DocuSign Envelope ID: 6F6340FF-E665-469F-BD54-BF578A214852

INDEX OF SHEETS

SEE SHEET NO. 2

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

EXIST NBI NO.: 07-164-0-0035-05-021
FUNCTIONAL CLASS = RURAL MINOR ARTERIAL
TERRAIN = ROLLING
DESIGN SPEED = 45 MPH
CURRENT ADT (2021) = 6,926
FUTURE ADT (2041) = 9,676

FEDERAL-AID PROJECT NUMBER			
BR 2021(816)			
CONT	SECT	JOB	HIGHWAY
0035	05	061	US 83
DIST	COUNTY		SHEET NO.
SJT	MENARD		1

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. BR 2021(816)

US 83
MENARD COUNTY

NET LENGTH OF PROJECT
ROADWAY = 200.00 FT = 0.038 MI
BRIDGE = 1259.47 FT = 0.238 MI
TOTAL = 1459.47 FT = 0.276 MI

LIMITS: AT SAN SABA RIVER

FOR THE CONSTRUCTION OF BRIDGE MAINTENANCE
CONSISTING OF BRIDGE MAINTENANCE

FINAL PLANS

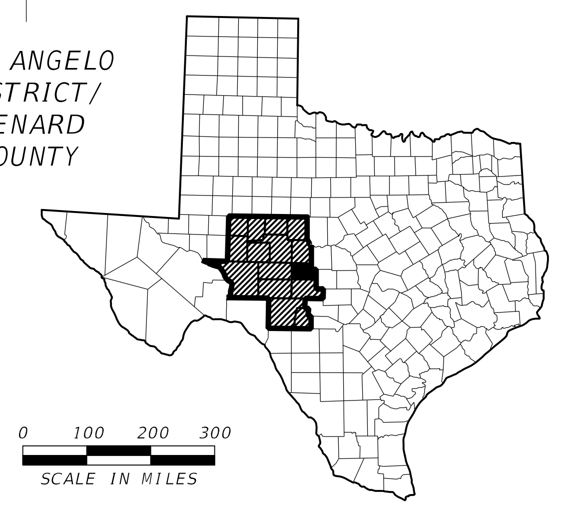
Letting Date: ______
Name of Contractor: ______
Date Work Began: ______
Date Work Completed: ______
Date Work Accepted: ______
Final Contract Cost: ______

Project was built according to the Plans & Specifications. These final plans reflect the work done and the quantities shown thereon and on the Final Estimate are Final Quantities.

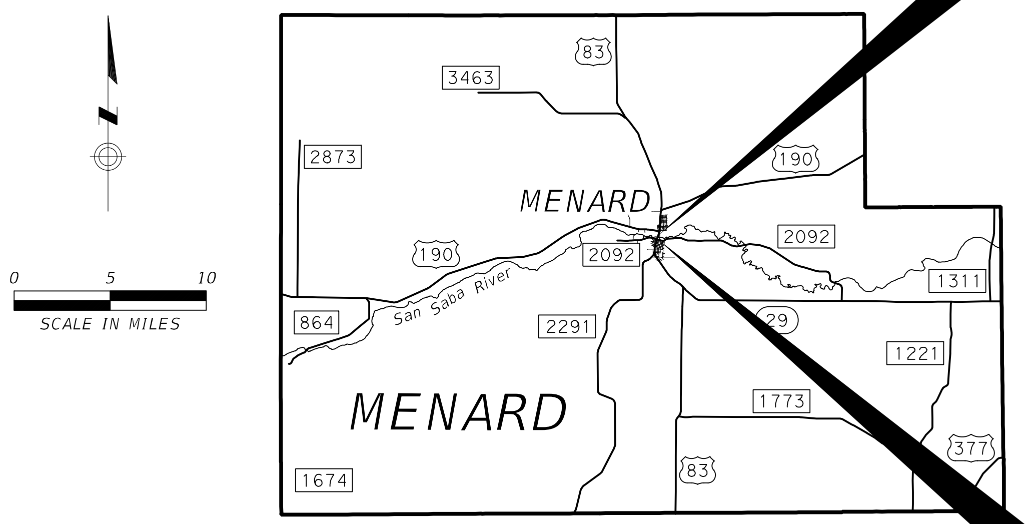
Area Engineer   Date

Summary of Change Orders:

SAN ANGELO DISTRICT/ MENARD COUNTY



END PROJECT
BEGIN C-S-J 0035-05-061
STA 1065+30.75



BEGIN PROJECT
END C-S-J 0035-05-061
STA 1050+71.28

VOLUME I
(CONTRACT CSJ: 0035-05-061)

2021
Texas Department of Transportation

SUBMITTED FOR LETTING: 7/7/2021
DocuSigned by:
Randee W Shields P.E.
BA73DA...
District Design Engineer

RECOMMENDED FOR LETTING: 7/7/2021
DocuSigned by:
826...
District Director of TP&D

APPROVED FOR LETTING: 7/7/2021
DocuSigned by:
BC10B17...
District Engineer

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED PROFESSIONAL ENGINEER
7/6/2021

Thomas G. Ashcraft

CP&Y
TBPE FIRM # 1741
SUBMITTED FOR LETTING:
Thomas G. Ashcraft
Consultant Engineer

EXCEPTIONS
NONE
EQUATIONS
NONE
RAILROAD CROSSINGS
NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012).

SHEET NO.		DESCRIPTION
		GENERAL
1		TITLE SHEET
2		INDEX OF SHEETS
3		LOCATION MAP
4		TYPICAL SECTION
5 – 6		GENERAL NOTES
7 – 8		ESTIMATE & QUANTITY SHEET
9		QUANTITY SUMMARIES
		TRAFFIC CONTROL PLAN
10		TRAFFIC CONTROL PLAN – GENERAL REQUIREMENTS
11		TRAFFIC CONTROL PLAN – PROJECT LIMIT SIGNS FOR ISOLATED WORK AREAS
12		TRAFFIC CONTROL PLAN – TYPICAL SECTIONS
		TRAFFIC CONTROL STANDARD SHEETS
13 – 24	*	BC(1–12)–21
25	*	TCP(2–5)–18
26	*	TCP(3–1)–13
27	*	TCP(3–3)–14
28	*	WZ(STPM)–13
		ROADWAY DETAILS
29		ROADWAY PLANS
		ROADWAY STANDARD SHEETS
30	*	BED–14
31	*	GF(31)–19
32	*	GF(31)MS–19
33 – 34	*	GF(31)TRTL3–20
35	*	SGT(10S)31–16
36	*	SGT(12S)31–18
37	*	GUARD FENCE DETAILS
		BRIDGES
38		BRIDGE ESTIMATED QUANITIES
39 – 45		BRIDGE REPAIR LAYOUT
46		TYPICAL SECTION
47		ABUTMENT REPAIR DETAILS
48 – 66		BENT REPAIR DETAILS
67 – 71		DECK REPAIR DETAILS
72		RAIL REPAIR DETAILS
73 – 77		EXISTING BRIDGE INFORMATION
		BRIDGE STANDARD SHEETS
78	#	TRF
79 – 80	#	TYPE T221
		TRAFFIC STANDARD SHEETS
81	*	D & OM(1)–20
82	*	D & OM(2)–20
83	*	D & OM(3)–20
84	*	D & OM(6)–20
85	*	D & OM(VIA)–20
86	*	PM(1)–20
87	*	PM(2)–20
		ENVIRONMENTAL ISSUES
88		TXDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)
89		ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
90		EROSION CONTROL PLAN
		STANDARD SHEETS
91	*	EC(1)–16
92 – 94	*	EC(9)–16

STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

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

MICHAEL J. KNAPIK, P.E.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

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

THOMAS W. STEPHENSON, P.E.

NO.	REVISION	BY	DATE

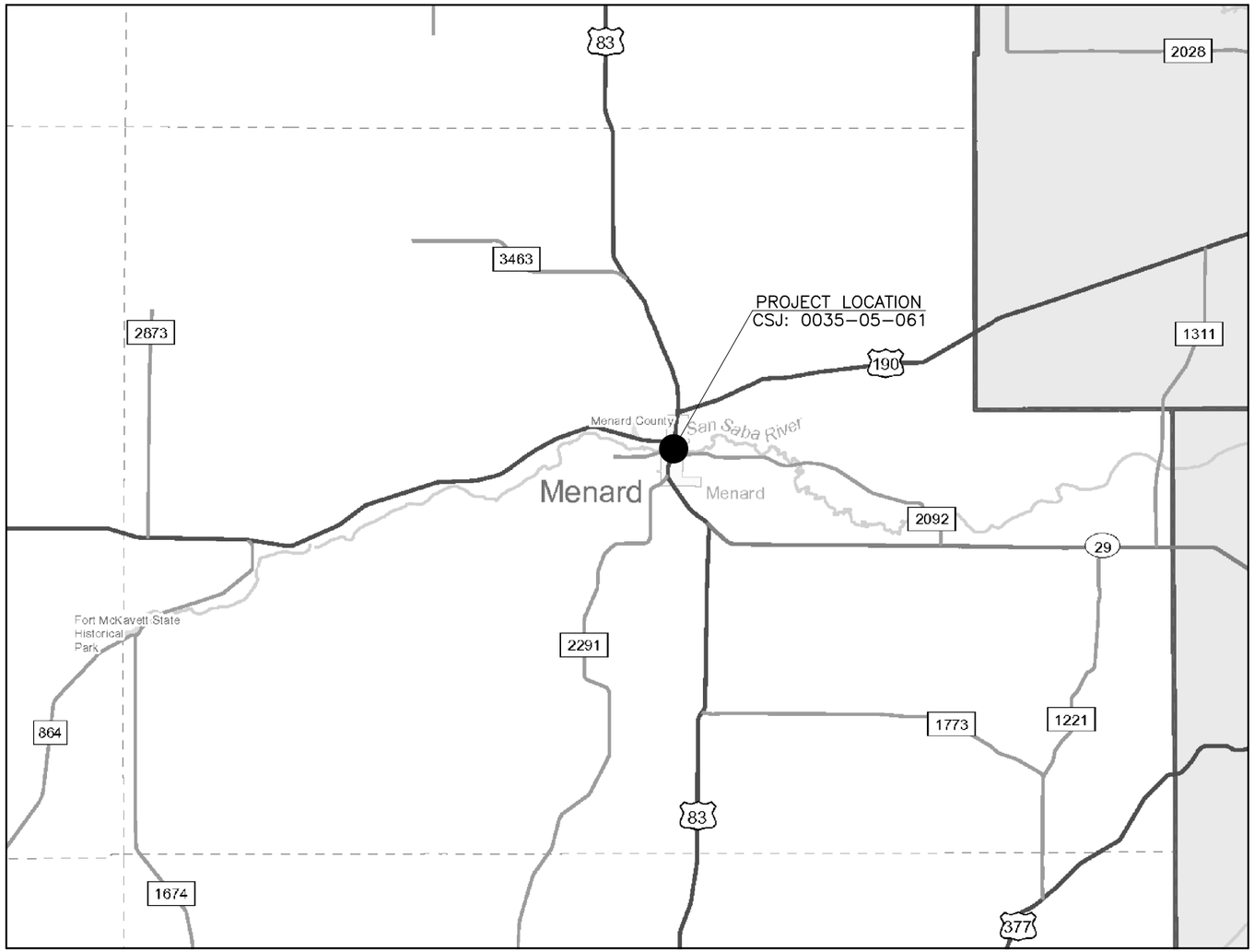
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

INDEX OF SHEETS

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	2

SHEET 1 OF 1



STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED PROFESSIONAL ENGINEER
5/27/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

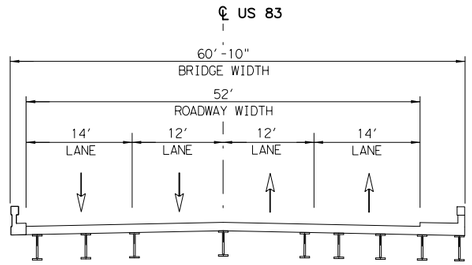
SAN ANGELO DISTRICT BRIDGE REHABILITATION

LOCATION MAP

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Checked:	CPY						
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	3

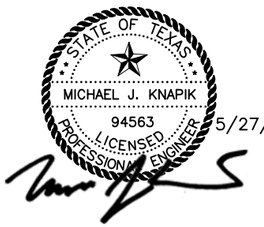
SHEET 1 OF 1

cpybw_ANSIB.tbl
cpydf_ANSIB.pltcfg
pw:/
5/27/2021 10:22:55 AM mknapik
pw:/



EXISTING/PROPOSED TYPICAL SECTION

STA. 1051+71.60 TO STA. 1064+31.02



NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

TYPICAL SECTION

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	4

County: Menard

Highway: US 83 **Control:** 0035-05-061

GENERAL NOTES

The following Standard Sheets have been modified: None

Locate the project bulletin board at an approved location within the project limits such as at a field office, staging area, or stockpile, and make accessible to the public at all times. Do not remove the bulletin board from the project until approved. If a construction site notice is required for the project, post a copy at each geographically separated work location.

If Contractor elects to establish a pit within 200 ft. of a public road, construct a barrier or other device in accordance with Natural Resources Code, Chapter 133, and Section 133.041.

Do not use salt water with solids in excess of 10,000 parts per million, as determined by evaporation.

Contractor questions on this project are to be addressed by the following individual:

Nicholas Greenly, P.E.; email SJT_PreliminaryReview@txdot.gov

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address: https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Item 5, "Control of the Work"

State Highway right of way markers destroyed by the Contractor shall be replaced by a Texas Registered Professional Land Surveyor (RPLS) at no cost to the State. Provide written documentation from the RPLS attesting to the replacement of the right of way markers.

Make suitable advance notification to affected non-participating municipalities regarding Class B underground facilities, call the Department's San Angelo District Traffic Office at telephone number (325) 947-9208 to have the Department's existing traffic signal and illumination utilities located, and call the Department's San Angelo District Maintenance Office at telephone number (325) 947-9322 to have the Department's existing irrigation utilities located.

Responsibility for construction surveying shall conform to Section 5.9.3., "Method C."

County: Menard

Highway: US 83 **Control:** 0035-05-061

Submit shop drawings electronically for the fabrication of structural items and other items specifically listed in the plans to SJT_ShopPlanReview@txdot.gov. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" at http://www.txdot.gov/business/resources/specifications/shop-drawings.html.

Item 6, "Control of Materials"

When allowed, store materials and equipment in approved areas within the right of way.

Access the work area from the right of way.

Item 7, "Legal Relations and Responsibilities"

No significant traffic generator events have been identified.

Item 8, "Prosecution and Progress"

Submit the sequence of work and estimated progress schedule on paper or as a Portable Document Format (PDF) electronic file compatible with Adobe Systems Incorporated "Acrobat Reader XI".

Charges for working days shall conform to Section 8.3.1.4., "Standard Workweek."

Item 9, "Measurement and Payment"

The progress payment period shall end two working days before the 28th of the month. Deliver invoices to be paid as material on hand on or before the end of the progress payment period.

For projects that include a disadvantaged business enterprises (DBE) goal, provide a conversion rate for units of payment for work subcontracted to DBE if units of payments differ from those shown on the plans.

Item 429, "Concrete Structure Repair"

Maintain a complete paper copy of the TxDOT Concrete Repair Manual at each active location which requires work performed under this Item. This document is available as a free download from: http://onlinemanuals.txdot.gov/txdotmanuals/crm/crm.pdf.

Obtain approval of both damaged concrete removal and concrete surface preparation before placing repair materials.

Item 446, "Field Cleaning and Painting Steel"

The existing coating on the steel beams and diaphragms to be repainted contains lead or other hazardous materials. Provide for the safety and health of employees and abide by all OSHA standards and regulations when removing and disposing of the existing coating material. All costs incurred for proper management shall be subsidiary to this Item.

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

GENERAL NOTES

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	5

SHEET 1 OF 2

Proposed paint color shall closely resemble the existing steel beam paint color. Use AMS Standard 595 issued by the US Government General Services Administration for the color identification and selection. The Engineer will approve final color choice before application begins.

Item 450, "Railing", Item 451, "Retrofit Railing", Item 512, "Permanent Concrete Traffic Barrier"

Furnish and install barrier reflectors on the top of concrete railing.

Obtain approval of drilled holes in existing concrete before placing anchor bars with epoxy.

Construct traffic and combination railings to increased heights to accommodate future overlay.

Existing slab bars are not epoxy coated.

Item 502, "Barricades, Signs and Traffic Handling"

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.

Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls"

The project is exempt from the Texas Pollutant Discharge Elimination System (TPDES) General Permit (TXR150000). Exempt projects are those that disturb less than one acre or routine maintenance activities that maintain the original line and grade, hydraulic capacity, or original purposes of the site. **Item 658, "Delineator and Object Marker Assemblies"**

Remove existing object markers and delineators. Removal is not a pay item.

Item 662, "Work Zone Pavement Markings"

Do not use temporary flexible-reflective roadway marker tabs to delineate words, symbols, shapes, or diagonal or transverse lines.

Paint and beads are allowed for nonremovable markings.

Item 666, "Retroreflectorized Pavement Markings"

Place glass beads for pavement markings in accordance with the following table:

County: Menard

Highway: US 83 **Control:** 0035-05-061

Marking Types	Glass Bead (Double Drop) Types	Glass Bead Rates	
		Surface Treatment	Asphalt Concrete Pavement, Microsurfacing, Concrete Pavement
TY I markings	Type II	12 LB per 100 SF	6 LB per 100 SF
	Type III	12 LB per 100 SF	6 LB per 100 SF
TY II markings	Type II	12 LB per GAL	6 LB per GAL
	Type III	12 LB per GAL	6 LB per GAL

Apply TY II marking material at a rate of 25 gallons per mile.

The striper speed shall not exceed 5 MPH during application. Convert to gravity-flow beaders (if not in use) to obtain optimum bead application, when directed.

Clean striper tanks before use if there is a build-up of dry paint, as directed. Flush lines and guns before use.

Reference existing markings before performing work that disturbs the markings, so that the markings can be re-established.

Provide a double-drop of Type II and Type III glass beads.

