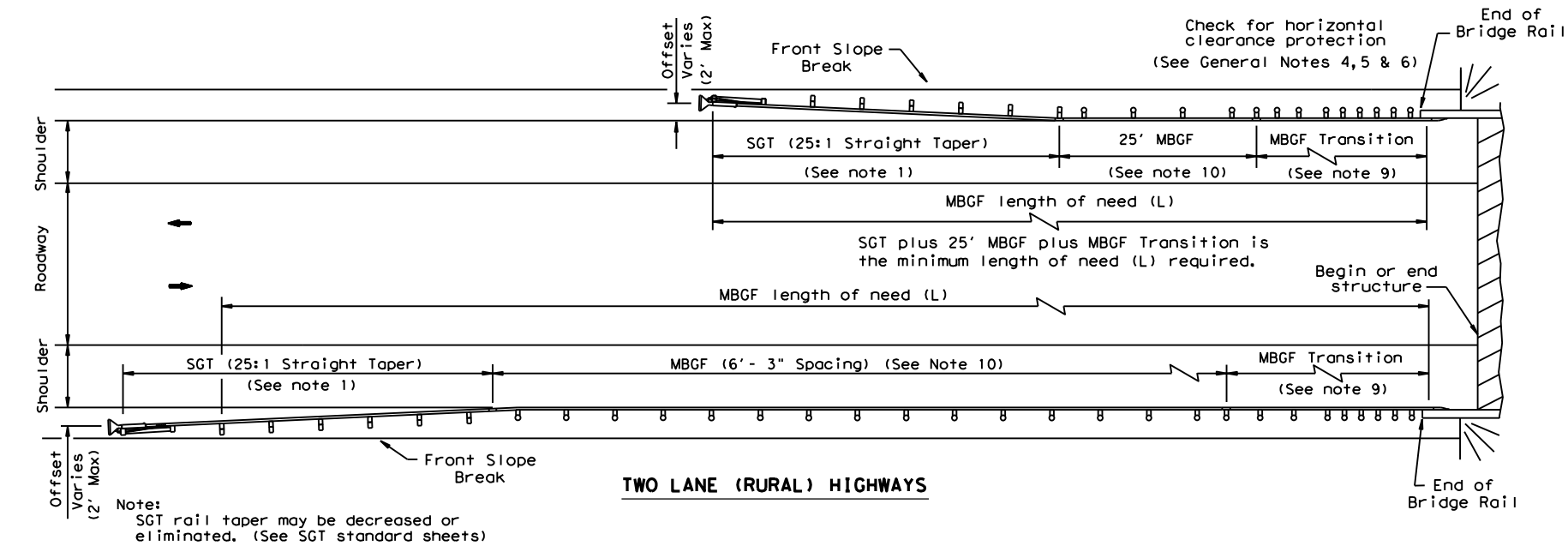
PLAN & PROFILE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	44

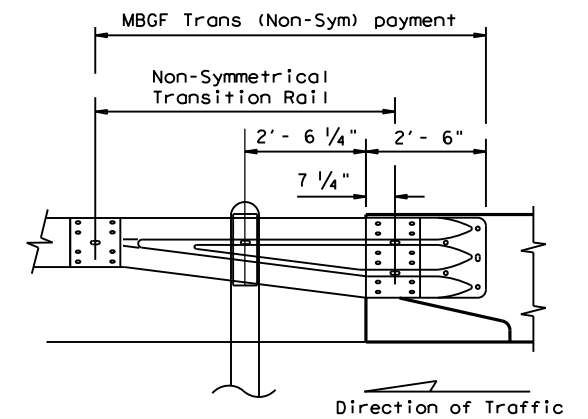
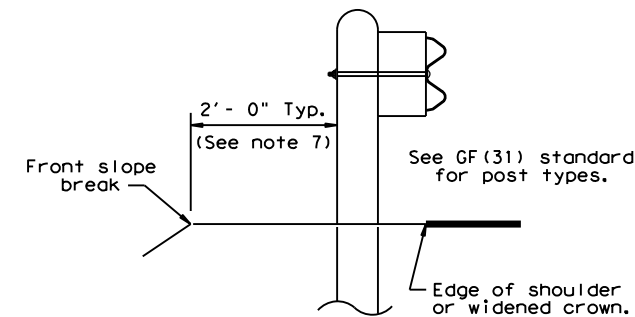
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



GENERAL NOTES

1. For more detail: See GF(31), SGT()31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBSG) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBSG 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.
4. MBSG may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBSG consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBSG 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)
7. The crown shall be widened to accommodate MBSG. Typically the "front slope" break should be 2'-0" from the back of the MBSG 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 MBSG).
8. For restrictive bridge widths: The MBSG should be properly transitioned from the existing bridge rail to the adjoining MBSG (See MBSG Transition Standards). Metal beam guard fence at these bridge location(s) 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.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBSG will be required.

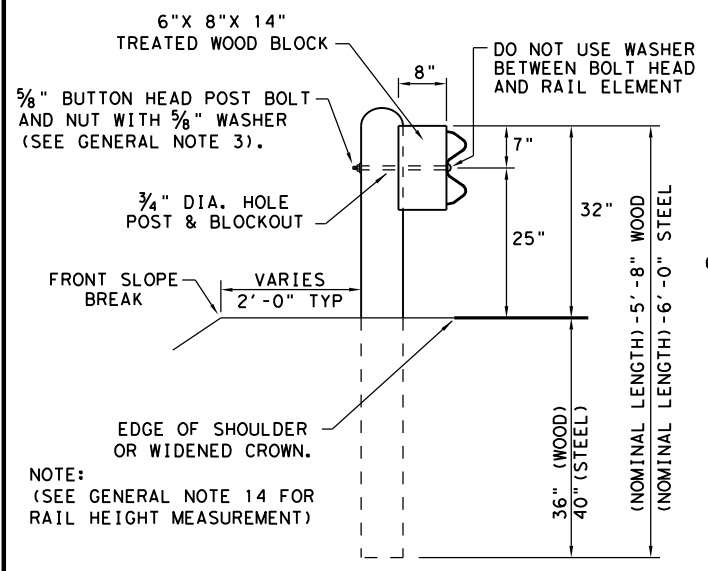


Note: All rail elements shall be lapped in the direction of adjacent traffic.

		Design Division Standard	
BRIDGE END DETAILS (METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)			
BED-14			
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP
© TxDOT: December 2011	CONT	SECT	JOB
REVISIONS	0447	04	018
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	45

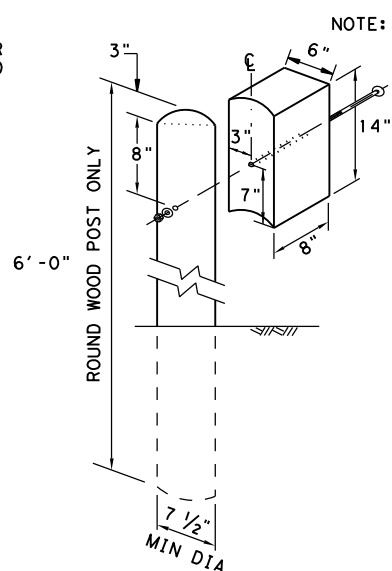
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: FILE:

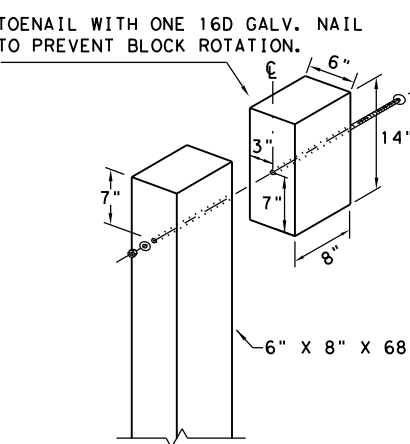


TYPICAL POST PLACEMENT

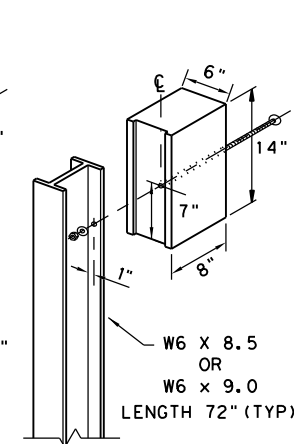
NOTE: (SEE GENERAL NOTE 14 FOR RAIL HEIGHT MEASUREMENT)



WOOD BLOCK TO ROUND WOOD POST

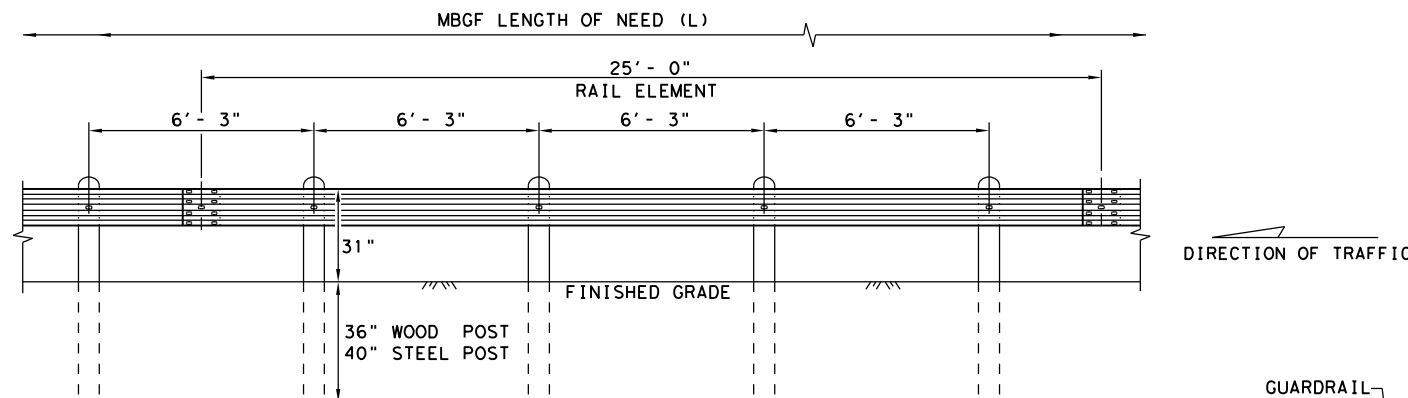


WOOD BLOCK TO RECTANGULAR WOOD POST



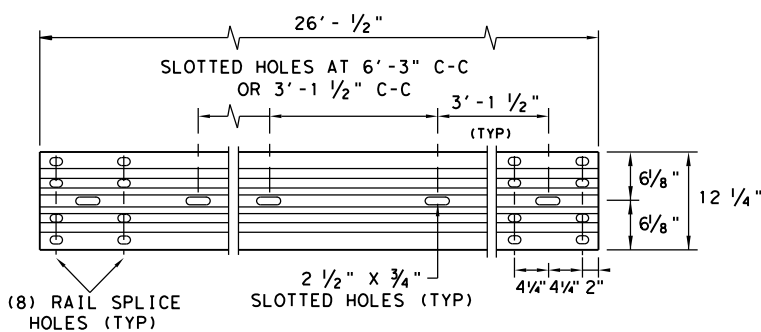
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25' - 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25' - 0" (NOM.) W-BEAM SECTION

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"

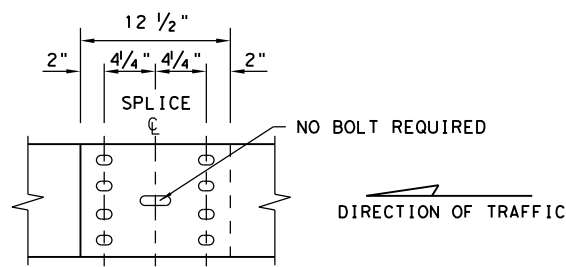
POST & BLOCK LENGTH

FBB03 = 10"

FBB04 = 18"

BUTTON HEAD BOLT

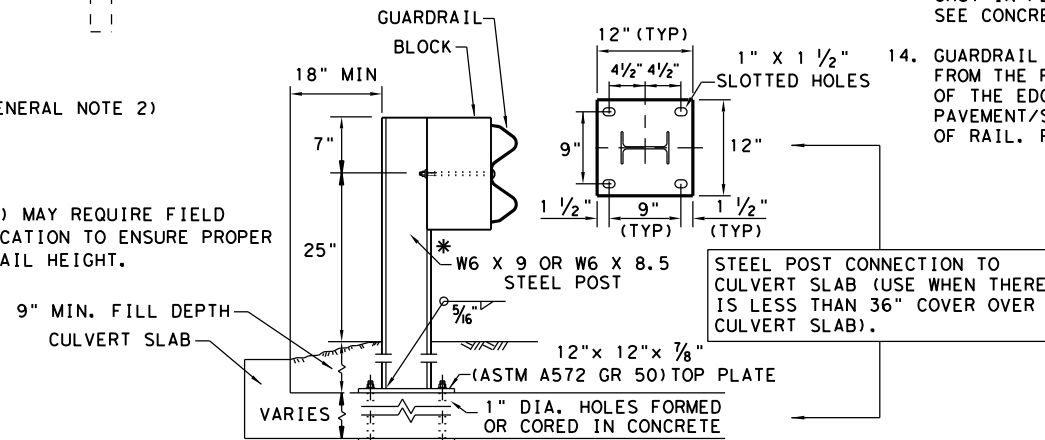
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.



LOW FILL CULVERT POST

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.

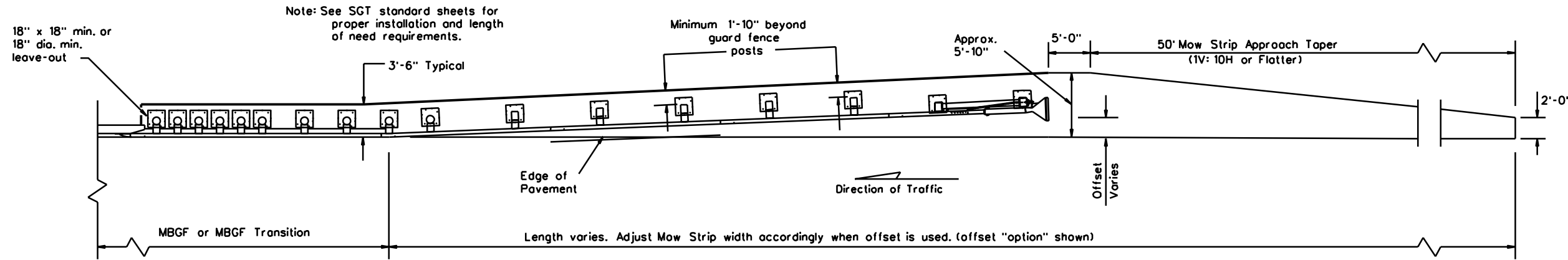
GENERAL NOTES

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/SOULDER 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.

NOTE: TRANSITIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS. SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS. SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

				Design Division Standard
METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF(31)-19				
FILE: gf3119.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CGL/AG
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	46	

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.



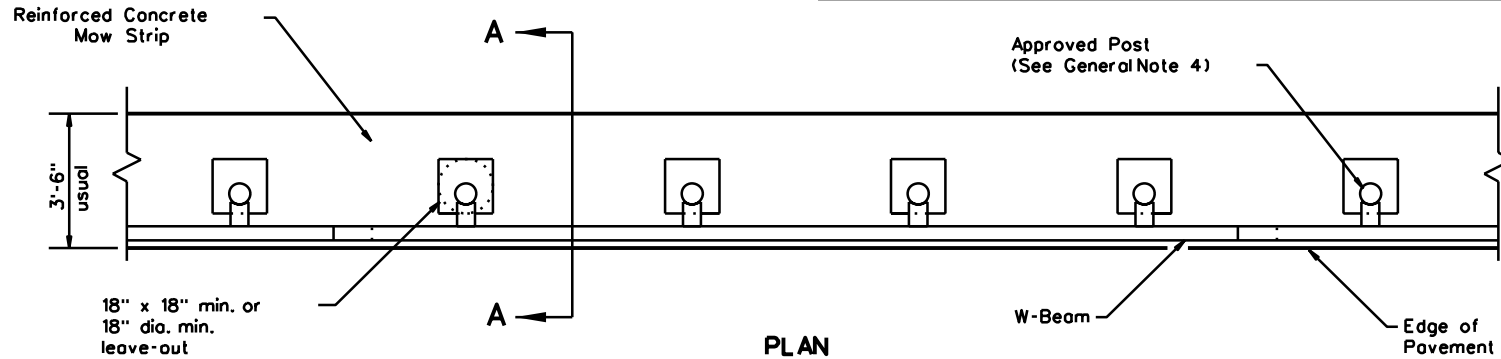
Note: See SGT standard sheets for proper installation and length of need requirements.

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.

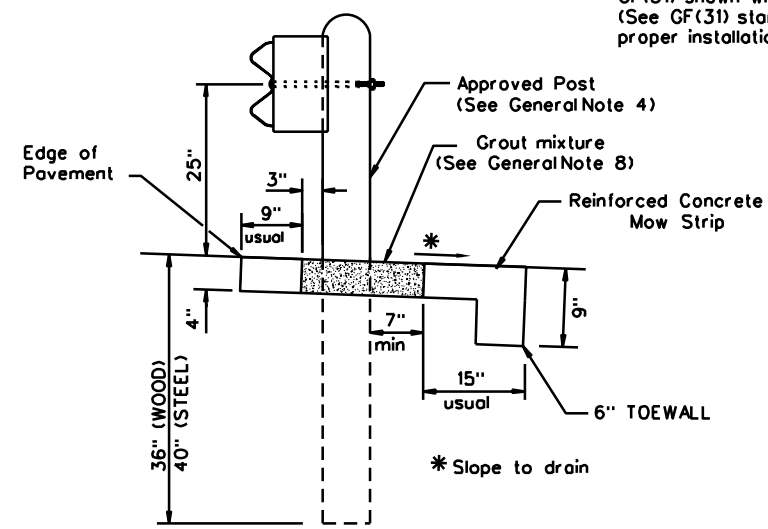
GENERAL NOTES

1. 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.
2. Mow strips shall be asphaltic pavement or reinforced concrete (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Asphaltic pavement shall meet the requirements of the item, and be placed in accordance with the pertinent bid item as shown in the plans. 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.
3. The leave-out behind the post shall be a minimum of 7".
4. 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.
5. 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.
6. Thickness of the mow strip will be 4".
7. The limits of payment for asphaltic pavement or reinforced concrete will include leave-outs for the posts.
8. 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.

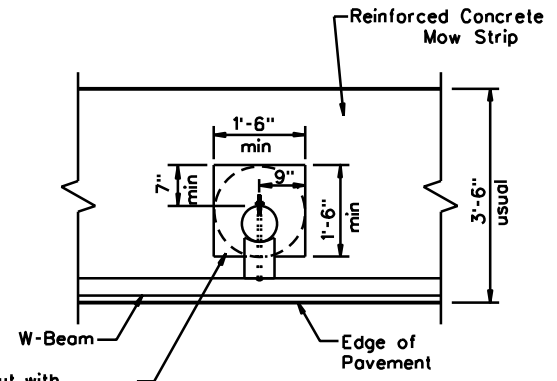


PLAN

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

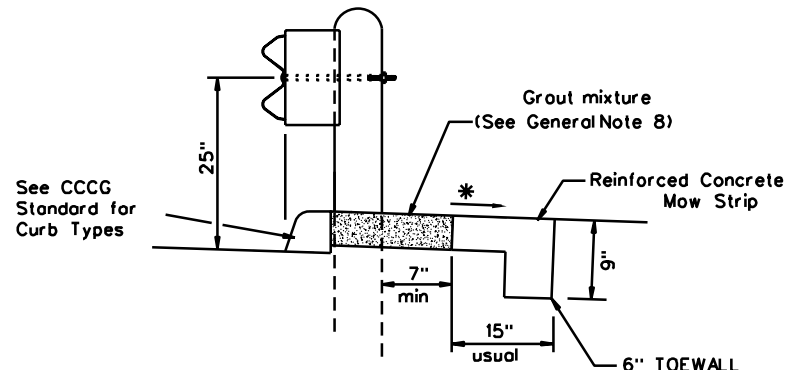


SECTION A-A
Typical



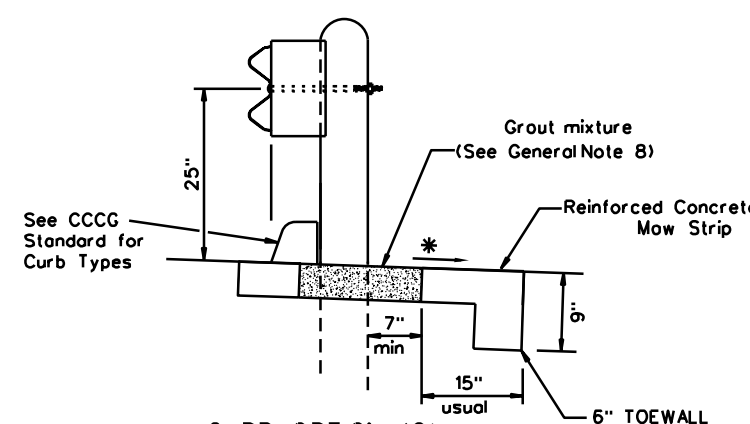
MOW STRIP DETAIL

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



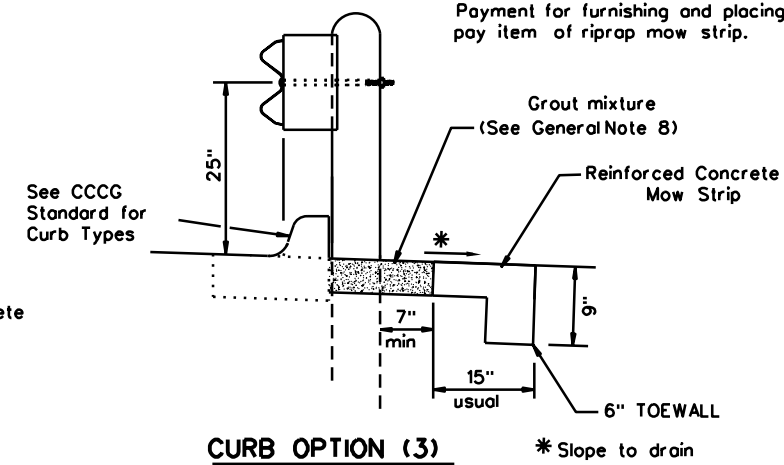
CURB OPTION (1)

This option will increase the post embedment through out the system.



CURB OPTION (2)

Curb shown on top of mow strip

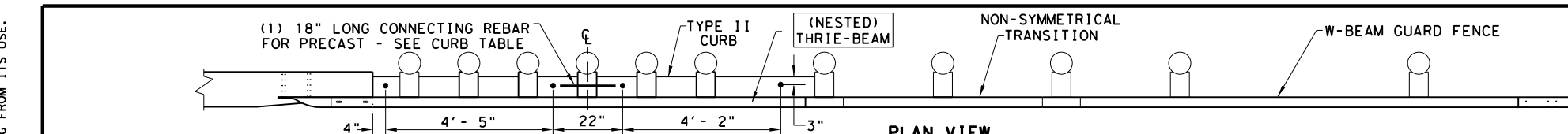


CURB OPTION (3)

DATE: \$DATE\$
 FILE: \$FILE\$

		Corpus Christi Standard	
METAL BEAM GUARD FENCE (MOW STRIP)			
CRP-GF(31)MS-19			
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: TXDOT
© TxDOT December 2011	CONT	SECT	JOB
REVISIONS	0447	04	018
Revised 11, 2019 KM	DIST	COUNTY	SH 202
CRP	REFUGIO	SHEET NO.	47

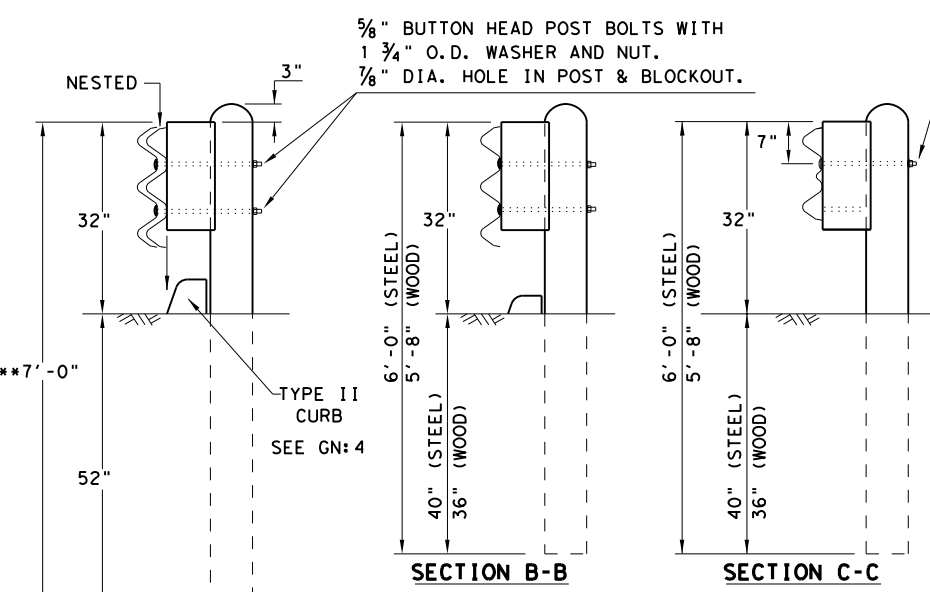
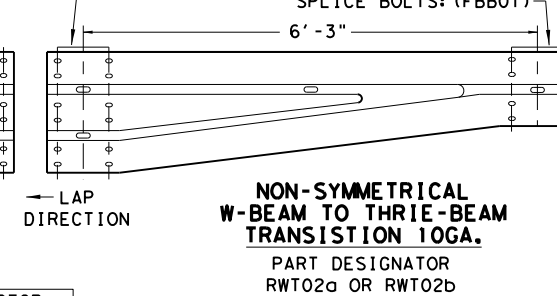
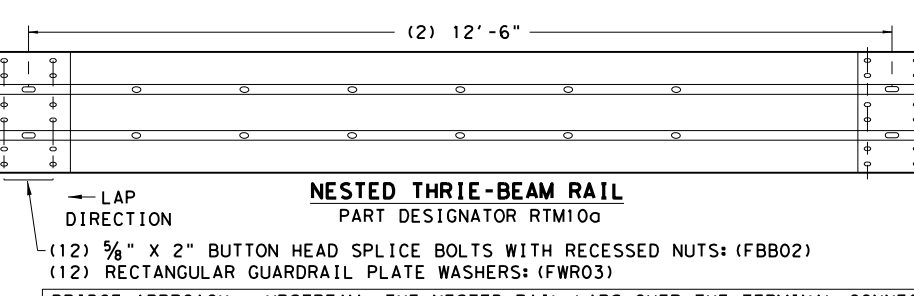
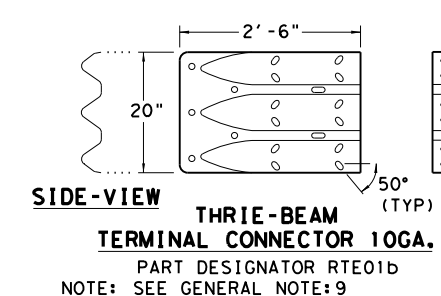
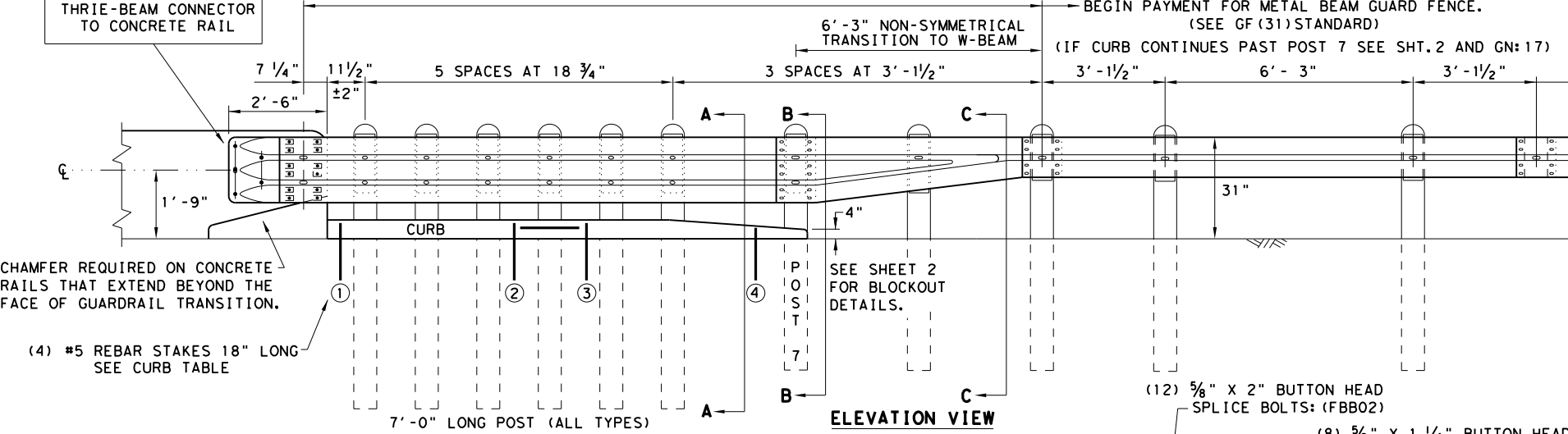
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TxDOT FOR ANY PURPOSE WHATSOEVER. TxDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



- (5) 1" DIA. HOLES.
- (5) 7/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR 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).

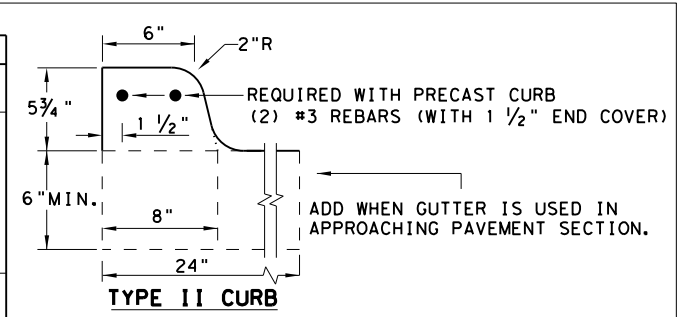
NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 7/8" HEX NUT. TRIM AS REQUIRED.

NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.



THRIE-BEAM TERMINAL - CURB TABLE	
PRECAST CURB FULL LENGTH EQUALS 12'- 2"	
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.	
CURB (1) LENGTH	5'- 8"
CURB (2) LENGTH	6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7	
CONNECTING PRECAST CURB SECTIONS (1) & (2):	
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END.	
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.	
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:	
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.	
FILL HOLES WITH APPROVED GROUT MIXTURE.	

* NOTES: NOT NEEDED FOR CAST-IN-PLACE. SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS. PERCUSSION DRILLING IS NOT PERMITTED WITH: TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.



NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCGG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE:17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF (31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. 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 (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. 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. TxDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF (31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION
SHEET 1 OF 2

Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF (31) TR TL3-20

FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
© TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	48	

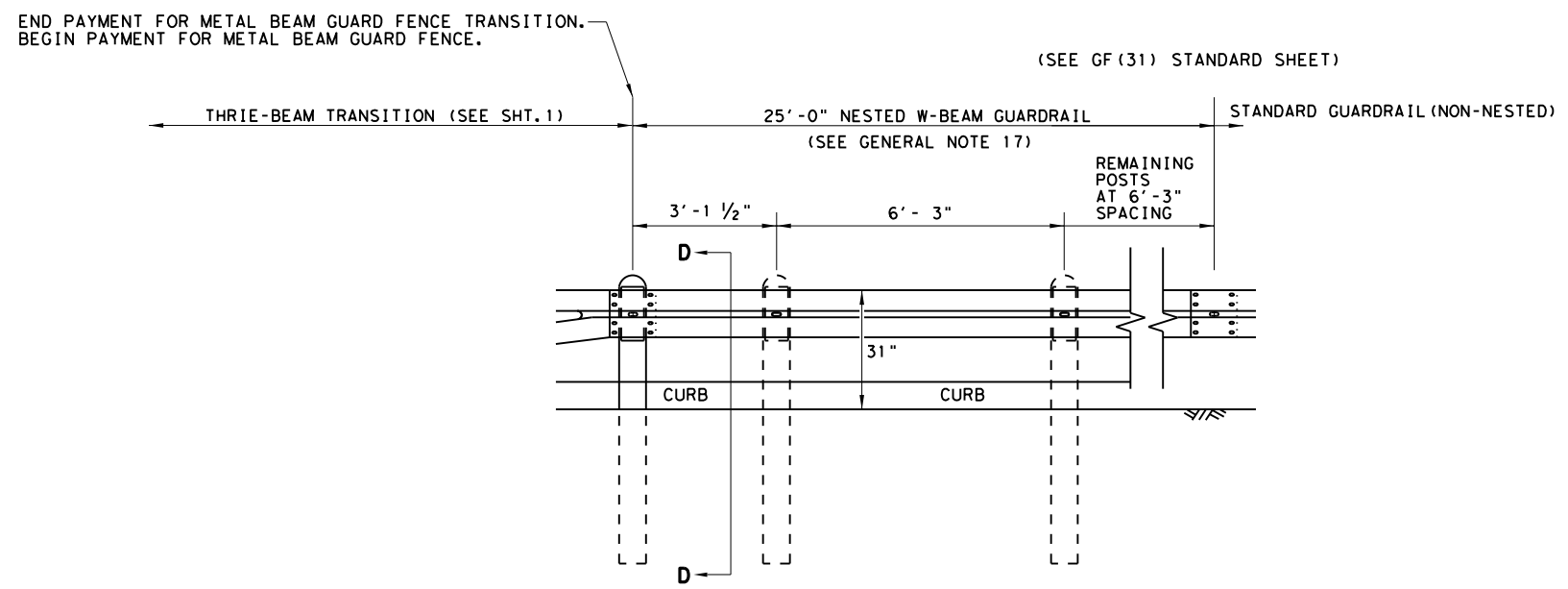
DATE: FILE:

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

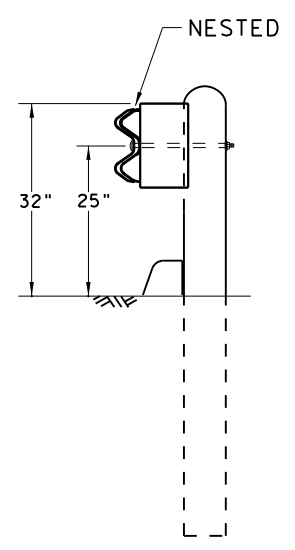
DISCLAIMER: THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE:
 FILE:

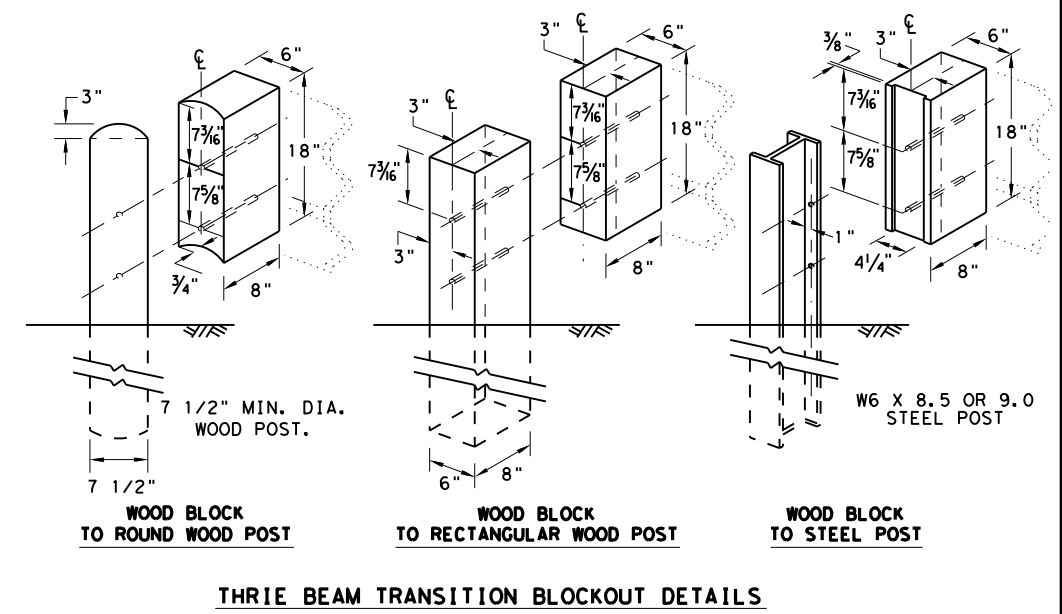
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



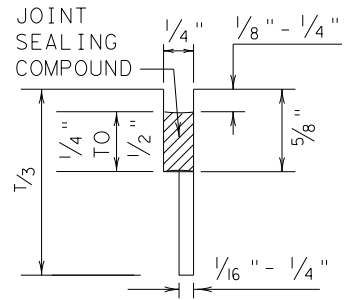
HIGH-SPEED TRANSITION

SHEET 2 OF 2

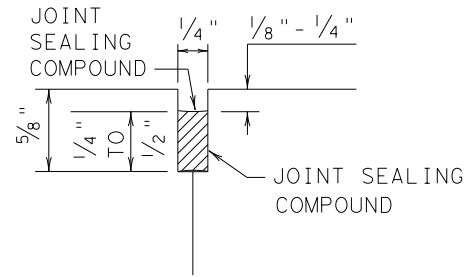
Texas Department of Transportation				<i>Design Division Standard</i>	
METAL BEAM GUARD FENCE THREE-BEAM TRANSITION TL-3 MASH COMPLIANT GF (31) TR TL3-20					
FILE: gf31tr+1320.dgn	DN: TXDOT	CK: KM	DW: KM	CK: CGL/AG	
©TXDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS			0447	04	018
DIST	COUNTY		SHEET NO.		
CRP	REFUGIO		49		

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.

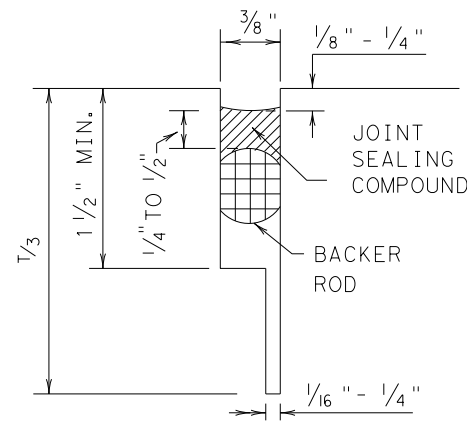
METHOD B: JOINT SEALING COMPOUND



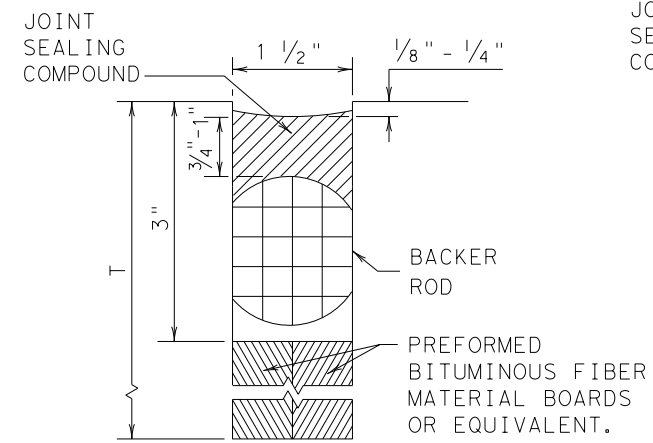
LONGITUDINAL SAWED CONTRACTION JOINT



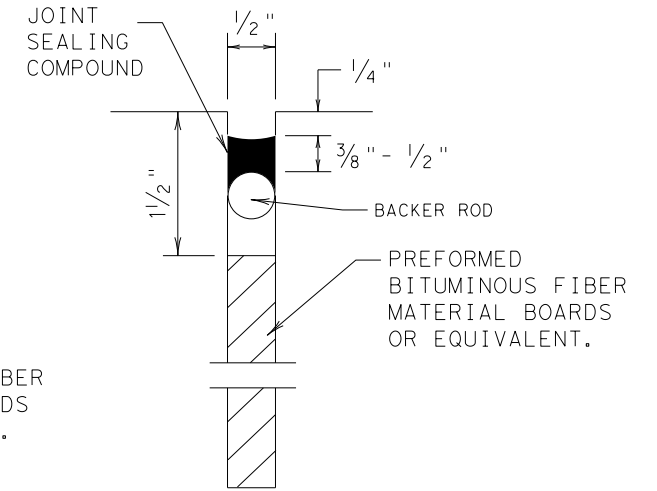
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

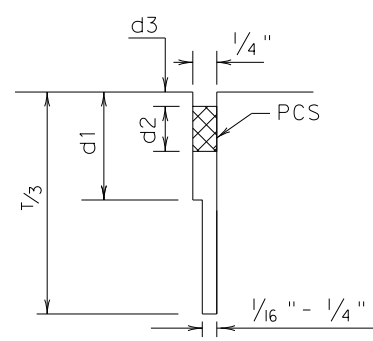


TRANSVERSE FORMED EXPANSION JOINT

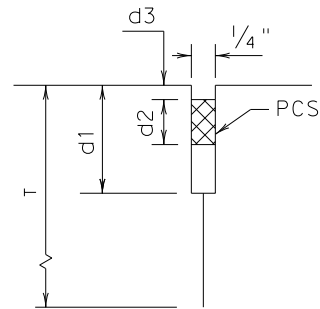


FORMED ISOLATION JOINT

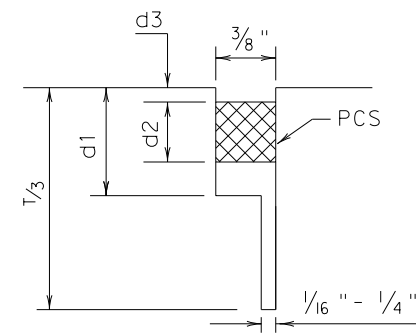
METHOD A: PREFORMED COMPRESSION SEALS (PCS) (DMS-6310 CLASS 6)



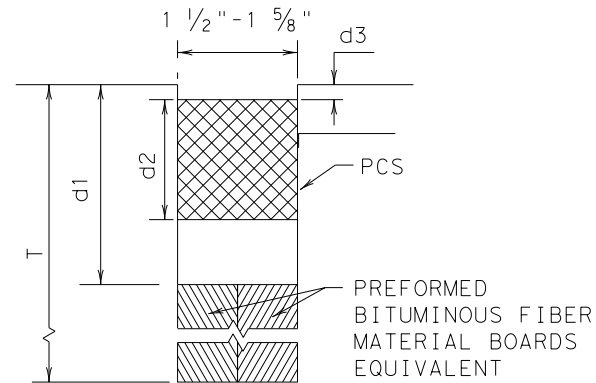
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

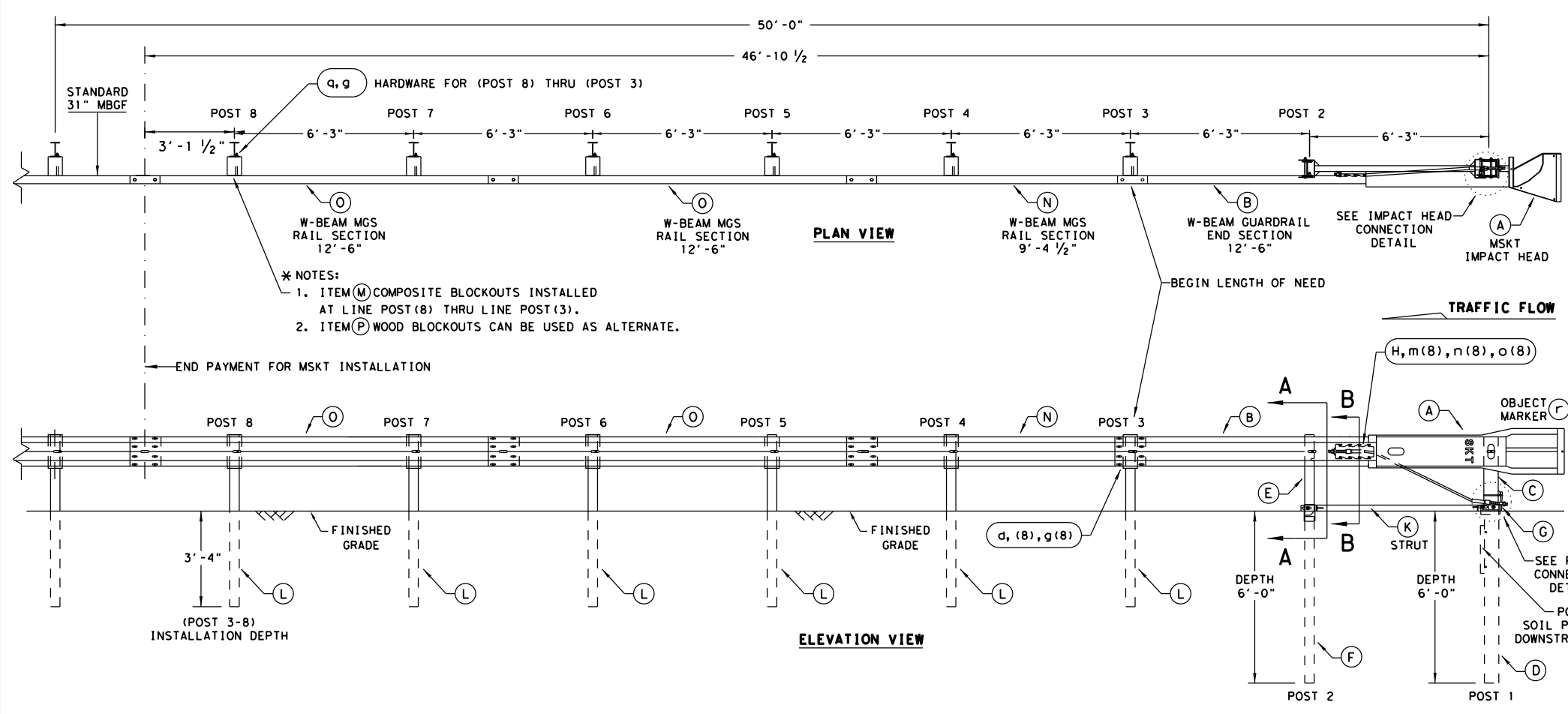
- UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
- THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
- THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
- DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
- REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
- FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
- FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
- THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
- ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

DATE:
FILE:

				Design Division Standard	
CONCRETE PAVING DETAILS JOINT SEALS JS-14					
FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN	
© TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
0447	04	018	SH 202		
DIST	COUNTY		SHEET NO.		
CRP	REFUGIO		50		

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

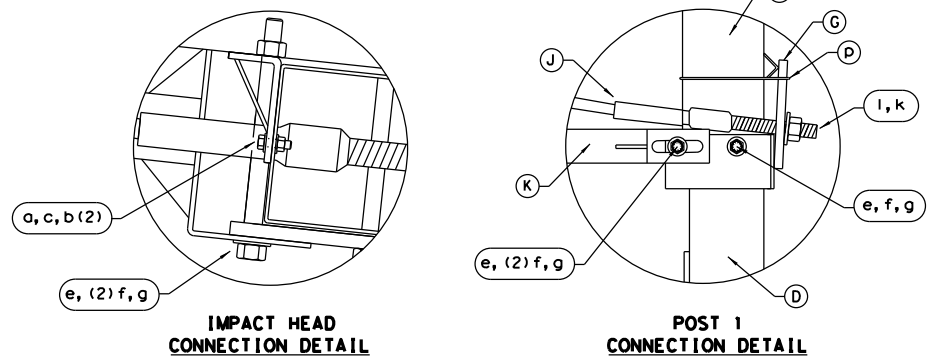
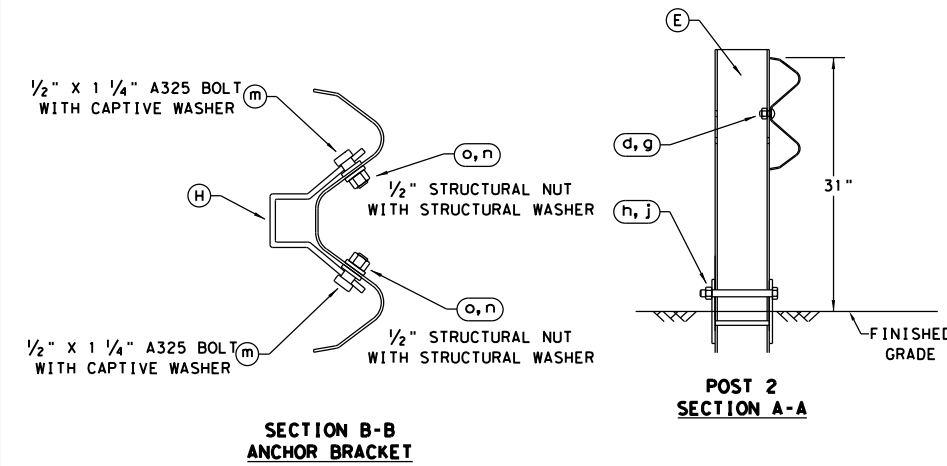
DATE: FILE:



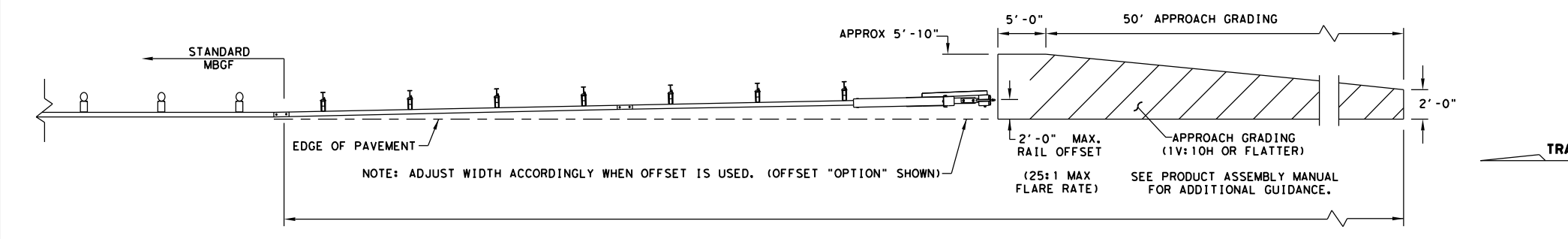
- * NOTES:**
- ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (8) THRU LINE POST (3).
 - ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

- 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 MBSGF STANDARD FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBSGF.
 - 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 ENCRoACHING 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" MBSGF PANELS, ONE 25'-0" MBSGF 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.

Design Division Standard

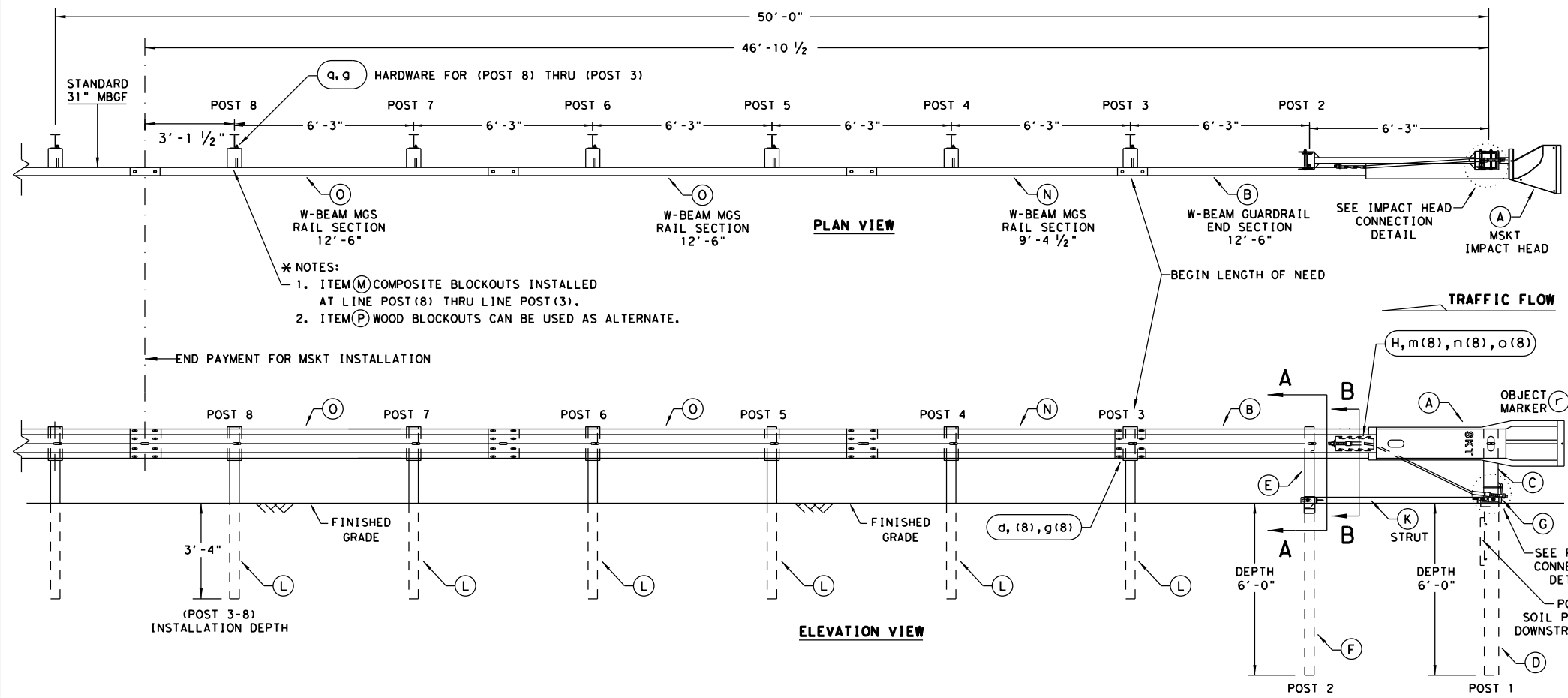
SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT (12S) 31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT SECT	JOB	HIGHWAY	
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY		SHEET NO.
	CRP	REFUGIO		51

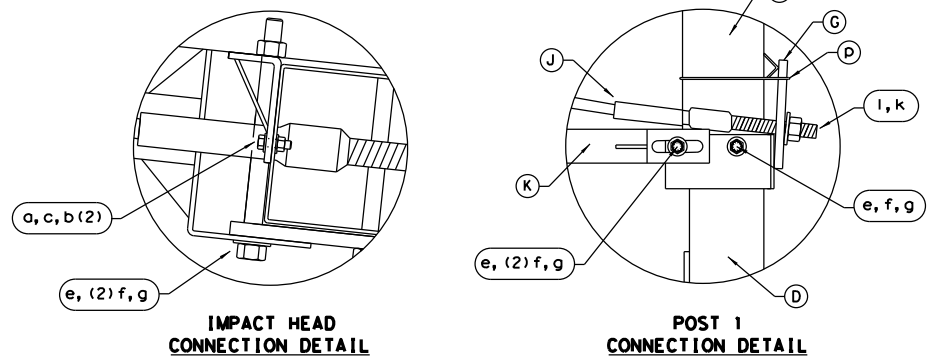
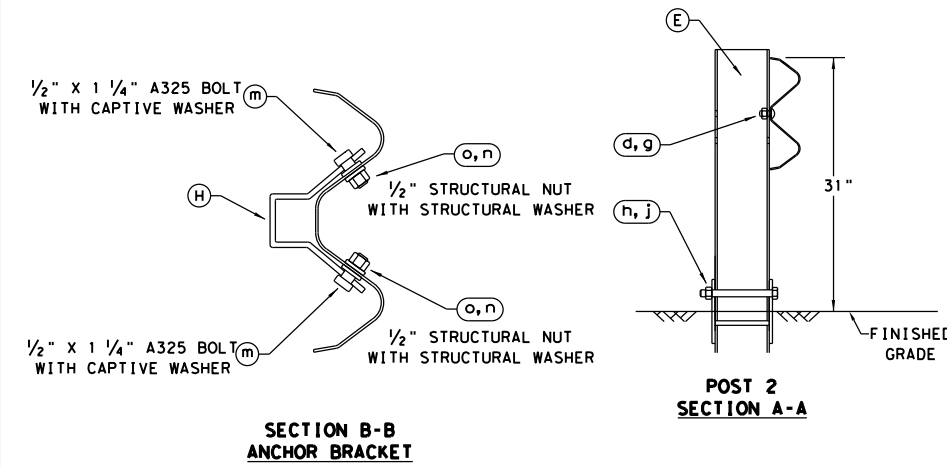
DISCLAIMER: THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



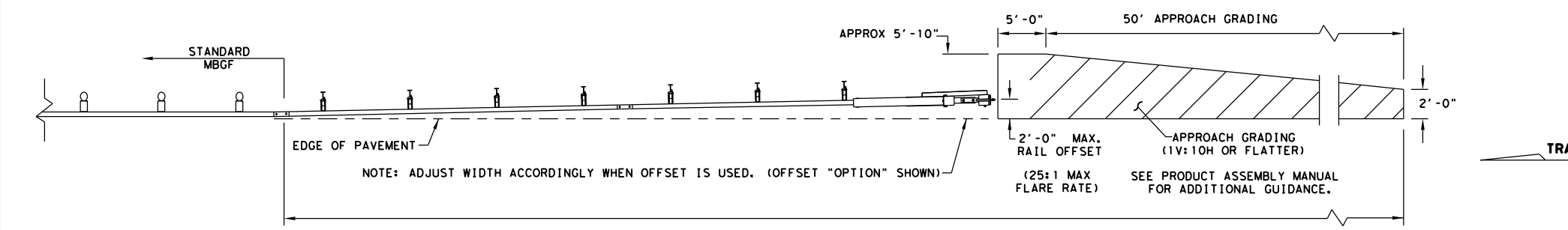
- * NOTES:**
- ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (8) THRU LINE POST (3).
 - ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

- 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 MBSGF STANDARD FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBSGF.
 - 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" MBSGF PANELS, ONE 25'-0" MBSGF 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.

Design Division Standard

SINGLE GUARDRAIL TERMINAL

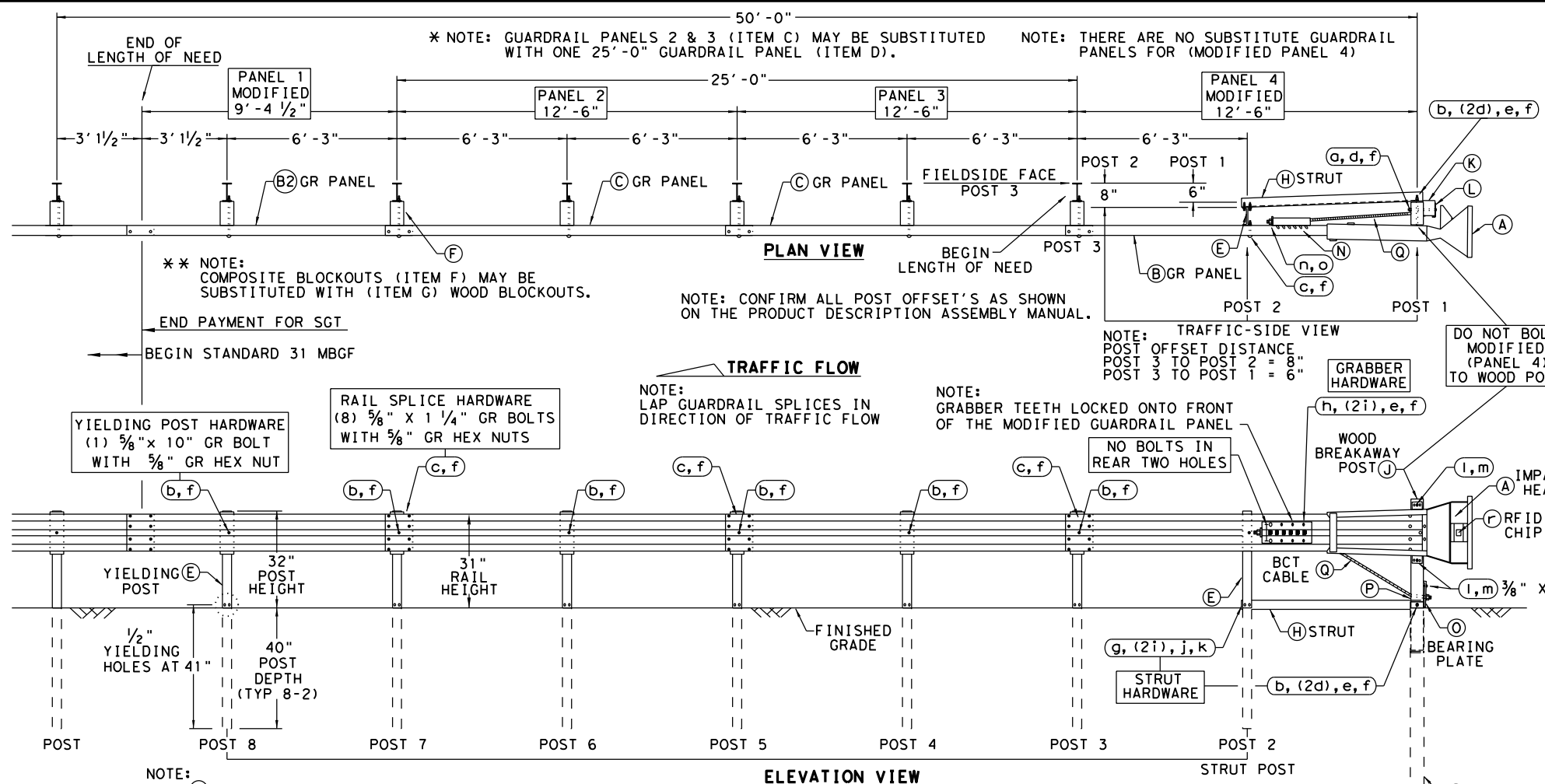
MSKT-MASH-TL-3

SGT (12S) 31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT SECT	JOB	HIGHWAY	
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY		SHEET NO.
	CRP	REFUGIO		51A

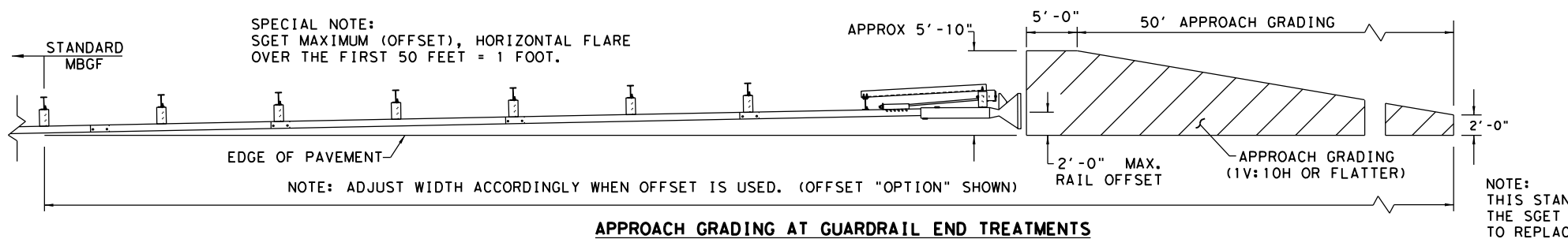
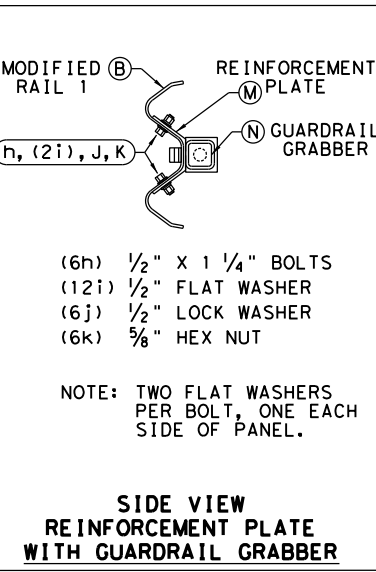
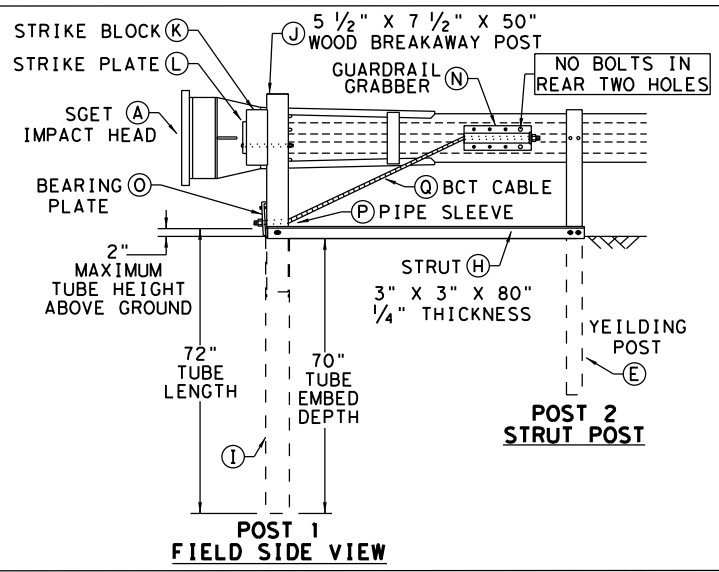
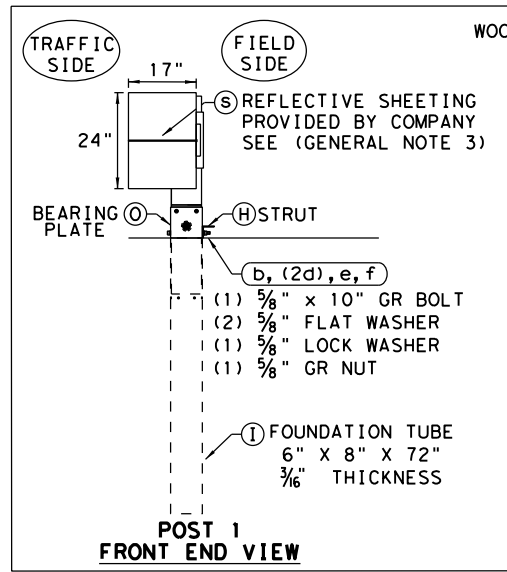
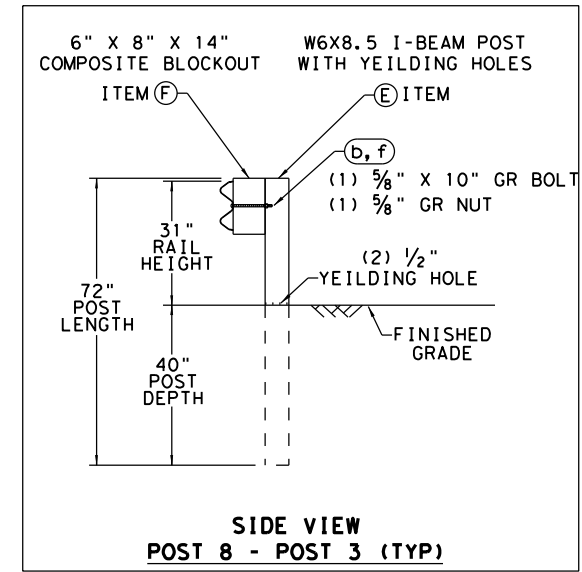
DATE: FILE:

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"	WBO8
H	1	STRUT 3" X 3" X 80" X 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" X 3/8"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" X 7 1/2" X 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBK14
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			
o	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 A563DH HDG	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



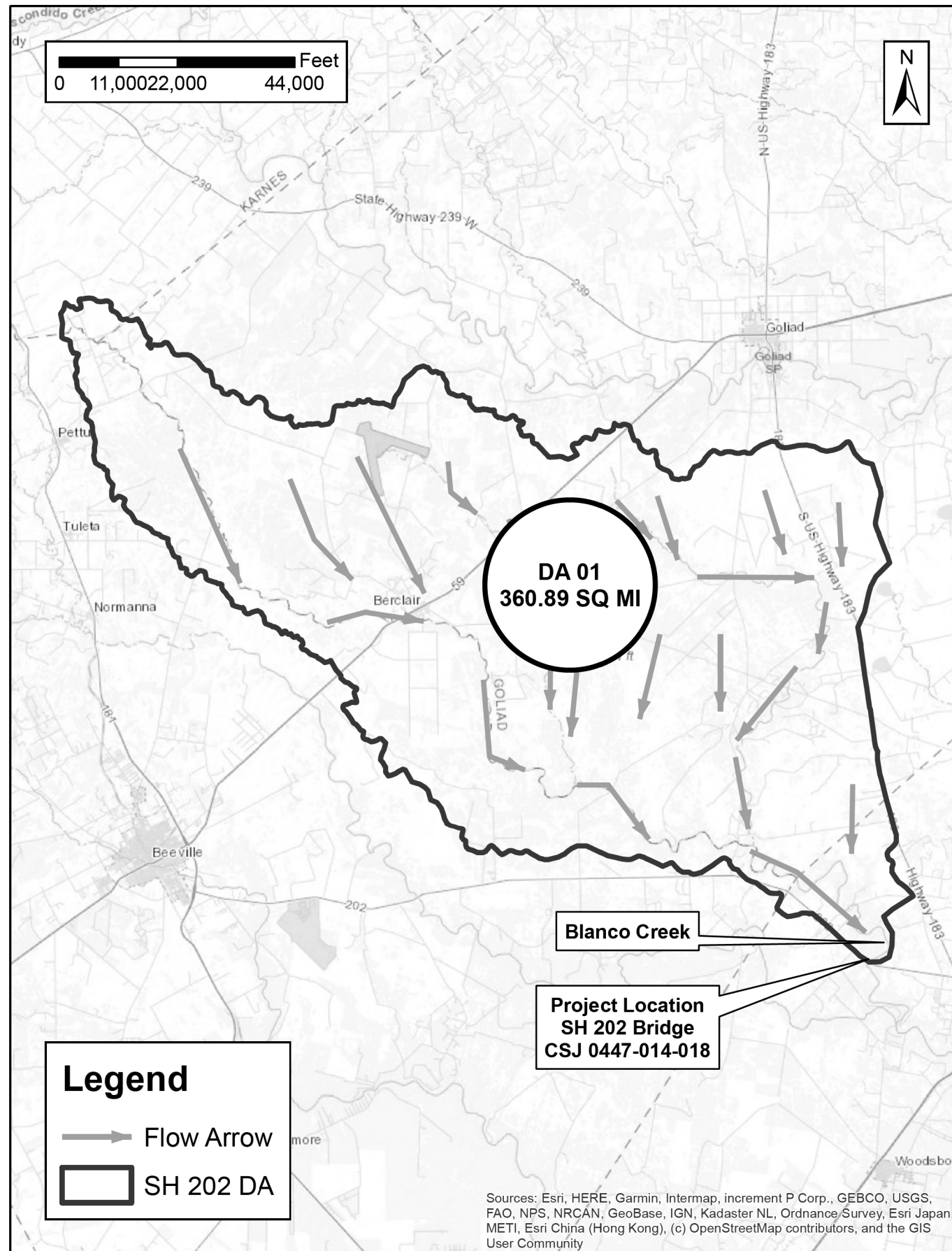
NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT (15) 31-20

FILE: sg+153120.dgn	DN: TXDOT	CK: KM	DW: VP	CK: VP
© TXDOT: APRIL 2020	CONT: 0447	SECT: 04	JOB: 018	HIGHWAY: SH 202
REVISIONS	DIST: CRP	COUNTY: REFUGIO	SHEET NO. 51B	

Texas Department of Transportation
Design Division Standard

DATE: FILE:

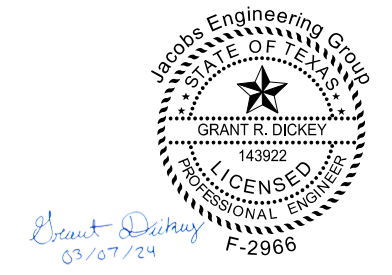


NOTES:

1. THIS PROJECT IS LOCATED IN FEMA DESIGNATED ZONE "AE" FIRM PANEL 48391C0275D EFFECTIVE DATE SEPTEMBER 26, 2014 FOR REFUGIO COUNTY.
2. COORDINATION WAS MADE WITH THE FLOODPLAIN ADMINISTRATOR FOR REFUGIO COUNTY, MR. ROBERT BLASCHKE ON NOVEMBER 28, 2022 AS A EXPLAINING THE PROJECT. THIS COORDINATION IS DOCUMENTED IN THE SH 202 BRIDGE REPLACEMENT DRAINAGE REPORT. JACOBS WILL PROVIDE FINAL REPORT PRESENTING THE CHANGE IN WATER SURFACE ANTICIPATED BASED ON THE ANALYSIS AND OFFERING THE TECHNICAL DATA FROM THE ANALYSIS.

REFERENCES:

1. TXDOT HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
2. TOPOGRAPHIC DATA SOURCES (TNRIS SOUTH TEXAS 2018 & SURVEY SITE DATA)



Jacobs 1899 BRYAN ST., SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 202

DRAINAGE
AREA MAP

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	52	

DRAINAGE AREA MAP

OMEGA EM REGRESSION CALCULATIONS:

Parameters Table		
PARAMETERS	INPUT	UNIT
Drainage Area =	360.89	sq.mi.
Main Channel Slope=	0.0013	ft/ft
P =	33	in
$\phi =$	0.197	-

Regression Flows Summary Table

PEAK FLOW	RESULT	UNIT
Q ₂ =	7373	cfs
Q ₅ =	16348	cfs
Q ₁₀ =	23592	cfs
Q ₂₅ =	35287	cfs
Q ₅₀ =	45747	cfs
Q ₁₀₀ =	58009	cfs
Q ₅₀₀ =	93215	cfs

PEAK DISCHARGE COMPARISON:

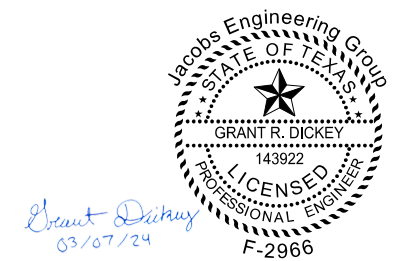
WATERSHED NAME	SOURCE	COMPUTED PEAK FLOWS						
		Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
DA 01	FIS Flows	10,786	15,195	17,900	27,740	39,700	50,600	77,400
	Omega Regression Flows	7,373	16,348	23,592	35,287	45,747	58,009	93,215

NOTES:

- EFFECTIVE DISCHARGES FROM THE FEMA FIS 48391CV000A EFFECTIVE DATE SEPTEMBER 26, 2014 FOR REFUGIO COUNTY ARE USED IN THIS STUDY FOR THE 10-YR, 50-YR, 100-YR, AND 500-YR FREQUENCY STORMS.
- THE 2-YR, 5-YR, AND 25-YR FREQUENCY STORM EVENT DISCHARGES WERE INTERPOLATED FROM THE EFFECTIVE FIS DISCHARGES USING BEST FIT TRENDLINE. SEE HYDRAULIC REPORT FOR ADDITIONAL DETAIL.

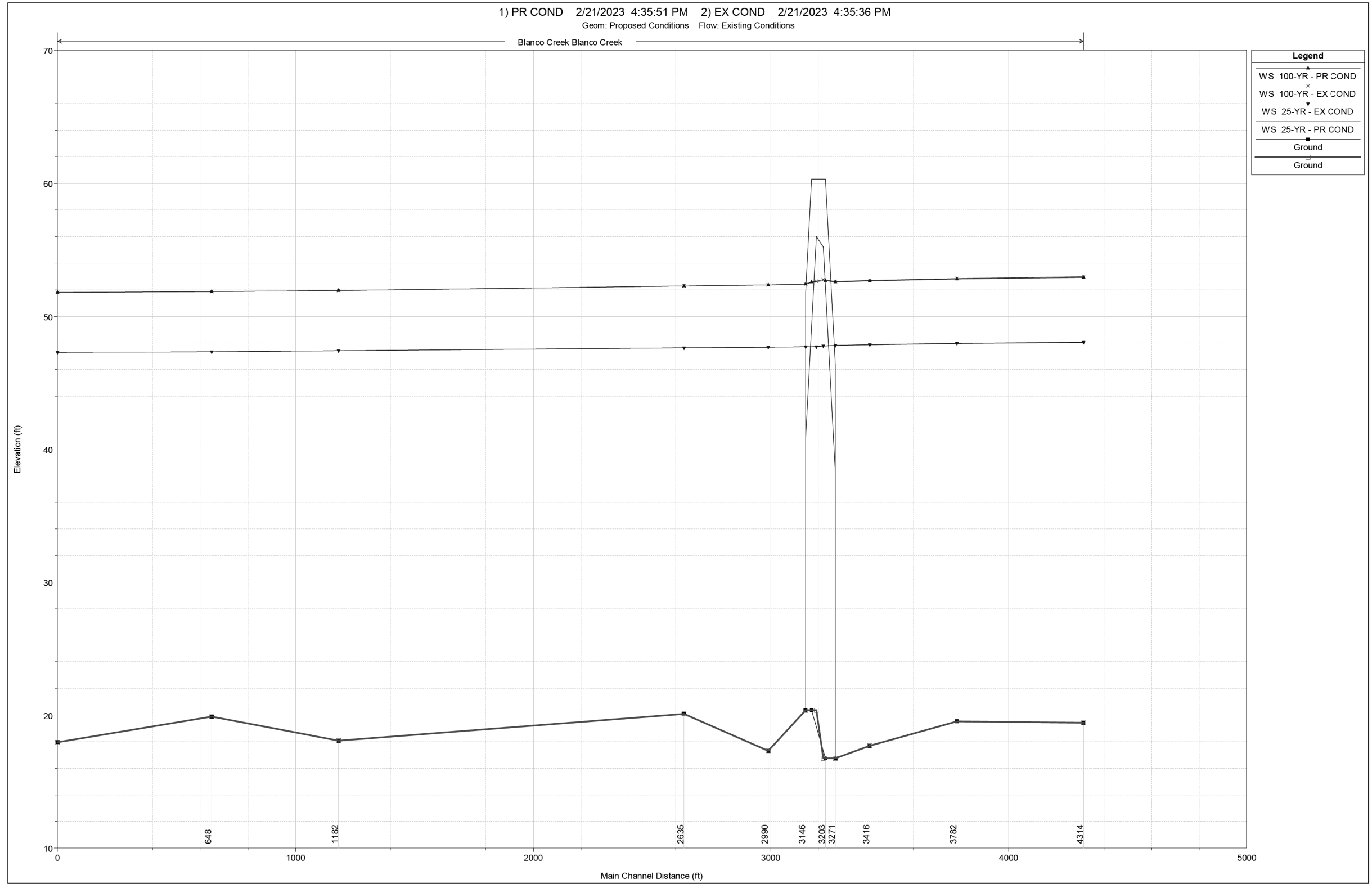
REFERENCES:

- TXDOT HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
- TOPOGRAPHIC DATA SOURCES (TNRIS SOUTH TEXAS 2018 & SURVEY SITE DATA)



SH 202
DRAINAGE
HYDROLOGIC DATA

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	53	

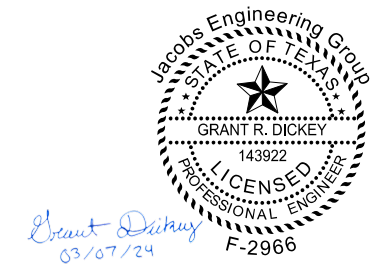


Legend

WS 100-YR - PR COND
WS 100-YR - EX COND
WS 25-YR - EX COND
WS 25-YR - PR COND
Ground
Ground

- NOTES:**
1. THIS PROJECT IS LOCATED IN FEMA DESIGNATED ZONE "AE". FIRM PANELS 48391C0275D EFFECTIVE DATE SEPTEMBER 26, 2014 FOR REFUGIO COUNTY.
 2. COORDINATION WAS MADE WITH THE FLOODPLAIN ADMINISTRATOR AS A LETTER EXPLAINING THE PROJECT, PRESENTING THE AMOUNT OF RISE ANTICIPATED BASED ON THE ANALYSIS AND OFFERING THE TECHNICAL DATA FROM THE ANALYSIS.
 3. UNITED STATES ARMY CORPS OF ENGINEERS (USACE) HEC-RAS VERSION 5.0.7 UTILIZED FOR THE ANALYSIS.
 4. FEMA EFFECTIVE MODEL REQUESTED AND RECEIVED IN HEC-2 PDF FORMAT. DUE TO POOR SCAN QUALITY, THE EFFECTIVE MODEL IS UNUSABLE.
 5. CROSS SECTIONS WERE DEVELOPED FROM SITE SURVEY WITH ADDITIONAL ELEVATIONS TAKEN FROM USGS TOPOGRAPHIC DATA (SOUTH TEXAS LIDAR 2018). SITE SURVEY BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204) NAD 83 WITH A SURFACE ADJUSTMENT FACTOR OF 1.00000. ALL ELEVATIONS BASED ON NAVD88 VERTICAL DATUM.
 6. PS&E CALCULATED FLOWS WERE USED OF THE DESIGN ANALYSIS OF THE 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, 100-YR, AND 500-YR STORM FREQUENCIES. SEE HYDRAULIC REPORT FOR MORE DETAIL.

- REFERENCES:**
1. TXDOT HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
 2. TOPOGRAPHIC DATA SOURCES (TNRIS SOUTH TEXAS 2018 & SURVEY SITE DATA)



Jacobs
 1899 BRYAN ST., SUITE 3500
 DALLAS, TX 75201-3138
 Phone: +1 (214) 638-0145
 Firm Registration: F-2966

Texas Department of Transportation

SH 202
 DRAINAGE
 HYDRAULIC DATA

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	54	

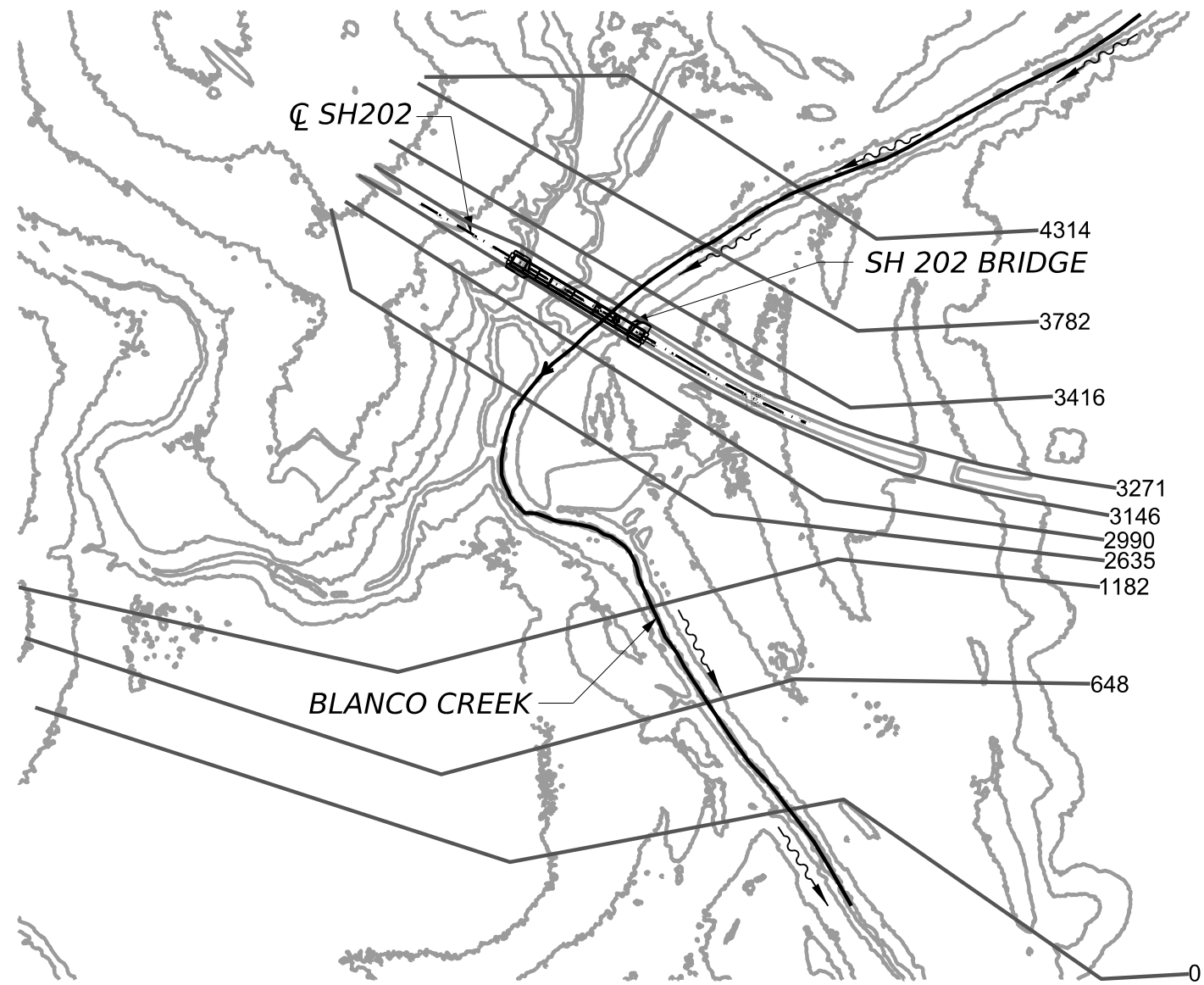
EXISTING CONDITIONS HEC-RAS RESULTS:

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/s)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
Blanco Creek	4314	2-YR	10786	19.43	41.08		41.1	0.00084	1.22	13143.74	1713.74		0.06
Blanco Creek	4314	5-YR	15195	19.43	43.45		43.47	0.00077	1.31	17721.14	2077.36		0.06
Blanco Creek	4314	10-YR	17900	19.43	44.93		44.95	0.00077	1.32	20840.89	2128.33		0.06
Blanco Creek	4314	25-YR	27740	19.43	48.06		48.08	0.00076	1.55	27631.13	2216.84		0.06
Blanco Creek	4314	50-YR	39700	19.43	50.61		50.64	0.00099	1.83	33429.86	2316.03		0.07
Blanco Creek	4314	100-YR	50600	19.43	52.98		53.01	0.00094	2.01	39011.78	2417.27		0.07
Blanco Creek	4314	500-YR	77400	19.43	56.6		56.64	0.00121	2.49	48009.48	2513.42		0.08
Blanco Creek	3782	2-YR	10786	19.52	41	29.94	41.03	0.00021	1.69	8357.14	1313.87		0.09
Blanco Creek	3782	5-YR	15195	19.52	43.37	32.98	43.4	0.00185	1.82	11545.19	1900.56		0.09
Blanco Creek	3782	10-YR	17900	19.52	44.86	33.72	44.89	0.00016	1.82	13831.19	1930.59		0.09
Blanco Creek	3782	25-YR	27740	19.52	47.98	34.83	48.02	0.000166	2.12	18728.61	1981.52		0.09
Blanco Creek	3782	50-YR	39700	19.52	50.51	35.96	50.57	0.000193	2.5	22826.13	2030.02		0.11
Blanco Creek	3782	100-YR	50600	19.52	52.85	36.76	52.93	0.000216	2.85	27353.66	2288.47		0.11
Blanco Creek	3782	500-YR	77400	19.52	56.45	38.71	56.55	0.000251	3.39	36000.81	2466.8		0.12
Blanco Creek	3416	2-YR	10786	17.69	40.88	30.5	40.93	0.000325	2.23	6758.07	1540.68		0.12
Blanco Creek	3416	5-YR	15195	17.69	43.26	31.95	43.32	0.000278	2.31	9482.1	2004.74		0.11
Blanco Creek	3416	10-YR	17900	17.69	44.77	33.01	44.82	0.000241	2.3	11391.78	2367.8		0.1
Blanco Creek	3416	25-YR	27740	17.69	47.88	35.75	47.95	0.000248	2.65	15573.96	2456.6		0.11
Blanco Creek	3416	50-YR	39700	17.69	50.39	37.42	50.48	0.000283	3.09	19141.58	2513.95		0.12
Blanco Creek	3416	100-YR	50600	17.69	52.71	38.05	52.83	0.000334	3.6	23331.12	2587.55		0.13
Blanco Creek	3416	500-YR	77400	17.69	56.3	40.43	56.44	0.000349	4.05	33055.52	2791.66		0.14
Blanco Creek	3271	2-YR	10786	16.74	40.83	29.93	40.89	0.000319	2.19	6337.37	1516.82		0.11
Blanco Creek	3271	5-YR	15195	16.74	43.22	31.99	43.28	0.00027	2.15	8600.34	2429.85		0.11
Blanco Creek	3271	10-YR	17900	16.74	44.73	32.62	44.78	0.000228	2.13	10109.78	2522.74		0.1
Blanco Creek	3271	25-YR	27740	16.74	47.83	35.39	47.91	0.000226	2.43	13253.95	2594.77		0.1
Blanco Creek	3271	50-YR	39700	16.74	50.33	37.17	50.44	0.000258	2.84	15799.73	2677.21		0.11
Blanco Creek	3271	100-YR	50600	16.74	52.63	38.4	52.76	0.000381	3.71	19033.52	2724.39		0.14
Blanco Creek	3271	500-YR	77400	16.74	56.27	40.77	56.38	0.00025	3.33	31711.31	3047.62		0.12
Blanco Creek	3203	Mult Open											
Blanco Creek	3146	2-YR	10786	20.36	40.74	31.54	40.81	0.000415	2.43	5662.66	1489.5		0.13
Blanco Creek	3146	5-YR	15195	20.36	43.13	32.83	43.2	0.000333	2.43	7660.27	2361.24		0.12
Blanco Creek	3146	10-YR	17900	20.36	44.64	33.22	44.71	0.000278	2.39	9018.45	2589.29		0.11
Blanco Creek	3146	25-YR	27740	20.36	47.72	35.57	47.81	0.000284	2.76	11807.52	2717.72		0.12
Blanco Creek	3146	50-YR	39700	20.36	50.16	37.84	50.3	0.000328	3.24	14048.95	2785.33		0.13
Blanco Creek	3146	100-YR	50600	20.36	52.43	39.09	52.59	0.000439	4.02	18243.9	2860.25		0.15
Blanco Creek	3146	500-YR	77400	20.36	56.11	41.04	56.2	0.000226	3.2	33004.76	3117.34		0.11
Blanco Creek	2990	2-YR	10786	17.31	40.69	29.77	40.75	0.000281	2.22	6999.46	1816.73		0.11
Blanco Creek	2990	5-YR	15195	17.31	43.09	31.36	43.15	0.00025	2.34	9668.61	2532.99		0.11
Blanco Creek	2990	10-YR	17900	17.31	44.61	32.16	44.66	0.000225	2.37	11425.85	2794.24		0.1
Blanco Creek	2990	25-YR	27740	17.31	47.69	35.49	47.76	0.000241	2.74	15065.46	2873.02		0.11
Blanco Creek	2990	50-YR	39700	17.31	50.13	37.26	50.23	0.000291	3.26	18020.09	2953.23		0.12
Blanco Creek	2990	100-YR	50600	17.31	52.36	38.41	52.52	0.000426	4.2	22666.67	3046.92		0.15
Blanco Creek	2990	500-YR	77400	17.31	56.04	40.29	56.15	0.000315	3.96	38671.37	3432.65		0.13
Blanco Creek	2635	2-YR	10786	20.09	40.62	32.07	40.65	0.000242	2.04	9166.66	2116.24		0.1
Blanco Creek	2635	5-YR	15195	20.09	43.03	33.27	43.06	0.000189	2.03	12654.96	2796.2		0.09
Blanco Creek	2635	10-YR	17900	20.09	44.56	34.36	44.59	0.000159	1.99	14912.49	2892.44		0.09
Blanco Creek	2635	25-YR	27740	20.09	47.64	35.57	47.68	0.000167	2.28	19497.67	2979.15		0.09
Blanco Creek	2635	50-YR	39700	20.09	50.08	36.53	50.13	0.000198	2.69	23181.87	3057.75		0.1
Blanco Creek	2635	100-YR	50600	20.09	52.28	37.47	52.37	0.000321	3.64	28163.71	3116.81		0.13
Blanco Creek	2635	500-YR	77400	20.09	55.97	39.14	56.04	0.000257	3.59	43551.34	3418.41		0.12
Blanco Creek	1182	2-YR	10786	18.07	40.27	31.83	40.31	0.00033	2.04	7596.77	1651.39		0.11
Blanco Creek	1182	5-YR	15195	18.07	42.77	33.57	42.81	0.000237	2	11202.05	2027.37		0.1
Blanco Creek	1182	10-YR	17900	18.07	44.34	34.15	44.38	0.000207	2.03	13730.65	2249.84		0.1
Blanco Creek	1182	25-YR	27740	18.07	47.43	35.48	47.47	0.000193	2.24	19128.69	2362.71		0.1
Blanco Creek	1182	50-YR	39700	18.07	49.84	36.75	49.9	0.000214	2.58	23511.82	2588.12		0.1
Blanco Creek	1182	100-YR	50600	18.07	51.95	37.91	52.03	0.000264	3.06	27902.66	2784.41		0.12
Blanco Creek	1182	500-YR	77400	18.07	55.68	39.72	55.76	0.000245	3.29	43710.99	4125.58		0.12
Blanco Creek	648	2-YR	10786	19.88	40.09		40.13	0.000337	2.11	8614.61	1775.66		0.12
Blanco Creek	648	5-YR	15195	19.88	42.66		42.69	0.0002	1.89	13448.98	1938.92		0.09
Blanco Creek	648	10-YR	17900	19.88	44.25		44.28	0.000151	1.78	16560.36	2012.04		0.08
Blanco Creek	648	25-YR	27740	19.88	47.35		47.38	0.000141	1.96	23128.53	2220.15		0.08
Blanco Creek	648	50-YR	39700	19.88	49.76		49.8	0.000158	2.26	28686.35	2416.94		0.09
Blanco Creek	648	100-YR	50600	19.88	51.86		51.91	0.000168	2.49	34139.17	2947.91		0.09
Blanco Creek	648	500-YR	77400	19.88	55.58		55.64	0.000185	2.9	48053.67	4325.63		0.1
Blanco Creek	0	2-YR	10786	17.95	40	27.53	40.01	0.000101	1.22	13216.41	1993.56		0.06
Blanco Creek	0	5-YR	15195	17.95	42.6	29.3	42.61	0.000076	1.23	19033.29	2455.77		0.06
Blanco Creek	0	10-YR	17900	17.95	44.2	30.32	44.21	0.000064	1.21	23056.55	2554.89		0.05
Blanco Creek	0	25-YR	27740	17.95	47.3	33.56	47.32	0.000065	1.38	31279.83	2737.45		0.06
Blanco Creek	0	50-YR	39700	17.95	49.7	34.61	49.72	0.000077	1.63	37969.08	2858.9		0.06
Blanco Creek	0	100-YR	50600	17.95	51.8	36.08	51.83	0.000083	1.81	44159.58	3025.19		0.07
Blanco Creek	0	500-YR	77400	17.95	55.5	37.29	55.54	0.000114	2.34	61192.89	5309.21		0.08

PROPOSED CONDITIONS HEC-RAS RESULTS:

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/s)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
Blanco Creek	4314	2-YR	10786	19.43	41.08		41.09	0.000085	1.22	13129.75	1707.28		0.06
Blanco Creek	4314	5-YR	15195	19.43	43.44		43.46	0.000078	1.31	17701.69	2076.96		0.06
Blanco Creek	4314	10-YR	17900	19.43	44.92		44.94	0.00007	1.32	20821.37	2128.06		0.06
Blanco Creek	4314	25-YR	27740	19.43	48.05		48.07	0.000076	1.55	27598.96	2216.34		0.06
Blanco Creek	4314	50-YR	39700	19.43	50.59		50.62	0.000091	1.84	33375.59	2315.17		0.07
Blanco Creek	4314	100-YR	50600	19.43	52.93		52.97	0.000095	2.01	38910.04	2415.82		0.07
Blanco Creek	4314	500-YR	77400	19.43	56.57		56.62	0.000122	2.5	47937.25	2513.19		0.08
Blanco Creek	3782	2-YR	10786	19.52	40.99	29.94	41.02	0.00021	1.69	8349.87	1309.82		0.09
Blanco Creek	3782	5-YR	15195	19.52	43.36	32.98	43.39	0.000185	1.82	11541.45	1897.91		0.09
Blanco Creek	3782	10-YR	17900	19.52	44.85	33.72	44.88	0.000161	1.82	13832.68	1930.46		0.09
Blanco Creek	3782	25-YR	27740	19.52	47.96	34.83	48.01	0.000166	2.12	18731.83	1981.3		0.09
Blanco Creek	3782	50-YR	39700	19.52	50.49	35.96	50.55	0.000193	2.5	22822.54	2029.41		0.11
Blanco Creek	3782	100-YR	50600	19.52	52.81	36.76	52.89	0.000218	2.85	27296.39	2284.96		0.11
Blanco Creek	3782	500-YR	77400	19.52	56.42	38.71	56.52	0.000252	3.39	35969.45	2466.72		0.12
Blanco Creek	3416	2-YR	10786	17.69	40.87	30.5							

CROSS SECTION AND STREAM LAYOUT

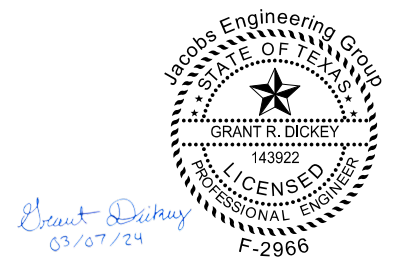


NOTES:

1. THIS PROJECT IS LOCATED IN FEMA DESIGNATED ZONE "AE". FIRM PANELS 48391C0275D EFFECTIVE DATE SEPTEMBER 26, 2014 FOR REFUGIO COUNTY.
2. COORDINATION WAS MADE WITH THE FLOODPLAIN ADMINISTRATOR AS A LETTER EXPLAINING THE PROJECT, PRESENTING THE AMOUNT OF RISE ANTICIPATED BASED ON THE ANALYSIS AND OFFERING THE TECHNICAL DATA FROM THE ANALYSIS.
3. UNITED STATES ARMY CORPS OF ENGINEERS (USACE) HEC-RAS VERSION 5.0.7 UTILIZED FOR THE ANALYSIS.
4. FEMA EFFECTIVE MODEL REQUESTED AND RECEIVED IN HEC-2 PDF FORMAT. DUE TO POOR SCAN QUALITY, THE EFFECTIVE MODEL IS UNUSABLE.
5. CROSS SECTIONS WERE DEVELOPED FROM SITE SURVEY WITH ADDITIONAL ELEVATIONS TAKEN FROM USGS TOPOGRAPHIC DATA (SOUTH TEXAS LIDAR 2018). SITE SURVEY BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204) NAD 83 WITH A SURFACE ADJUSTMENT FACTOR OF 1.00000. ALL ELEVATIONS BASED ON NAVD88 VERTICAL DATUM.
6. PS&E CALCULATED FLOWS WERE USED OF THE DESIGN ANALYSIS OF THE 2-YR, 5-YR, 10-YR, 25-YR, 50-YR, 100-YR, AND 500-YR STORM FREQUENCIES. SEE HYDRAULIC REPORT FOR MORE DETAIL.