For the purposes of this project, existing no-passing zone markings were not evaluated for adherence to current standards, but were re-established in their existing locations.

NO.	REVISION	BY	DATE

TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

GENERAL NOTES

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061		6

SHEET 2 OF 2

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0035-05-061 **DISTRICT** San Angelo **COUNTY** Coke, Menard
HIGHWAY SH 70, US 83

				CONTROL SECTION JOB	0035-05-061		0264-04-055		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00132162		A00124913			
				COUNTY	Menard		Coke			
				HIGHWAY	US 83		SH 70			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	105-6069	REMOVING STAB BASE & ASPH PAV (4" - 6")	SY				178.000		178.000	
	162-6002	BLOCK SODDING	SY		980.000		240.000		1,220.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY		980.000		240.000		1,220.000	
	330-6009	LRA PAV TY-II GR-BS SAC-B	TON				2.000		2.000	
	400-6004	STRUCT EXCAV (BRIDGE)	CY				182.000		182.000	
	400-6005	CEM STABIL BKFL	CY				182.000		182.000	
	403-6001	TEMPORARY SPL SHORING	SF				80.000		80.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY		1.800				1.800	
	422-6015	APPROACH SLAB	CY				64.200		64.200	
	427-6006	EPOXY WATERPROOF FINISH	SF		18,613.000		74.000		18,687.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF		2,790.000		2.000		2,792.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY		17.400				17.400	
	442-6007	STR STEEL (MISC NON - BRIDGE)	LB		9,730.000				9,730.000	
	446-6002	CLEAN & PAINT EXIST STR (SYSTEM II)	LS		1.000				1.000	
	450-6004	RAIL (TY T221)	LF		12.000				12.000	
	500-6001	MOBILIZATION	LS		0.800		0.200		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO		4.000		3.000		7.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF		350.000		400.000		750.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF		350.000		400.000		750.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF		60.000		120.000		180.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF		60.000		120.000		180.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO				4.000		4.000	
	512-6067	PTB (FRN&INSTL)(F SHAPE)(TY 1) OR (STL)	LF		1,410.000		540.000		1,950.000	
	512-6069	PTB (MOVE)(F SHAPE)(TY 1) OR (STL)	LF		1,410.000		540.000		1,950.000	
	512-6071	PTB (REMOVE)(F SHAPE)(TY 1) OR (STL)	LF		1,410.000		540.000		1,950.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF		75.000		100.000		175.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA		2.000		4.000		6.000	
	540-6039	MTL BM GD FEN TRANS (31"-28")(25')	EA				4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF				100.000		100.000	
	542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA				4.000		4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA		2.000				2.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA				2.000		2.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA				2.000		2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA				2.000		2.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA		47.000		18.000		65.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA		14.000		10.000		24.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA		6.000				6.000	

TxDOTCONNECT

Report Generated By: txdotconnect_internal_ext

Report Created On: Jul 6, 2021 4:58:07 PM

DISTRICT	COUNTY	CCSJ	SHEET
San Angelo	Menard	0035-05-061	7

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0035-05-061 **DISTRICT** San Angelo **COUNTY** Coke, Menard
HIGHWAY SH 70, US 83

			CONTROL SECTION JOB		**0035-05-061**		**0264-04-055**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00132162**		**A00124913**			
			COUNTY		**Menard**		**Coke**			
			HIGHWAY		**US 83**		**SH 70**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	662-6050	WK ZN PAV MRK REMOV (REFL) TY II-A-A		EA			240.000		240.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)		LF	3,220.000		3,200.000		6,420.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)		LF			24.000		24.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)		LF	6,440.000		10,800.000		17,240.000	
	666-6224	PAVEMENT SEALER 4"		LF	4,025.000		2,390.000		6,415.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)		LF	810.000				810.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)		LF			1,620.000		1,620.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)		LF			1,740.000		1,740.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)		LF	3,220.000				3,220.000	
	672-6007	REFL PAV MRKR TY I-C		EA	40.000				40.000	
	672-6009	REFL PAV MRKR TY II-A-A		EA	80.000		80.000		160.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")		LF	4,000.000		14,000.000		18,000.000	
	678-6001	PAV SURF PREP FOR MRK (4")		LF			970.000		970.000	
	776-6041	REPAIR (STEEL RAIL)		LF	32.000				32.000	
	785-6010	BRIDGE JOINT REPLACEMENT (ARMOR)		LF			76.000		76.000	
	786-6001	CARBON FIBER REINF POLYMER PROTECTION		SF			564.000		564.000	
	4002-6001	REPLACE ELASTOMERIC BEARING PADS		EA			1.000		1.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN		DAY	120.000		80.000		200.000	
	6185-6002	TMA (STATIONARY)		DAY	120.000		80.000		200.000	
	6185-6005	TMA (MOBILE OPERATION)		DAY	10.000		10.000		20.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)		LS	1.000		1.000		2.000	
		OTHER: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000		1.000		2.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000		1.000		2.000	

SUMMARY OF ROADWAY ITEMS

LOCATION	ITEM NO.	432 6045	540 6002	540 6006	544 6001
		RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)
		CY	LF	EA	EA
CSJ: 0035-05-061					
US 83 ROADWAY PLAN (SAN SABA RIVER BRIDGE)		17.4	75	2	2
TOTAL		17.4	75	2	2

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	ITEM NO.	162 6002	169 6001	506 6038	506 6039	506 6041	506 6043
	COUNTY	BLOCK SODDING	SOIL RETENTION BLANKETS (CL 1)(TY A)	TEMP SEDMT CONT FENCE (INSTL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
		SY	SY	LF	LF	LF	LF
CSJ: 0035-05-061							
US 83 ROADWAY PLAN (SAN SABA RIVER BRIDGE)	MENARD	980	980	350	350	60	60
TOTAL		980	980	350	350	60	60

SUMMARY OF TRAFFIC CONTROL

LOCATION	ITEM NO.	512 6067	512 6069	512 6071	658 6013	662 6063	662 6095	677 6001	6001 6001	6185 6002	6185 6005
		PTB (FRN&INSTL) (F SHAPE)(TY 1) OR (STL)	PTB (MOVE) (F SHAPE) (TY 1) OR (STL)	PTB (REMOVE) (F SHAPE) (TY 1) OR (STL)	INSTL DEL ASSM (D-SW) SZ (BRF)CTB	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		LF	LF	LF	EA	LF	LF	LF	DAY	DAY	DAY
CSJ: 0035-05-061											
TRAFFIC CONTROL PLAN (SAN SABA RIVER BRIDGE)											
PHASE ONE - SHEET ONE		1200			40	1300	2600	3225			
PHASE ONE - SHEET TWO		210			7	310	620	775			
PHASE TWO - SHEET ONE			1200	1200		1300	2600				
PHASE TWO - SHEET TWO			210	210		310	620				
TOTAL		1,410	1,410	1,410	47	3,220	6,440	4,000	120	120	10

SUMMARY OF DELINEATION, SIGNING AND STRIPING

LOCATION	ITEM NO.	658 6014	658 6062	666 6300	666 6315	666 6224	672 6007	672 6009
		INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BI)	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	RE PM W/RET REQ TY I (W) 4" (BRK)(100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD)(100MIL)	PAVEMENT SEALER 4"	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
		EA	EA	LF	LF	LF	EA	EA
CSJ: 0035-05-061								
US 83 ROADWAY PLAN (SAN SABA RIVER BRIDGE)		14	6	810	3,220	4,025	40	80
TOTAL		14	6	810	3,220	4,025	40	80

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

QUANTITY SUMMARIES

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	9

SHEET 1 OF 1

DATE: 5/27/2021 11:17:43 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.03 TCP\01 San Saba River\010 TRAFFIC CONTROL PLAN - GENERAL REQUIREMENTS.dgn

GENERAL NOTES

1. When a contractor force account "Safety Contingency" has been established for the project, it is for work zone enhancements that were unforeseen in the project planning and design stage, but would improve the effectiveness of the traffic control plan. 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 doing so does not slow implementation of work zone enhancements.
2. Shadow, lead, trail, and ramp control vehicles shown on the plans are required.
3. Use high level warning flags on advance warning signs during daytime operations.
4. Provide flaggers at such times and locations as directed to ensure the safe passage of traffic through construction areas. When flaggers are used to control traffic, furnish and install signs CW20-7 "FLAGGER SYMBOL", CW20-7aD "FLAGGER AHEAD", and CW3-4 "BE PREPARED TO STOP". Flaggers shall use 24 in. STOP/SLOW paddles.
5. Temporarily relocate existing mailbox assemblies on portable mailbox stands as shown on the plans, or as directed. Use materials conforming to the Compliant Work Zone Traffic Control Device List (CWZTCDL).
6. Prior to each work day, make provisions to exclude vehicles from parking within work areas.
7. Temporarily relocate existing permanent sign assemblies to temporary supports as shown on the plans, or as directed.
8. Omit advance warning signs and furnish and install reduced size signs CW20-1 "ROAD WORK AHEAD" mounted back to back with reduced size signs G20-2 "END ROAD WORK" signs at intersecting city streets and county roads.
9. Furnish and install signs CW20-1D "ROAD WORK AHEAD", G20-1aT "ROAD WORK ←NEXT X MILES, NEXT X MILES→", and G20-2 "END ROAD WORK" at intersecting state highways.
10. Sign and buffer spacing may be altered to fit field conditions, as directed.
11. In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have employee(s) available to respond on the project for emergencies and for taking corrective measures within 30 minutes.
12. Cones may be used as the typical channelizing device for freeway surfacing projects.
13. 28 in. tall cones will be allowed only for short duration or short term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate term stationary work areas should use drums, vertical panels, or 42 in. tall two-piece cones.
14. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
15. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
16. Warning signs for long term stationary work should be mounted at 7 ft. to the bottom of the sign.
17. For long term stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
18. All motor vehicle equipment having an obstructed view to the rear shall have a reverse signal alarm audible above the surrounding noise level.
19. Traffic control devices denoted with the triangle symbol on the plans may be omitted.
20. When sheet WZ(RS) is included in the plans, furnish and install temporary rumble strips for daytime lane closures. Do not use temporary rumble strips on freeways or expressways.
21. When sheet WZ(BRK) is included in the plans, furnish and install signs CW21-1T "GIVE US A BRAKE".
22. Flags attached to signs shown in the plans are required.
23. Signs END ROAD WORK (G20-2) may be omitted when conflicting with G20-2 signs already in place on the project.
24. The Engineer will determine advisory speeds to be shown on plaques CW13-1P.
25. Temporary work zone devices (including portable barriers) manufactured after December 31, 2019 must have been successfully tested to the 2016 edition of Manual for Assessing Safety Hardware (MASH). Such devices manufactured on or before this date, and successfully tested to either National Cooperative Highway Research Program (NCHRP) Report 350 or the 2009 edition of MASH, may continue to be used.

TRUCK MOUNTED ATTENUATOR REQUIREMENTS

Provide the number of vehicles with truck mounted attenuators listed in the table below. The Contractor shall determine if multiple operations will occur at the same time, to determine the total number of truck mounted attenuators needed for the project.

WZ(BTS-1)	0	TCP(2-3)	0	TCP(6-1)	0
TCP(1-1)	0	TCP(2-4)	0	TCP(6-2)	0
TCP(1-2)	0	TCP(2-5)	2	TCP(6-3)	0
TCP(1-3)	0	TCP(2-6)	0	TCP(6-4)	0
TCP(1-4)	0	TCP(3-1)	2	TCP(6-5)	0
TCP(1-5)	0	TCP(3-2)	0	TCP(6-6)	0
TCP(1-6)	0	TCP(3-3)	2	TCP(6-7)	0
TCP(2-1)	0	TCP(3-4)	0	TCP(6-8)	0
TCP(2-2)	0	TCP(5-1)	0	TCP(6-9)	0
TRAFFIC CONTROL PLAN PILOT VEHICLE OPERATION					0
TRAFFIC CONTROL PLAN TWO LANE CLOSURES ON FOUR LANE UNDIVIDED HIGHWAYS					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN SHOULDER CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN WORK SPACE NEAR SHOULDER					0
TRAFFIC CONTROL PLAN CROSSOVER CLOSURE					0
TRAFFIC CONTROL PLAN TURNAROUND CLOSURE					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL AND BARRIER					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL					0
TRAFFIC CONTROL PLAN FREEWAY CLOSURE					0

PORTABLE CHANGEABLE MESSAGE SIGN REQUIREMENTS

Provide the portable changeable message signs listed in the table below. The Contractor shall determine if multiple operations will occur at the same time, to determine the total number of portable changeable message signs needed for the project.

TCP(6-1)	0	TCP(6-4)	0	TCP(6-8)	0
TCP(6-2)	0	TCP(6-6)	0	TCP(6-9)	0
TCP(6-3)	0	TCP(6-7)	0		
TRAFFIC CONTROL PLAN LANE CLOSURES WITH BARRIER					2
TRAFFIC CONTROL PLAN SHOULDER CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL AND BARRIER					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL					0
TRAFFIC CONTROL PLAN FREEWAY CLOSURE					0

TYPICAL USAGE

MOBILE
Work that moves continuously or intermittently (stopping for up to approximately 15 minutes).

SHORT DURATION
Work that occupies a location up to 1 hour.

SHORT TERM STATIONARY
Daytime work that occupies a location for more than 1 hour in a single daylight period.

INTERMEDIATE TERM STATIONARY
Work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.

LONG TERM STATIONARY
Work that occupies a location more than 3 days.

STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

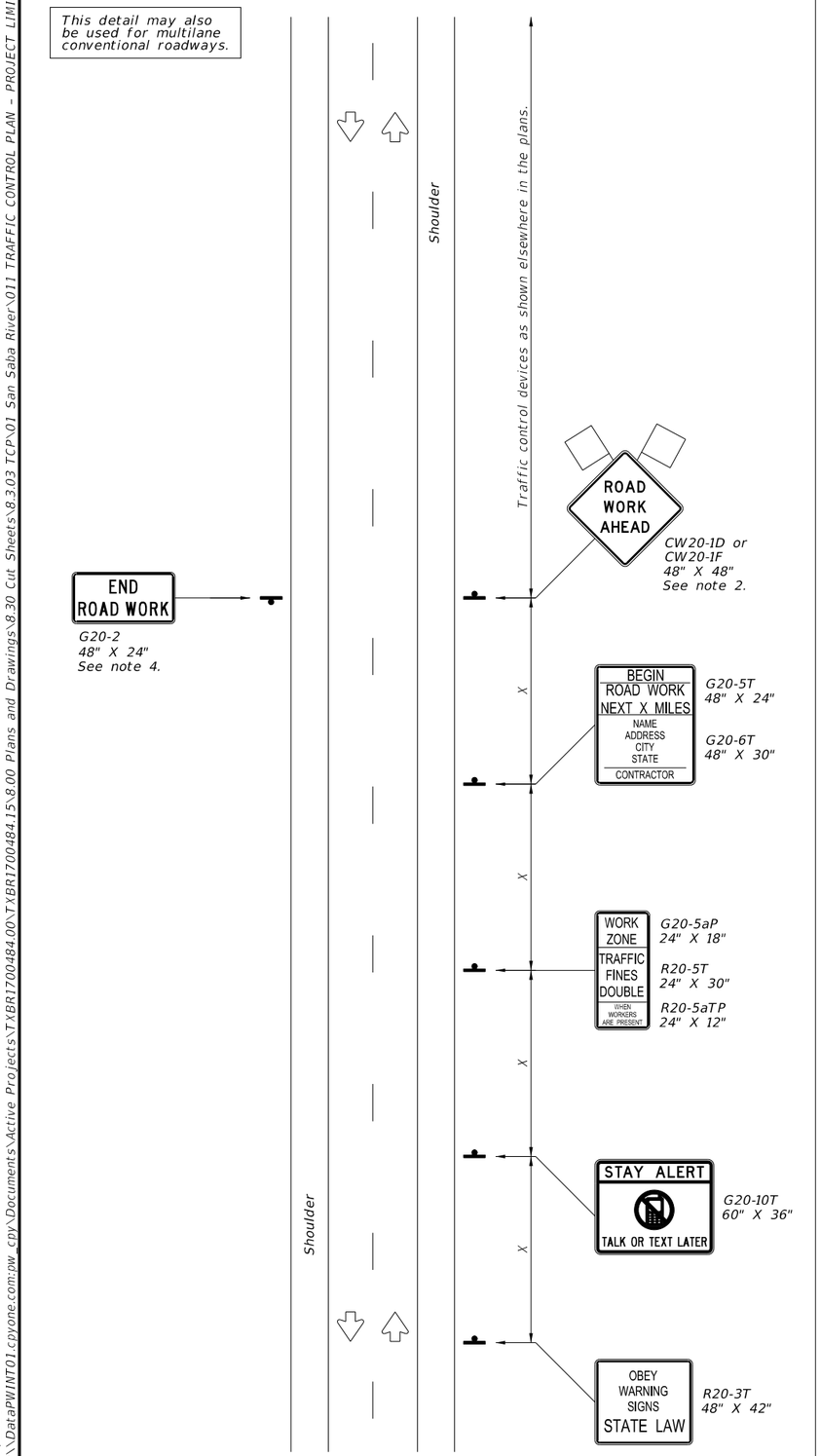
Texas Department of Transportation | San Angelo District

TRAFFIC CONTROL PLAN GENERAL REQUIREMENTS

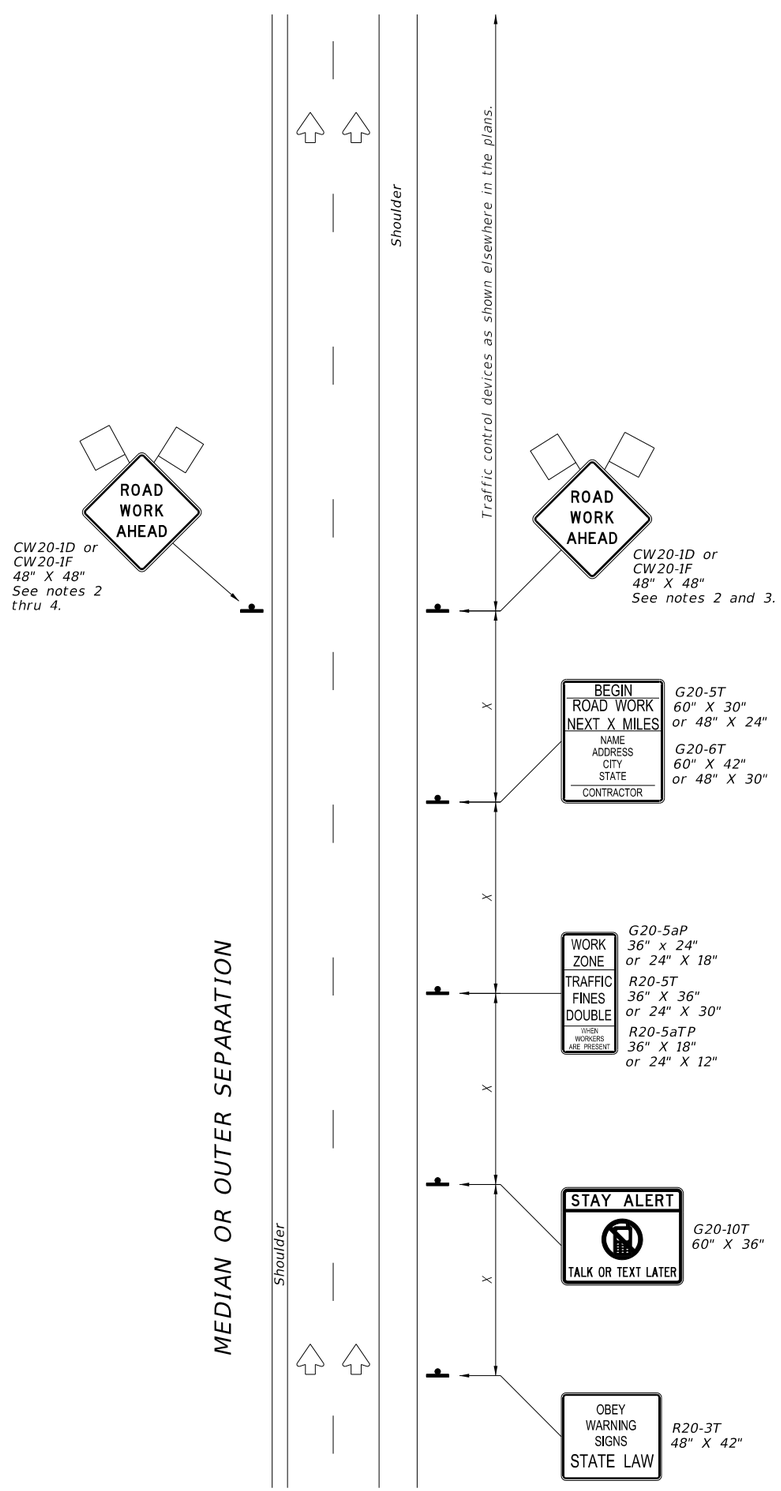
SHEET 1 OF 1 NOT TO SCALE

SHEET ISSUED OR LAST REVISED 11-19

CONT	SECT	JOB	HIGHWAY
0035	05	061	US 83
DIST	COUNTY		SHEET NO.
SJT	MENARD		10



TYPICAL CONVENTIONAL ROADWAY
OR TYPICAL TWO-WAY FRONTAGE ROAD



TYPICAL DIVIDED HIGHWAY OR FREEWAY
OR TYPICAL ONE-WAY FRONTAGE ROAD

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Pilot Vehicle
	Temporary or Portable Traffic Signal		Automated Flagger Assistance Device (AFAD)

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	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		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		750'	825'	900'	75'	150'	900'	540'	820'
80		800'	880'	960'	80'	160'	1000'	615'	910'

** 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

1. This traffic control plan is for use at isolated work areas not associated with CSJ limits.
2. Display sign message "ROAD WORK 1 MILE" if sign type CW20-1F is required as shown in the plans.
3. Omit flags attached to signs on freeways.
4. Omit sign if indicated elsewhere in the plans.
5. Where two sign sizes are shown, use the larger sizes for divided highways or freeways and use the smaller sizes for conventional roadways.

STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

Texas Department of Transportation
San Angelo District

TRAFFIC CONTROL PLAN PROJECT LIMIT SIGNS FOR ISOLATED WORK AREAS

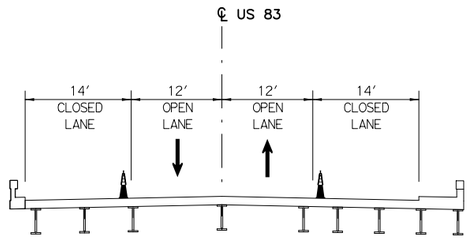
SHEET 1 OF 1 NOT TO SCALE

SHEET ISSUED OR LAST REVISED	CONT	SECT	JOB	HIGHWAY
11-19	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		11

US 83
07–064–0–0035–05–021

SUGGESTED SEQUENCE OF WORK

1. STRUCTURE 07–064–0–0035–05–021 (US 83 OVER SAN SABA RIVER) INSTALL CHANGEABLE MESSAGE BOARDS 7 DAYS PRIOR TO LANE CLOSURES.
2. PLACE ADVANCE WARNING SIGNS AS SHOWN IN THE PLANS AND STANDARDS. COVER ALL SIGNS THAT ARE IMPACTED BY THE CONSTRUCTION. PLACE TEMPORARY EROSION CONTROL DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER PRIOR TO BEGINNING ANY OTHER WORK.
3. INSTALL TRAFFIC DEVICES THAT WILL LIMIT TRAFFIC TO ONE LANE FOR CONSTRUCTING MBGF AND REPAIRING BRIDGE RAIL.
4. CONTRACTOR TO UTILIZE STATE STANDARD TCP(2–5)–18 FOR DAY TIME CLOSURES. ALL LANES TO BE OPEN EVERYDAY AFTER CONSTRUCTION STOPS.
5. CONSTRUCT TRF FOUNDATION AND T221 RAIL. INSTALL GUARDRAIL TRANSITION AND MBGF.
6. SUBSTRUCTURE REPAIR, SUPERSTRUCTURE REPAIR, INSTALLATION OF DRAIN PIPES, AND PAINTING OF STEEL GIRDERS CAN BE COMPLETED AT ANY TIME DURING THE PROJECT.



TRAFFIC CONTROL PLAN – TEMP. CLOSURES

CONSTRUCTION NOTES:

1. VERIFY CHANGEABLE MESSAGE BOARD LOCATION PRIOR TO DELIVERY AND VERIFY ADVANCED WARNING MESSAGE WITH ENGINEER.
2. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISPLACED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN A SMOOTH, NEAT AND SIGHTLY CONDITION.
3. TCP CHANNELIZING DEVICES ARE PLASTIC DRUMS AS DESCRIBED ON BC(8)–14. OTHER APPROVED DEVICES MAY BE USED AT THE CONTRACTOR'S OPTION AND BY THE ENGINEER'S APPROVAL.
4. THE CONTRACTOR MAY USE A DIFFERENT CONSTRUCTION PHASING AND TRAFFIC CONTROL PLAN. ANY VARIATION FROM THE PLANS SHALL BE FORMALLY SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. ANY CHANGES PROPOSED BY THE CONTRACTOR WILL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER.
5. BARRICADE AND CONSTRUCTION STANDARDS BC(1)–14 TO BC(12)–14 ARE REQUIRED FOR ALL PHASES. REFER TO "WORK ZONE" AND "TCP" STANDARD SHEETS FOR ADDITIONAL DETAILS. STANDARDS SHOWN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENTS FOR WORK ZONE SIGNING AND TRAFFIC CONTROL. ADDITIONAL OR OTHER DEVICES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS AND
CONSTRUCTION NARRATIVE

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	12

SHEET 1 OF 1

DATE: 5/27/2021 11:17:57 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 Standards\bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

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

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

Texas Department of Transportation | Traffic Safety Division Standard

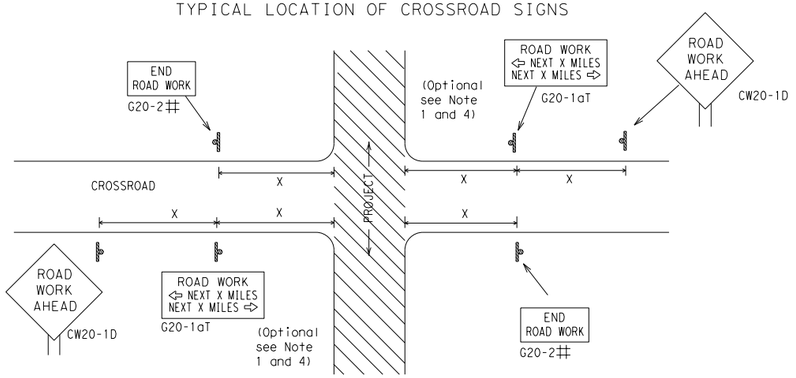
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	SJT	MENARD		13

DATE: 5/27/2021 11:17:59 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR170048.00\TXBR170048_00 Plans and Drawings\8.30 Cur Sheets\8.3.09 TxDOT Standards\Traffic Control\01 Standard\bc-21.dgn

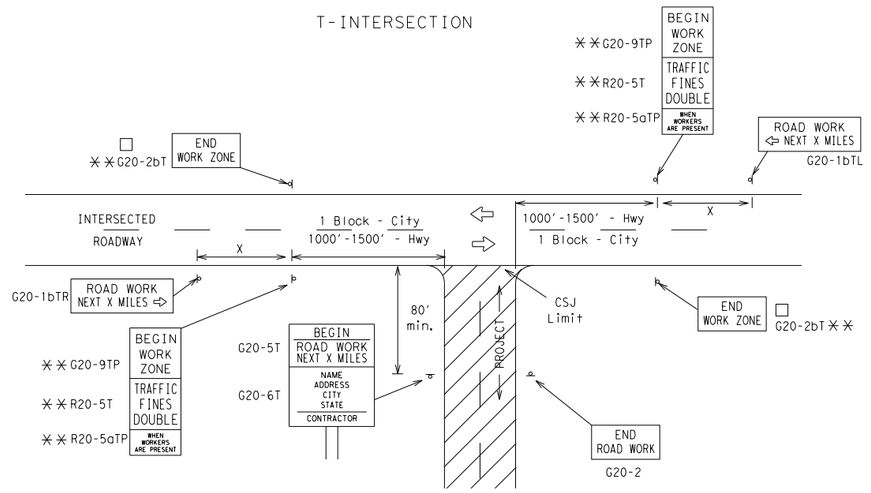
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. 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.
2. 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.
3. 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.
4. 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.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. 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

1. 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.
2. 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]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
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.

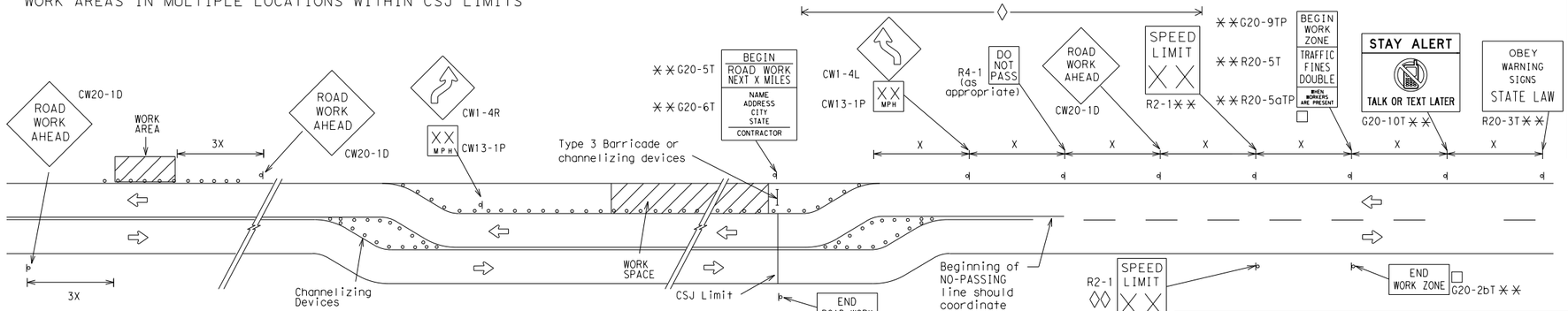
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 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".
5. Only diamond shaped warning sign sizes are indicated.
6. 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.

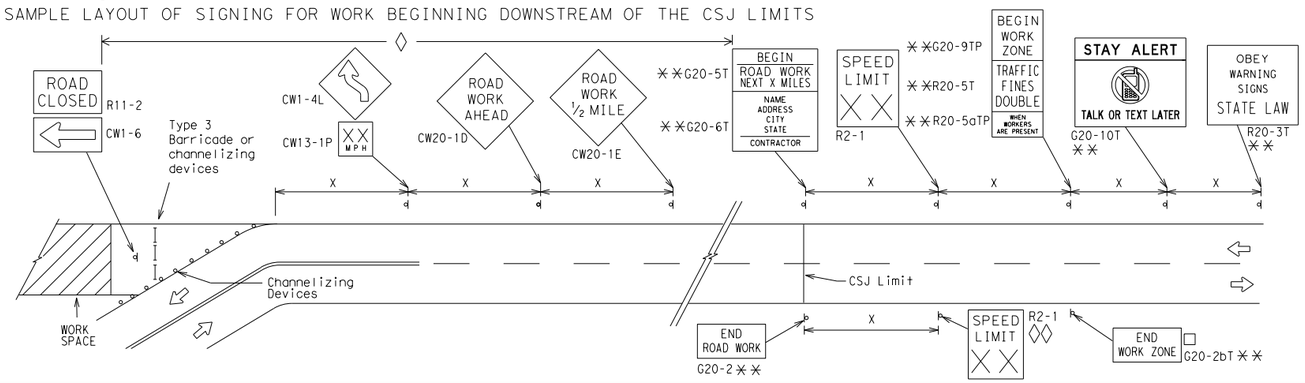
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

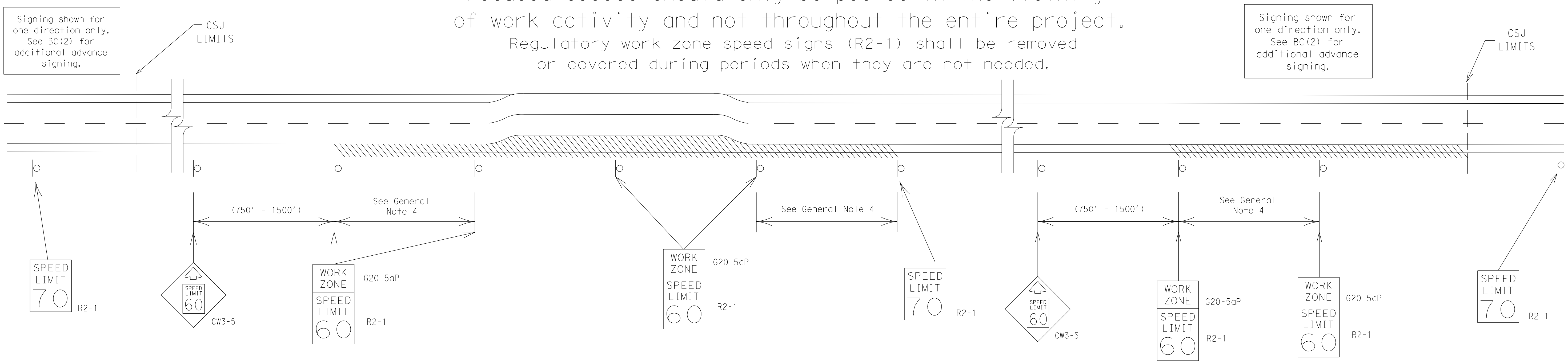
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	MENARD		14

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) 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

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. 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
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. 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.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. 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.

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

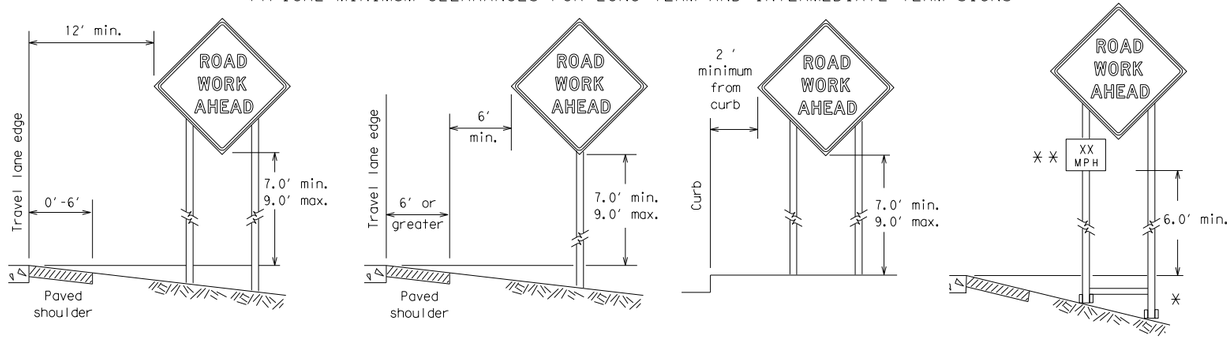
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT 0035	SECT 05	JOB 061	HIGHWAY US 83
REVISIONS 9-07 8-14 7-13 5-21	DIST SJT		COUNTY MENARD	SHEET NO. 15

97

DATE: 5/27/2021 11:18:02 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484\TXBR1700484.15\8.00 Plans and Drawings\8.30 CT Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S

DATE: 5/27/2021 11:18:05 AM
FILE: pw:\\DartPWINT01.cboyone.com:pw_cby\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S

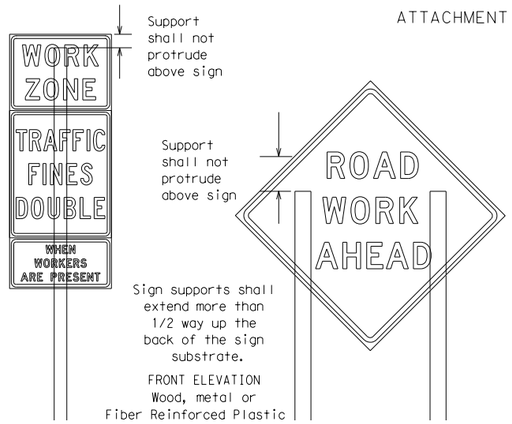
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

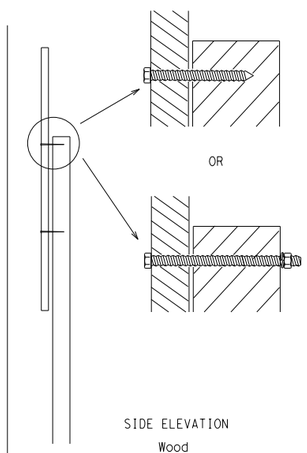


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





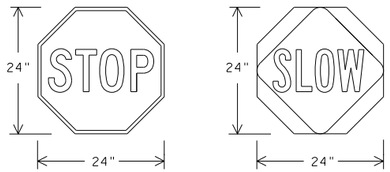
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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 spice 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 retroreflectorized 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 CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
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" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
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 CWZTCD 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 CWZTCD 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.