REFERENCES:

1. TXDOT HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)
2. TOPOGRAPHIC DATA SOURCES (TNRIS SOUTH TEXAS 2018 & SURVEY SITE DATA)



Jacobs 1999 BRYAN ST., SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Firm Registration: F-2966

Texas Department of Transportation

SH 202

DRAINAGE
CROSS SECTION LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	56

DW: GD CK: BK DW: GD CK: BK DW: GD CK: BK

50 YR DESIGN STORM

Parameter	Description	LOB	Channel	ROB
y1	Hydraulic depth at approach section (ft)	8.22	22.24	17.87
V1	Velocity at approach section (fps)	0.72	1.84	1.21
S1	HGL Slope in channel (ft/ft)		0.000091	
D50	Median particle size (ft)		0.00072	
T	Fall velocity @ 20°C (fps)		0.075	
Q1	Flow at approach section (cfs)	5,518	9,277	24,905
W1	Width at approach section (ft)	932	227	1,156
W2	Width at contraction section (ft)	16	342	313
V2	Velocity at contraction section (fps)	2.52	3.59	2.17
Q2	Flow at contraction section (cfs)	650	20,271	12,682
yo	Hydraulic depth at contraction section (ft)	6.87	19.55	15.84
a	Pier width (ft)	0.00	3.00	3.00
L	Pier length (ft)		58	

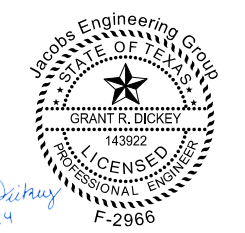
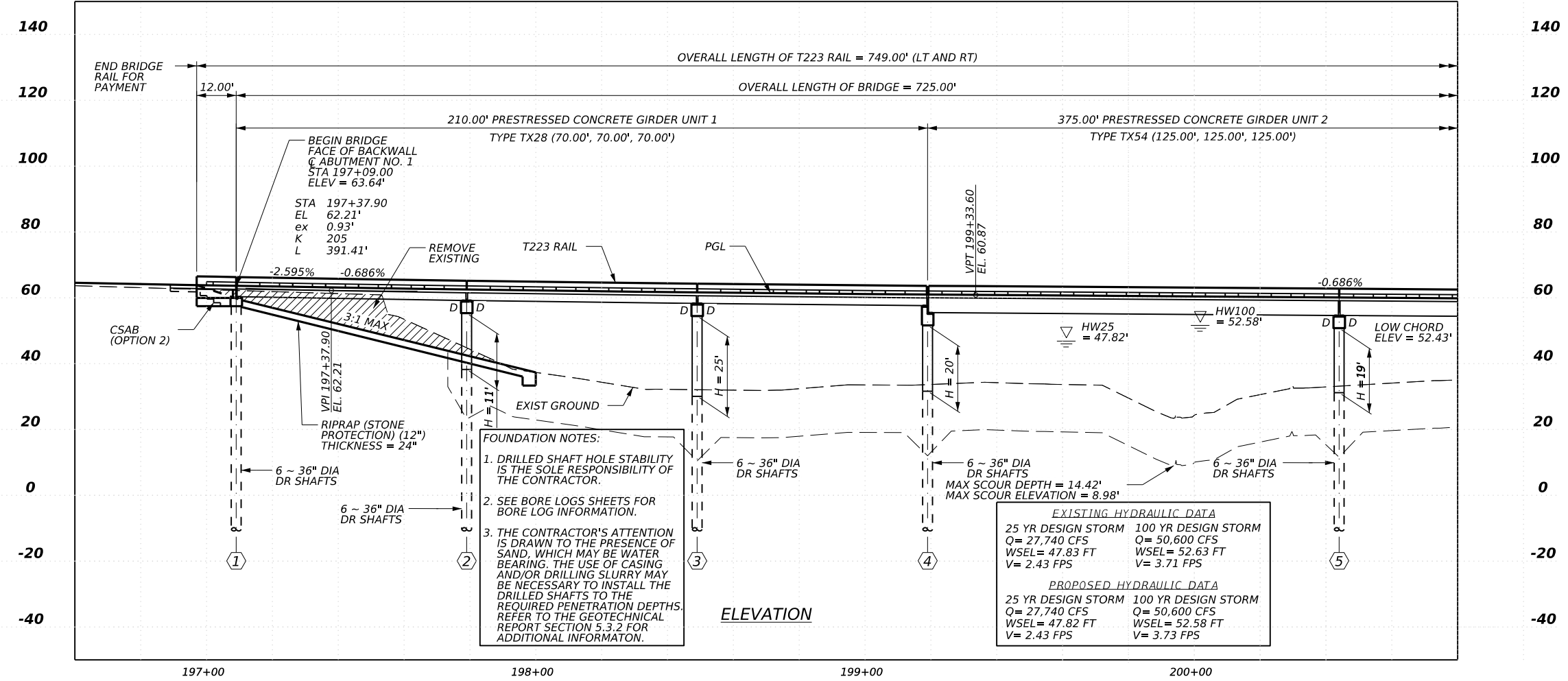
Location	Flow Regime	Calculated Scour (ft)		
		Contraction	Pier	Total
Left overbank	Clear water	15.18	0	15.18
Channel	Live bed	13.21	7.2	20.41
Right overbank	Clear water	6.16	7.2	13.36

100 YR CHECK STORM

Parameter	Description	LOB	Channel	ROB
y1	Hydraulic depth at approach section (ft)	9.67	24.48	19.91
V1	Velocity at approach section (fps)	0.83	2.03	1.34
S1	HGL Slope in channel (ft/ft)		0.000097	
D50	Median particle size (ft)		0.00072	
T	Fall velocity @ 20°C (fps)		0.075	
Q1	Flow at approach section (cfs)	8,162	11,262	31,176
W1	Top width at approach section (ft)	1,017	227	1,168
W2	Top width at contraction section (ft)	38	313	372
V2	Velocity at contraction section (fps)	3.42	4.02	2.66
Q2	Flow at contraction section (cfs)	1,157	27,333	17,654
yo	Hydraulic depth at contraction section (ft)	9.00	21.84	17.97
a	Pier width (ft)	0.00	3.00	3.00
L	Pier length (ft)		58	

Location	Flow Regime	Calculated Scour (ft)		
		Contraction	Pier	Total
Left overbank	Clear water	8.22	0.00	8.22
Channel	Live bed	20.10	7.20	27.30
Right overbank	Clear water	7.22	7.20	14.42

- DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 9TH EDITION (2020) INTERIMS, AND AS MODIFIED BY THE TXDOT LRFD BRIDGE DESIGN MANUAL (2021) AND BRIDGE DETAILING GUIDE (2022).
- THE "H" VALUES SHOWN ARE AVERAGE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CALCULATIONS.
- FOR BORINGS SEE SOIL BORING PROFILE SHEET.
- "D" DENOTES BENTS WITH D BARS AND SLOTTED HOLES AT EXTERIOR GIRDERS. "E" DENOTES EXPANSION BEARING. "F" DENOTES FIXED BEARING.
- CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL STRUCTURES, UTILITIES, ELEVATIONS, AND DIMENSIONS PRIOR TO ORDERING MATERIALS OR PERFORMING ANY CONSTRUCTION WORK AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
- ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, X-SLOPE, AND/OR SUPERELEVATION.
- SEE ROADWAY PLANS FOR RIPRAP LIMITS.
- FHWA HEC-18 METHOD USED FOR SCOUR EVALUATION.



Grant Dickey
03/07/24

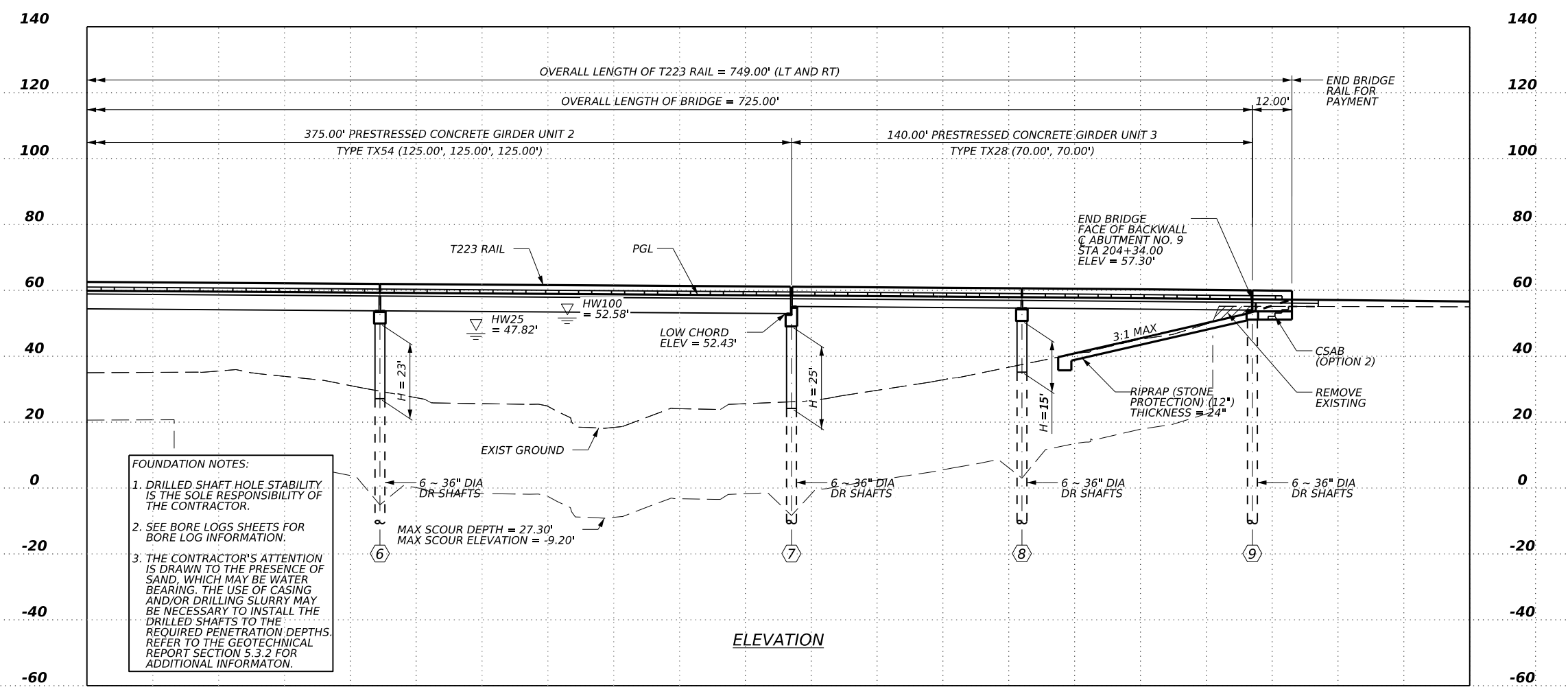


SH 202
DRAINAGE
SCOUR DATA SHEET

SHEET 1 OF 2

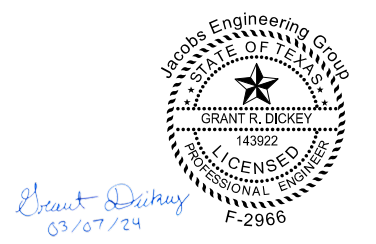
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	57	

DATE: 4/25/2023 2:11 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58458\SH202DHD06.dgn



FOUNDATION NOTES:

1. DRILLED SHAFT HOLE STABILITY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SEE BORE LOGS SHEETS FOR BORE LOG INFORMATION.
3. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE PRESENCE OF SAND, WHICH MAY BE WATER BEARING. THE USE OF CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL THE DRILLED SHAFTS TO THE REQUIRED PENETRATION DEPTHS. REFER TO THE GEOTECHNICAL REPORT SECTION 5.3.2 FOR ADDITIONAL INFORMATION.



Jacobs
 1899 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fm Registration: F-2966

Texas Department of Transportation

SH 202
 DRAINAGE
 SCOUR DATA SHEET

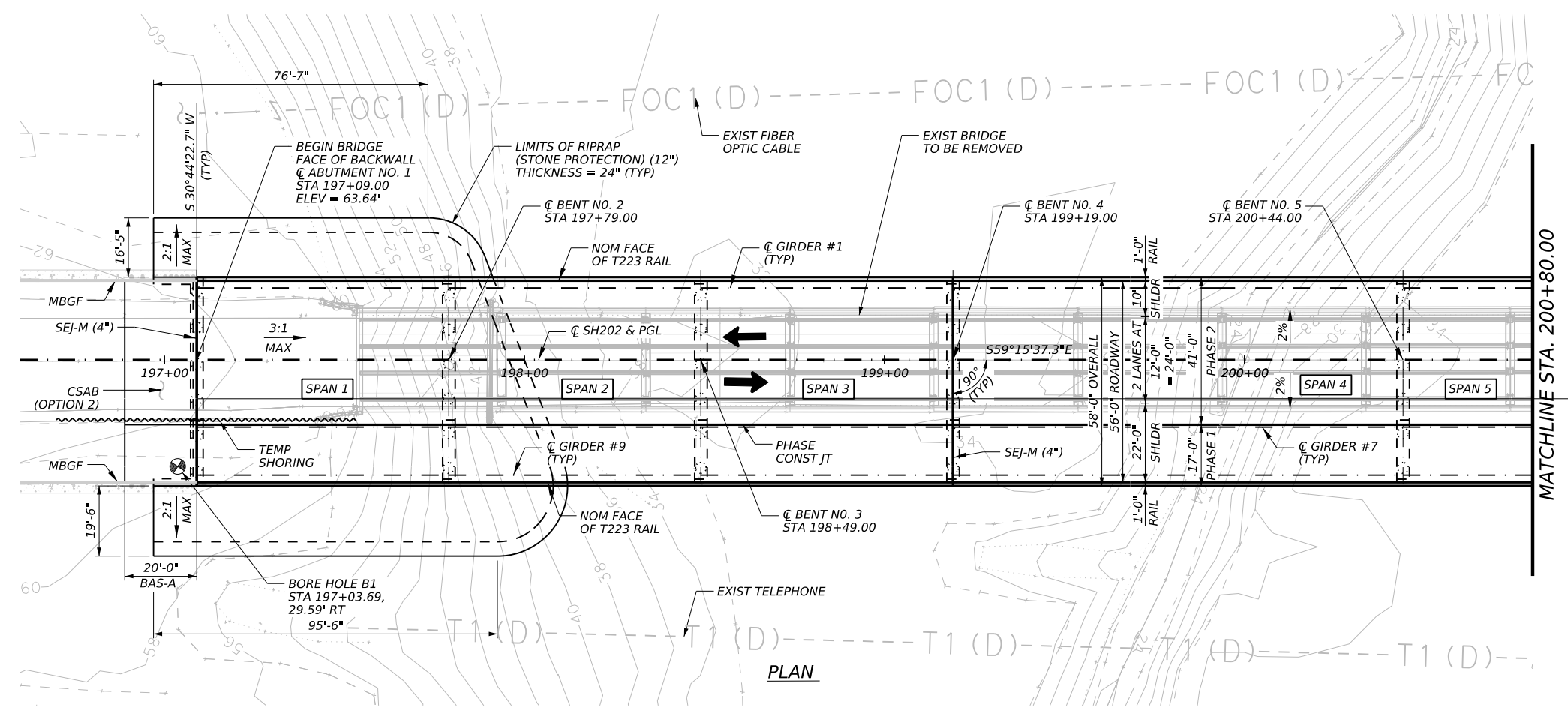
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	58	

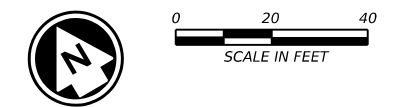


- NOTES:**
- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATION 9TH EDITION (2020), AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
 - ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE OR CROSS-SLOPE WHERE APPROPRIATE.
 - THE "H" VALUES SHOWN ARE AVERAGE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
 - "D" DENOTES BENTS WITH D BARS AND SLOTTED HOLES AT EXTERIOR AND PHASE GIRDERS.
 - CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL STRUCTURES, UTILITIES, ELEVATIONS, AND DIMENSIONS PRIOR TO ORDERING MATERIALS OR PERFORMING ANY CONSTRUCTION WORK AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
 - DESCRIPTION OF EXISTING STRUCTURE TO BE REMOVED: STEEL I-BEAM BRIDGE ON CONCRETE BENTS, APPROXIMATELY 29.2' WIDE x 671.5' LONG, 14 SPANS. SEE EXISTING BRIDGE PLANS FOR MORE INFORMATION.
 - FOR BORINGS, SEE BORE LOGS SHEETS.
 - SAW-CUT GROOVING FINAL SURFACE TEXTURE ON THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.

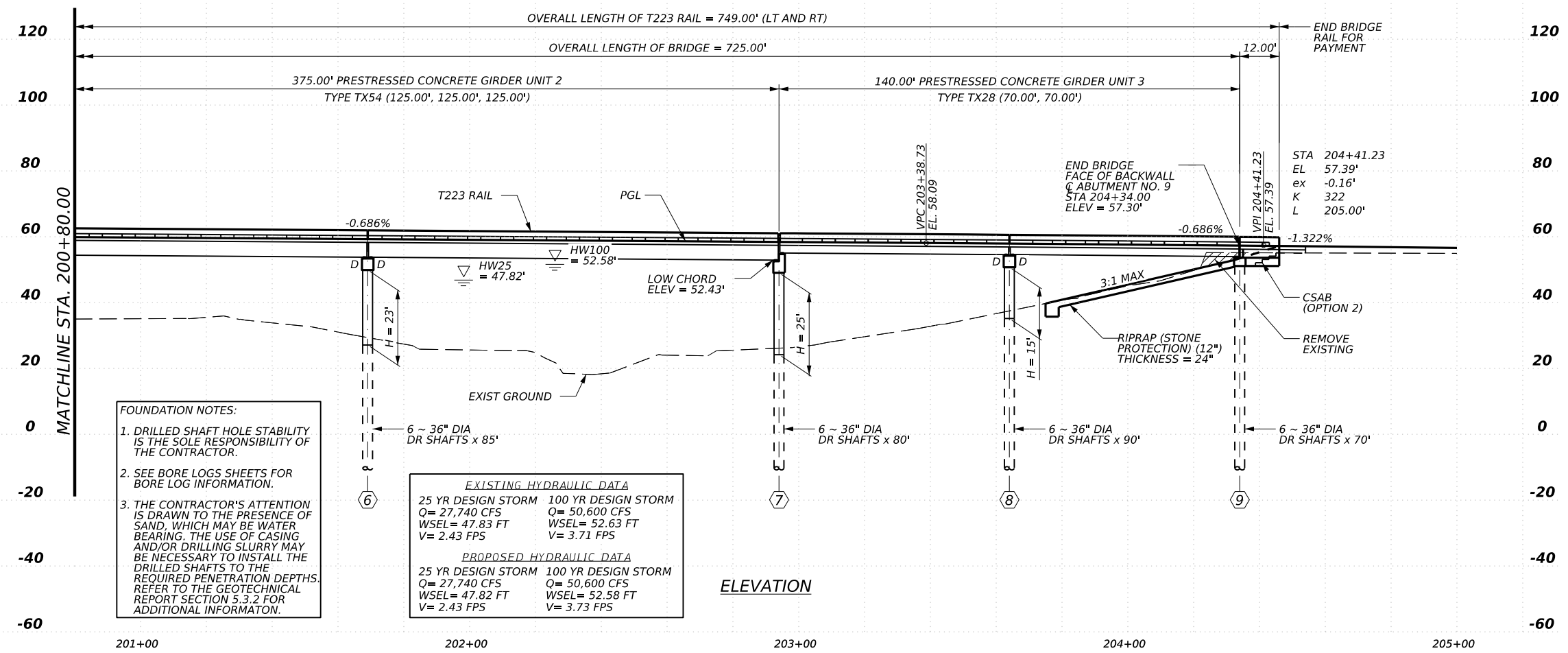
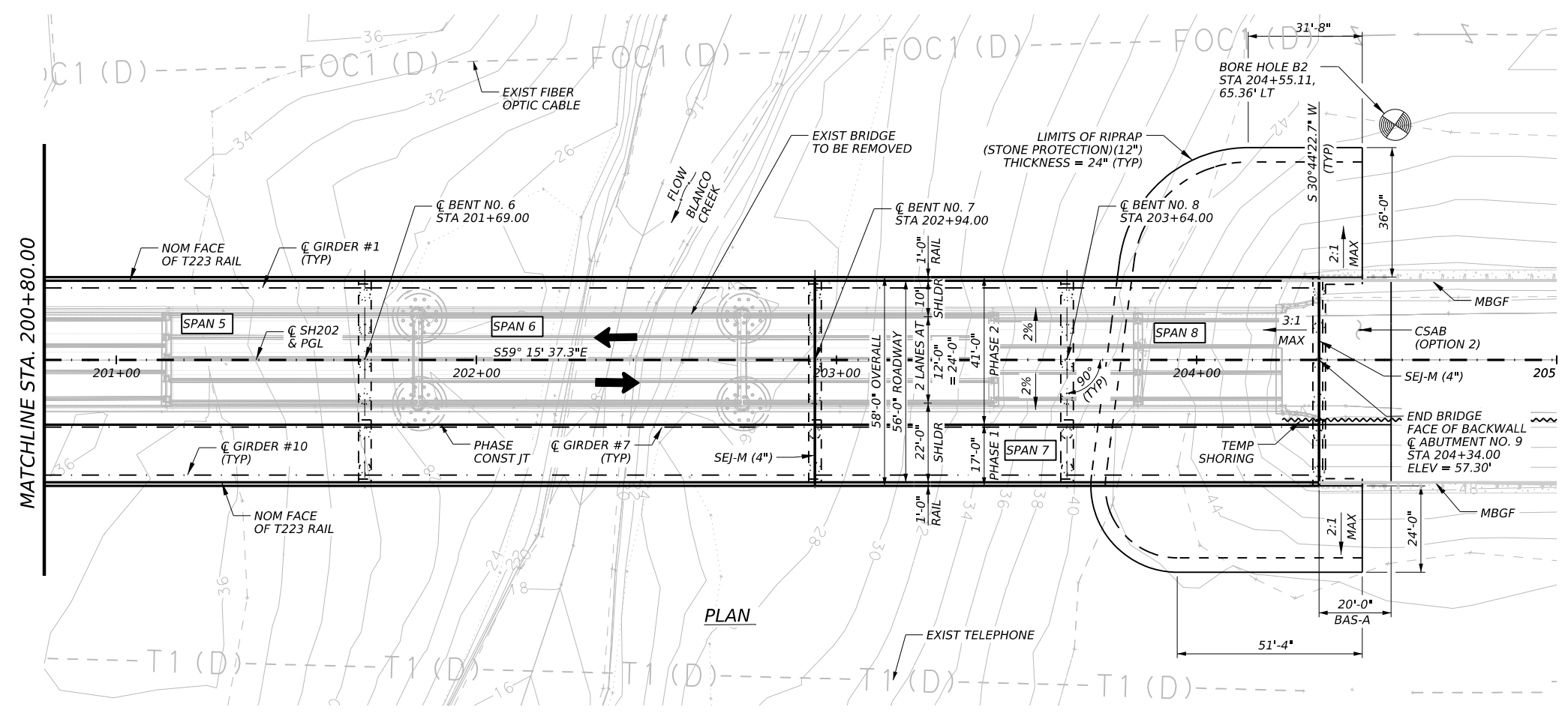
NBI NO. (NEW): 16-196-0-0447-04-156
 NBI NO. (EXIST): 16-196-0-0447-04-029
 DESIGN SPEED: 65 MPH
 FUNCTIONAL CLASSIFICATION: MAJOR COLLECTOR
 ADT : 1,135 (2021)
 ADT : 1,589 (2041)



DW: VH CK: CW
 DW: VH CK: CW
 DW: VH CK: CW



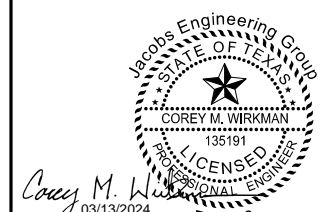
NOTES:
 1. SEE BRIDGE LAYOUT SHEET 1 OF 2 FOR NOTES.



FOUNDATION NOTES:

1. DRILLED SHAFT HOLE STABILITY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SEE BORE LOGS SHEETS FOR BORE LOG INFORMATION.
3. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE PRESENCE OF SAND, WHICH MAY BE WATER BEARING. THE USE OF CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL THE DRILLED SHAFTS TO THE REQUIRED PENETRATION DEPTHS. REFER TO THE GEOTECHNICAL REPORT SECTION 5.3.2 FOR ADDITIONAL INFORMATION.

EXISTING HYDRAULIC DATA	
25 YR DESIGN STORM Q= 27,740 CFS WSEL= 47.83 FT V= 2.43 FPS	100 YR DESIGN STORM Q= 50,600 CFS WSEL= 52.63 FT V= 3.71 FPS
PROPOSED HYDRAULIC DATA	
25 YR DESIGN STORM Q= 27,740 CFS WSEL= 47.82 FT V= 2.43 FPS	100 YR DESIGN STORM Q= 50,600 CFS WSEL= 52.58 FT V= 3.73 FPS



SUPER INV/OPR RATING: 1.00/1.92
 HL93 LOADING

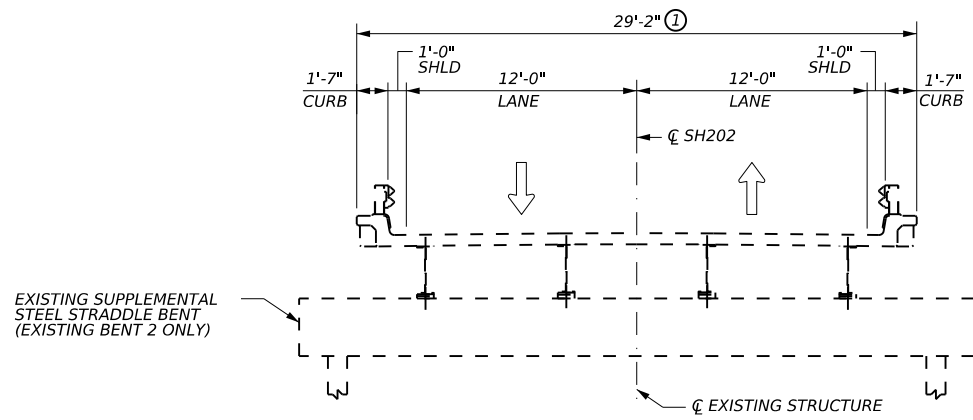


SH 202
BLANCO CREEK BRIDGE
BRIDGE LAYOUT
 NBI NO. 16-196-0-0447-04-156

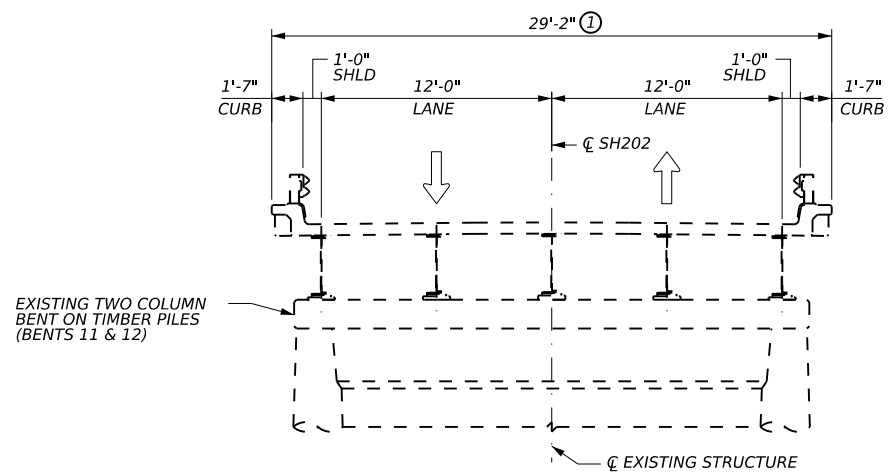
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	60	

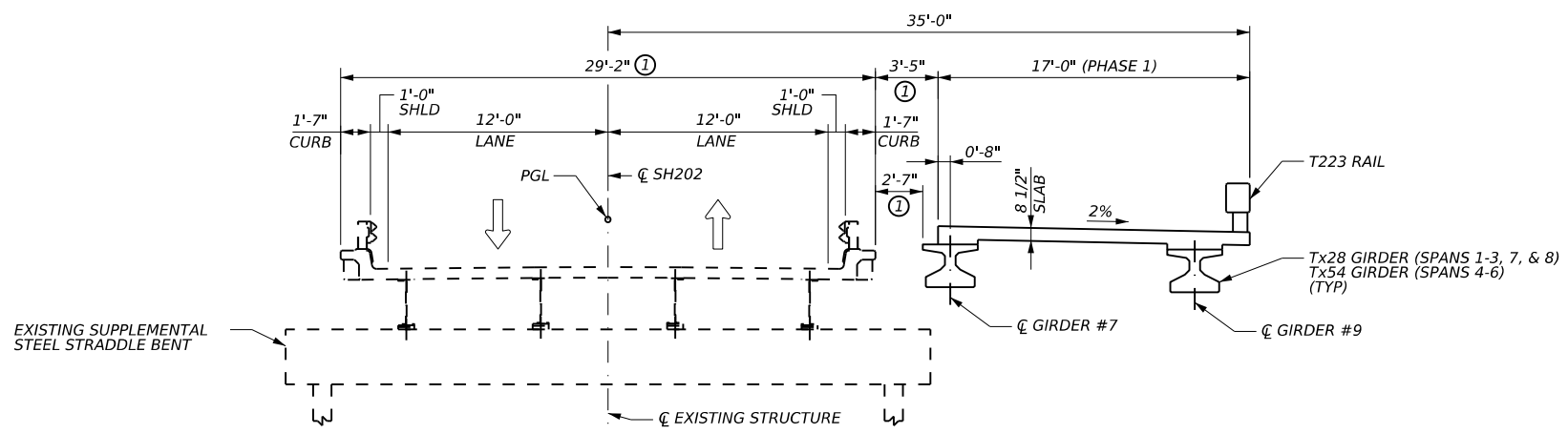
DATE: 3/13/2024 9:22 AM
 FILE: c:\pw\workdir\jacobs-amer-trans\p\dms58443\SH202_SBL02.dgn



EXISTING TYPICAL SECTION
 SCALE: N.T.S.
 (EXISTING SPANS 1-9 & 13-14)
 (EXISTING BENT 2 SHOWN; OTHER BENTS SIMILAR)



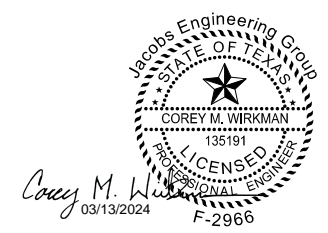
EXISTING TYPICAL SECTION
 SCALE: N.T.S.
 (EXISTING SPANS 10-12)
 (EXISTING BENT 11 SHOWN; OTHER BENTS SIMILAR)



PHASE 1 TYPICAL SECTION
 SCALE: N.T.S.
 (SPANS 1-3, 7, & 9)
 (EXISTING BENT 2 SHOWN; OTHER BENTS SIMILAR)

① CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL STRUCTURES AND THEIR DIMENSIONS PRIOR TO ORDERING MATERIALS OR PERFORMING ANY CONSTRUCTION WORK AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.

DATE: 8/24/2023 10:38 AM
 FILE: c:\pw_workdir\jacobs-amer-transp\dms58443\SH202 5BS01.dgn



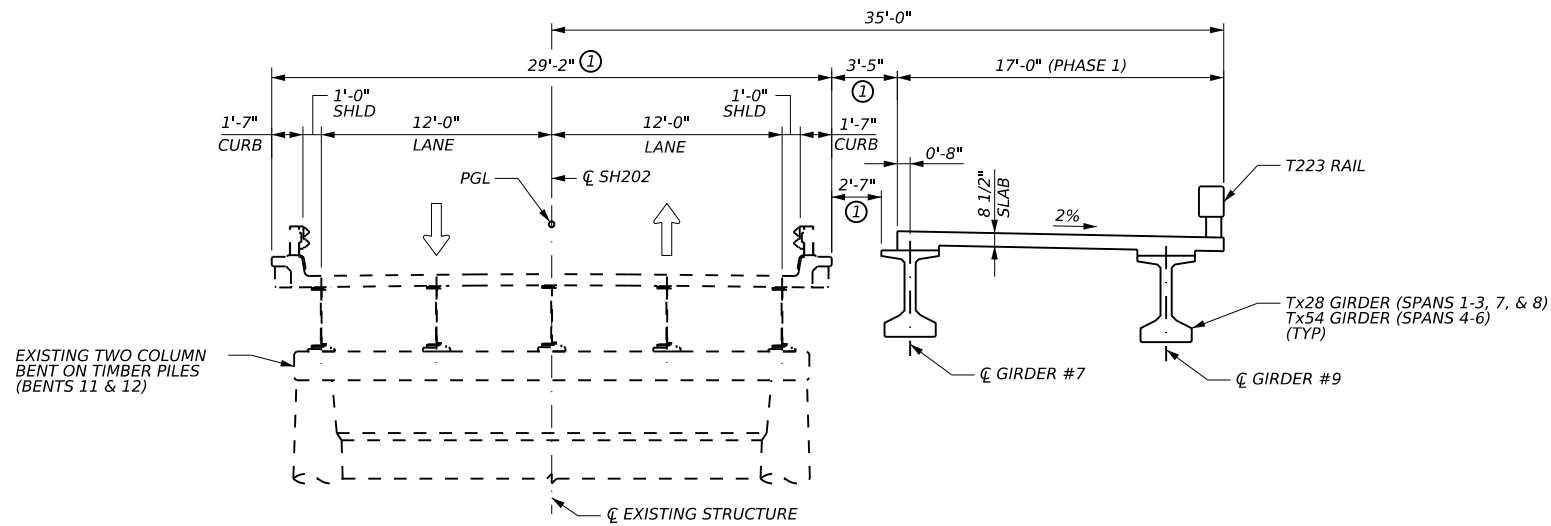
HL93 LOADING



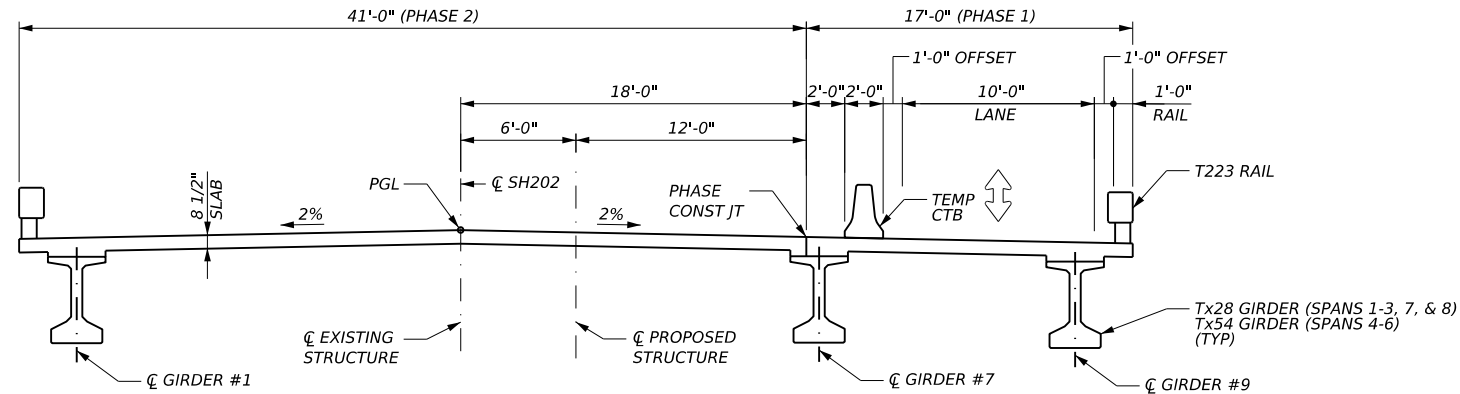
SH 202
BLANCO CREEK BRIDGE
TYPICAL SECTIONS

SHEET 1 OF 2

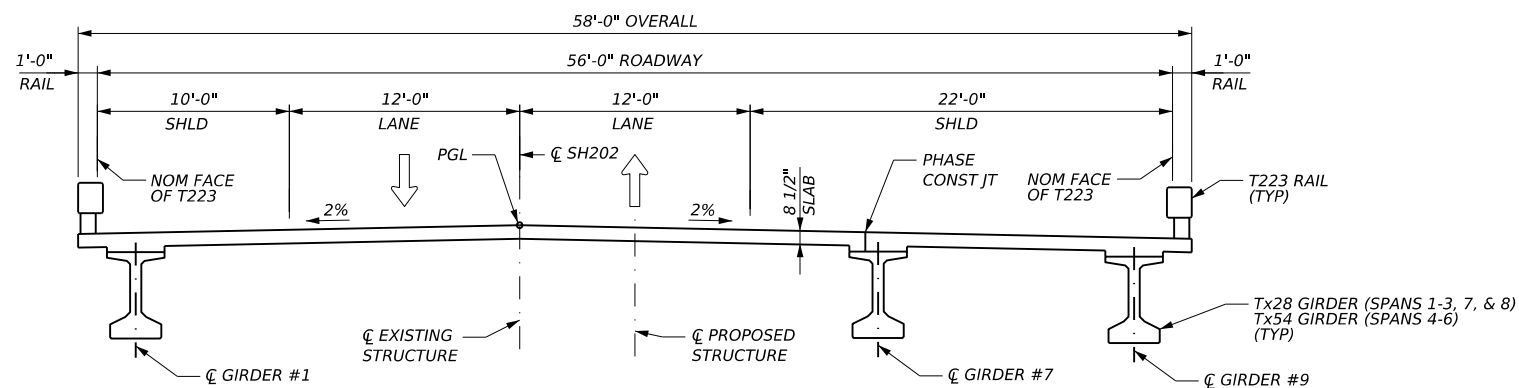
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	61	



PHASE 1 TYPICAL SECTION
 SCALE: N.T.S.
 (EXISTING SPANS 4-6)
 (EXISTING BENT 11 SHOWN; OTHER BENTS SIMILAR)



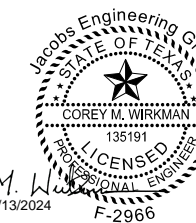
PHASE 2 TYPICAL SECTION
 SCALE: N.T.S.



COMPLETED TYPICAL SECTION
 SCALE: N.T.S.

① CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL STRUCTURES AND THEIR DIMENSIONS PRIOR TO ORDERING MATERIALS OR PERFORMING ANY CONSTRUCTION WORK AND NOTIFY ENGINEER IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.

DATE: 8/24/2023 10:42 AM
 FILE: c:\pw_workdir\jacobs-amer-transp\dms58443\SH202 58502.dgn



HL93 LOADING

Jacobs

1999 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fm Registration: F-2966

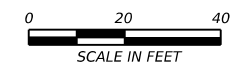
Texas Department of Transportation

SH 202

BLANCO CREEK BRIDGE
 TYPICAL SECTIONS

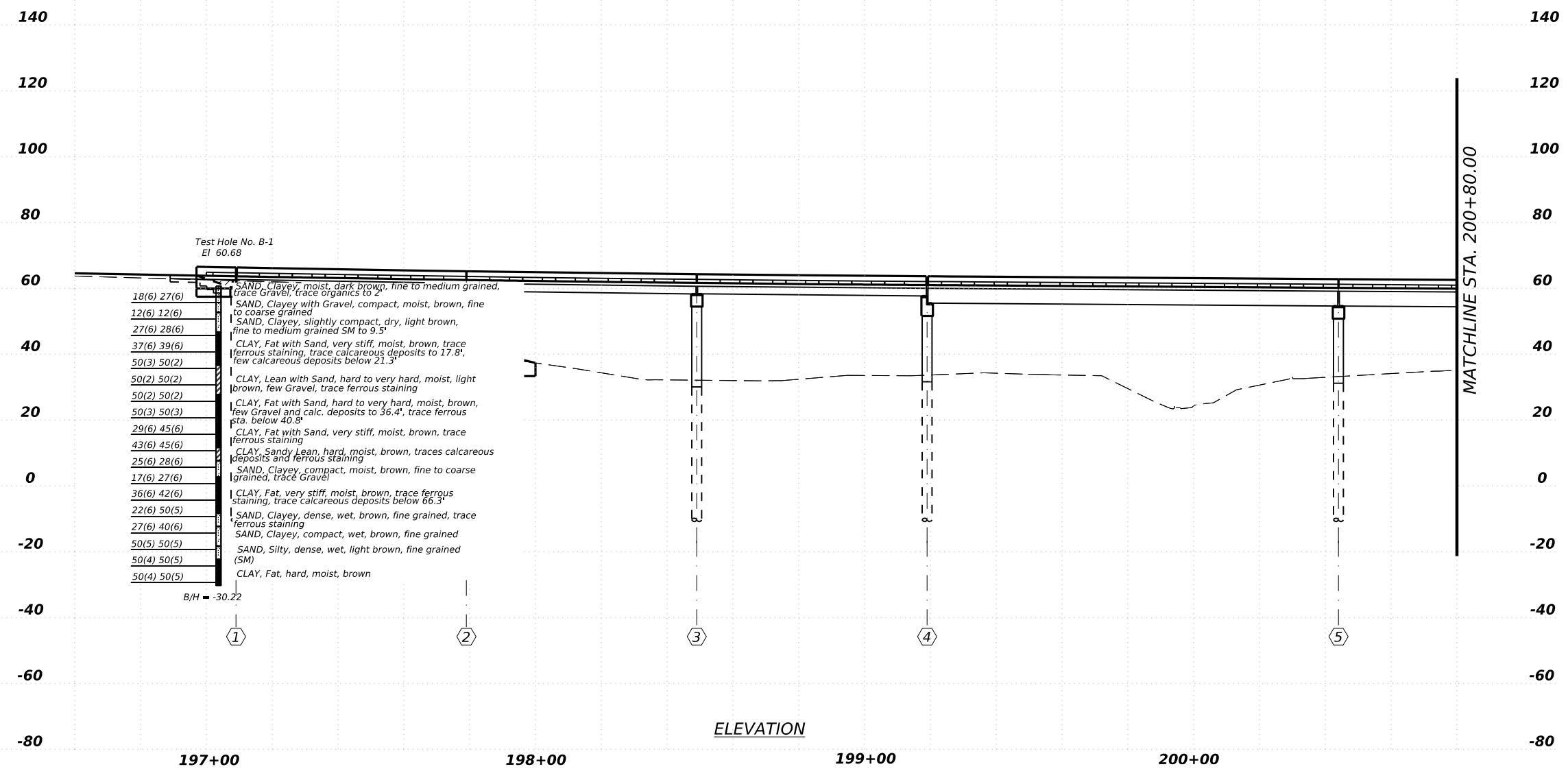
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	62	



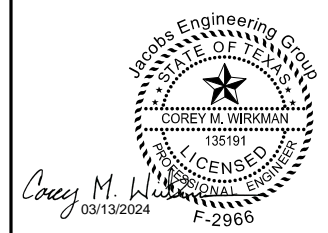
NOTES:

1. BORE LOGS ARE SHOWN FOR INFORMATION ONLY.
2. BORING B1 WAS TAKEN 10/09/2022 TO 10/10/2022 BORING B2 WAS TAKEN 10/09/2022
3. THE GEOTECHNICAL DATA PRESENTED HERE WAS PROVIDED BY CORSAIR CONSULTING, LLC.



FOUNDATION NOTES:

1. DRILLED SHAFT HOLE STABILITY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE PRESENCE OF SAND, WHICH MAY BE WATER BEARING. THE USE OF CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL THE DRILLED SHAFTS TO THE REQUIRED PENETRATION DEPTHS. REFER TO THE GEOTECHNICAL REPORT SECTION 5.3.2 FOR ADDITIONAL INFORMATION.



Jacobs
1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

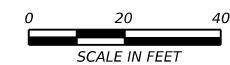
Texas Department of Transportation

SH 202
BLANCO CREEK BRIDGE
BORE LOGS

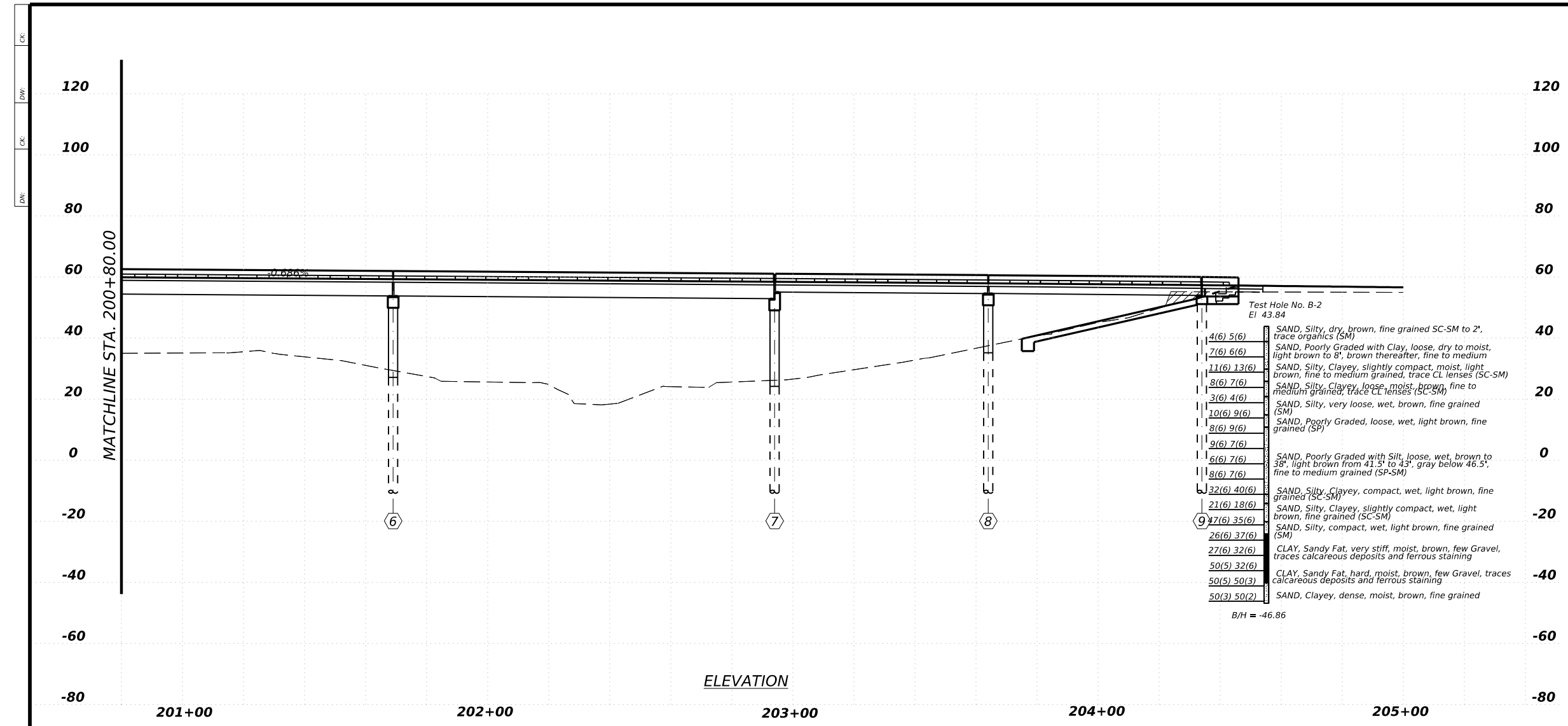
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	63	

DATE: 3/12/2024 4:35 PM
FILE: c:\pw_workdir\jacobs-amer-transp\dms58443\SH202 5BH01.dgn

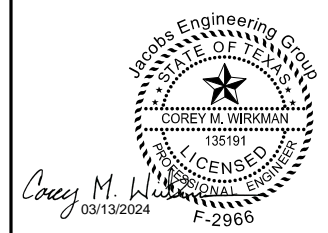


NOTES:
1. SEE BORE LOGS SHEET 1 OF 2 FOR NOTES.



FOUNDATION NOTES:

1. DRILLED SHAFT HOLE STABILITY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE PRESENCE OF SAND, WHICH MAY BE WATER BEARING. THE USE OF CASING AND/OR DRILLING SLURRY MAY BE NECESSARY TO INSTALL THE DRILLED SHAFTS TO THE REQUIRED PENETRATION DEPTHS. REFER TO THE GEOTECHNICAL REPORT SECTION 5.3.2 FOR ADDITIONAL INFORMATON.



HL93 LOADING
Jacobs
1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 202
BLANCO CREEK BRIDGE
BORE LOGS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	64	

DATE: 8/24/2023 8:25 PM
FILE: c:\pw_workdir\jacobs-amer-transp\dms58443\SH202 5BH02.dgn

DW: VH
 CK: CW
 DW:

SUMMARY OF ESTIMATED QUANTITIES

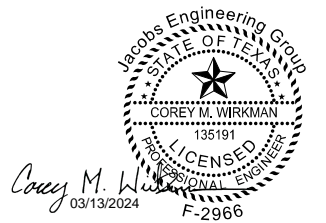
BRIDGE ELEMENT	BID CODES	0400 6005	0416 6004	0420 6013	0420 6029	0420 6037	0422 6001	0422 6015	0425 6035	0425 6039	0432 6031	0450 6006	0454 6018
	BID ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (36 IN) ①	CL C CONC (ABUT) ②	CL C CONC (CAP) ③	CL C CONC (COLUMN)	REINF CONC SLAB	APPROACH SLAB	PRESTR CONC GIRDER (TX28)	PRESTR CONC GIRDER (TX54)	RIPRAP (STONE PROTECTION) (12 IN)	RAIL (TY T223)	SEALED EXPANSION JOINT (4") (SEJ-M)
		CY	LF	CY	CY	CY	SF	CY	LF	LF	CY	LF	LF
PHASE 1													
2 - ABUTMENTS		44	210	22.9				25.7			327	24.0	
5 - INTERIOR BENTS			810		41.3	48.7							
2 - TRANSITION BENTS			320		21.4	23.6							
1 - 210.00' PRESTR CONC I-GIRDER UNIT (Tx28)							3,570		625.56			210.0	33
1 - 375.00' PRESTR CONC I-GIRDER UNIT (Tx54)							6,375			1,120.50		375.0	17
1 - 140.00' PRESTR CONC I-GIRDER UNIT (Tx28)							2,380		417.00			140.0	17
PHASE 1 SUBTOTAL		44	1,340	22.9	62.7	72.3	12,325	25.7	1,042.56	1,120.50	327	749.0	67
PHASE 2													
2 - ABUTMENTS		109	420	40.9				64.2			458	24.0	
5 - INTERIOR BENTS			1,620		90.1	97.4							
2 - TRANSITION BENTS			640		46.9	47.1							
1 - 210.00' PRESTR CONC I-GIRDER UNIT (Tx28)							8,610		1,251.12			210.0	81
1 - 375.00' PRESTR CONC I-GIRDER UNIT (Tx54)							15,375			2,241.00		375.0	41
1 - 140.00' PRESTR CONC I-GIRDER UNIT (Tx28)							5,740		834.00			140.0	41
PHASE 2 SUBTOTAL		109	2,680	40.9	137.0	144.5	29,725	64.2	2,085.12	2,241.00	458	749.0	163
TOTAL		153	4,020	63.8	199.7	216.8	42,050	89.9	3,127.68	3,361.50	785	1,498.0	230

- ① CONTRACTOR SHALL USE SULPHATE RESISTANCE CONCRETE FOR DRILLED SHAFTS.
- ② QUANTITY INCLUDES 0.8 CY FOR SHEAR KEYS. SEE ABUTMENT AND SHEAR KEY DETAILS FOR I-GIRDERS (IGSK) STANDARD SHEET FOR SHEAR KEY LOCATION, DETAIL, AND NOTES.
- ③ QUANTITY INCLUDES 5.6 CY FOR SHEAR KEYS. SEE BENT AND SHEAR KEY DETAILS FOR I-GIRDERS (IGSK) STANDARD SHEET FOR SHEAR KEY LOCATION, DETAIL, AND NOTES.

BEARING SEAT ELEVATIONS

	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8	BEAM 9
BENT 1 (FWD)	59.639	59.767	59.896	60.025	59.923	59.794	59.665	59.532	59.398
BENT 2 (BK)	58.543	58.672	58.801	58.930	58.828	58.699	58.570	58.437	58.303
BENT 2 (FWD)	58.515	58.643	58.772	58.901	58.799	58.670	58.541	58.408	58.275
BENT 3 (BK)	57.651	57.780	57.909	58.038	57.936	57.807	57.678	57.545	57.411
BENT 3 (FWD)	57.629	57.758	57.887	58.016	57.914	57.785	57.656	57.523	57.389
BENT 4 (BK)	56.999	57.127	57.256	57.385	57.283	57.154	57.025	56.892	56.758
BENT 4 (FWD)	54.817	54.946	55.074	55.203	55.101	54.972	54.843	54.710	54.577
BENT 5 (BK)	53.968	54.097	54.226	54.355	54.253	54.124	53.995	53.862	53.728
BENT 5 (FWD)	53.955	54.084	54.212	54.341	54.239	54.110	53.981	53.848	53.715
BENT 6 (BK)	53.111	53.240	53.369	53.498	53.395	53.266	53.138	53.004	52.871
BENT 6 (FWD)	53.097	53.226	53.355	53.484	53.382	53.253	53.124	52.991	52.857
BENT 7 (BK)	52.253	52.382	52.511	52.640	52.538	52.409	52.280	52.147	52.013
BENT 7 (FWD)	54.448	54.577	54.706	54.835	54.733	54.604	54.475	54.341	54.208
BENT 8 (BK)	53.972	54.101	54.230	54.359	54.257	54.128	53.999	53.866	53.732
BENT 8 (FWD)	53.957	54.086	54.215	54.344	54.242	54.113	53.984	53.850	53.717
BENT 9 (BK)	53.363	53.492	53.621	53.750	53.648	53.519	53.390	53.257	53.123

SIGNING AND SEALING ONLY FOR BEARING SEAT ELEVATIONS



HL93 LOADING

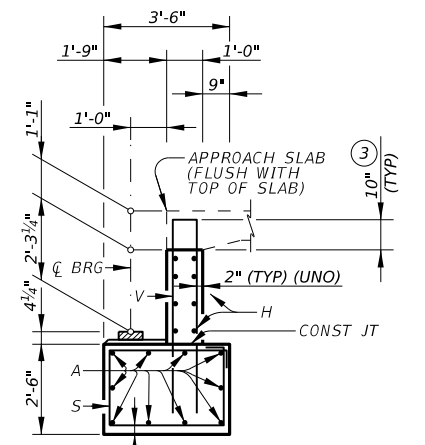
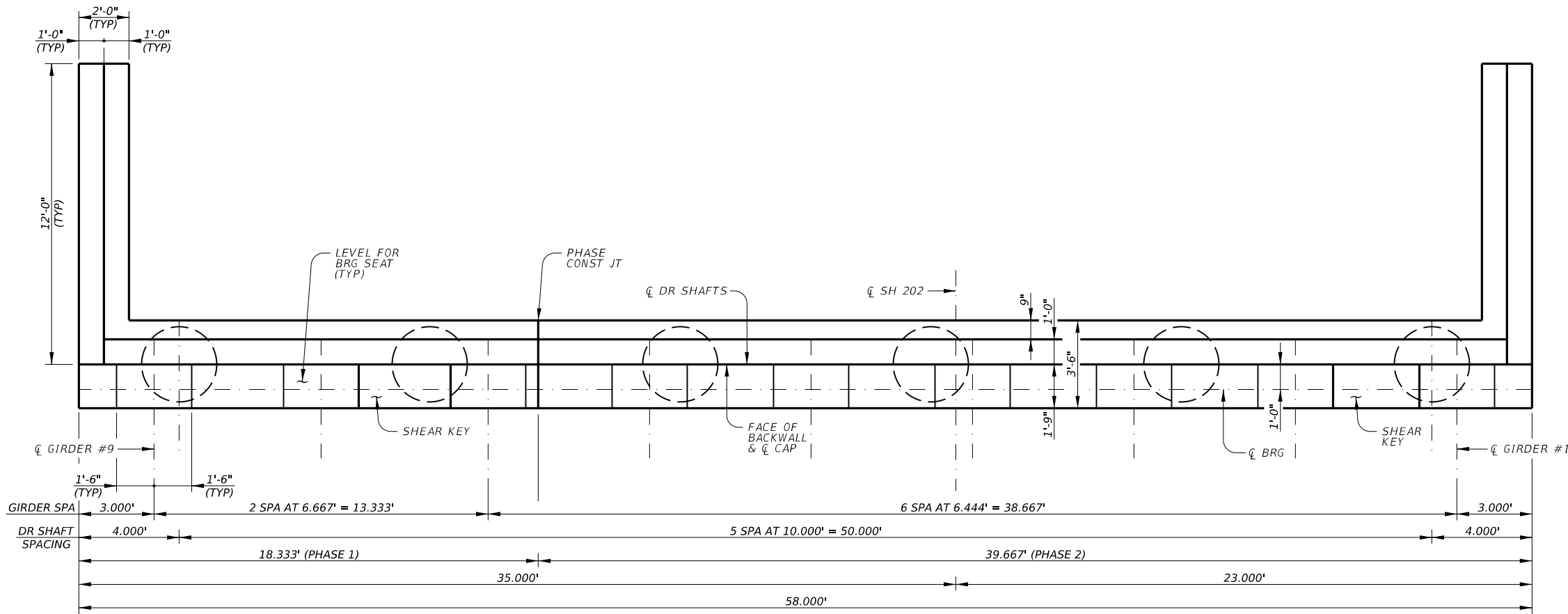


SH 202
BLANCO CREEK BRIDGE
ESTIMATED QUANTITIES &
BEARING SEAT ELEVATIONS

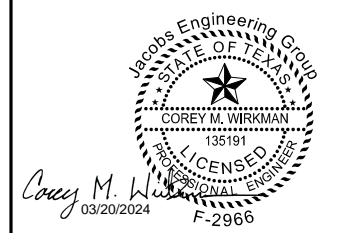
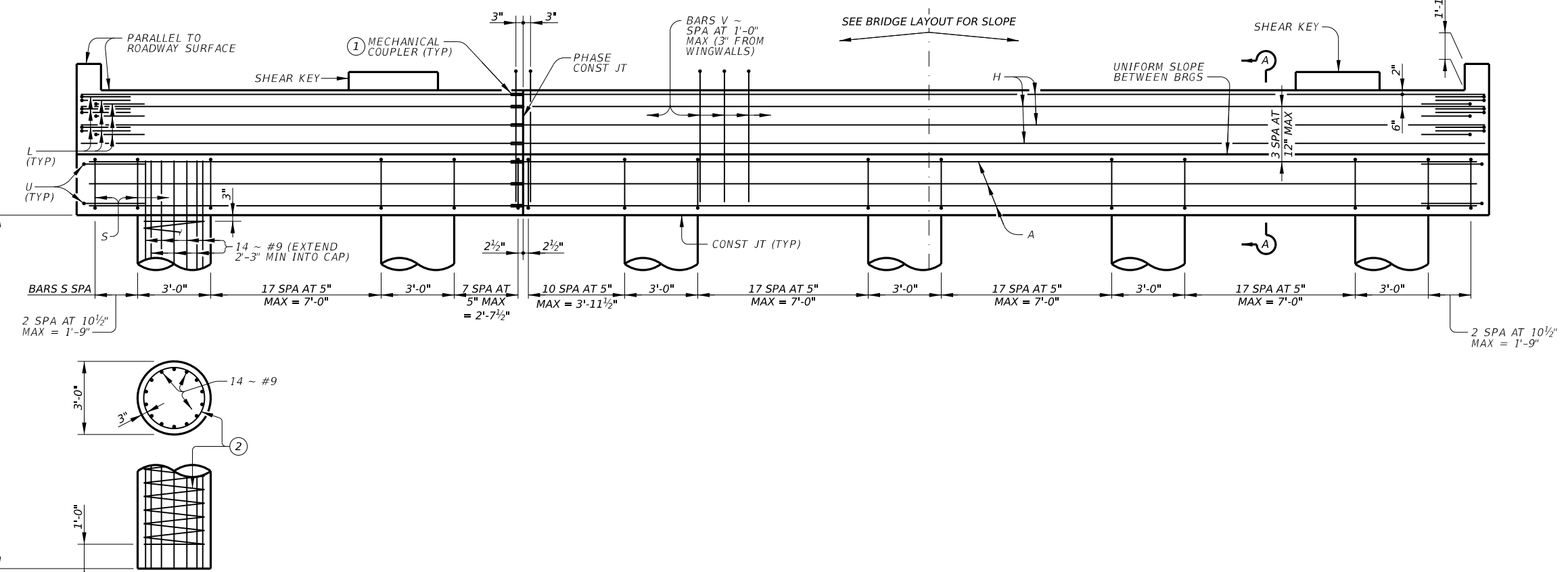
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	65	

DATE: 3/13/2024 9:43 AM
 FILE: c:\pw_workdir\jacobs-amer-transp\dms58443\SH202 SEQ01.dgn



- ① THE CONTRACTOR SHALL SPLICE BARS AT THE PHASE JOINT BY USING FLUSH MOUNTED MECHANICAL COUPLERS IN ACCORDANCE WITH TxDOT ITEM 440, "REINFORCEMENT FOR CONCRETE"
- ② #3 SPIRAL AT 6" PITCH (ONE AND A HALF FLAT TURNS TOP AND BOTTOM)
- ③ INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



HL93 LOADING

Jacobs
1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

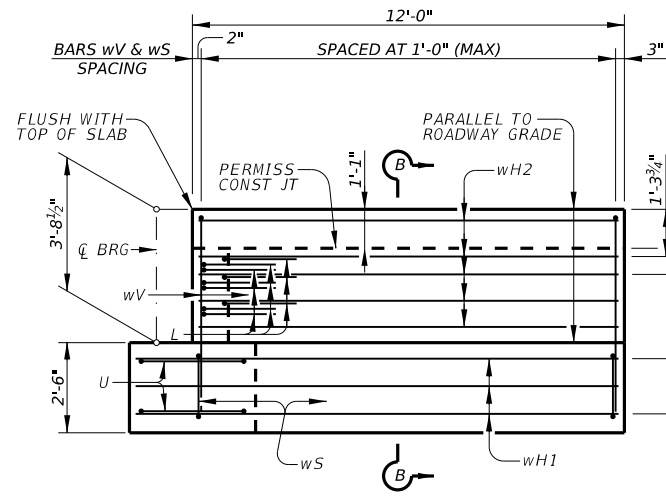
SH 202

BLANCO CREEK BRIDGE
ABUTMENT NOS. 1 & 9

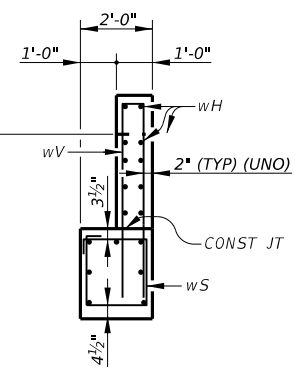
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	66	

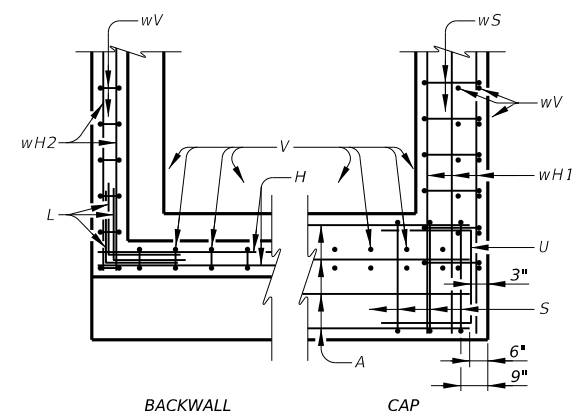
DATE: 3/20/2024 5:31 PM
FILE: c:\pw\workdir\jacobs-amer-transpldms58443\SH202_SAB01.dgn



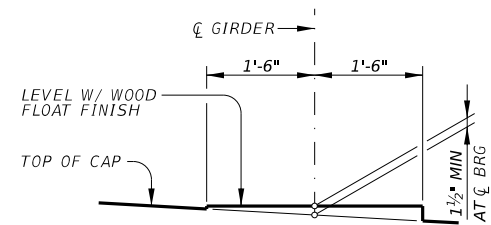
WINGWALL ELEVATION



SECTION B-B

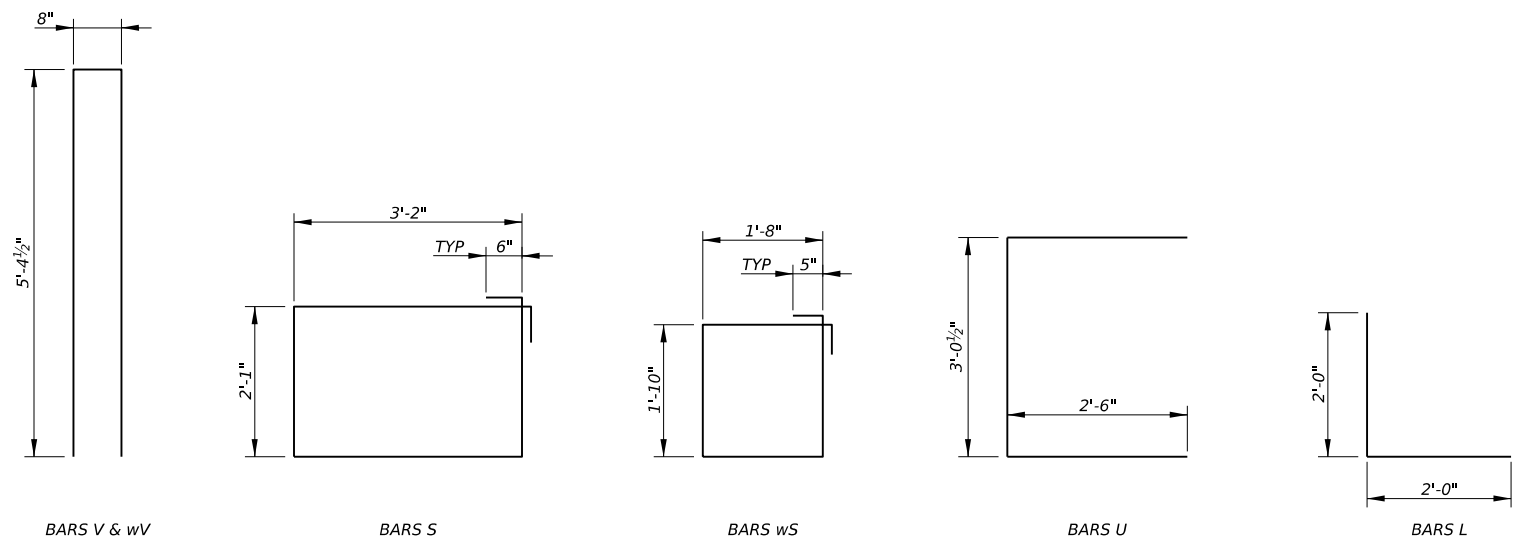


CORNER DETAILS



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



BARS V & wV

BARS S

BARS wS

BARS U

BARS L

TABLE OF ESTIMATED QUANTITIES (PHASE 1) (4)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	17'-10"	947
H	8	#6	18'-2"	218
L	9	#6	4'-0"	54
S	29	#5	11'-6"	348
U	2	#6	8'-1"	24
V	18	#5	12'-1"	227
wH1	7	#6	13'-5"	141
wH2	10	#6	11'-8"	175
wS	13	#4	7'-10"	68
wV	13	#5	12'-1"	164
REINFORCING STEEL (5)			LB	2,366
CLASS "C" CONC (ABUT)			CY	11.5

GENERAL NOTES:

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020), AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
- SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION LENGTH.
- SEE SRR STANDARD FOR RIPRAP ATTACHMENT DETAILS.
- SEE T223 STANDARD FOR RAIL ANCHORAGE IN WINGWALL.
- SEE SHEAR KEY (IGSK) STANDARD FOR ALL SHEAR KEY DETAILS.
- CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.
- CALCULATED FOUNDATION SERVICE LOADS: 107 TONS/DR SHAFT

MATERIAL NOTES:

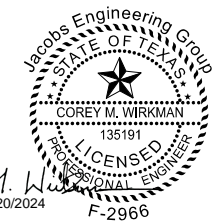
- PROVIDE CLASS "C" CONCRETE ($f_c = 3,600$ PSI).
- PROVIDE GRADE 60 REINFORCING STEEL.
- MINIMUM LAP FOR #9 DRILLED SHAFT BARS ~ 3'-9"

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

TABLE OF ESTIMATED QUANTITIES (PHASE 2) (4)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	39'-2"	2,081
H	8	#6	39'-6"	475
L	9	#6	4'-0"	54
S	68	#5	11'-6"	816
U	2	#6	8'-1"	24
V	39	#5	12'-1"	492
wH1	7	#6	13'-5"	141
wH2	10	#6	11'-8"	175
wS	13	#4	7'-10"	68
wV	13	#5	12'-1"	164
REINFORCING STEEL (5)			LB	4,490
CLASS "C" CONC (ABUT)			CY	20.4

- (4) QUANTITIES SHOWN ARE FOR ONE ABUTMENT ONLY
 (5) FOR CONTRACTOR'S INFORMATION ONLY



HL93 LOADING

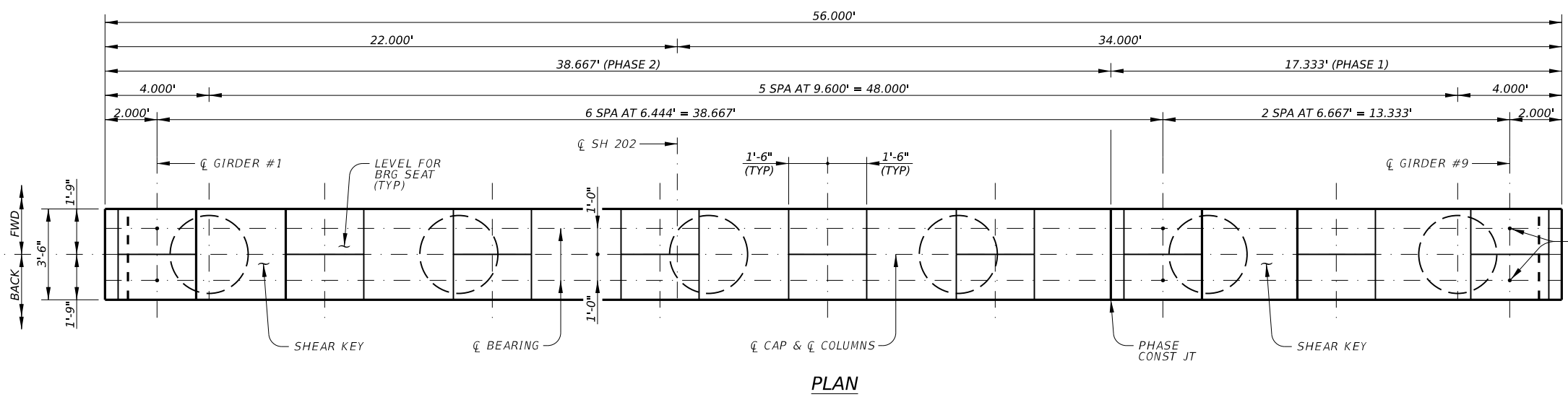


SH 202
BLANCO CREEK BRIDGE
ABUTMENT NOS. 1 & 9

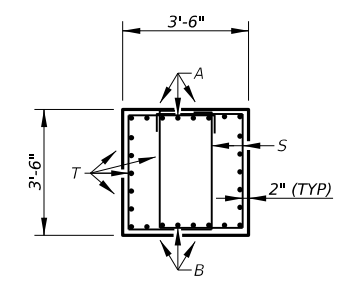
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	67

DW: FM
 CK: CMW
 DW: FM
 CK: CMW

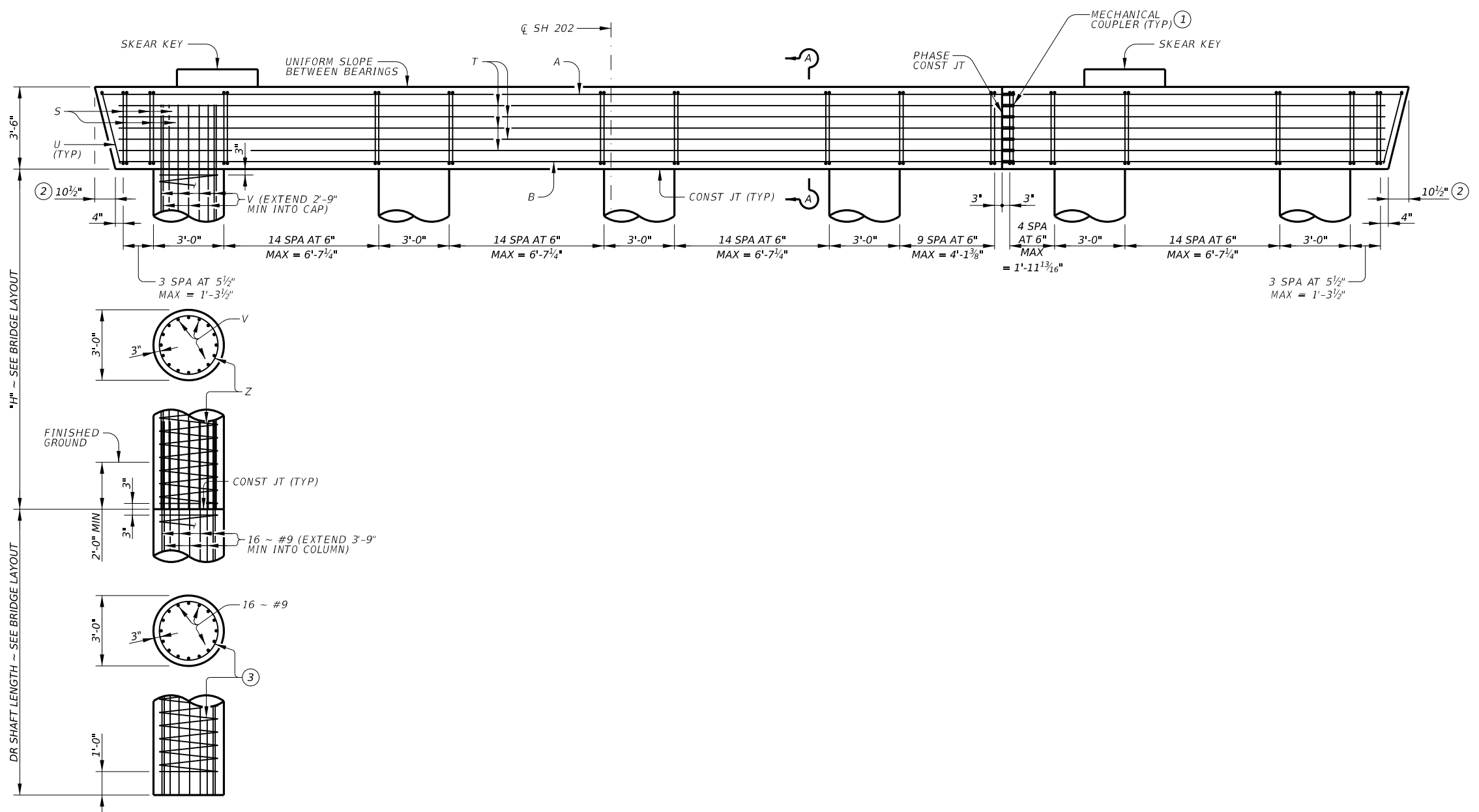


PLAN



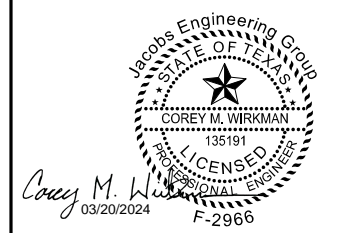
SECTION A-A

- ① THE CONTRACTOR SHALL SPLICE BARS AT THE PHASE JOINT BY USING FLUSH MOUNTED MECHANICAL COUPLERS IN ACCORDANCE WITH TxDOT ITEM 440, "REINFORCEMENT FOR CONCRETE"
- ② MEASURED PARALLEL TO TOP OF CAP CROSS-SLOPE
- ③ #3 SPIRAL AT 6" PITCH (ONE AND A HALF FLAT TURNS TOP AND BOTTOM)



ELEVATION

DATE: 3/20/2024 3:21 PM
 FILE: c:\pw\workdir\jacobs-amer-transpldms58443\SH202 SBEO1.dgn

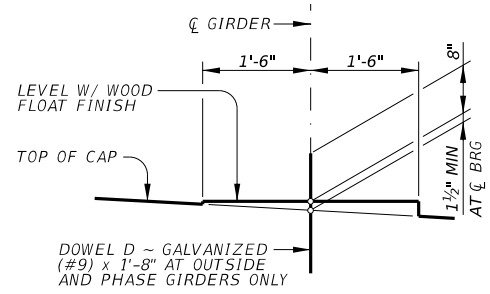


HL93 LOADING
Jacobs
 1999 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fm Registration: F-2966
 Texas Department of Transportation

SH 202
 BLANCO CREEK BRIDGE
 INTERIOR BENT NOS.
 2, 3, 5, 6, & 8

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	68	



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

TABLE OF ESTIMATED COLUMN QUANTITIES (PHASE 1) (6)

BENT NO.	"H" FT	BARS V 16 ~ #9 EA COLUMN		BARS Z 2 ~ #4 PHASE 1		REINF STEEL (5)	CL "C" CONC (COL) CY
		LENGTH	WEIGHT	LENGTH	WEIGHT		
2	11	13'-9"	1,496	369'-2"	494	1,990	5.8
3	25	27'-9"	3,019	809'-0"	1,080	4,099	13.1
5	19	21'-9"	2,366	620'-6"	828	3,194	9.9
6	23	25'-9"	2,802	746'-2"	996	3,798	12.0
8	15	17'-9"	1,931	494'-10"	662	2,593	7.9
TOTALS						15,674	48.7

TABLE OF ESTIMATED COLUMN QUANTITIES (PHASE 2) (6)

BENT NO.	"H" FT	BARS V 16 ~ #9 EA COLUMN		BARS Z 4 ~ #4 PHASE 2		REINF STEEL (5)	CL "C" CONC (COL) CY
		LENGTH	WEIGHT	LENGTH	WEIGHT		
2	11	13'-9"	2,992	369'-2"	988	3,980	11.5
3	25	27'-9"	6,040	809'-0"	2,160	8,200	26.2
5	19	21'-9"	4,732	620'-6"	1,656	6,388	19.9
6	23	25'-9"	5,604	746'-2"	1,992	7,596	24.1
8	15	17'-9"	3,864	494'-10"	1,324	5,188	15.7
TOTALS						31,352	97.4

TABLE OF ESTIMATED CAP QUANTITIES (PHASE 1) (4)

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	#11	17'-1"	726	
B	8	#11	16'-4"	694	
D	4	#9	1'-8"	23	
S	48	#5	12'-0"	601	
T	10	#5	16'-4"	170	
U	1	#5	9'-8"	10	
REINFORCING STEEL (5)				LB	2,224
CLASS "C" CONC (CAP)				CY	8.3

TABLE OF ESTIMATED CAP QUANTITIES (PHASE 2) (4)

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	#11	38'-5"	1,633	
B	8	#11	37'-8"	1,601	
D	2	#9	1'-8"	11	
S	118	#5	12'-0"	1,477	
T	10	#5	37'-5"	390	
U	1	#5	9'-8"	10	
REINFORCING STEEL (5)				LB	5,122
CLASS "C" CONC (CAP)				CY	18.0

GENERAL NOTES:

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020), AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
- SEE BRIDGE LAYOUT FOR FOUNDATION LENGTH.
- SEE SHEAR KEY (IGSK) STANDARD FOR ALL SHEAR KEY DETAILS.
- CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.
- CALCULATED FOUNDATION SERVICE LOADS: 330 TONS/DR SHAFT

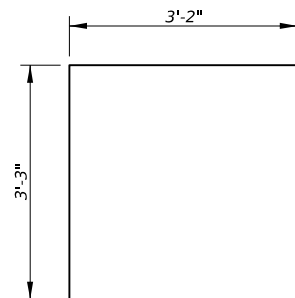
- (4) QUANTITIES SHOWN ARE FOR ONE BENT ONLY
- (5) FOR CONTRACTOR'S INFORMATION ONLY
- (6) QUANTITIES SHOWN ARE BASED ON THE INDICATED "H" VALUE. FOR EACH LINEAR FOOT VARIATION IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
 BARS V LENGTH, 1'-0"
 BARS Z LENGTH, 31'-5"
 REINFORCING STEEL, 76 LB
 CLASS "C" CONC (COL), 0.27 CY

MATERIAL NOTES:

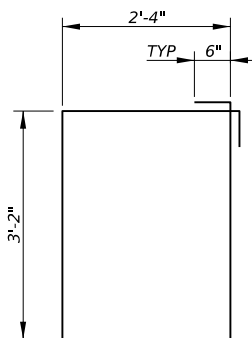
- PROVIDE CLASS "C" CONCRETE (f'c = 3,600 PSI).
- PROVIDE GRADE 60 REINFORCING STEEL.
- GALVANIZE DOWEL BARS D.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

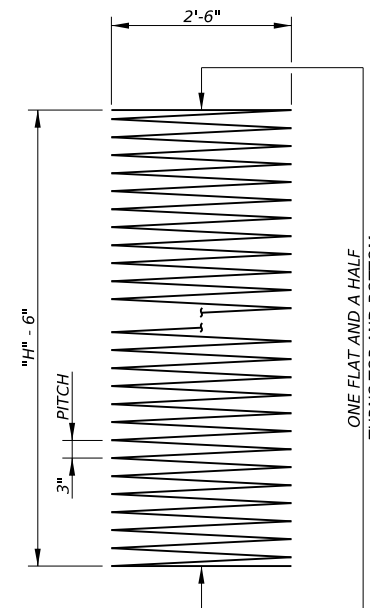
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.