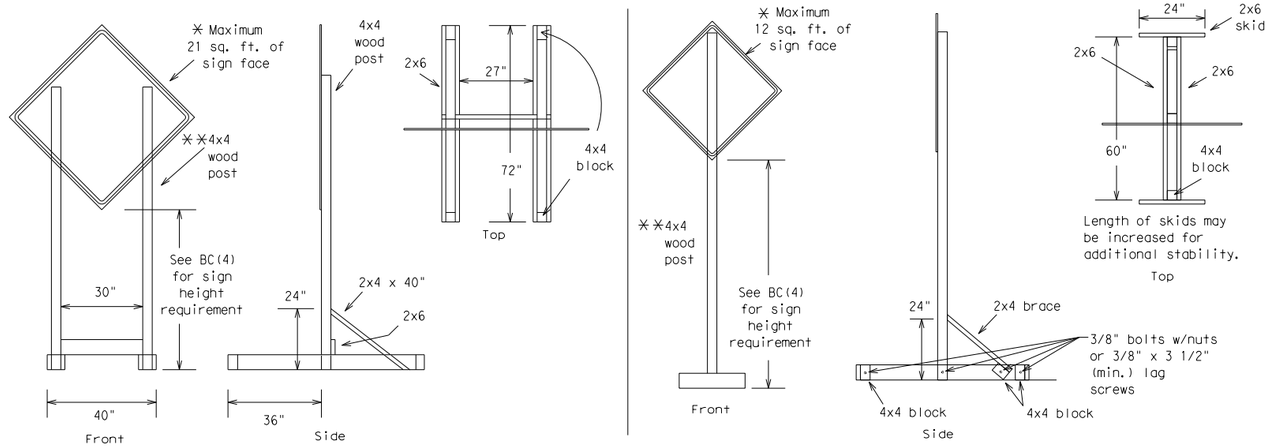
Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

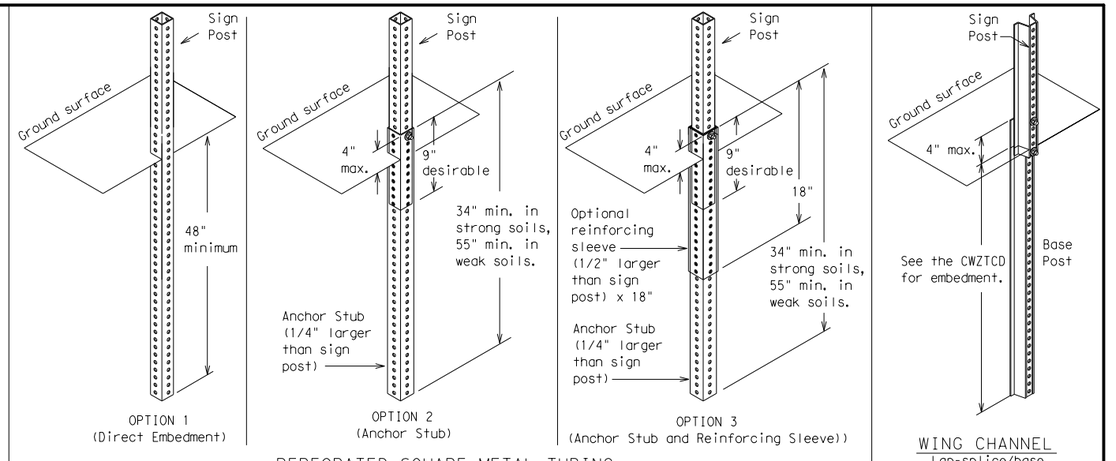
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	MENARD		16

DATE: 5/27/2021 11:18:08 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw-cpy\Documents\Active Projects\TXBR170484.00\TXBR170484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\V01 S



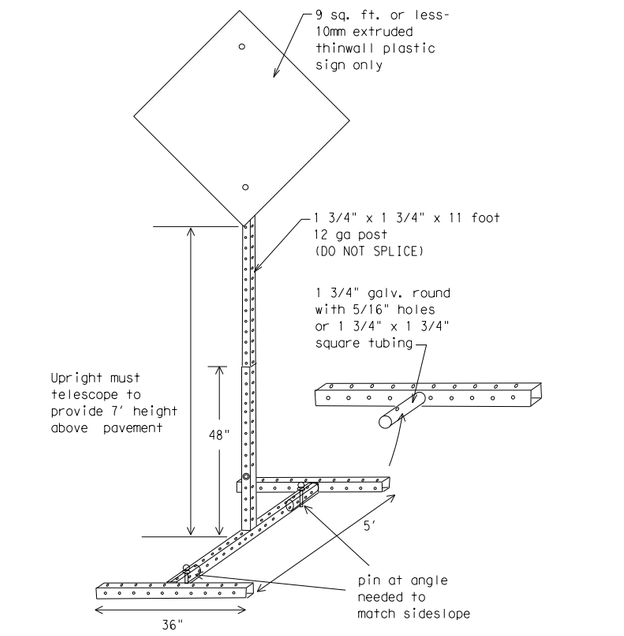
SKID MOUNTED WOOD SIGN SUPPORTS

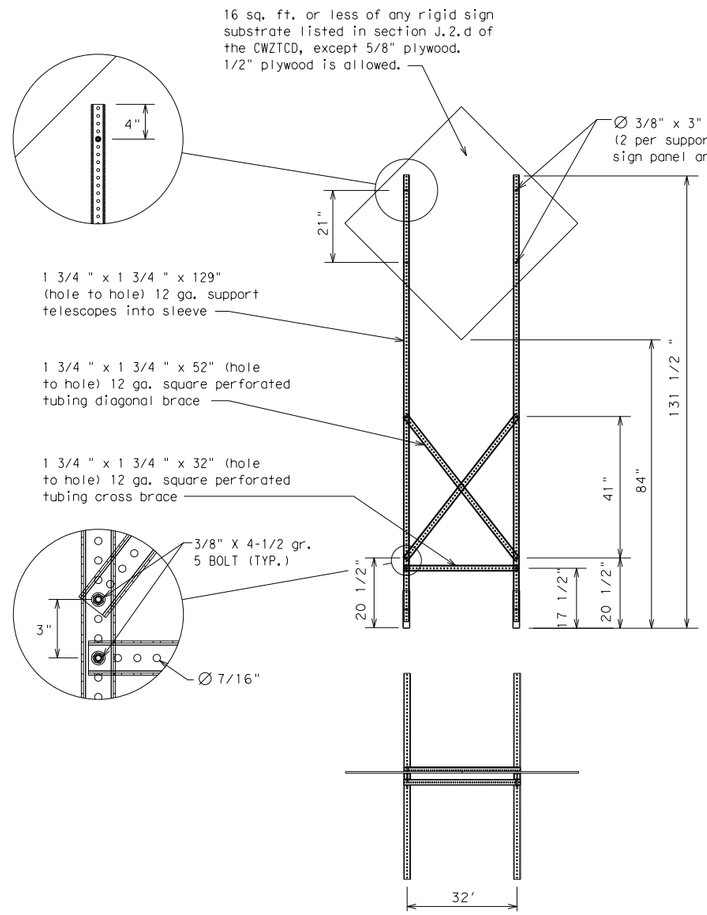
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

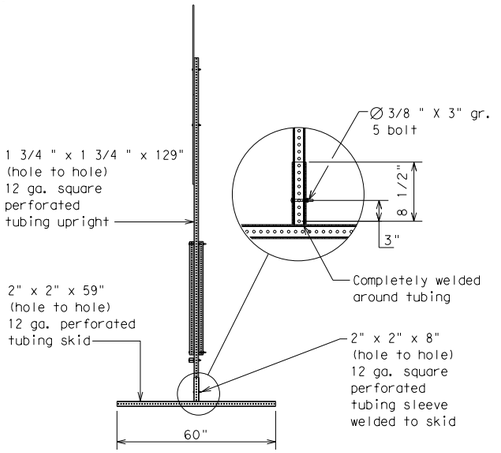


GROUND MOUNTED SIGN SUPPORTS

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

1. 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.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. 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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	MENARD		17

DATE: 5/27/2021 11:18:11 AM
FILE: pw:\\DotPWINTOI.dfyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S

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

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. 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.
3. 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.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. 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.
8. 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.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. 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.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. 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.
15. 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.
16. Each line of text should be centered on the message board rather than left or right justified.
17. 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.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

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 *	

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. 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.
6. 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

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. 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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

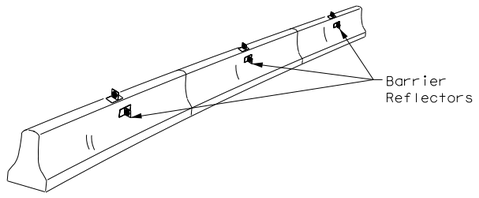
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0035	05	061	US 83
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		SJT	MENARD		18

100

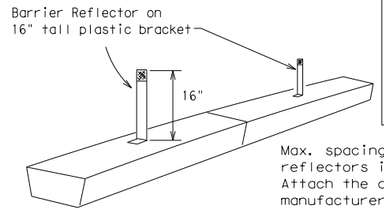
DATE: 5/27/2021 11:18:13 AM
FILE: pw:\\DotPWINTOI.dfyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S

1. 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).
2. 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)

3. 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.
4. 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.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

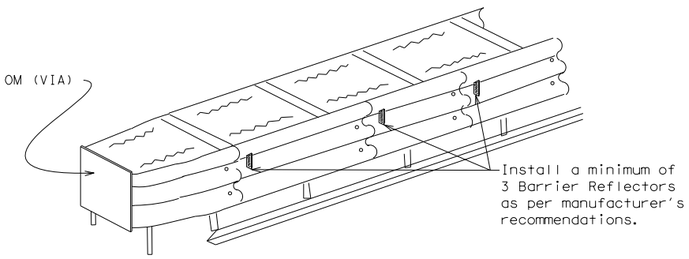


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.



DELINEATION OF END TREATMENTS

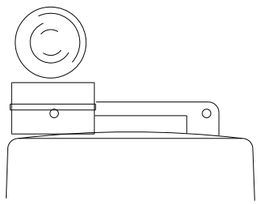
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate 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

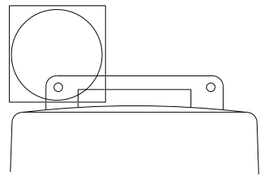
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this 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.
4. 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".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. 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.
7. 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.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. 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.
4. 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.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.



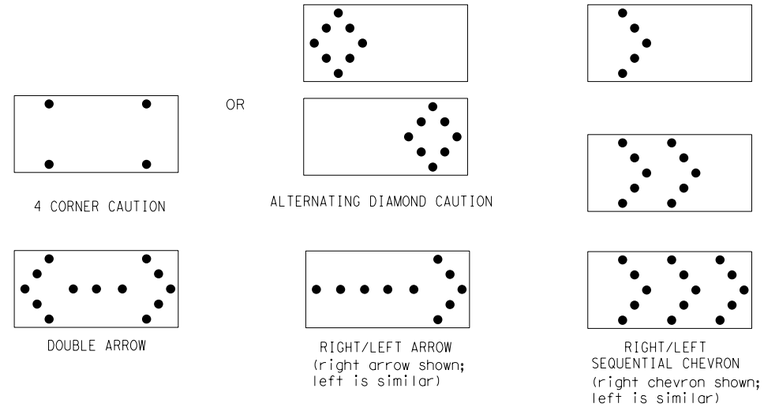
Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

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

1. 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.
2. 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.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. 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.
6. 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.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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.

1. 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.
2. 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.
3. 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.
4. The Flashing Arrow Board should be able to display the following symbols:



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW (right arrow shown; left is similar)

RIGHT/LEFT SEQUENTIAL CHEVRON (right chevron shown; left is similar)

5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. 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.
8. 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.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. 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.
14. 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

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. 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.
6. 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	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	MENARD		19

101

DATE: 5/27/2021 11:18:16 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S

GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. 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.
3. 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.
4. 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).
5. 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.
6. 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:

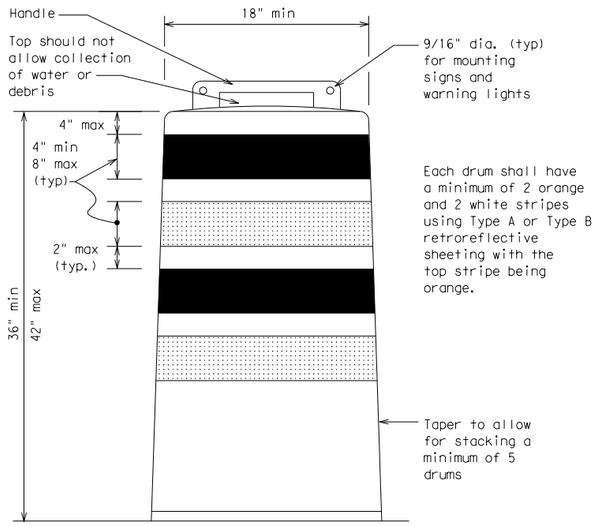
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

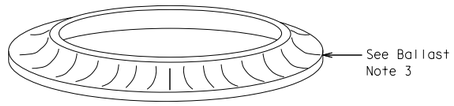
RETROREFLECTIVE SHEETING

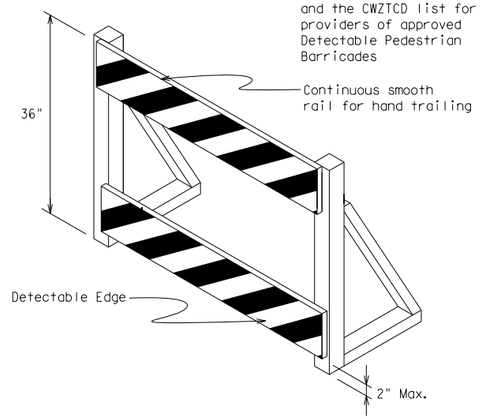
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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

1. 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.
2. 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.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. 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.
5. 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.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

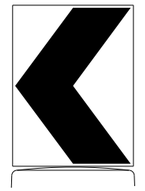




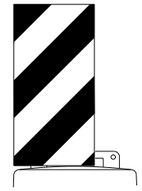


DETECTABLE PEDESTRIAN BARRICADES

1. 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.
2. 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.
3. 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.
4. 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.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. 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.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. 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.
3. 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.
4. 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.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. 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.
8. 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.

Texas Department of Transportation | Traffic Safety Division Standard

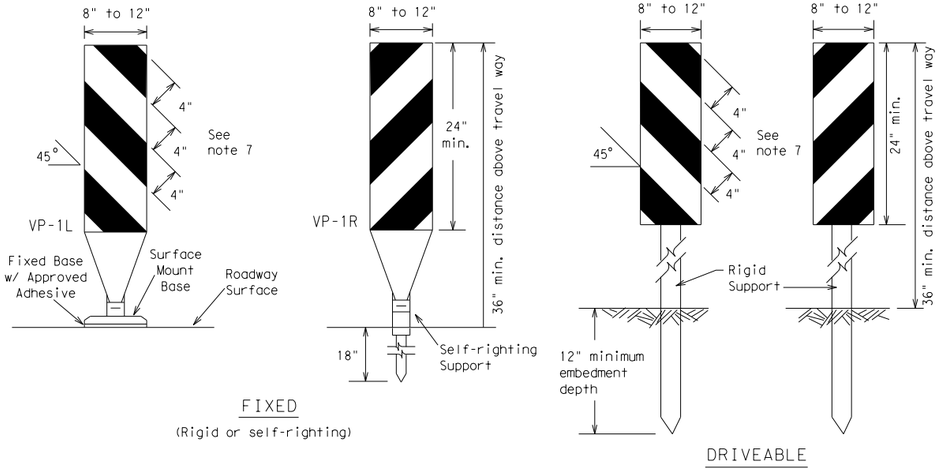
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SJT	MENARD		20
7-13				

102

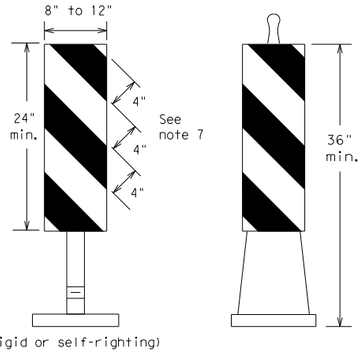
DATE: 5/27/2021 11:18:19 AM
FILE: pw:\\DataPWINT01.cbyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S



FIXED

(Rigid or self-righting)

DRIVEABLE

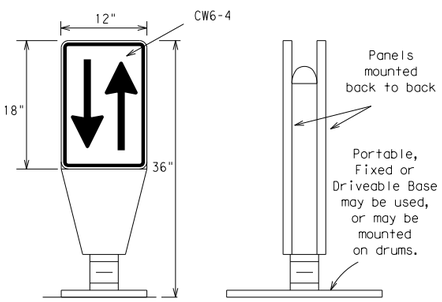


(Rigid or self-righting)

PORTABLE

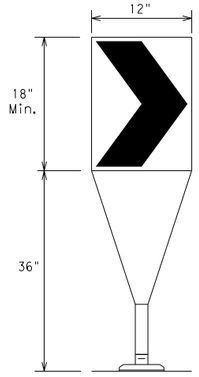
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. 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.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. 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.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. 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.

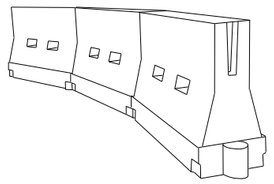
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. 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.
3. 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.
4. To be effective, the chevron should be visible for at least 500 feet.
5. 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.
6. 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)

1. 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.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. 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

1. 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.
2. 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.
3. 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.
4. 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.
5. 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

1. 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).
2. 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.
3. 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).
4. 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.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. 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.
7. 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	$L = \frac{WS^2}{60}$	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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

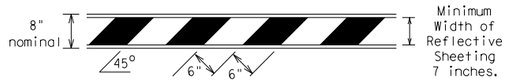
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	MENARD		21

DATE: 5/27/2021 11:18:22 AM
FILE: pw:\\Data\PWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S

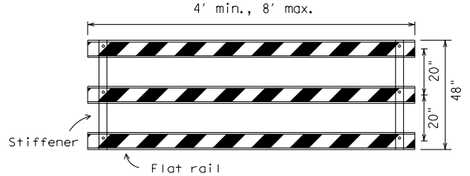
TYPE 3 BARRICADES

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.



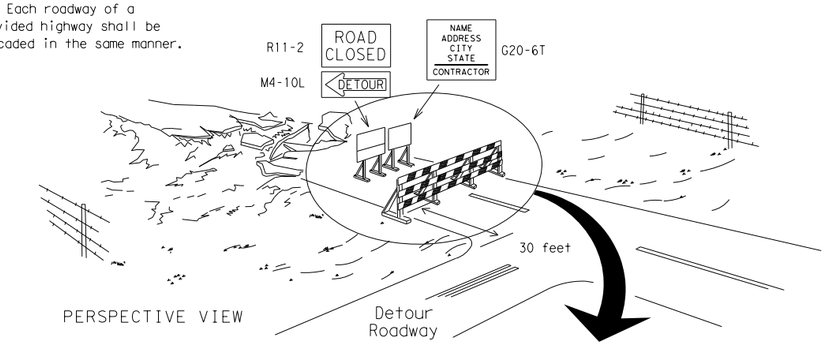
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

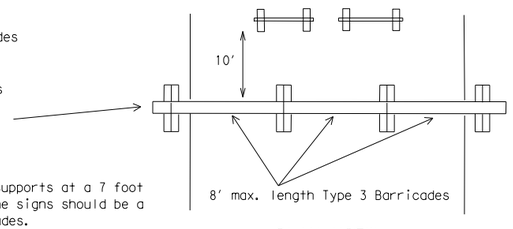
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

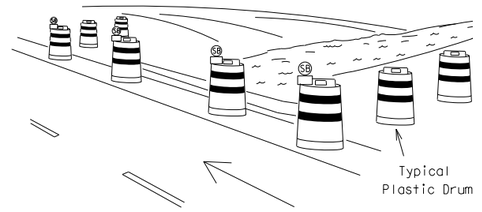
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

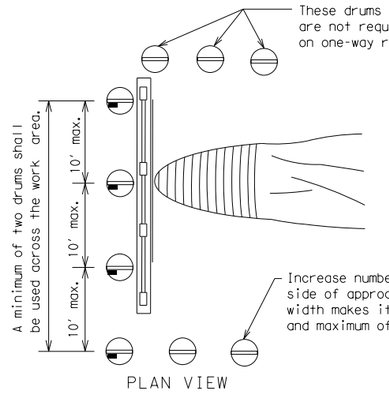
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

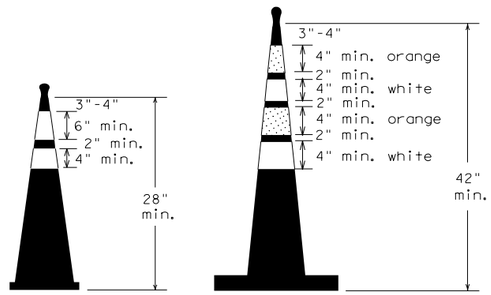
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



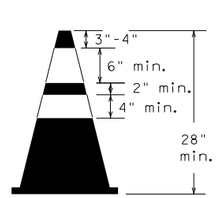
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

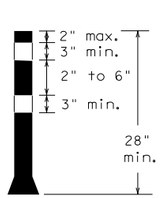
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

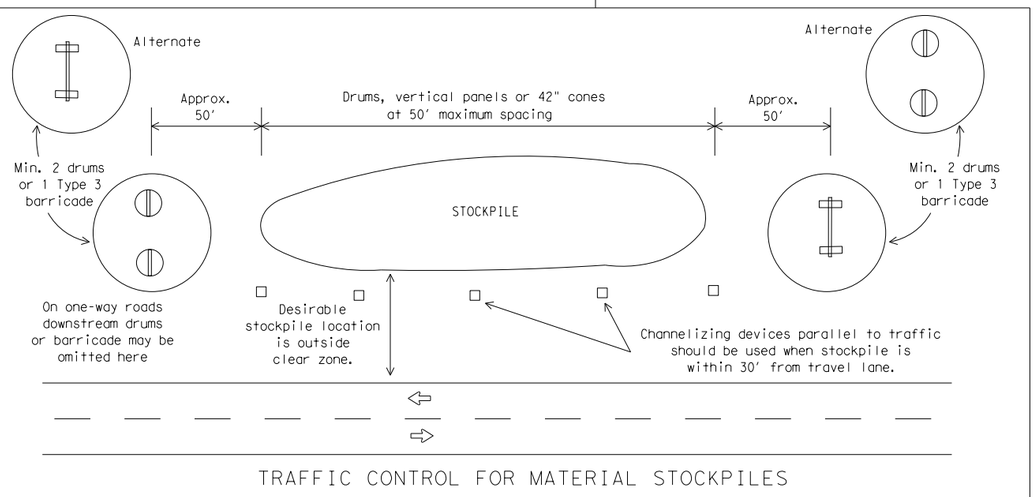


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	MENARD		22

WORK ZONE PAVEMENT MARKINGS

GENERAL

1. 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.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. 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).
6. 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.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. 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

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

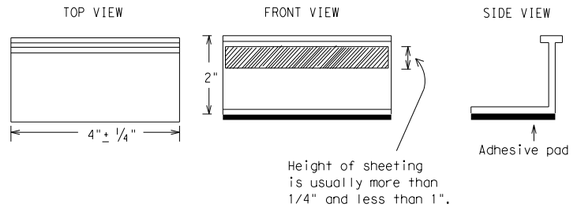
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. 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.
3. 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.
4. 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

1. 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.
2. 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.
3. 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".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. 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.
10. 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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. 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.
   A. 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.
   B. 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.
3. Small design variances may be noted between tab manufacturers.
4. 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

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. 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).

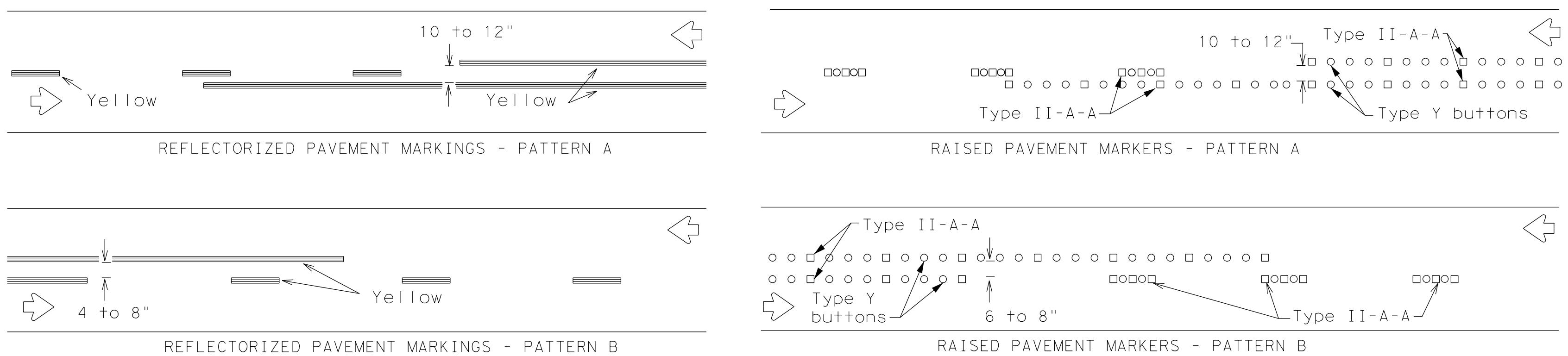
Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

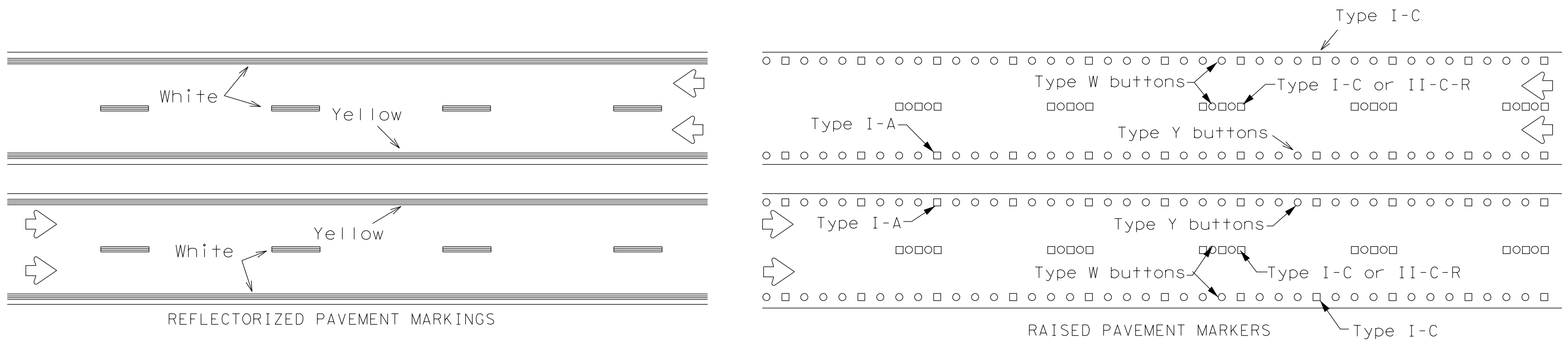
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	SJT	MENARD		23
11-02 8-14				

PAVEMENT MARKING PATTERNS



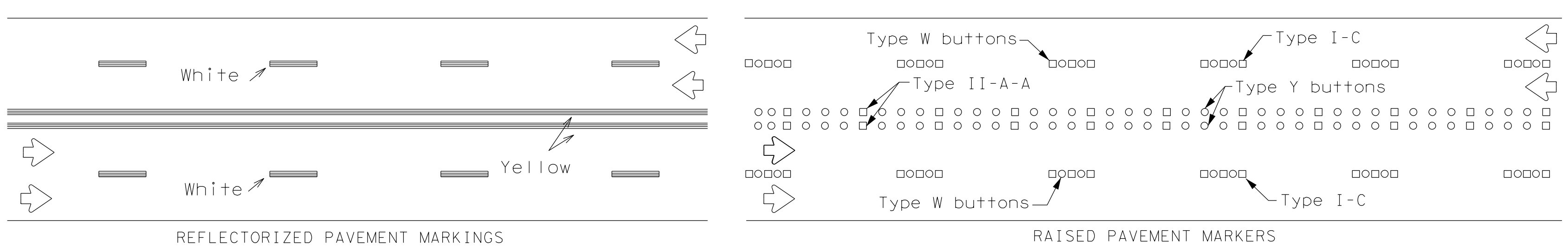
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



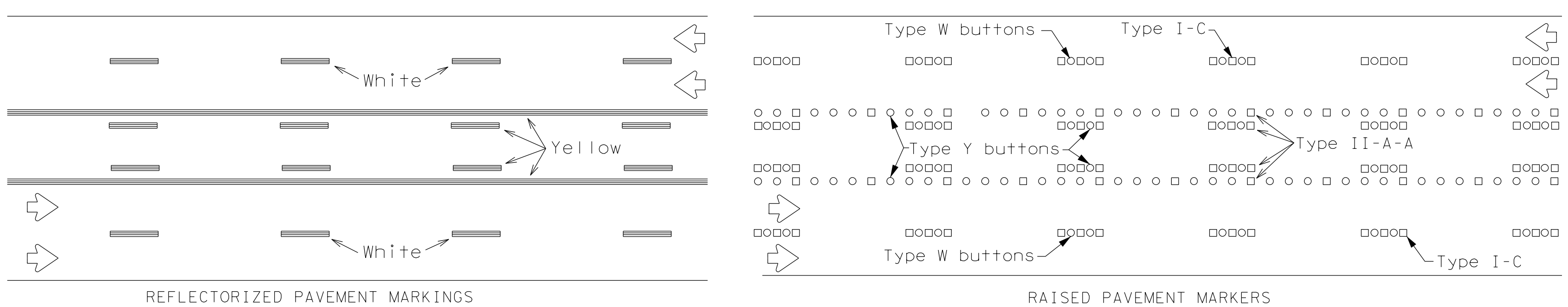
Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

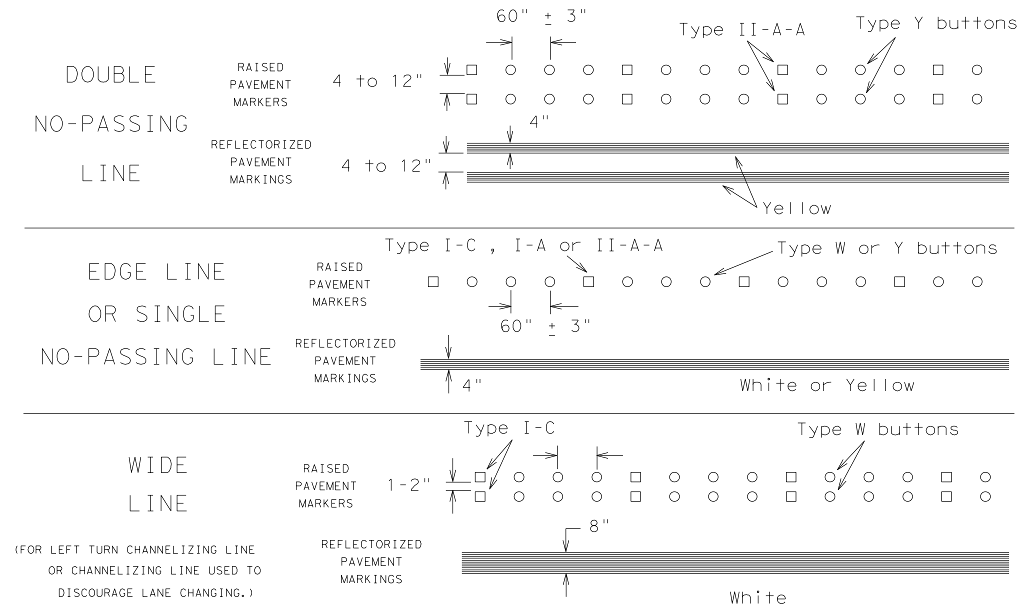


Prefabricated markings may be substituted for reflectorized pavement markings.

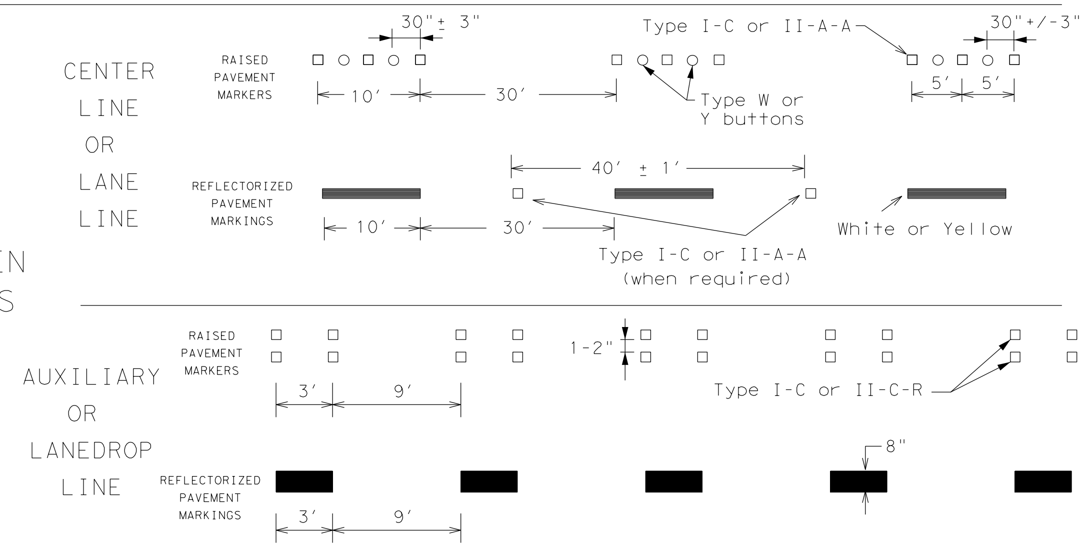
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

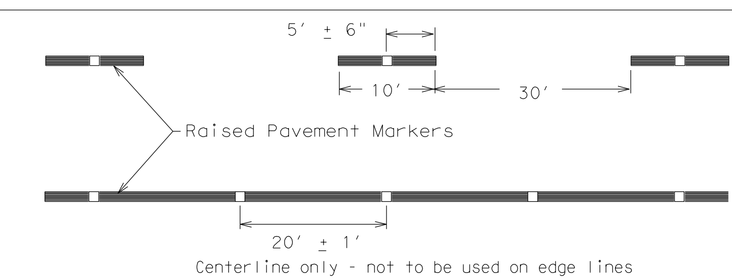


BROKEN LINES



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.



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."