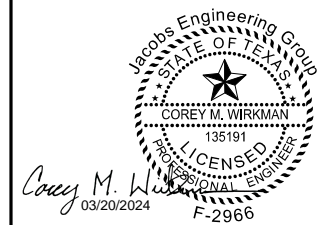
BARS U



BARS S



BARS Z



HL93 LOADING



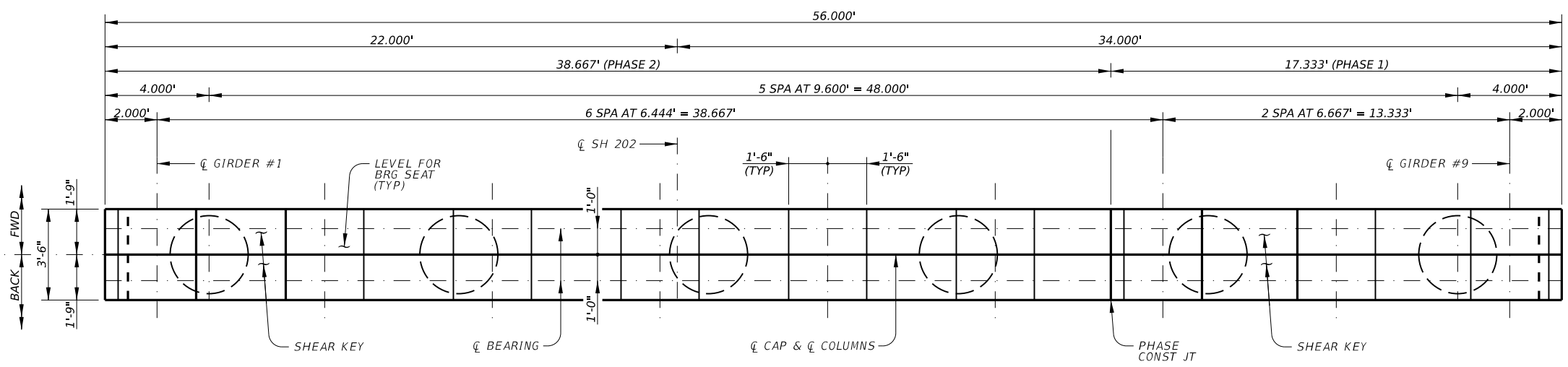
SH 202

BLANCO CREEK BRIDGE
 INTERIOR BENT NOS.
 2, 3, 5, 6, & 8

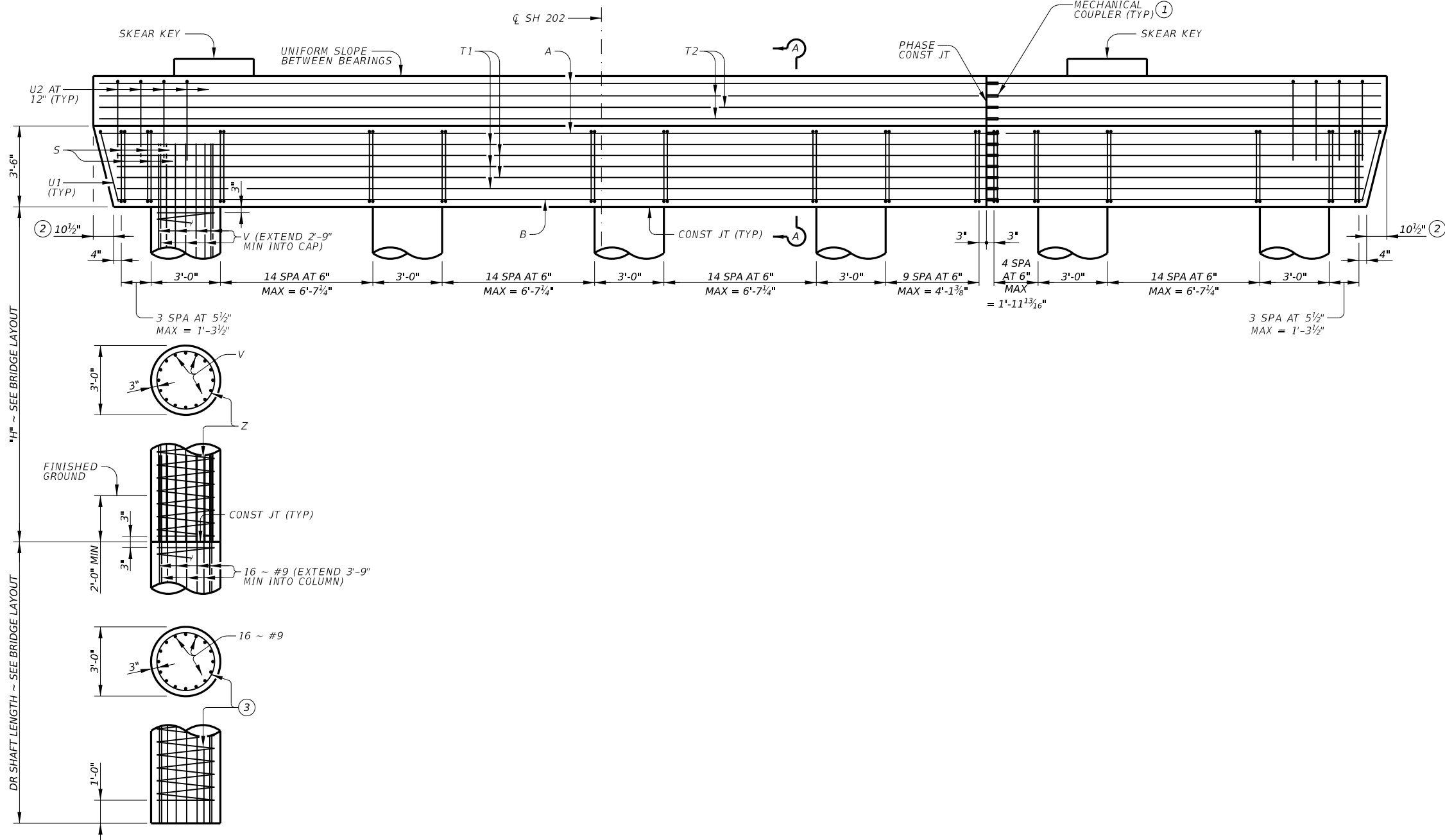
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	69

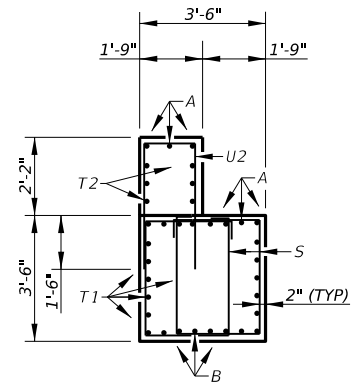
DW: FM
 CK: CMW
 DW: FM
 CK: CMW



PLAN
(BENT 4 SHOWN, BENT 7 MIRRORED ABOUT CL CAP)



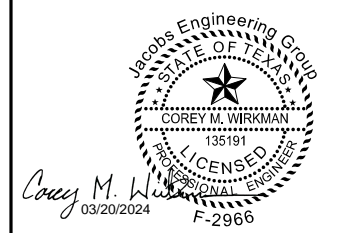
ELEVATION



SECTION A-A

- ① THE CONTRACTOR SHALL SPLICE BARS AT THE PHASE JOINT BY USING FLUSH MOUNTED MECHANICAL COUPLERS IN ACCORDANCE WITH TxDOT ITEM 440, "REINFORCEMENT FOR CONCRETE"
- ② MEASURED PARALLEL TO TOP OF CAP CROSS-SLOPE
- ③ #3 SPIRAL AT 6" PITCH (ONE AND A HALF FLAT TURNS TOP AND BOTTOM)

DATE: 3/20/2024 4:11 PM
 FILE: c:\pw_workdir\jacobs-amer-transpldms58443\SH202_SBE03.dgn



HL93 LOADING

Jacobs

1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

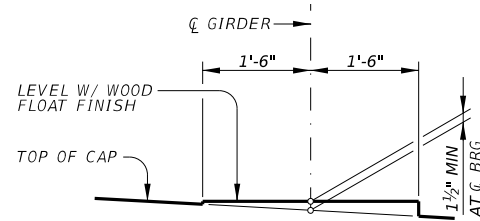
Texas Department of Transportation

SH 202

BLANCO CREEK BRIDGE
INTERIOR BENT NOS.
4 & 7

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	70	



BEARING SEAT DETAIL
 (BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

TABLE OF ESTIMATED COLUMN QUANTITIES (PHASE 1) (6)

BENT NO.	"H" FT	BARS V 16 ~ #9 EA COLUMN		BARS Z 2 ~ #4 PHASE 1		REINF STEEL (5) LB	CL "C" CONC (COL) CY
		LENGTH	WEIGHT	LENGTH	WEIGHT		
4	20	22'-9"	2,476	651'-11"	870	3,346	10.5
7	25	27'-9"	3,019	809'-0"	1,080	4,099	13.1
TOTALS						7,445	23.6

TABLE OF ESTIMATED COLUMN QUANTITIES (PHASE 2) (6)

BENT NO.	"H" FT	BARS V 16 ~ #9 EA COLUMN		BARS Z 4 ~ #4 PHASE 2		REINF STEEL (5) LB	CL "C" CONC (COL) CY
		LENGTH	WEIGHT	LENGTH	WEIGHT		
4	20	22'-9"	4,952	651'-11"	1,740	6,692	20.9
7	25	27'-9"	6,040	809'-0"	2,160	8,200	26.2
TOTALS						14,892	47.1

TABLE OF ESTIMATED CAP QUANTITIES (PHASE 1) (4)

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	11	#11	17'-1"	998	
B	8	#11	16'-4"	694	
S	48	#5	12'-0"	601	
T1	10	#5	16'-4"	170	
T2	6	#5	17'-1"	107	
U1	1	#5	9'-8"	10	
U2	17	#5	9'-10"	174	
REINFORCING STEEL (5)				LB	2,754
CLASS "C" CONC (CAP)				CY	10.7

TABLE OF ESTIMATED CAP QUANTITIES (PHASE 2) (4)

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	11	#11	38'-5"	2,245	
B	8	#11	37'-8"	1,601	
S	118	#5	12'-0"	1,477	
T1	10	#5	37'-5"	390	
T2	6	#5	38'-5"	240	
U1	1	#5	9'-8"	10	
U2	38	#5	9'-10"	390	
REINFORCING STEEL (5)				LB	6,353
CLASS "C" CONC (CAP)				CY	23.5

GENERAL NOTES:

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020), AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
- SEE BRIDGE LAYOUT FOR FOUNDATION LENGTH.
- SEE SHEAR KEY (IGSK) STANDARD FOR ALL SHEAR KEY DETAILS.
- CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.
- CALCULATED FOUNDATION SERVICE LOADS: 266 TONS/DR SHAFT

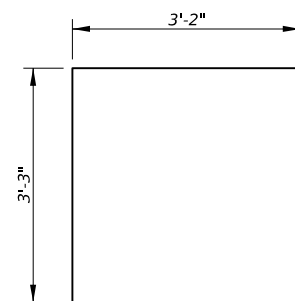
- (4) QUANTITIES SHOWN ARE FOR ONE BENT ONLY
 (5) FOR CONTRACTOR'S INFORMATION ONLY
 (6) QUANTITIES SHOWN ARE BASED ON THE INDICATED "H" VALUE. FOR EACH LINEAR FOOT VARIATION IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
 BARS V LENGTH, 1'-0"
 BARS Z LENGTH, 31'-5"
 REINFORCING STEEL, 76 LB
 CLASS "C" CONC (COL), 0.27 CY

MATERIAL NOTES:

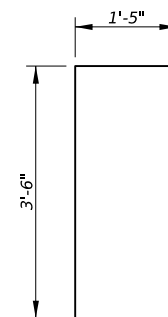
- PROVIDE CLASS "C" CONCRETE ($f_c = 3,600$ PSI).
- PROVIDE GRADE 60 REINFORCING STEEL.
- GALVANIZE DOWEL BARS D.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

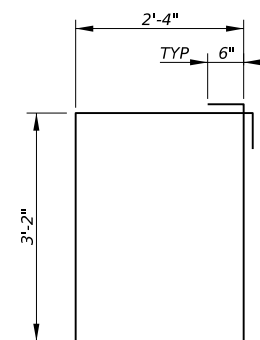
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.



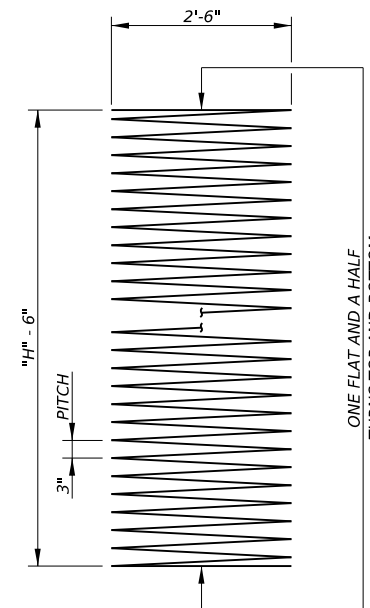
BARS U1



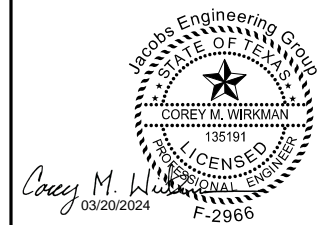
BARS U2



BARS S



BARS Z



HL93 LOADING

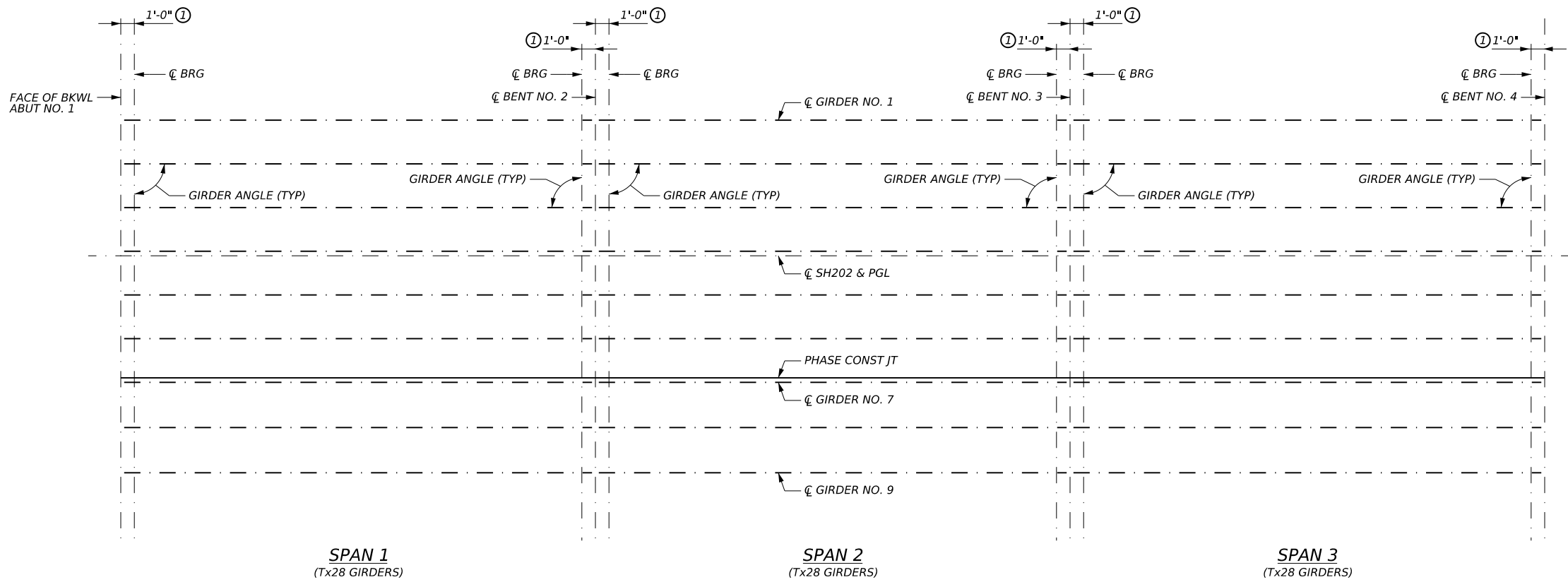


SH 202

BLANCO CREEK BRIDGE
 INTERIOR BENT NOS.
 4 & 7

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	71



- ① SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) STANDARD SHEET FOR ORIENTATION OF DIMENSIONS.
- ② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS FOR GIRDER SLOPE.

BENT REPORT

ABUT NO. 1 (S 30 44 22.7 W)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L			
SPAN 1	BEAM SPA.	BEAM ANGLE	
		(C.L. BENT)	D M S
BEAM 1	0.000	90	0 0
BEAM 2	6.444	90	0 0
BEAM 3	6.444	90	0 0
BEAM 4	6.444	90	0 0
BEAM 5	6.444	90	0 0
BEAM 6	6.444	90	0 0
BEAM 7	6.444	90	0 0
BEAM 8	6.667	90	0 0
BEAM 9	6.667	90	0 0
TOTAL	52.000		

BENT NO. 3 (S 30 44 22.7 W)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L			
SPAN 2	BEAM SPA.	BEAM ANGLE	
		(C.L. BENT)	D M S
BEAM 1	0.000	90	0 0
BEAM 2	6.444	90	0 0
BEAM 3	6.444	90	0 0
BEAM 4	6.444	90	0 0
BEAM 5	6.444	90	0 0
BEAM 6	6.444	90	0 0
BEAM 7	6.444	90	0 0
BEAM 8	6.667	90	0 0
BEAM 9	6.667	90	0 0
TOTAL	52.000		

BENT NO. 2 (S 30 44 22.7 W)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L			
SPAN 1	BEAM SPA.	BEAM ANGLE	
		(C.L. BENT)	D M S
BEAM 1	0.000	90	0 0
BEAM 2	6.444	90	0 0
BEAM 3	6.444	90	0 0
BEAM 4	6.444	90	0 0
BEAM 5	6.444	90	0 0
BEAM 6	6.444	90	0 0
BEAM 7	6.444	90	0 0
BEAM 8	6.667	90	0 0
BEAM 9	6.667	90	0 0
TOTAL	52.000		

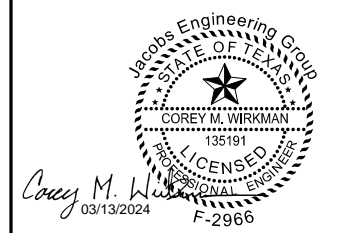
BENT NO. 4 (S 30 44 22.7 W)			
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L			
SPAN 3	BEAM SPA.	BEAM ANGLE	
		(C.L. BENT)	D M S
BEAM 1	0.000	90	0 0
BEAM 2	6.444	90	0 0
BEAM 3	6.444	90	0 0
BEAM 4	6.444	90	0 0
BEAM 5	6.444	90	0 0
BEAM 6	6.444	90	0 0
BEAM 7	6.444	90	0 0
BEAM 8	6.667	90	0 0
BEAM 9	6.667	90	0 0
TOTAL	52.000		

BEAM REPORT

BEAM REPORT, SPAN 1			
C-C BENT	C-C BRG.	TRUE DISTANCE	
		HORIZONTAL DISTANCE	BOT. BM. FLG. ②
BEAM 1	70.000	68.000	69.51
BEAM 2	70.000	68.000	69.51
BEAM 3	70.000	68.000	69.51
BEAM 4	70.000	68.000	69.51
BEAM 5	70.000	68.000	69.51
BEAM 6	70.000	68.000	69.51
BEAM 7	70.000	68.000	69.51
BEAM 8	70.000	68.000	69.51
BEAM 9	70.000	68.000	69.51

BEAM REPORT, SPAN 2			
C-C BENT	C-C BRG.	TRUE DISTANCE	
		HORIZONTAL DISTANCE	BOT. BM. FLG. ②
BEAM 1	70.000	68.000	69.51
BEAM 2	70.000	68.000	69.51
BEAM 3	70.000	68.000	69.51
BEAM 4	70.000	68.000	69.51
BEAM 5	70.000	68.000	69.51
BEAM 6	70.000	68.000	69.51
BEAM 7	70.000	68.000	69.51
BEAM 8	70.000	68.000	69.51
BEAM 9	70.000	68.000	69.51

BEAM REPORT, SPAN 3			
C-C BENT	C-C BRG.	TRUE DISTANCE	
		HORIZONTAL DISTANCE	BOT. BM. FLG. ②
BEAM 1	70.000	68.000	69.50
BEAM 2	70.000	68.000	69.50
BEAM 3	70.000	68.000	69.50
BEAM 4	70.000	68.000	69.50
BEAM 5	70.000	68.000	69.50
BEAM 6	70.000	68.000	69.50
BEAM 7	70.000	68.000	69.50
BEAM 8	70.000	68.000	69.50
BEAM 9	70.000	68.000	69.50

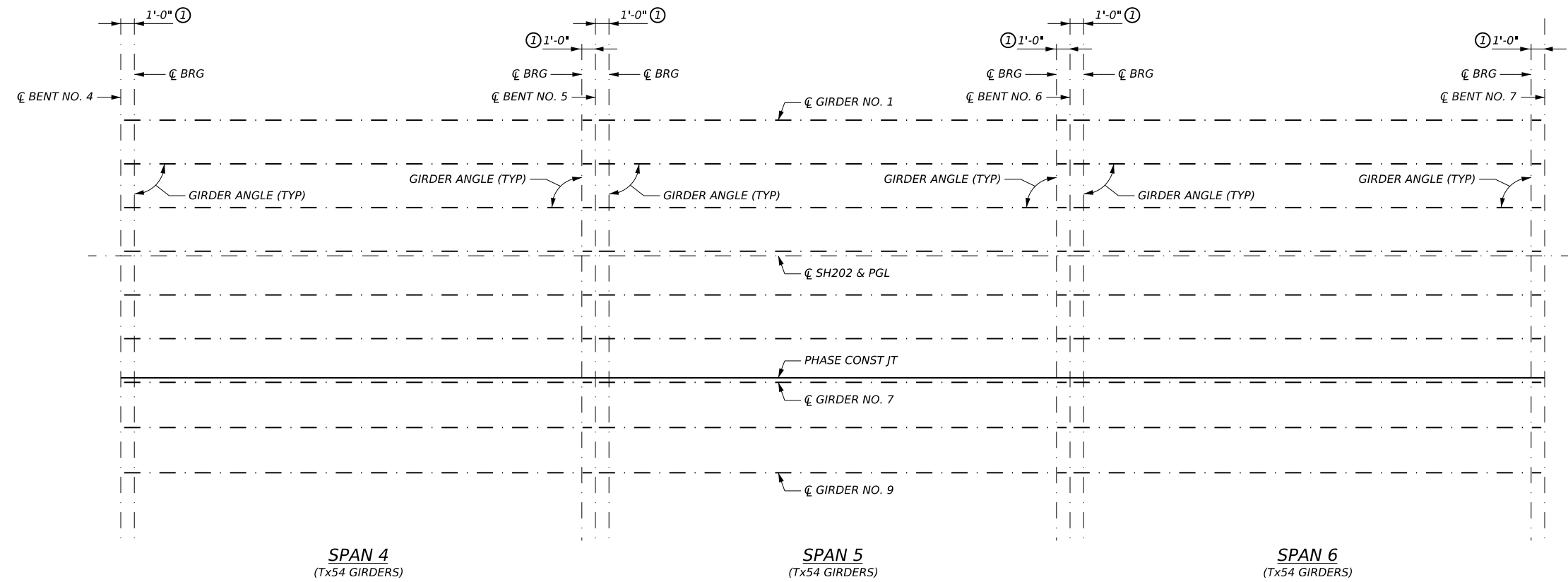


HL93 LOADING



SH 202
BLANCO CREEK BRIDGE
FRAMING PLAN
(SPAN NOS. 1-3)

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY		SHEET NO.
CRP	REFUGIO		72



- ① SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) STANDARD SHEET FOR ORIENTATION OF DIMENSIONS.
- ② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS FOR GIRDER SLOPE.

BENT REPORT

BENT NO. 4 (S 30 44 22.7 W)				
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L				
SPAN 4	BEAM SPA.	BEAM ANGLE		
		(C.L. BENT)	D	M
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

BENT NO. 5 (S 30 44 22.7 W)				
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L				
SPAN 4	BEAM SPA.	BEAM ANGLE		
		(C.L. BENT)	D	M
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

BENT NO. 6 (S 30 44 22.7 W)				
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L				
SPAN 5	BEAM SPA.	BEAM ANGLE		
		(C.L. BENT)	D	M
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

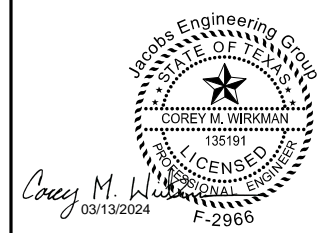
BENT NO. 7 (S 30 44 22.7 W)				
DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L				
SPAN 5	BEAM SPA.	BEAM ANGLE		
		(C.L. BENT)	D	M
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

BEAM REPORT

BEAM REPORT, SPAN 4				
C-C BENT	HORIZONTAL DISTANCE	C-C BRG.	TRUE DISTANCE	
			BOT. BM. FLG. ②	BEAM SLOPE
BEAM 1	125.000	123.000	124.50	-0.0069
BEAM 2	125.000	123.000	124.50	-0.0069
BEAM 3	125.000	123.000	124.50	-0.0069
BEAM 4	125.000	123.000	124.50	-0.0069
BEAM 5	125.000	123.000	124.50	-0.0069
BEAM 6	125.000	123.000	124.50	-0.0069
BEAM 7	125.000	123.000	124.50	-0.0069
BEAM 8	125.000	123.000	124.50	-0.0069
BEAM 9	125.000	123.000	124.50	-0.0069

BEAM REPORT, SPAN 5				
C-C BENT	HORIZONTAL DISTANCE	C-C BRG.	TRUE DISTANCE	
			BOT. BM. FLG. ②	BEAM SLOPE
BEAM 1	125.000	123.000	124.50	-0.0069
BEAM 2	125.000	123.000	124.50	-0.0069
BEAM 3	125.000	123.000	124.50	-0.0069
BEAM 4	125.000	123.000	124.50	-0.0069
BEAM 5	125.000	123.000	124.50	-0.0069
BEAM 6	125.000	123.000	124.50	-0.0069
BEAM 7	125.000	123.000	124.50	-0.0069
BEAM 8	125.000	123.000	124.50	-0.0069
BEAM 9	125.000	123.000	124.50	-0.0069

BEAM REPORT, SPAN 6				
C-C BENT	HORIZONTAL DISTANCE	C-C BRG.	TRUE DISTANCE	
			BOT. BM. FLG. ②	BEAM SLOPE
BEAM 1	125.000	123.000	124.50	-0.0069
BEAM 2	125.000	123.000	124.50	-0.0069
BEAM 3	125.000	123.000	124.50	-0.0069
BEAM 4	125.000	123.000	124.50	-0.0069
BEAM 5	125.000	123.000	124.50	-0.0069
BEAM 6	125.000	123.000	124.50	-0.0069
BEAM 7	125.000	123.000	124.50	-0.0069
BEAM 8	125.000	123.000	124.50	-0.0069
BEAM 9	125.000	123.000	124.50	-0.0069



HL93 LOADING

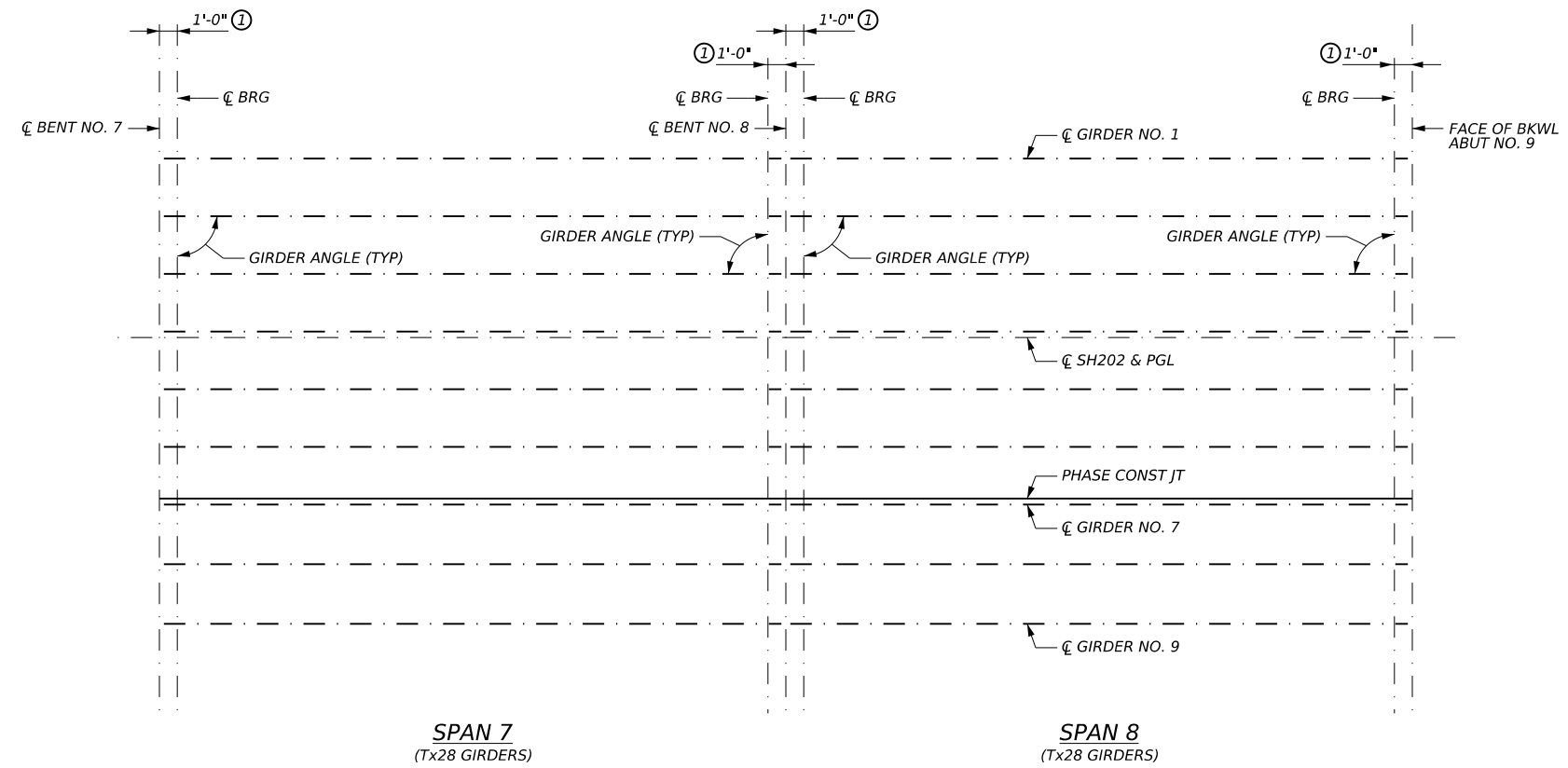


SH 202
BLANCO CREEK BRIDGE
FRAMING PLAN
(SPAN NOS. 4-6)

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	73	



- ① SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) STANDARD SHEET FOR ORIENTATION OF DIMENSIONS.
- ② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS FOR GIRDER SLOPE.



BENT REPORT

BENT NO. 7 (S 30 44 22.7 W)
 DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L

SPAN 7	BEAM	BEAM ANGLE		
		D	M	S
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

ABUT NO. 9 (S 30 44 22.7 W)
 DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L

SPAN 8	BEAM	BEAM ANGLE		
		D	M	S
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

BENT NO. 8 (S 30 44 22.7 W)
 DISTANCE BETWEEN STATION LINE AND BEAM 1 20.000 L

SPAN 7	BEAM	BEAM ANGLE		
		D	M	S
BEAM 1	0.000	90	0	0
BEAM 2	6.444	90	0	0
BEAM 3	6.444	90	0	0
BEAM 4	6.444	90	0	0
BEAM 5	6.444	90	0	0
BEAM 6	6.444	90	0	0
BEAM 7	6.444	90	0	0
BEAM 8	6.667	90	0	0
BEAM 9	6.667	90	0	0
TOTAL	52.000			

SPAN 8

BEAM	BEAM ANGLE
BEAM 1	0.000 90 0 0
BEAM 2	6.444 90 0 0
BEAM 3	6.444 90 0 0
BEAM 4	6.444 90 0 0
BEAM 5	6.444 90 0 0
BEAM 6	6.444 90 0 0
BEAM 7	6.444 90 0 0
BEAM 8	6.667 90 0 0
BEAM 9	6.667 90 0 0
TOTAL	52.000

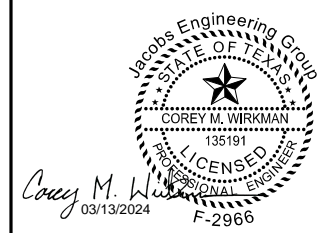
BEAM REPORT

BEAM REPORT, SPAN 7

BEAM	HORIZONTAL DISTANCE		TRUE DISTANCE	BEAM SLOPE
	C-C BENT	C-C BRG.		
BEAM 1	70.000	68.000	69.50	-0.0070
BEAM 2	70.000	68.000	69.50	-0.0070
BEAM 3	70.000	68.000	69.50	-0.0070
BEAM 4	70.000	68.000	69.50	-0.0070
BEAM 5	70.000	68.000	69.50	-0.0070
BEAM 6	70.000	68.000	69.50	-0.0070
BEAM 7	70.000	68.000	69.50	-0.0070
BEAM 8	70.000	68.000	69.50	-0.0070
BEAM 9	70.000	68.000	69.50	-0.0070

BEAM REPORT, SPAN 8

BEAM	HORIZONTAL DISTANCE		TRUE DISTANCE	BEAM SLOPE
	C-C BENT	C-C BRG.		
BEAM 1	70.000	68.000	69.50	-0.0087
BEAM 2	70.000	68.000	69.50	-0.0087
BEAM 3	70.000	68.000	69.50	-0.0087
BEAM 4	70.000	68.000	69.50	-0.0087
BEAM 5	70.000	68.000	69.50	-0.0087
BEAM 6	70.000	68.000	69.50	-0.0087
BEAM 7	70.000	68.000	69.50	-0.0087
BEAM 8	70.000	68.000	69.50	-0.0087
BEAM 9	70.000	68.000	69.50	-0.0087



HL93 LOADING



SH 202
BLANCO CREEK BRIDGE
FRAMING PLAN
(SPAN NOS. 7-8)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY		SHEET NO.
CRP	REFUGIO		74

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: 8/21/2023 12:00 PM
 FILE: c:\pwworkdir\jacobs-amer-trans\pdm5843\igndsts1-22.dgn

STRUCTURE	DESIGNED GIRDERS								DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN				LOAD RATING FACTORS				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS							NO.	TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP \bar{c}) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOT \bar{c}) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH f _{pu} (ksi)	"e" \bar{c} (in)	"e" END (in)	Moment								Shear	Inv	Opr	Inv
SH202 BLANCO CREK BRIDGE	1-3	ALL	TX28		24	0.6	270	9.65	6.98	4	20.5	4.900	5.700	3.088	-3.750	2,747	0.553	0.719	1.48	1.92	1.00
	4-6	ALL	TX54		42	0.6	270	19.01	12.72	6	50.5	5.600	6.600	4.384	-4.257	8,108	0.550	0.719	1.71	2.22	1.06
	7-8	ALL	TX28		24	0.6	270	9.65	6.98	4	20.5	4.900	5.700	3.070	-3.734	2,741	0.553	0.719	1.48	1.92	1.01

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT \bar{c} OF GIRDER

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = 0.24 $\sqrt{f'ci}$

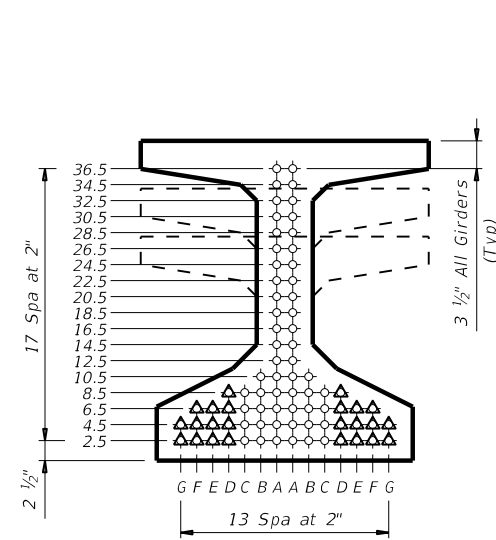
Optional designs must likewise conform.

(2) Portion of full HL93.

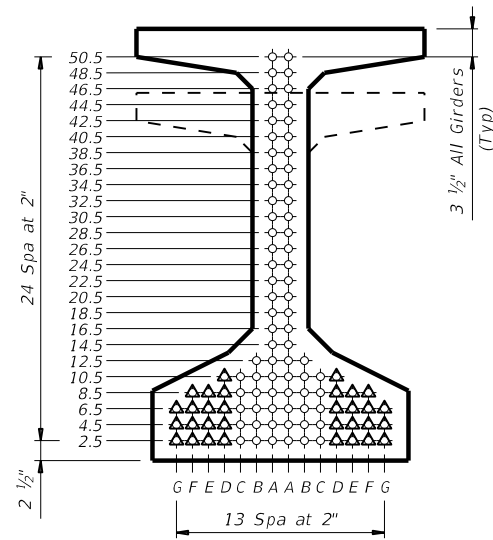
DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation. Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder. Prestress losses for the designed girders 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 bars. Use low relaxation strands, each pretensioned to 75 percent of f_{pu}. Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked Δ . Double wrap full-length debonded strands in outer most position of each row. When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas. Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

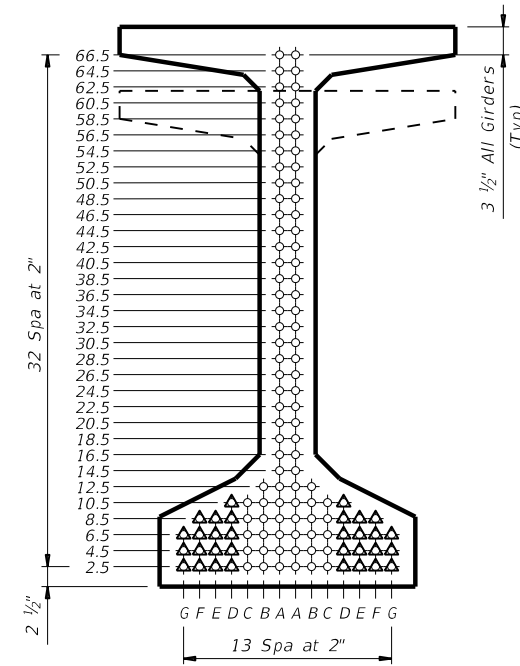
DEPRESSED STRAND DESIGNS:
 Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



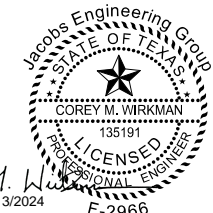
TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70

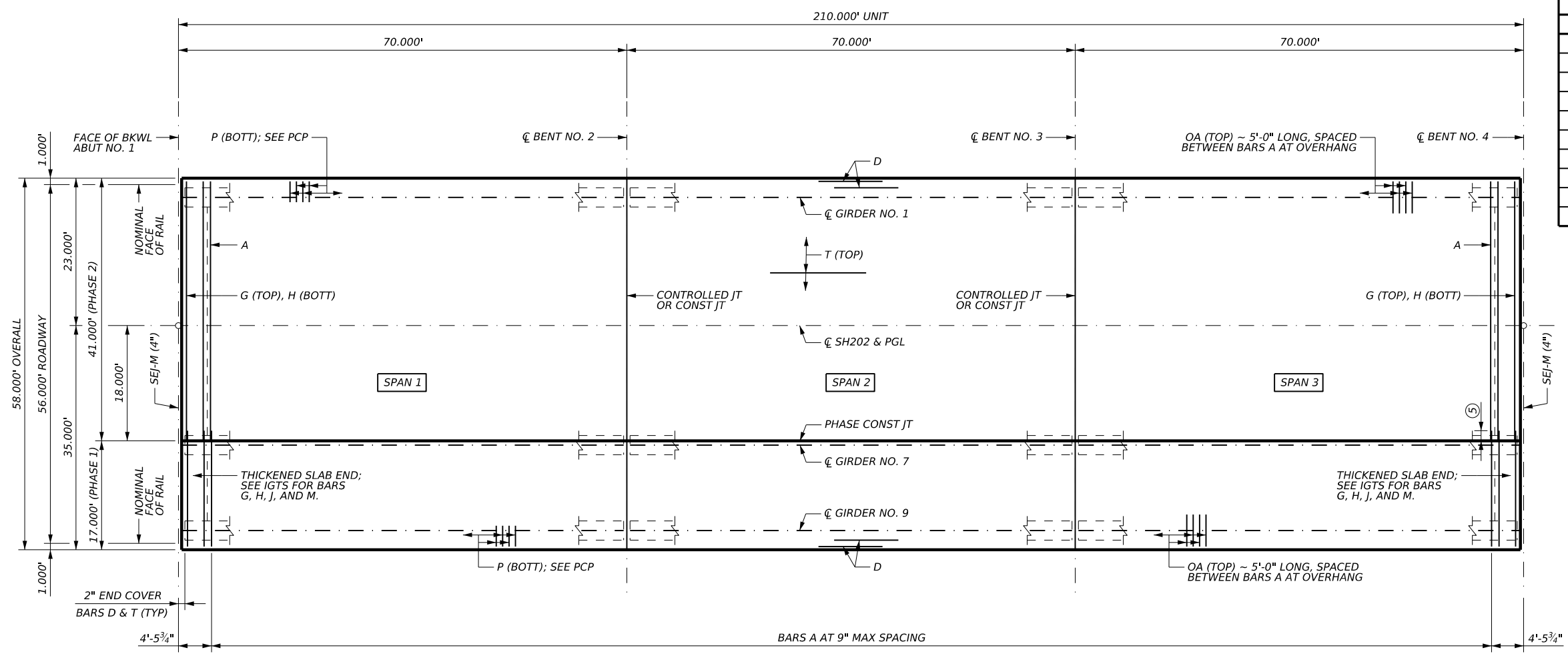


HL93 LOADING

Texas Department of Transportation		Bridge Division Standard	
SH 202 PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS) IGND			
FILE: igndsts1-22.dgn	DN: TxDOT	CK: TxDOT	DW: EFC
©TxDOT August 2017	CONV	SECT	JOB
REVISIONS	0447	04	018
10-19: Modified for depressed strands only.	DIST	COUNTY	SHEET NO.
3-22: Added Load Rating.	CRP	REFUGIO	75

DATE: 3/12/2024 5:21 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58443\SH202 55B01.dgn

CC: CMW
 DW: VH
 VH: CMW



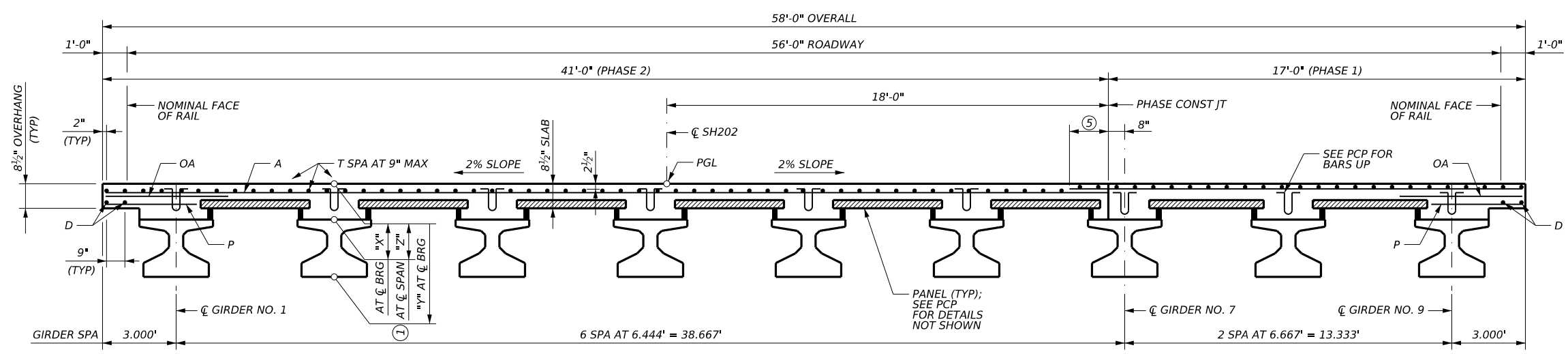
PLAN

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4
UP	#4

TABLE OF ESTIMATED QUANTITIES (PHASE 1)			
SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS	REINF STEEL
		(Tx28) (4)	(2) (3)
NO.	SF	LF	LB
1	1,190	208.53	2,737
2	1,190	208.53	2,737
3	1,190	208.50	2,737
TOTAL	3,570	625.56	8,211

TABLE OF ESTIMATED QUANTITIES (PHASE 2)			
SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS	REINF STEEL
		(Tx28) (4)	(2) (3)
NO.	SF	LF	LB
1	2,870	417.06	6,601
2	2,870	417.06	6,601
3	2,870	417.00	6,601
TOTAL	8,610	1,251.12	19,803

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	"X" AT C BRG	"Y" AT C BRG	"Z" AT C SPAN (1)
1 - 3	1 - 6	1'-0 3/4"	3'-4 1/4"	10"
	7	1'-0 3/4"	3'-4 1/4"	9 5/8"
	8 - 9	1'-0 3/4"	3'-4 1/4"	10"



TYPICAL TRANSVERSE SECTION

GENERAL NOTES

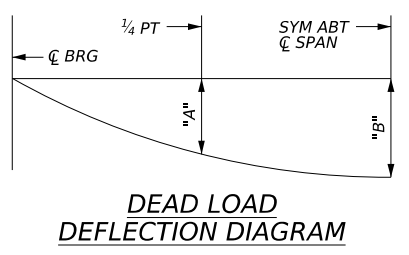
- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
- SEE PRESTRESSED CONCRETE PANEL (PCP) AND PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) STANDARD SHEETS FOR PANEL DETAILS NOT SHOWN.
- SEE THICKENED SLAB END DETAILS (IGTS) STANDAR SHEET FOR THICKENED SLAB END DETAILS NOT SHOWN.
- SEE MISCELLANEOUS SLAB DETAILS (IGMS) STANDARD SHEET FOR MISCELLANEOUS DETAILS.
- SEE TY T223 STANDARD SHEETS FOR RAIL ANCHORAGE IN SLAB.
- SEE PERMANENT METAL DECK FORMS (PMDF) STANDARD SHEET FOR DETAILS AND QUANTYIY ADJUSTMENTS IF THIS OPTION IS USED.

- SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITHIN SLAB.
- CONCRETE COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES

- PROVIDE CLASS "S" CONCRETE ($f_c = 4,000$ psi).
- PROVIDE GRADE 60 REINFORCING STEEL.
- BAR LAPS, WHERE REQUIRED, ARE AS FOLLOWS: UNCOATED ~ #4 = 1'-7"
- DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

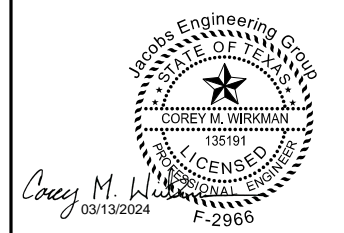
- THEORETICAL DIMENSION
- FOR CONTRACTOR'S INFORMATION ONLY
- REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.
- QUANTITIES SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEET FOR GIRDER LENGTHS.
- EXTEND PHASE 1 BARS A, G, & H 1'-7" INTO PHASE 2.



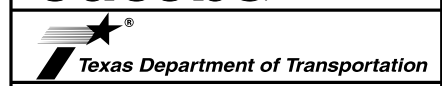
DEAD LOAD DEFLECTION DIAGRAM
 NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE SLAB ONLY ($E_c = 5,000$ ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF DEAD LOAD DEFLECTIONS			
SPAN NO.	GIRDER NO.	"A"	"B"
		FT	FT
1 - 3	1	0.071	0.100
	2 - 6	0.073	0.104
	7 (6)	0.045	0.065
	8	0.076	0.108
	9	0.072	0.102

(6) DEFLECTIONS SHOWN FOR GIRDER NO. 7 ARE DUE TO PHASE 1 PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE SLAB ONLY.



HL93 LOADING

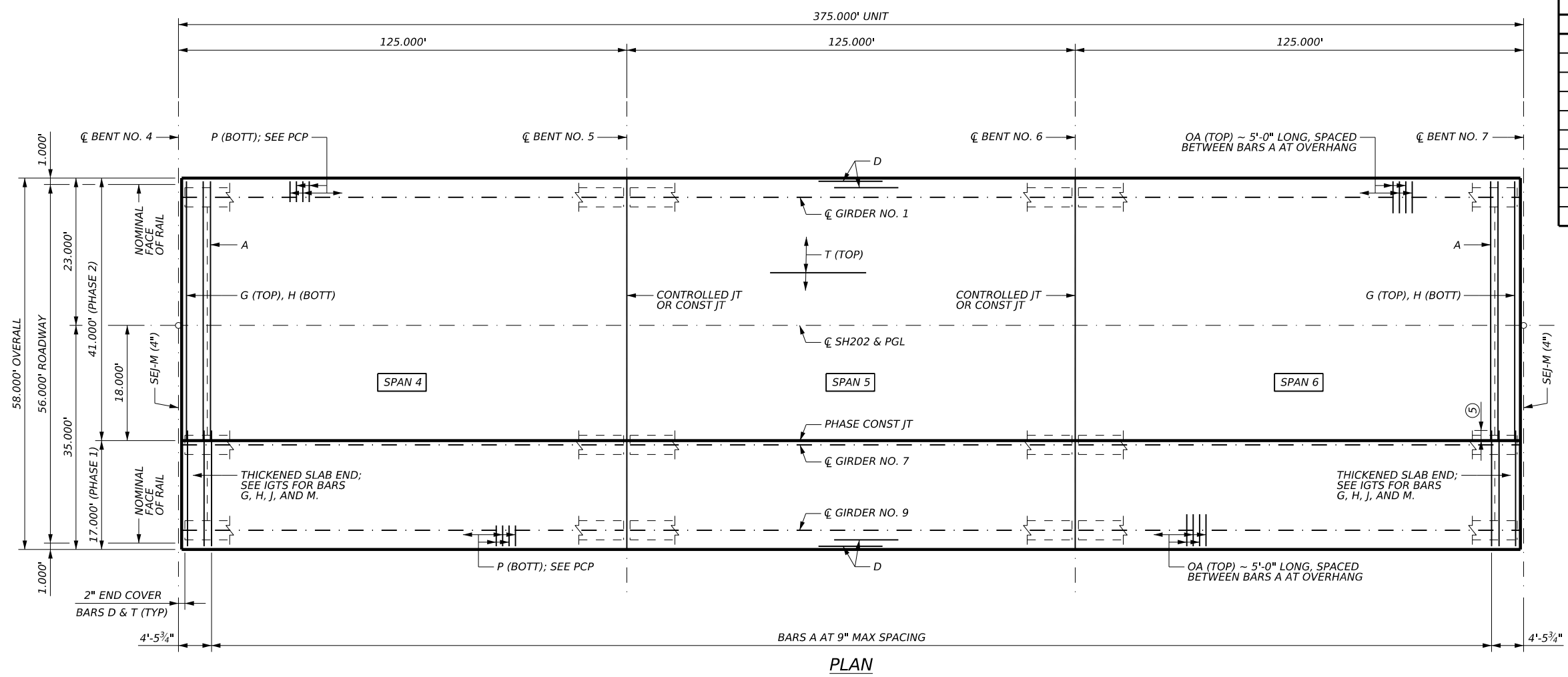


SH 202
BLANCO CREEK BRIDGE
210.00' PRESTRESSED
CONCRETE GIRDER UNIT
(SPAN NOS. 1-3)

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	76

DATE: 8/23/2023 7:05 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58443\SH202 55B02.dgn

DN: VH
 CK: CMW
 DW: VH
 CC: CMW



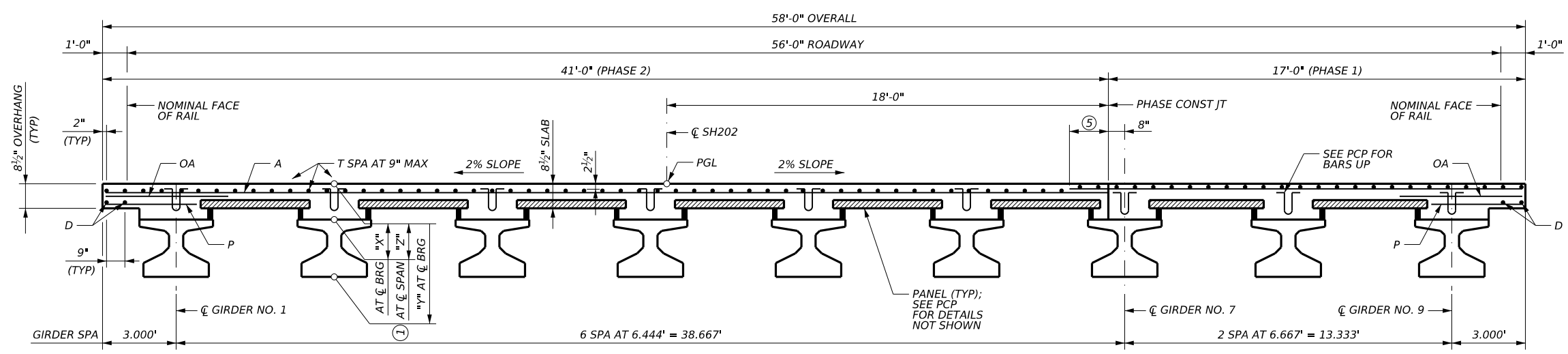
PLAN

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4
UP	#4

TABLE OF ESTIMATED QUANTITIES (PHASE 1)			
SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS	REINF STEEL
		(Tx54) (4)	(2) (3)
NO.	SF	LF	LB
4	2,125	373.50	4,888
5	2,125	373.50	4,888
6	2,125	373.50	4,888
TOTAL	6,375	1,120.50	14,664

TABLE OF ESTIMATED QUANTITIES (PHASE 2)			
SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS	REINF STEEL
		(Tx54) (4)	(2) (3)
NO.	SF	LF	LB
4	5,125	747.00	11,788
5	5,125	747.00	11,788
6	5,125	747.00	11,788
TOTAL	15,375	2,241.00	35,363

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	"X" AT C BRG	"Y" AT C BRG	"Z" AT C SPAN (1)
4	1	1'-0 3/4"	5'-6 3/4"	10 1/8"
	2 - 6	1'-0 3/4"	5'-6 3/4"	10 1/4"
	7	1'-0 3/4"	5'-6 3/4"	9 1/2"
	8 - 9	1'-0 3/4"	5'-6 3/4"	10 1/4"
5 - 6	1 - 6	1'-0 3/4"	5'-6 3/4"	10 1/4"
	7	1'-0 3/4"	5'-6 3/4"	9 1/2"
	8	1'-0 3/4"	5'-6 3/4"	10 3/8"
9	1'-0 3/4"	5'-6 3/4"	10 1/4"	



TYPICAL TRANSVERSE SECTION

GENERAL NOTES

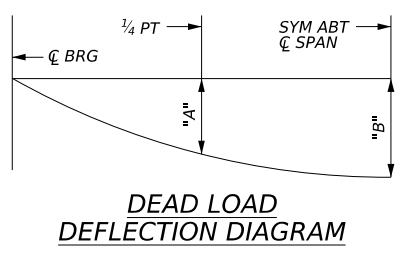
- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
- SEE PRESTRESSED CONCRETE PANEL (PCP) AND PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) STANDARD SHEETS FOR PANEL DETAILS NOT SHOWN.
- SEE THICKENED SLAB END DETAILS (IGTS) STANDARD SHEET FOR THICKENED SLAB END DETAILS NOT SHOWN.
- SEE MISCELLANEOUS SLAB DETAILS (IGMS) STANDARD SHEET FOR MISCELLANEOUS DETAILS.
- SEE TY T223 STANDARD SHEETS FOR RAIL ANCHORAGE IN SLAB.
- SEE PERMANENT METAL DECK FORMS (PDMF) STANDARD SHEET FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.

- SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITHIN SLAB.
- CONCRETE COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES

- PROVIDE CLASS "S" CONCRETE ($f_c = 4,000$ psi).
- PROVIDE GRADE 60 REINFORCING STEEL.
- BAR LAPS, WHERE REQUIRED, ARE AS FOLLOWS:
UNCOATED ~ #4 = 1'-7"
- DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

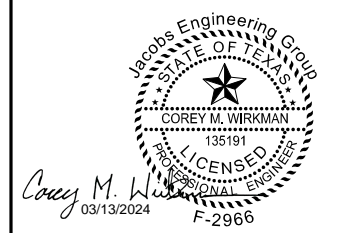
- THEORETICAL DIMENSION
- FOR CONTRACTOR'S INFORMATION ONLY
- REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.
- QUANTITIES SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEET FOR GIRDER LENGTHS.
- EXTEND PHASE 1 BARS A, G, & H 1'-7" INTO PHASE 2.



DEAD LOAD DEFLECTION DIAGRAM
 NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE SLAB ONLY ($E_c = 5,000$ ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF DEAD LOAD DEFLECTIONS			
SPAN NO.	GIRDER NO.	"A"	"B"
		FT	FT
4 - 6	1	0.133	0.189
	2 - 6	0.138	0.196
	7 (6)	0.086	0.122
	8	0.143	0.203
	9	0.136	0.193

(6) DEFLECTIONS SHOWN FOR GIRDER NO. 7 ARE DUE TO PHASE 1 PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE SLAB ONLY.



HL93 LOADING

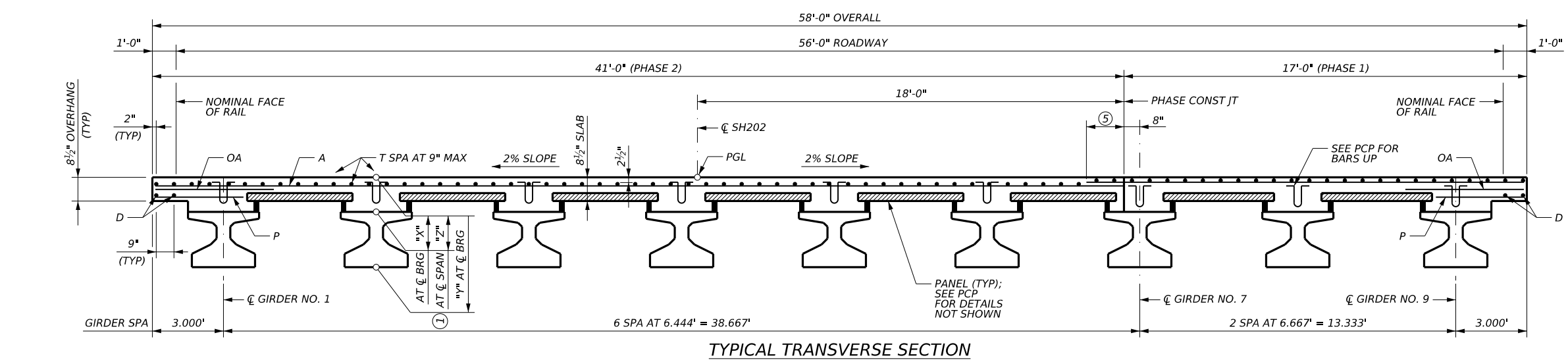
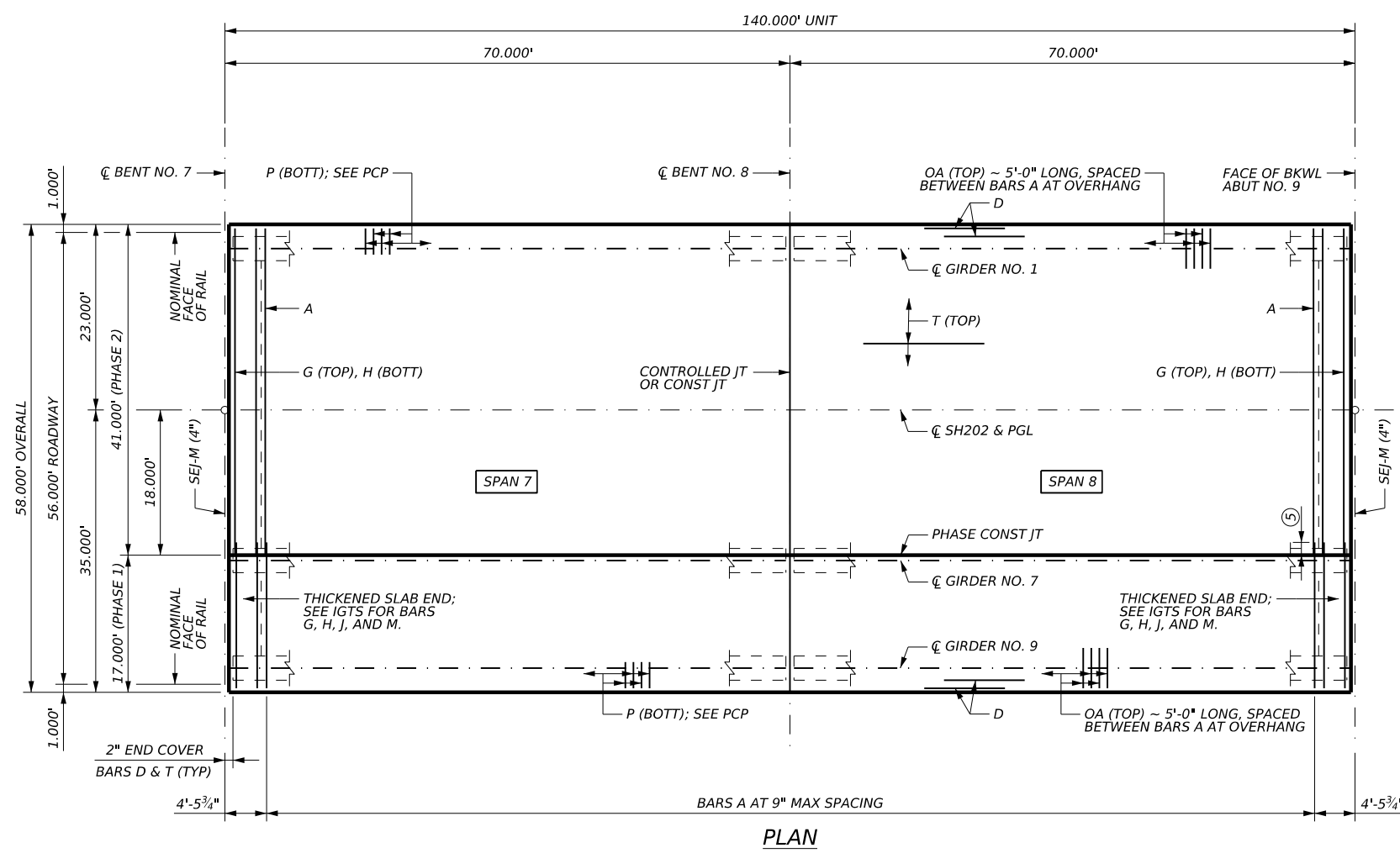


SH 202
BLANCO CREEK BRIDGE
375.00' PRESTRESSED
CONCRETE GIRDER UNIT
(SPAN NOS. 4-6)

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	77

DATE: 8/23/2023 6:02 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58443\SH202 55B03.dgn

CC: CMW
 VH
 DW: CMW
 VH

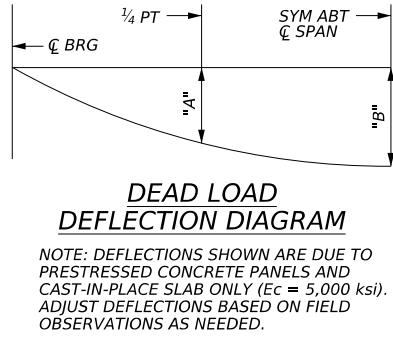


GENERAL NOTES

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AS MODIFIED BY THE TxDOT BRIDGE DESIGN MANUAL (2021) AND THE TxDOT BRIDGE DETAILING GUIDE (2022).
- SEE PRESTRESSED CONCRETE PANEL (PCP) AND PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) STANDARD SHEETS FOR PANEL DETAILS NOT SHOWN.
- SEE THICKENED SLAB END DETAILS (IGTS) STANDAR SHEET FOR THICKENED SLAB END DETAILS NOT SHOWN.
- SEE MISCELLANEOUS SLAB DETAILS (IGMS) STANDARD SHEET FOR MISCELLANEOUS DETAILS.
- SEE TY T223 STANDARD SHEETS FOR RAIL ANCHORAGE IN SLAB.
- SEE PERMANENT METAL DECK FORMS (PDMF) STANDARD SHEET FOR DETAILS AND QUANTYIY ADJUSTMENTS IF THIS OPTION IS USED.

- SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITHIN SLAB.
 - CONCRETE COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
- MATERIAL NOTES**
- PROVIDE CLASS "S" CONCRETE ($f_c = 4,000$ psi).
 - PROVIDE GRADE 60 REINFORCING STEEL.
 - BAR LAPS, WHERE REQUIRED, ARE AS FOLLOWS:
UNCOATED ~ #4 = 1'-7"
 - DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

- THEORETICAL DIMENSION
- FOR CONTRACTOR'S INFORMATION ONLY
- REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.
- QUANTITIES SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEET FOR GIRDER LENGTHS.
- EXTEND PHASE 1 BARS A, G, & H 1'-7" INTO PHASE 2.



SPAN NO.	GIRDER NO.	"A"	"B"
		FT	FT
7 - 8	1	0.071	0.100
	2 - 6	0.073	0.104
	7 ⑥	0.045	0.065
	8	0.076	0.108
	9	0.072	0.102

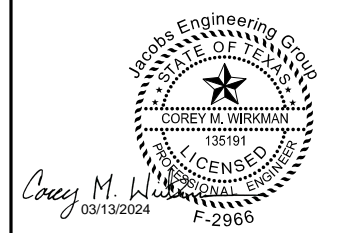
⑥ DEFLECTIONS SHOWN FOR GIRDER NO. 7 ARE DUE TO PHASE 1 PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE SLAB ONLY.

BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4
UP	#4

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS	REINF STEEL
		(Tx28) ④	
NO.	SF	LF	LB
7	1,190	208.50	2,737
8	1,190	208.50	2,737
TOTAL	2,380	417.00	5,474

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS	REINF STEEL
		(Tx28) ④	
NO.	SF	LF	LB
7	2,870	417.00	6,601
8	2,870	417.00	6,601
TOTAL	5,740	834.00	13,202

SPAN NO.	GIRDER NO.	"X" AT C BRG	"Y" AT C BRG	"Z" AT C SPAN ①
7 - 8	1 - 6	11 3/4"	3'-3 3/4"	10"
	7	11 3/4"	3'-3 3/4"	9 3/8"
	8	11 3/4"	3'-3 3/4"	10 1/8"
	9	11 3/4"	3'-3 3/4"	10"



HL93 LOADING

Jacobs

1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 202

**BLANCO CREEK BRIDGE
140.00' PRESTRESSED
CONCRETE GIRDER UNIT
(SPAN NOS. 7-8)**

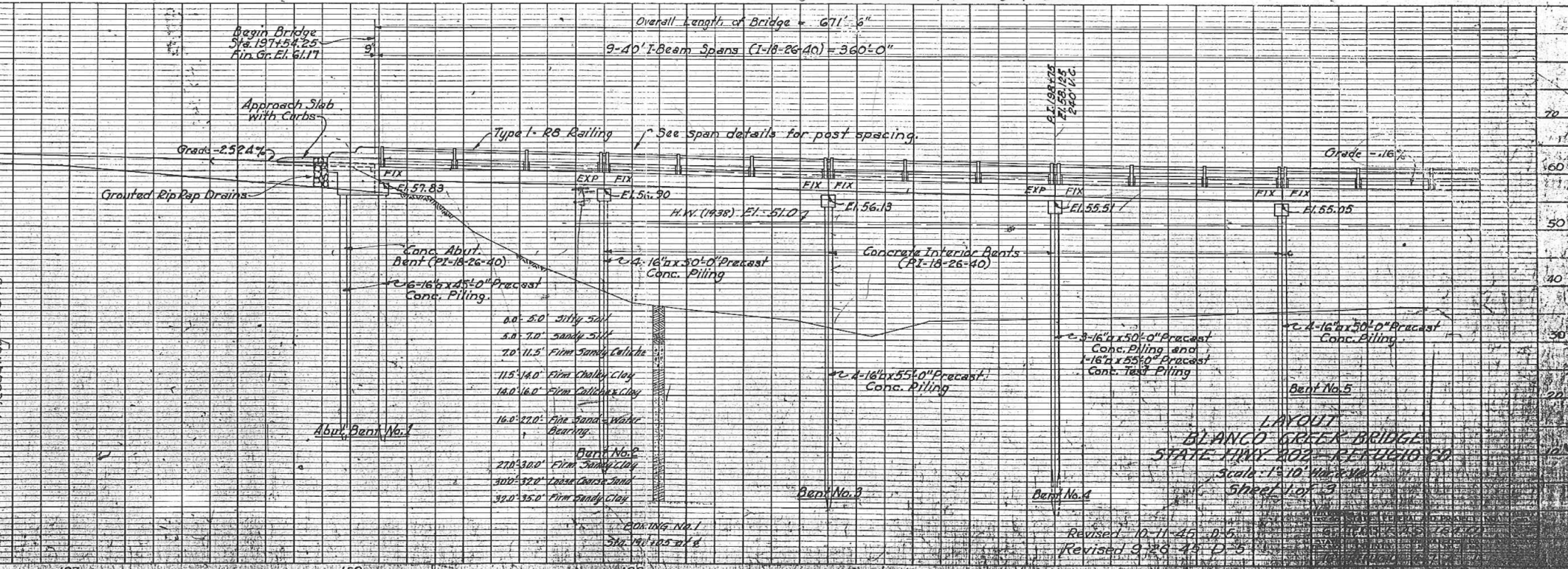
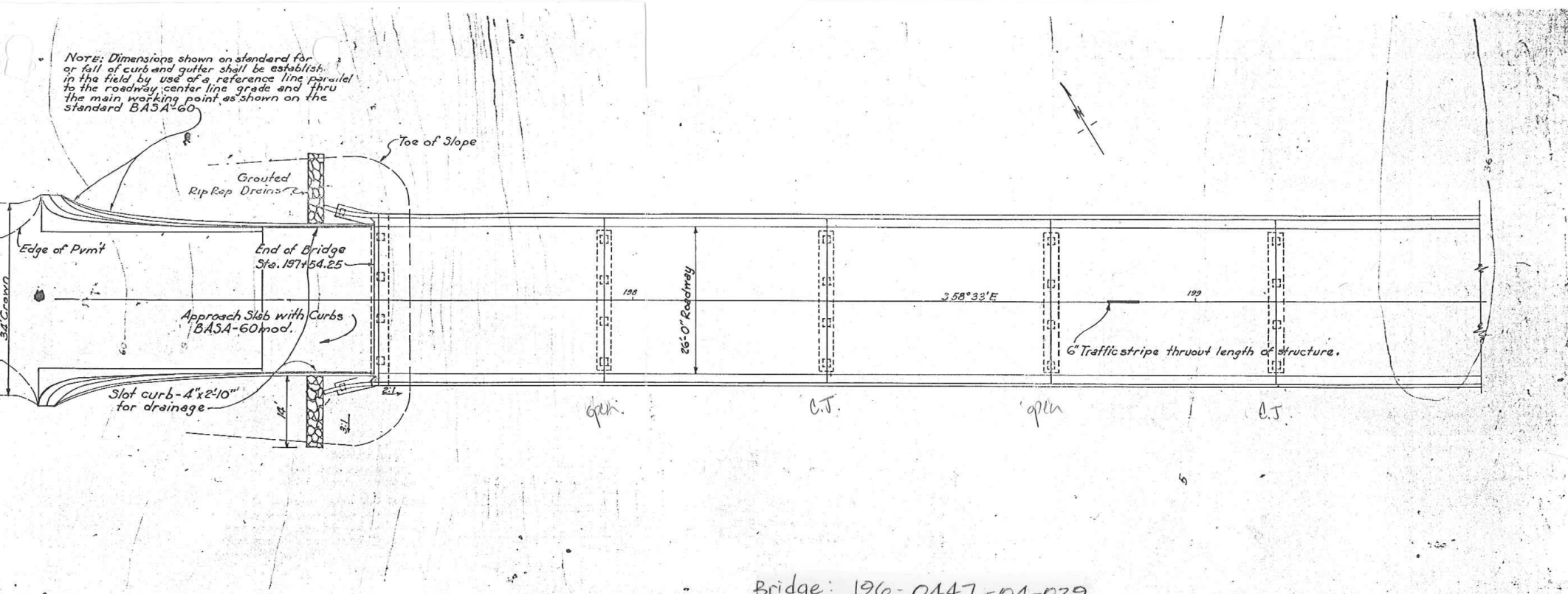
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	78	

DN: CK: DW: CK: CK:

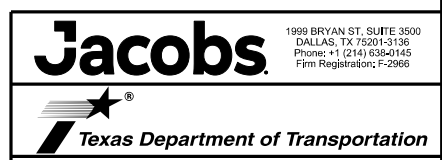
DATE: 4/3/2023 1:08 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58443\SH202 EX01.dgn

TOTAL BRIDGE QUANTITIES		Class A Concrete	Class B Concrete	Class C Concrete	Class D Concrete	Class E Concrete	Class F Concrete	Class G Concrete	Class H Concrete	Class I Concrete	Class J Concrete	Class K Concrete	Class L Concrete	Class M Concrete	Class N Concrete	Class O Concrete	Class P Concrete	Class Q Concrete	Class R Concrete	Class S Concrete	Class T Concrete	Class U Concrete	Class V Concrete	Class W Concrete	Class X Concrete	Class Y Concrete	Class Z Concrete																
150.8	150.8	301.4	301.4	23.0	23.0	130	130	572	572	55.6	55.6	32.400	32.400	16.5	16.5	1920	1920	1340	1340	460	460	880	880	4.7	4.7	7	7	2755	2755	16.5	16.5	1920	1920	1340	1340	460	460	880	880	4.7	4.7	7	7



Bridge: 196-0447-04-029

FOR CONTRACTOR'S INFORMATION ONLY

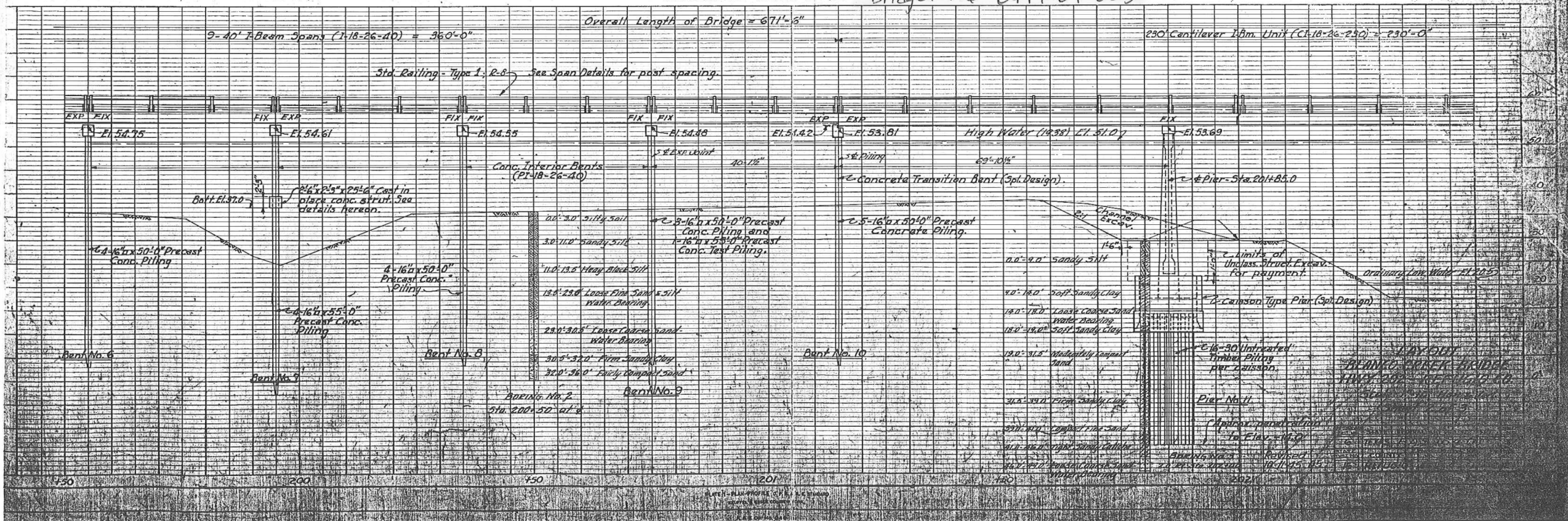
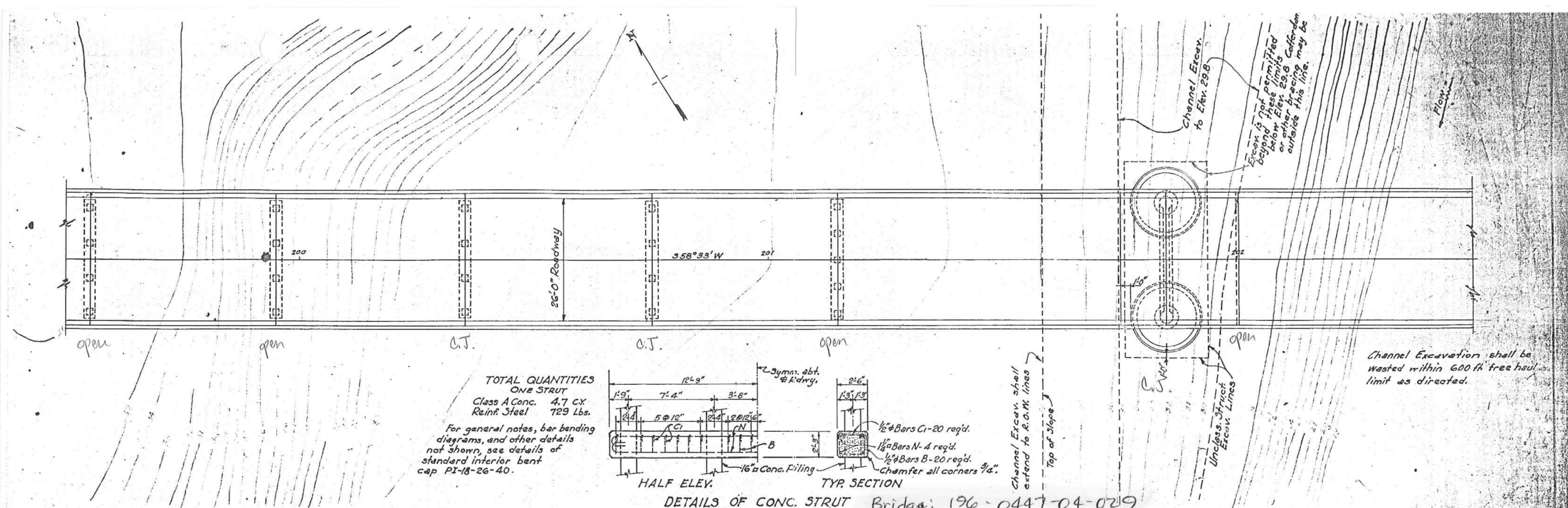


SH 202
 BLANCO CREEK BRIDGE
 EXISTING BRIDGE PLANS

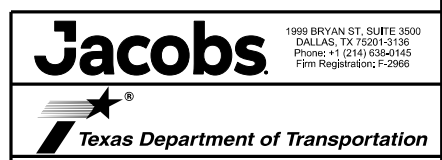
LAYOUT
 BLANCO CREEK BRIDGE
 STATE HWY 202 - REFUGIO CO
 Scale: 1" = 10' Horiz. Dist.
 Sheet 1 of 3
 Revised 10-11-45 R.S.
 Revised 9-26-49 D.S.

SHEET 1 OF 9			
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	79	

CK
DW
CK
DN



FOR CONTRACTOR'S INFORMATION ONLY



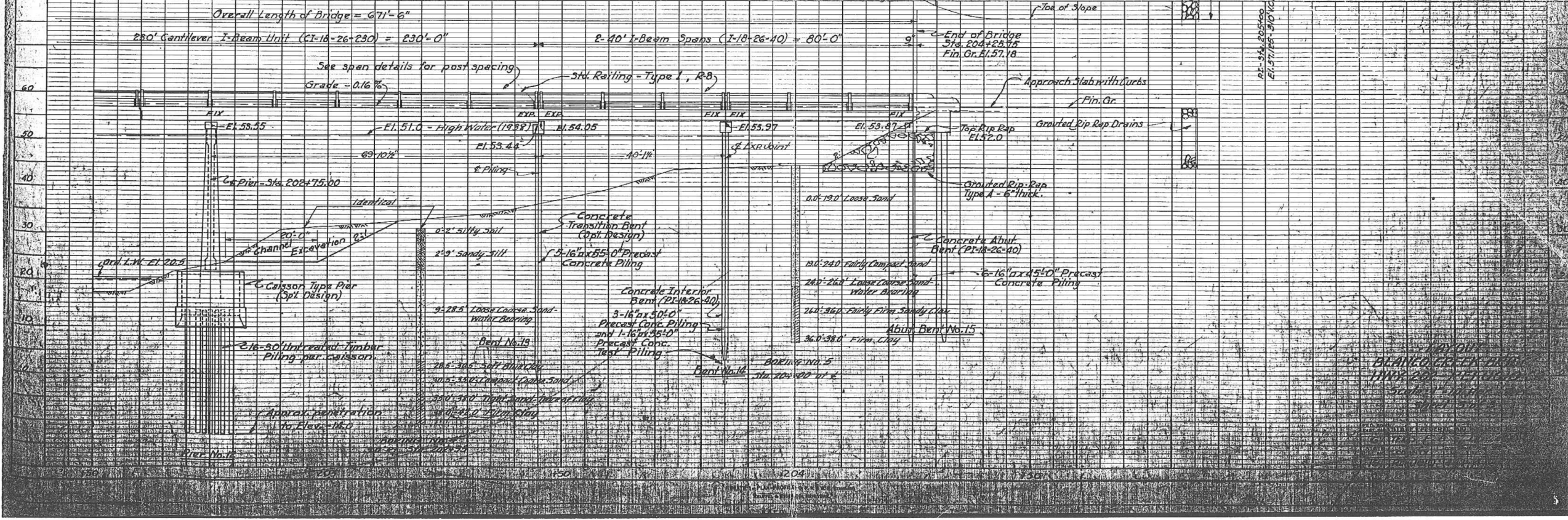
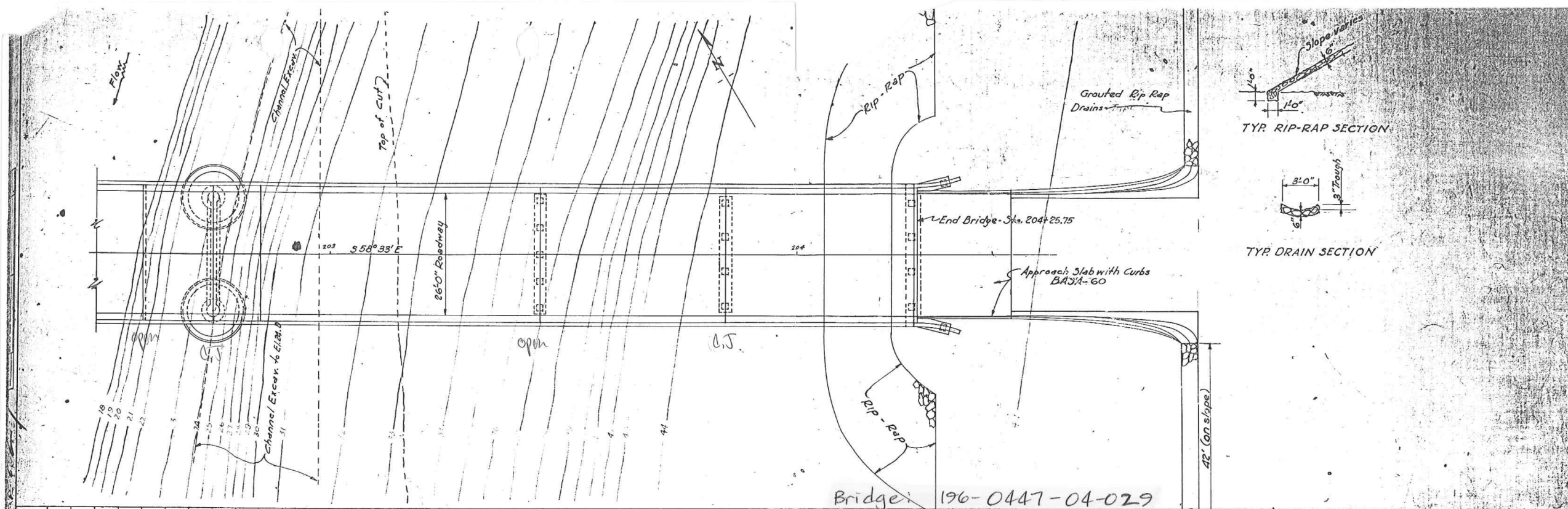
SH 202
 BLANCO CREEK BRIDGE
 EXISTING BRIDGE PLANS

SHEET 2 OF 9

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	80	

DATE: 4/3/2023 1:11 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58443\SH202 EX02.dgn

CK
DW
CK
DW



FOR CONTRACTOR'S INFORMATION ONLY

Jacobs
Texas Department of Transportation

SH 202
BLANCO CREEK BRIDGE
EXISTING BRIDGE PLANS

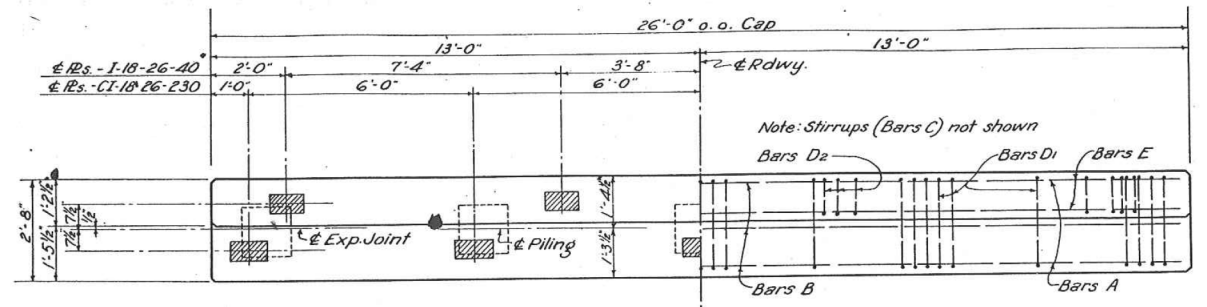
SHEET 3 OF 9

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	81	

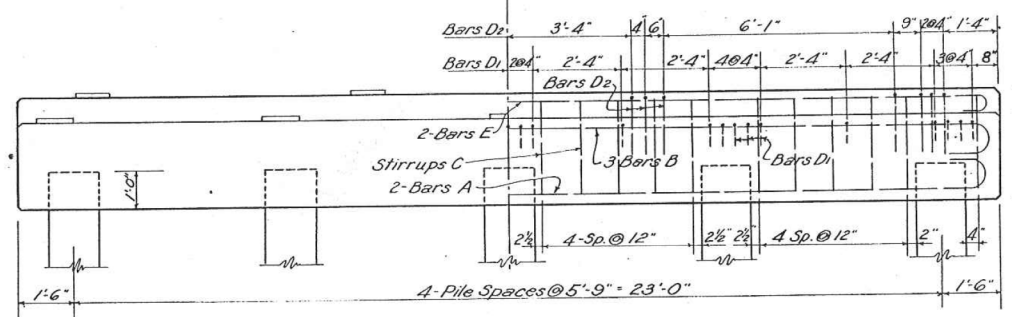
DATE: 4/3/2023 1:15 PM
FILE: c:\pw\workdir\jacobs-amer-trans\pdsms58443\SH202 EX03.dgn

1999 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

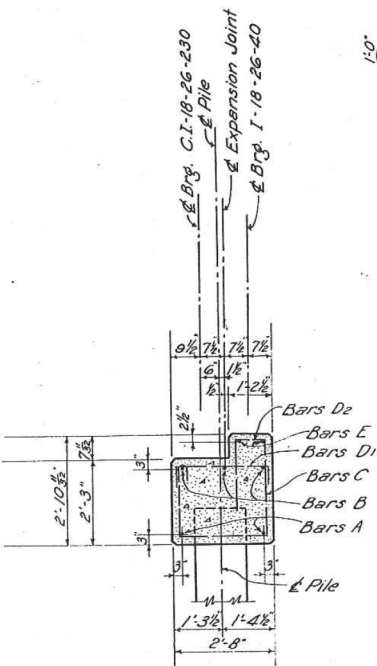
DW: CK
 DW: CK
 DW: CK



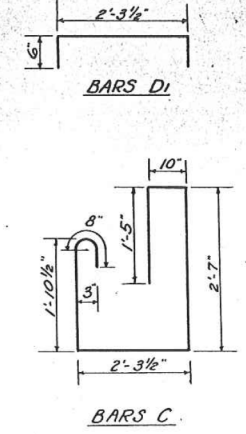
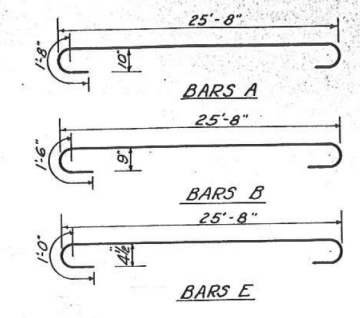
PLAN OF BENT CAP



ELEVATION OF BENT CAP



SECTION



BILL OF REINFORCING STEEL

Location	Bar	Spa	Size	No.	Length	Weight
Boff. of Cap	A	-	1/2"	2	28'-2"	242
Top - "	B	-	1/2"	3	27'-11"	224
Stirrups	C	12"	1/2"	22	9'-6"	140
Top of Cap	D1	Shown	1/2"	27	3'-3"	59
Riser Hairpins	D2	-	1/2"	14	3'-8"	34
Top of Riser	E	-	3/4"	2	27'-3"	82
Total						Lbs. 781

TABLE OF TOTAL QUANTITIES

Class A Concrete (Bents) C.Y.	6.5
Reinforcing Steel	Lbs. 781

GENERAL NOTES:
 Designed for 2 lanes, H-20 loading, in accordance with 1941 AASHO specifications for $f_s = 18000 \text{ psi}$ and $f_c = 1000 \text{ psi}$.
 All concrete shall be Class A. All corners shall be chamfered 3/4".
 All dimensions relating to reinforcing are to centers of bars.
 Quantities shown hereon do not include any material for piling.
 See standard drawing P-1 for details of piling and bridge layout sheet for lengths of piling required.
 Average pile load is 31.4 tons.

Bridge: 196-0447-04-029

DATE: 4/3/2023 1:17 PM
 FILE: c:\pw\workdir\jacobs-amer-transp\dms58443\SH202 EX04.dgn

DWG. WAR	DATE: 10/1/94	STATE: TEXAS	FEDERAL AID PROJECT NO.
CK: EM	DATE: 10/1/94	COUNTY: TARRANT	SECTION: 018
CK: JMS	DATE: 10/1/94	CITY: REFUGIO	PROJECT NO. 16
Aus. 1944			

TEXAS HIGHWAY DEPARTMENT
 BLANCO CREEK BRIDGE
 TRANSITION BENT
 CI-18-26-230 To I-18-26-40
 (1944)

FOR CONTRACTOR'S
 INFORMATION ONLY

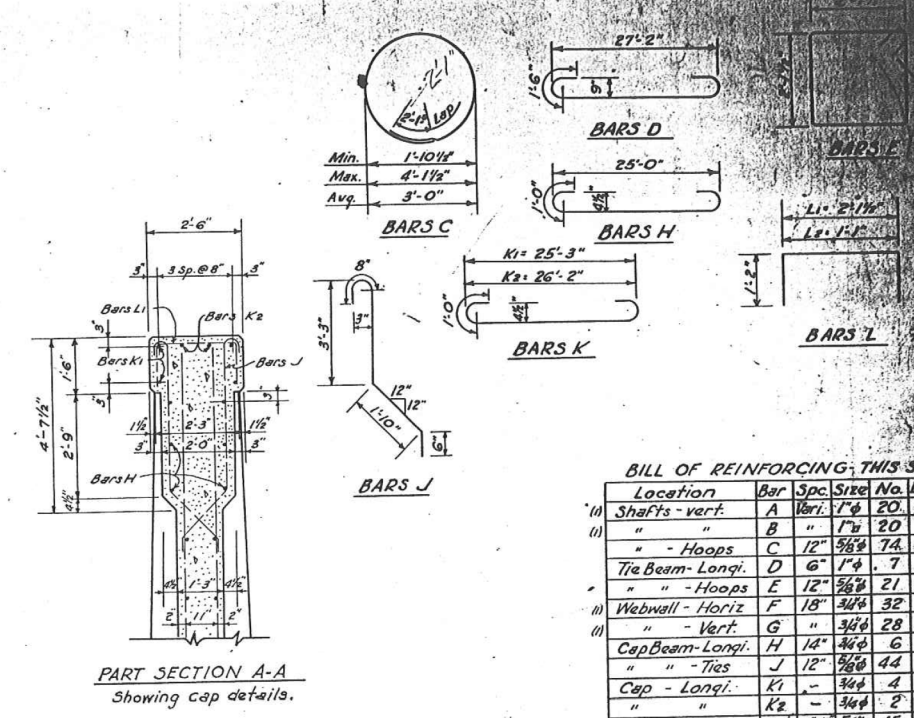
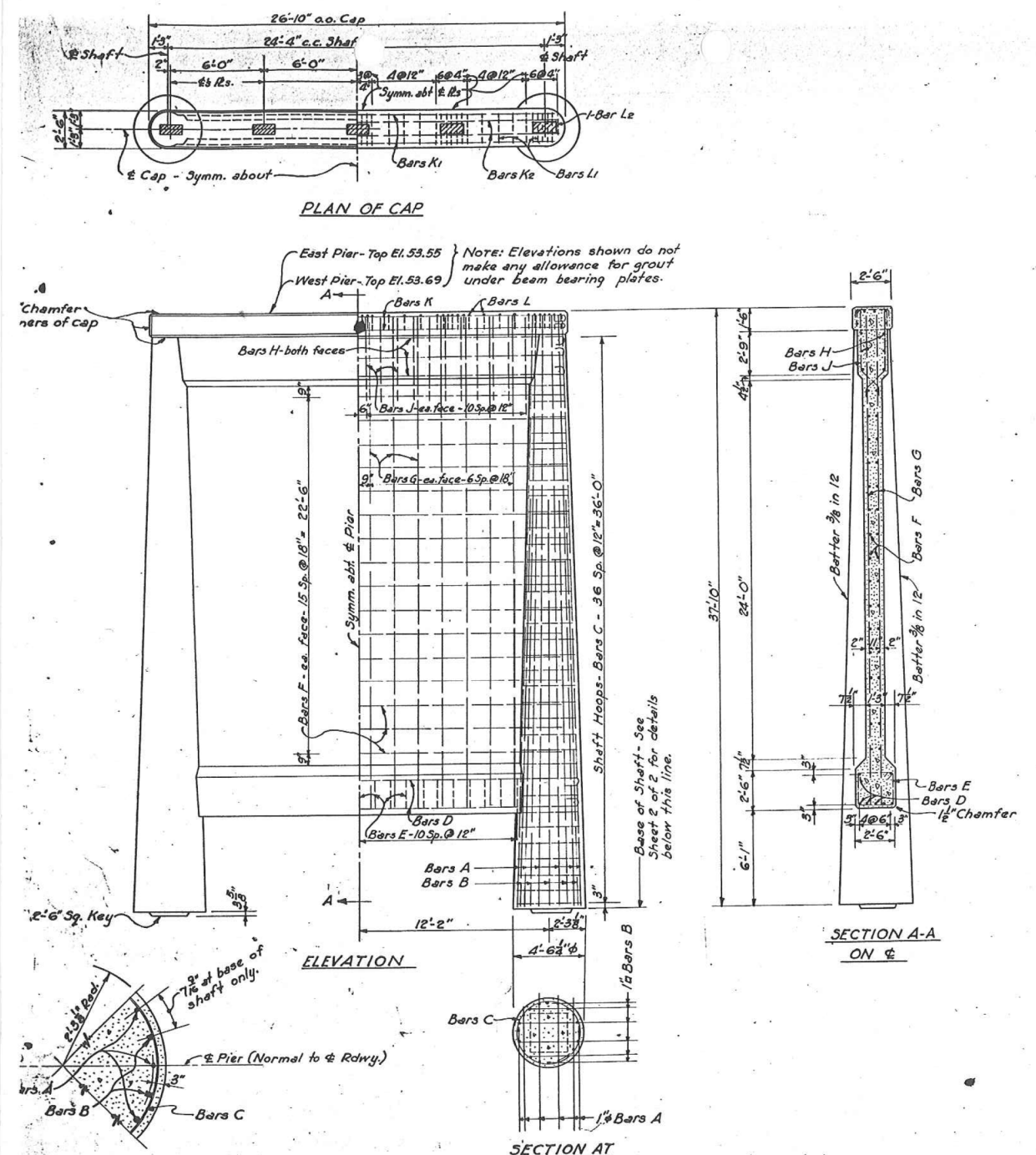


SH 202
 BLANCO CREEK BRIDGE
 EXISTING BRIDGE PLANS

SHEET 4 OF 9

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	82	

DW: CK
 DW: CK
 DW: CK



BILL OF REINFORCING - THIS SHEET ONLY

Location	Bar	Sp.	Size	No.	Length	Weight
Shafts - vert.	A	Vari.	1"φ	20	37'-4"	1999
" - "	B	"	1"φ	20	26'-4"	1722
" - Hoops	C	12"	5/8"φ	74	11'-7"	894
Tie Beam - Longi.	D	6"	1"φ	7	29'-5"	550
" - Hoops	E	12"	5/8"φ	21	9'-2"	201
Webwall - Horiz	F	18"	3/4"φ	32	26'-2"	1258
" - Vert.	G	"	3/4"φ	28	3'-3"	1314
Cap Beam - Longi.	H	14"	3/4"φ	6	26'-7"	240
" - Ties	J	12"	5/8"φ	44	6'-1"	279
Cap - Longi.	K1	"	3/4"φ	2	27'-9"	84
" - Ties	L1	4"φ	5/8"φ	45	4'-5"	2007
" - "	L2	"	5/8"φ	2	3'-5"	100
TOTAL						8909

TOTAL QUANTITIES - ONE PIER
 Class A Concrete 6,930 cu yd
 Reinforcing Steel 8,909 lbs

GENERAL NOTES:
 Pier designed for 90'-0" span of CI-18-26-230, for two lanes loaded with H-20 equi. lane loading in accordance with AASHTO 1941 specifications for $f_c = 18,000 \text{ psi}$ and $f_s = 100,000 \text{ psi}$.
 Under normal dead plus live loading the calculated pile load is 18.0 tons.
 All concrete shall be Class A, except as otherwise noted on Sheet 2 for Seal, which shall be Class E.
 All piling shall be untreated timber and of lengths as shown on the layout sheet.
 Structural steel surfaces in contact with concrete shall not be painted.

*Includes quantities for details shown on this sheet only. For quantities in footings, caissons and seals, see sheet 2 of 2.

PART SECTION AT BASE OF SHAFT
 Dowels not shown.

TEXAS HIGHWAY DEPARTMENT
BLANCO CREEK BRIDGE
 PIERS FOR 90' SPAN
 230' CANTILEVER I-BEAM UNIT
 (CI-18-26-230)
 (1941)

Revised 9-26-45 D5

DESIGNED BY	W.A.R.	CHECKED BY	W.A.R.
DRAWN BY	W.A.R.	APPROVED BY	W.A.R.
DATE	9-26-45	PROJECT NO.	22-22-21
SCALE	AS SHOWN	COUNTY	REFUGIO
PROJECT	BLANCO CREEK BRIDGE	SHEET NO.	5 OF 9

FOR CONTRACTOR'S INFORMATION ONLY

Jacobs
 Texas Department of Transportation

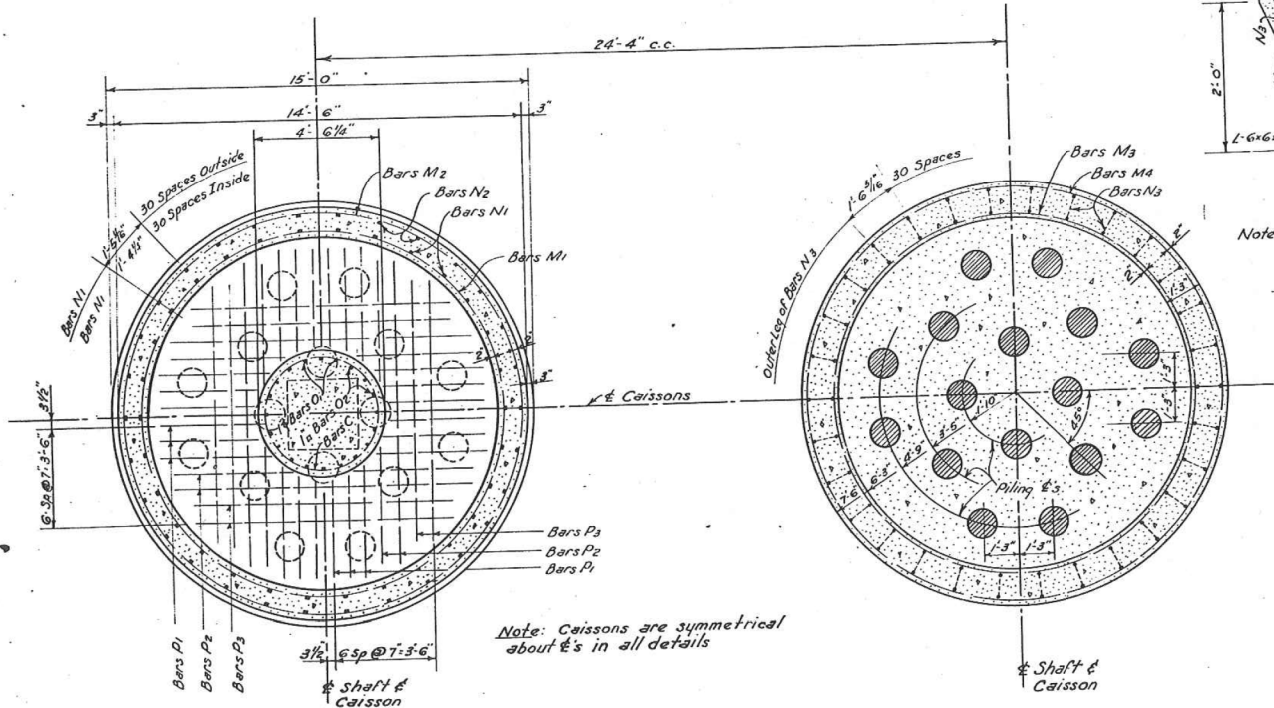
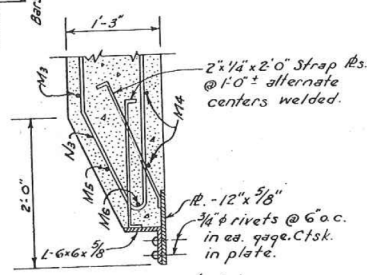
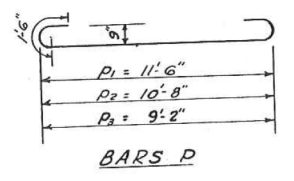
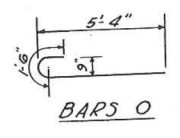
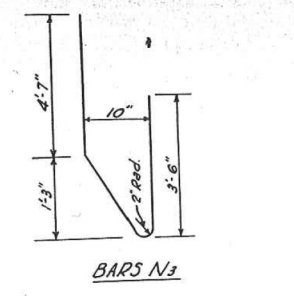
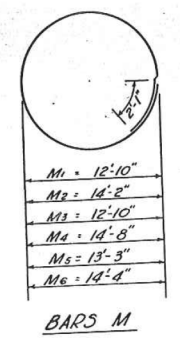
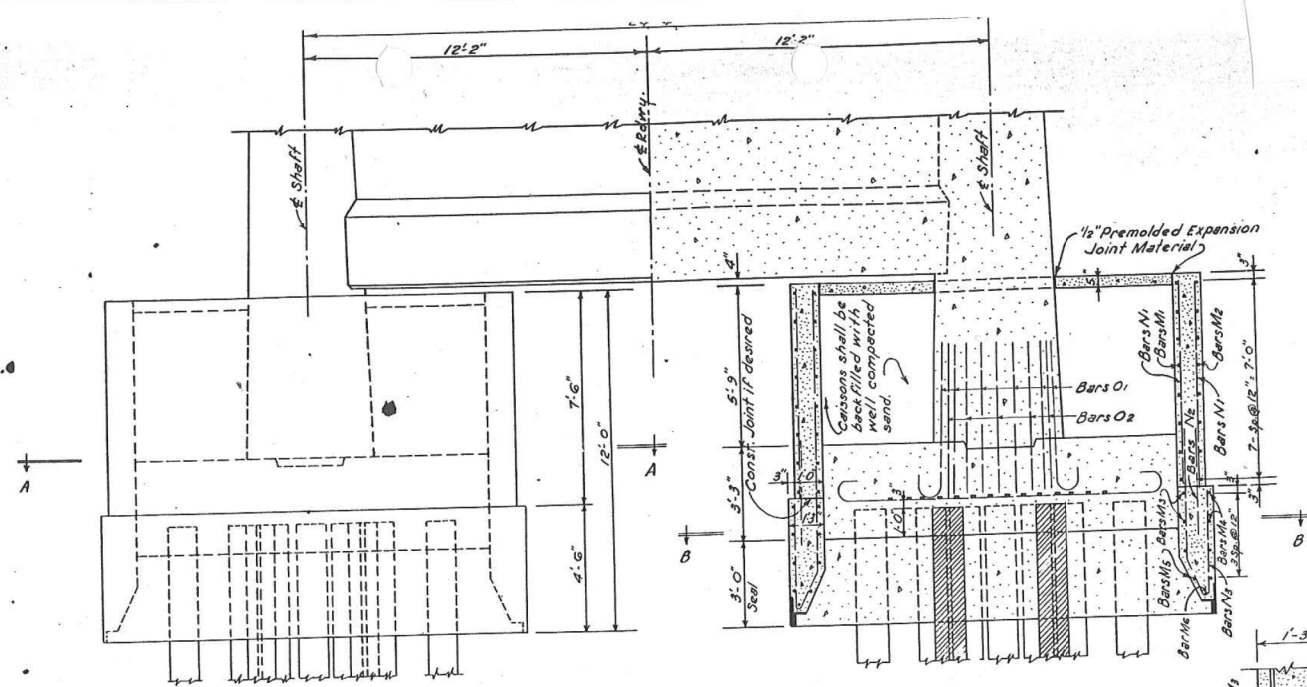
SH 202
 BLANCO CREEK BRIDGE
 EXISTING BRIDGE PLANS

SHEET 5 OF 9

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	83	

DATE: 4/3/2023 1:20 PM
 FILE: c:\pw\workdir\jacobs-amer-transpldms58443\SH202 EX05.dgn

DW: CK
 DW: CK
 DW: CK



Note: Caissons are symmetrical about \bar{x} s in all details

BILL OF REINFORCING - THIS SHEET ONLY

Location	Bar	Sp.	Size	No.	Length	Weight
Upper Caisson Shell	M1	12"	3/4"	16	47'-6"	709
"	M2	"	3/4"	16	46'-8"	719
Lower "	M3	"	3/4"	6	47'-6"	266
"	M4	"	3/4"	8	48'-2"	408
Cutting Edge	M5	"	3/4"	2	48'-9"	131
"	M6	"	3/4"	2	47'-2"	130
Upper Caisson Shell	N1	18"	3/4"	120	7'-5"	927
"	N2	"	3/4"	60	9'-6"	619
Lower "	N3	"	3/4"	60	9'-6"	635
Shaft Dowels	O1	15"	1"	20	6'-5"	349
"	O2	15"	1"	20	6'-5"	436
Shaft Base Slab	P1	7"	1"	24	18'-9"	1122
"	P2	"	1"	16	12'-11"	703
"	P3	"	1"	16	11'-5"	621
Total						7291

(1) Indicates straight bar and no diagram shown.

QUANTITIES - THIS SHEET ONLY

Reinforcing Steel	Lbs.	7291
Class A Concrete (Caissons)	CY	37.8
Class A Concrete (Footings)	CY	28.6
Class E Concrete (Seal)	CY	27.8
Structural Steel	Lbs.	4700
Class A Concrete (Piers)	CY	3.4

(1) Includes one splice
(2) Cap slab only

TOTAL PIER QUANTITIES - SHEETS 1 & 2

Reinforcing Steel	Lbs.	16,200
Class A Concrete (Piers)	CY	63.0
Class A Concrete (Caissons)	CY	37.8
Class A Concrete (Footings)	CY	28.6
Class E Concrete (Seal)	CY	27.8
Structural Steel	Lbs.	4700

GENERAL NOTES:
For General Notes see sheet 1 of 2 sheets.

FOR CONTRACTOR'S INFORMATION ONLY

TEXAS HIGHWAY DEPARTMENT
BLANCO CREEK BRIDGE
 PIERS FOR 90' SPAN
 OR
 230' CANTILEVER I-BEAM UNIT
 (CI-18-26-230) **SHEET 2 OF 2**

DW. WAR	STATE	FEDERAL AID PROJECT NO.	261
DW. WAR	TEXAS	SA 5 111-07	261
TR. J.A.D.	COUNTY	REFUGIO	447
CK. J.M.S.	DIST. NO.	16	REFUGIO
Aug. 1944			447

Revised 9-26-45 D-5

DATE: 4/3/2023 1:22 PM
 FILE: c:\pw\workdir\jacobs-amer-transpldms58443\SH202 EX06.dgn

Jacobs
 1999 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fm Registration: F-2966

Texas Department of Transportation

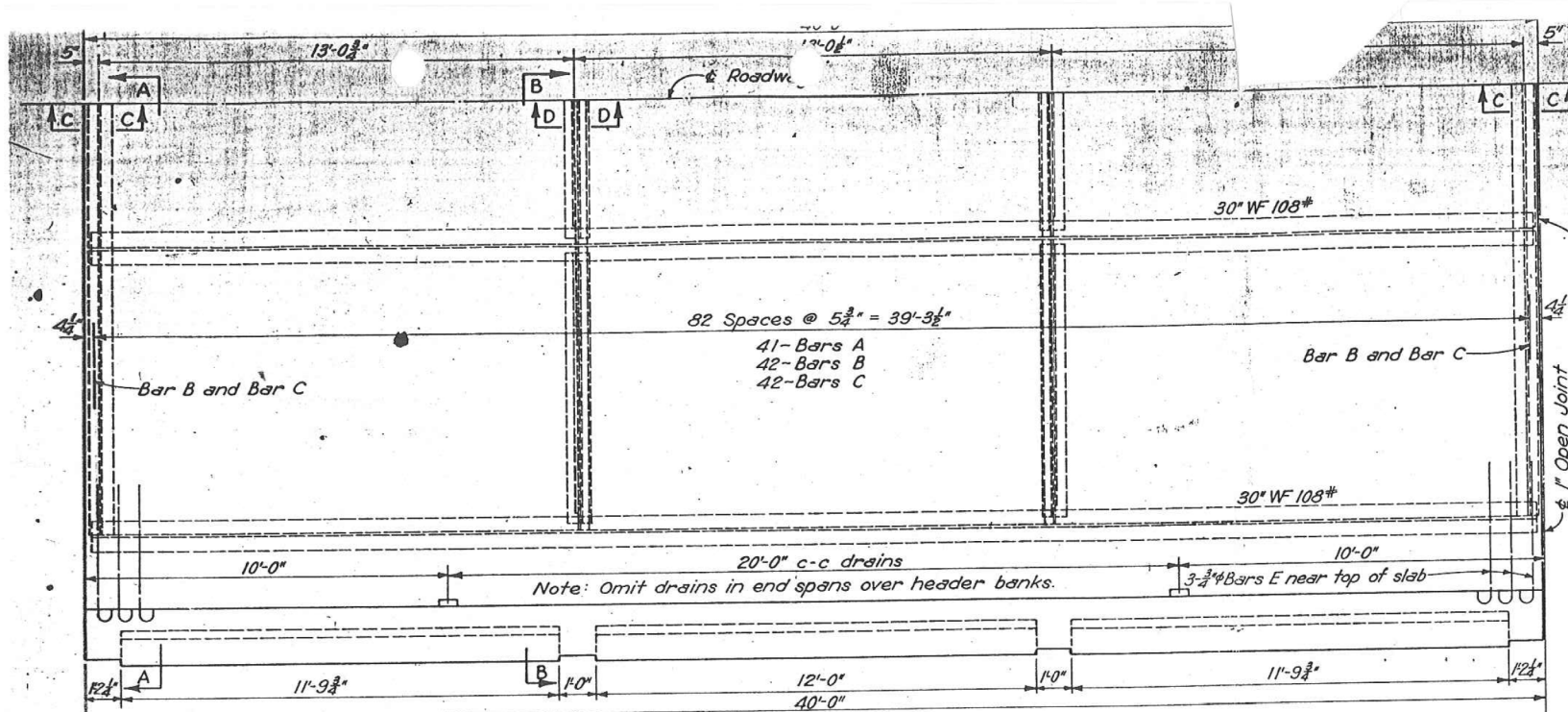
SH 202

BLANCO CREEK BRIDGE
 EXISTING BRIDGE PLANS

SHEET 6 OF 9

COUNT	0447	SECT	04	JOB	018	HIGHWAY	SH 202
DIST	CRP	COUNTY	REFUGIO	SHEET NO.	84		

CK
DW
CK
DW

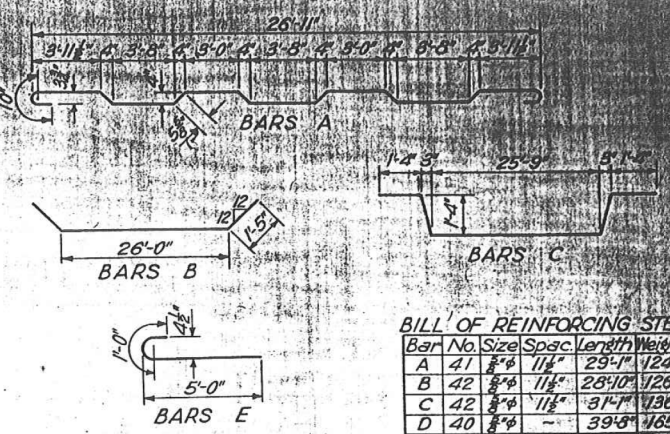


82 Spaces @ 5 1/2\" = 39-3 1/2\"
41-Bars A
42-Bars B
42-Bars C

Note: Omit drains in end spans over header banks.

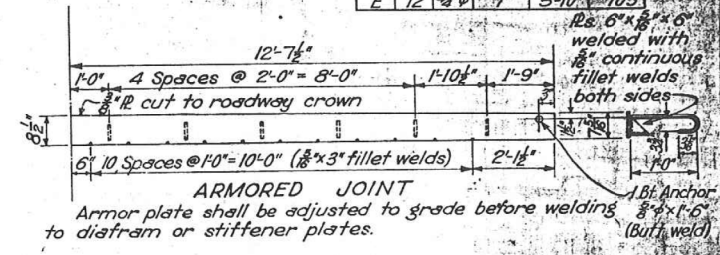
HALF PLAN

For Rail Details and Post Anchors see Standard Railing R-8



BILL OF REINFORCING STEEL

Bar No.	Size	Spec.	Length	Weight
A	1 1/4"	11 1/2"	29'-1"	1244
B	1 1/4"	11 1/2"	23'-10"	1263
C	1 1/4"	11 1/2"	31'-7"	1362
D	1 1/4"	-	39'-5"	1655
E	1 1/4"	7"	5'-10"	105



ARMORED JOINT
Armor plate shall be adjusted to grade before welding. 1 Bl. Anchor 3/4\" x 1-6\" (buff weld)

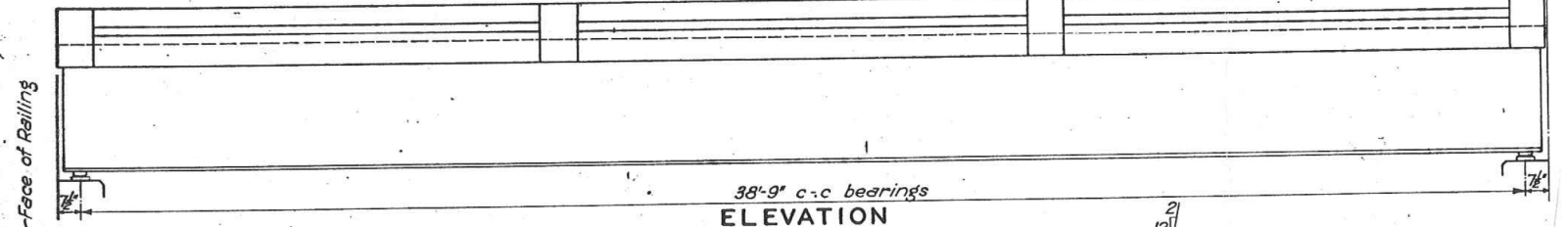
GENERAL NOTES:-

Design: H-20 loading under A.A.S.H.O. 1941 Specifications
Concrete shall be Class A. Chamfer exposed corners 3/4\" unless noted otherwise.
Beams do not require mill cambering.
Each series of bearings shall be accurately aligned and set to a common elevation on beds of portland cement (dry or paste) of the thickness required to remove irregularities from bearing seat.
Anchor bolt nuts shall be loosened one turn and threads burred.

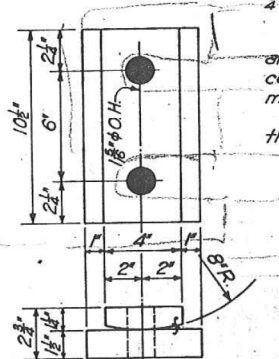
ESTIMATED QUANTITIES

Concrete	Cu Yds.	27.4
Reinforcing Steel	Lbs.	5,629
Structural Steel, Beam Spans	Lbs.	20,170
Structural Steel, Armored Joint (2 Rs)	Lbs.	560
Railing, Type 1 (R-8)	Lin. Ft.	80

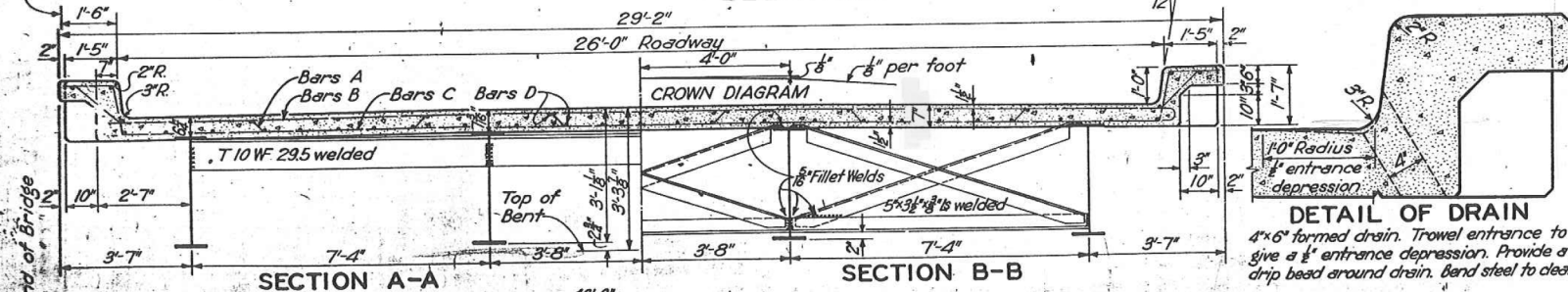
FOR CONTRACTOR'S INFORMATION ONLY



ELEVATION



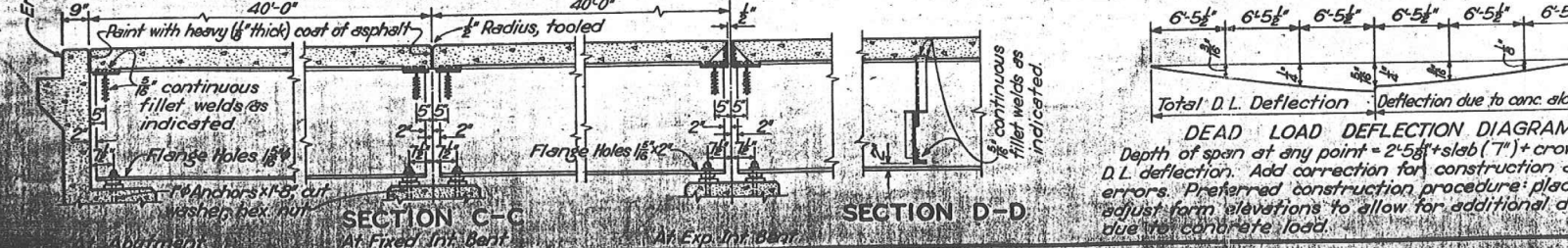
DETAIL OF SHOES
Shoes to be fabricated from structural steel.



SECTION A-A

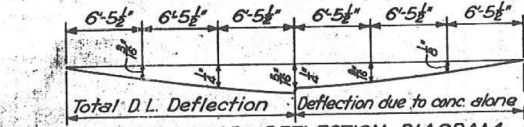
SECTION B-B

DETAIL OF DRAIN
4\" x 6\" formed drain. Trowel entrance to give a 1/2\" entrance depression. Provide a 1/2\" drip bead around drain. Band steel to clear drain 1\".



SECTION C-C At Fixed Int. Bearing

SECTION D-D At Exp. Int. Bearing



DEAD LOAD DEFLECTION DIAGRAM
Depth of span at any point = 2-5 1/2\" + slab (7\") + crown (1\") + total D.L. deflection. Add correction for construction and rolling errors. Preferred construction procedure: place forms, adjust form elevations to allow for additional deflection due to concrete load.

TEXAS STATE HIGHWAY DEPARTMENT
STANDARD 40'-0\" I-BEAM SPAN
26'-0\" ROADWAY 18\" CURBS H-20 LOADING

I-18-26-40

DESIGNED BY	REVISED 10-11-45-05	CHECKED BY	APPROVED BY
DRAWN BY		DATE	
IN CHARGE		PROJECT	
DATE		SCALE	

DATE: 4/3/2023 1:28 PM
FILE: c:\pw\workdir\jacobs-amer-transpldms58443\SH202 EX08.dgn

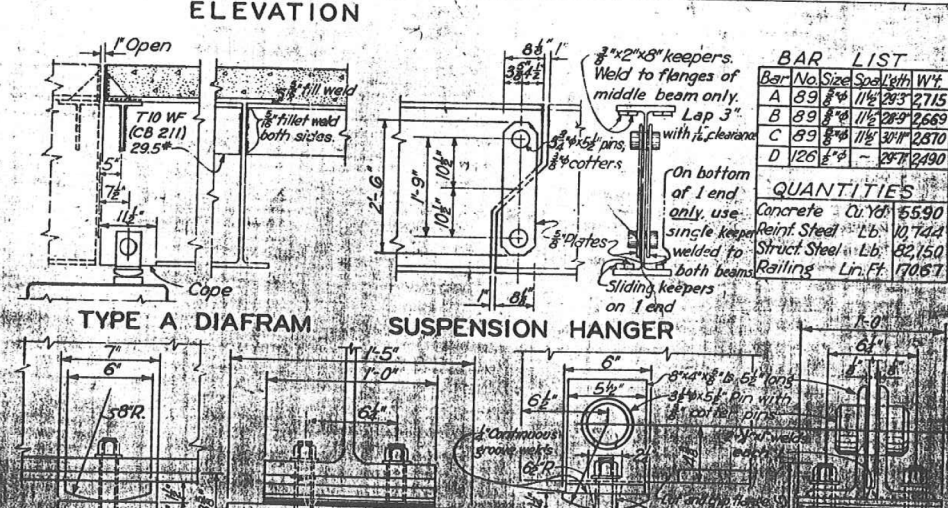
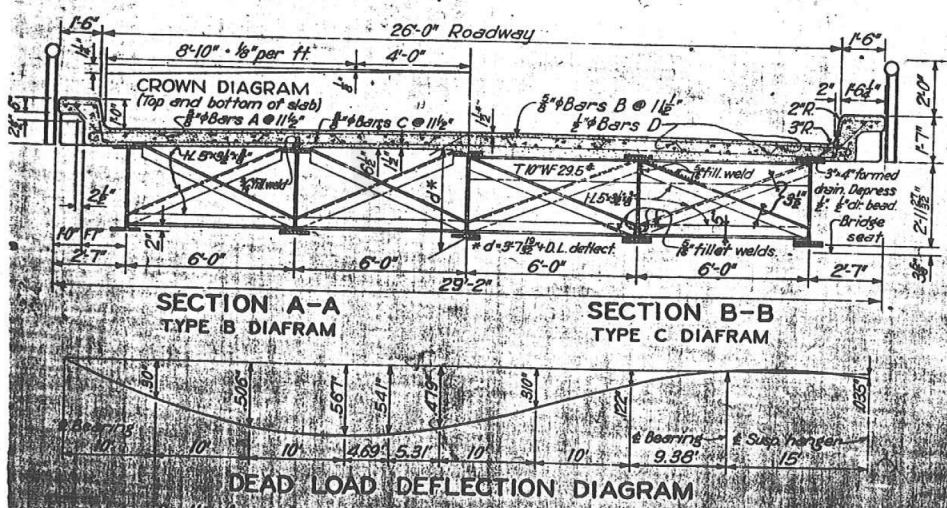
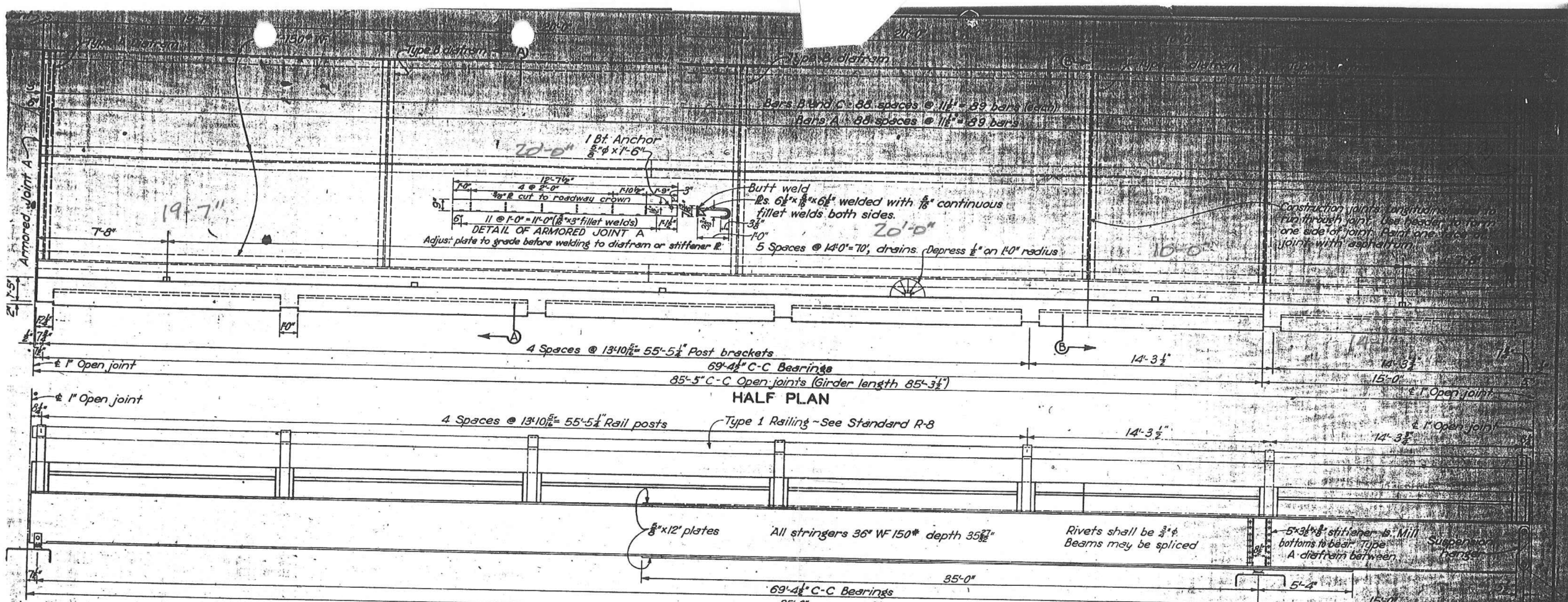


SH 202
BLANCO CREEK BRIDGE
EXISTING BRIDGE PLANS

SHEET 8 OF 9

CONT.	SECT.	JOB	HIGHWAY
0447	04	018	SH 202
DIST.	COUNTY	SHEET NO.	
CRP	REFUGIO	86	

CK
DW
CK
DW



BAR LIST

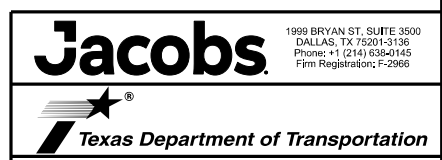
Bar No	Size	Spcl	Wt
A	89	1 1/4	2715
B	89	1 1/4	2689
C	89	1 1/4	2670
D	126	1 1/4	2490

QUANTITIES

Concrete - Cu Yd	5590
Rein Steel - Lb	10,744
Struct Steel - Lb	82,150
Railing - Lin Ft	17067

CANTILEVER BEAM ANCHOR SPAN
230'-0" LENGTH 70' 0" 3/4"
26'-0" ROADWAY 16' 0" 3/4"
SHEET 9 OF 9

FOR CONTRACTOR'S INFORMATION ONLY



SH 202
BLANCO CREEK BRIDGE
EXISTING BRIDGE PLANS

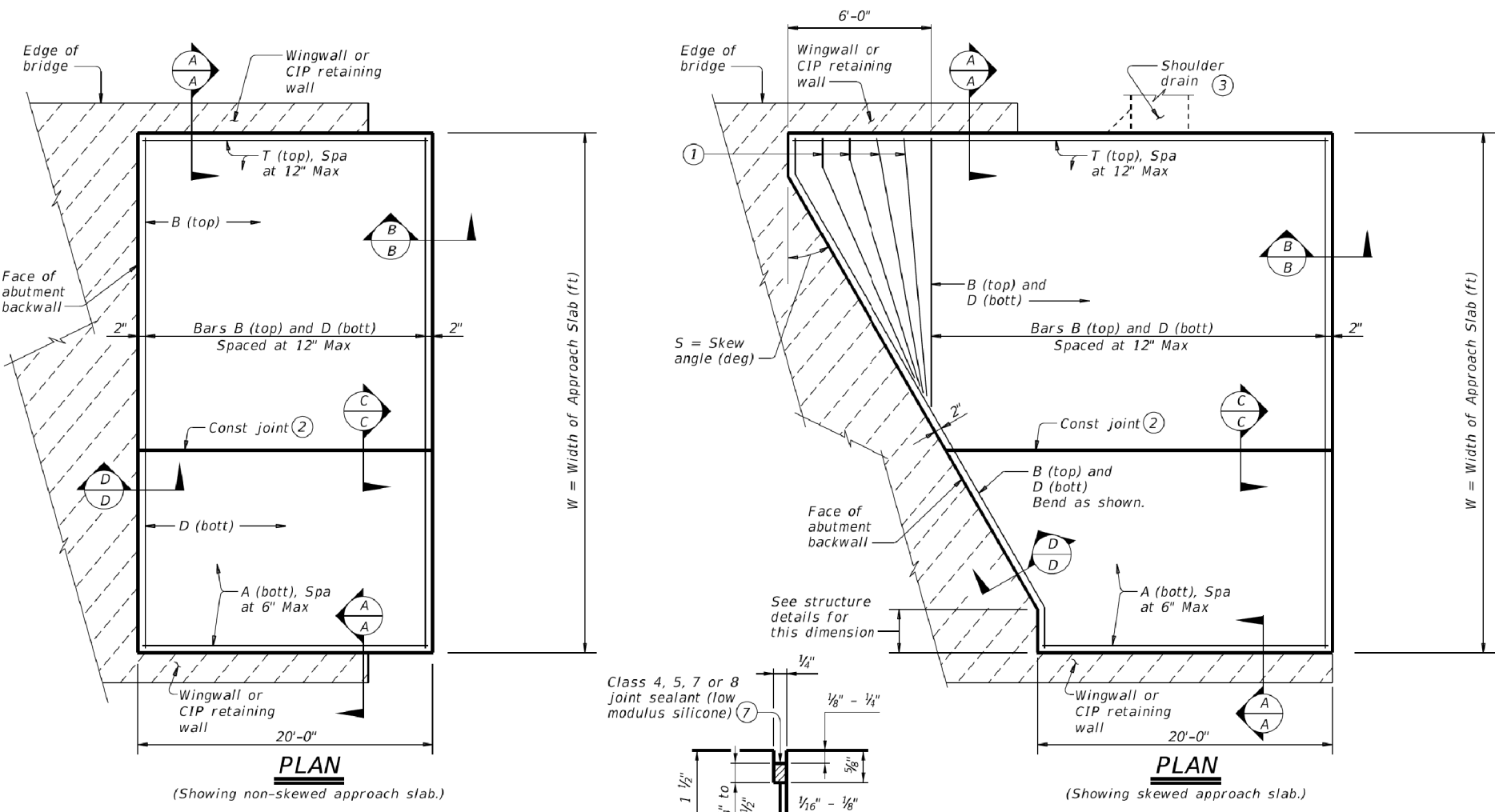
SHEET 9 OF 9

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	87	

DATE: 4/3/2023 1:31 PM
FILE: c:\pwworkdir\jacobs-amer-transpldms58443\SH202 EX09.dgn

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: FILE:

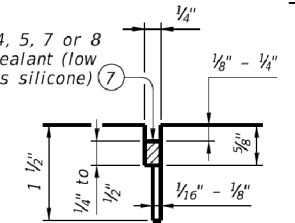


BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

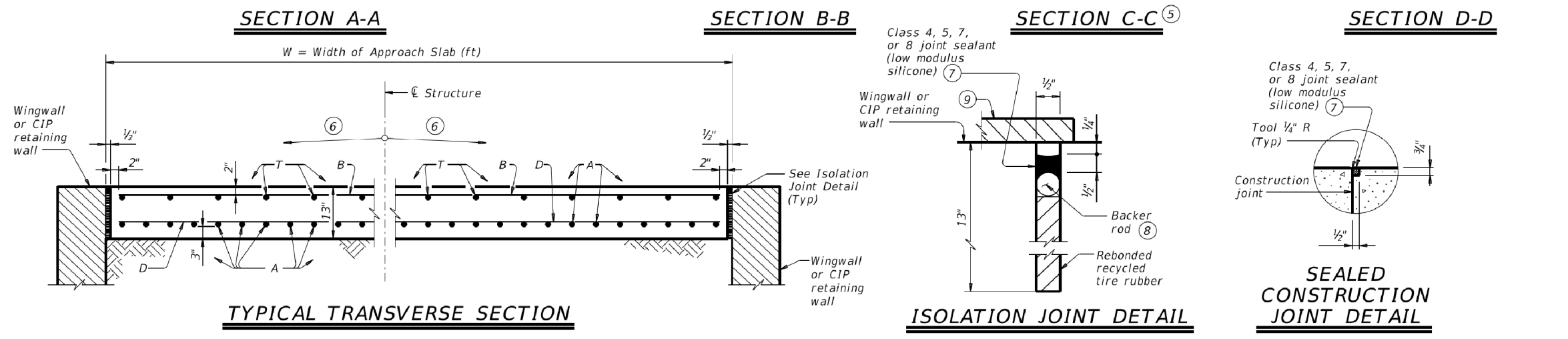
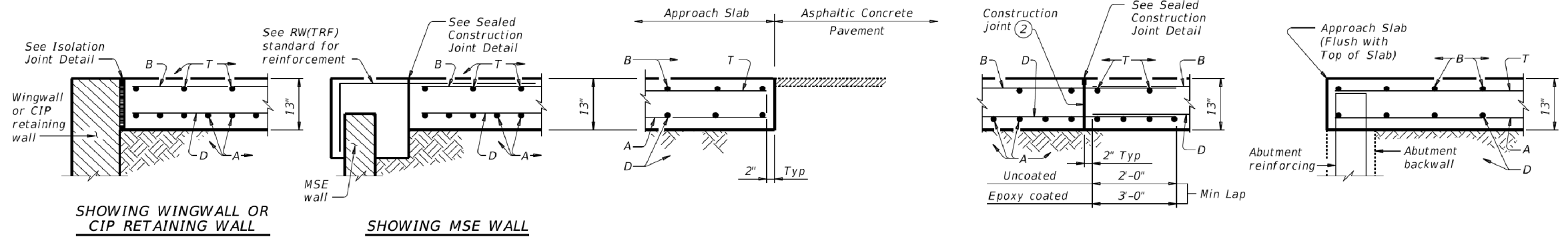
APPROXIMATE QUANTITIES ⁽⁴⁾	
Reinf steel weight = 8.5 Lbs/SF of Approach Slab	
Volume of Appr Slab Conc (CY) = 0.802W + 0.02W ² Tan S	
W = Width of Approach Slab (ft)	
S = Skew Angle (deg)	

- 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.
- 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.

LONGITUDINAL SAW CUT JOINT DETAIL

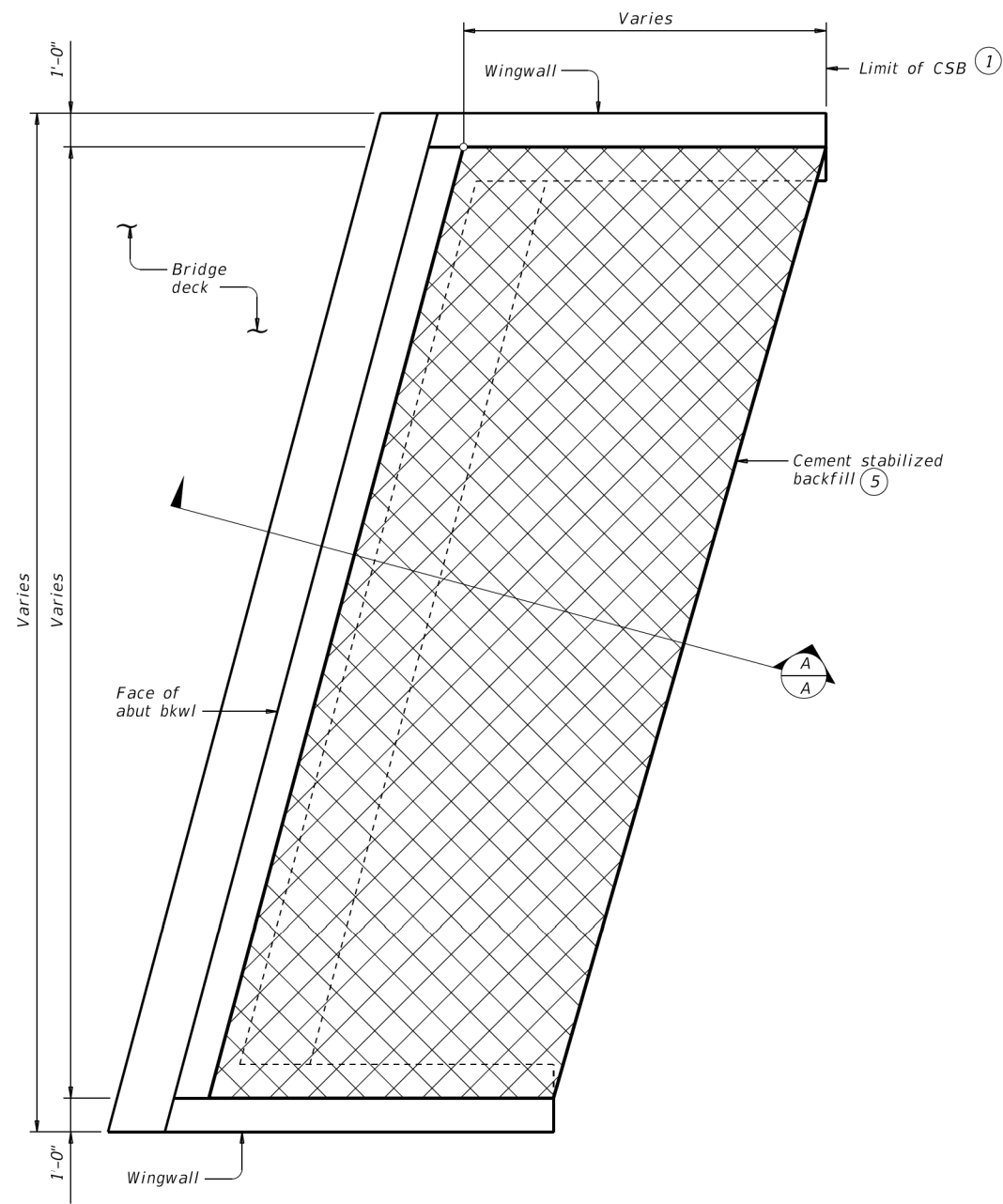


GENERAL NOTES:
 Construct approach slab in accordance with Item 422.
 Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
 Provide Grade 60 reinforcing steel.
 Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width 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.



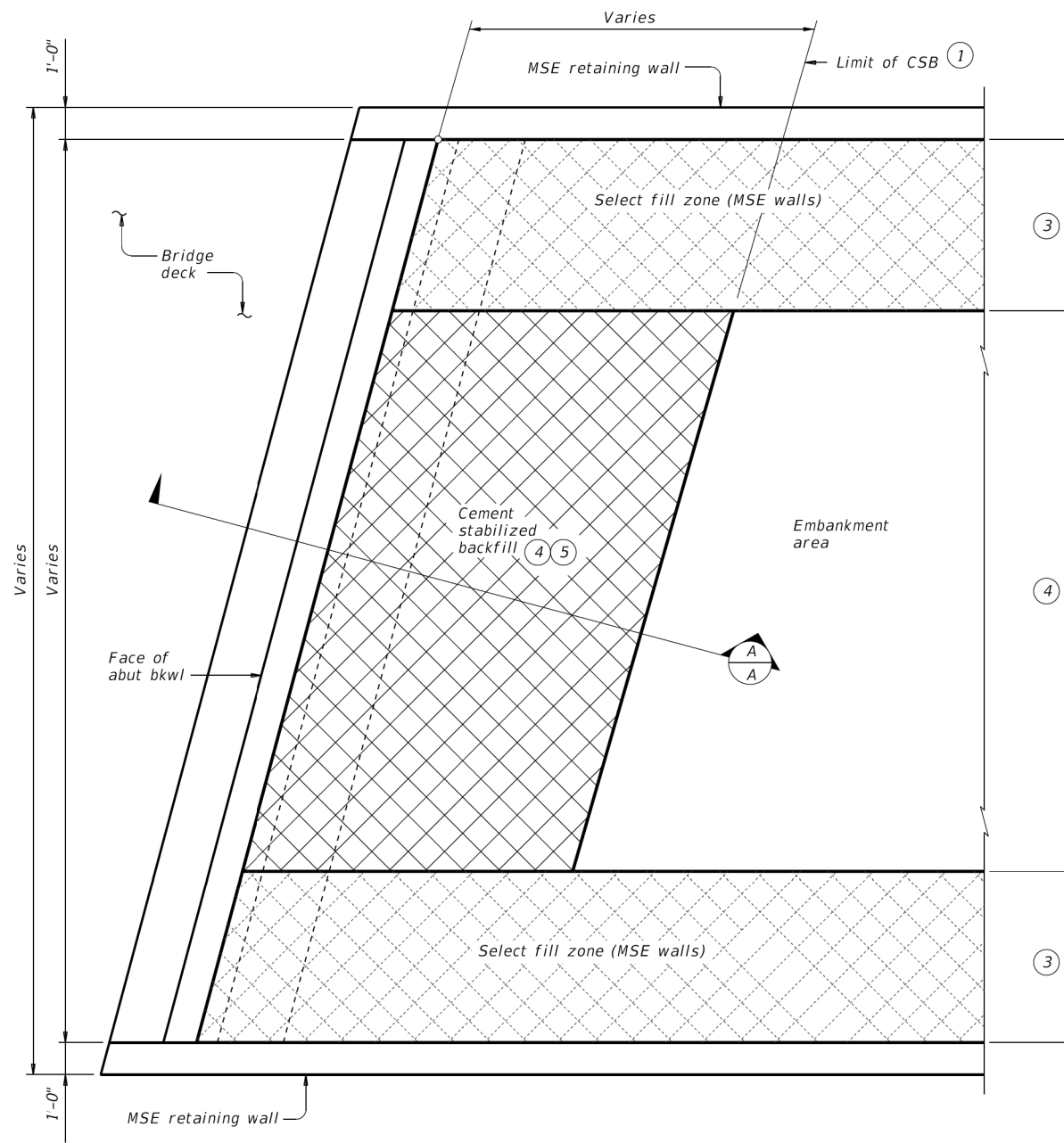
		Bridge Division Standard	
BRIDGE APPROACH SLAB ASPHALTIC CONCRETE PAVEMENT			
BAS-A			
FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
REV: April 2019	CONV: 0447	SECT: 04	JOB: 018
REV: 02-20: Removed stress relieving pad.	DIST: CRP	COUNTY: REFUGIO	SHEET NO: 88

DISCLAIMER: 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.



OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a) If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b) Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 1 is intended for construction only requiring plasticity index (PI) controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Option 2 is intended for new construction requiring high plasticity embankment fill with a PI greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays.

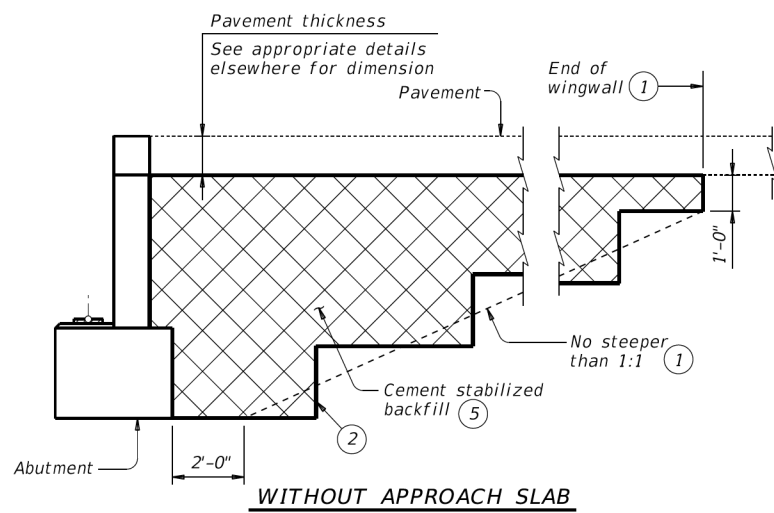
Construct abutment backfill in accordance with Item 400, "Excavation and Backfill for Structures".

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

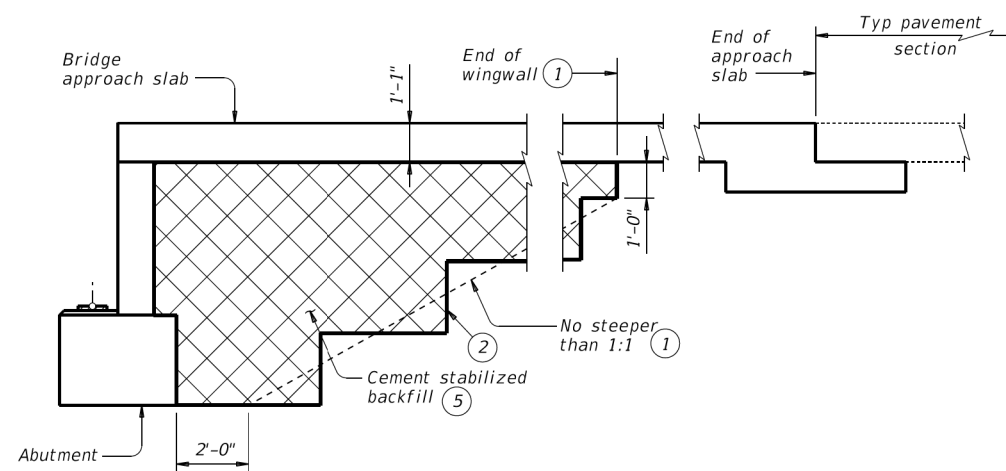
If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

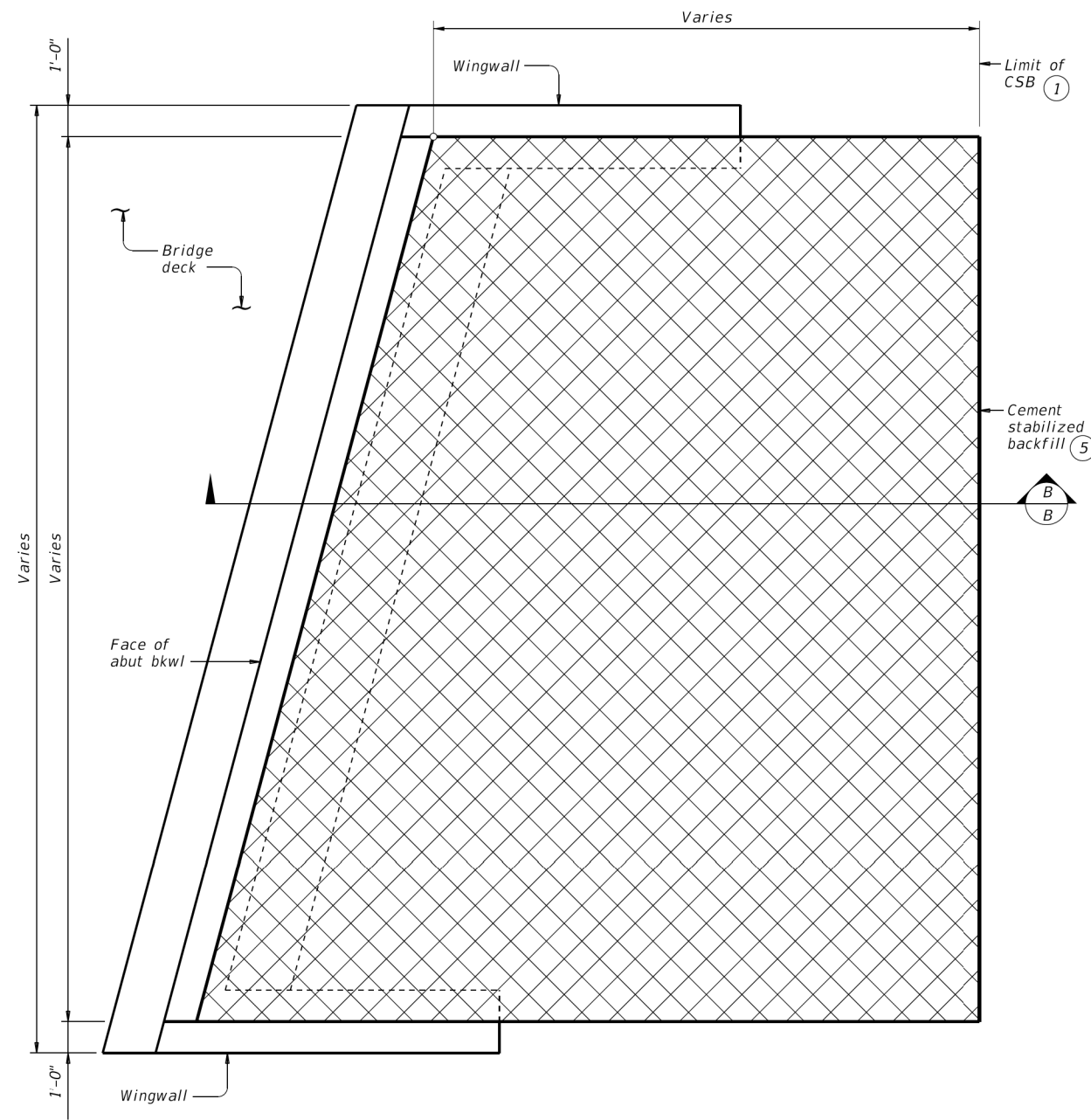
SECTION A-A

SHEET 1 OF 2

		Bridge Division Standard	
CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT			
CSAB			
FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
REVISIONS	CONT	SECT	JOB
0447	04	018	SH 202
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.
03-23: Updated General Notes.	CRP	REFUGIO	89

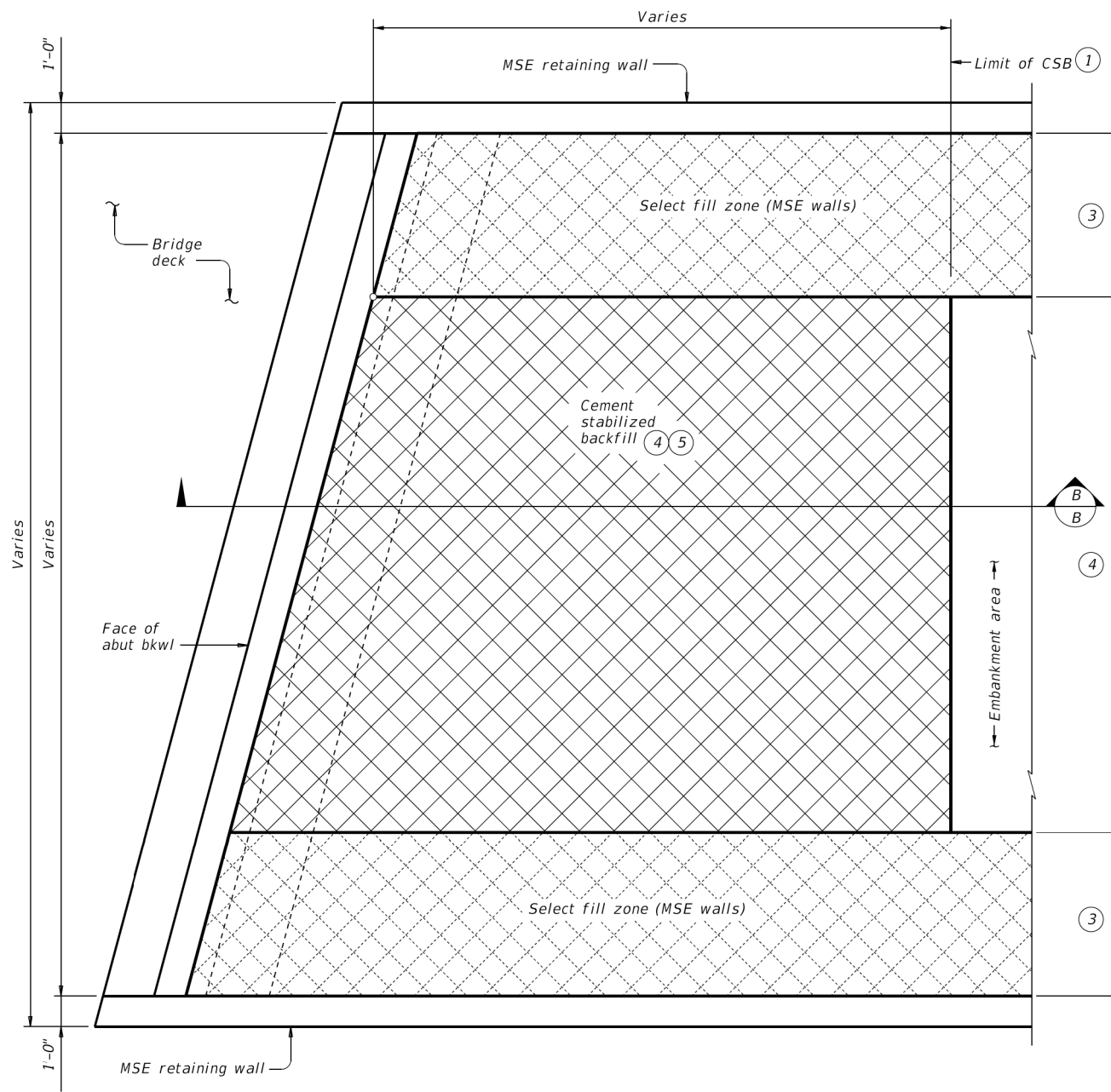
DATE: FILE:

DISCLAIMER: 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.



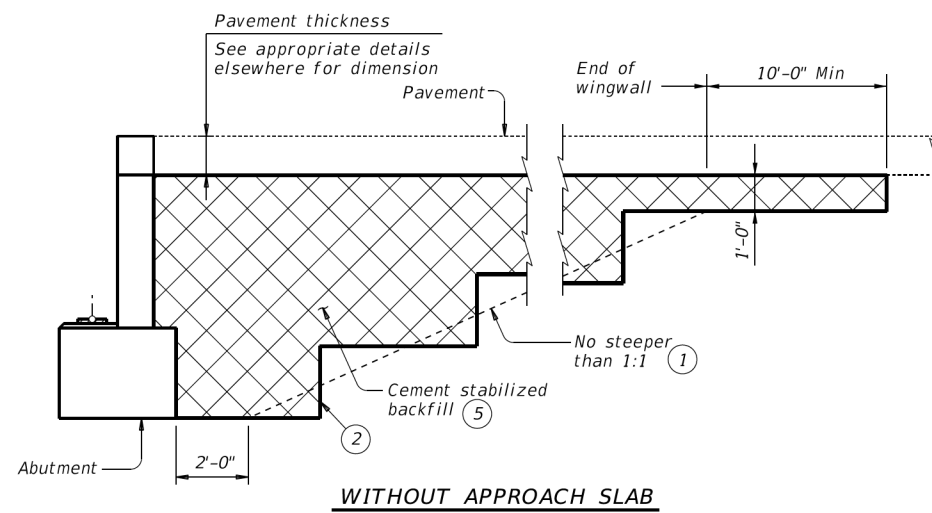
OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

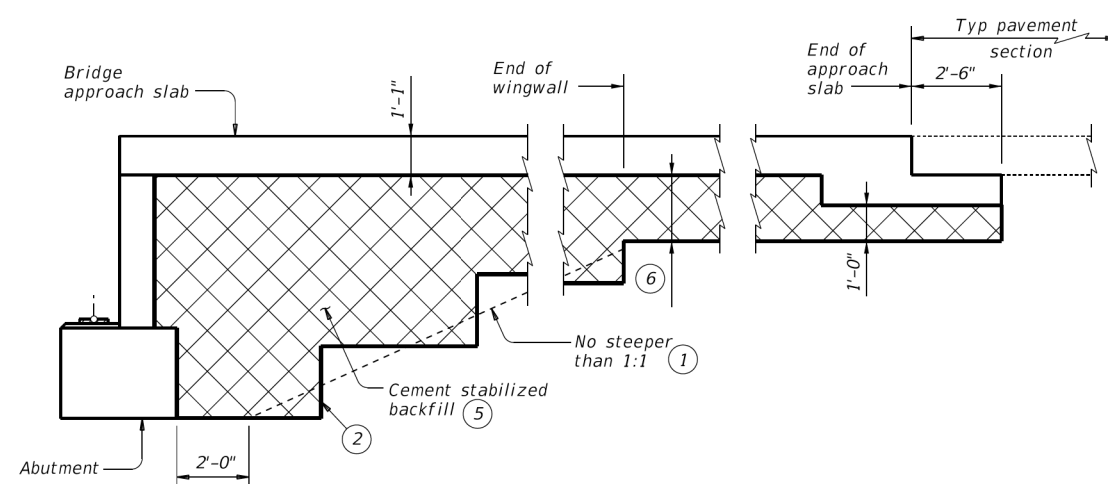


OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).
- ⑥ 1'-0" for BAS-A
1'-10" for BAS-C



WITHOUT APPROACH SLAB



SECTION B-B

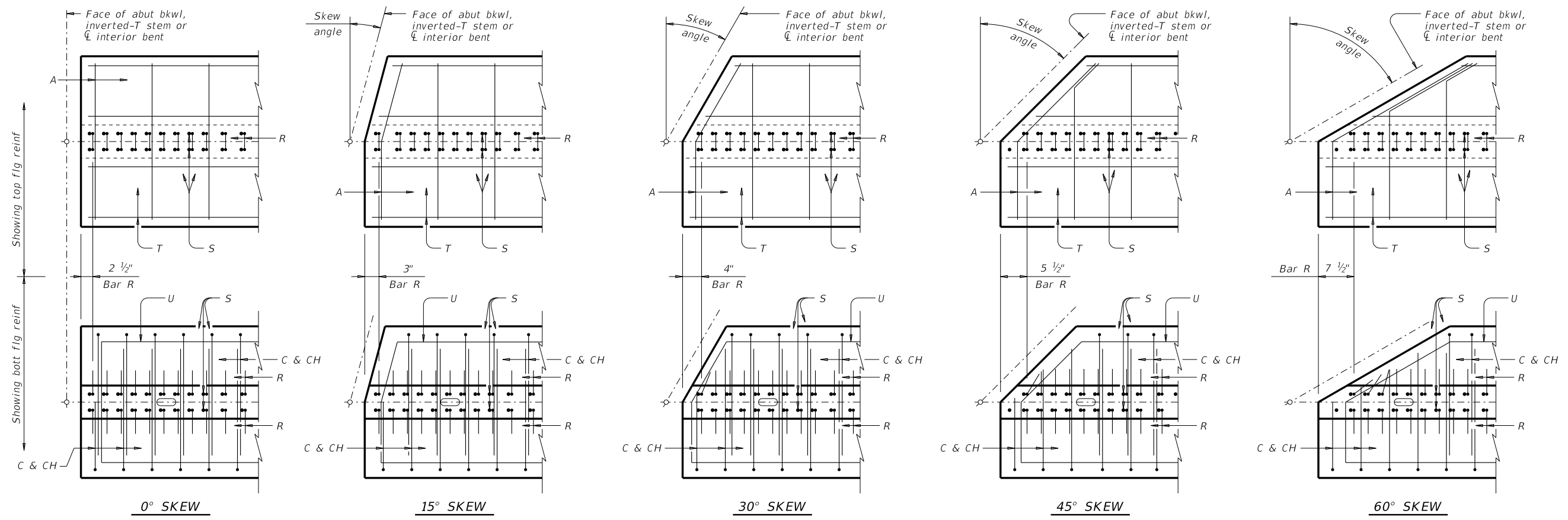
WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SHEET 2 OF 2

		Bridge Division Standard	
CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT			
CSAB			
FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
REVISIONS	CONT	SECT	JOB
0447	04	018	SH 202
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.
03-23: Updated General Notes.	CRP	REFUGIO	90

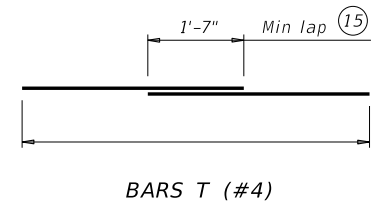
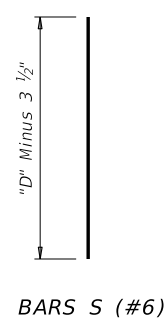
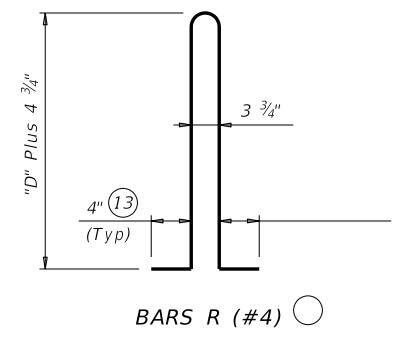
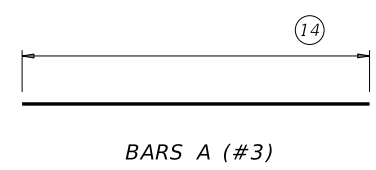
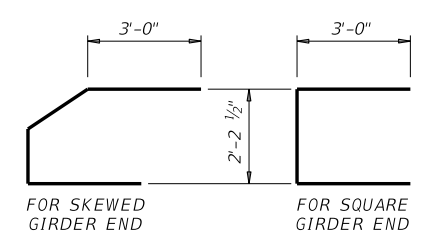
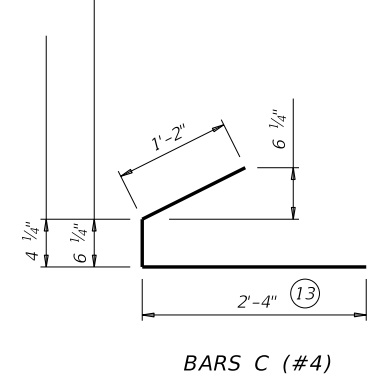
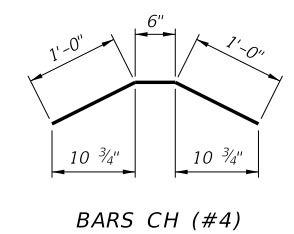
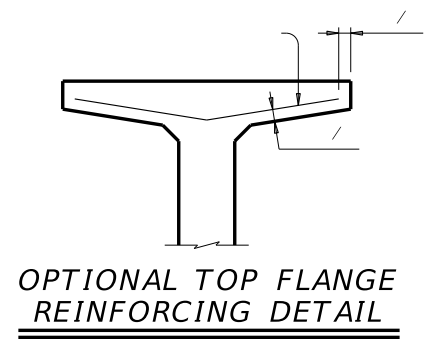
DATE: FILE:

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 OF GIRDER ENDS (12)

control top flange cracking



- (12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.
- (13) Bars may be cut or bent at skewed end as required.
- (14) Increase as necessary for bars at skewed end.
- (15) No portion of bar less than 10 ft.
- (16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

DATE: 7/24/2023 3:28:41 PM
FILE: DOCUMENT NAME



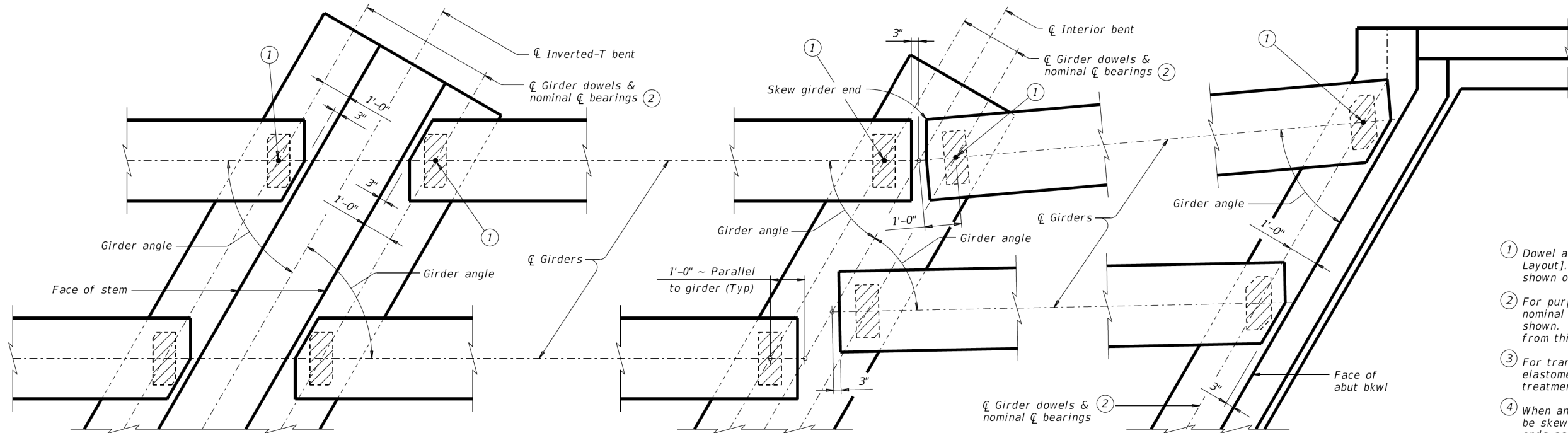
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH202
10-19: Added Bars C and CH full length for VC= 20'	DIST	COUNTY	SHEET NO.	
3-23: Clarified C and CH requirement	CRP	REFUGIO	92	

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: FILE:

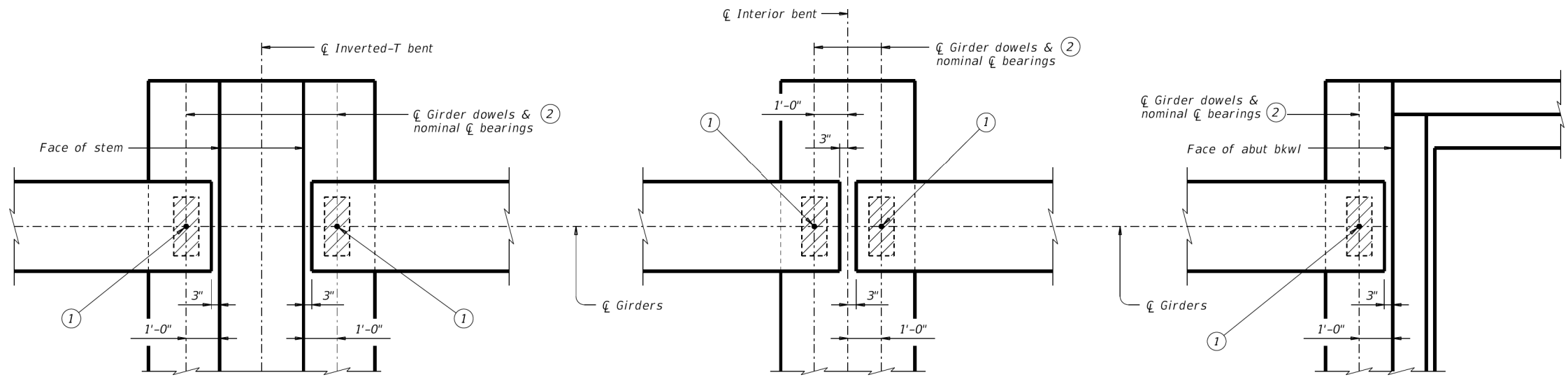


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW

- ① Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.
- ② For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- ③ For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.
- ④ When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.
- ⑤ See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.



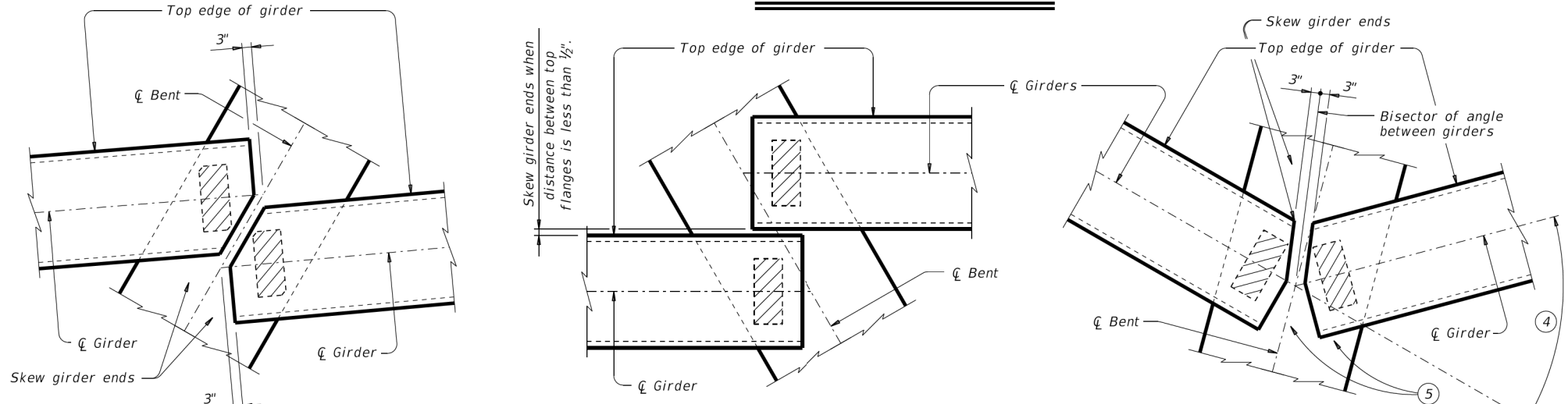
AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT

GIRDER END DETAILS

GENERAL NOTES:
 These details accommodate skew angles up to 60°. 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, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".



GIRDER CONFLICT DETAILS

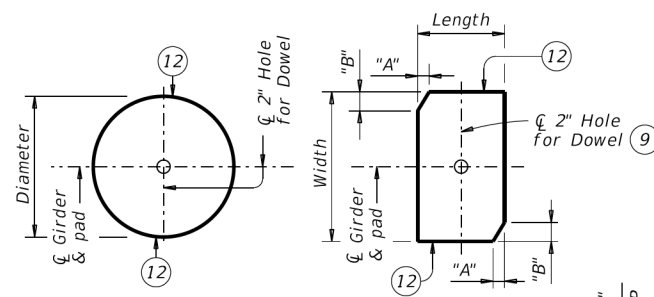


ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

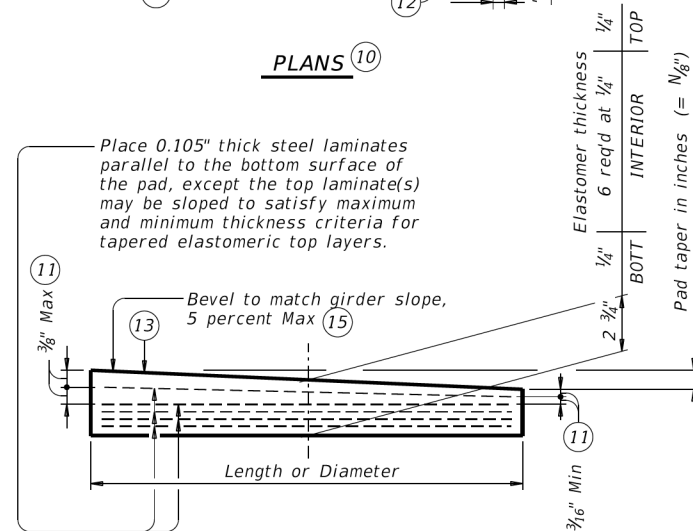
IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	93	

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.



PLANS (10)



ELEVATION

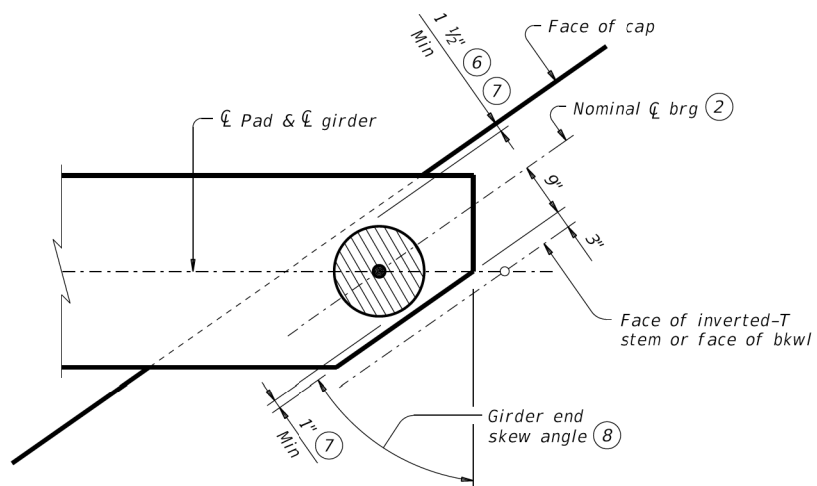
LAMINATED ELASTOMERIC BEARING PAD
(50 DUROMETER)

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

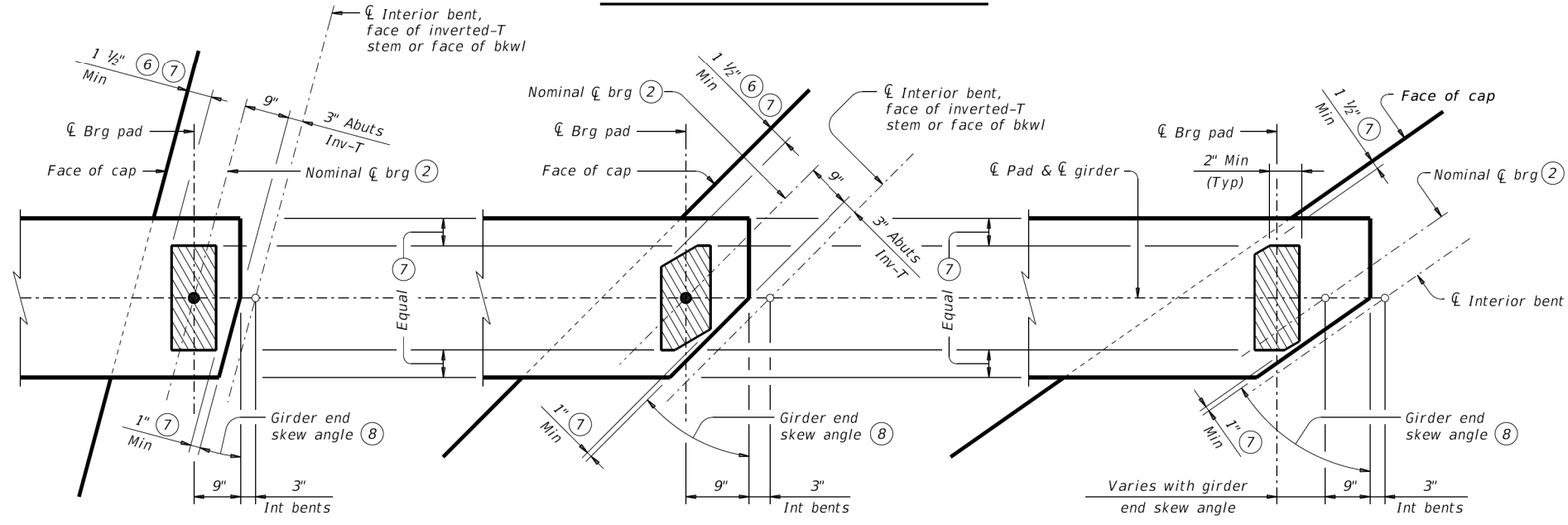
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 1/2"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 1/2"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions	
					"A"	"B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 1/2"	4 1/2"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 1/2"	2 1/2"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 1/2"	4 1/2"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 1/4"	4 1/4"
CONVENTIONAL INTERIOR BENTS	Tx28, Tx34, Tx40, Tx46 & Tx54	---	---	---	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 1/2"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-11-"N"	18°+ thru 30°	9" x 21"	---	---
G-12-"N"	30°+ thru 45°	9" x 21"	1 1/2"	1 1/2"		
G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 3/4"		



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

- (2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- (6) 3" for inverted-T.
- (7) Place centerline pad as near nominal centerline bearing as possible between limits shown.
- (8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.
- (9) Provide 2" dia hole only at locations required. See Substructure details for location.
- (10) See Table of Bearing Pad Dimensions for dimensions.
- (11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- (12) Locate Permanent Mark here.
- (13) 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 girder slope by more than (0.0625" / Length or Dia) IN/IN.
- (14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.
- (15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.
- (16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3



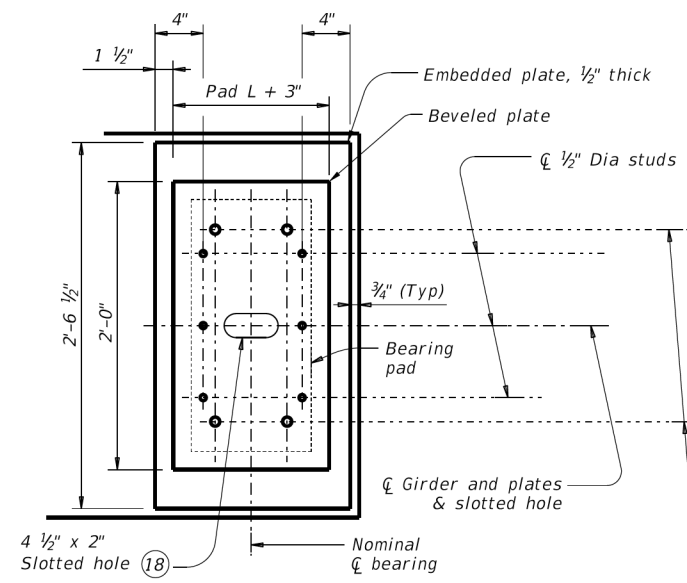
ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

IGEB

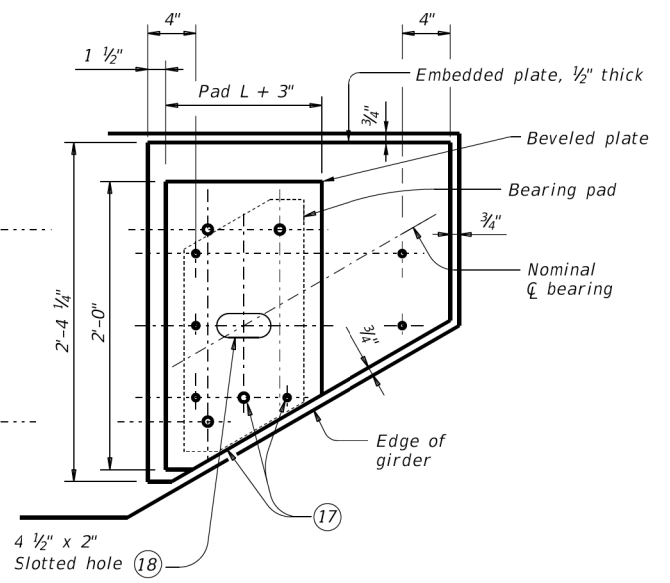
FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202	
DIST	COUNTY	SHEET NO.		
CRP	REFUGIO	94		

DATE: FILE:

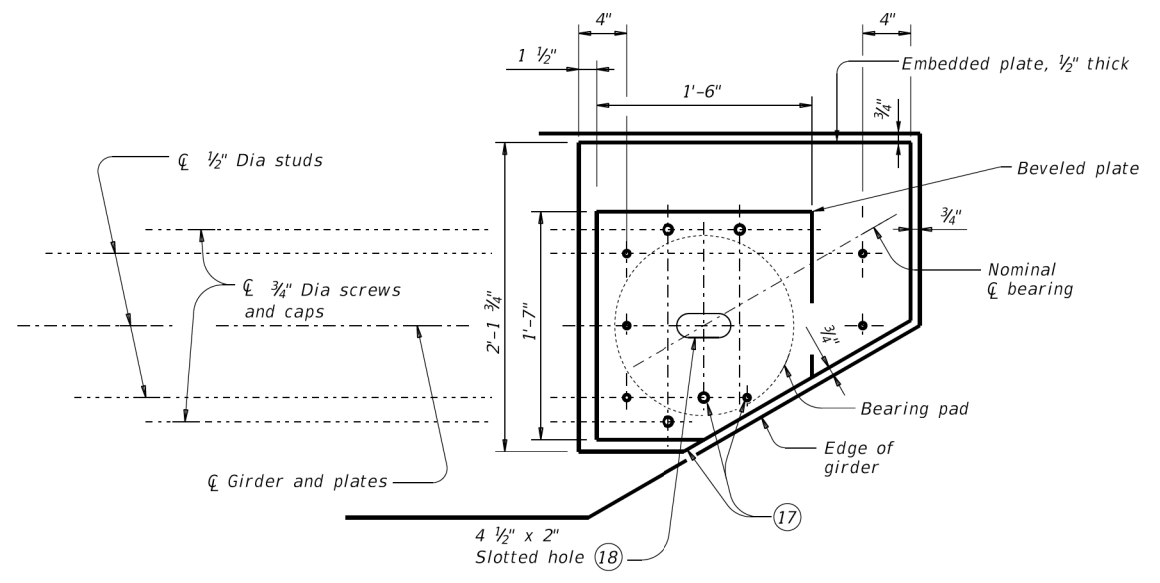
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



NORMAL GIRDER END
RECTANGULAR BEARING PAD

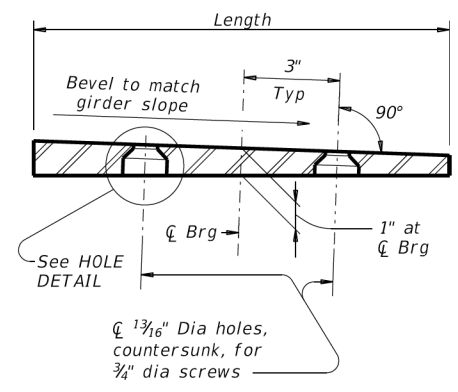


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

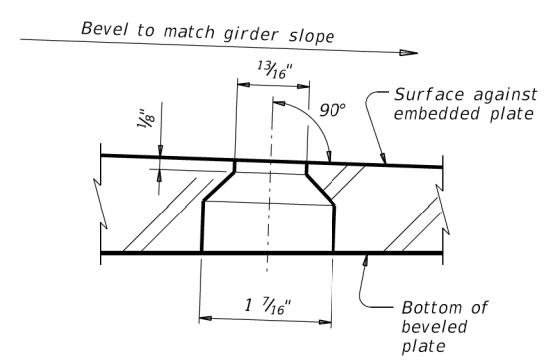


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



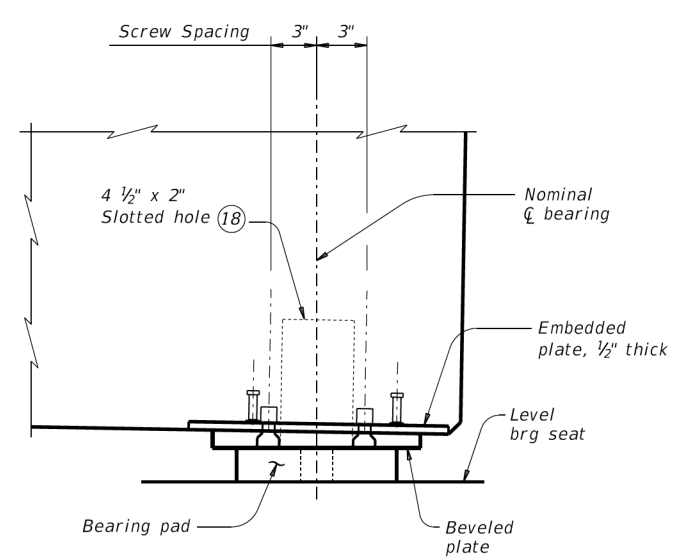
SECTION



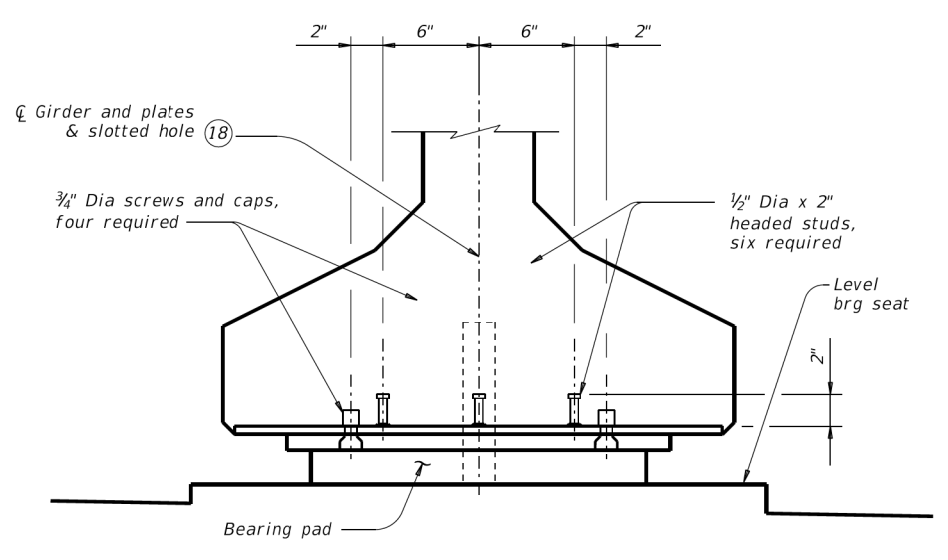
HOLE DETAIL

- (17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.
- (18) Slotted hole is required at doweled girder end locations.