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

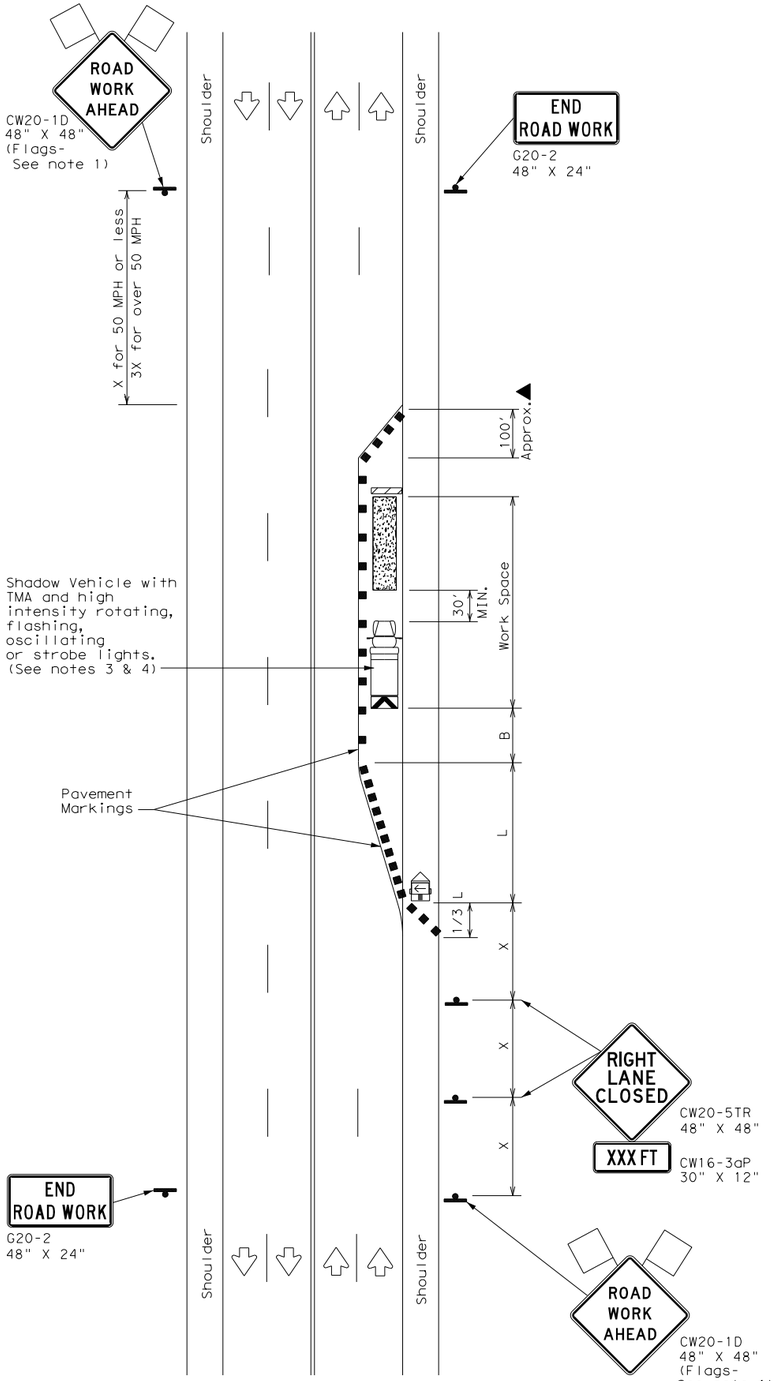
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT 0035	SECT 05	JOB 061	HIGHWAY US 83
REVISIONS 1-97 9-07 5-21 / 2-98 7-13 / 11-02 8-14	DIST SJT		COUNTY MENARD	SHEET NO. 24

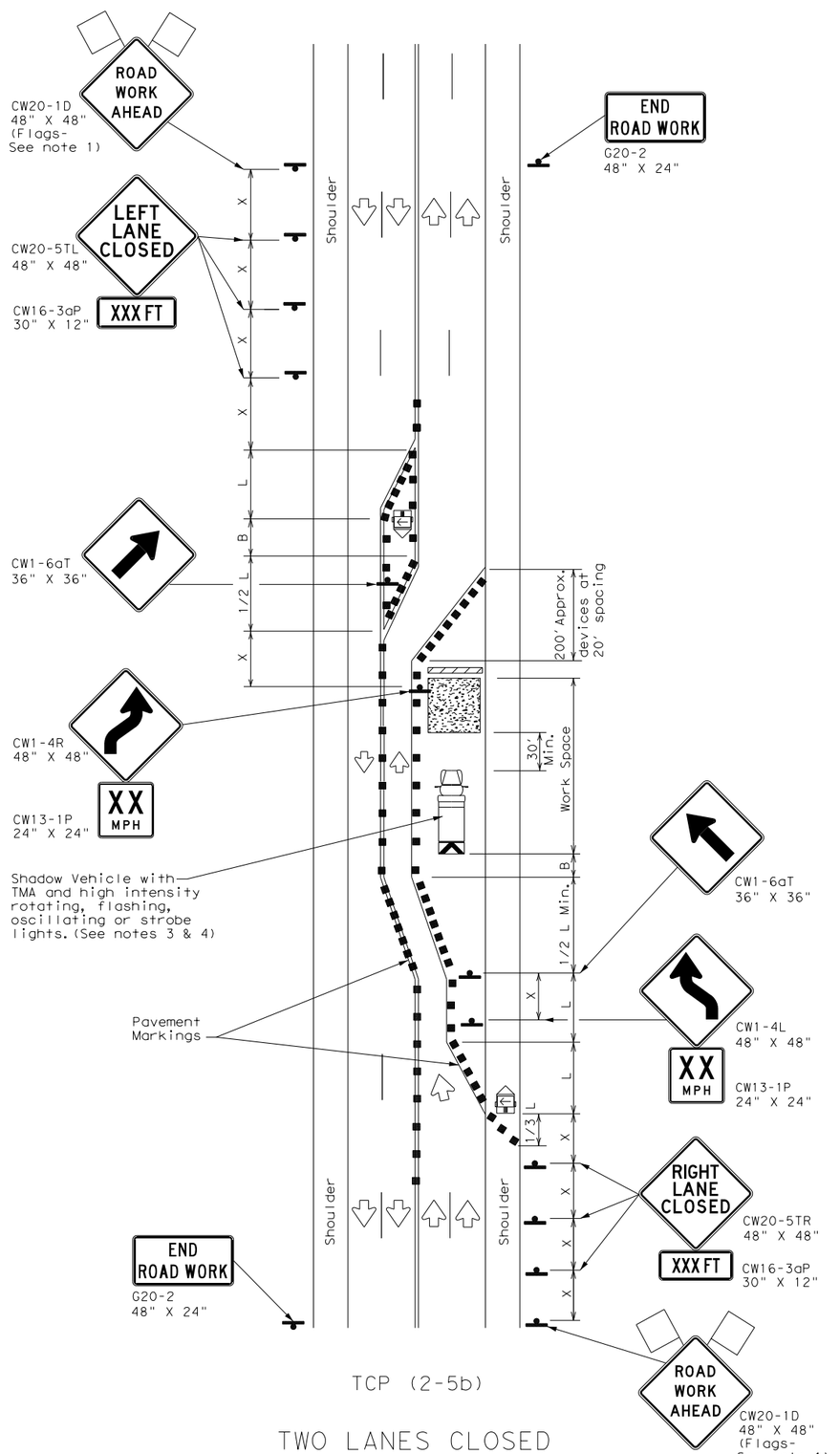
106

DATE: 5/27/2021 11:18:27 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Traffic Control\01 S



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	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
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. 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.
3. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

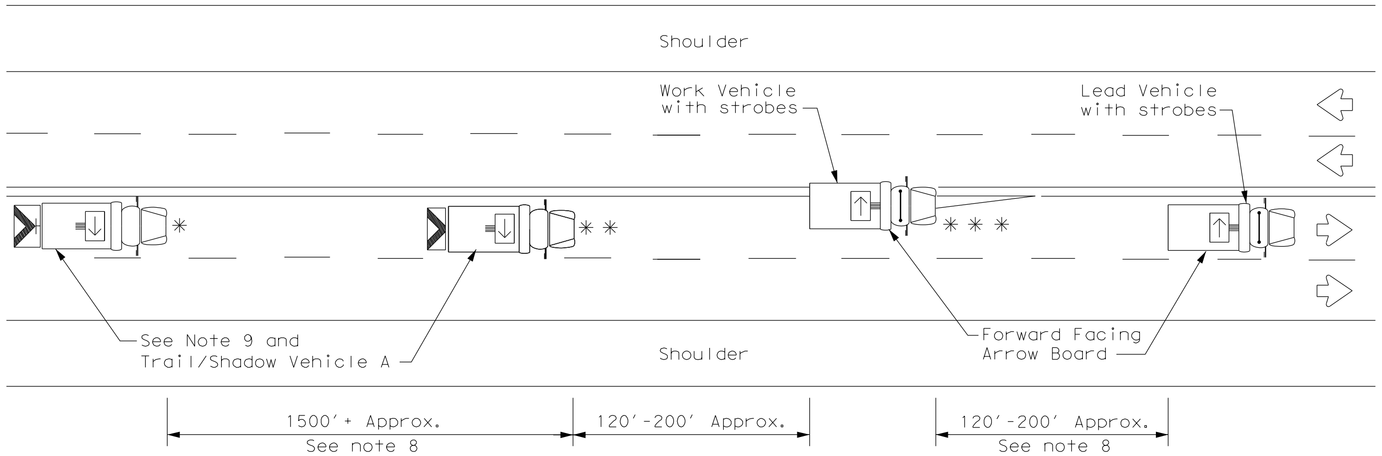
TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12	0035	05	061	US 83
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	SJT	MENARD		25

165

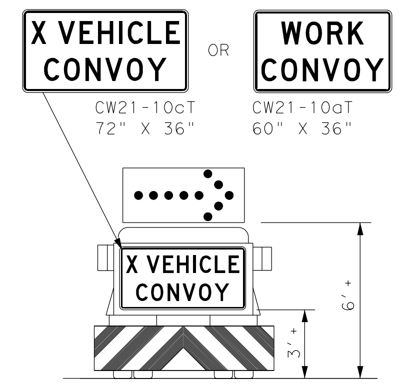
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion

DATE: 5/27/2021 11:18:33 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR17004840\...\Traffic Control\01 S



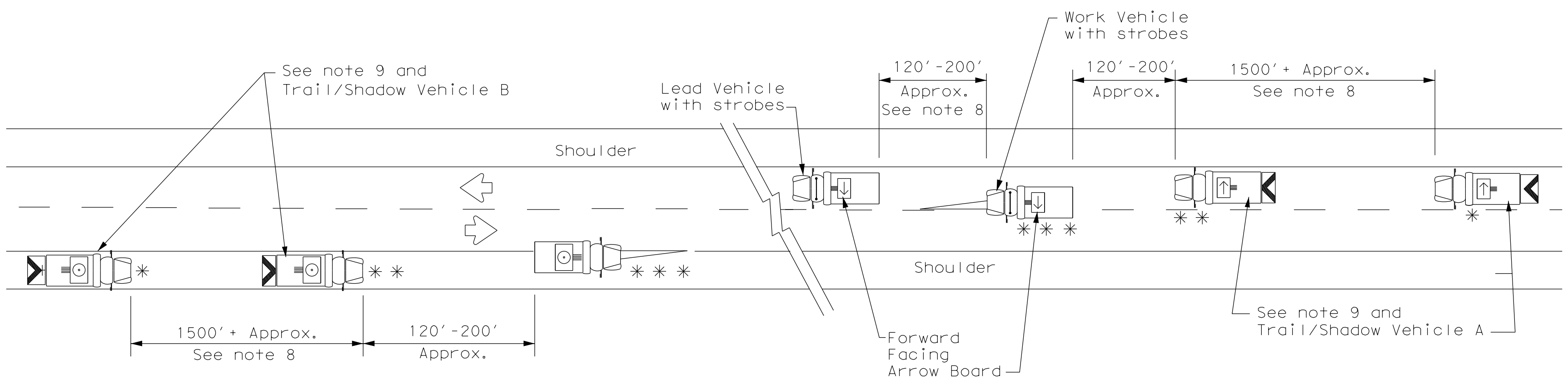
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

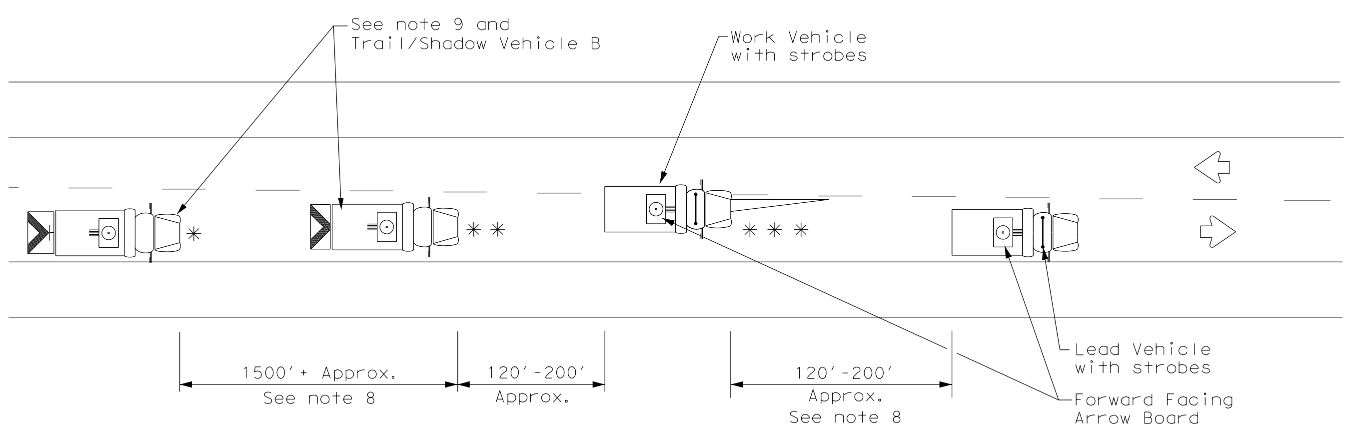


WORK ON SHOULDER

WORK ON TRAVEL LANE

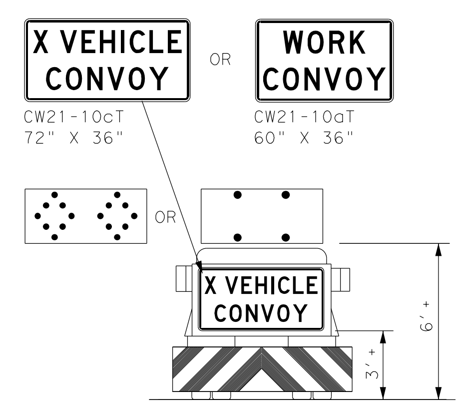
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display

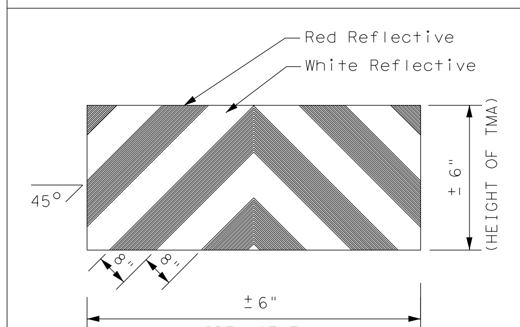
LEGEND

*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

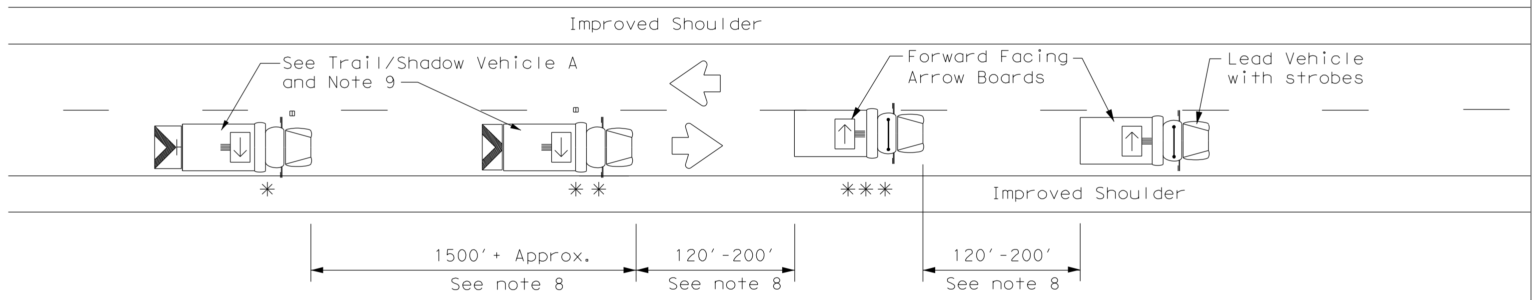
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0035	05	061	US 83
	DIST		COUNTY	SHEET NO.
	SJT		MENARD	26