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16" +/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

3/4" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a 3/4" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than 1/2" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.



ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

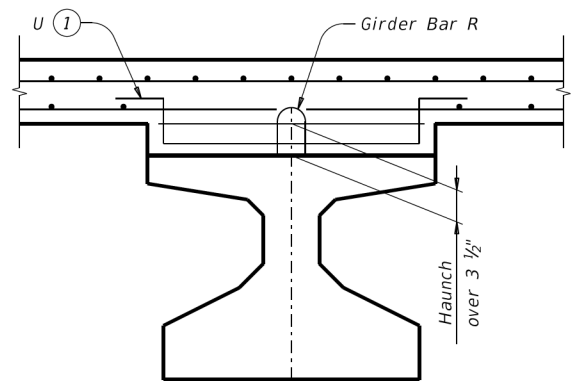
IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
August 2017	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	95	

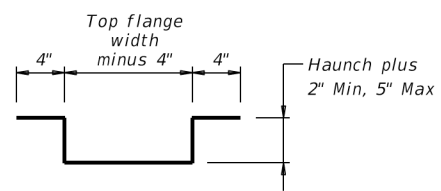
DATE:
FILE:

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.

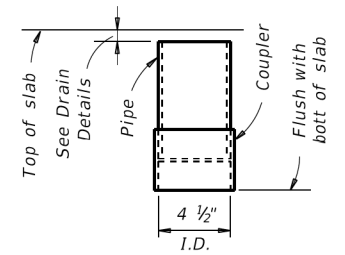
DATE: FILE:



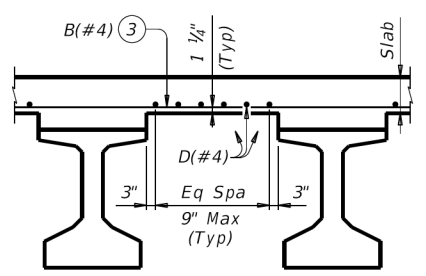
HAUNCH REINFORCING DETAIL



BARS U (#4)

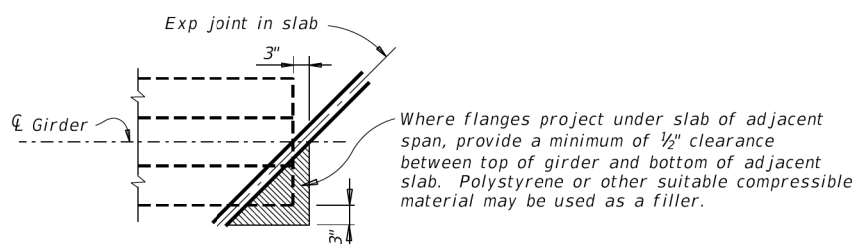


C-I-P DRAIN DETAIL

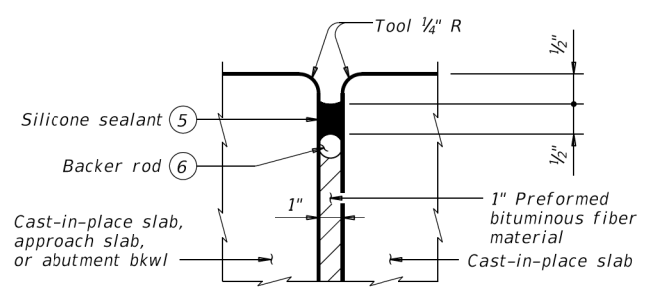


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP

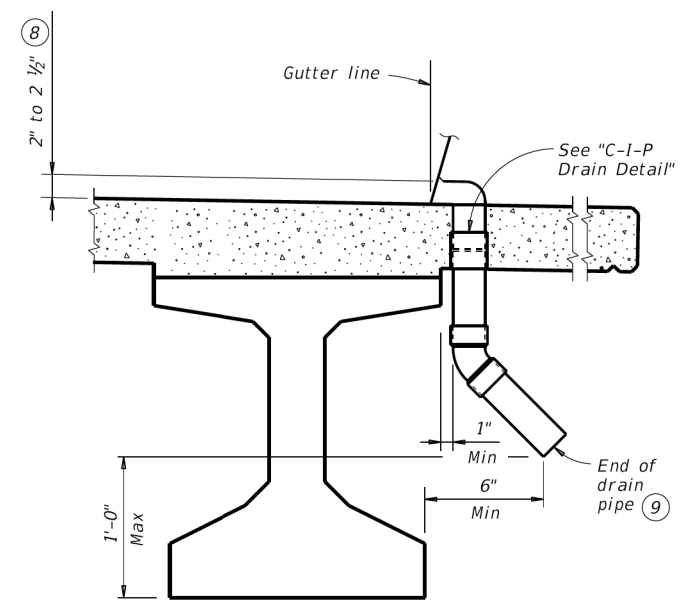
Top reinforcing steel not shown for clarity.



TREATMENT AT GIRDER END FOR SKEWED SPANS



TYPE A JOINT DETAIL



DRAIN DETAIL

- ① Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 1/2".
- ② Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
- ③ Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
- ④ Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"
- ⑤ Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- ⑥ 1 1/4" 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.
- ⑦ The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.
- ⑧ Drain entrance formed in rail or sidewalk.
- ⑨ Water may not be discharged onto girders.
- ⑩ All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railroads, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."
All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

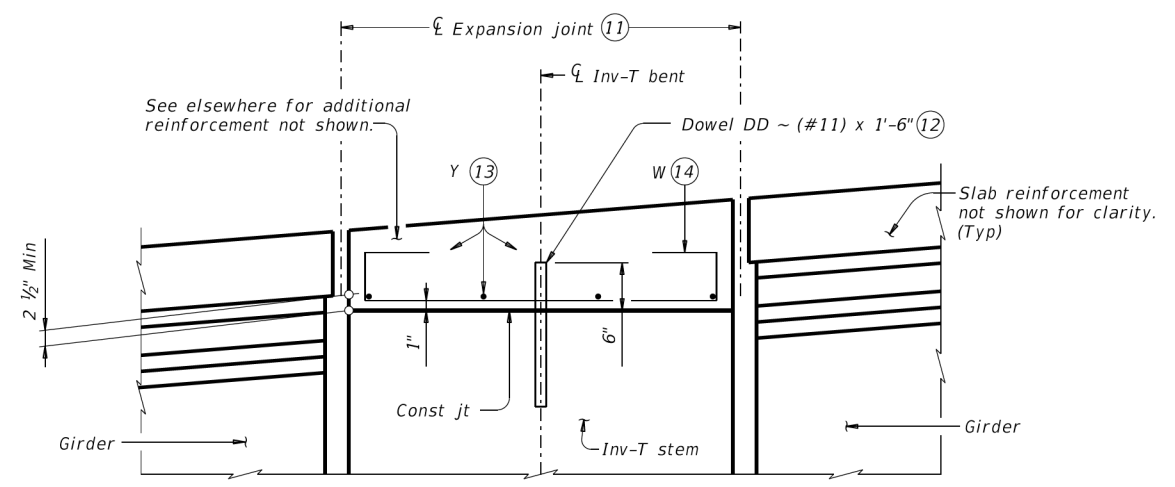
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:
Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

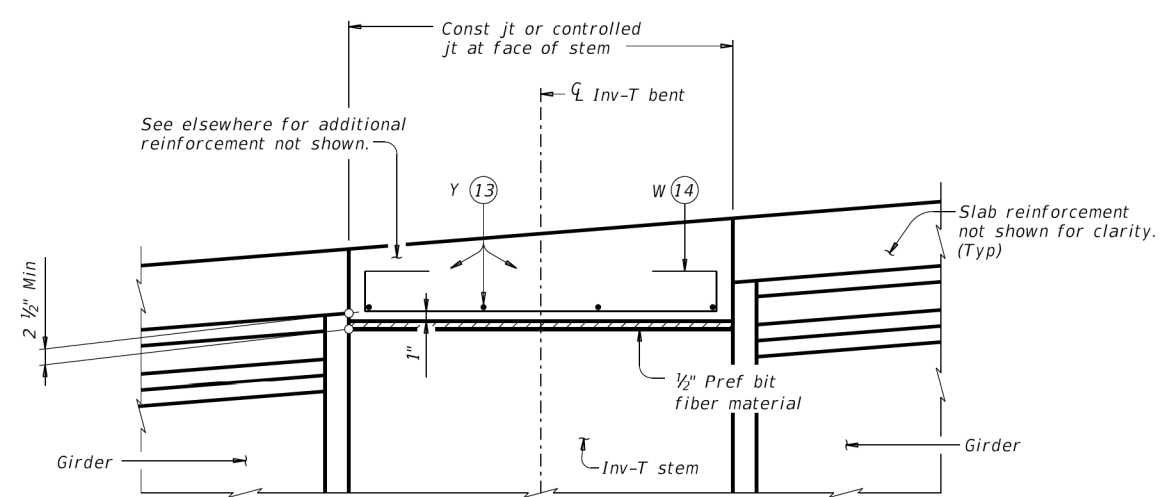
		Bridge Division Standard	
MISCELLANEOUS SLAB DETAILS PRESTR CONCRETE I-GIRDERS			
IGMS			
FILE: igmssts1-19.dgn	DN: TxDOT	ck: TxDOT	DW: JTR
©TxDOT August 2017	CONT	SECT	JOB
REVISIONS	0447	04	018
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	96

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.

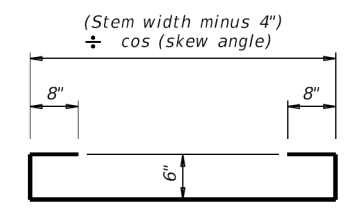
DATE:
FILE:



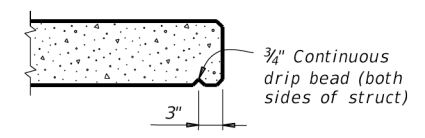
SHOWING EXPANSION JOINTS



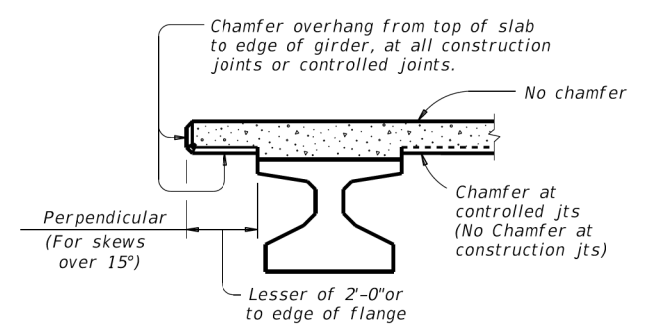
**SHOWING CONST JTS OR CONTROLLED JTS
REINFORCEMENT OVER INV-T BENTS**



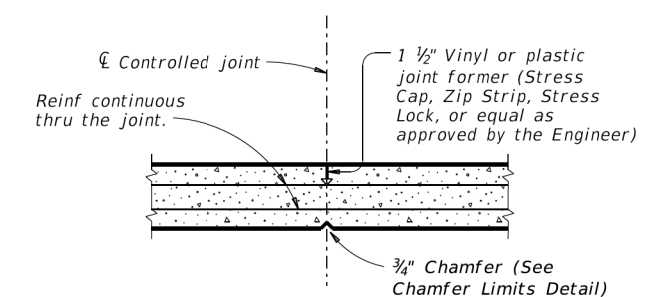
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL
(Saw-cutting is not allowed)

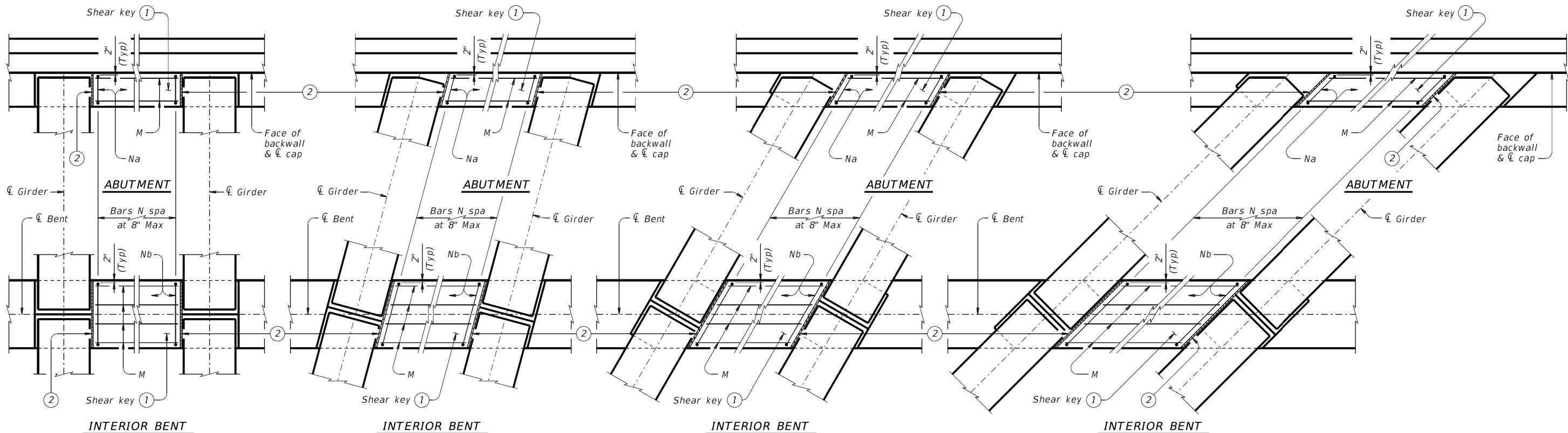
- (11) See Layout for joint type.
- (12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.
- (13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
- (14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.
- (15) See Span details for type of joint and joint locations.

**MISCELLANEOUS
SLAB DETAILS
PRESTR CONCRETE I-GIRDERS**

IGMS

FILE: igmssts1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
10-19: Modified Note 7, Type A now a pay item.	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	97	

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.



PARTIAL PLANS WITH NO SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 15° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

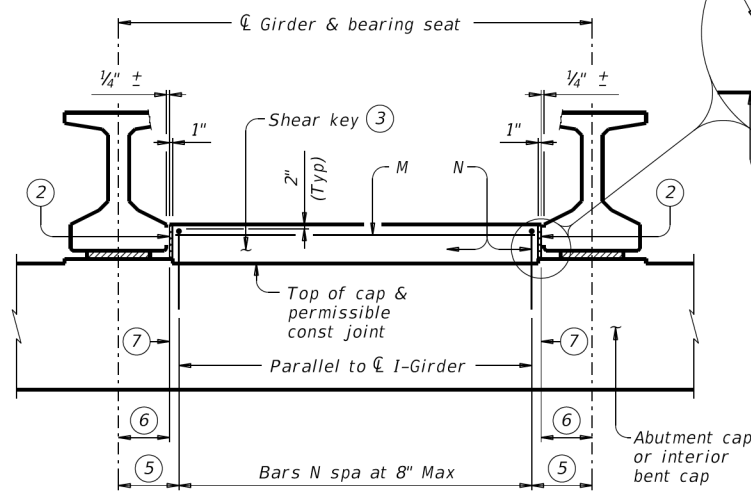
PARTIAL PLANS WITH 30° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 45° SKEW

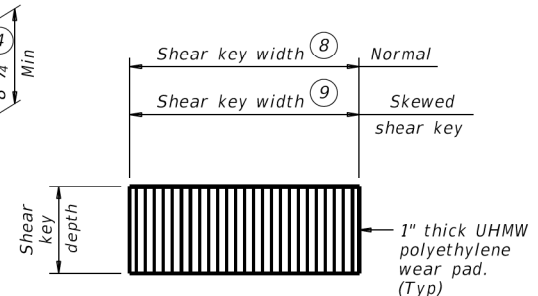
Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

- ① Place shear keys on the upstream side of structure between outside girder and next adjacent girder, unless shown otherwise on plans.
- ② UHMW polyethylene wear pad. (Typ)
- ③ Leave a 1/4" gap plus or minus between girder and face of wear pad. Cast wear pad with shear key, smooth side facing girder. Care must be taken to keep concrete from flowing under girder. Slope top of shear keys in accordance with Item 420.4.9, "Treatment and Finishing of Horizontal Surfaces."
- ④ Measure at higher bearing seat elevation forward or back. Dimension based on typical bearing pad and bearing seat. Increase as necessary to maintain 5" overlap.
- ⑤ With No Skew = 1'-8 1/4", measured along $\bar{\ell}$ cap.
With Skew = $1'-8 \frac{1}{4} \div \cos \text{Skew}$, measured along $\bar{\ell}$ cap.
- ⑥ With No Skew = 1'-4 1/4", measured along $\bar{\ell}$ cap.
With Skew = $1'-4 \frac{1}{4} \div \cos \text{Skew}$, measured along $\bar{\ell}$ cap.
- ⑦ Face of UHMW polyethylene wear pad. Smooth side of pad facing girder.
- ⑧ Abutments = 1/2 Cap width.
Interior bents = Cap width.
- ⑨ Abutments = 1/2 Cap width $\div \cos \text{Skew}$.
Interior bents = Cap width $\div \cos \text{Skew}$.

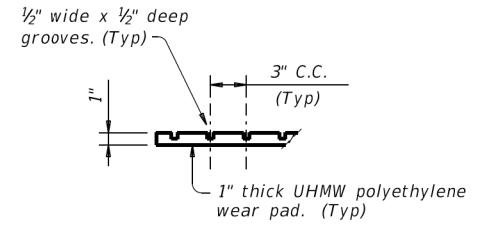


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP

Showing shear key with girder Type Tx46. Other I-Girder types similar.

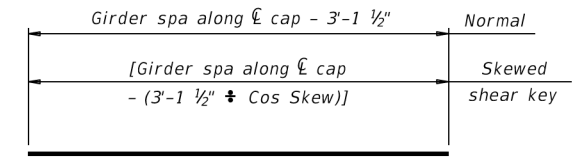


ELEVATION

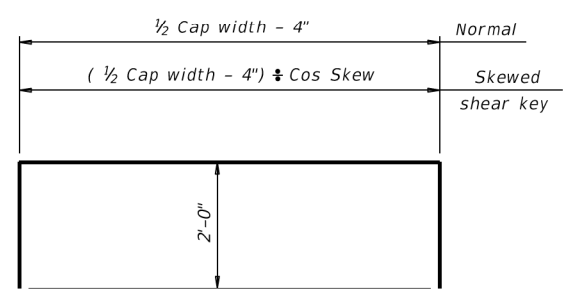


PART SECTION

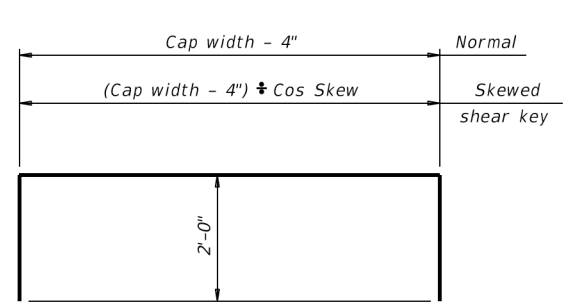
ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



BARS M (#5)



BARS Na (#5) (For abutments)



BARS Nb (#5) (For interior bents)

CONSTRUCTION NOTES:
 Provide Class "C" concrete ($f'_c = 3,600$ psi). Provide Class "C" (HPC) if shown elsewhere on the plans.
 Provide Grade 60 reinforcing steel.
 Provide epoxy coated reinforcing steel for shear key if abutment or interior bent reinforcing steel is epoxy coated.
 Provide Ultra High Molecular Weight (UHMW) polyethylene wear pads in accordance with ASTM D6712.

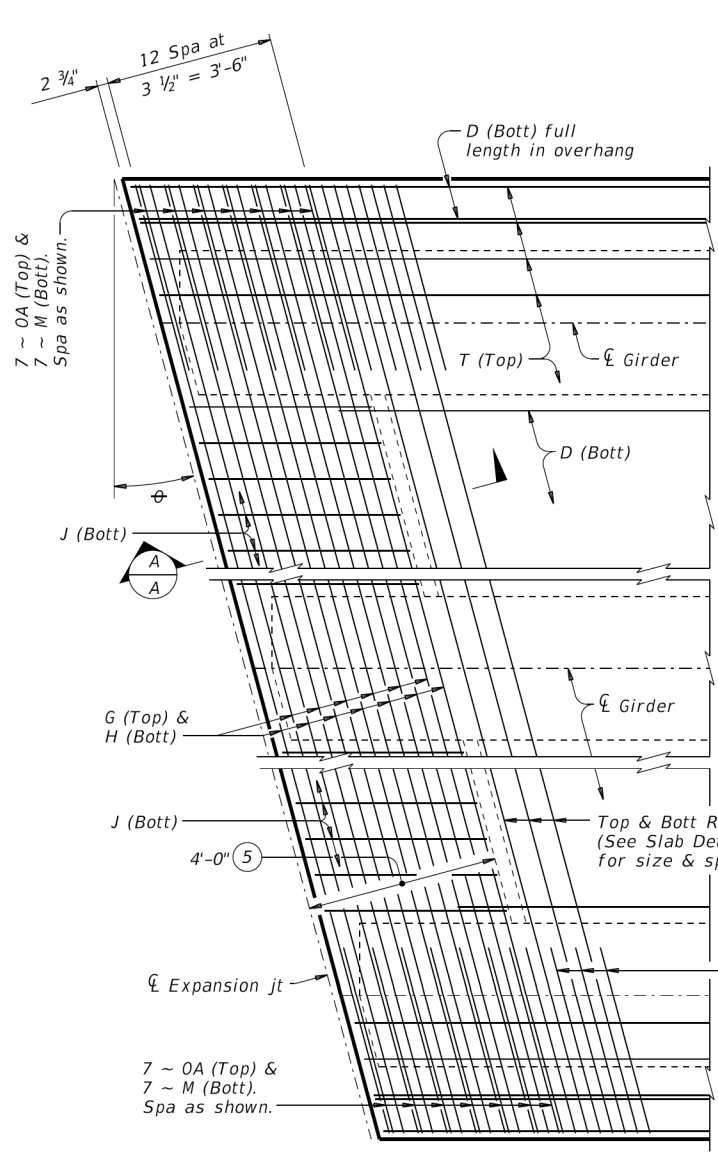
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Details showing skew are drawn showing right forward skew. See Bridge Layout for actual skew direction.
 These details are limited to bridges skewed 45 degrees and less. This standard is only applicable for I-Girders.
 Modify details for bearing conditions, and girder spacing not shown on this standard. Details do not account for sole plate or pedestal bearing seat.
 Include shear key concrete in abutment or bent concrete for payment.
 UHMW polyethylene wear pads are subsidiary to Class "C" concrete.

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

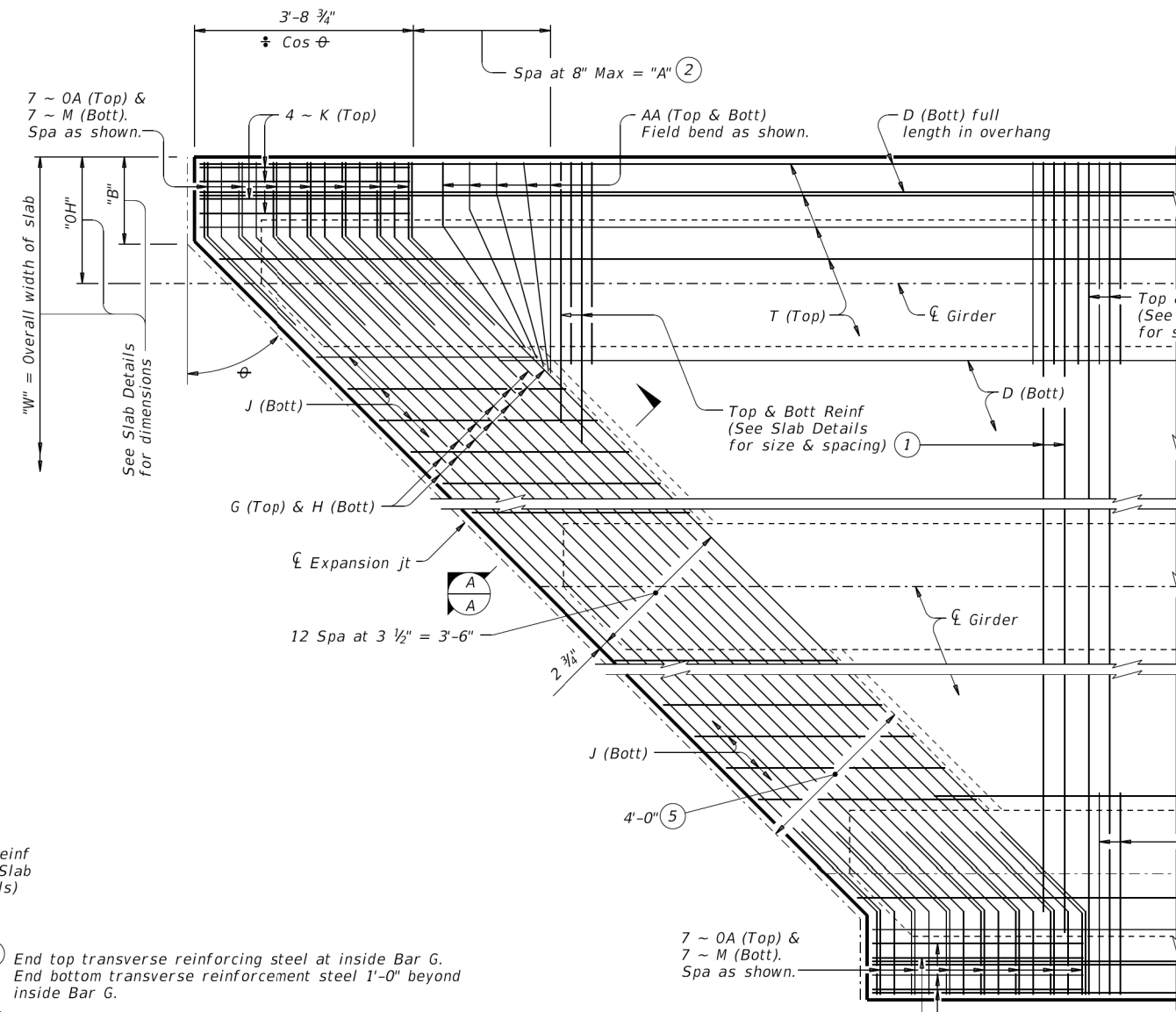
		Bridge Division Standard	
SHEAR KEY DETAILS PRESTR CONCRETE I-GIRDERS			
IGSK			
FILE: igskstds-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	JOB
August 2017	0447	04	018
	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	98

DATE: FILE:

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.

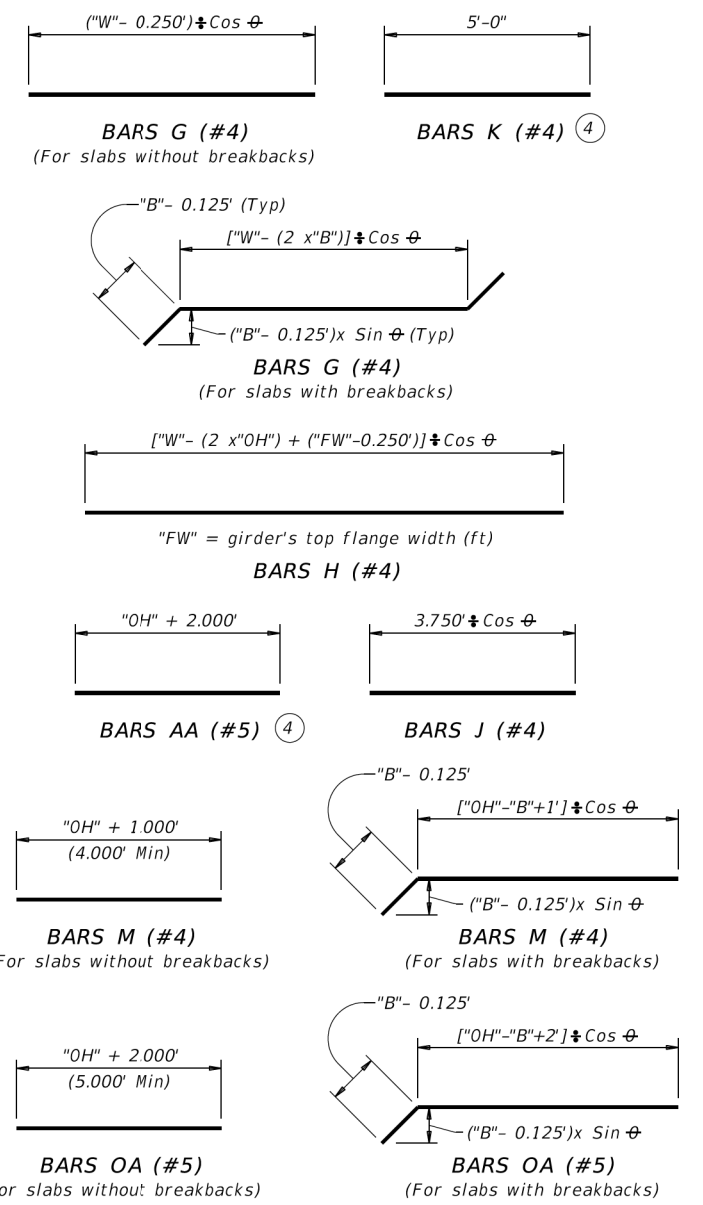


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

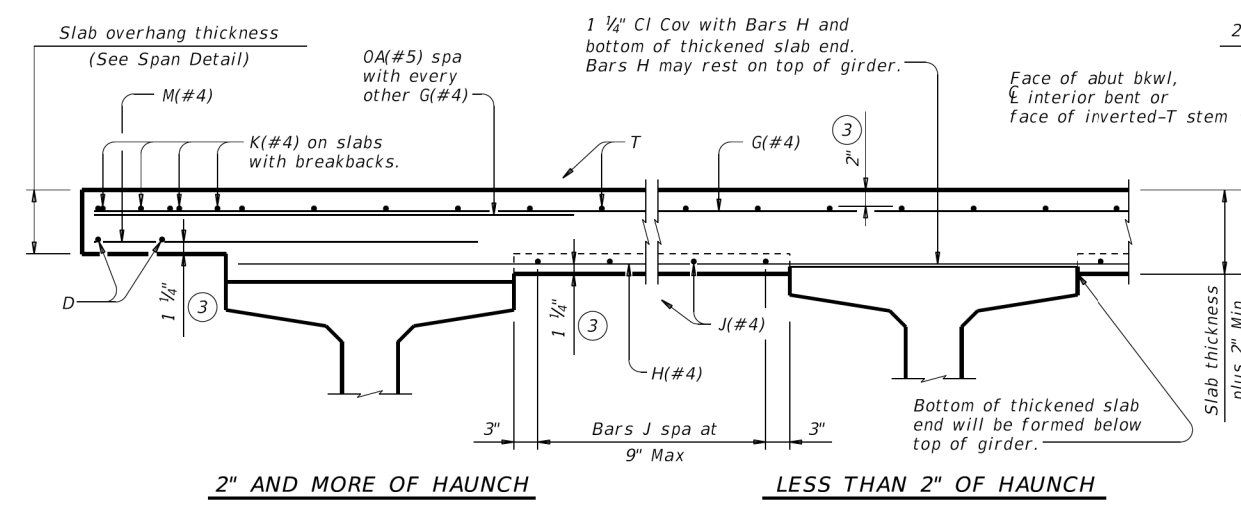
- 1 End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
- 2 $A = ("OH" + 2.333' - "B") \times \tan \phi$
- 3 Provide clear cover as indicated unless otherwise shown on Span Details.
- 4 Only required on slabs with breakbacks.
- 5 Thickened slab end dimensioned perpendicular to face of bkw, centerline interior bent or face of inverted-T stem.



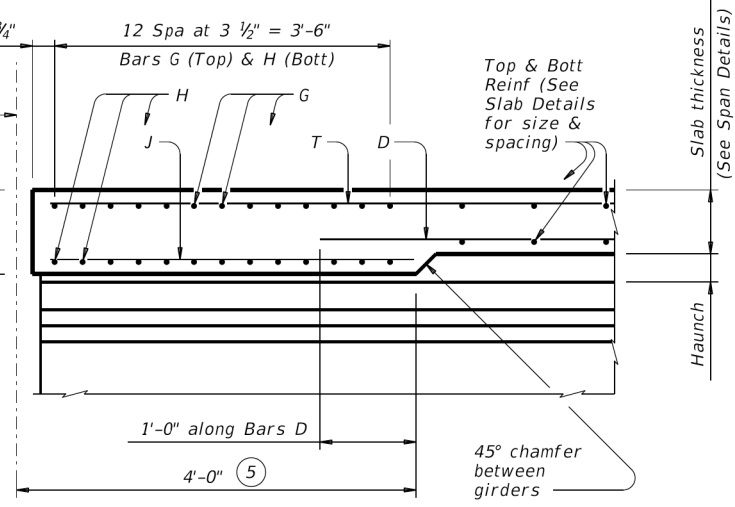
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. These details are restricted to Prestressed Concrete I-Girder Spans. These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used). When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel. If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated. Provide bar laps, where required, as follows:
 Uncoated - #4 = 1'-7"
 Epoxy Coated - #4 = 2'-5"

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



TYPICAL TRANSVERSE SECTION
 (Showing Prestressed Conc I-Girders at ϕ Brg)



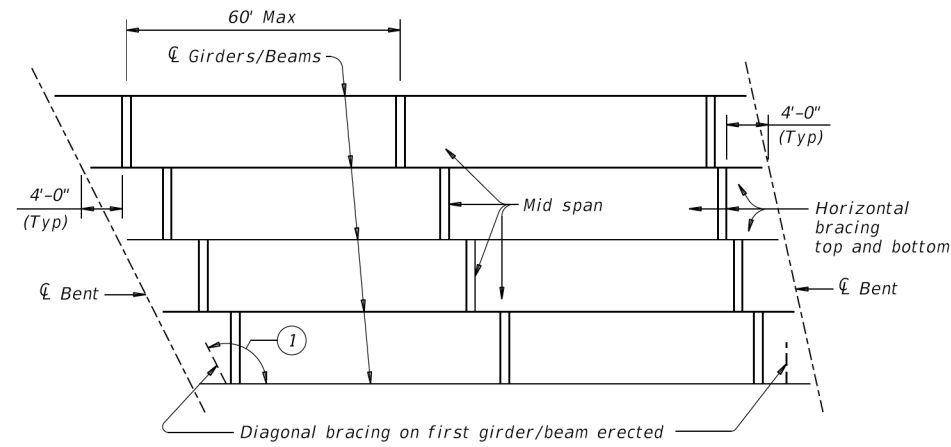
SECTION A-A
 (Showing with 2" and more of haunch)

HL93 LOADING		Bridge Division Standard	
THICKENED SLAB END DETAILS			
PRESTRESSED CONCRETE I-GIRDER SPANS			
IGTS			
FILE: igtss1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	JOB
August 2017	0447	04	018
	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	99

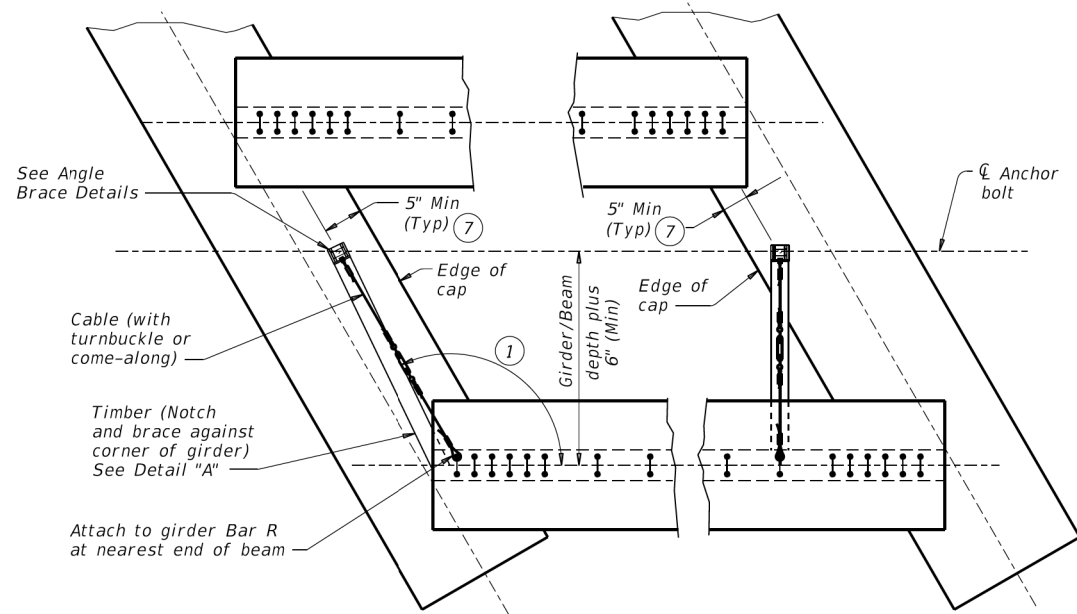
DATE: FILE:

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.

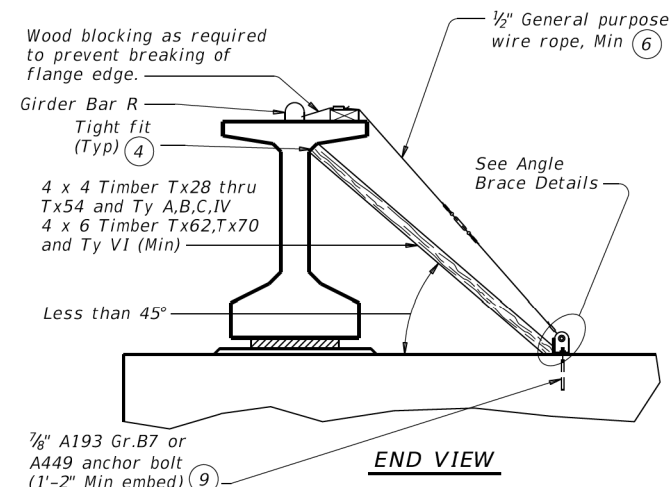
DATE: FILE:



ERECTION BRACING



PLAN



END VIEW

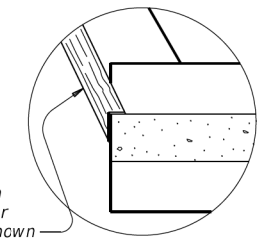
DIAGONAL BRACING DETAILS (5)

(To be used on both ends of the first girder/beam erected in the span in each phase.)

HAULING & ERECTION:
The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

ERECTION BRACING:
Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425. Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

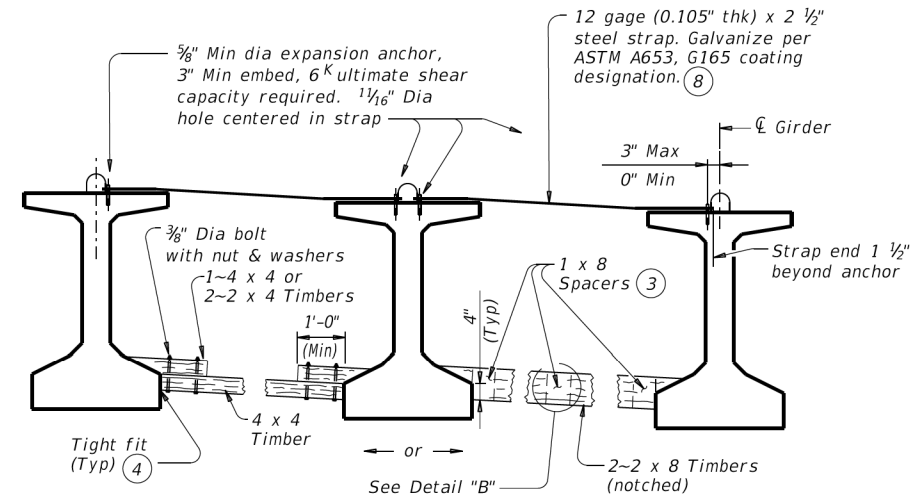
PHASED CONSTRUCTION:
Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

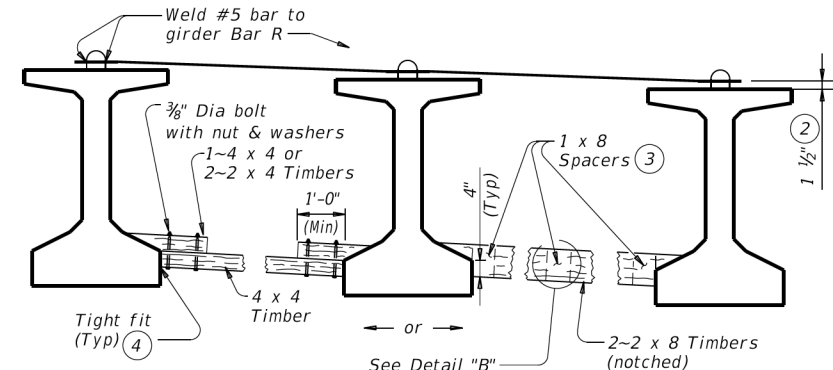
- 1 If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
- 2 Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
- 3 Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- 4 Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 5 Pressure treated landscape timbers can not be used.
- 6 All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing against the dead end.
- 7 It is acceptable to tie anchor bolts to cap reinforcement.
- 8 Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- 9 Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

SHEET 1 OF 2



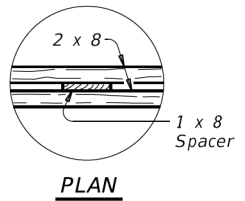
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



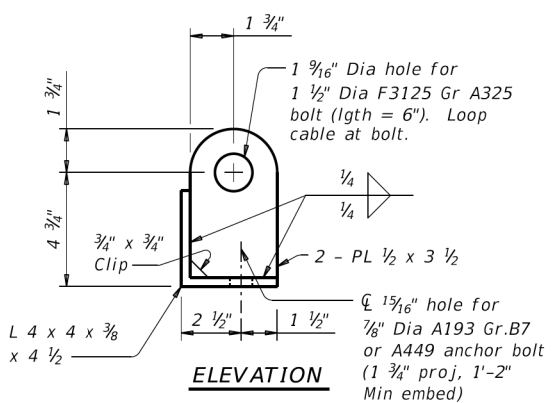
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS (5)

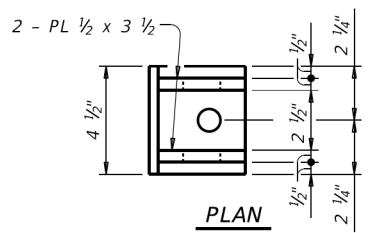


PLAN

DETAIL "B"



ELEVATION



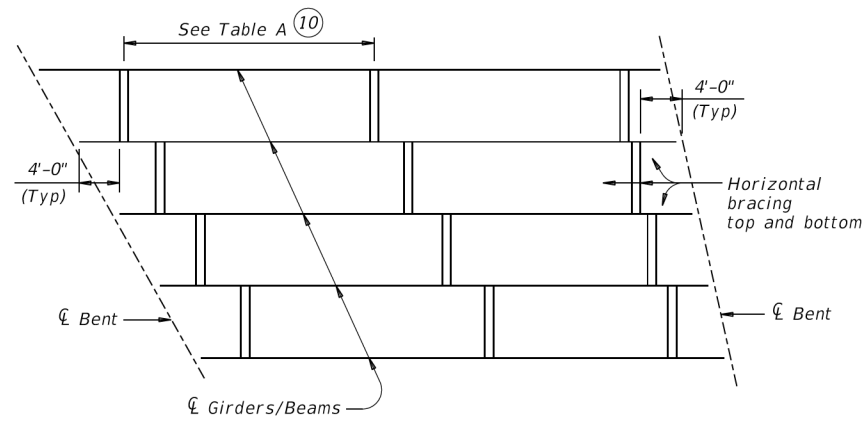
PLAN

ANGLE BRACE DETAILS

		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
REVISIONS	CONT	SECT	JOB
August 2017	0447	04	018
	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	100

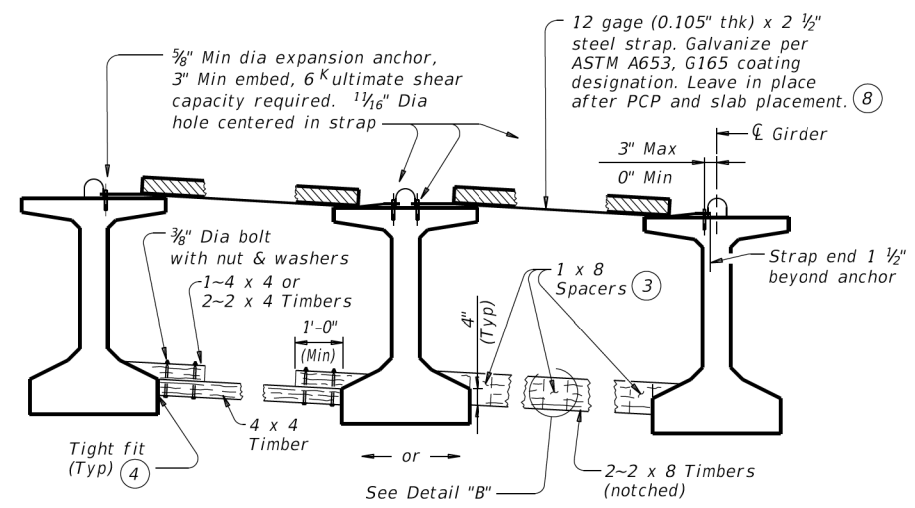
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



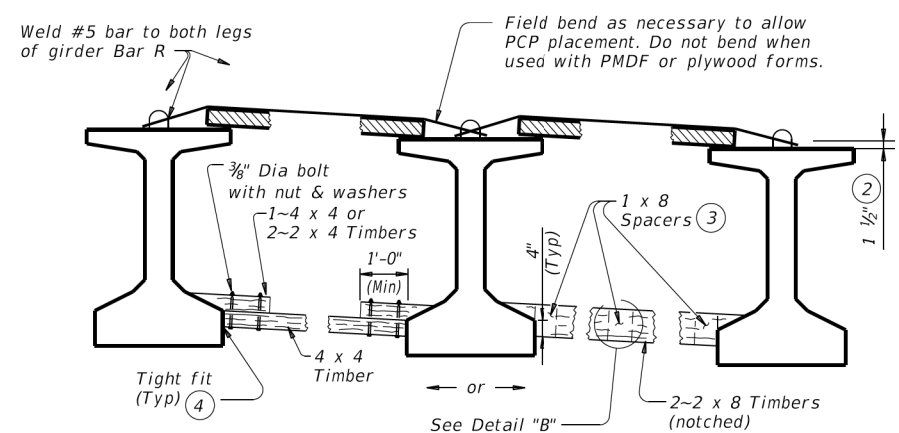
SLAB PLACEMENT BRACING

TABLE A				
Girder or Beam Type	OPTION 1-RIGID BRACING (STEEL STRAP)		OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)	
	Maximum Bracing Spacing		Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	1/4 points	1/4 points	Tx28	1/4 points
Tx34	1/4 points	1/4 points	Tx34	1/4 points
Tx40	1/4 points	1/8 points	Tx40	1/4 points
Tx46	1/4 points	1/8 points	Tx46	1/4 points
Tx54	1/4 points	1/8 points	Tx54	1/4 points
Tx62	1/4 points	1/8 points	Tx62	1/4 points
Tx70	1/4 points	1/8 points	Tx70	1/4 points
A	1/8 points	1/8 points	A	2.0 ft
B	1/8 points	1/8 points	B	3.0 ft
C	1/8 points	1/8 points	C	4.5 ft
IV	1/4 points	1/8 points	IV	1/4 points
VI	1/4 points	1/8 points	VI	1/4 points



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

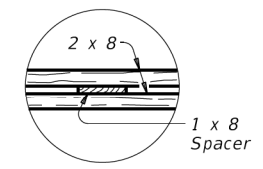
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



**PLAN
DETAIL "B"**

- (2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.
- (3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- (4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- (5) Pressure treated landscape timbers can not be used.
- (8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- (10) Bracing spacing (1/4 and 1/8 points) measured between first and last typical brace location.
- (11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

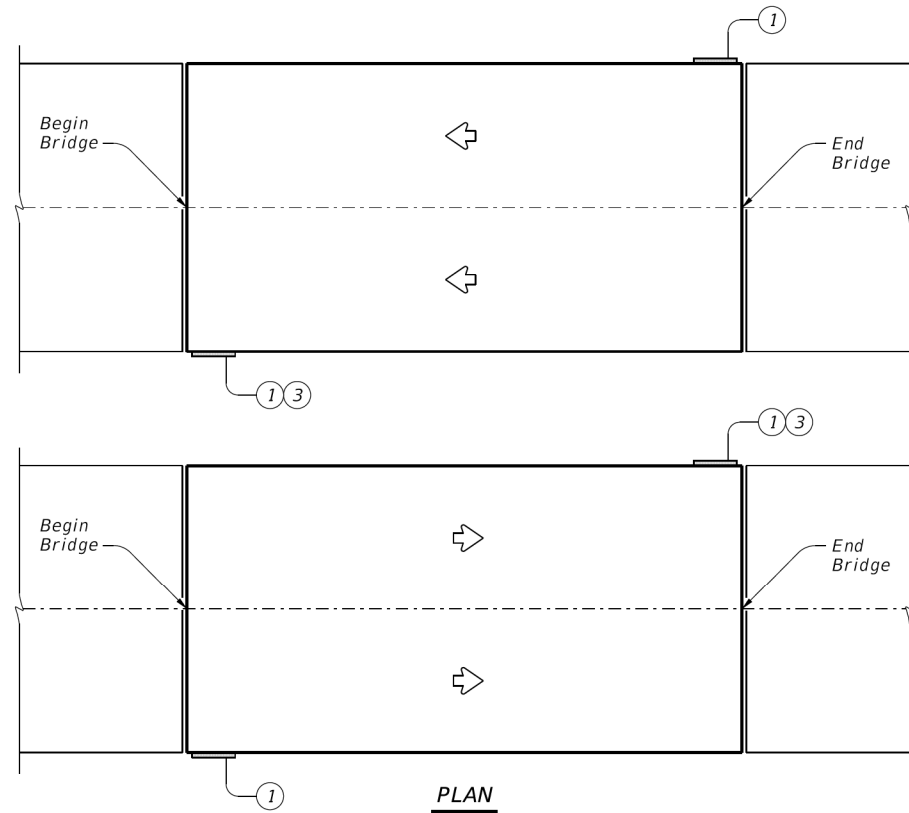
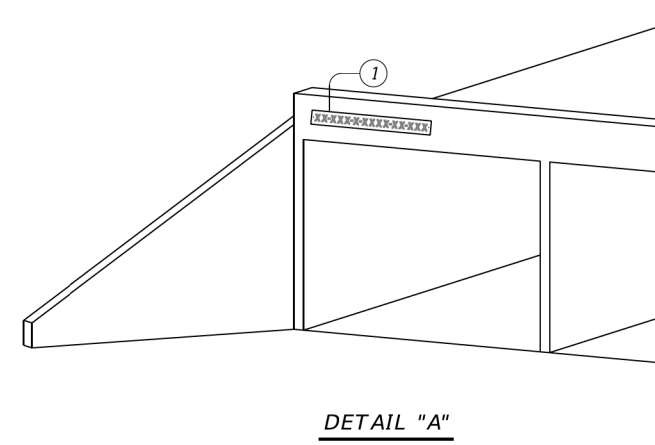
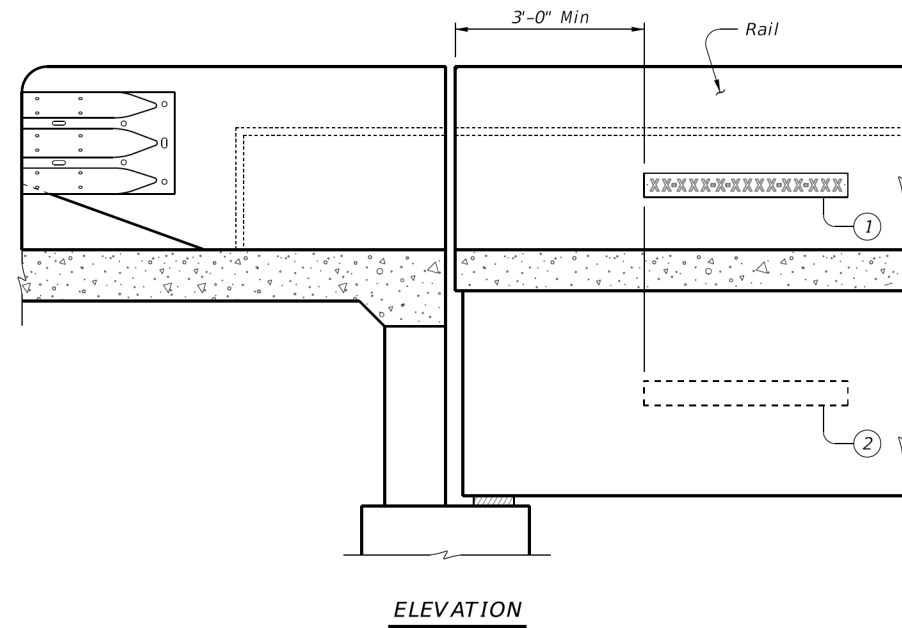
SLAB PLACEMENT BRACING:
The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425. Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:
Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection. Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure. Removal of bracing for short periods of time to align girders and beams is permissible. All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown. Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

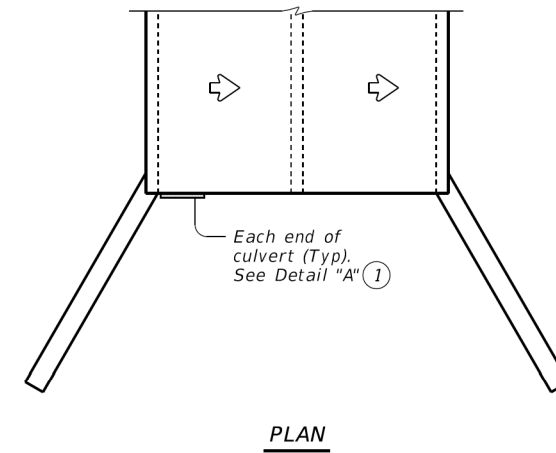
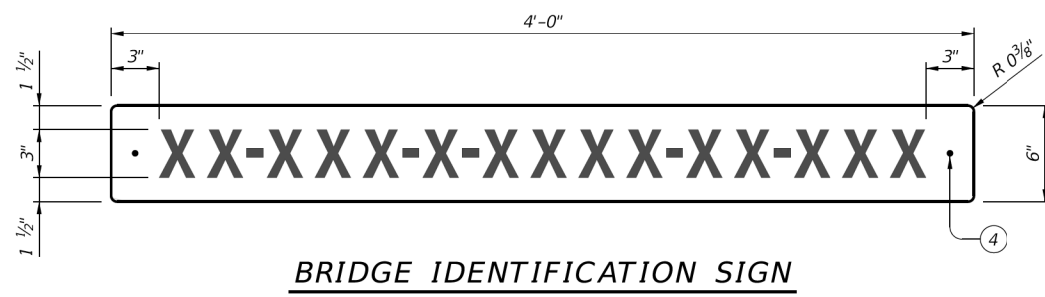
		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT August 2017	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	COUNTY: REFUGIO		HIGHWAY: SH 202
	CRP	SHEET NO. 101	

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.

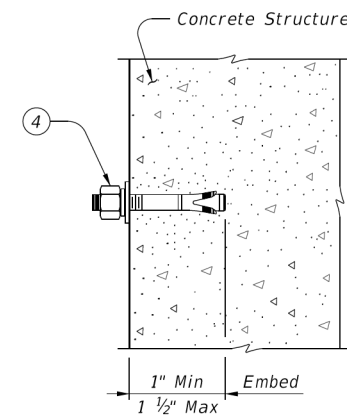
DATE:
FILE:



BRIDGE SIGN LOCATIONS



BRIDGE CLASS CULVERT SIGN PLACEMENT



SHEETING REQUIREMENTS

Usage	Color	Sign Face Material
Background	White	Type B or C Sheeting
Letters and Symbols	Black	Type B or C Sheeting

- ① Bridge identification sign location
- ② Alternate sign placement location for exterior concrete beams.
- ③ If adjacent bridges are less than 2 feet apart, these signs may be omitted.
- ④ 1/4" Diameter stainless steel expansion anchor with hex nut, washer, and spring-lock washer.

SIGN NOTES:

Standard sign designs can be found in the Standard Highway Sign Designs for Texas (SHSD).

Use the Clearview Alphabet CV-2W for the letters and symbols.

MATERIAL NOTES:

Provide lateral spacing between letters and numerals conforming with the SHSD, and any approved changes thereto. Provide a balanced appearance when spacing is not shown.

Provide aluminum sign blanks with a minimum thickness of 0.080" that meet the requirements of DMS-7110.

Provide sign face materials that meet the requirements of DMS-8300 and the sheeting requirements shown in the table.

Provide 1/4" diameter stainless steel expansion anchors with one hex head nut, one flat washer, and one helical spring-lock washer each.

Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). Provide anchor products that have a designated ICC-ES Evaluation Report number. The approval status must be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environments, provide both stainless steel anchor bodies and expansion wedges.

GENERAL NOTES:

Prior to hole drilling, locate rebar to ensure clearing of existing reinforcement and/or strands.

Prior to installation, obtain approval of sign locations from the Engineer. Avoid placement of sign over travel lanes and pedestrian walkways. Submit proposed installation method to Engineer prior to beginning work. Install anchors as shown on plans and in accordance with the anchor manufacturer's published installation instructions.

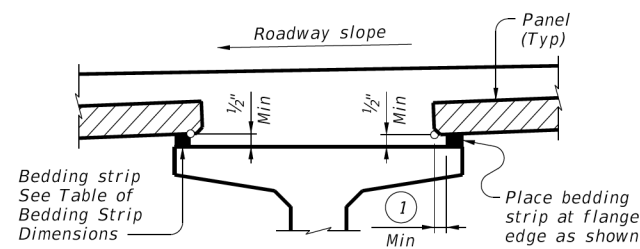
Do not install anchors sections of members under tension.

For new construction, the signs and anchors are subsidiary to the bridge. For installations on existing structures, the signs and anchors are paid under Item 442, "Metal for Structures." Each sign weighs 28 lbs.

		Bridge Division Standard	
NBI BRIDGE IDENTIFICATION SIGN STANDARD			
NBIS			
FILE: MS-NBIS-23.dgn	DN: TAR	ck: TxDOT	DW: JER
©TxDOT March 2023	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	HIGHWAY		SH 202
DIST: CRP	COUNTY: REFUGIO	SHEET NO. 102	

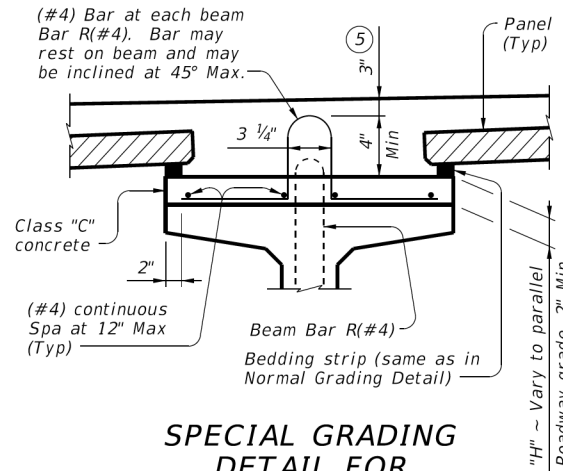
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



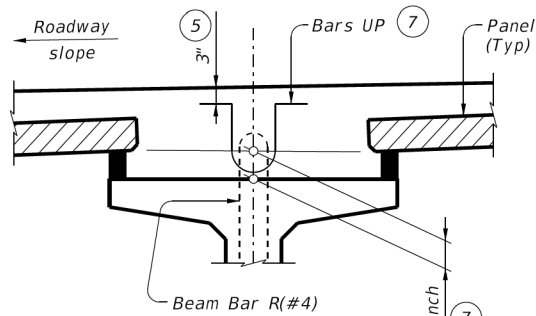
NORMAL GRADING DETAIL ③

Showing prestressed concrete I-girders. (Other beam types similar)



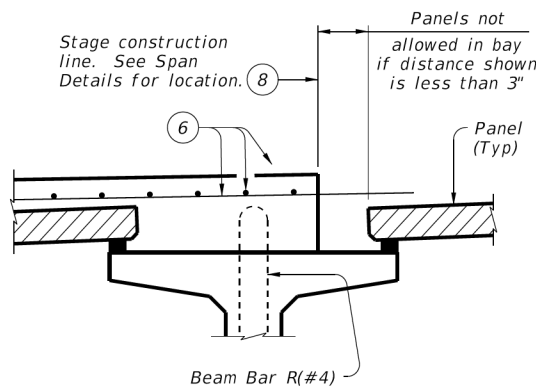
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders. (Other beam types similar)



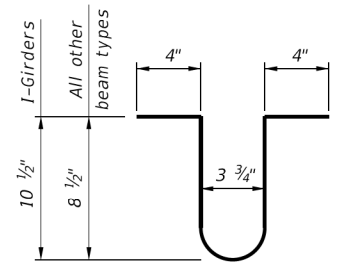
HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders. (Other beam types similar)

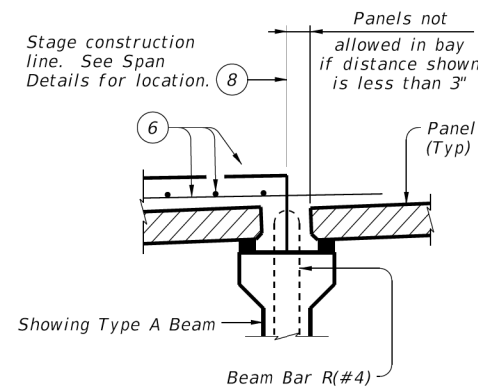


PRESTR CONC I-GIRDERS

WIDTH	HEIGHT ④	
	Min	Max
1" (Min)	1/2"	2"
1 1/4"	1/2"	2 1/2"
1 1/2"	1/2"	3"
1 3/4"	1/2"	3 1/2"
2"	1/2"	4"
2 1/4"	1/2"	4 1/2" ②
2 1/2"	1/2"	5" ②
2 3/4"	1/2"	5 1/2" ②
3" (Max)	1/2"	6" ②



BARS UP (#4) ⑦



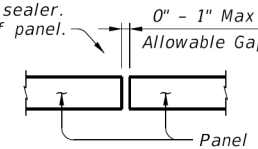
PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)

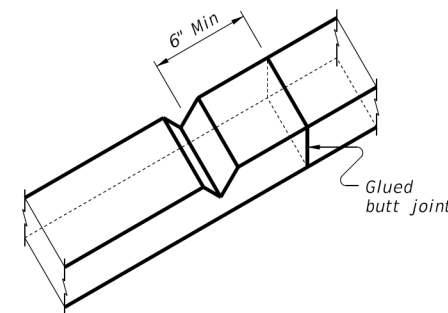
- ① 2" Min for I-girders, 1 1/2" Min for all other beam types.
- ② Allowed for prestressed concrete I-girders, not allowed on other beam types.
- ③ To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in 1/4" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is 1/4". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.
- ④ Height must not exceed twice the width.
- ⑤ Provide clear cover as indicated unless otherwise shown on Span Details.
- ⑥ See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- ⑦ Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 1/2" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.
- ⑧ Do not locate construction joints on top of a panel.
- ⑨ Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8" o.c..

Seal joint between panels when gap exceeds 1/4" with polyurethane sealant or expanding foam sealer. Make seal flush with top of panel.



PANEL JOINTS

(Panel reinforcing not shown for clarity. The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



BEDDING STRIP DETAIL ⑨

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges. Placing panels to minimize joint openings is recommended. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction. Bars U, shown on PCP-FAB, may be bent over or cut off if necessary. Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 1/2" under the panels as the slab concrete is placed. To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least 1/2". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required. For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement. If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated. Provide bar Laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees. Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use. These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings. When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer. Any additional reinforcing or concrete required on this standard is considered subsidiary to the bid item "Reinforced Concrete Slab".

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

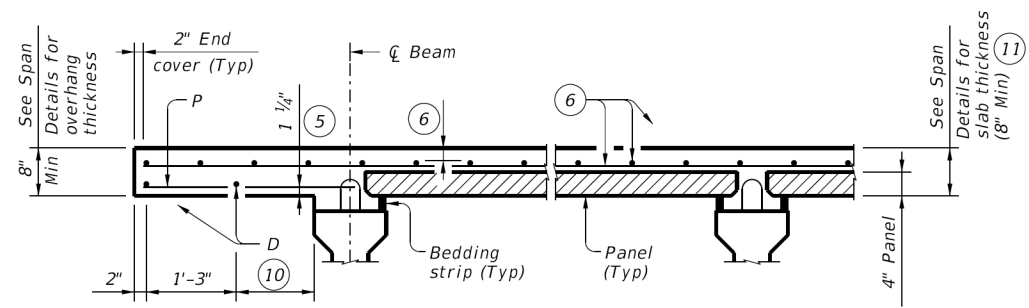


PRESTRESSED CONCRETE PANELS DECK DETAILS

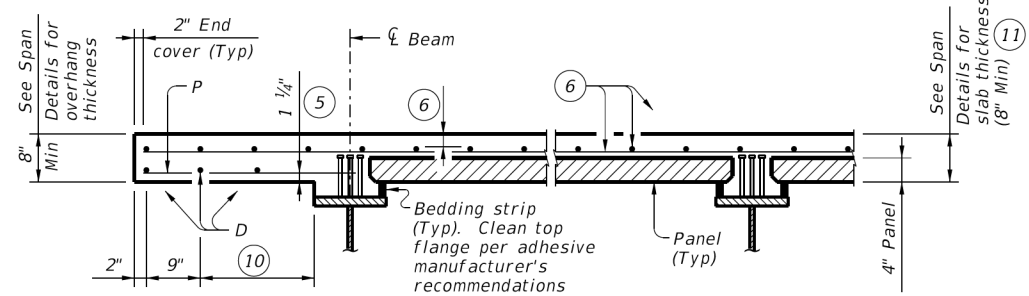
PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
3/2023: Removed top flange tension limit.	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	103	

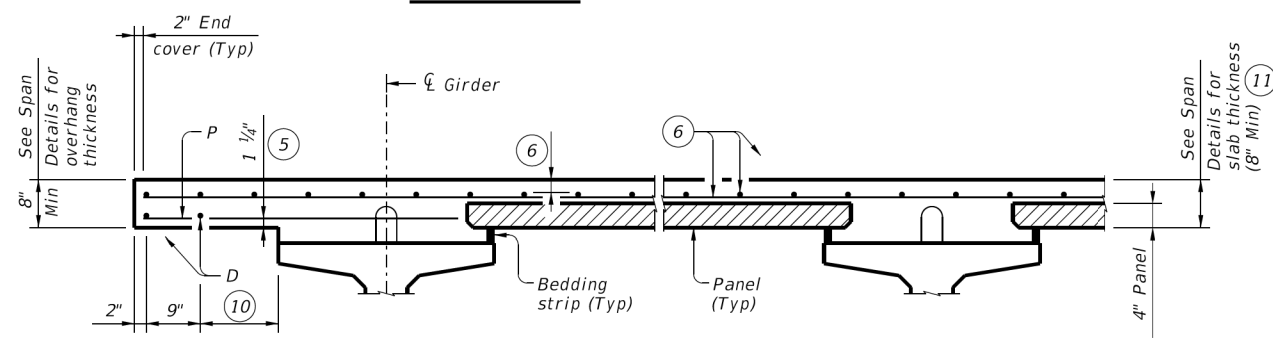
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



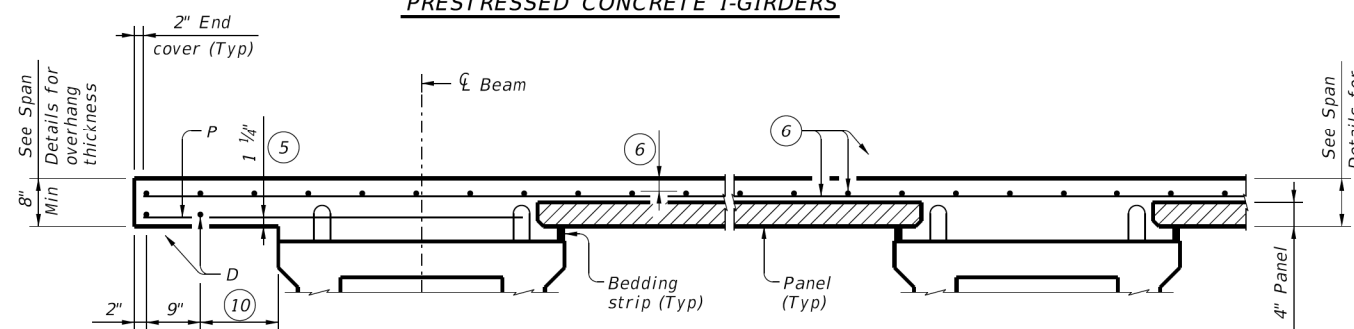
PRESTRESSED CONCRETE I-BEAMS



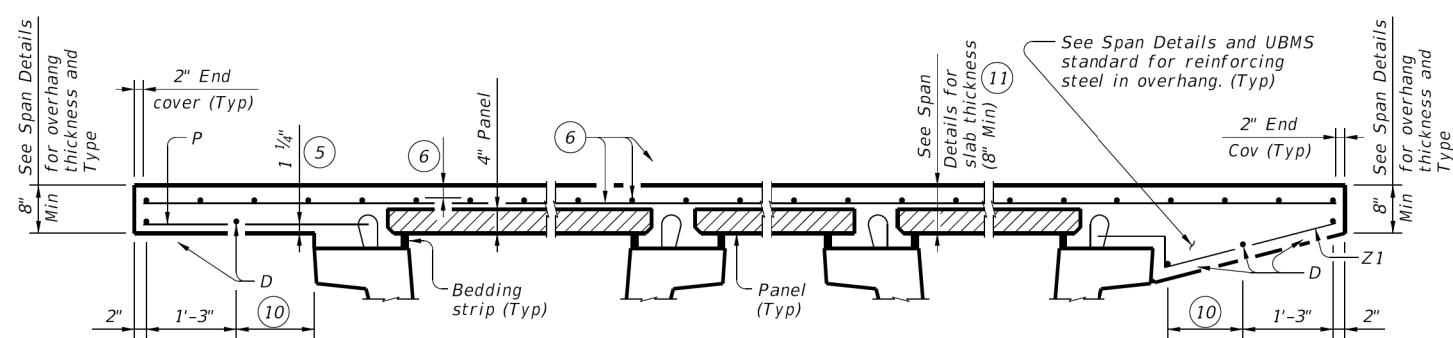
STEEL BEAMS 13



PRESTRESSED CONCRETE I-GIRDERS



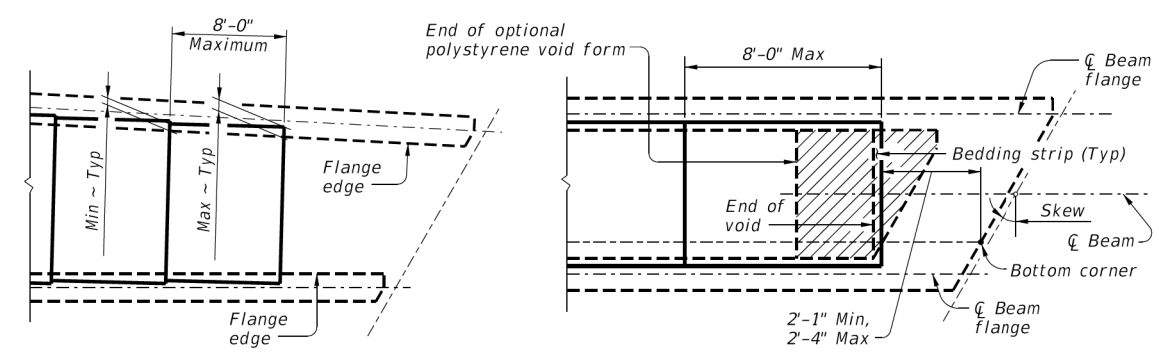
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS



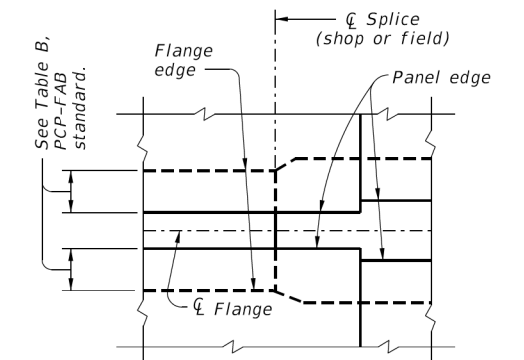
AT FLARED BEAMS OR GIRDERS

OVER CONC U-BEAMS

See PCP-FAB standard for Min and Max dimensions based on beam/girder type.

PART PLANS OF PANEL PLACEMENT

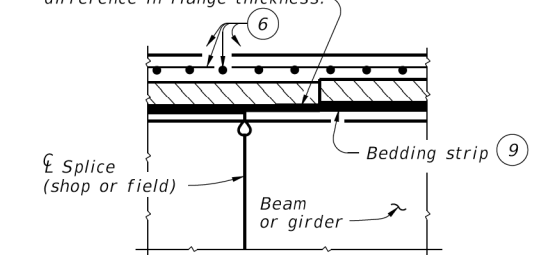
- 5 Provide clear cover as indicated unless otherwise shown on Span Details.
- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c..
- 10 Equally space additional bar if more than 1'-3" Max.
- 11 The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.
- 12 Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.
- 13 Panels are allowed over top tension flanges, as approved by the Engineer. See Span Details for additional top mat reinforcement required in tension zones. Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



PLAN AT SPLICE

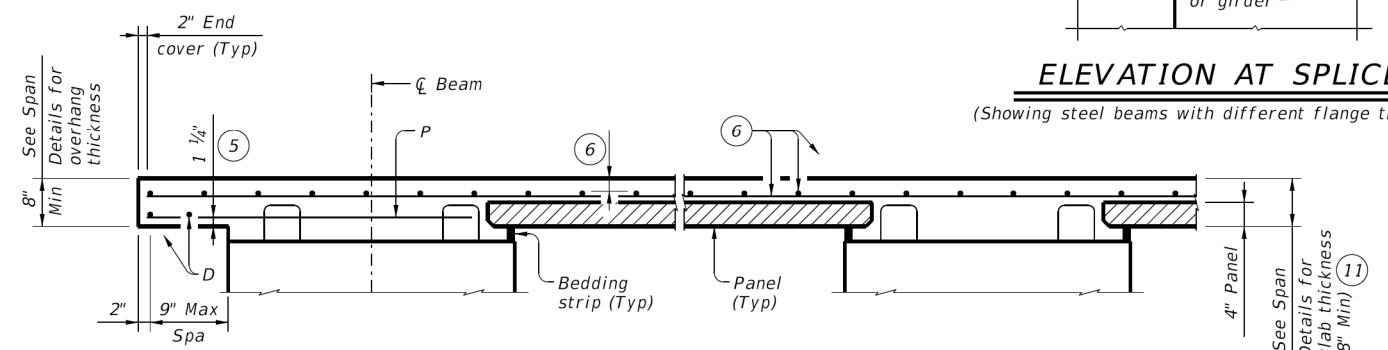
(Showing steel beams with flange width transition)

Cut bedding strip to adjust for difference in flange thickness.



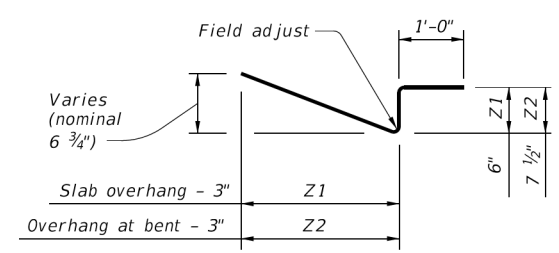
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) 12

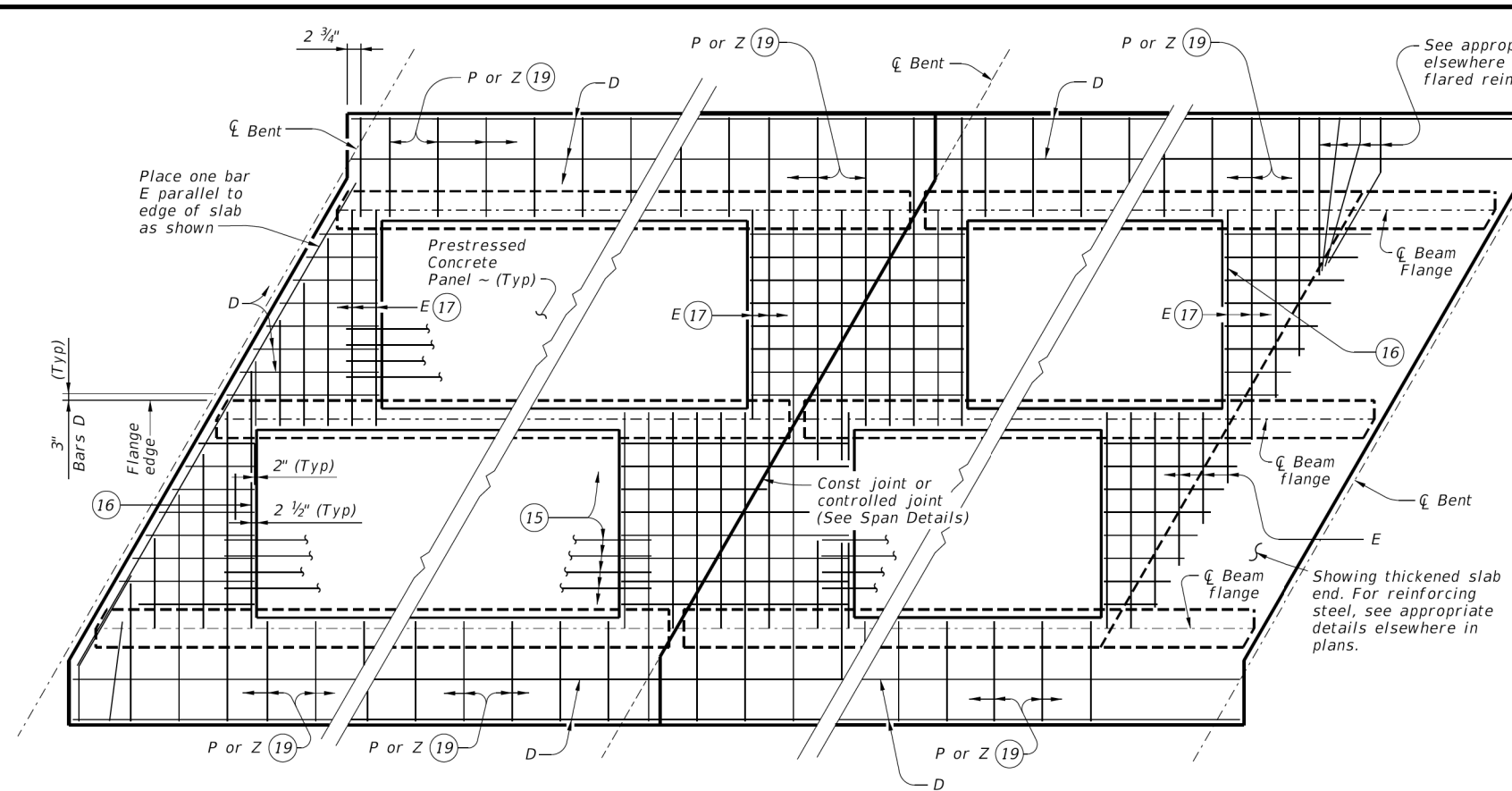
PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	ck: TxDOT	DW: JTR	ck: JMH
REVISIONS	CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202	
3/2023: Removed top flange tension limit.	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	104	

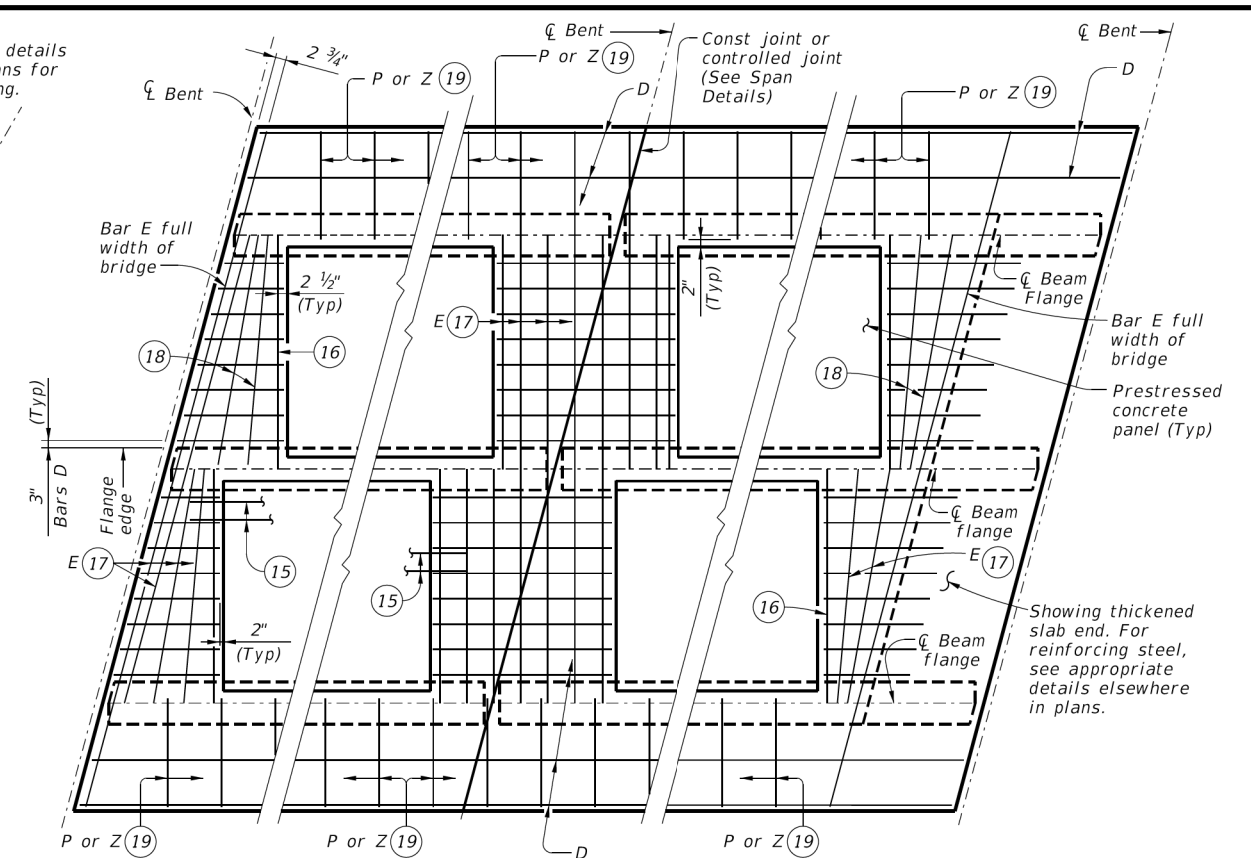
DATE: FILE:

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



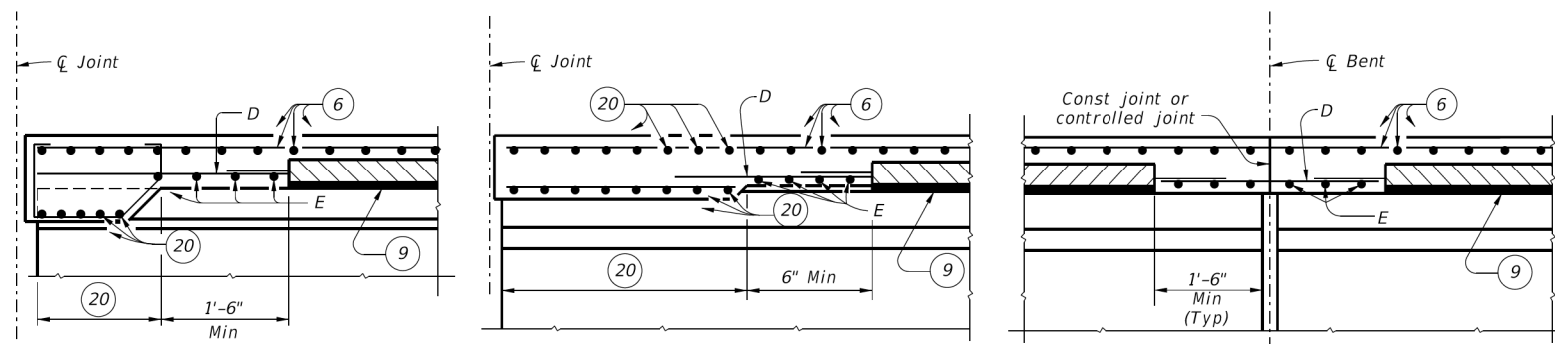
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE
 AT INTERIOR BENTS
 AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

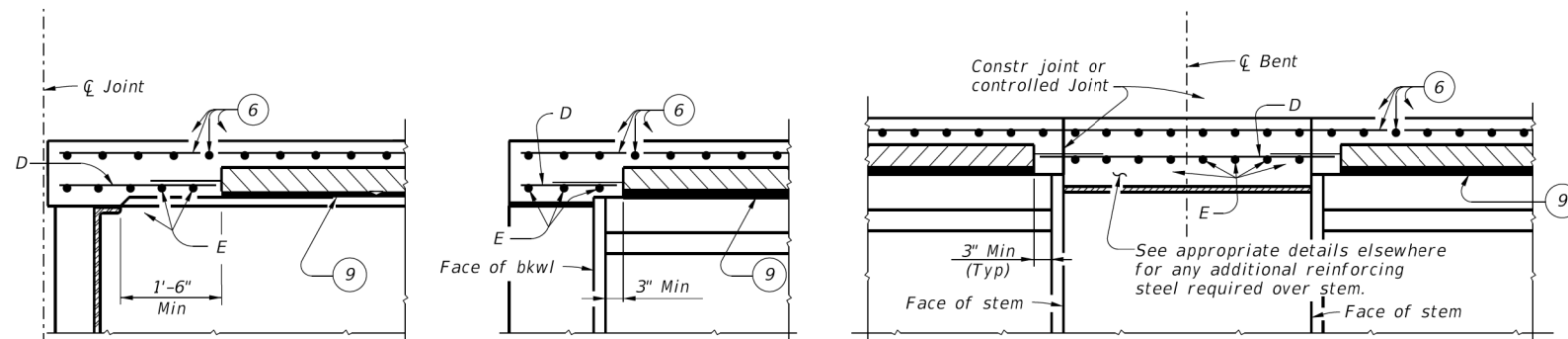


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE
 AT INTERIOR BENTS
 AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS
 AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS
 AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS
 AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS
 AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c.
- 14 Max Spacing as listed unless otherwise shown.
- 15 At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.
- 16 Maintain one Bar E(#4) parallel to panel ends (Typ).
- 17 Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.
- 18 Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.
- 19 Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.
- 20 See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING SHEET 3 OF 4



PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
REVISIONS	CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202	
3/2023: Removed top flange tension limit.	DIST	COUNTY	SHEET NO.	
CRP	REFUGIO		105	

DATE: FILE:

DISCLAIMER: 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.

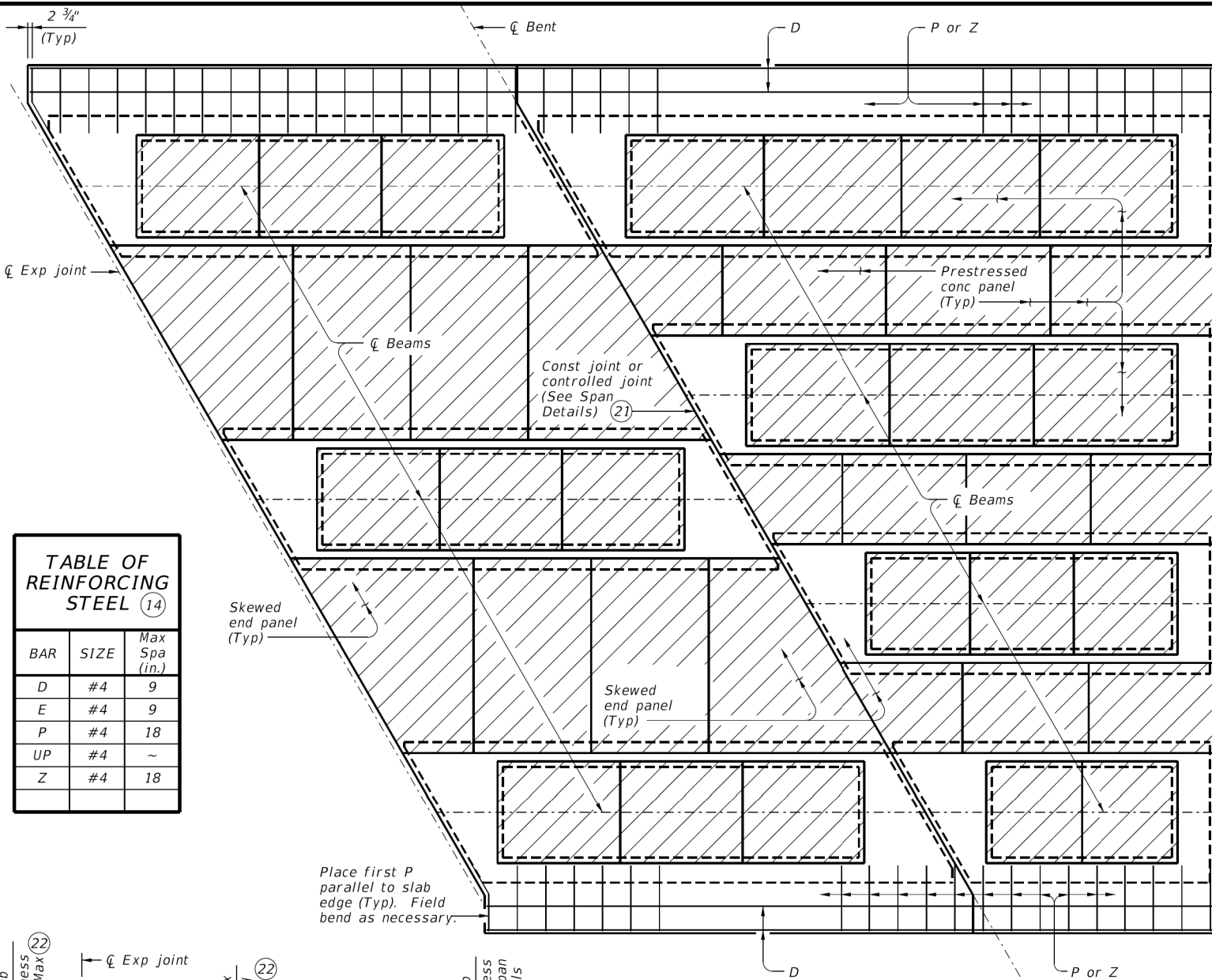


TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

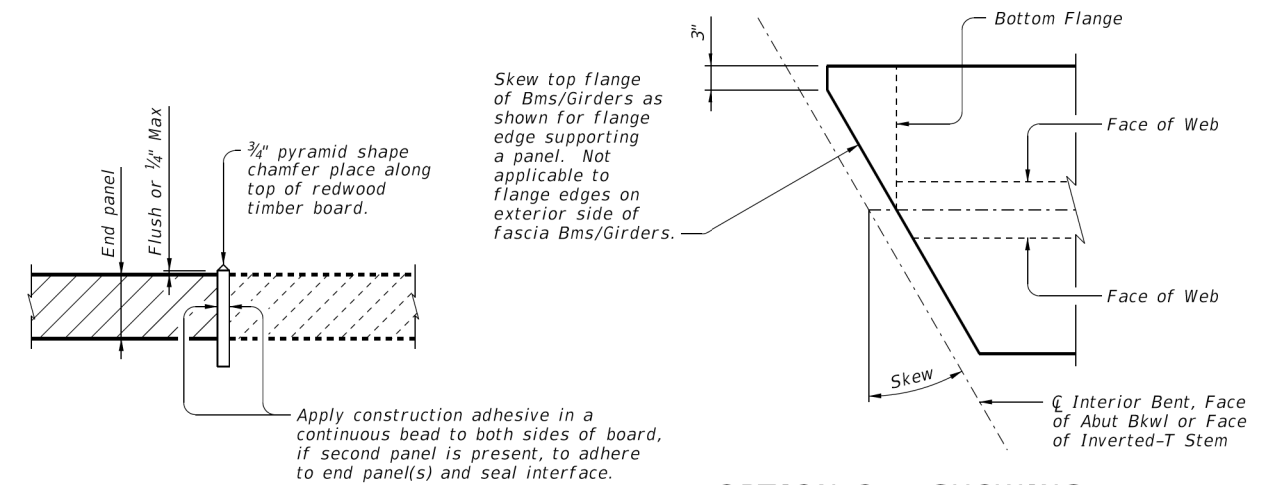
ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".

- (6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- (14) Max Spacing as listed unless otherwise shown.
- (21) 1 1/2" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
- (22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than 1/2" thick.
- (23) 3/4" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within 1/4" Max above panel. Place 3/4" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within 1/4" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.
- (24) Place panel within 1/2" of 3/4" thick board.
- (25) Permanent galvanized steel sheet form. Removable formwork is acceptable.
- (26) Place end panel within 1/2" of expansion joint opening. End panel cannot encroach on required expansion joint opening.
- (27) Place additional (#4) bar 5'-0" in length between every slab Bars T. Center (#4) bar on Joint.
- (28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

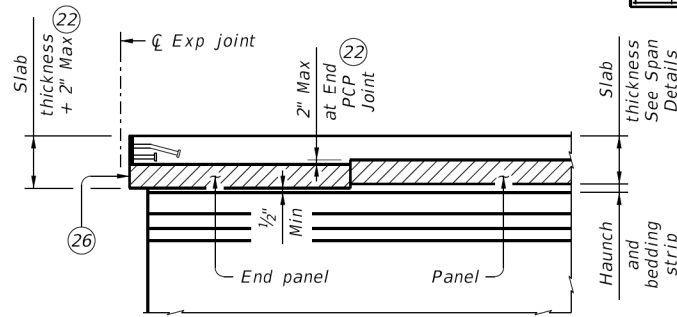
OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Beam/I-Girder, U-Beams and Steel Beams similar.



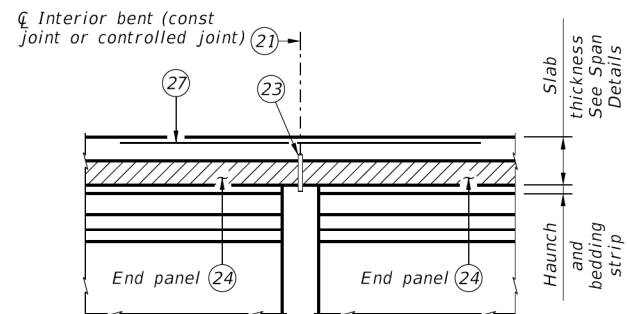
OPTION 2 ~ PLAN OF SLAB

(Showing U-Beams; other beams similar)



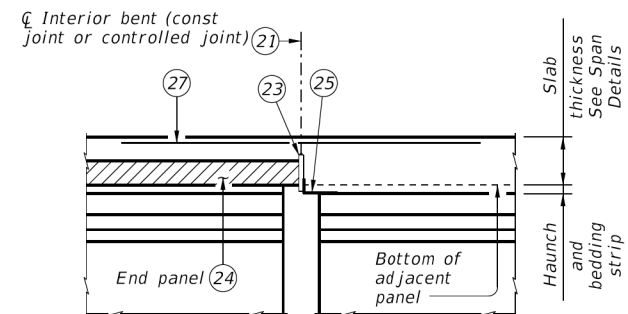
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-B, SEJ-M, SEJ-S(0), AJ, and Type A expansion joints only.



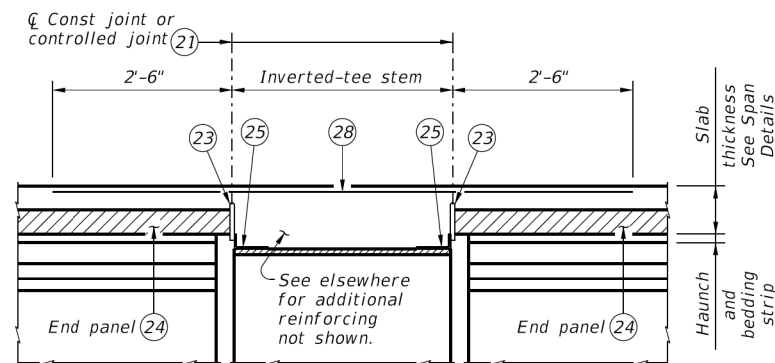
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

Panel against beam/girder end in adjacent span.



INVERTED-T BENT

Panels against inverted-tee stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)

SPECIAL OPTION 2 CONSTRUCTION NOTES:

- When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.
- Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 1/2". Do not extend the longitudinal panel reinforcement into the cast-in-place slab.
- Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.
- Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.
- Bending of anchor studs of expansion joints shown on standards AJ, SEJ-B, SEJ-M, and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.
- Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.
- Provide Bars AA, G, K and OA from standard IGTS in the slab.

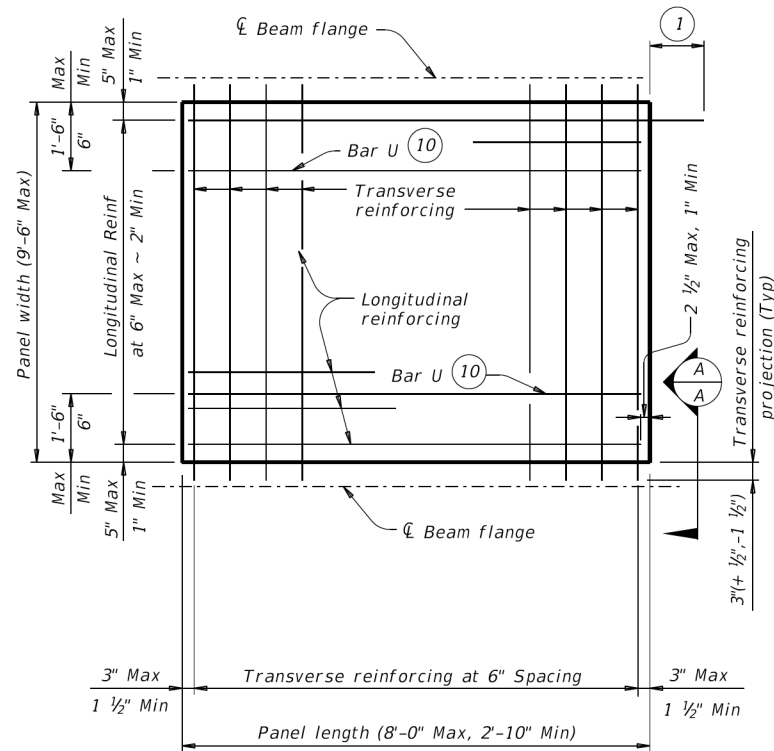
HL93 LOADING SHEET 4 OF 4

		Bridge Division Standard	
<h2>PRESTRESSED CONCRETE PANELS DECK DETAILS</h2>			
<h3>PCP</h3>			
FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	JOB
0447	04	018	SH 202
3/2023: Removed top flange tension limit.	DIST	COUNTY	SHEET NO.
CRP	REFUGIO		106

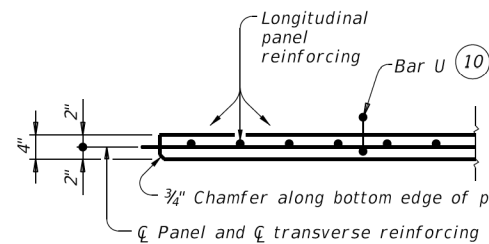
DATE: FILE:

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: FILE:

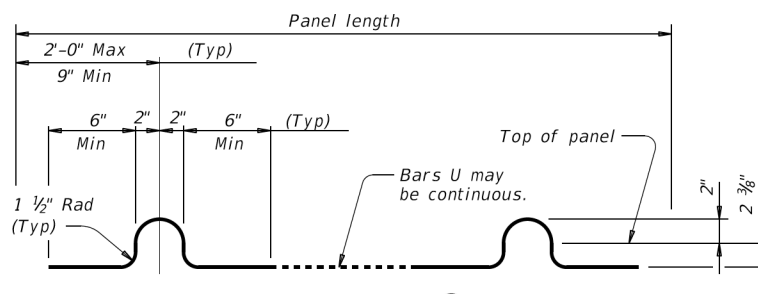


TYPICAL NON-SKEWED PANEL PLAN

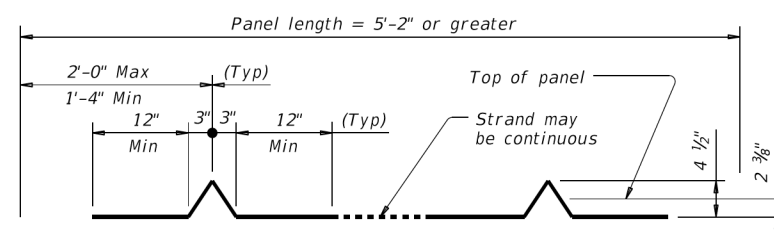


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)



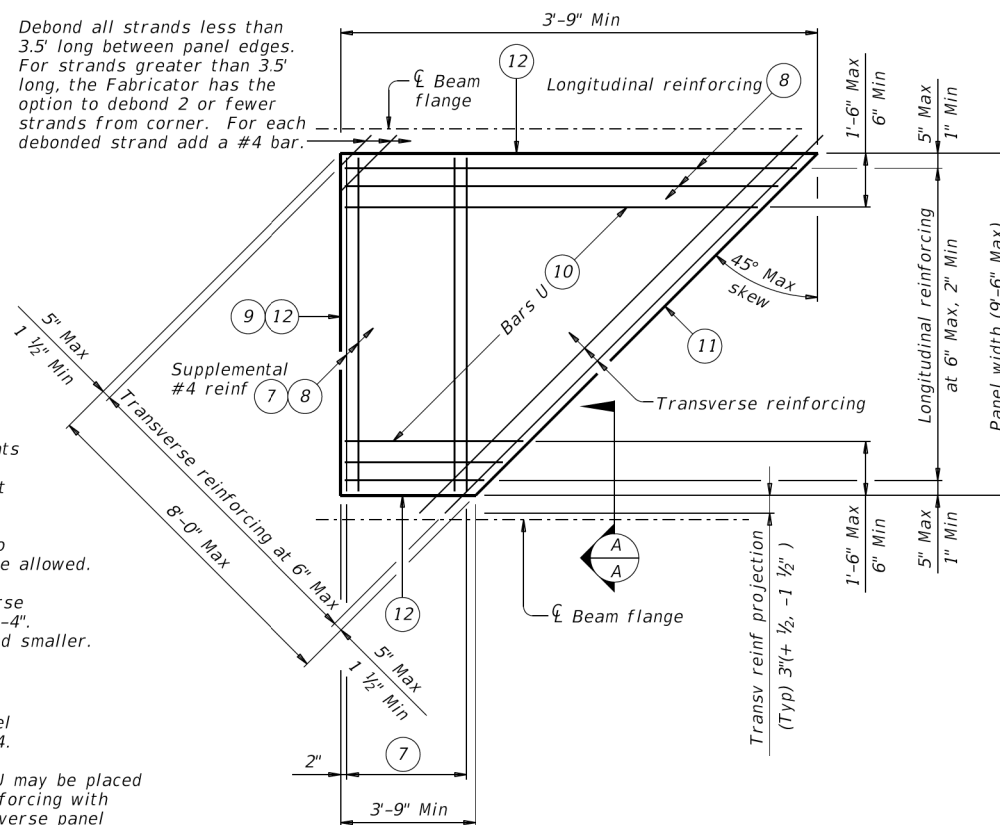
BARS U (#3) 2



OPTIONAL STRAND FOR BARS U 3

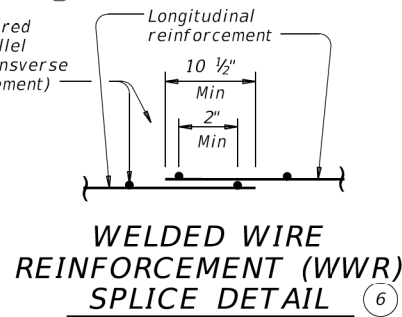
- 1 At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2", -0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
- 2 Four loops required per panel.
- 3 Four loops required per panel. 3/8" or 1/2" strands may be used.
- 4 Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
- 5 See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
- 6 One Splice allowed per panel. No more than two sheets of WWR are allowed.
- 7 Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
- 8 End Cover 2 1/2" Max, 1" Min.
- 9 Recess strands on indicated panel edge in accordance with Item 424.
- 10 At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
- 11 Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
- 12 Timber form work permissible this edge.

Debond all strands less than 3.5' long between panel edges. For strands greater than 3.5' long, the Fabricator has the option to debond 2 or fewer strands from corner. For each debonded strand add a #4 bar.

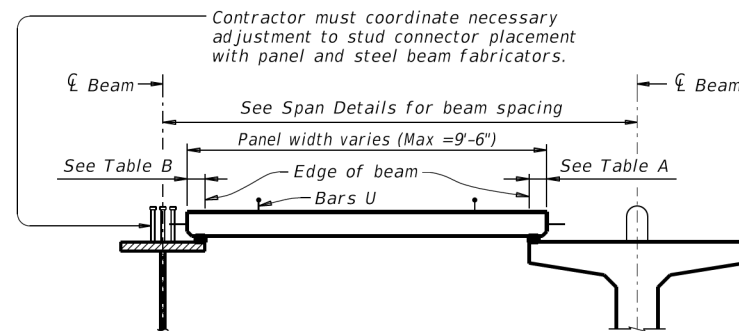


TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

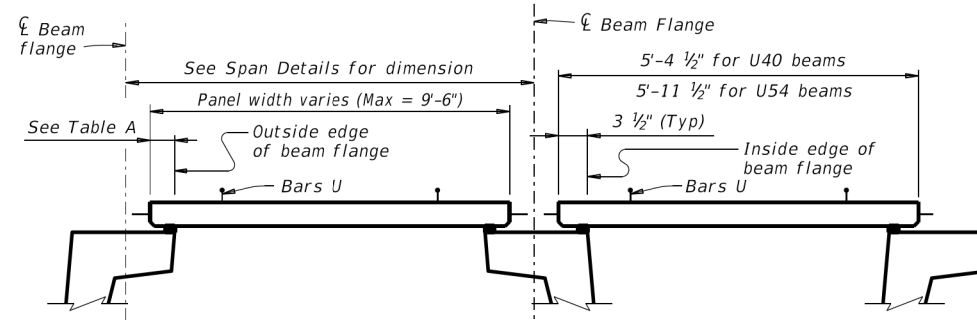


WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL 6



STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS
Typ unless noted otherwise



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

Beam Type	TABLE A 4 5		
	Normal (In.)	Min (In.)	Max (In.)
A	3	2 1/2	3 1/2
B	3	2 1/2	3 1/2
C	4	3	4 1/2
IV	6	4	7 1/2
VI	6 1/2	4 1/2	8 1/2
U40 - 54	5 1/2	5 1/2	7
Tx28-70	6	5	7 1/2
XB20 - 40	4	3	4 1/2
XSB12 - 15	4	3	4 1/2

Top Flange Width	TABLE B 4 5		
	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 3/4	2 1/2	2 3/4
Over 12" to 15"	3 1/4	3	3 1/4
Over 15" to 18"	4	3	4 3/4
Over 18"	5	3 1/2	6 1/4

GENERAL NOTES:

- Provide Class H concrete for panels. Release strength $f'_{ci}=3,500$ psi. Minimum 28 day strength $f'_c=5,000$ psi.
- Provide 3/4" chamfer along bottom edge of panel on beam side. Do not use epoxy-coated reinforcing steel bar or strand in panels. Remove laitance from top panel surface.
- Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
- Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.
- A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

- For panel widths over 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.
- For panel widths over 3'-6" up to and including 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.
- For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).
- Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

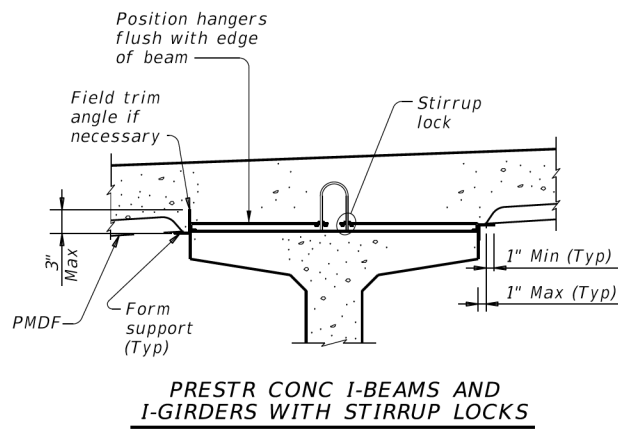
- Any of the following options may be used for longitudinal panel reinforcement:
 1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
 2. 3/8" Dia prestressing strands at 4 1/2" Max Spacing (unstressed). No splices allowed.
 3. 1/2" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
 4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.
- No combination of longitudinal reinforcement options in a panel is allowed.
- Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

HL93 LOADING

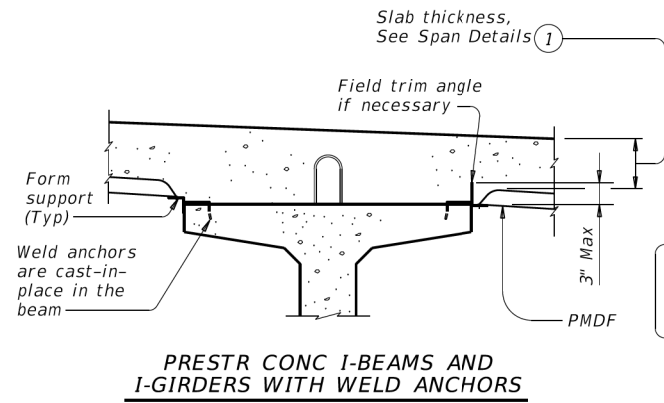
		Bridge Division Standard	
PRESTRESSED CONCRETE PANEL FABRICATION DETAILS			
PCP-FAB			
FILE: pcpstde2-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	JOB
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	107	

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.

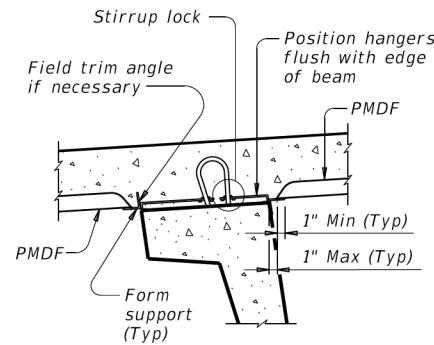
DATE: FILE:



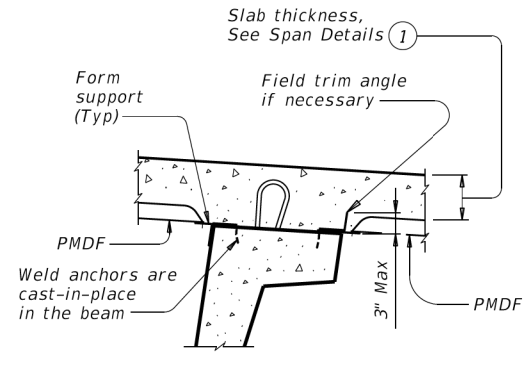
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



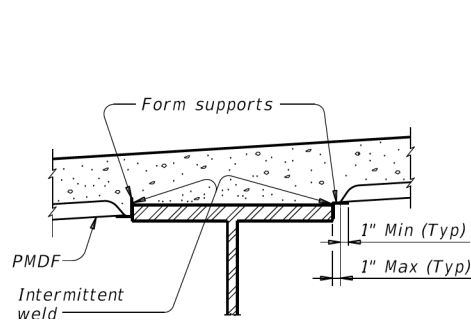
PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS



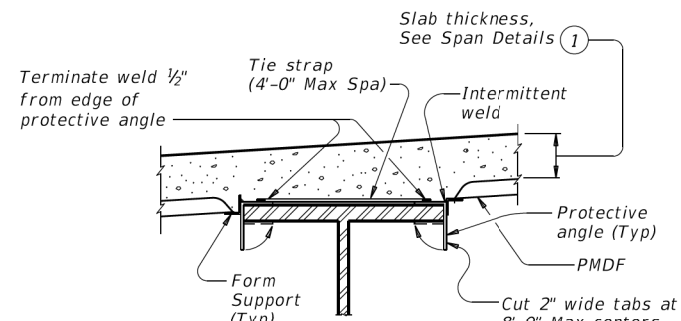
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

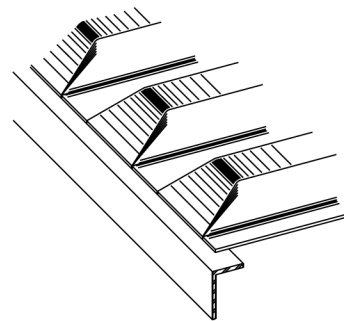


STEEL BEAMS AT COMPRESSION FLANGES

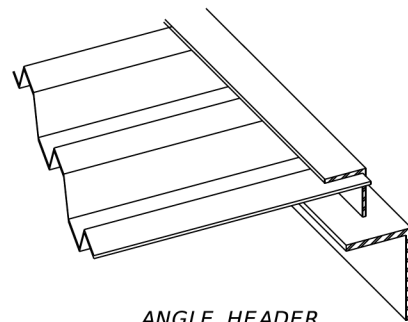


STEEL BEAMS AT TENSION FLANGES

TYPICAL TRANSVERSE SECTIONS



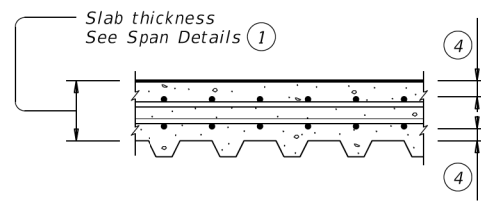
PRECLOSED



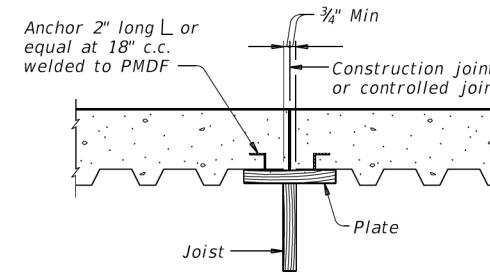
ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES



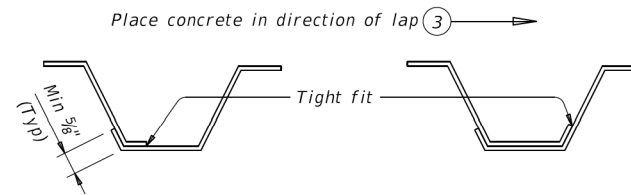
TYP LONGITUDINAL SLAB SECTION



Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT

FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
 Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422 "Concrete Superstructures."
FOR PRESTR CONC TX-GIRDER BRIDGES:
 See Miscellaneous Slab Details, Prestr Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.



SIDE LAP DETAILS

- ① Slab thickness minus 5/8" if corrugations match reinforcing bars.
- ② Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.
- ③ The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.
- ④ See Span details for cover requirements.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage. Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans. The details and notes shown on this standard are to be used as a guide in preparation of the forming plans. All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:
 As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi. Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

1/240 of the form design span, but not more than 0.75", for all design spans of railroad overpass bridge spans fully or partially over railroad right-of-way, and for all bridge spans of railroad underpass structures.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

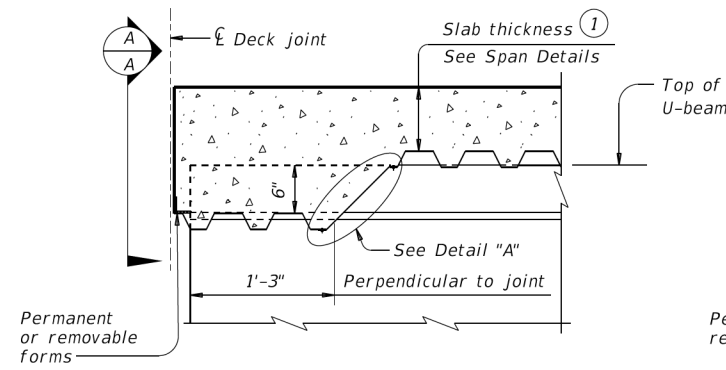
Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

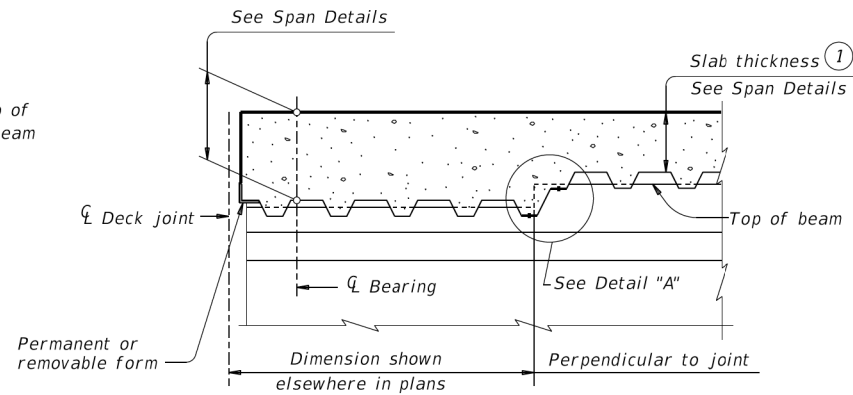
		Bridge Division Standard	
PERMANENT METAL DECK FORMS			
PMDF			
FILE: pmdfst1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
REVISIONS	CONT	SECT	JOB
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	108	

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.

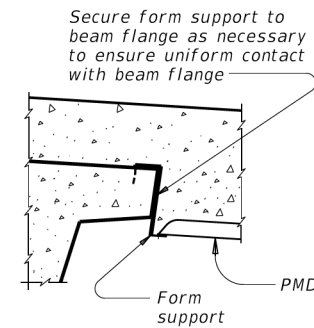
DATE: FILE:



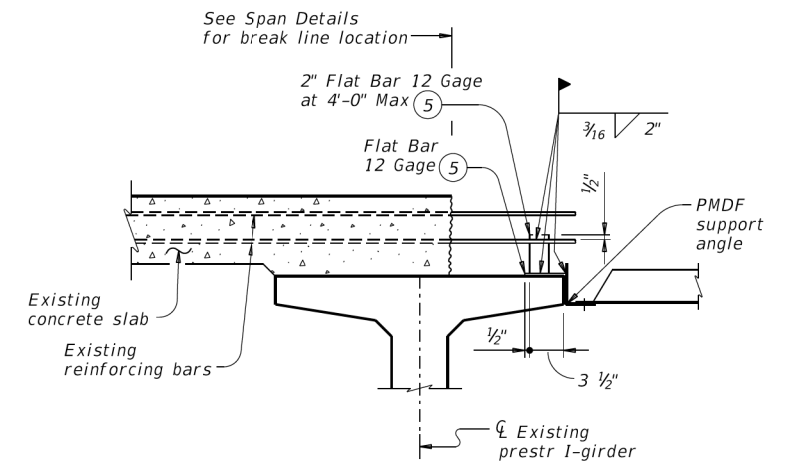
AT THICKENED SLAB END FOR U-BEAMS



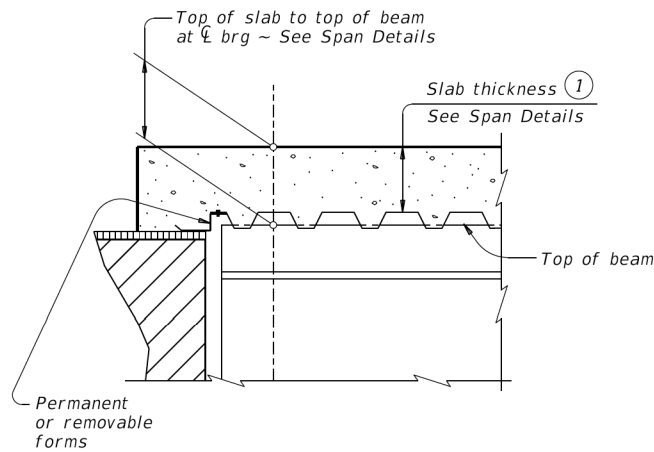
AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS
Showing I-beam block-out. No block-out for I-girders or steel beams.



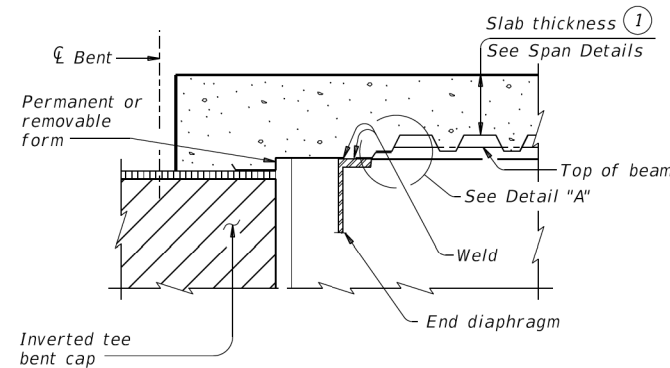
SECTION A-A



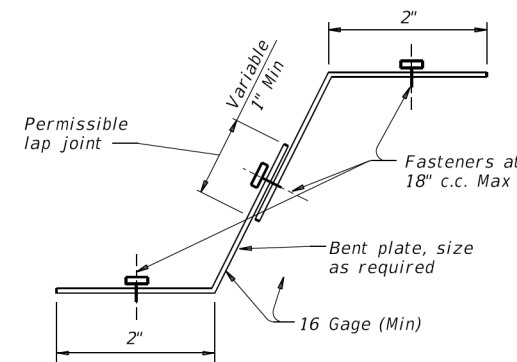
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



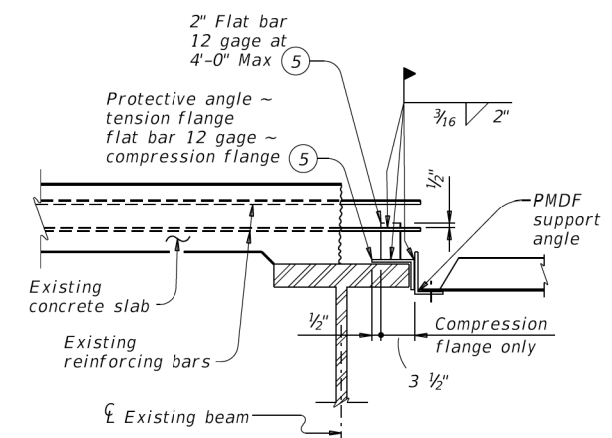
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



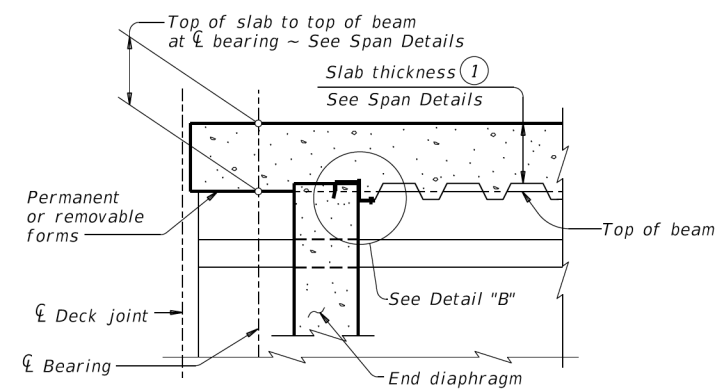
AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



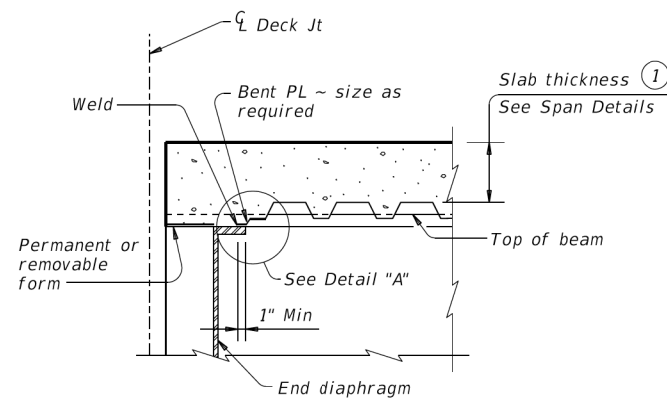
DETAIL "A"



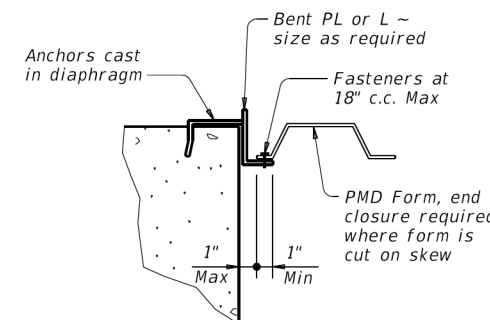
SHOWING STEEL BEAMS



AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

- (1) Slab thickness minus 5/8" if corrugations match reinforcing bars
- (5) Minimum yield stress of 12 gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

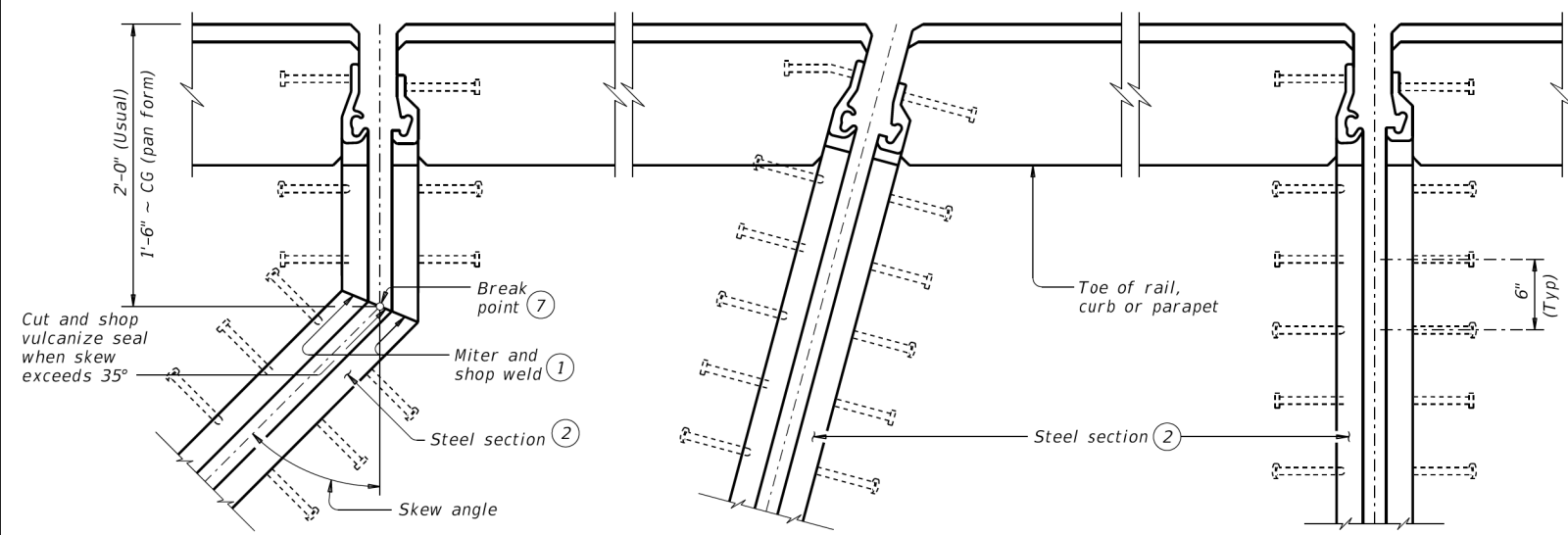
WIDENING DETAILS

SHEET 2 OF 2

		Bridge Division Standard	
PERMANENT METAL DECK FORMS			
PMDF			
FILE: pmdfste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	0447	04	018
02-20: Modified box note by adding steel beams/girders and subsidiary	DIST	COUNTY	SHEET NO.
12-21: Updated max deflection for RR.	CRP	REFUGIO	109

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: FILE:

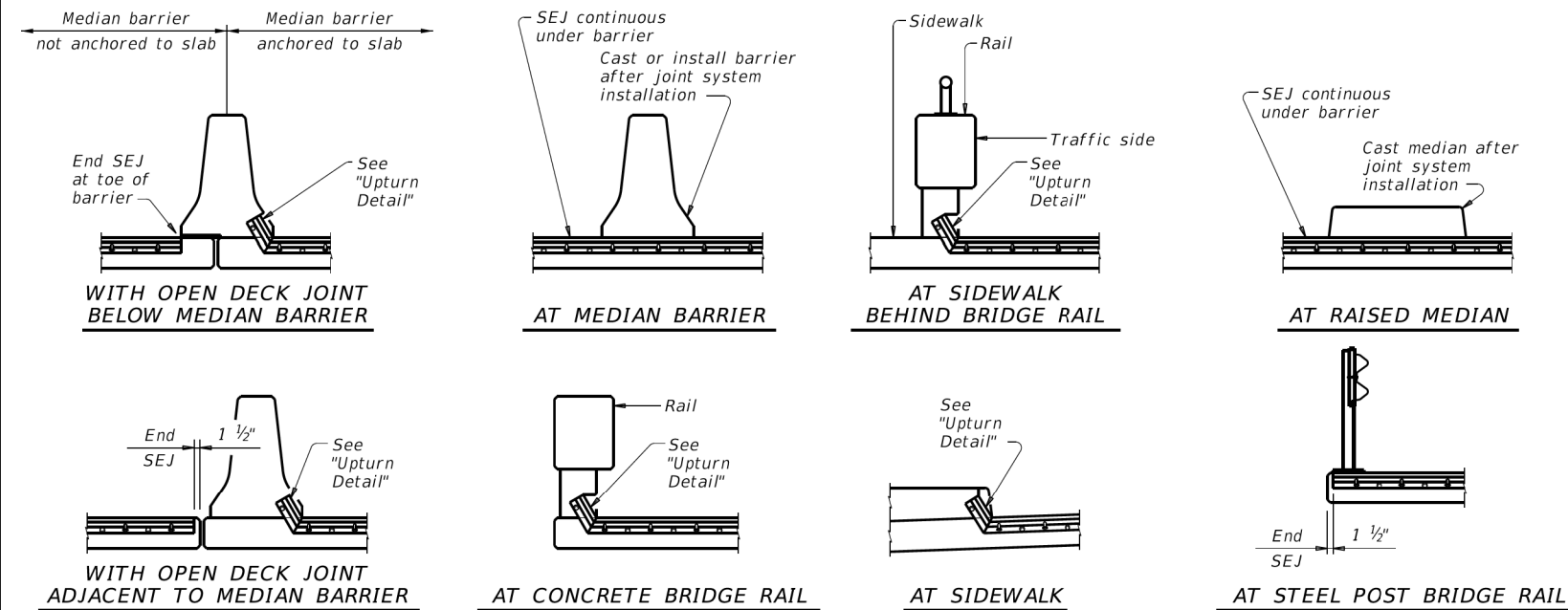


SHOWING SKEWS WITH SLAB BREAKBACKS

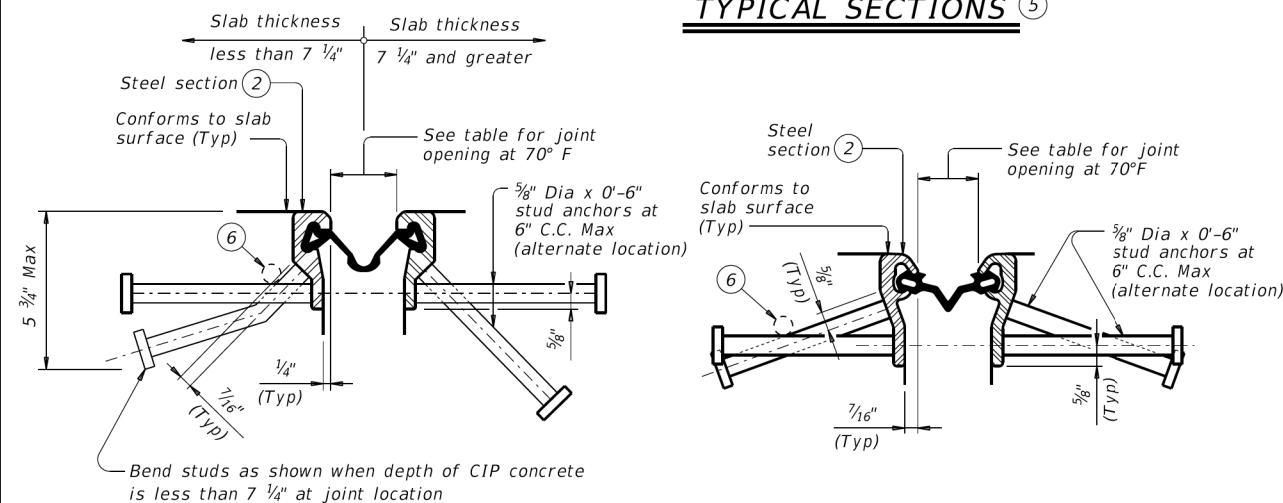
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

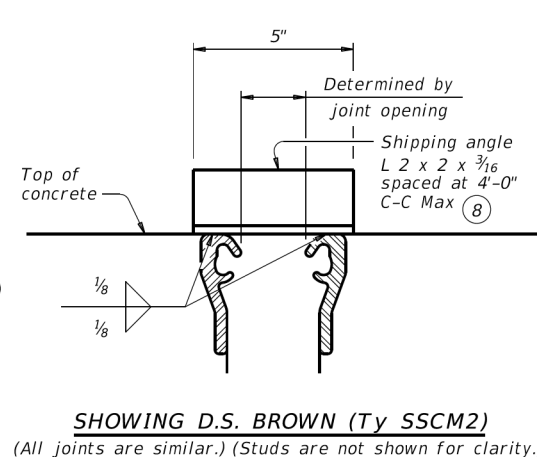


TYPICAL SECTIONS



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS

SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Type SSCM2) (All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION ②	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening ③	Seal Type	Joint Opening ③
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations. For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

- Remove all burrs which will be in contact with seal prior to making splice.
- Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- These openings are also the recommended minimum installation openings.
- Reduce for sidewalk or parapet heights less than 6".
- Other conditions affecting the joint profile should be noted elsewhere.
- Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- See Span details for location of break point.
- Align shipping angle perpendicular to joint.

FABRICATION NOTES:

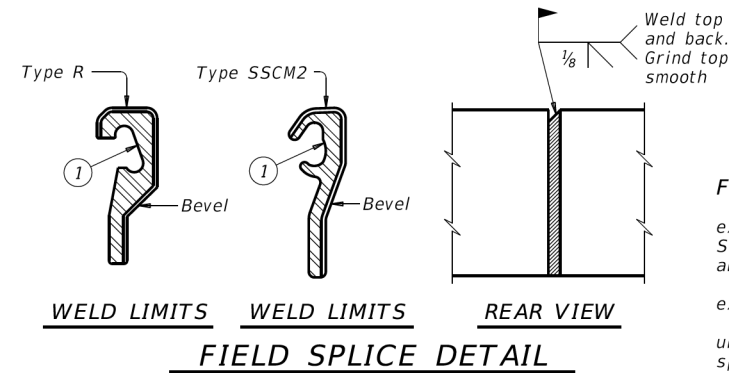
Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts. The seal must be continuous and included in the price bid for sealed expansion joint. Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged 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. Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop. Paint the entire steel section with System II or IV primer in accordance with Item 446, "Field Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4. Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

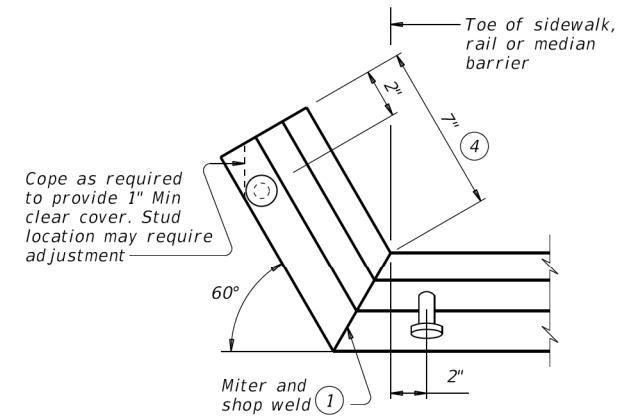
Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint. Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint. Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans. Minimum slab and overhang thickness required for the use of SEJ-M is 6 1/2".



WELD LIMITS WELD LIMITS REAR VIEW
FIELD SPlice DETAIL

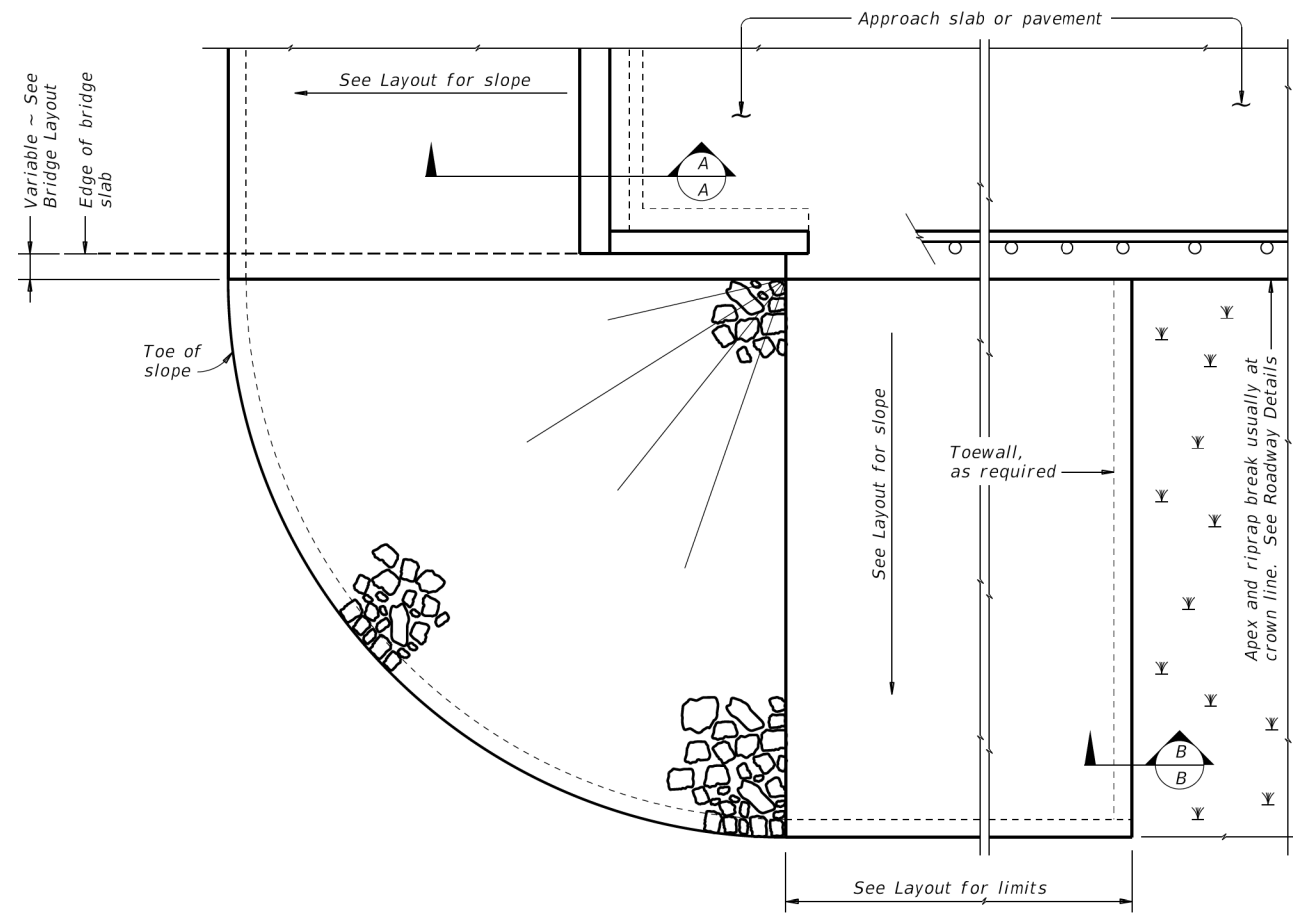


UPTURN DETAIL

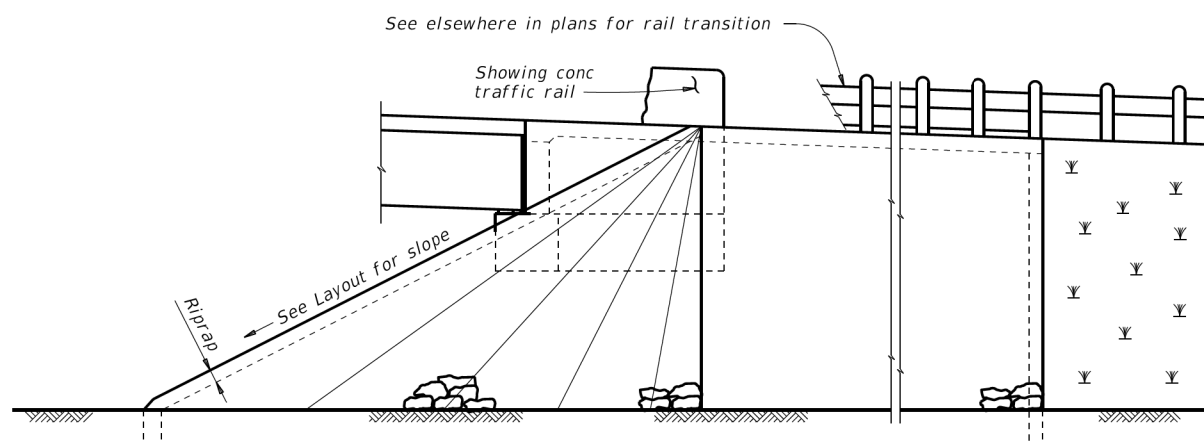
		Bridge Division Standard	
SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY			
SEJ-M			
FILE: MS-SEJ-M-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REV: 04	CON: 04	SECT: 04	JOB: 018
CRP	DIST: REFUGIO	COUNTY: REFUGIO	SHEET NO: 110

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.

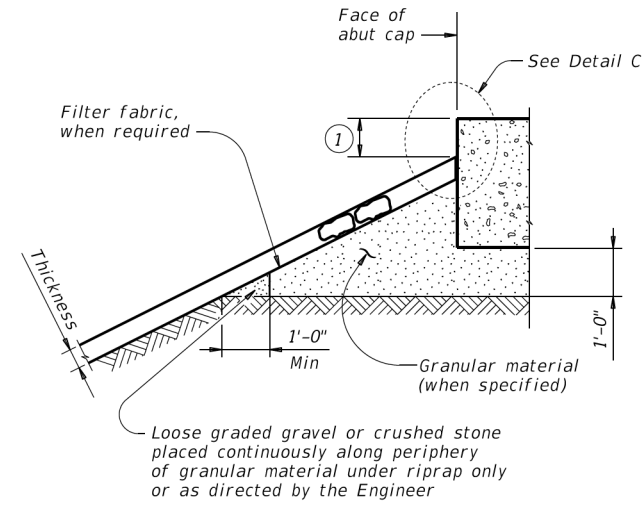
DATE:
FILE:



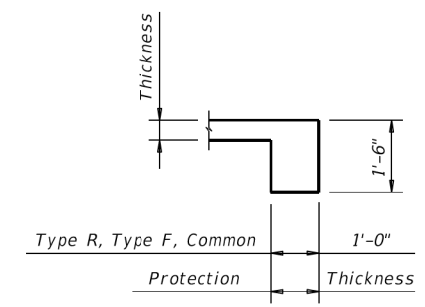
PLAN



ELEVATION

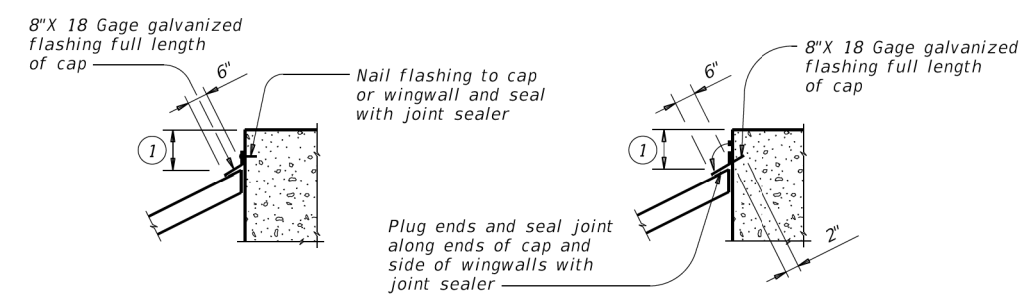


SECTION A-A AT CAP



SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C

① Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for span, box beam, or slab beam bridges.

GENERAL NOTES:
 Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
 See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

		Bridge Division Standard	
<h2>STONE RIPRAP</h2>			
<h3>SRR</h3>			
FILE: srrstde1-19.dgn	DN: AES	ck: JGD	DW: BWH
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	0447	04	018
	DIST	COUNTY	SHEET NO.
CRP	REFUGIO		111

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: FILE:

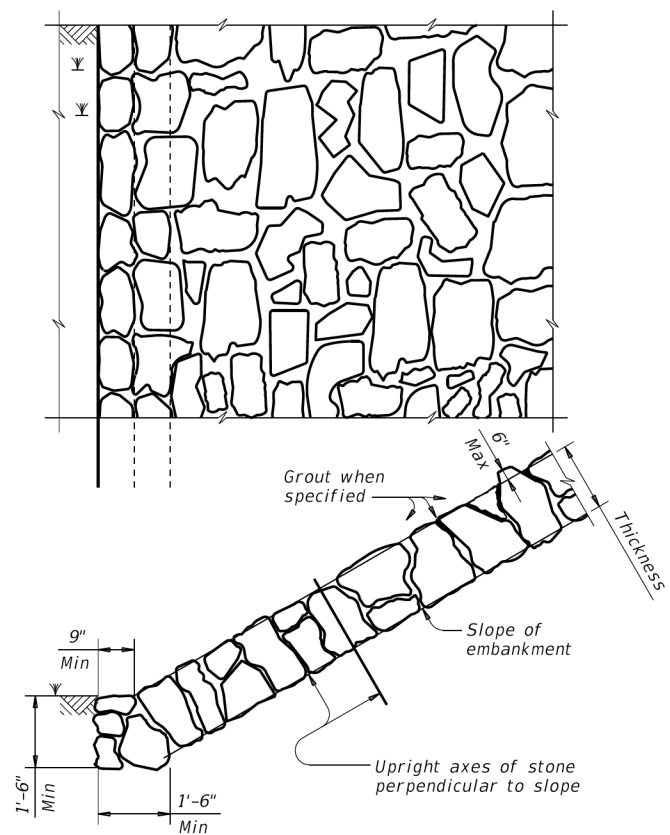


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

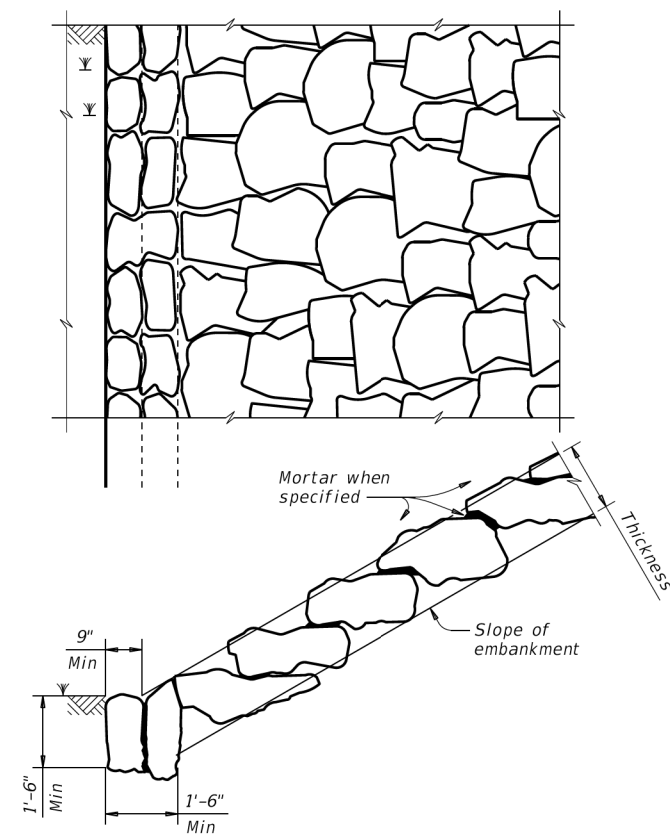


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

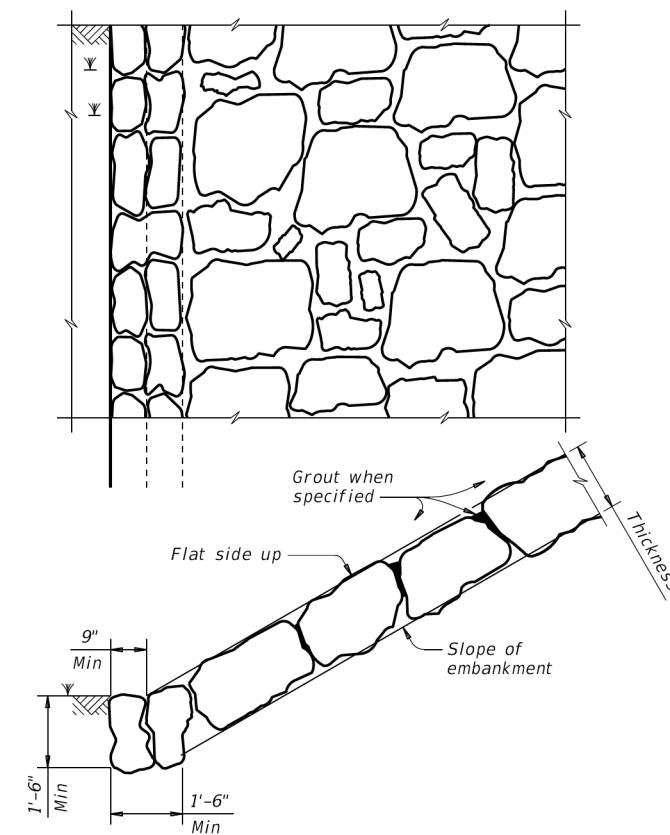
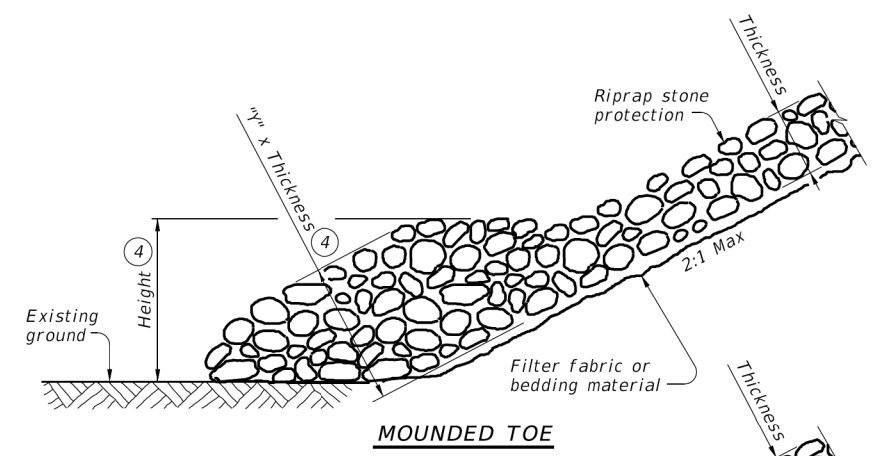
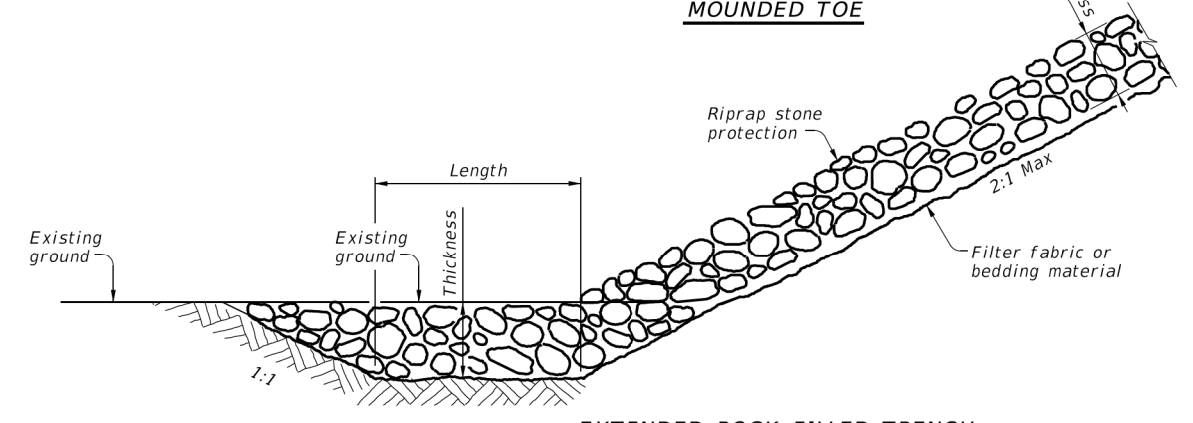


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

- ② Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.
- ③ Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.
- ④ "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.
- ⑤ List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS ⑤

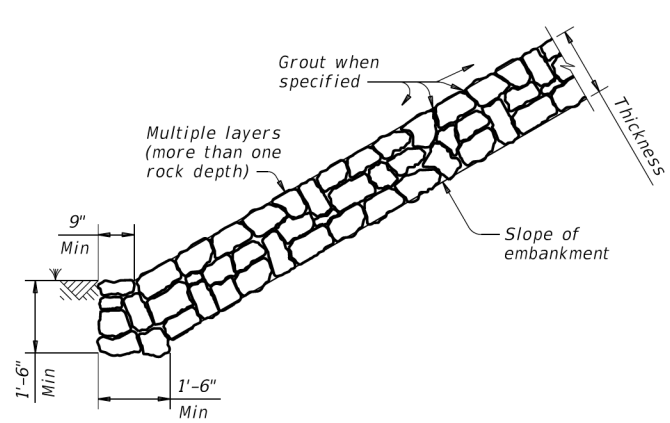
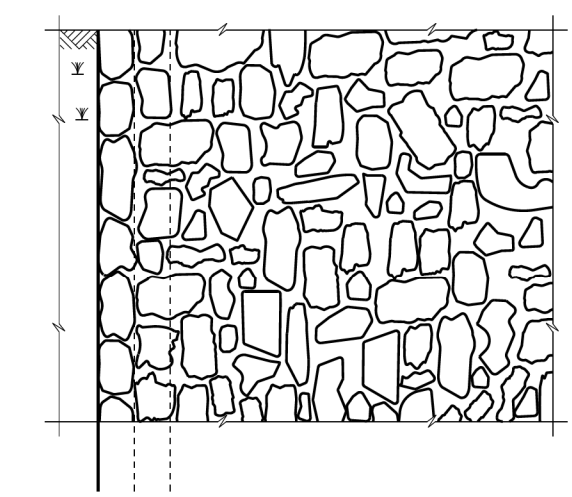


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

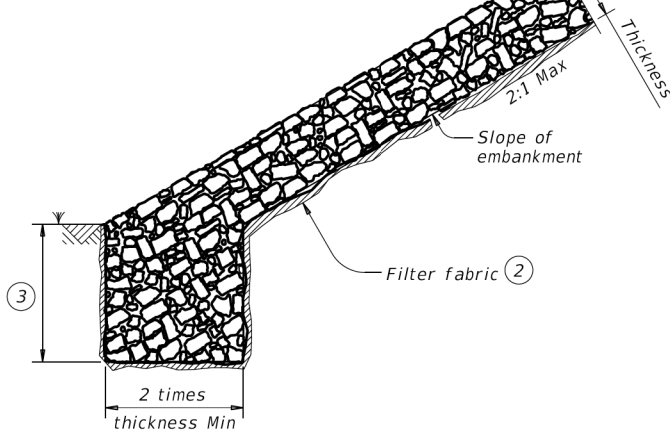
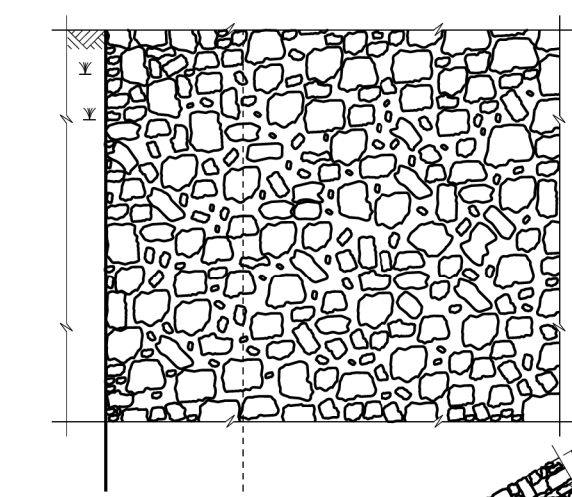


FIGURE 5 ~ PROTECTION STONE RIPRAP ⑤

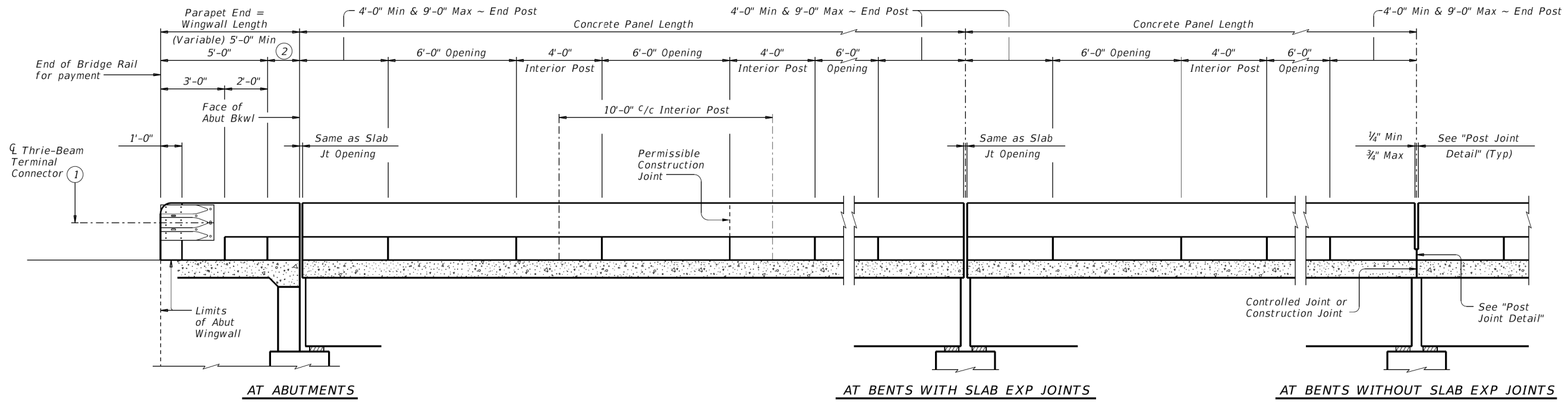
STONE RIPRAP

SRR

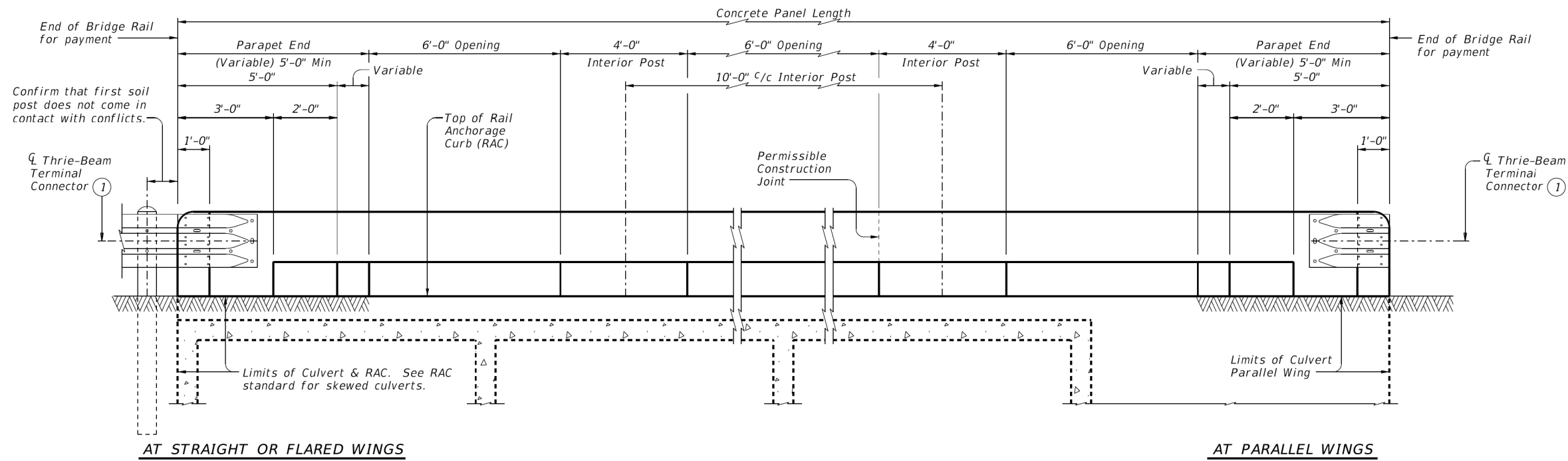
FILE: srrstde1-19.dgn	DN: AES	ck: JGD	DW: BWH	ck: AES
©TxDOT April 2019 REVISIONS	CONT 0447	SECT 04	JOB 018	HIGHWAY SH 202
	DIST CRP	COUNTY REFUGIO	SHEET NO. 112	

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:
FILE:



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

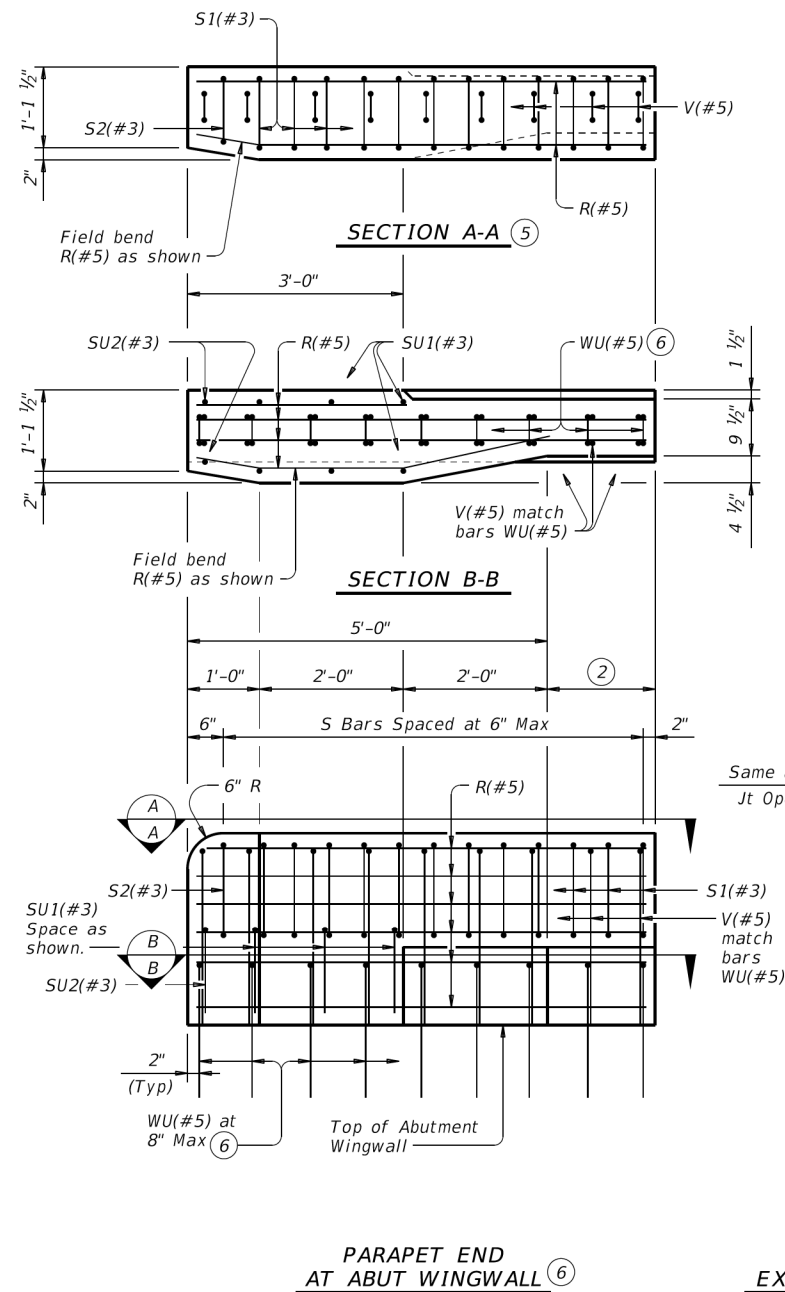
Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

- 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)

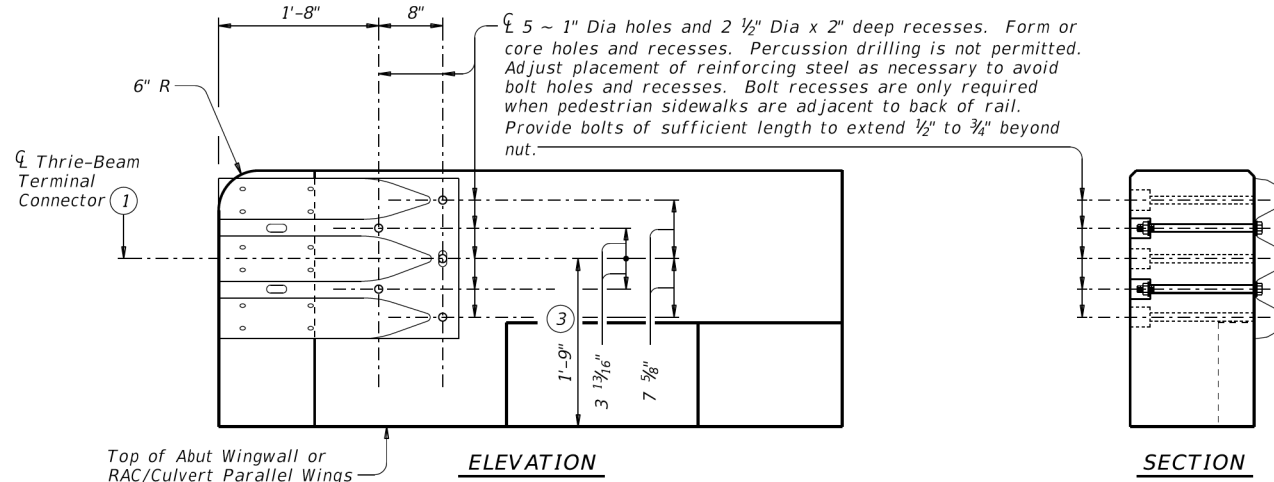
		Bridge Division Standard	
<h2>TRAFFIC RAIL</h2>			
<h3>TYPE T223</h3>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	HIGHWAY: SH 202		
DIST: CRP	COUNTY: REFUGIO	SHEET NO.: 113	

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.

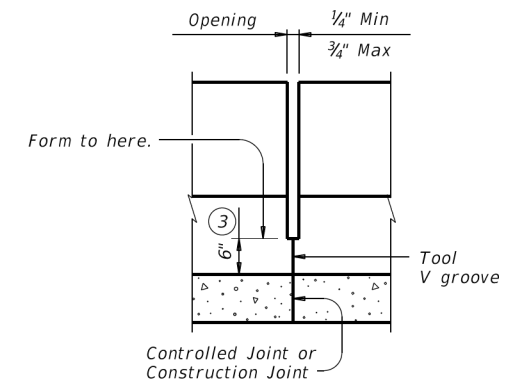
DATE:
FILE:



PARAPET END AT ABUT WINGWALL ⑥

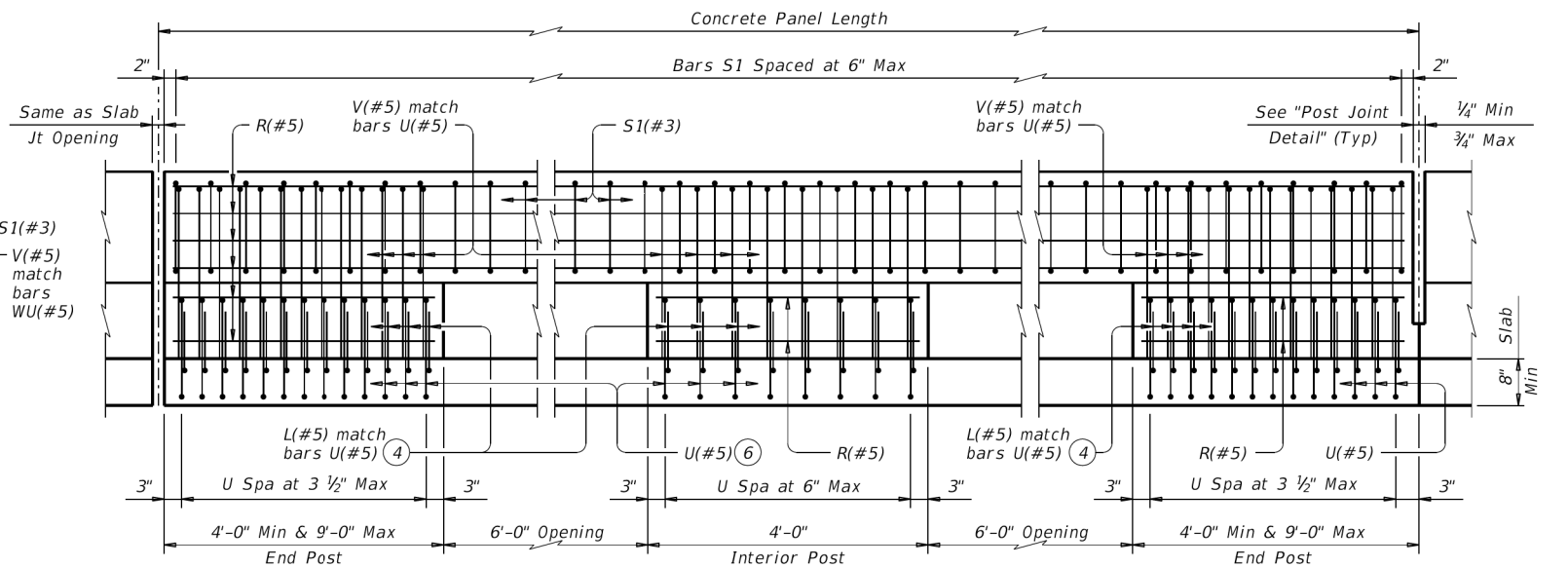


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

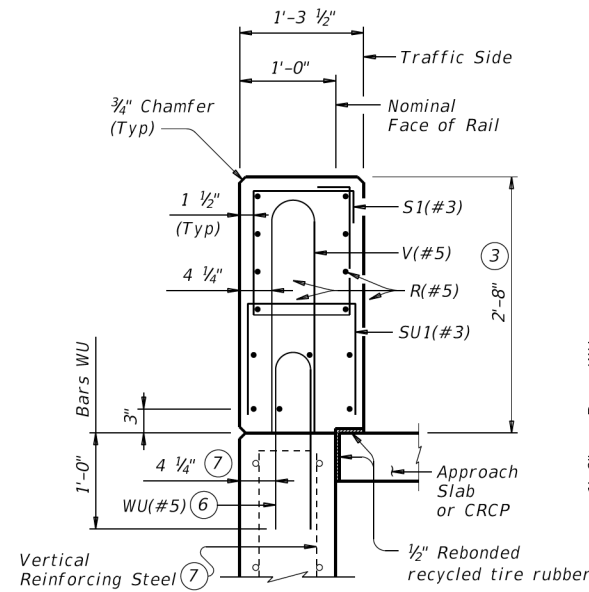
Showing rail on slab. Rail on box culvert similar.

- 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.

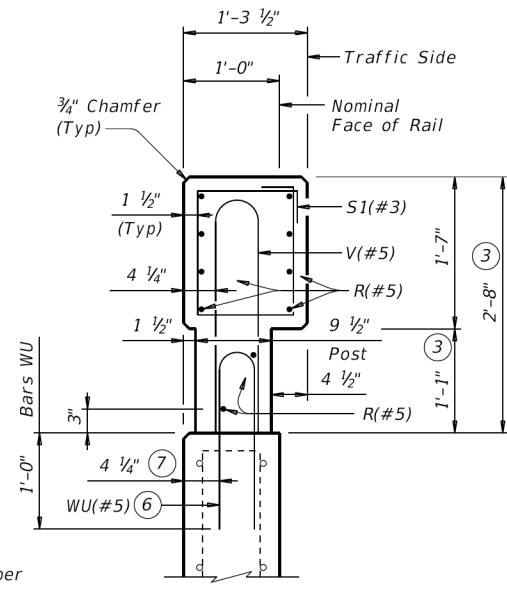
		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T223</h2>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT: 0447	SECT: 04	JOB: 018
REVISIONS	COUNTY: REFUGIO		HIGHWAY: SH 202
CRP	SHEET NO. 114		

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.