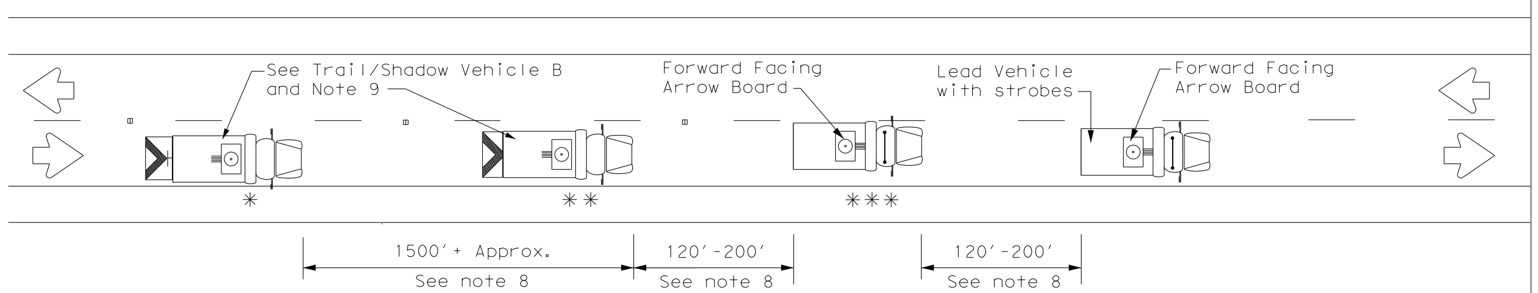
175



TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS

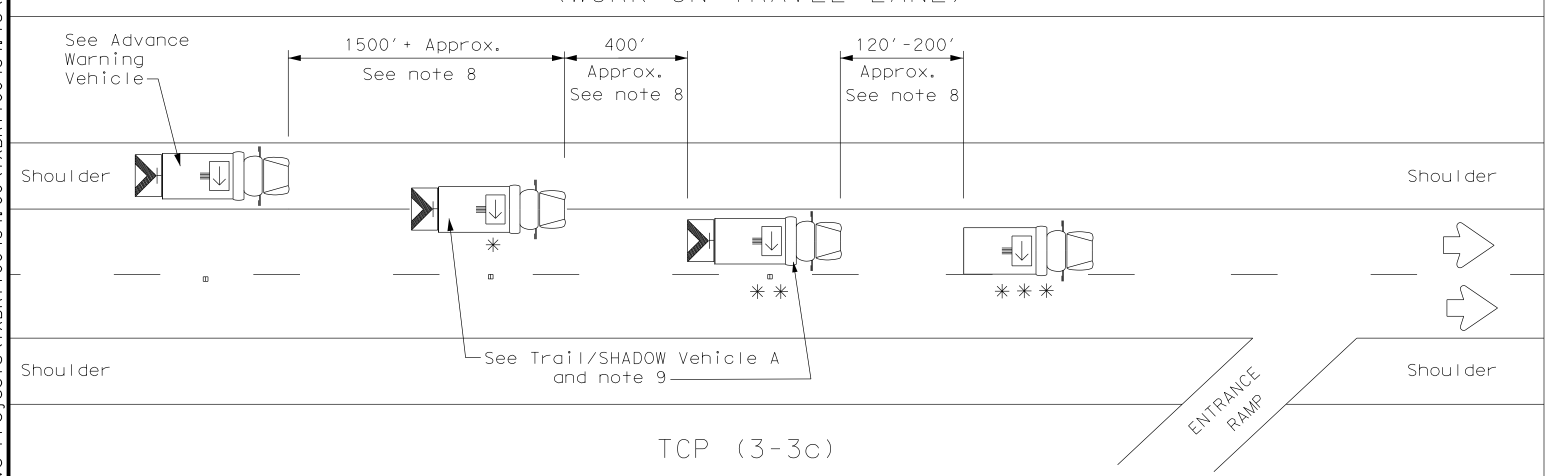
(WORK ON TRAVEL LANE)



TCP (3-3b)

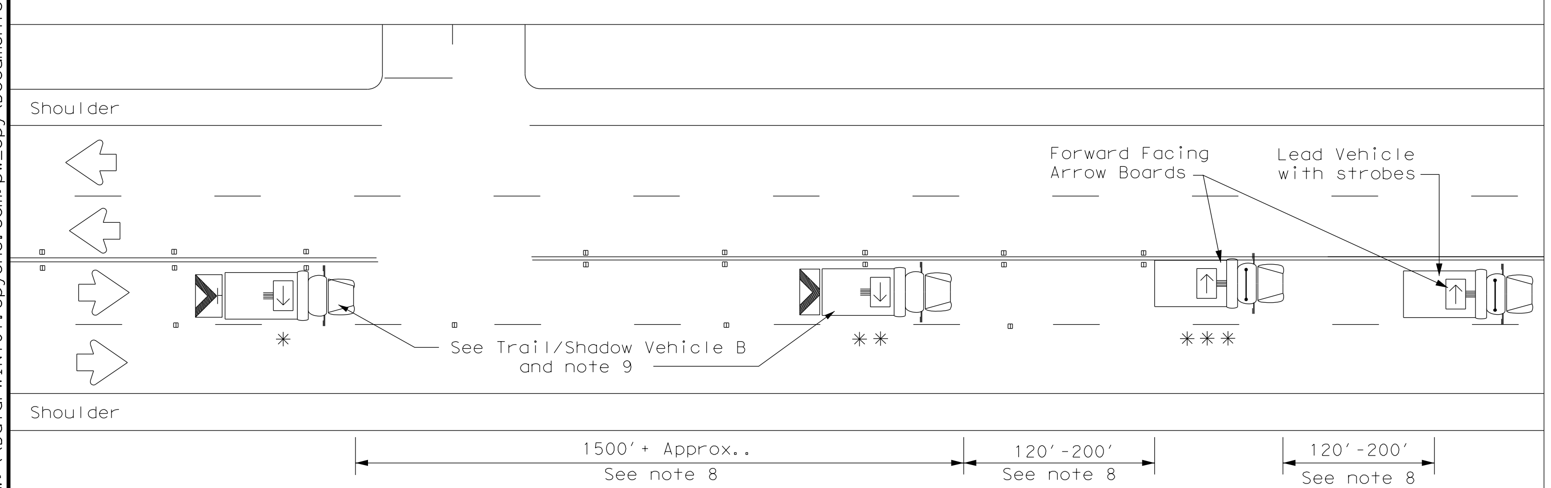
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS

(WORK ON TRAVEL LANE)



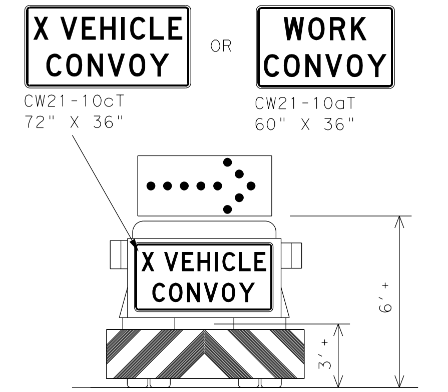
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



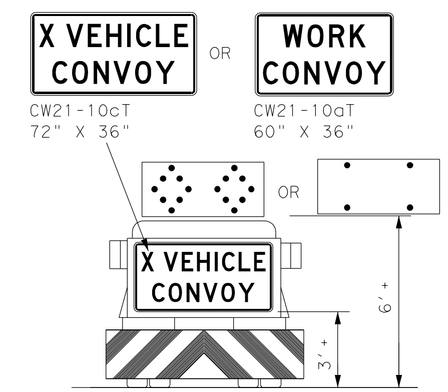
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



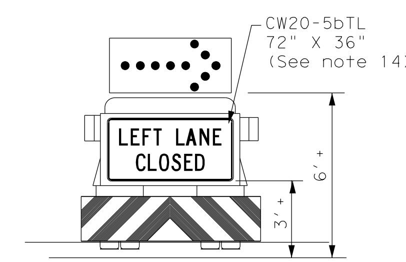
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

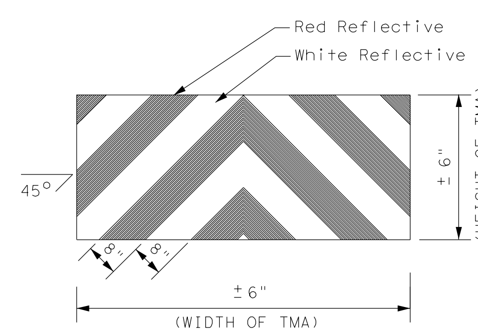


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND

*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

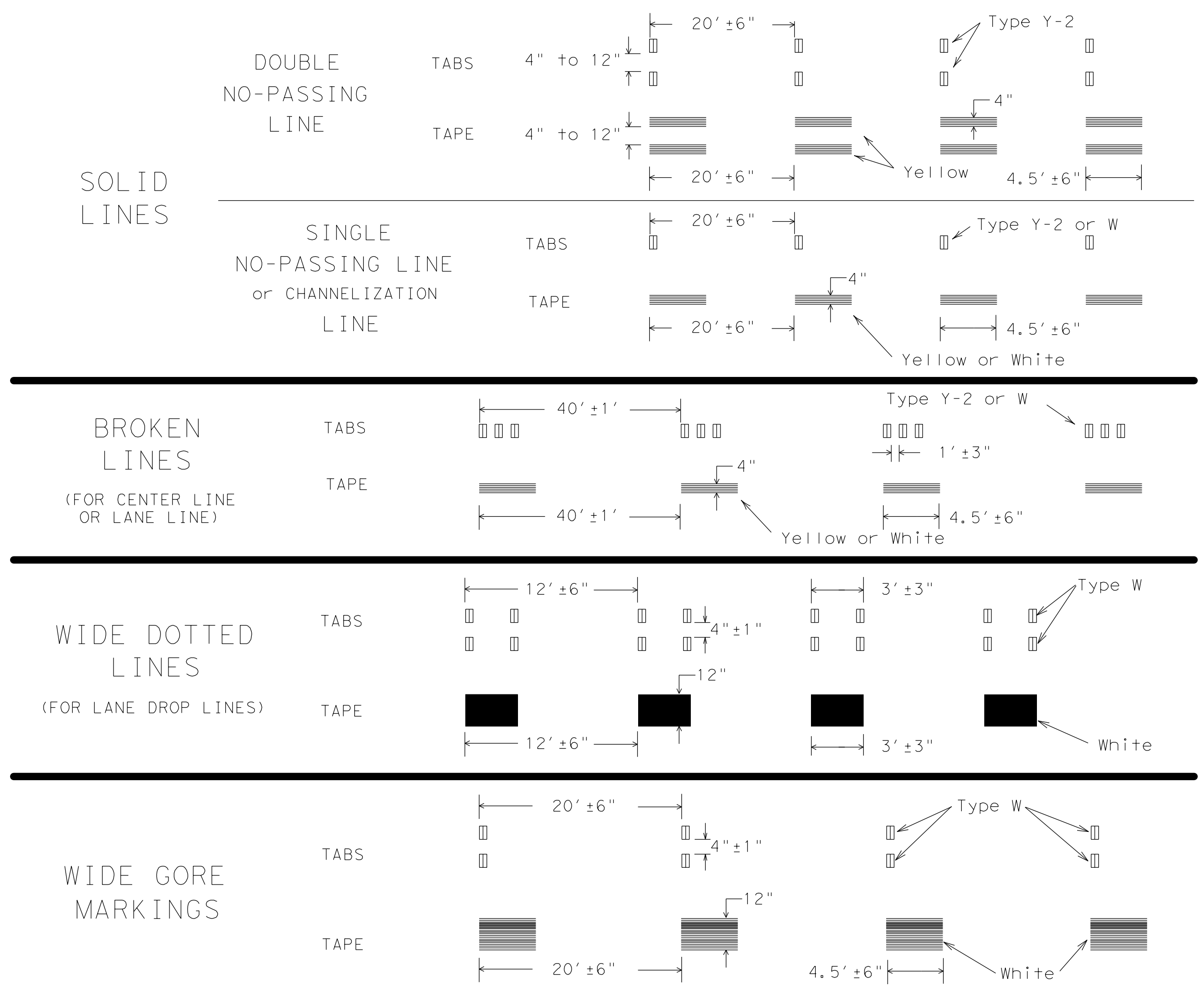
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97 7-14	0035	05	061	US 83
	DIST		COUNTY	SHEET NO.
	SJT		MENARD	27

DATE: 5/27/2021 11:18:35 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484\00 ...\Traffic Control\01 S

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



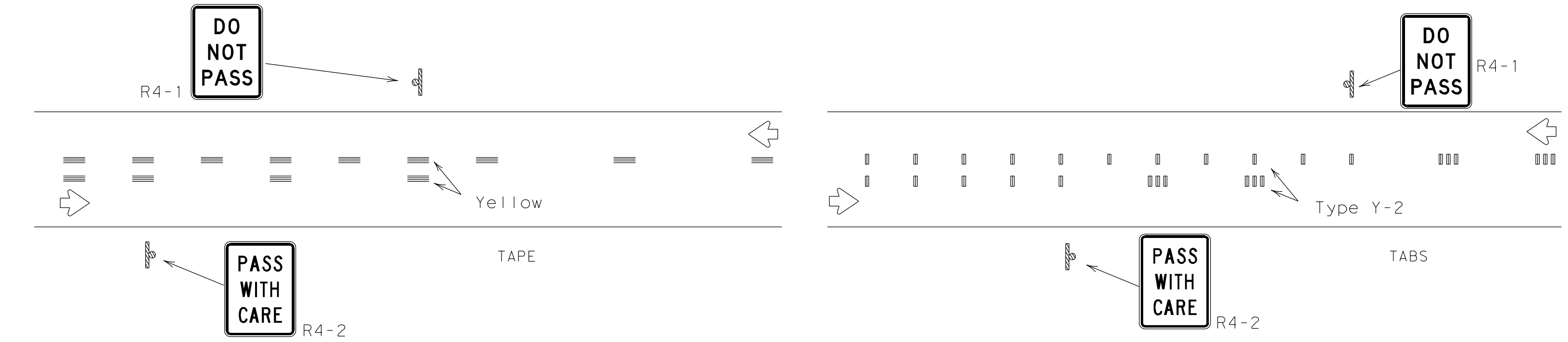
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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).
8. 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.

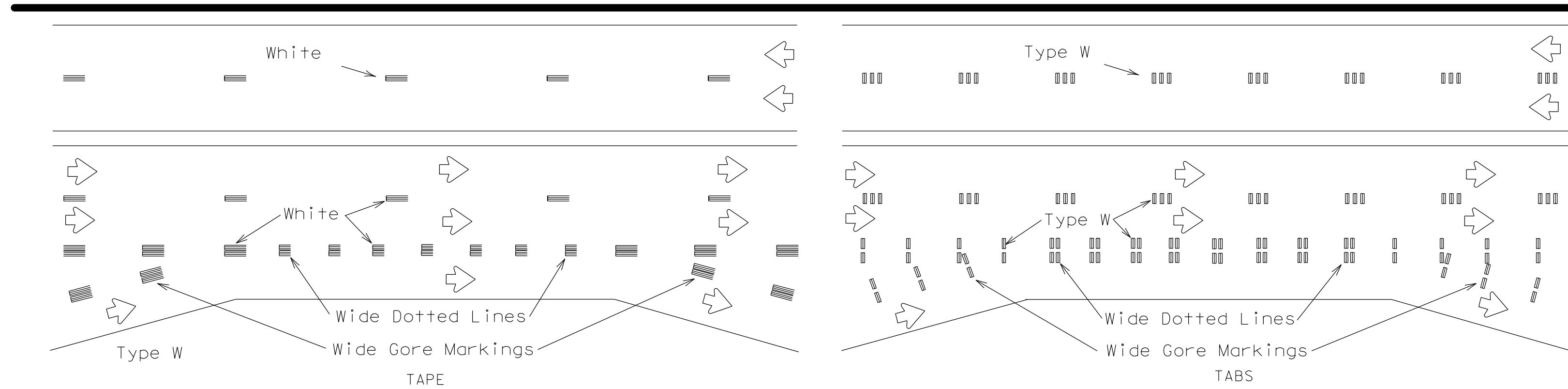
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. 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).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. 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.
4. 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.

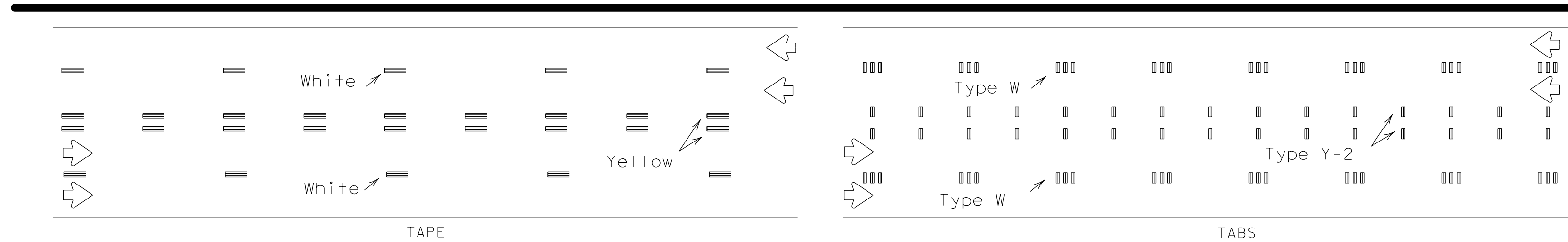
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



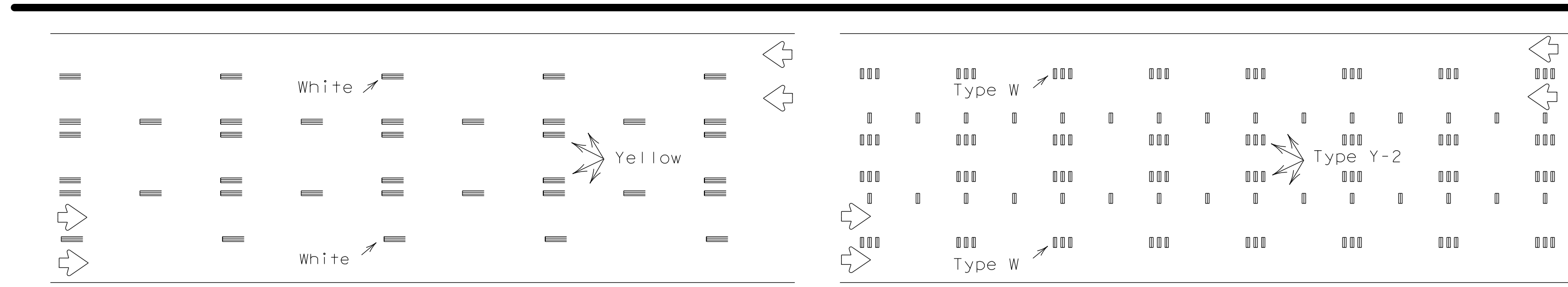
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



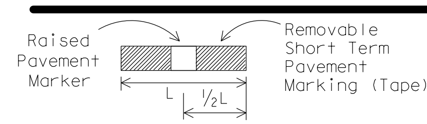
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. 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)

1. 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 Operations Division Standard