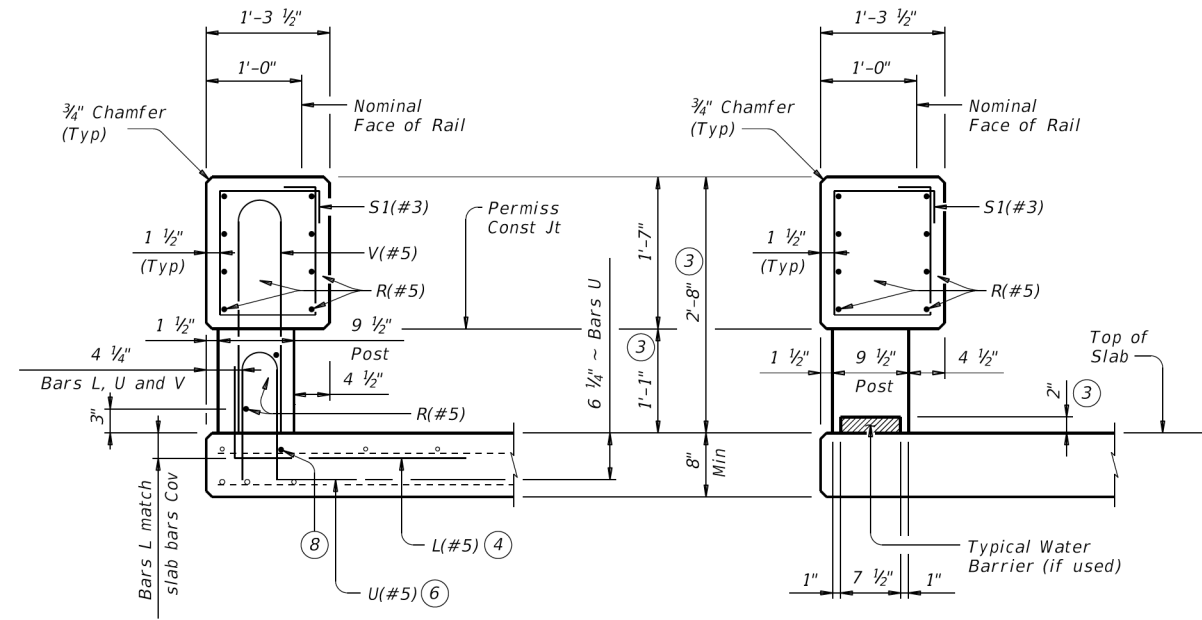
DATE: FILE:



**SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS**

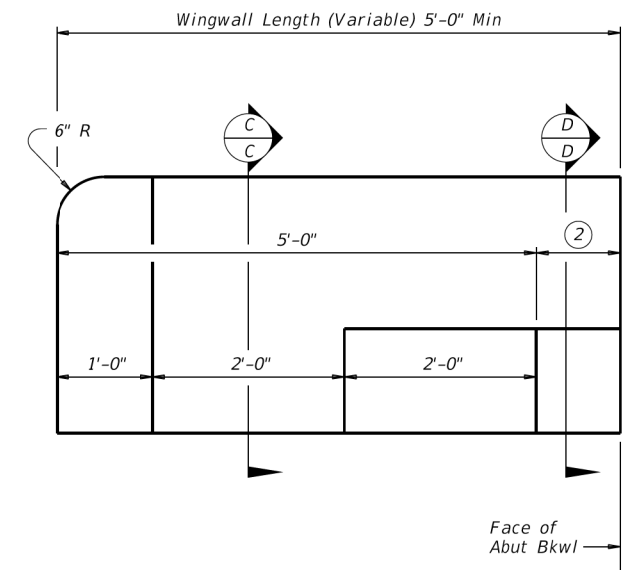


**SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS**



**AT POST
ON BRIDGE SLAB**

**AT OPENING
ON BRIDGE SLAB**



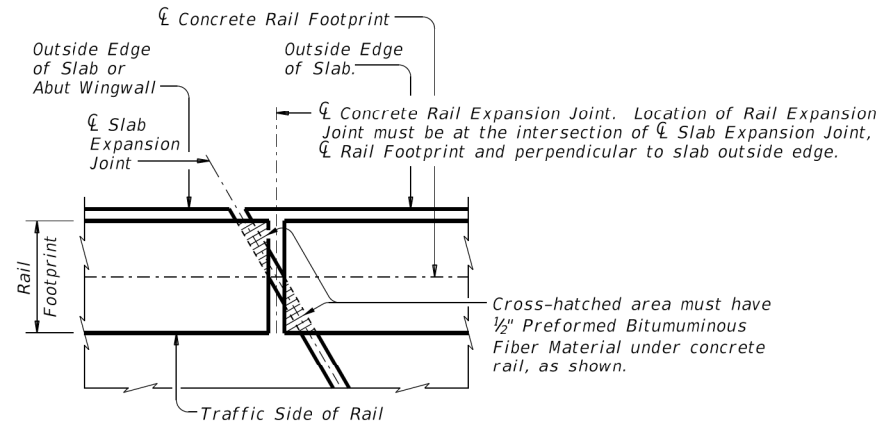
**ELEVATION AT
ABUTMENT WINGWALL**

Box culvert parallel wings or rail anchorage curb similar.

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.

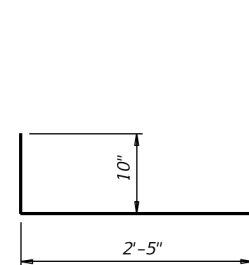
MATERIAL NOTES:

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"

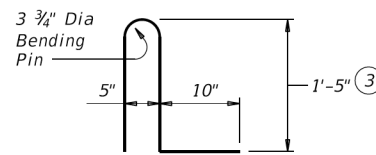
GENERAL NOTES:

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 pcf.

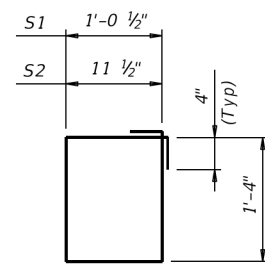
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



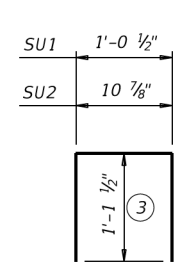
BARS L (#5)



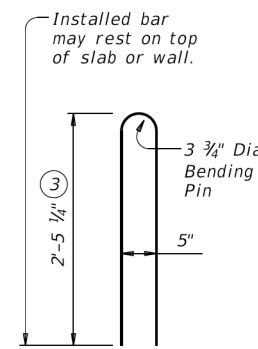
BARS U (#5) ⑨



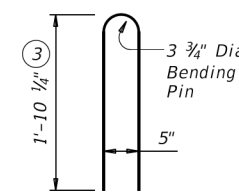
BARS S (#3)



BARS SU (#3)



BARS V (#5) ⑨



BARS WU (#5)

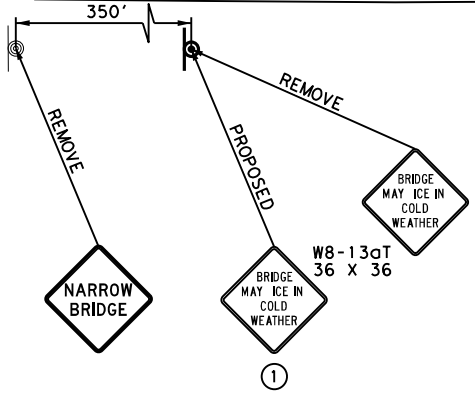
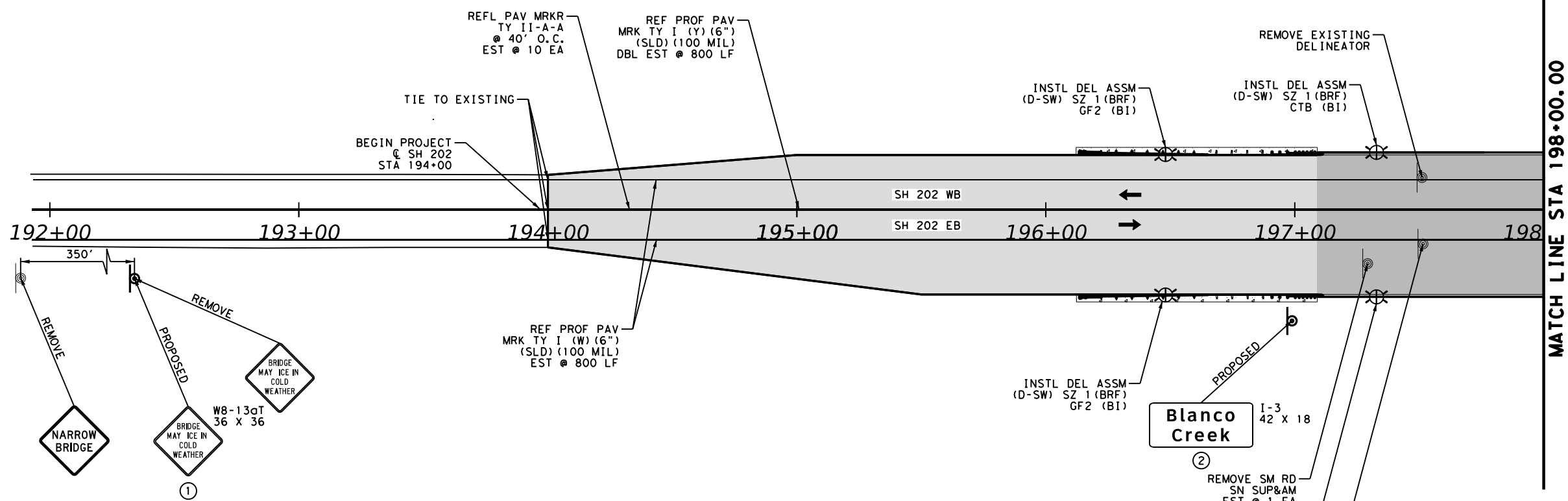
		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T223</h2>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	JOB
	0447	04	018
	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	115

CK:
DW:
CK:
DW:

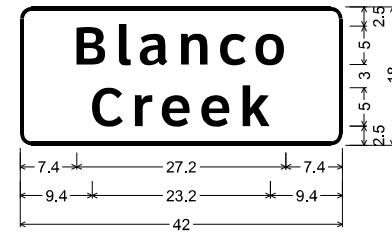


LEGEND

- BIDIRECTIONAL DELINEATOR
- TRAFFIC FLOW ARROW
- EXISTING SIGN/DELINEATOR
- PROPOSED SIGN



SMALL SIGN DETAILS



1.5" Radius, 0.5" Border, White on Green;

STATE OF TEXAS

ERIC HERNANDEZ
 114309
 LICENSED PROFESSIONAL ENGINEER
Eric Hernandez
 3/8/2024

LEGACY ENGINEERING GROUP
 Legacy Engineering Group, PLLC
 7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.493.3700
 TBPE Firm Registration No. 20623

Texas Department of Transportation

SH 202
TRAFFIC ITEMS
SIGNING, PAVEMENT MARKING
& DELINEATION LAYOUT

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	117

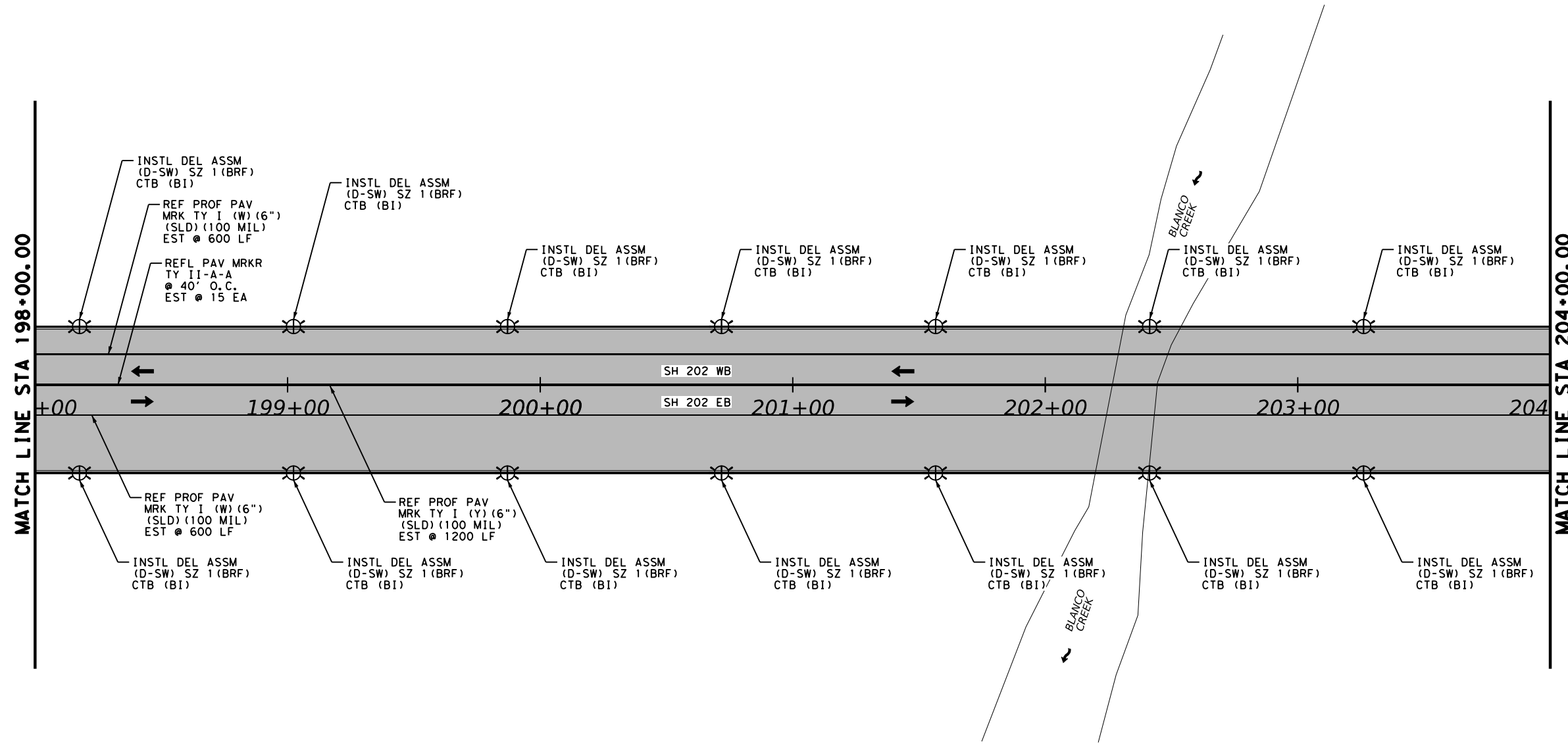
DATE:
FILE:

CK:
DW:
CK:
DW:



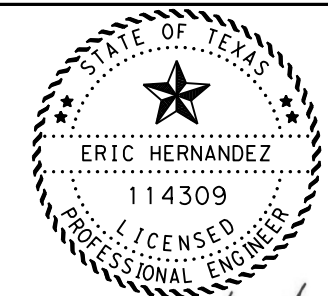
LEGEND

- BIDIRECTIONAL DELINEATOR
- TRAFFIC FLOW ARROW
- EXISTING SIGN/DELINEATOR
- PROPOSED SIGN



MATCH LINE STA 198+00.00

MATCH LINE STA 204+00.00



Eric Hernandez
3/8/2024



Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.493.3700
TBPE Firm Registration No. 20623



SH 202
TRAFFIC ITEMS
SIGNING, PAVEMENT MARKING
& DELINEATION LAYOUT

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST		COUNTY	SHEET NO.
CRP		REFUGIO	118

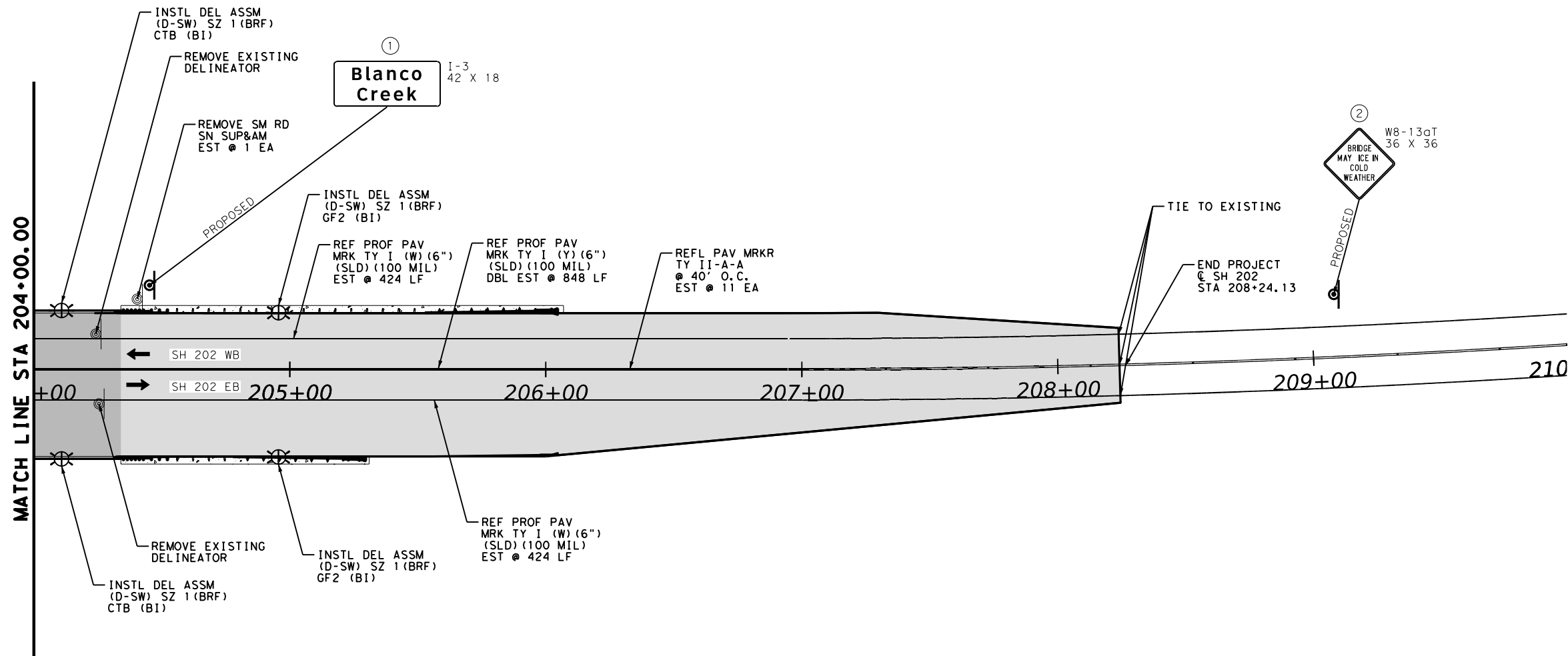
DATE:
FILE:

CK:
DW:
CK:
DW:

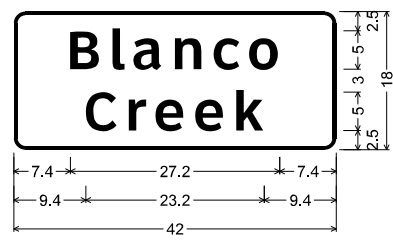


LEGEND

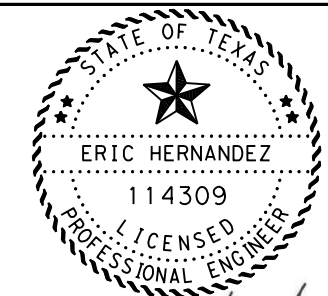
- BIDIRECTIONAL DELINEATOR
- TRAFFIC FLOW ARROW
- EXISTING SIGN/DELINEATOR
- PROPOSED SIGN



SMALL SIGN DETAILS



1.5" Radius, 0.5" Border, White on Green;



Eric Hernandez
3/8/2024



Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230, 210.493.3700
TBPE Firm Registration No. 20623



SH 202
TRAFFIC ITEMS
SIGNING, PAVEMENT MARKING
& DELINEATION LAYOUT

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	119	

DATE:
FILE:

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: FILE:

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 BRFL = 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 DIRECTION If Required BI = Bi-Directional BR = Bi-Directional with red on back	
SHEETING	Yellow, White or Red Type B or C reflective sheeting				Yellow, White or Red Type B or C Reflective Sheeting					
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 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.				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 unit (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
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	
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT	
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP	

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE: 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.	
GF1 GF2 CTB 			W1-8 				W1-6 			
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)	60" x 30" (Expressway & Freeway)
			MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"	
NOTE			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).							
SHEETING	Yellow, White, Red									



DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	CRP	REFUGIO	120	

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: FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

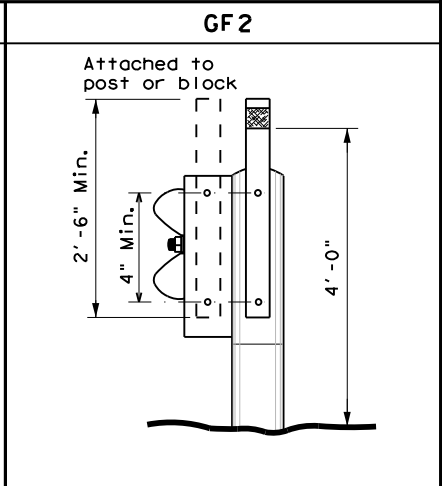
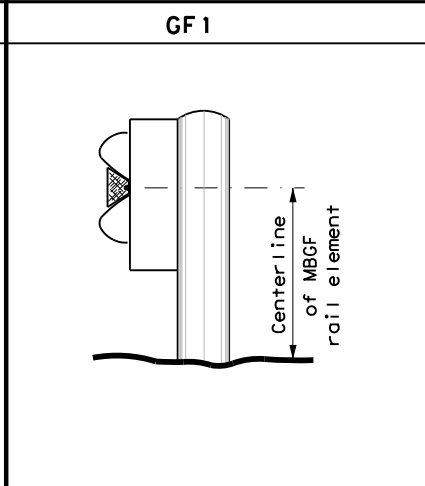
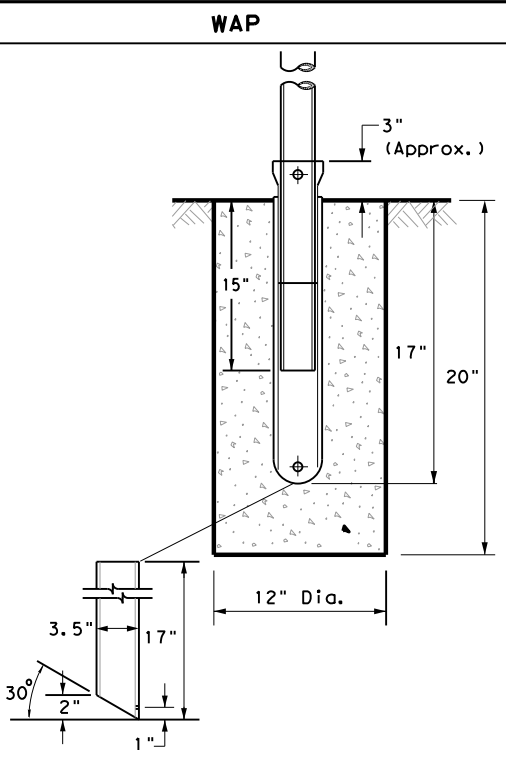
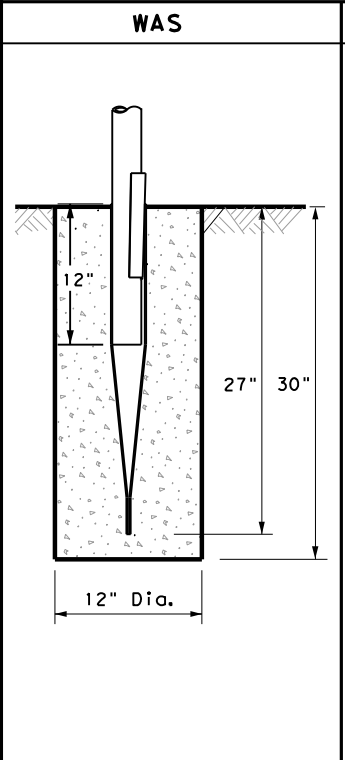
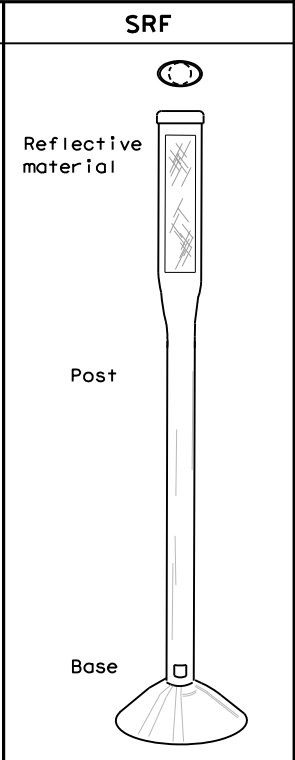
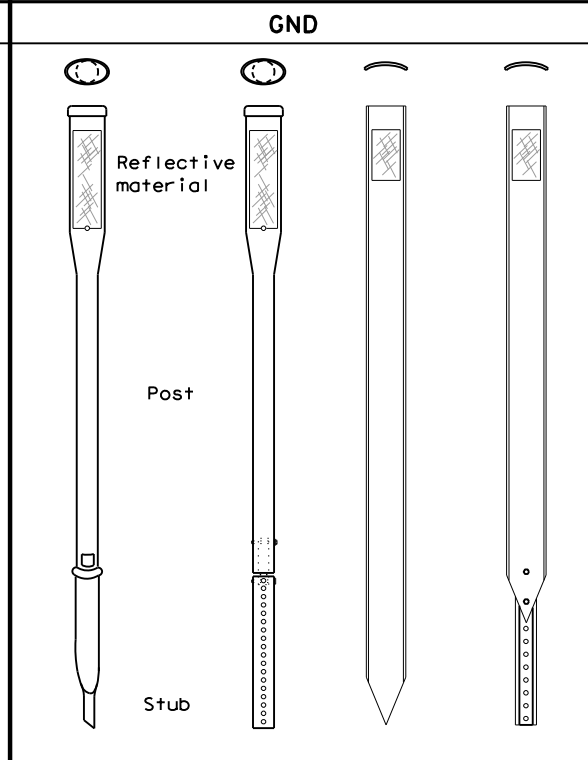
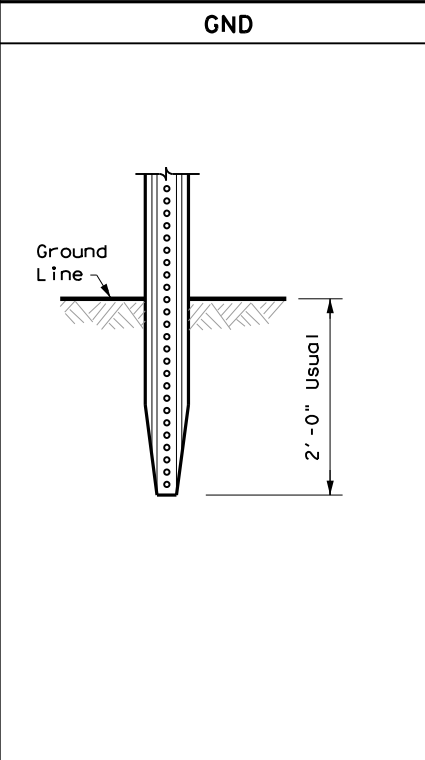
TYPE OF BARRIER MOUNTS

WING CHANNEL (WC)

FLEXIBLE POSTS (YFLX, WFLX)

WEDGE ANCHOR SYSTEMS

GUARD FENCE ATTACHMENT



NOTES

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.

EMBEDDED **SURFACE MOUNT**

NOTES

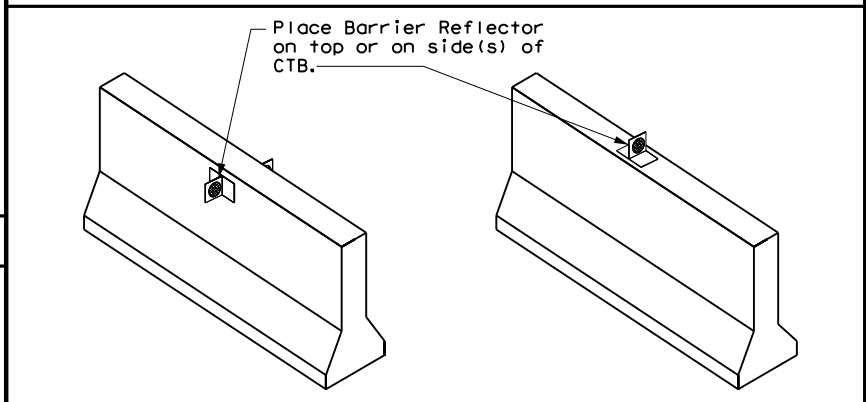
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

STEEL **PLASTIC**

NOTE

1. Install per manufacturer's recommendations.

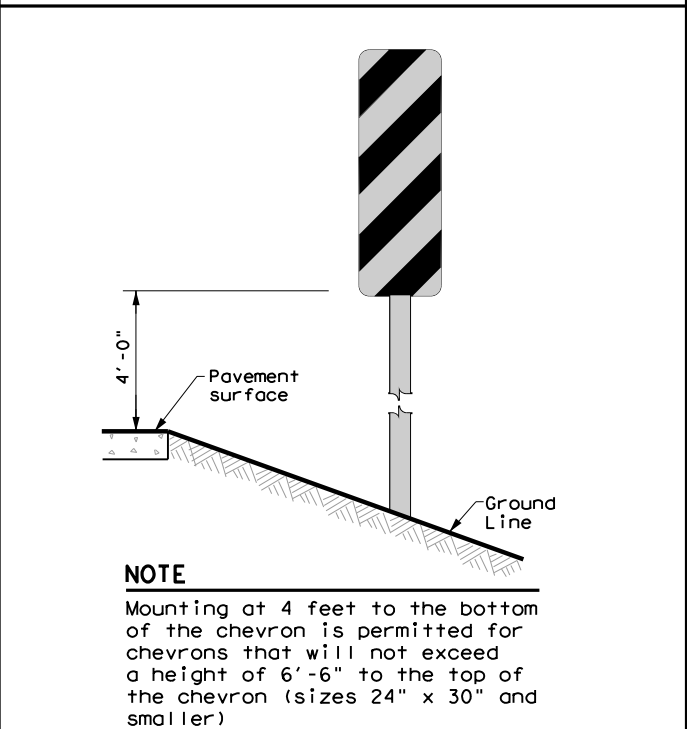
CONCRETE TRAFFIC BARRIER (CTB)



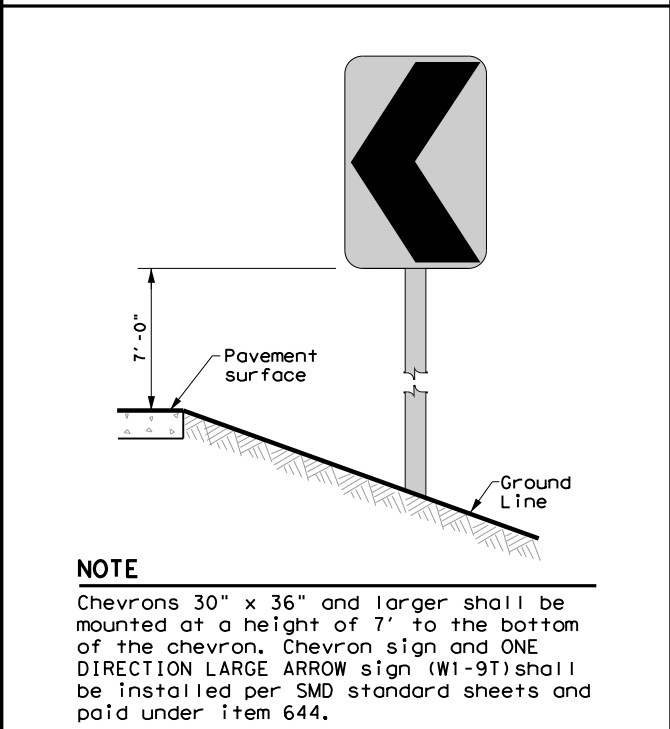
GENERAL NOTES

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.

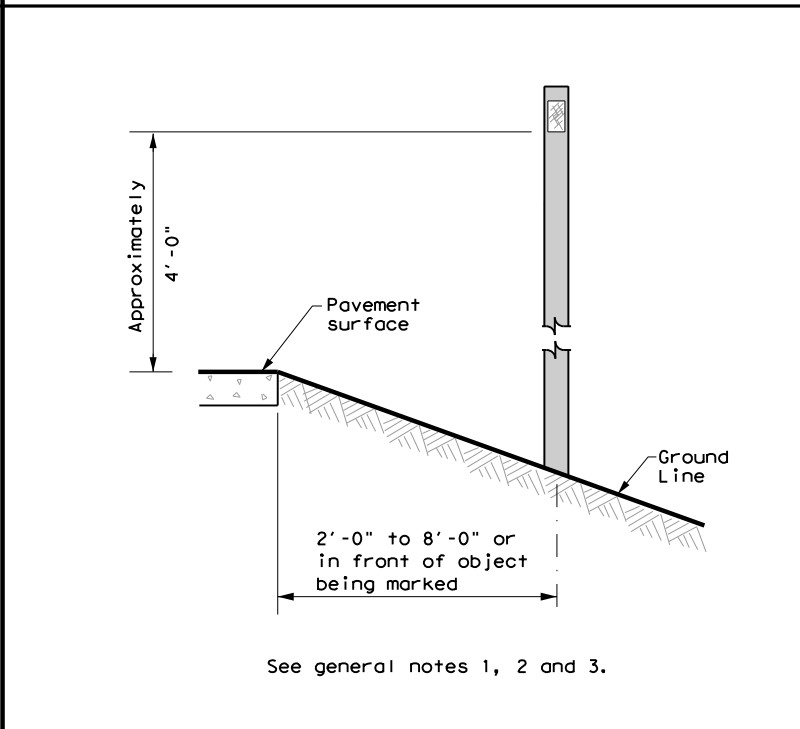
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS



CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



DELINEATORS AND TYPE 2 OBJECT MARKERS



Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

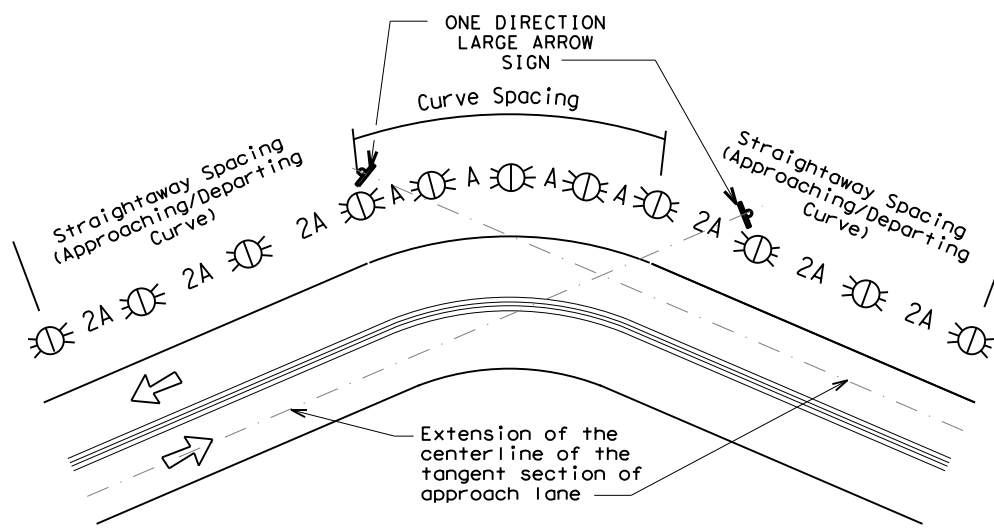
FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	CRP	REFUGIO	121	

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.

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

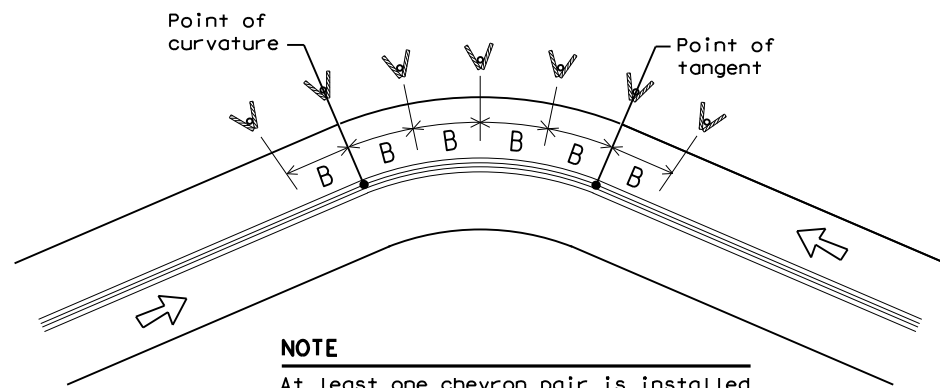
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

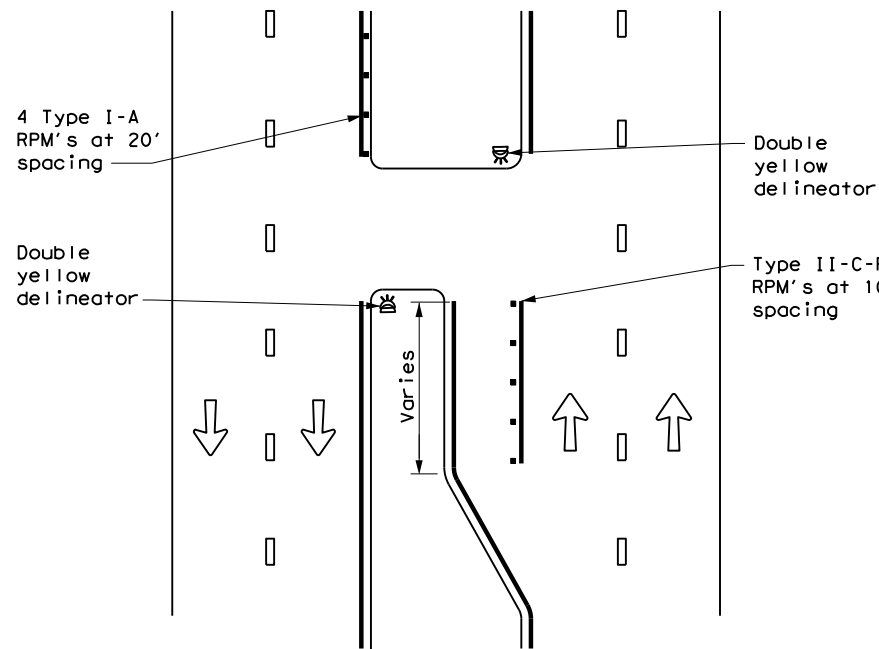
D & OM(3)-20

FILE: dom3-20.dgn	DW: TXDOT	CK: TXDOT	OW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	CRP	REFUGIO	122	

DATE: FILE:

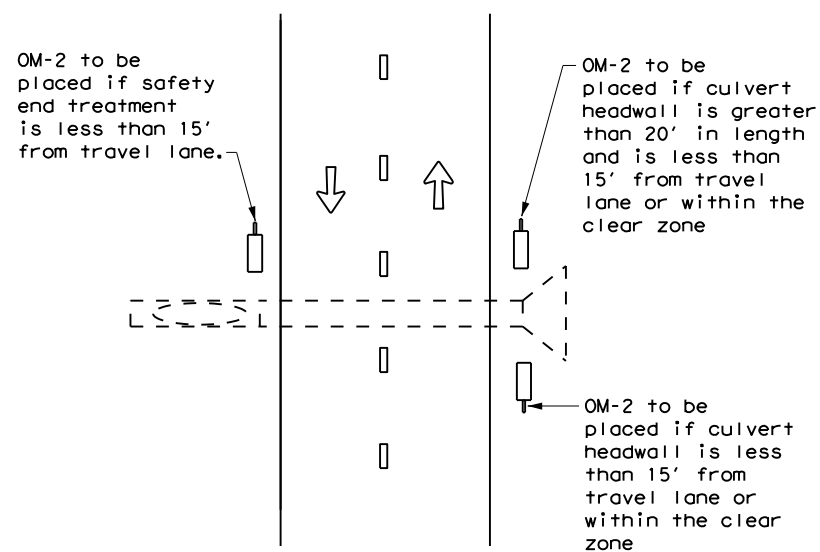
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

CROSSOVERS



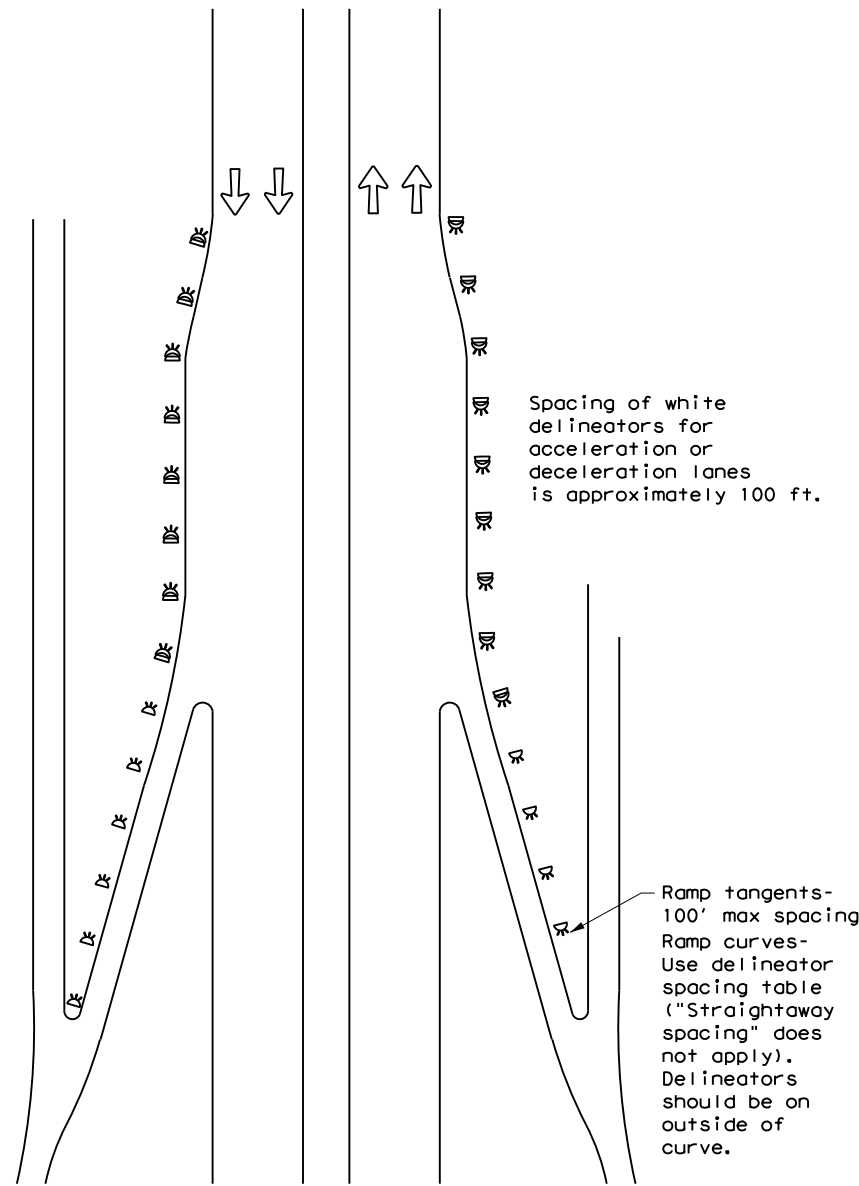
DETAIL 1

FOR CULVERTS WITHOUT MBGF



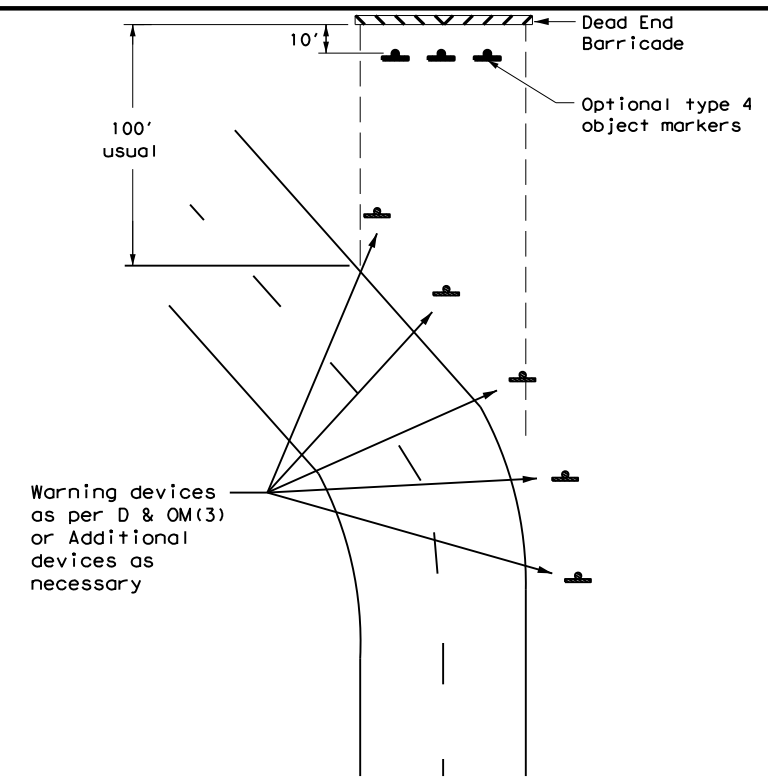
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



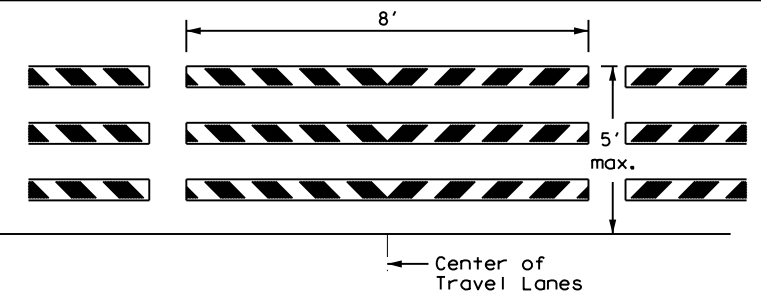
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

- Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- Barricade striping is red and white sloping toward the center of the roadway.
- Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator



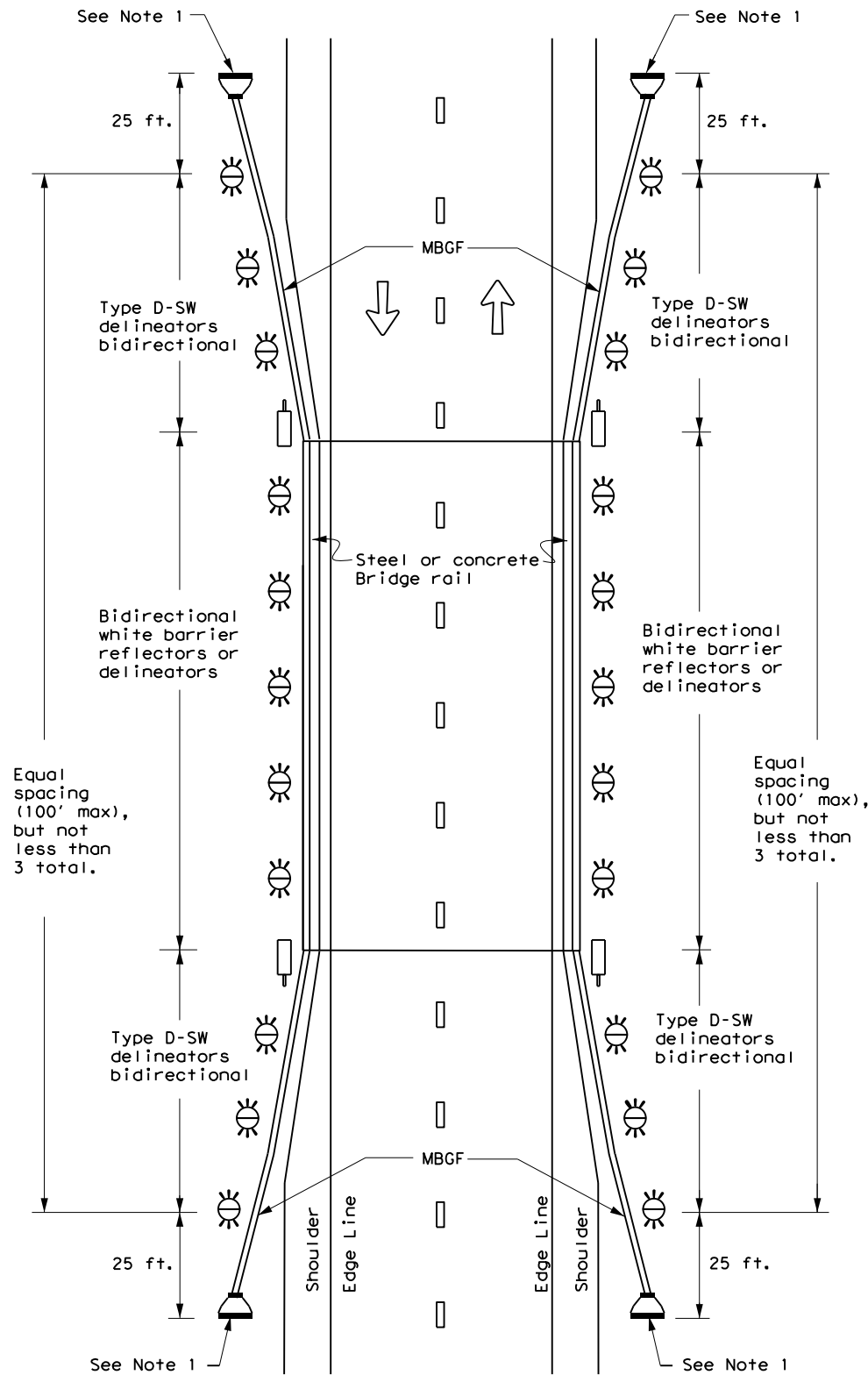
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) -20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	OW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
3-15	DIST	COUNTY	SHEET NO.	
7-20	CRP	REFUGIO	123	

DATE:
FILE:

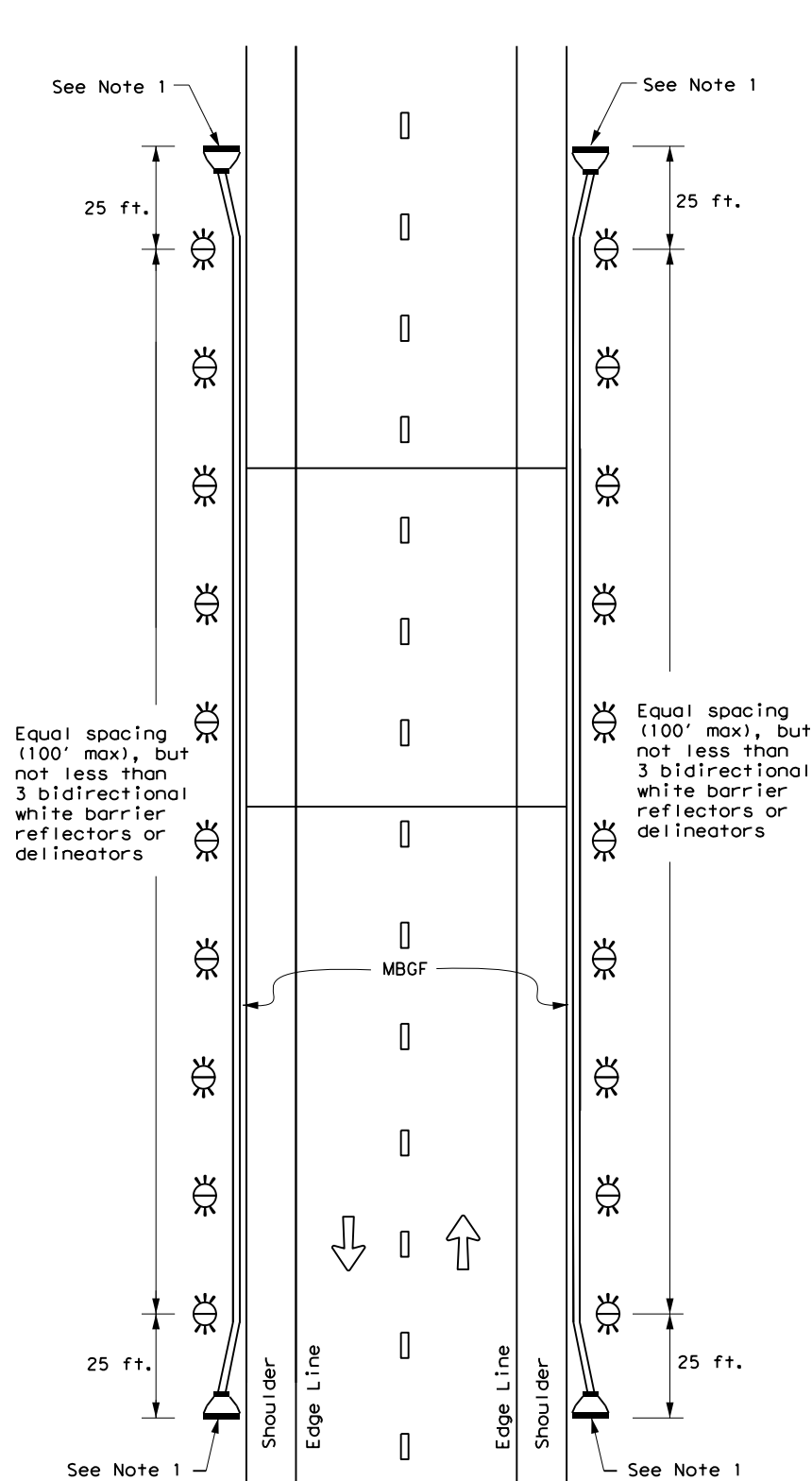
**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**



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.

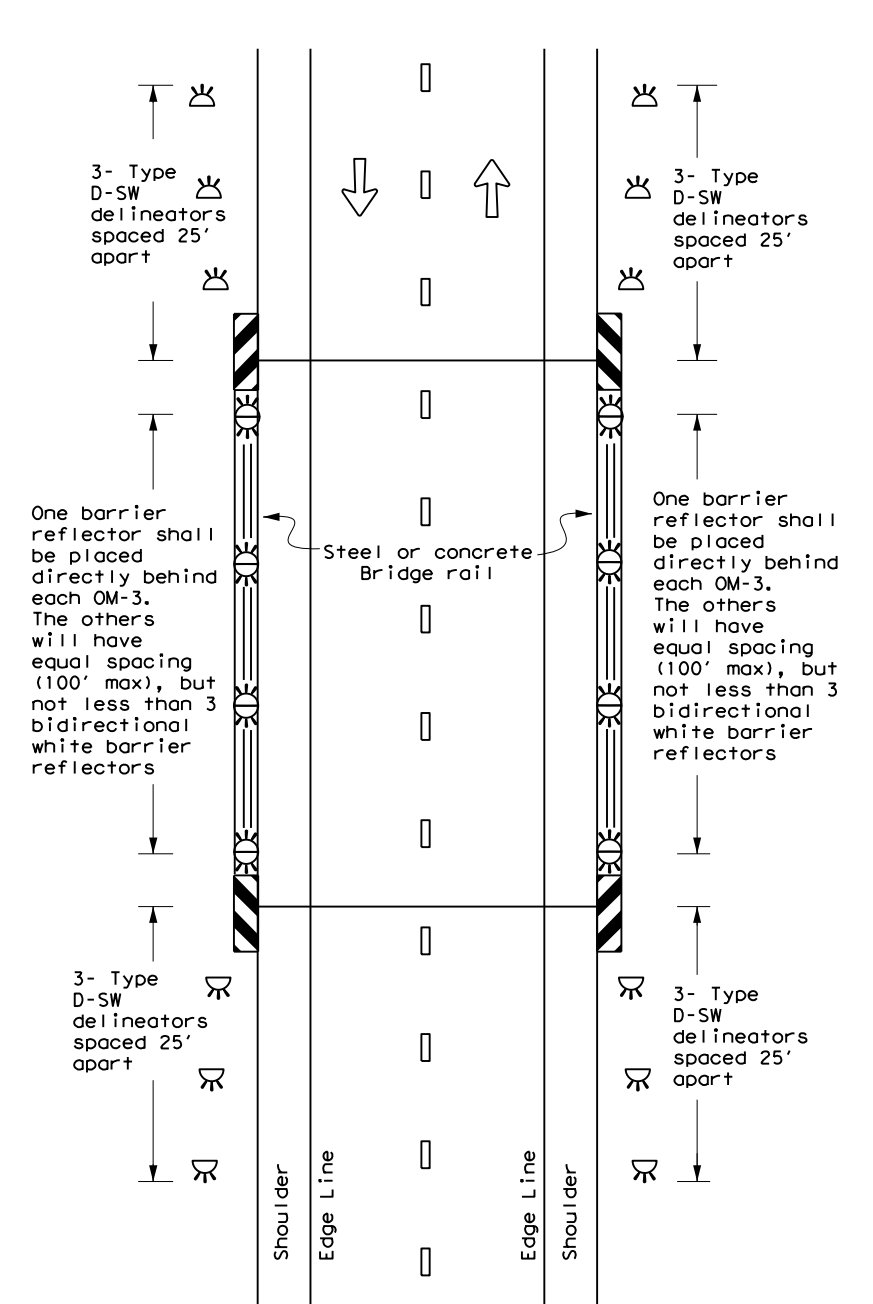
**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



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

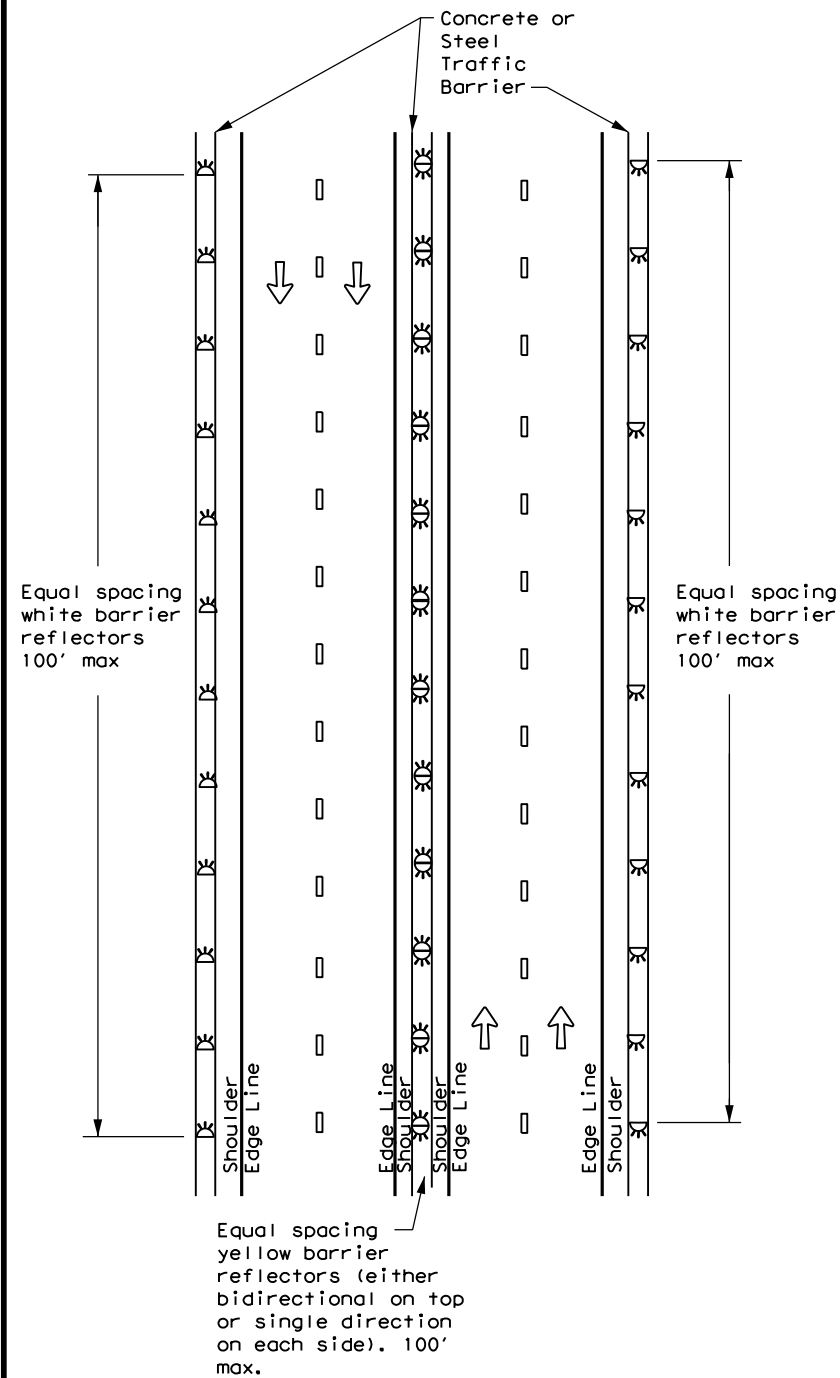
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
7-20	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	124	

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.

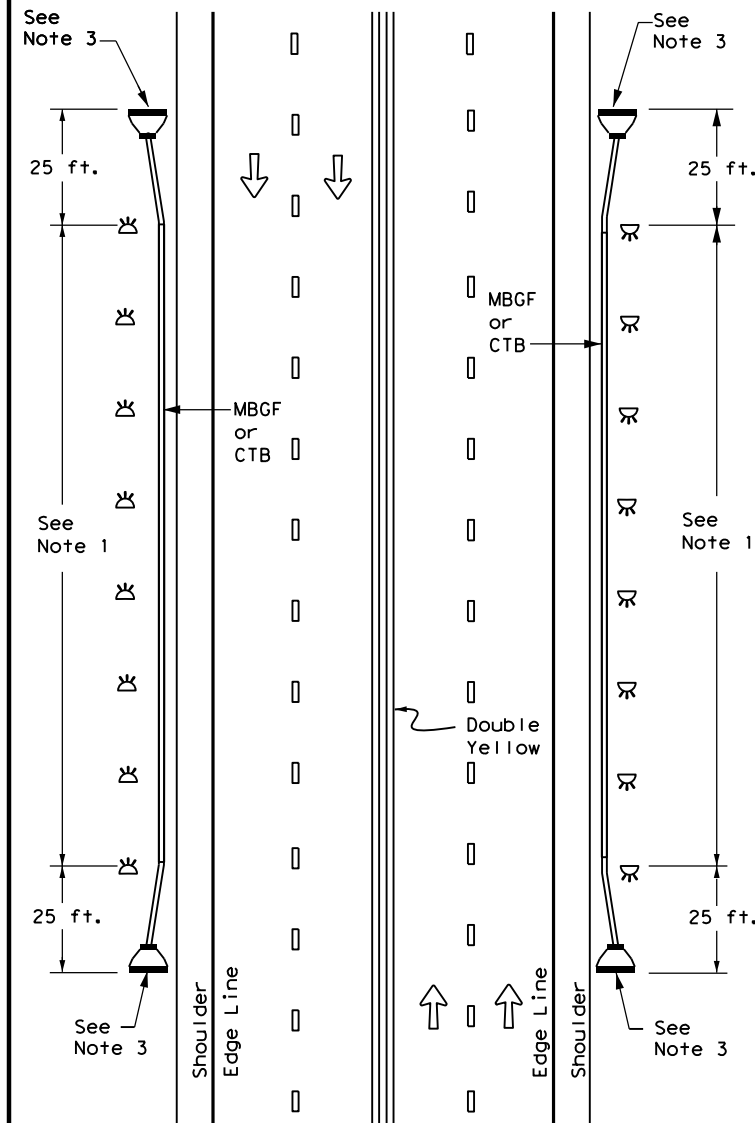
DATE:
FILE:

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.

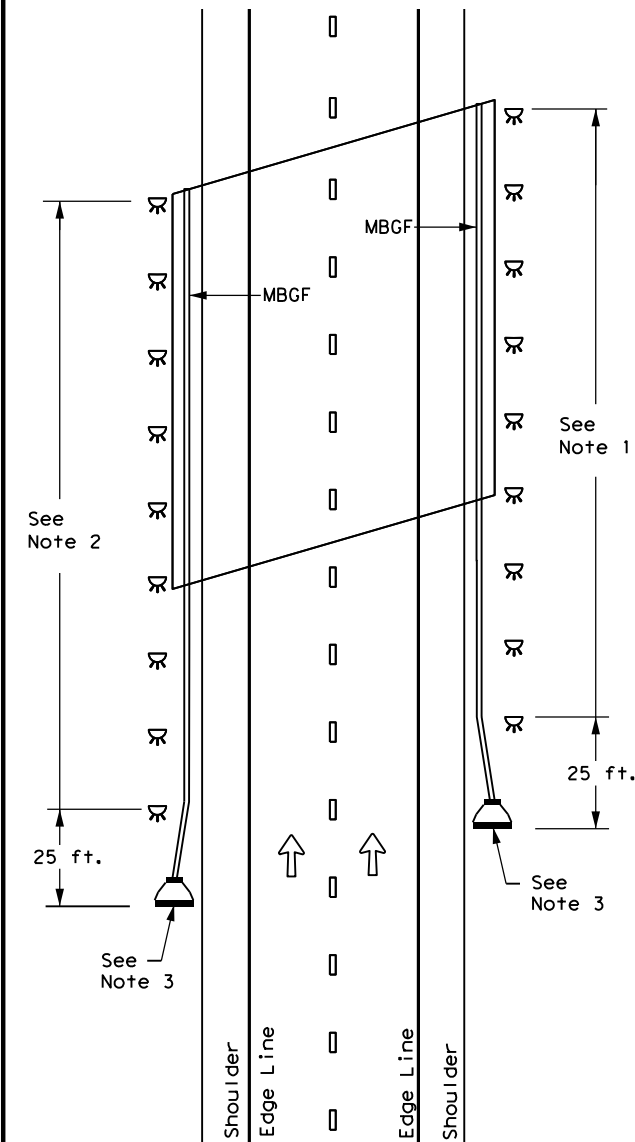
CONTINUOUS CONCRETE OR STEEL BARRIER



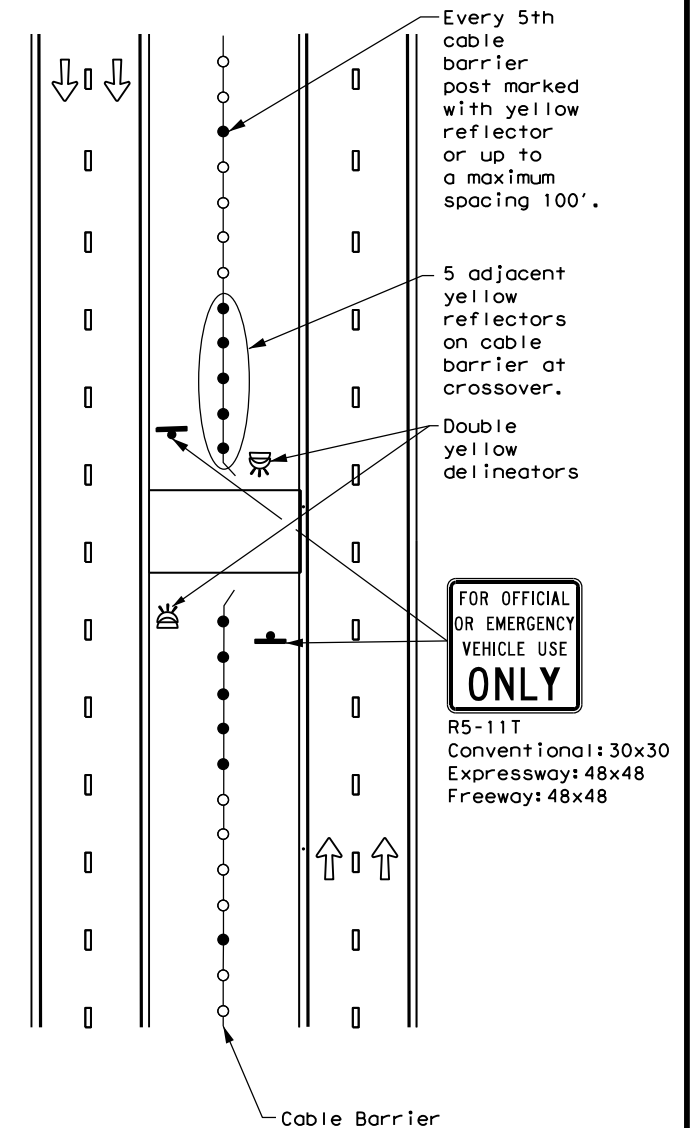
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuous Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. 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.

LEGEND

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



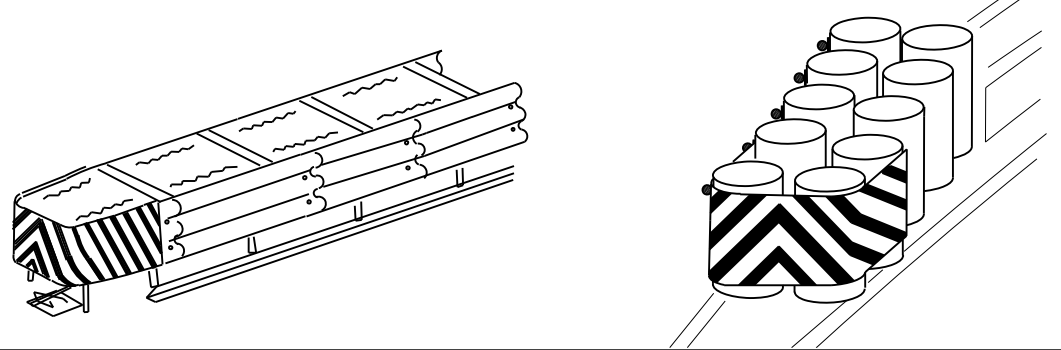
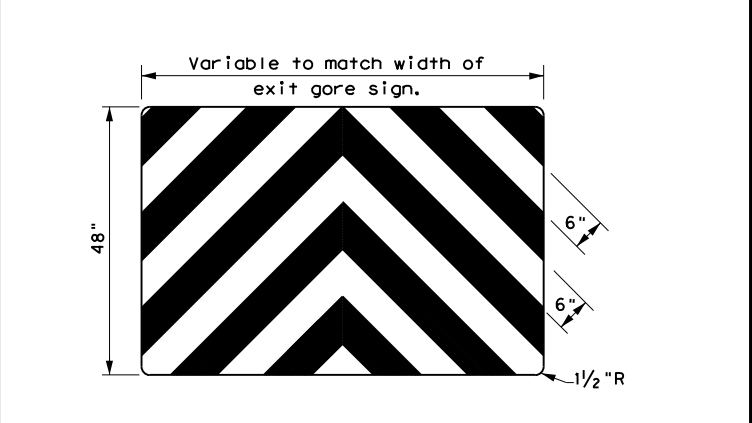
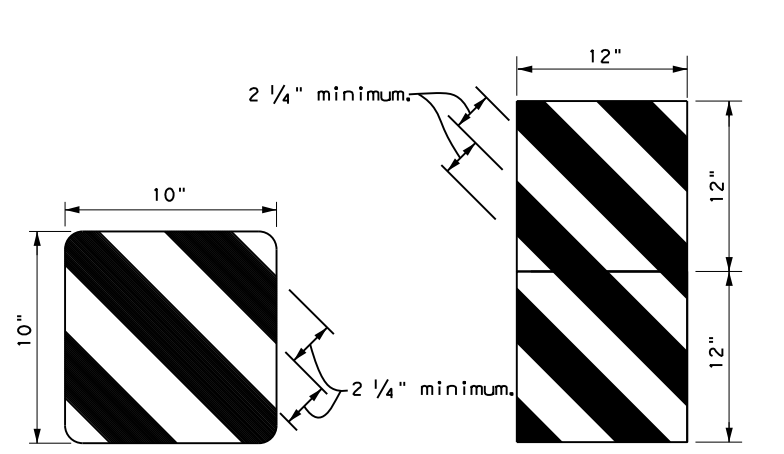
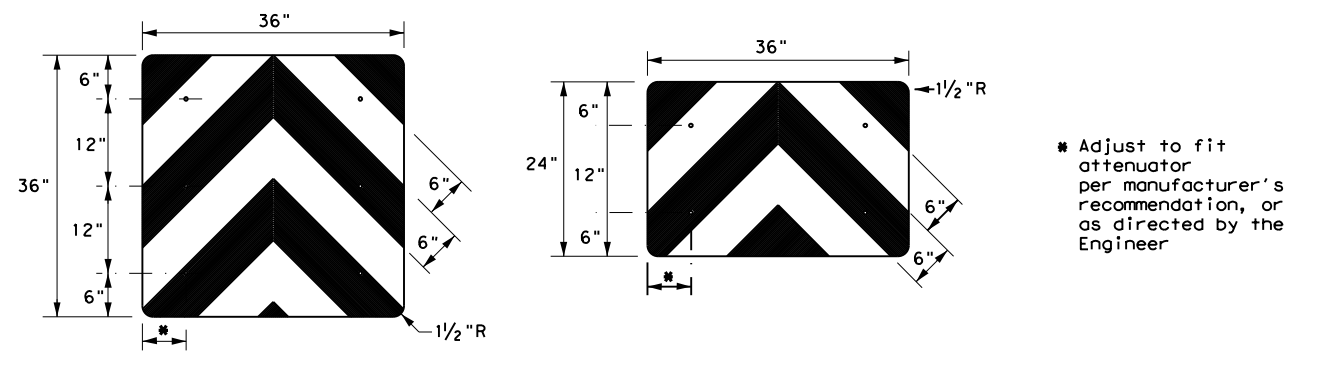
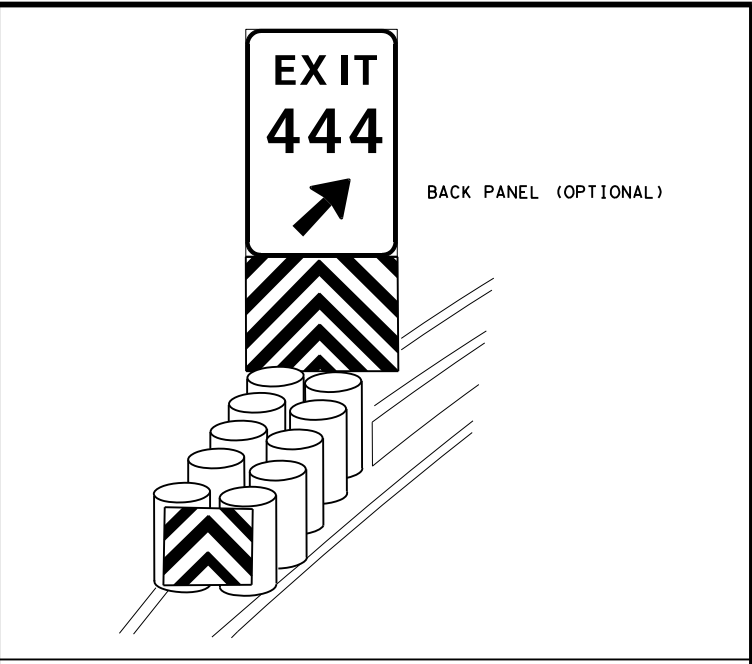
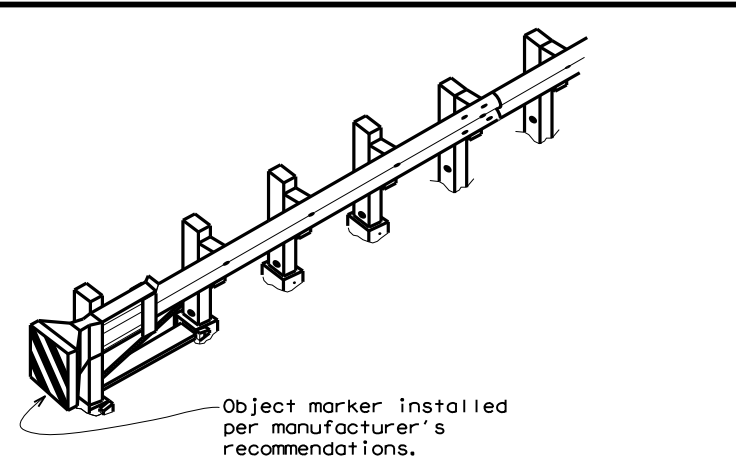
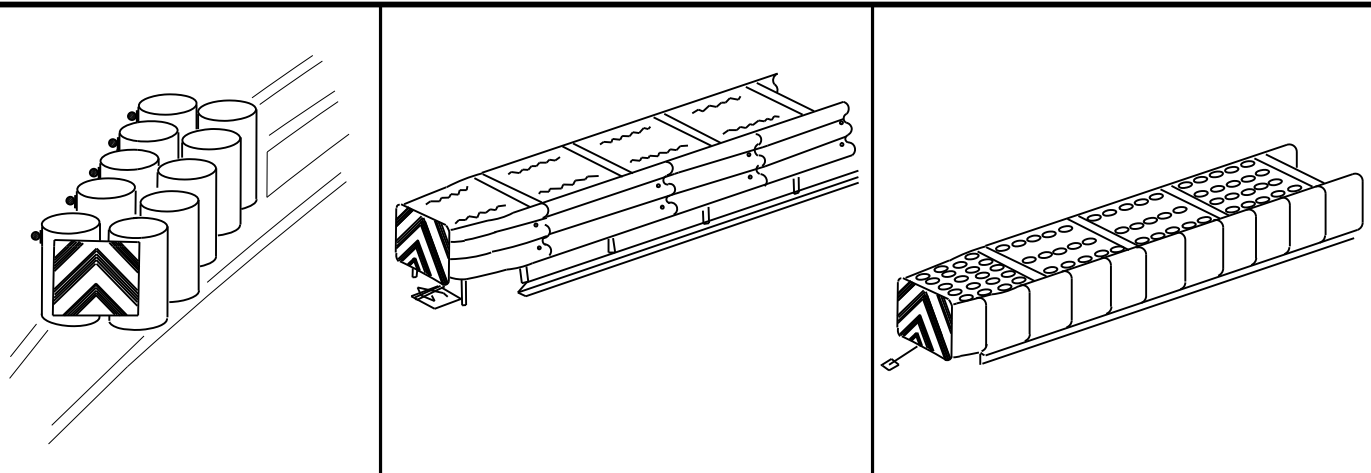
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
7-20	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	125	

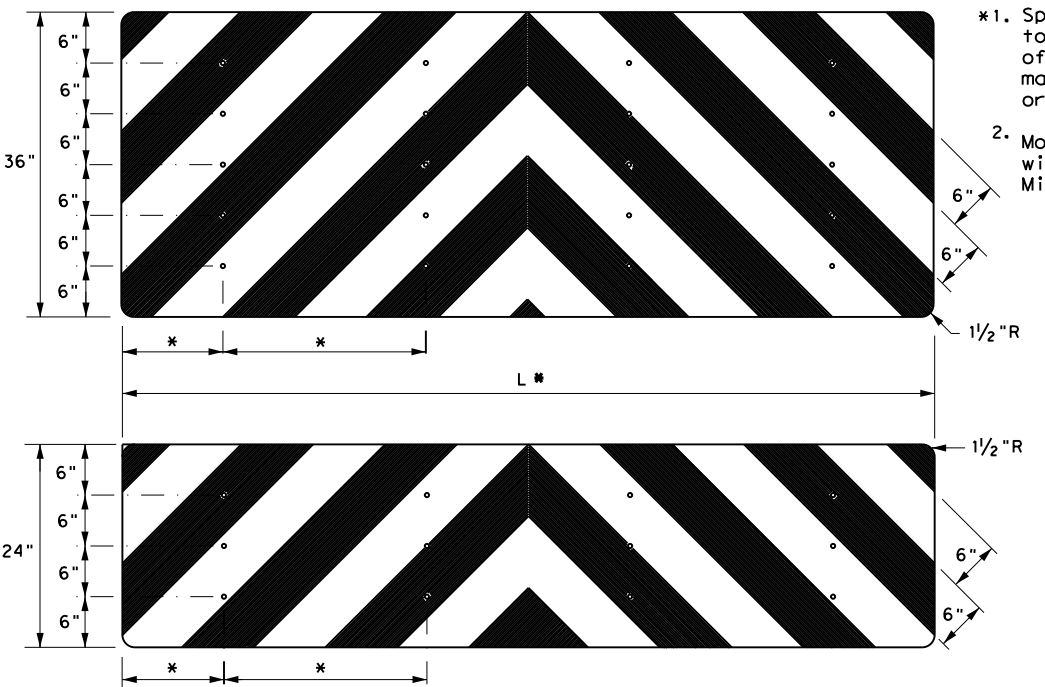
DATE:
FILE:

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.



OBJECT MARKERS SMALLER THAN 3 FT²

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



- NOTES**
- 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.
 - 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.
 - 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".
 - 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.
 - Object Marker at nose of attenuator is subsidiary to the attenuator.
 - See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

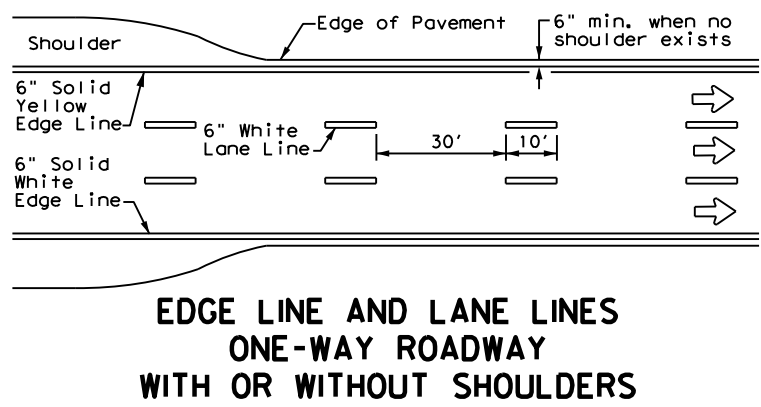
D & OM(VIA) -20

FILE: domvia20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
4-92 8-04	DIST	COUNTY	SHEET NO.	
8-95 3-15	CRP	REFUGIO	126	
4-98 7-20				

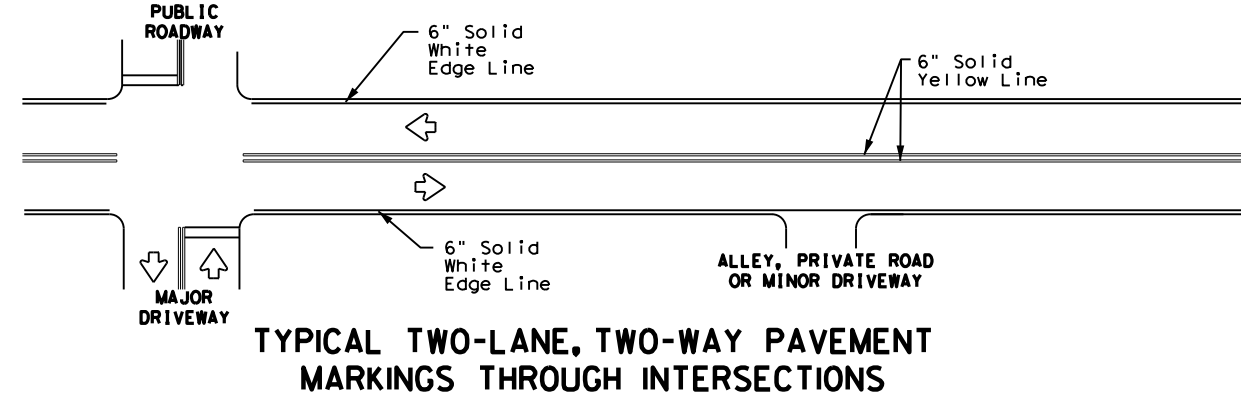
20G

DATE:
FILE:

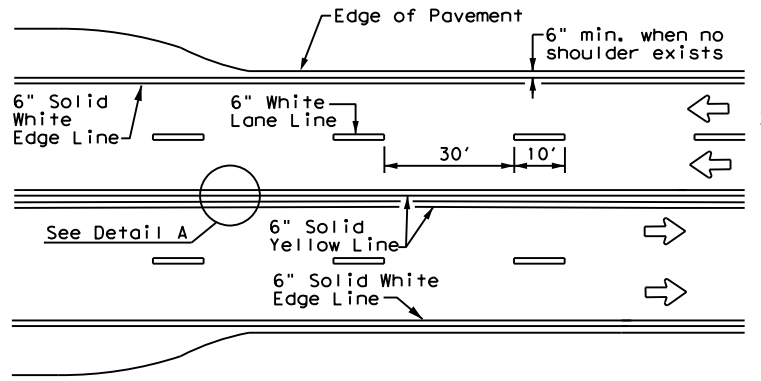
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



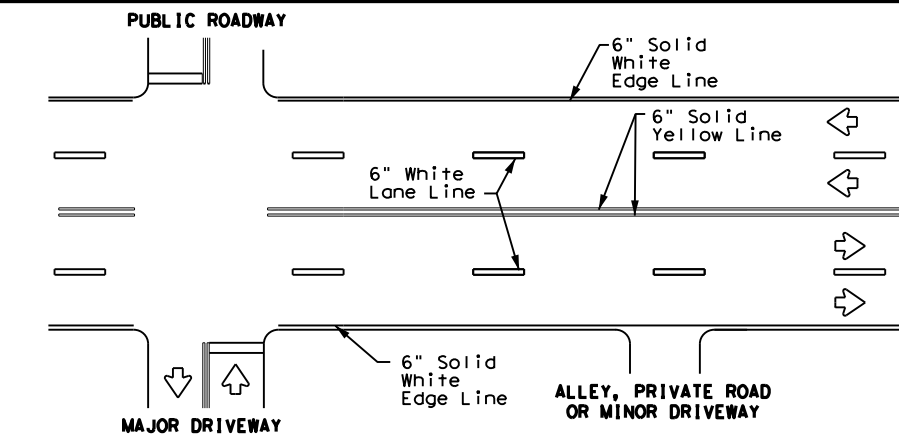
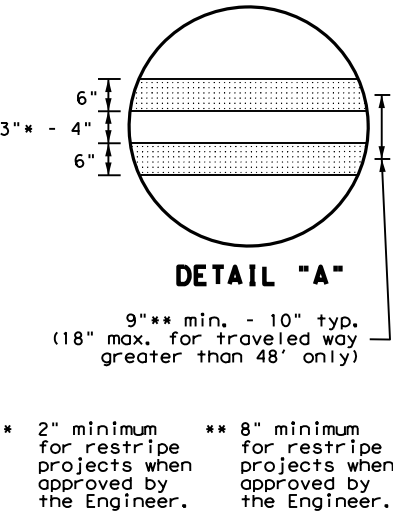
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



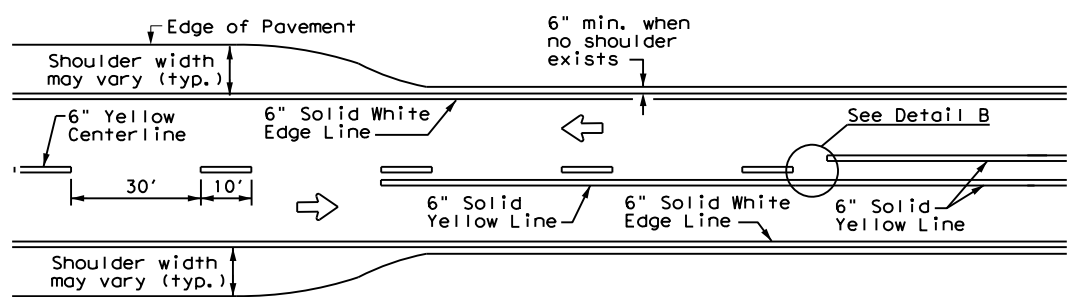
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



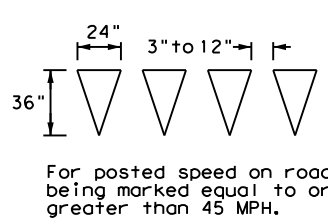
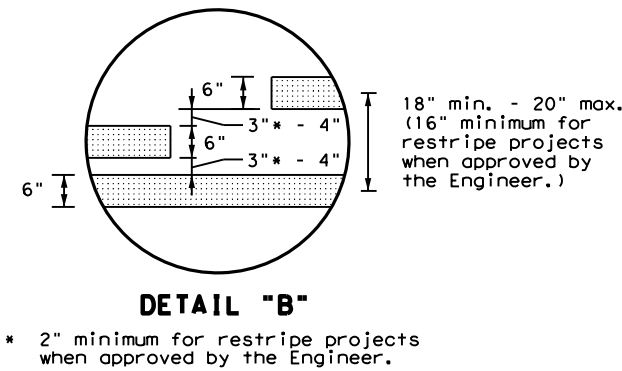
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



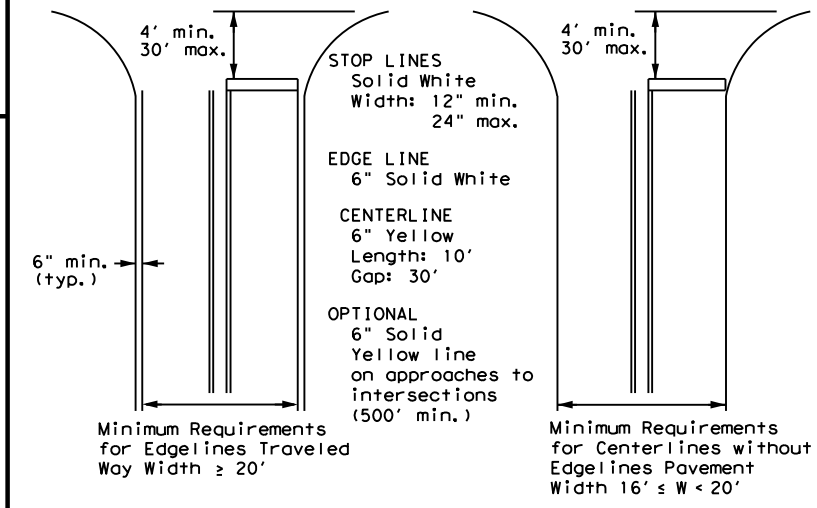
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



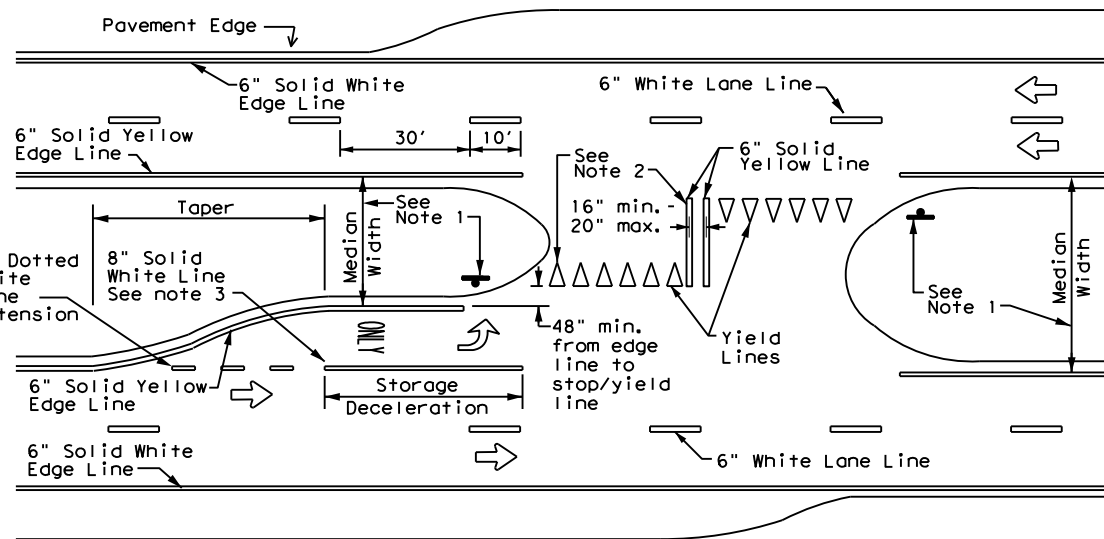
**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

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.

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.



**TYPICAL STANDARD
PAVEMENT MARKINGS**

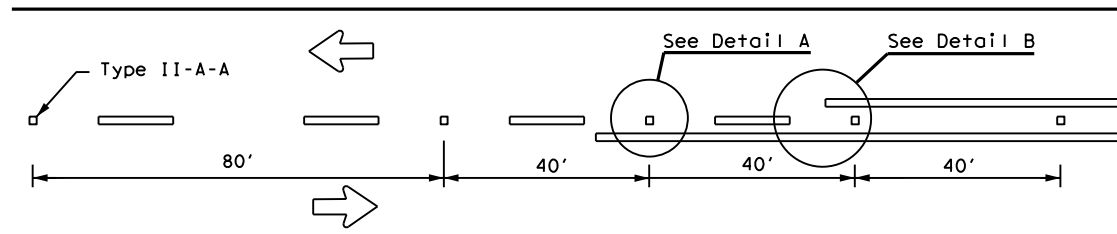
PM(1) - 22

FILE:	pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
11-78	8-00 6-20	0447	04	018	SH 202
8-95	3-03 12-22	DIST	COUNTY		SHEET NO.
5-00	2-12	CRP	REFUGIO		127

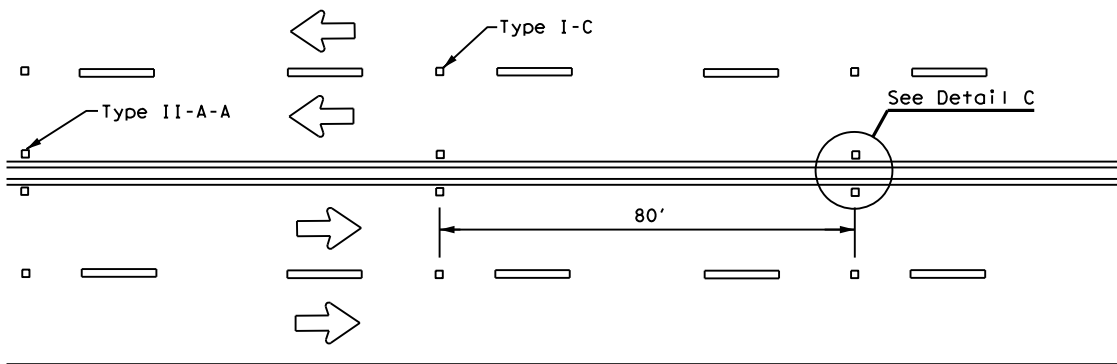
DATE:
FILE:

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

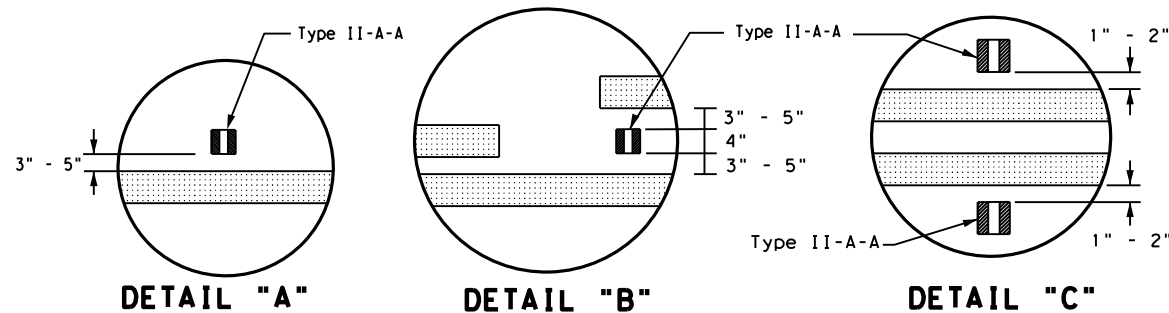
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



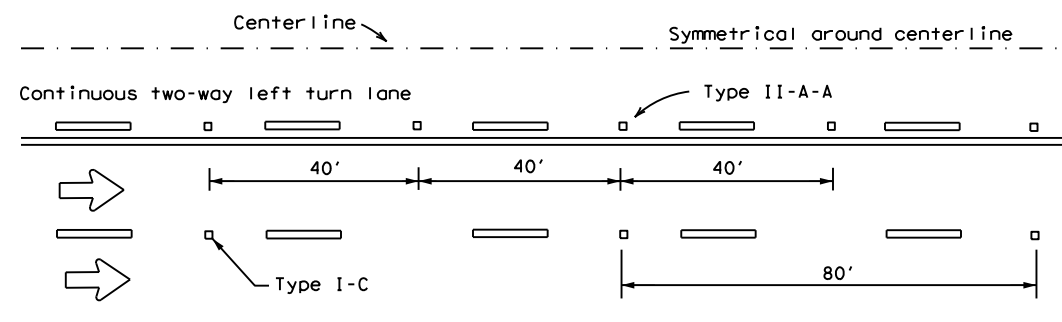
**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS**



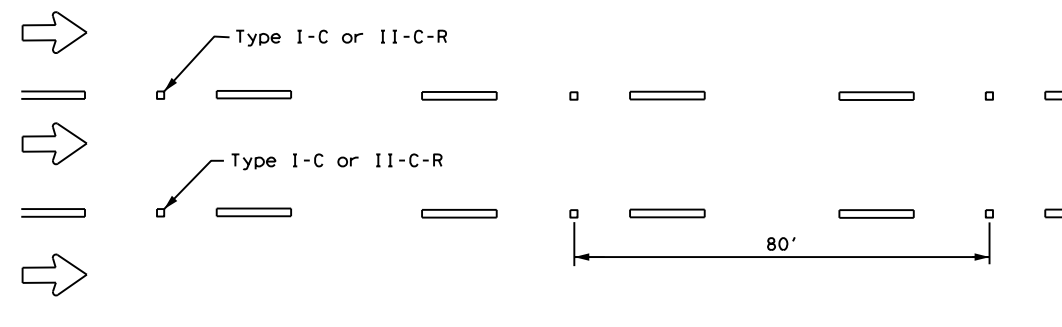
DETAIL "A"

DETAIL "B"

DETAIL "C"

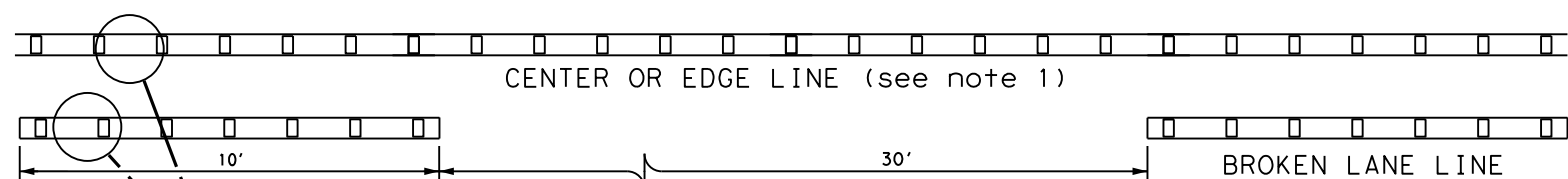


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



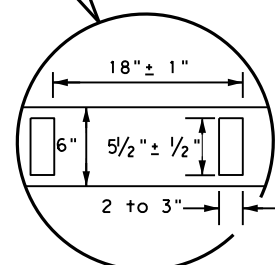
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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



CENTER OR EDGE LINE (see note 1)

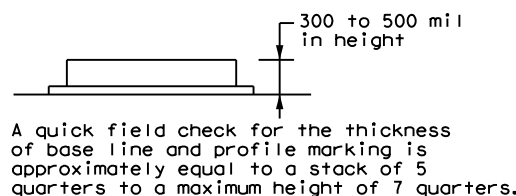
BROKEN LANE LINE



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

**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



NOTES

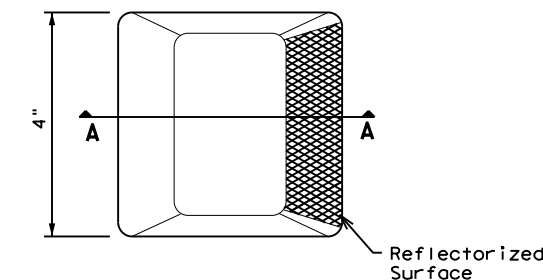
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

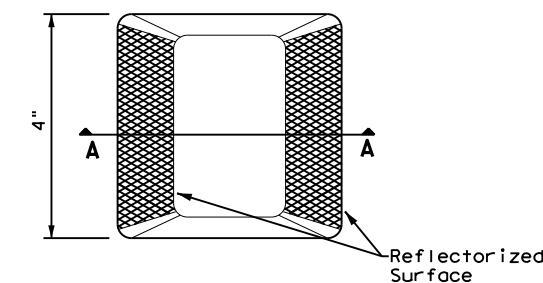
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, 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

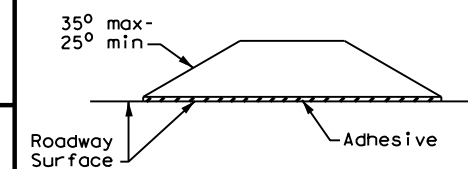
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



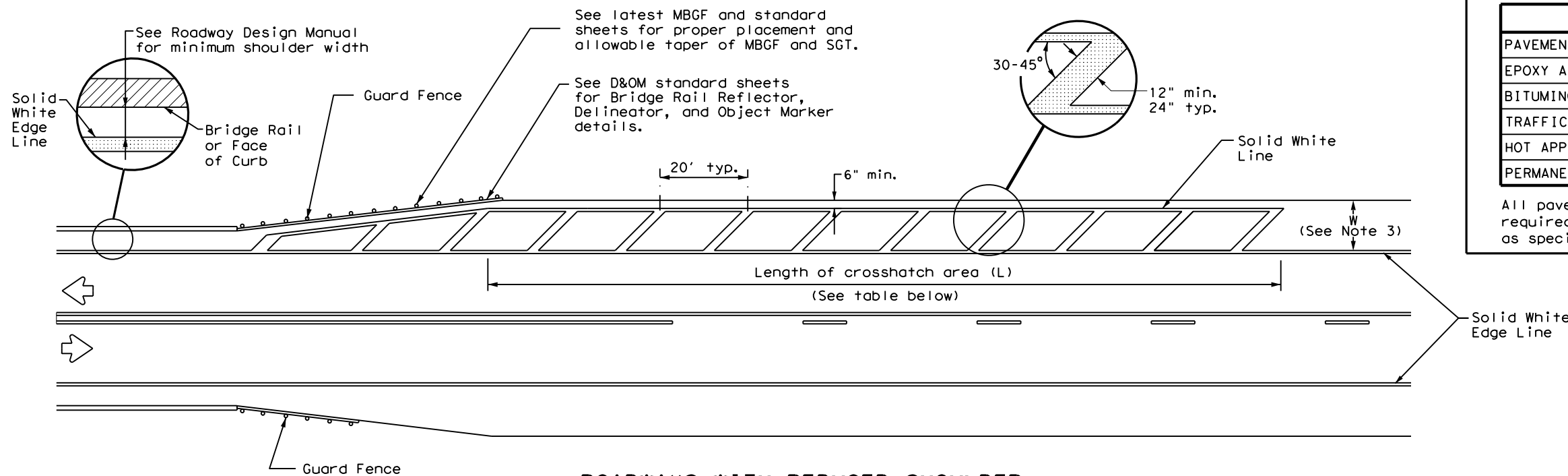
**POSITION GUIDANCE USING
RAISED MARKERS
REFLECTORIZED PROFILE
MARKINGS
PM(2) - 22**

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
4-77 8-00 6-20	DIST	COUNTY	SHEET NO.	
4-92 2-10 12-22	CRP	REFUGIO	128	
5-00 2-12				

DATE:
FILE:

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:
FILE:



ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

CROSSHATCH LENGTH (L)	
Posted Speed (MPH)	L (ft)
30	300 ft
35	
40	
45	
50	500 ft
55	
60	
65	
70	
75	

NOTES

1. 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 4 inches from the bridge rail or face of curb or 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions.
2. No-passing zone on bridge approach is optional. If used, the no-passing zone shall be a minimum 500 feet long from the beginning of the bridge.
3. The crosshatching should be required if the shoulder width in advance of the bridge is 4 feet or wider and a reduction of at least 3 feet in shoulder width across the bridge occurs.
4. On divided highways, review both the right and left shoulder widths for the need for narrow bridge pavement markings.

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.



PAVEMENT MARKINGS FOR ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT
PM(5) - 22

FILE: pm5-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	129	

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.

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

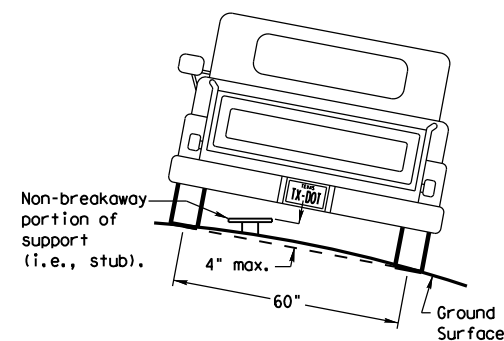
Post Type
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

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))

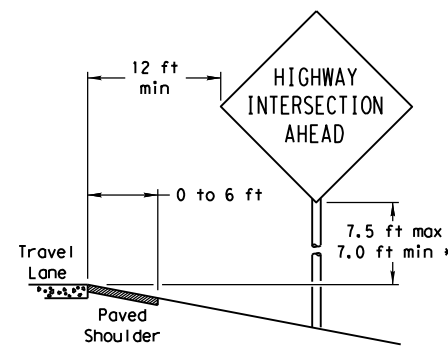
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

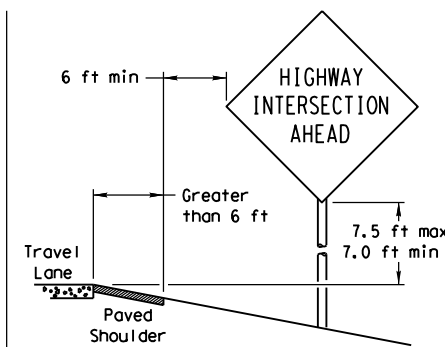
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

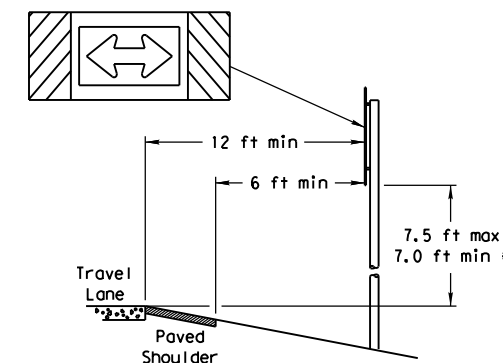
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

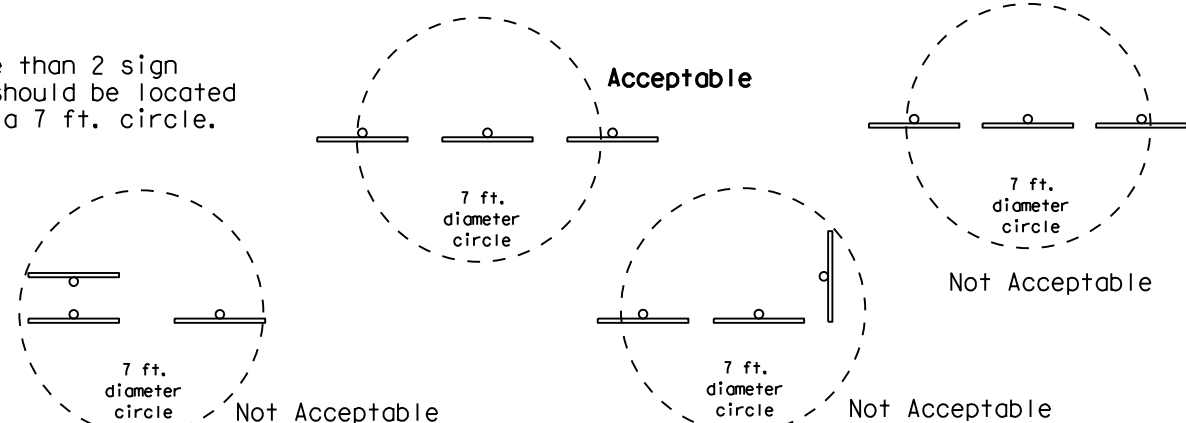
When the shoulder is greater than 6 ft. in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

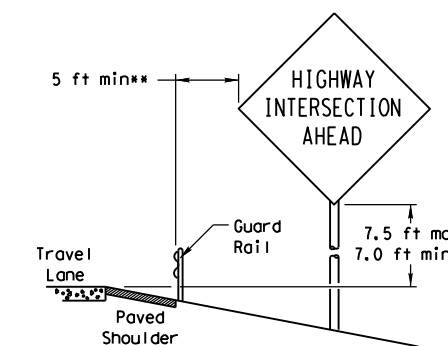


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

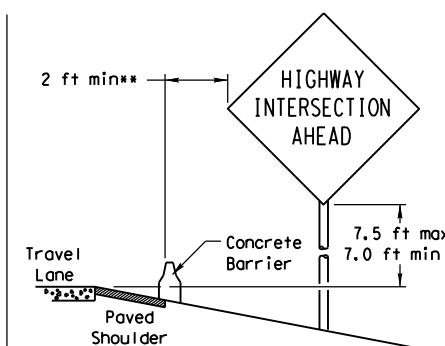
No more than 2 sign posts should be located within a 7 ft. circle.



BEHIND BARRIER



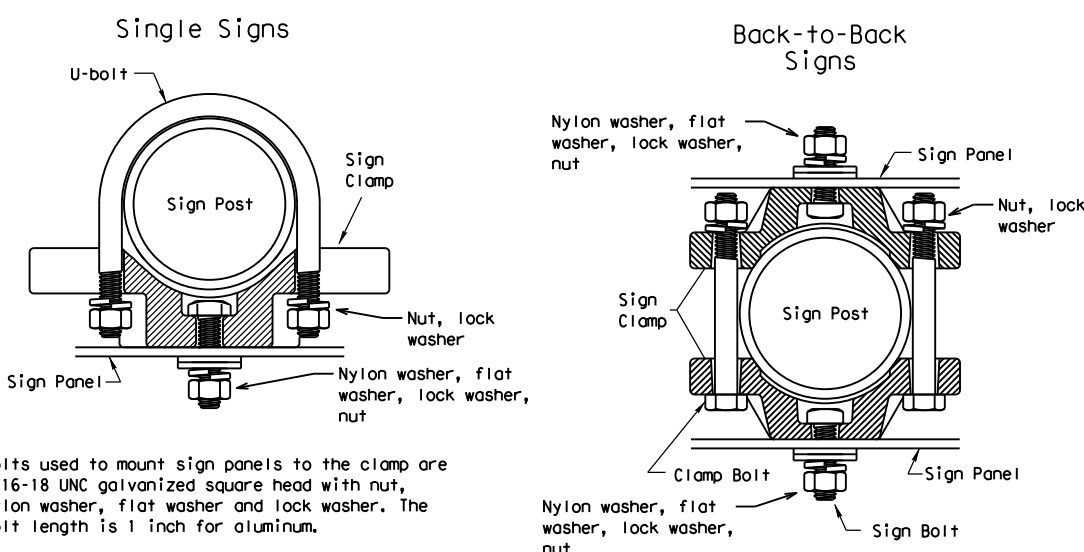
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

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

TYPICAL SIGN ATTACHMENT DETAIL



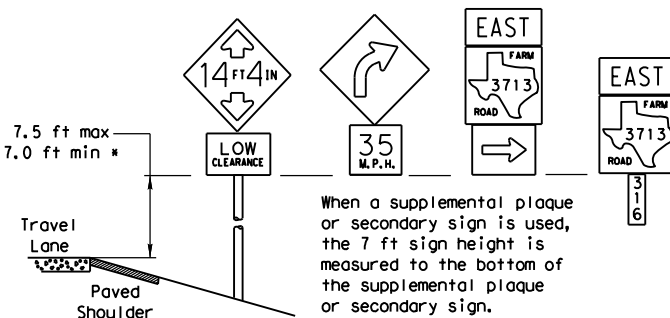
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

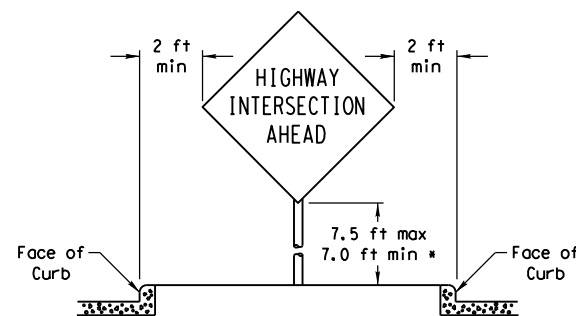
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

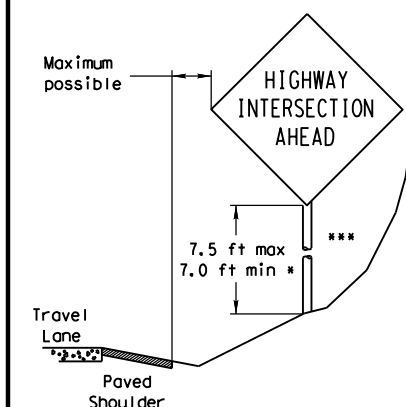


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



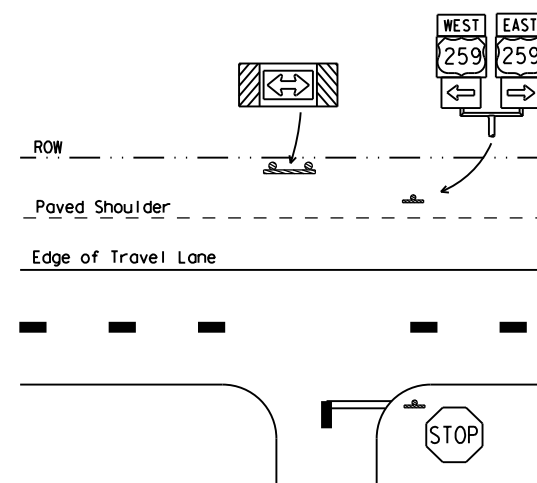
RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



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.



* 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>

Texas Department of Transportation
 Traffic Operations Division

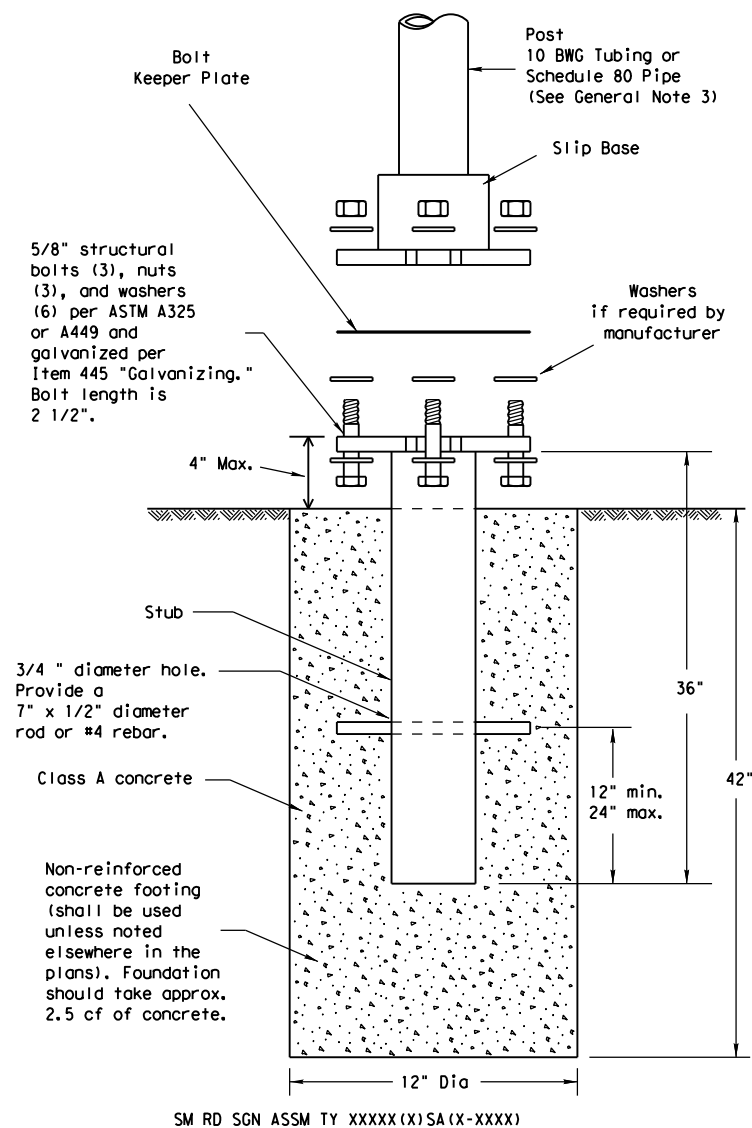
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB
		0447	04	018
		DIST	COUNTY	SH 202
		CRP	REFUGIO	SHEET NO.
				130

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.

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

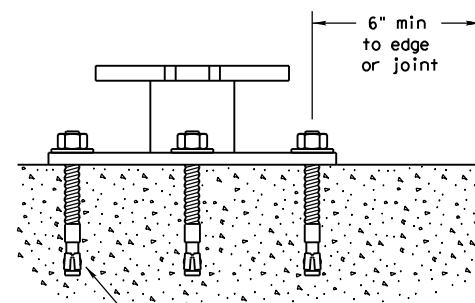
Foundation

- 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



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.

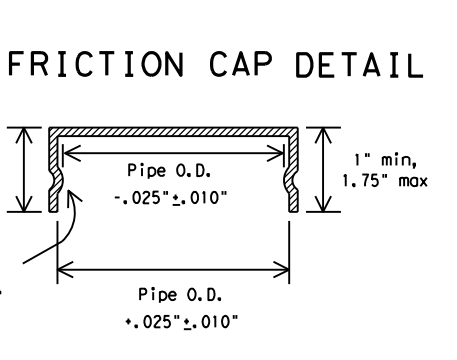
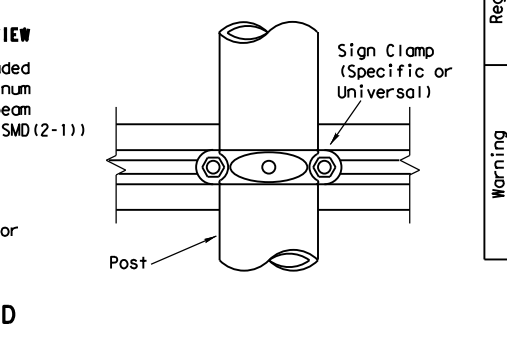
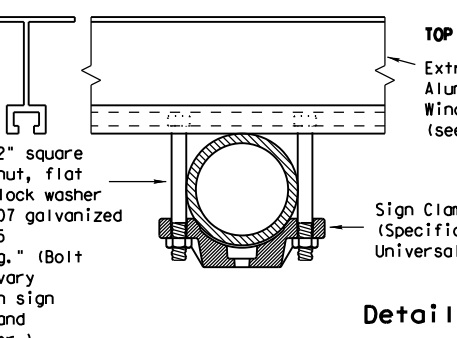
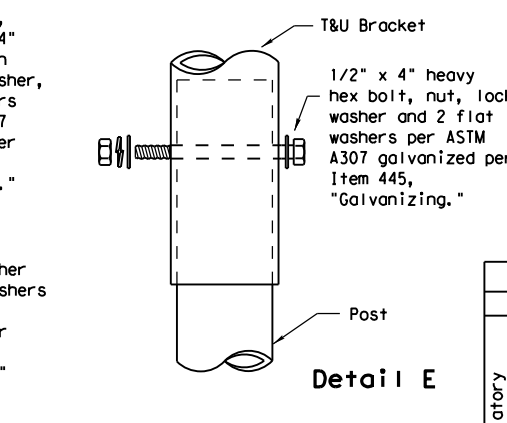
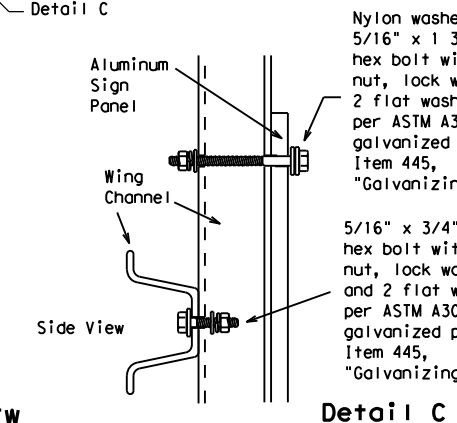
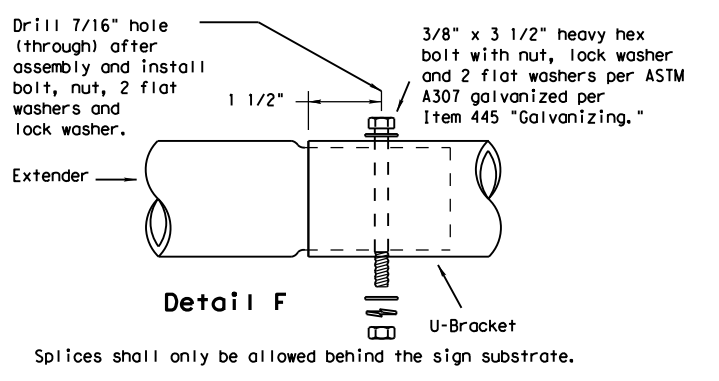
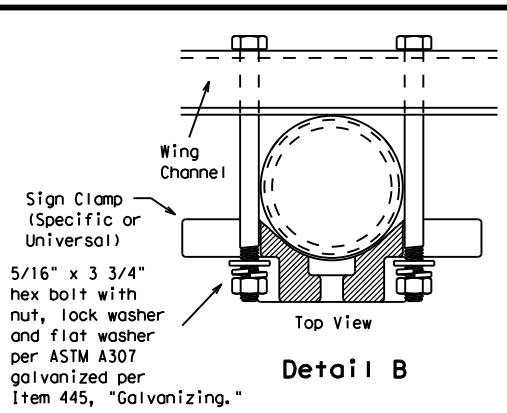
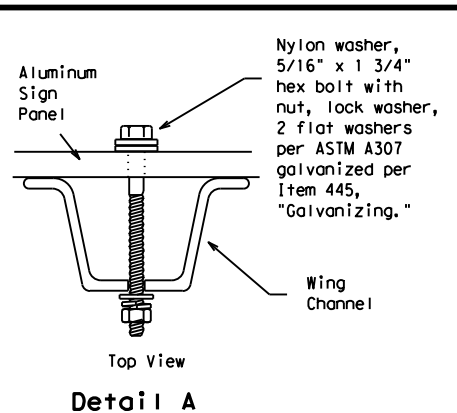
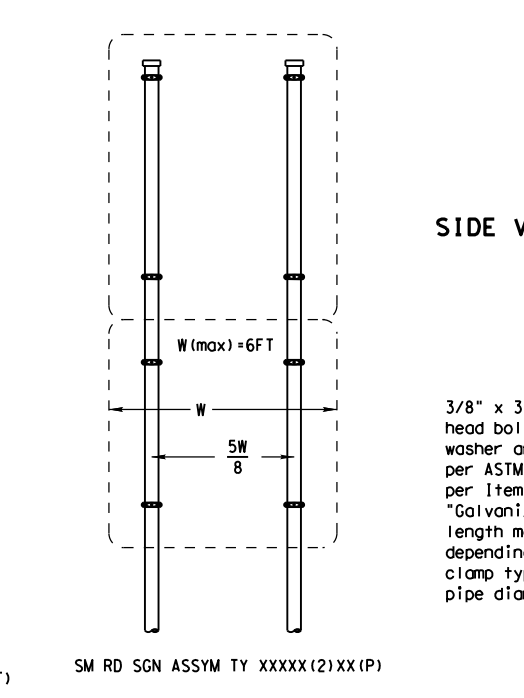
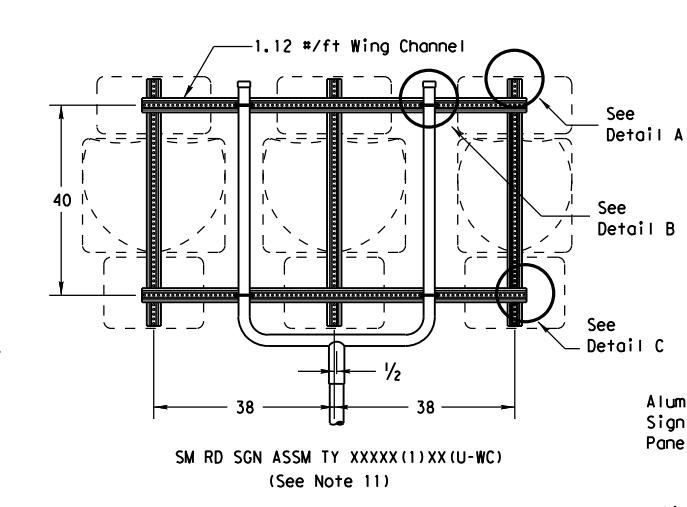
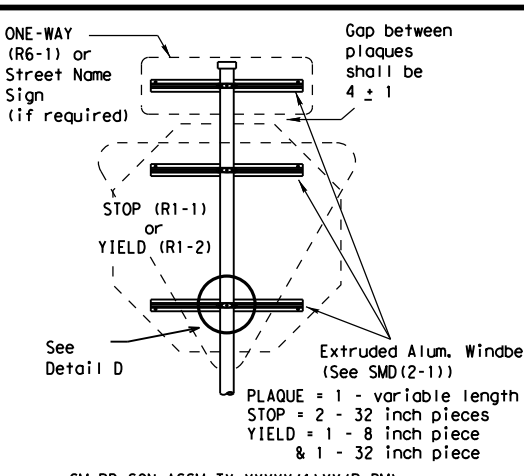
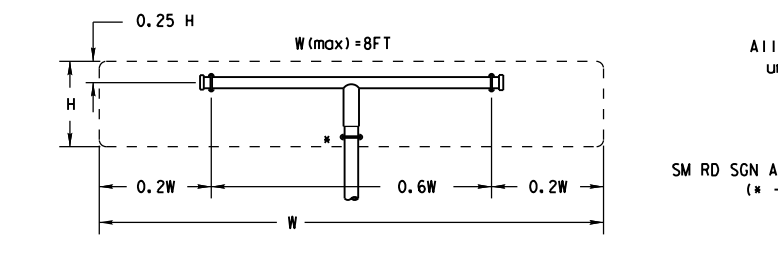
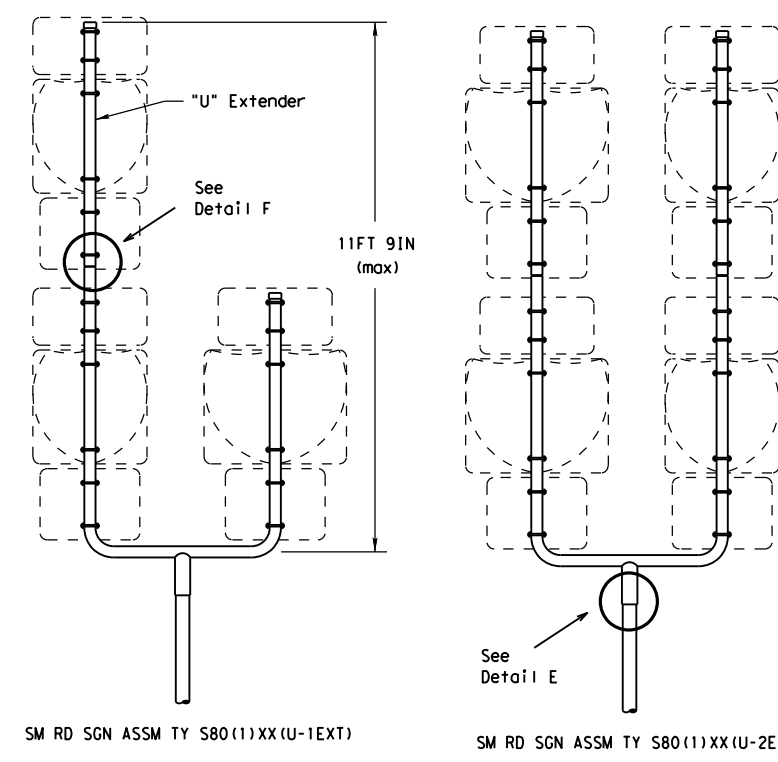
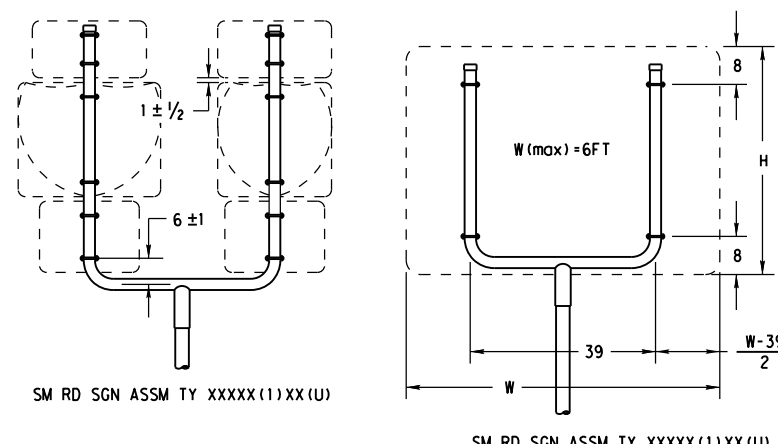
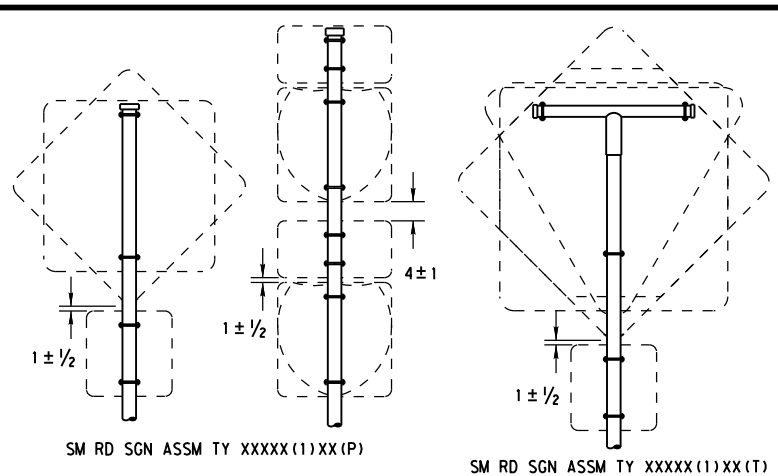
Texas Department of Transportation
 Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0447	04	018	SH 202
		DIST	COUNTY	SHEET NO.	
		CRP	REFUGIO	131	

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.



All dimensions are in english unless detailed otherwise.

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:

1. 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
2. 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.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. 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.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. 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.
7. 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.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. 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."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. 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.
12. Post open ends shall be fitted with Friction Caps.
13. 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)	



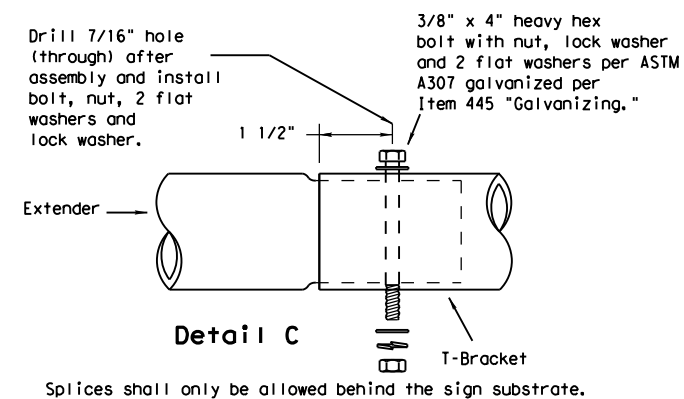
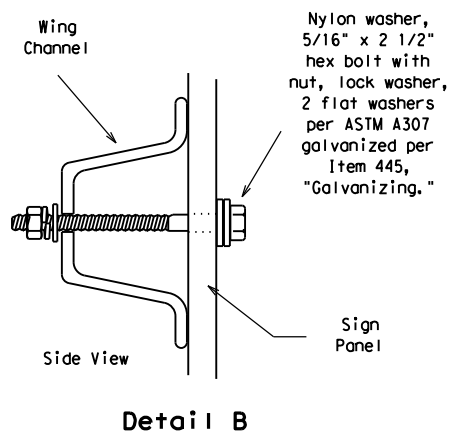
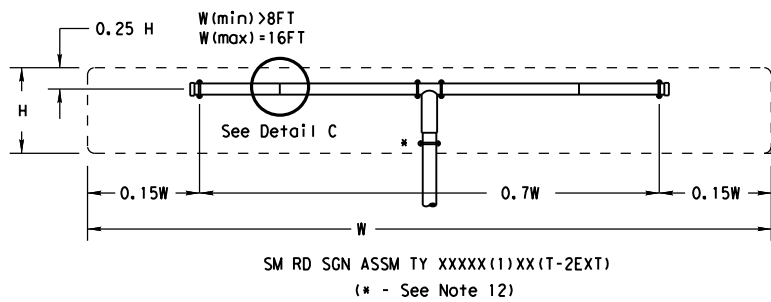
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2)-08

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	CON: 0447	SECT: 04	JOB: 018	HIGHWAY: SH 202
	DIST: CRP	COUNTY: REFUGIO	SHEET NO. 132	

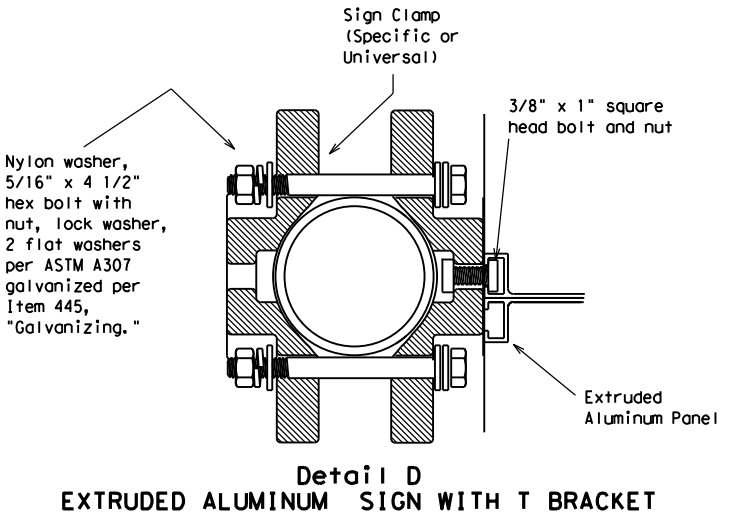
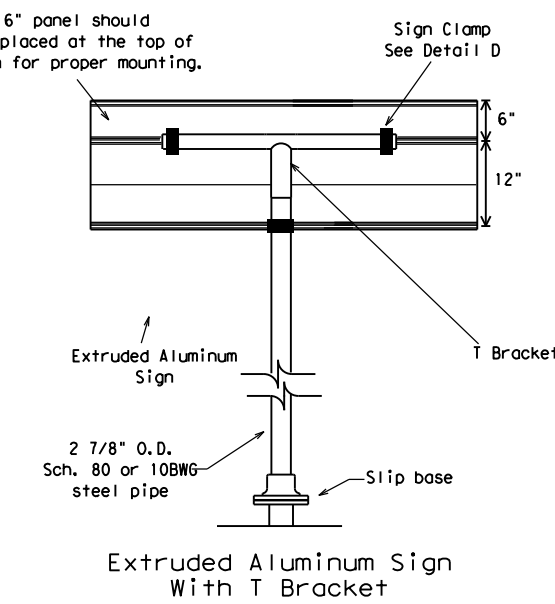
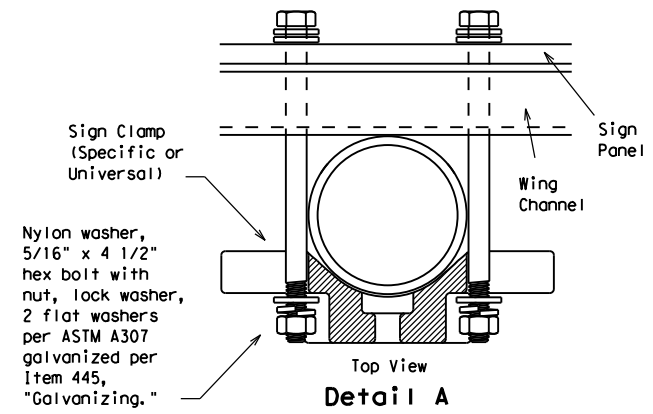
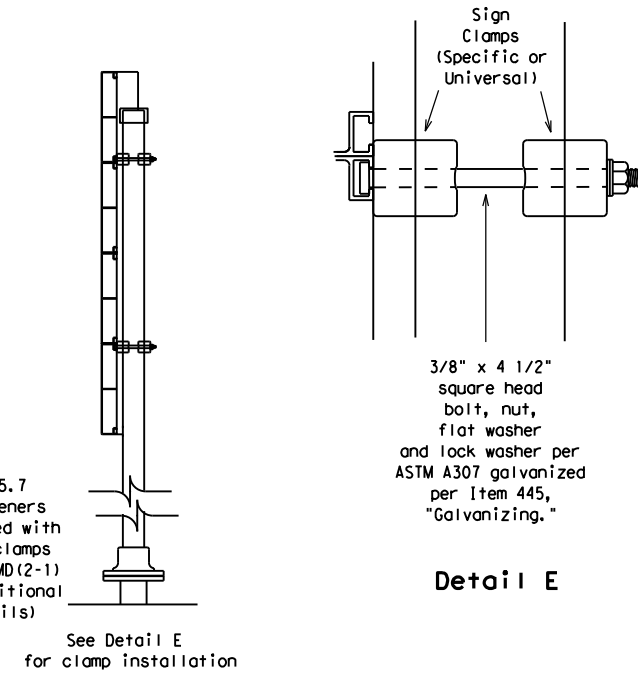
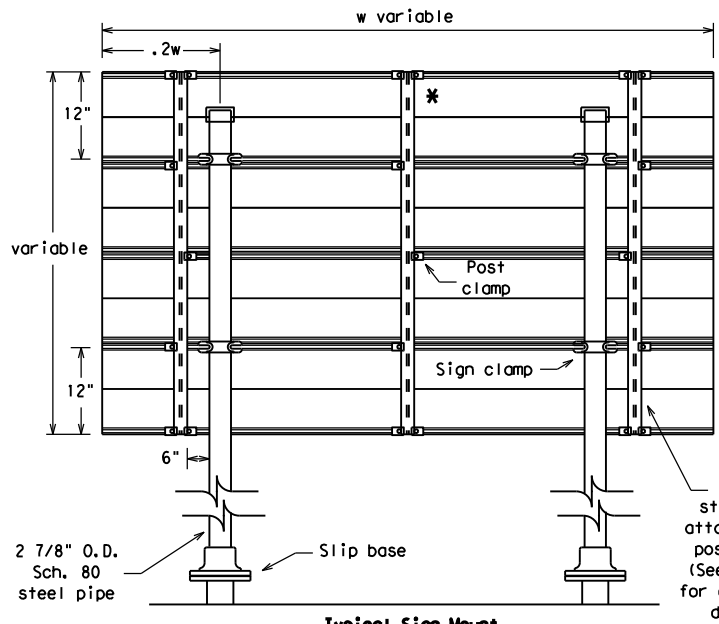
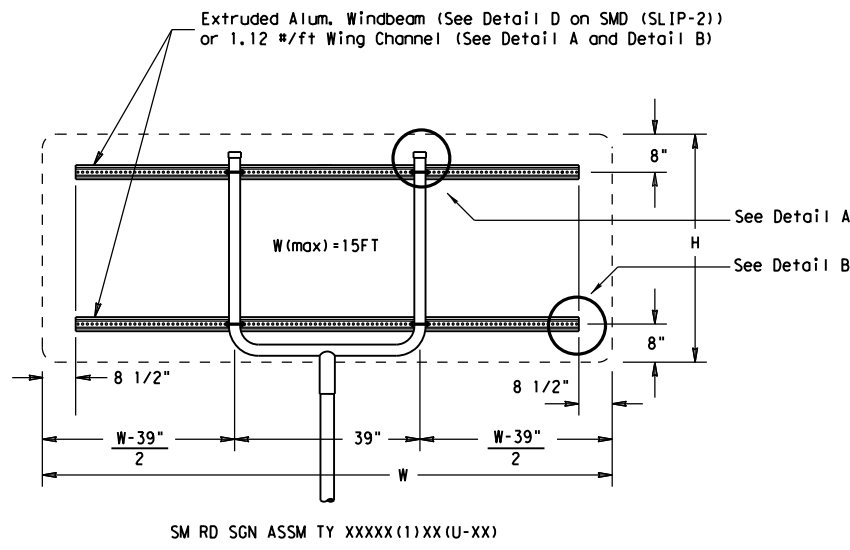
DATE: FILE:

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.

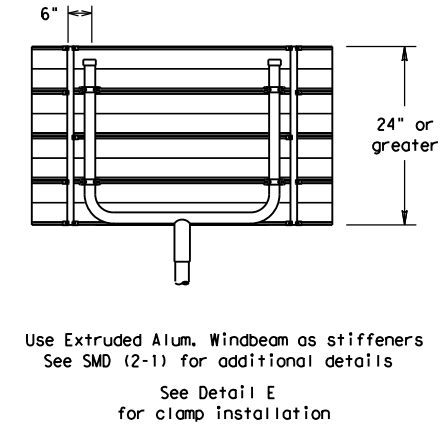
DATE:
FILE:



- 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)



Texas Department of Transportation
Traffic Operations Division

**SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM**

SMD(SLIP-3)-08

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0447	04	018	SH 202
		DIST	COUNTY		SHEET NO.
		CRP	REFUGIO		133

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: FILE:

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. None
2. No Action Required Required Action

- Action No.
- Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
 - Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
 - Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
 - 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.

- Blanco Creek (Segment 2002C)
-
-
-

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 type="checkbox"/> Temporary Vegetation	<input checked="" type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input checked="" 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 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.

-
-
-
-

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.

- See Sheet 2 of 2
-
-
-

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

- No Action Required Required Action

Action No.

- See Sheet 2 of 2
-
-
-

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
MSA: 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.

- Proposed demolition of the bridge structure may include potential exposure to lead-based paint (LBP) and/or asbestos containing material (ACM). Surveys for LBP and ACM are being completed for this project and results are pending. Copies of LBP and ACM survey reports will be made available by the Engineer upon completion.

VII. OTHER ENVIRONMENTAL ISSUES


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

- No Action Required Required Action

Action No.

- Water Quality, see Sheet 2 of 2
-
-

SHEET 1 OF 2

 Texas Department of Transportation		<i>Design Division Standard</i>	
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC			
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP
©TxDOT: February 2015	CONT	SECT	JOB
12-12-2011 (DS) REVISIONS	0447	04	018
05-07-14 ADDED NOTE SECTION IV, 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	DIST	COUNTY	SHEET NO.
	CRP	REFUGIO	134

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: FILE:

IV. VEGETATION RESOURCES

1. Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided to the greatest extent practicable. Wherever practicable, impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation. The use of seed mix that contains seeds from only locally adapted native species is recommended.
2. Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse impacts to birds.

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

Amphibians

1. Be advised of the potential occurrence of the black-spotted newt in the project area. This species prefers warm shallow watered areas with vegetative cover such as arroyos, canals, ditches, or even shallow depressions. During dry seasons, the newt lays dormant underground. Ensure that SW3P and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
2. Be advised of the potential occurrence of sheep frog in the project area. This species prefers subterranean burrows, such as those of pack rats. They will also burrow under fallen tree limbs. Although this species will remain in its burrow for most of the year, they may emerge with heavy rains in the late summer season. Breeding takes place in August and September. Minimize disturbance to downed woody debris. Ensure that SW3P and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
3. Be advised of the potential occurrence of South Texas siren in the project area. This species prefers warm shallow waters with vegetative cover such as ponds, ditches and swamps. This is a nocturnal species that burrows during the day. Ensure that SWPPP and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
4. Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats. Maintain hydrologic regime and connections between wetlands and other aquatic features. Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
5. Consider applying hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, using erosion control blankets or mats that contain no netting, or only contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
6. Project Specific Locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features. When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and overwinter sites (e.g., brush and debris piles, crawfish burrows), where feasible. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible.

Birds

7. The Federal Migratory Bird Treaty Act (MBTA) states that it is unlawful to pursue, hunt, take, kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit. This project does not have a federal permit; therefore, in accordance with this regulation, the Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, etc. Typical breeding season occurs from March through August; therefore, tree trimming and other vegetation clearing activities that may disturb breeding birds should be done in the non-breeding season (September-February), when possible. If work must be performed during the breeding season, the Contractor shall have a qualified biologist conduct a survey of the right of way to determine if bird nests are present. In the event that active nests are encountered on-site during construction, the Contractor shall notify the Engineer and measures shall be taken to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the MBTA. Phasing of work during construction may be necessary to stay in compliance with the MBTA. The Contractor can discuss other preventative measures with the Project Engineer and/or District Environmental Staff.

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

Birds (Cont.)

8. Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

Insects

9. Be advised of the potential occurrence of Monarch Butterfly in the project area. This species can inhabit a variety of habitats including native prairies, pastures, open woodlands and savannas, desert scrub, roadsides, and other habitats with abundant nectar plants, including urbanized areas. Although adults may be present year-round, they are primarily observed between March and November (Caterpillars; April and September). Common host plants in Texas are milkweeds, milkweed vines, climbing milkweed, swallowworts, and Anglepod.

Mammals

10. Be advised of the potential occurrence of Eastern spotted skunk in the project area. This species prefers open fields prairies, croplands, fence rows, farmyards, forest edges. It can be found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. Avoid unnecessary impacts to dens if encountered. Avoid harming this species if encountered.
11. Be advised of the potential occurrence of Long-tailed weasel in the project area. This species prefers to inhabit brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub and usually lives close to water. Avoid unnecessary impacts to dens if encountered. Avoid harming this species if encountered.

Reptiles

12. Be advised of the potential occurrence of spot-tailed earless lizard in the project area. This species prefers prairie-brushland that is fairly flat and free of vegetation or other obstructions, including disturbed areas; it utilizes cleared and disturbed areas, as well as, graded roadways. Avoid harming this species if encountered.
13. Be advised of the potential occurrence of Texas indigo snake in the project area. This species prefers lightly vegetated areas not far from permanent water sources and is active year round. During severely dry weather, this species will retreat to dens/burrows left by other animals or brush piles. Avoid harming this species and unnecessary impacts to burrows if encountered.
14. Due to the increased activity (mating) of reptiles during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (April-May) season. It is also encouraged to conduct ground disturbing activities before October to prevent disturbing reptiles that become less active and may be using burrows in the project area.
15. Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
16. If reptiles are found on project site allow species to safely leave the project area. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.

Other

17. Do not attempt to handle or catch any of these species. Report all sightings and/or impacts to the TxDOT-Corpus Christ District Environmental Section.


VII. OTHER ENVIRONMENTAL ISSUES

Water Quality

1. Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges. When temporary stream crossings are unavoidable, remove stream crossing once they are no longer needed and stabilize banks and soil around the crossings.
2. Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.

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
NMP: Nationwide Permit	USACE: U.S. Army Corps of Engineers
NOI: Notice of Intent	USFWS: U.S. Fish and Wildlife Service

		Design Division Standard		
<p>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS</p> <p>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	0447	04	018	SH 202
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.	CRP	REFUGIO	135	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0447-04-018; Federal Aid Project No. F 2B24(083)

1.2 PROJECT LIMITS:

From: Blanco Creek Str 29 on SH 202

To: 3.2 MI W OF US 183

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 28.3451° (N), (Long) 97.3338° (W)

END: (Lat) 28.3451° (N), (Long) 97.3338° (W)

1.4 TOTAL PROJECT AREA (Acres): 3.1

1.5 TOTAL AREA TO BE DISTURBED (Acres): 2.4

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Bridge replacement consisting of replacing bridge and approaches.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Monteola clay, 3 to 5% slopes	85% monteola and similar soils, 15% minor components, moderately well drained, very high runoff
Sinton clay loam, frequently flooded	85% sinton and similar soils, 15% minor components, well drained, negligible runoff
Odem fine sandy loam, 0 to 3% slopes, occasionally flooded	95% odem and similar soils, 5% minor components, well drained, negligible runoff

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 2.5.)

- 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
- Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities.

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
Blanco Creek	Mission River Above Tidal (2002)

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- Development of plans and specifications
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years

Other: _____

Other: _____

Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- Day To Day Operational Control
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years

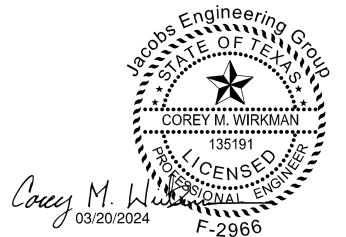
Other: _____

Other: _____

Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity



STORMWATER POLLUTION PREVENTION PLAN (SWP3)

© 2023 July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				136
STATE	STATE DIST.	COUNTY		
TEXAS	CRP	REFUGIO		
CONT.	SECT.	JOB	HIGHWAY NO.	
0447	04	018	SH 202	

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- Sediment Trap
 - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
 - 3,600 cubic feet of storage per acre drained
- Sedimentation Basin
 - Not required (<10 acres disturbed)
 - Required (>10 acres) and implemented.
 - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
 - 3,600 cubic feet of storage per acre drained
 - Required (>10 acres), but not feasible due to:
 - Available area/Site geometry
 - Site slope/Drainage patterns
 - Site soils/Geotechnical factors
 - Public safety
 - Other: _____

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
Permanent Seeding	194+00 203+75	198+00 208+25
Riprap	197+09 203+75	198+00 204+34

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
- Daily street sweeping
- 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
No surface waters present, vegetated buffer zones are not planned		

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 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

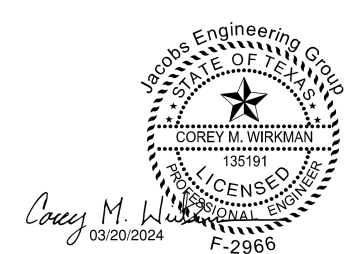
2.9 INSPECTIONS:

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 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 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 2.5 of this SWP3.










STORMWATER POLLUTION PREVENTION PLAN (SWP3)

© 2023 July 2023 Sheet 2 of 2

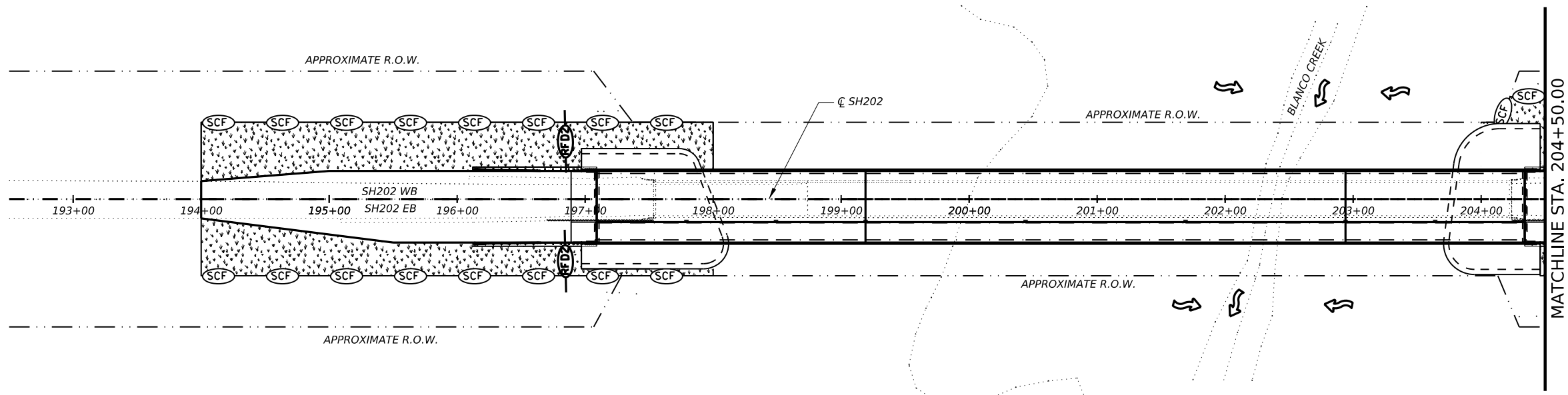
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				137
STATE	STATE DIST.	COUNTY		
TEXAS	CRP	REFUGIO		
CONT.	SECT.	JOB	HIGHWAY NO.	
0447	04	018	SH 202	

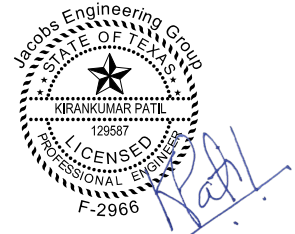


- LEGEND**
-  ROCK FILTER DAM (TY 2)
 -  SEDIMENT CONTROL FENCE
 -  DRAINAGE FLOW ARROWS
 -  SEEDING AREA
 -  PERMANENT PAVEMENT
 -  RIPRAP (CONCRETE)
 -  RIPRAP (STONE PROTECTION)

- NOTE:**
1. AREAS NOT SHOWN BY SEEDING OR AREAS CONSIDERED TO BE VEGETATION BUFFERS AND MAY NOT BE DISTURBED UNLESS AS DIRECTED.
 2. EROSION CONTROL QUANTITIES LISTED ARE APPROXIMATE AND MAY NEED TO BE VARIED TO MEET FIELD CONDITIONS.



03/07/2024



Jacobs
 1899 BRYAN ST. SUITE 3500
 DALLAS, TX 75201-3136
 Phone: +1 (214) 638-0145
 Fax: Registration: F-2966

Texas Department of Transportation








SH 202

ENVIRONMENTAL
SWP3 LAYOUT

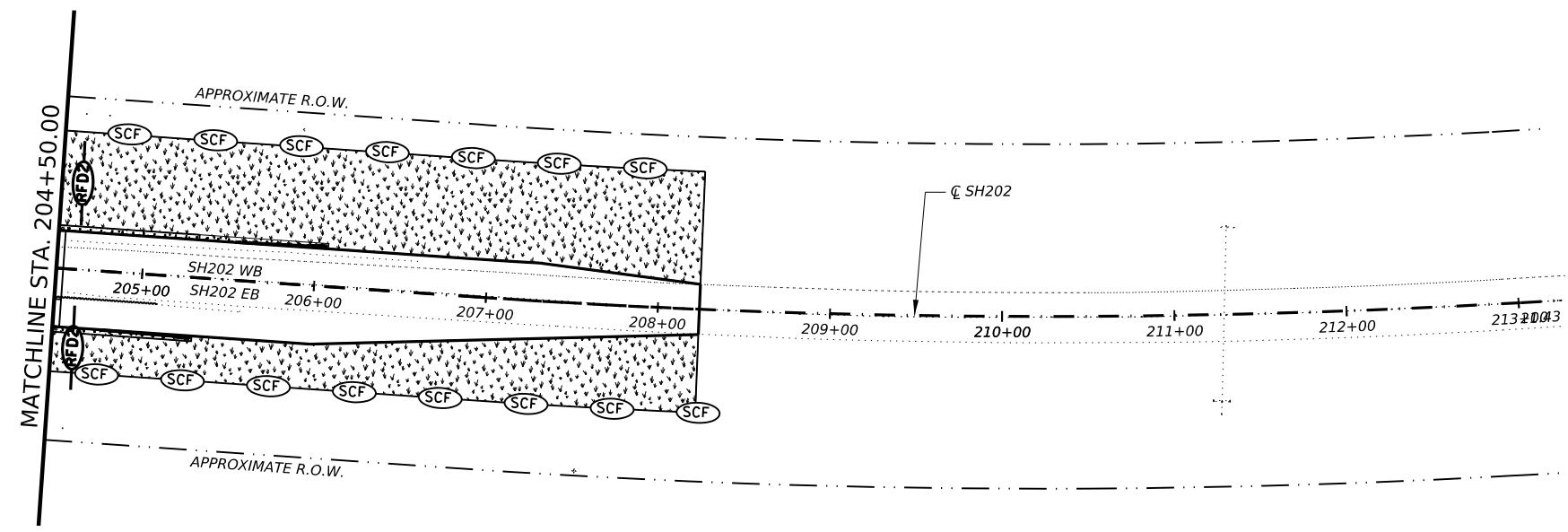
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	138	

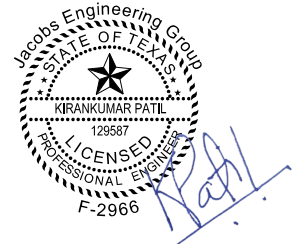


- LEGEND**
-  ROCK FILTER DAM (TY 2)
 -  SEDIMENT CONTROL FENCE
 -  DRAINAGE FLOW ARROWS
 -  SEEDING AREA
 -  PERMANENT PAVEMENT
 -  RIPRAP (CONCRETE)
 -  RIPRAP (STONE PROTECTION)

- NOTE:**
1. AREAS NOT SHOWN BY SEEDING OR AREAS CONSIDERED TO BE VEGETATION BUFFERS AND MAY NOT BE DISTURBED UNLESS AS DIRECTED.
 2. EROSION CONTROL QUANTITIES LISTED ARE APPROXIMATE AND MAY NEED TO BE VARIED TO MEET FIELD CONDITIONS.



03/07/2024



Jacobs 1899 BRYAN ST. SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 202

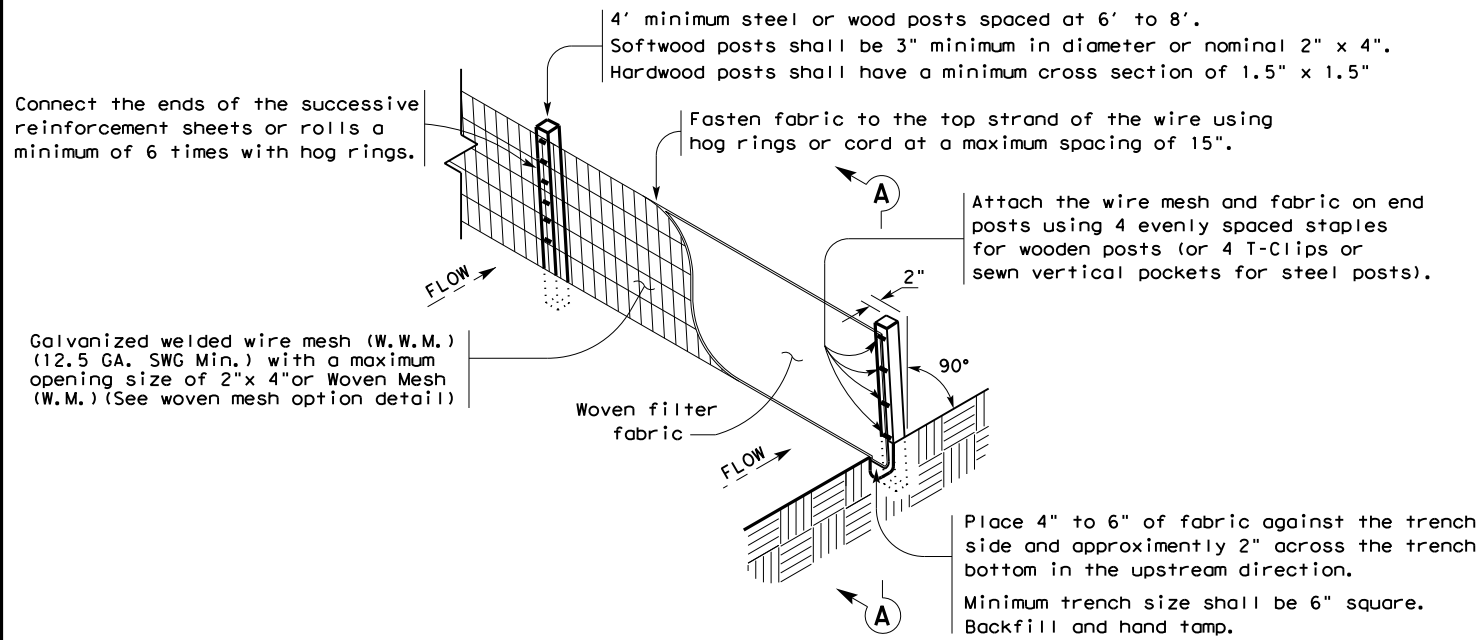
**ENVIRONMENTAL
SWP3 LAYOUT**

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0447	04	018	SH 202
DIST	COUNTY	SHEET NO.	
CRP	REFUGIO	139	

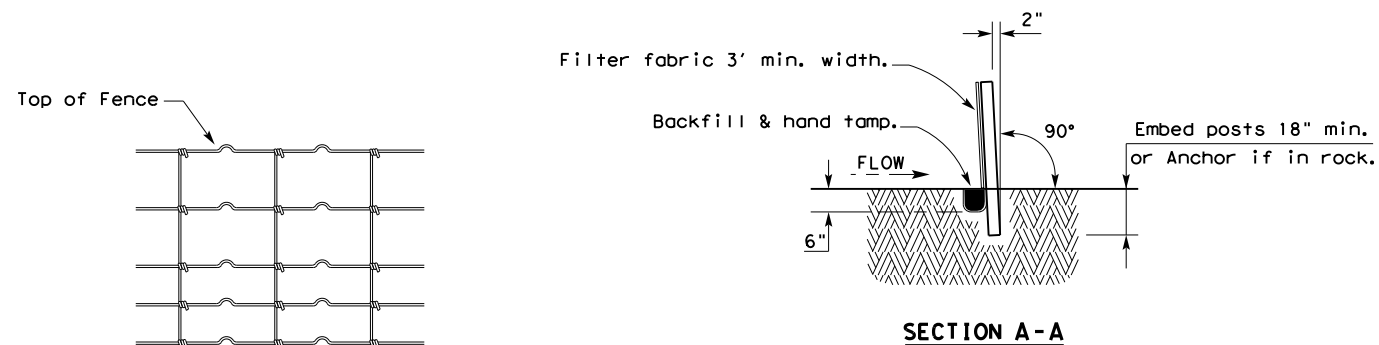
DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. The use of this standard is for the conversion of this standard to other formats or for incorrect results or damages resulting from its use. TxDOT assumes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

DATE
FILE



TEMPORARY SEDIMENT CONTROL FENCE

SCF



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.

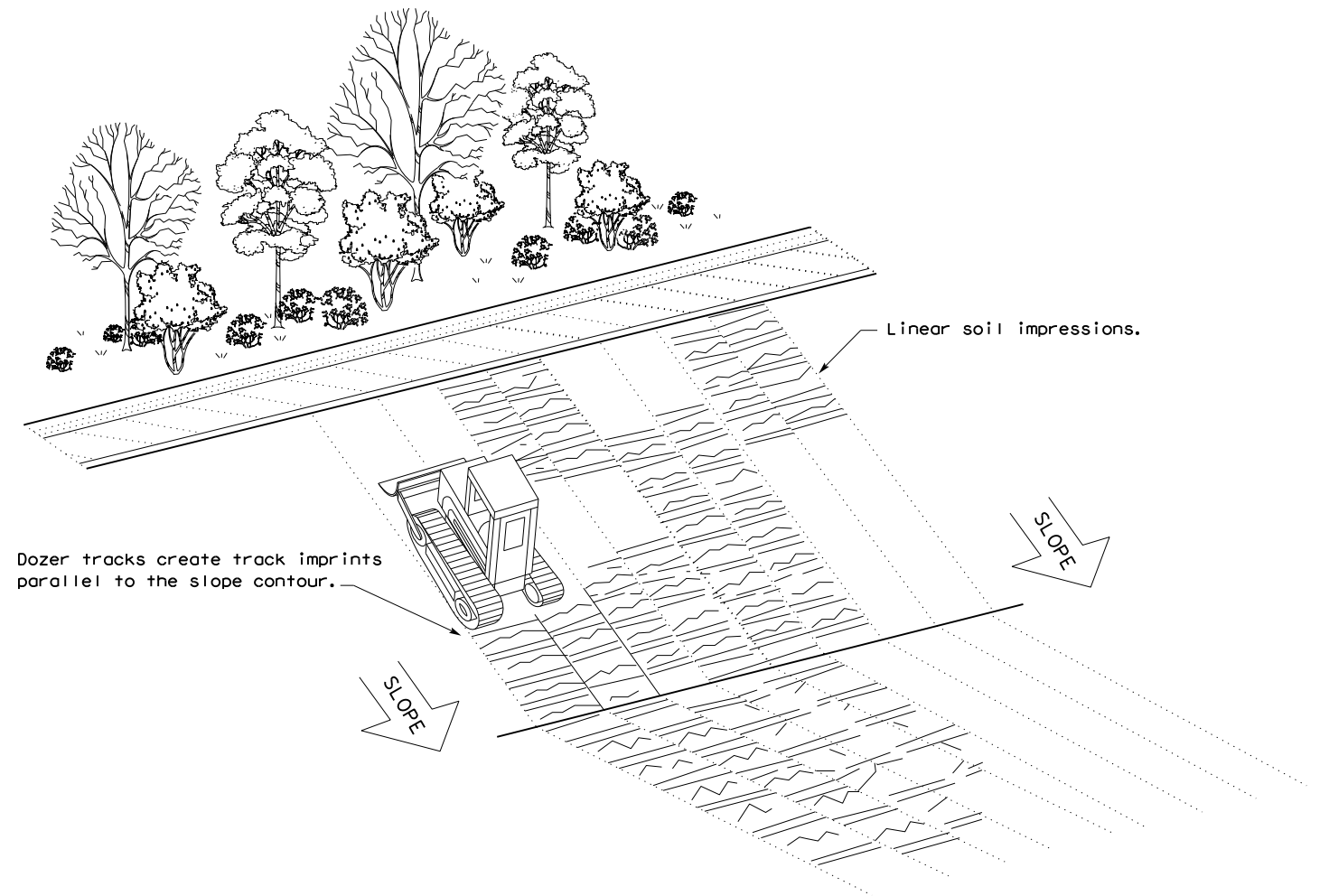
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

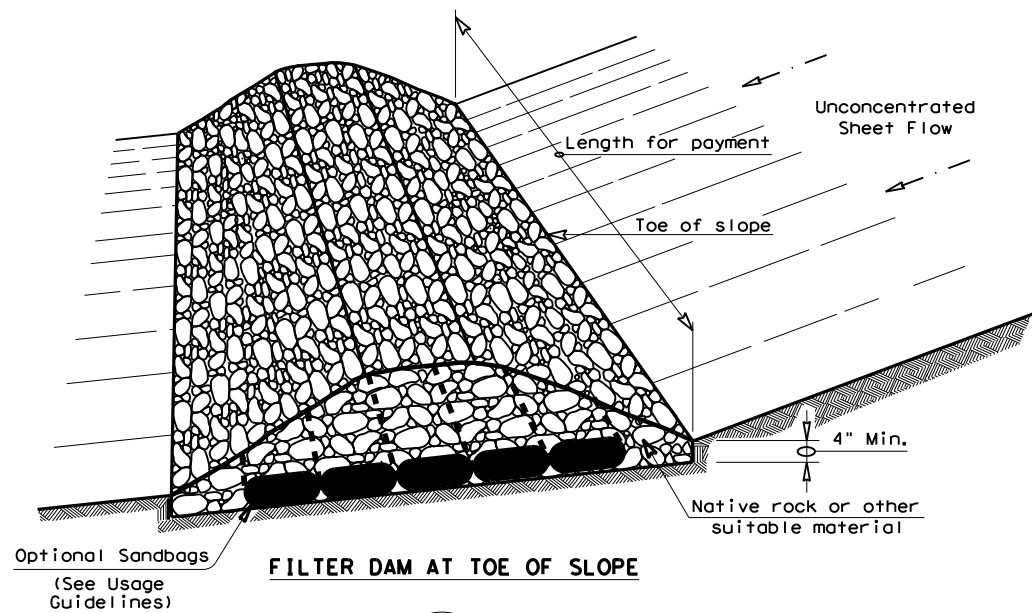
1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum 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.



VERTICAL TRACKING

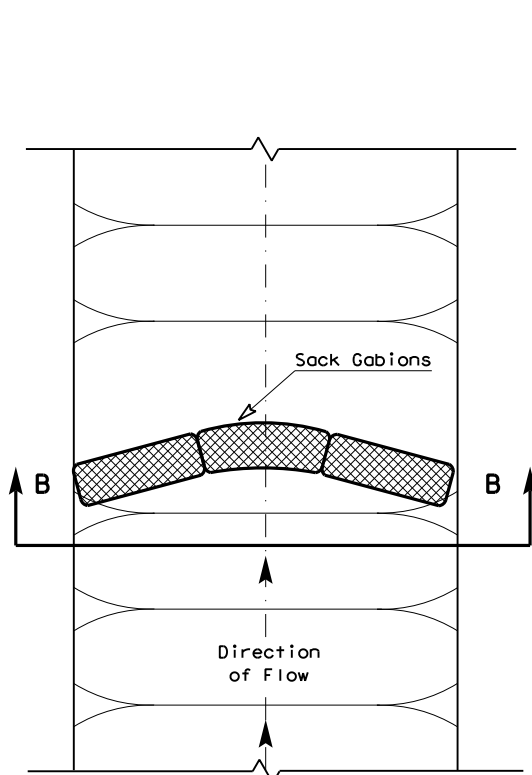
				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING EC(1)-16					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0447	04	018	SH 202	
	DIST	COUNTY		SHEET NO.	
	CRP	REFUGIO		140	

DISCLAIMER: 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.



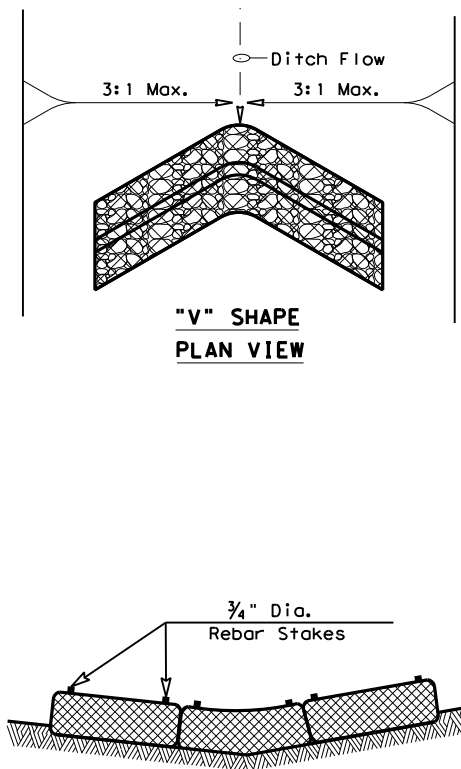
FILTER DAM AT TOE OF SLOPE

RFD1

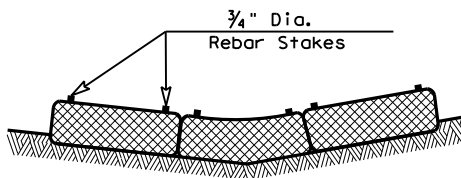


PLAN VIEW

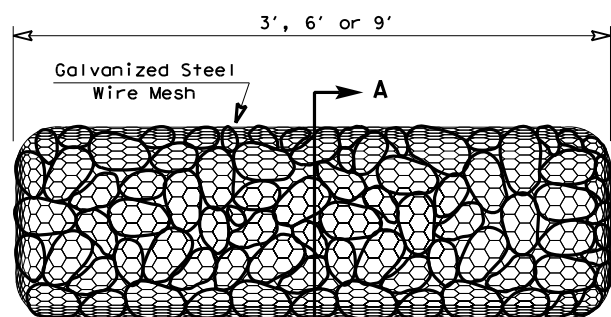
RFD1



"V" SHAPE PLAN VIEW

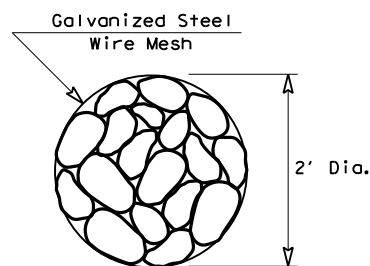


SECTION B-B

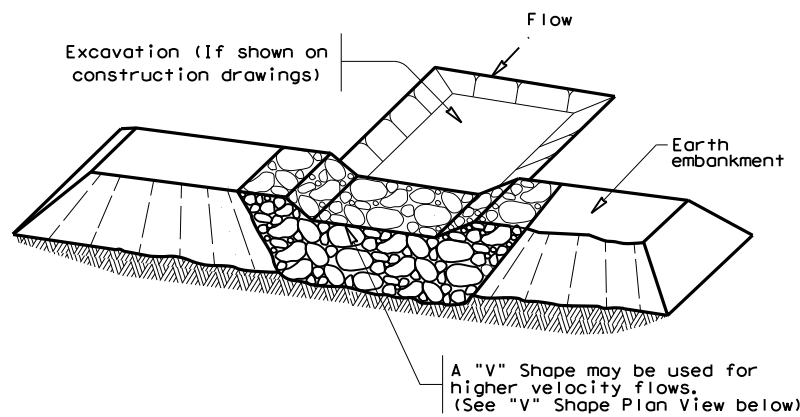


TYPE 4 (SACK GABIONS)

RFD4

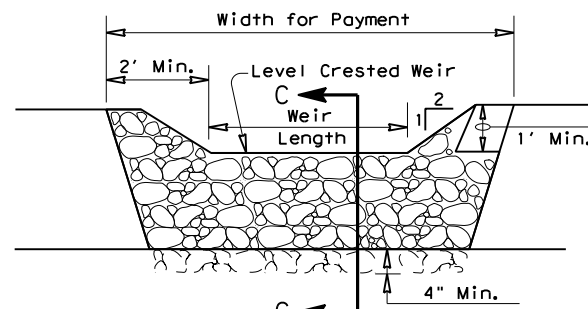


SECTION A-A

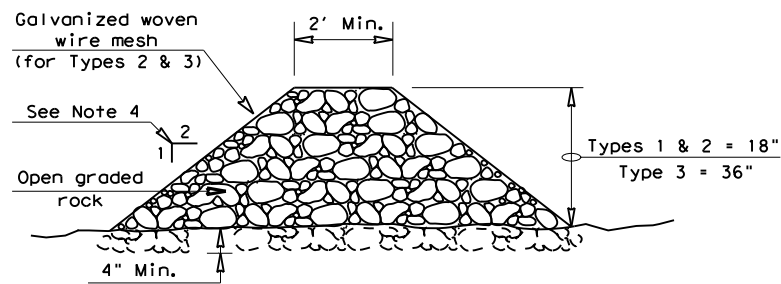


FILTER DAM AT SEDIMENT TRAP

RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

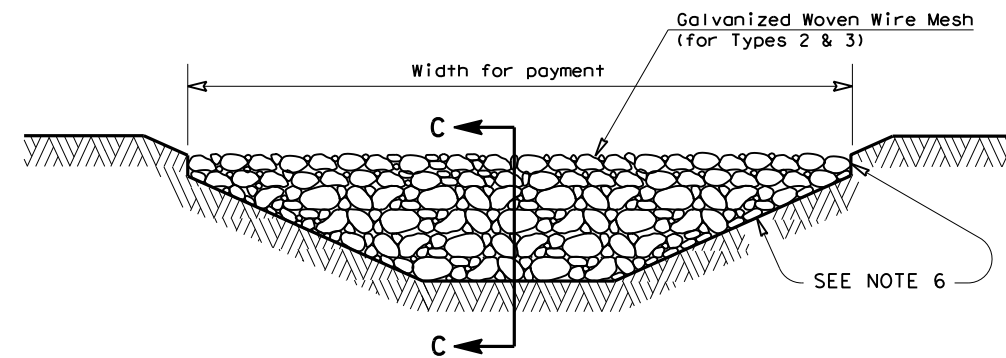
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

- Type 1 Rock Filter Dam — RFD1 —
- Type 2 Rock Filter Dam — RFD2 —
- Type 3 Rock Filter Dam — RFD3 —
- Type 4 Rock Filter Dam — RFD4 —



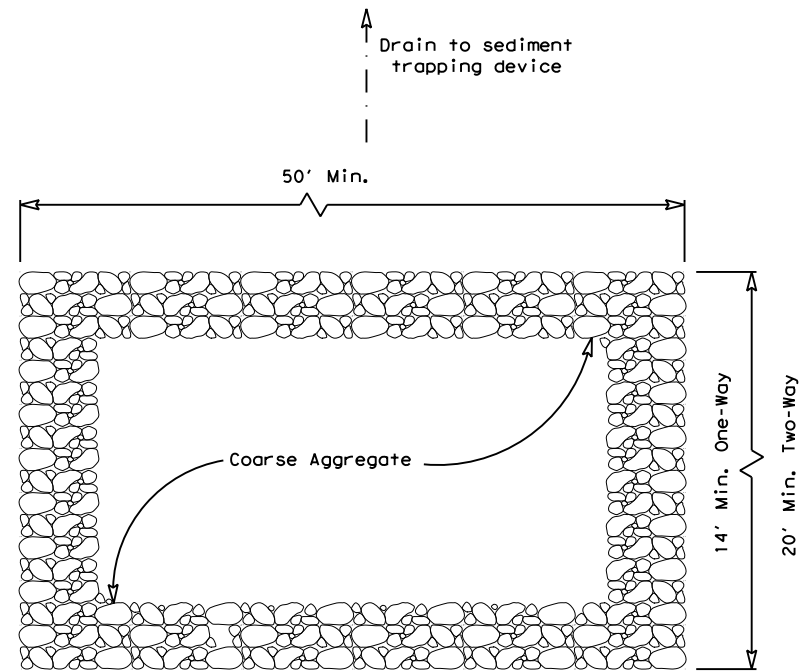
**TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
ROCK FILTER DAMS
EC(2) - 16**

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0447	04	018	SH 202
	DIST	COUNTY	SHEET NO.	
	CRP	REFUGIO	141	

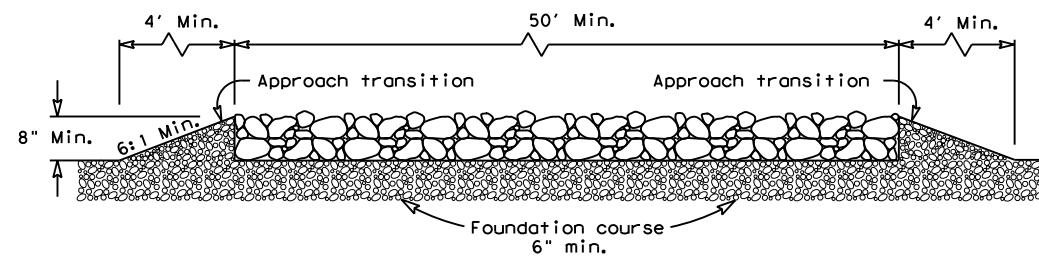
DATE:
FILE:

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

DATE: \$DATES
FILE: \$FILES



PLAN VIEW

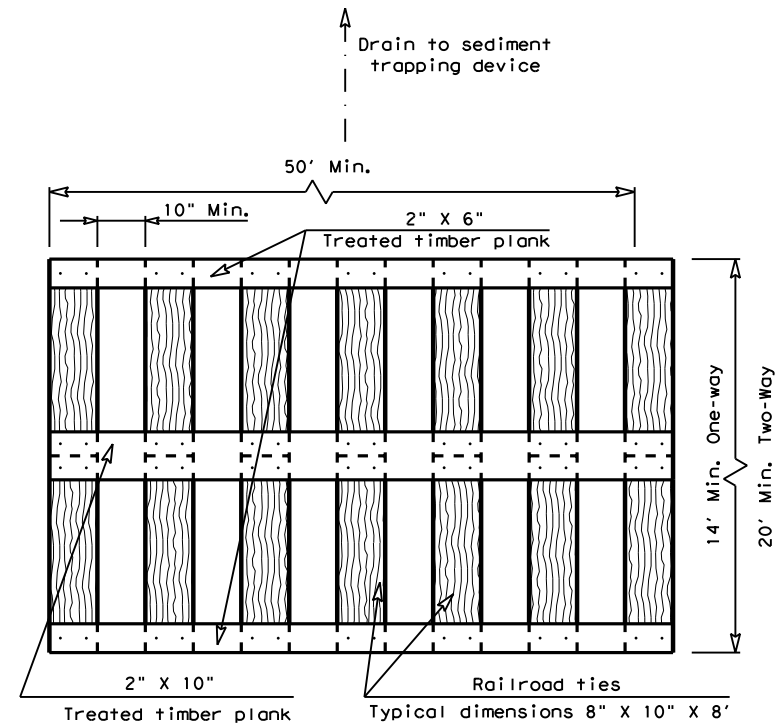


ELEVATION VIEW

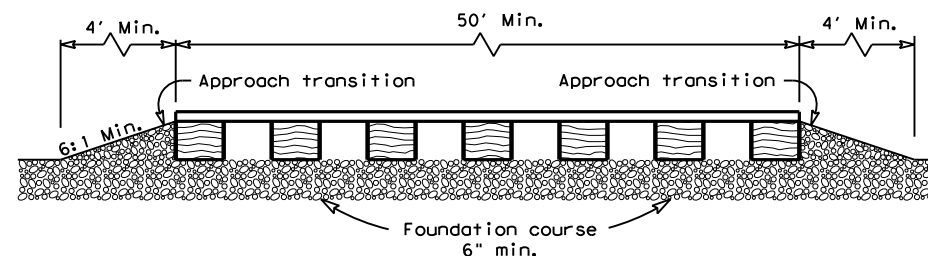
CONSTRUCTION EXIT (TYPE 1)
ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

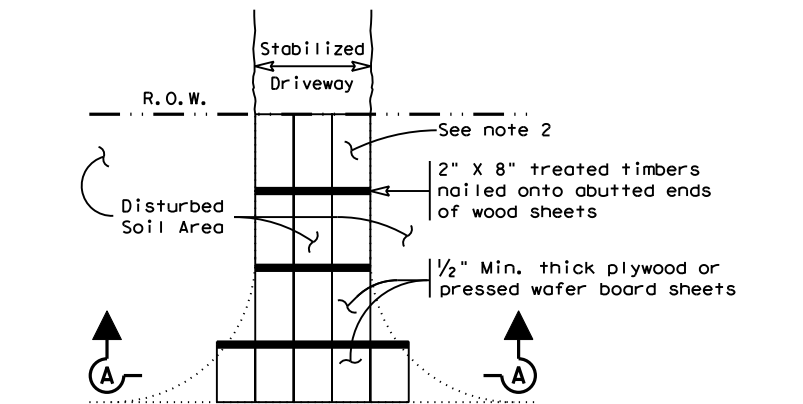


ELEVATION VIEW

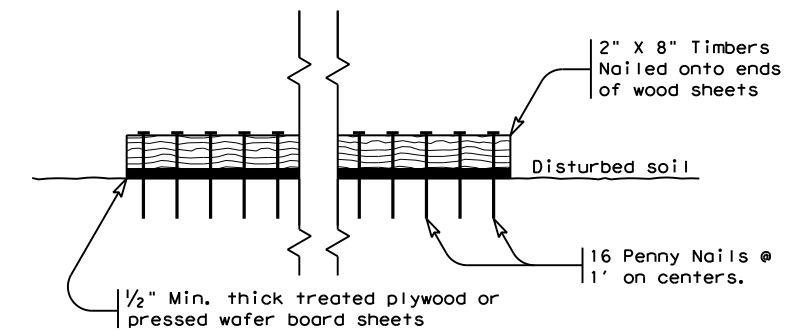
CONSTRUCTION EXIT (TYPE 2)
TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



SECTION A-A
CONSTRUCTION EXIT (TYPE 3)
SHORT TERM

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT: 0447	SECT: 04	JOB: 018
REVISIONS		HIGHWAY: SH 202	
DIST: CRP	COUNTY: REFUGIO	SHEET NO.: 142	