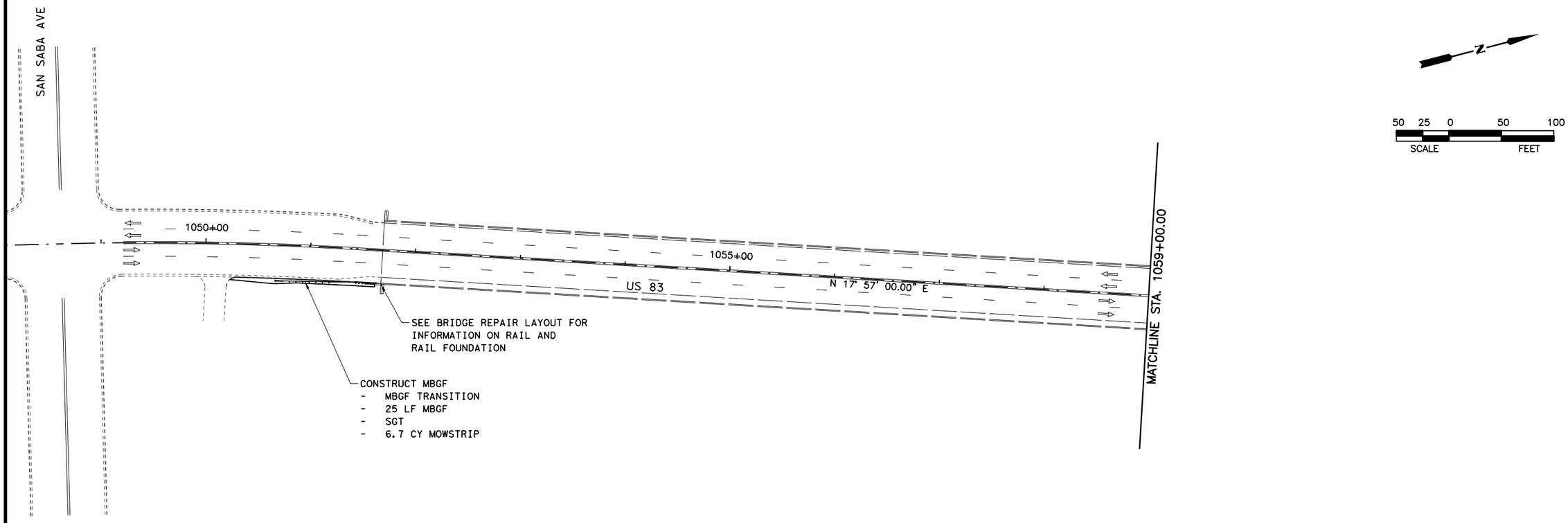
WORK ZONE SHORT TERM PAVEMENT MARKINGS

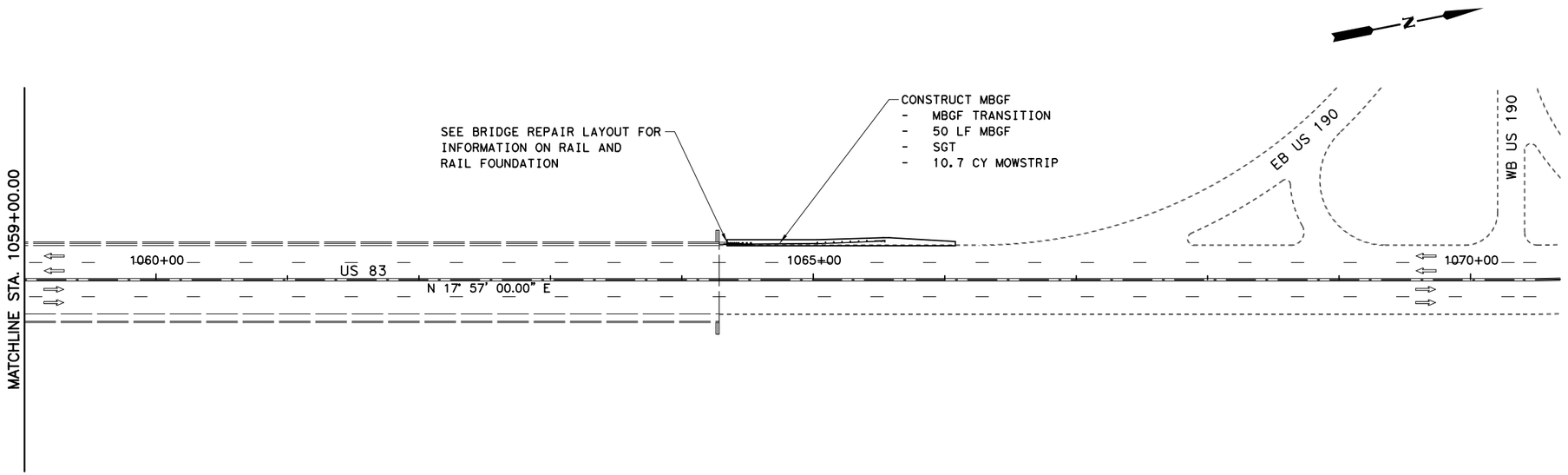
WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 3-03 7-13		0035	05	061	US 83
		DIST	COUNTY		SHEET NO.
		SJT	MENARD		28

111

DATE: 5/27/2021 11:18:38 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700...





STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

ROADWAY PLAN

BEGIN PROJECT TO END PROJECT

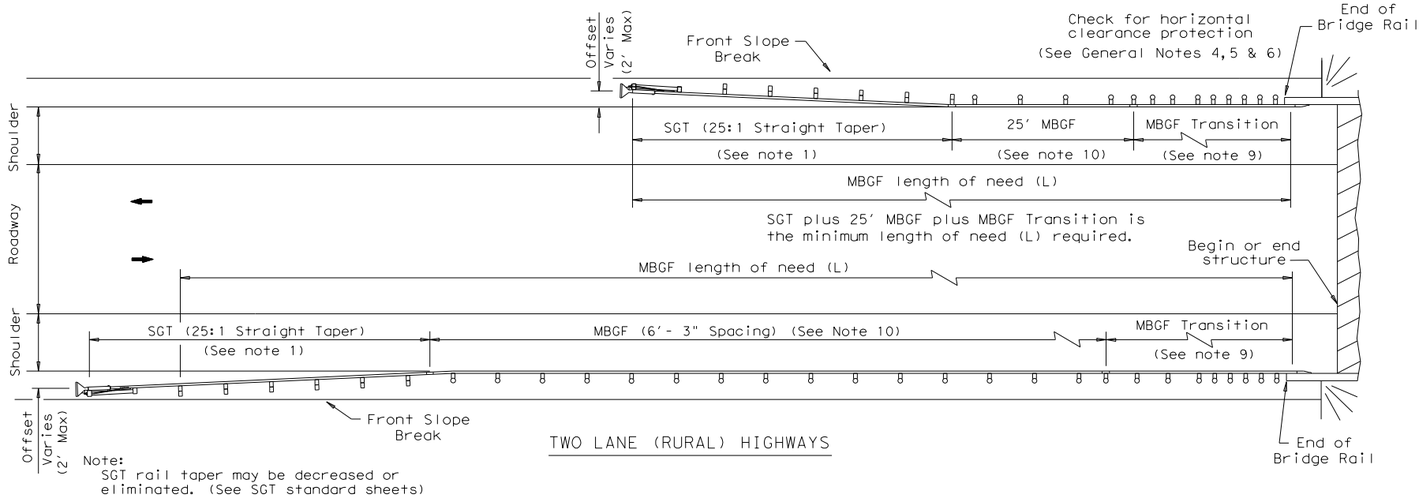
Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	29

SHEET 1 OF 1

cpybw_ANSIB.tbl
cpypf_ANSIB.pltcfg
pw:/

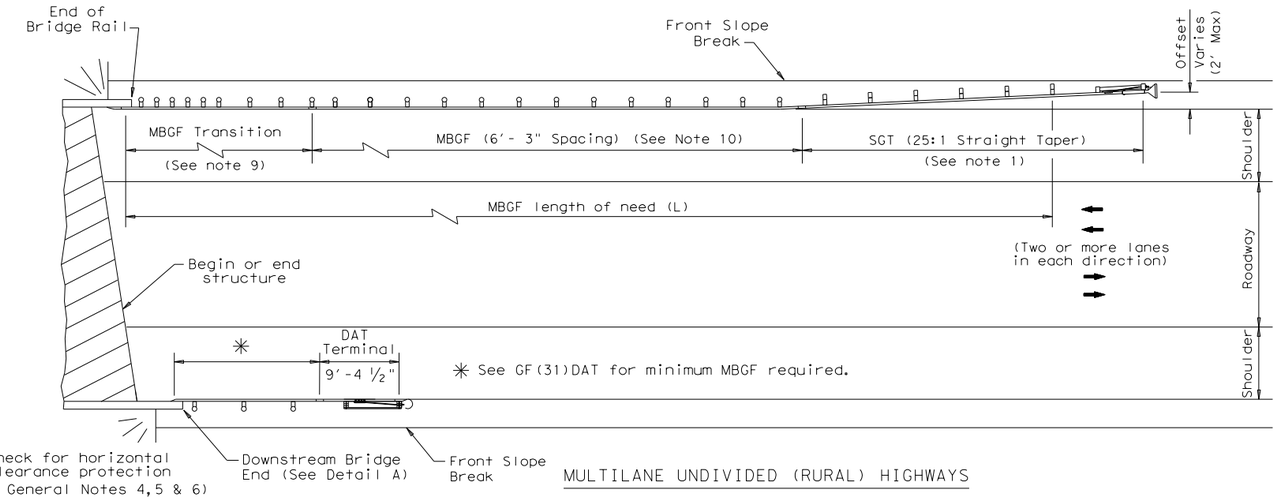
5/27/2021 11:19:35 AM mknapik
pw:/

DATE:
FILE:

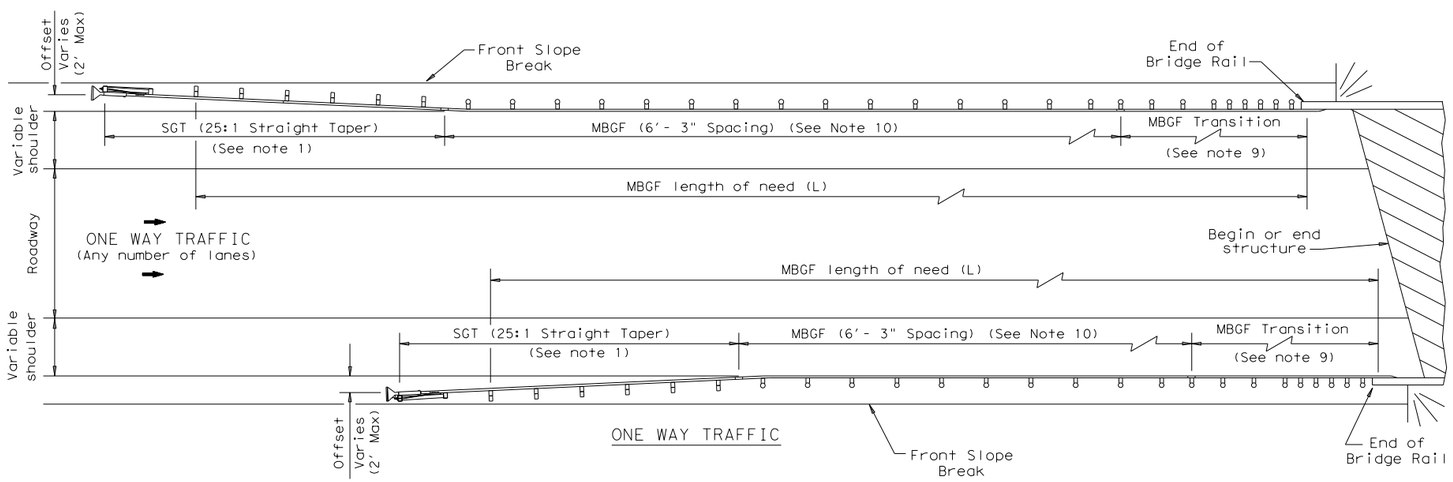


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



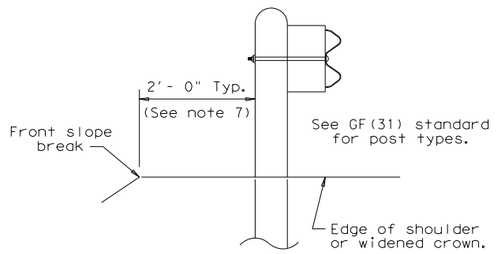
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



ONE WAY TRAFFIC

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 (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge 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 MBGF will be required.



TYPICAL CROSS SECTION AT MBGF

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

DETAIL A
Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

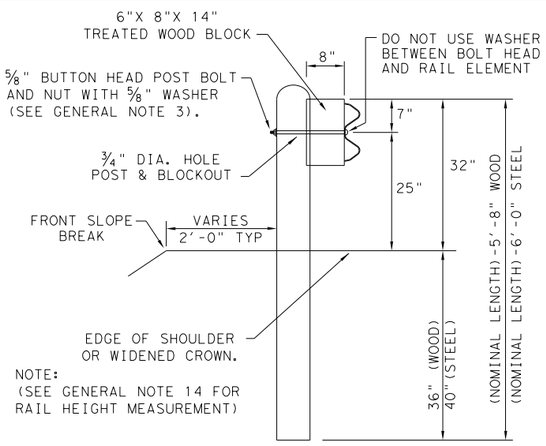
BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

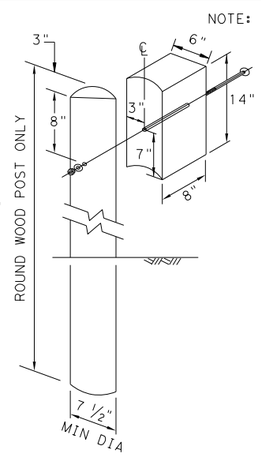
BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	SJT	MENARD		30

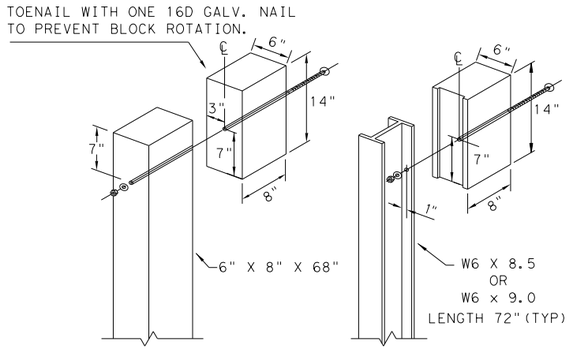
DATE: 5/27/2021
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba TXBR1700484.00TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba



TYPICAL POST PLACEMENT



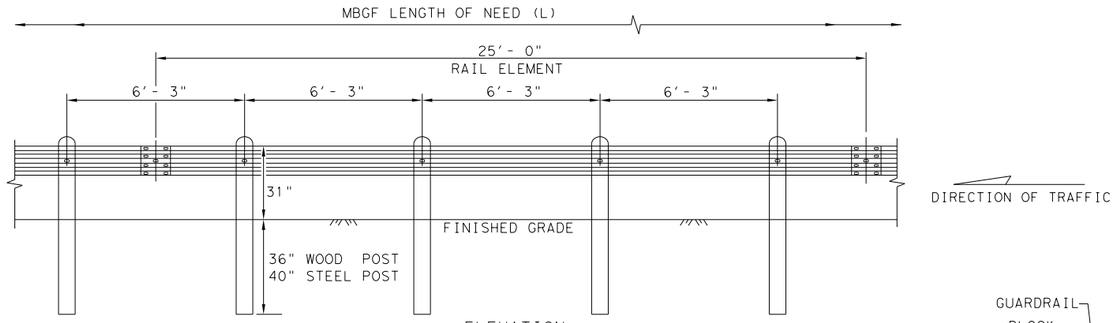
WOOD BLOCK TO
ROUND WOOD POST



WOOD BLOCK TO
RECTANGULAR WOOD POST

ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

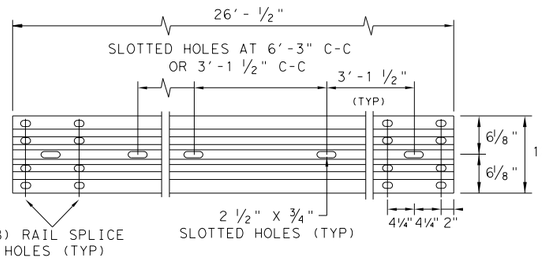
NOTE: ✳✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION
MID-SPAN RAIL SPLICE

DIRECTION OF TRAFFIC

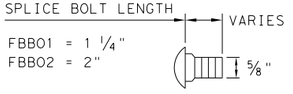
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

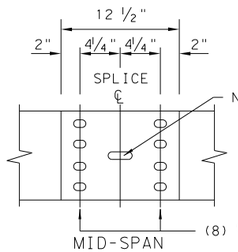
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.



BUTTON HEAD BOLT

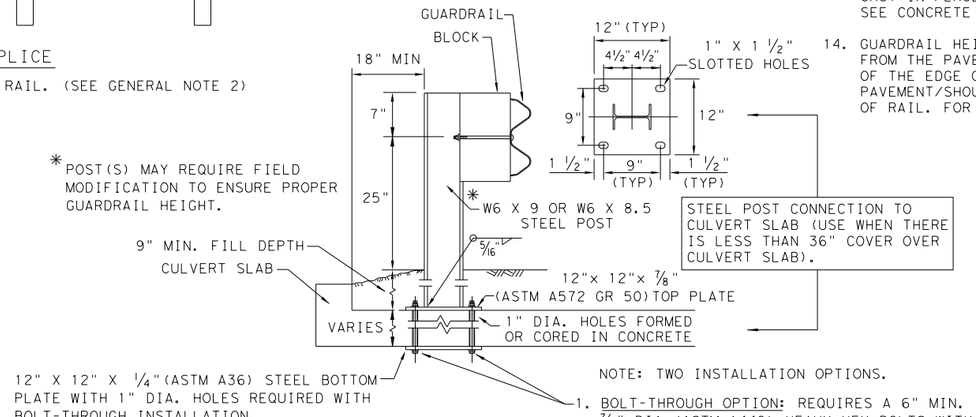
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN
RAIL SPLICE DETAIL

DIRECTION OF TRAFFIC

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" 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 ¼" 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 ½" 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 ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

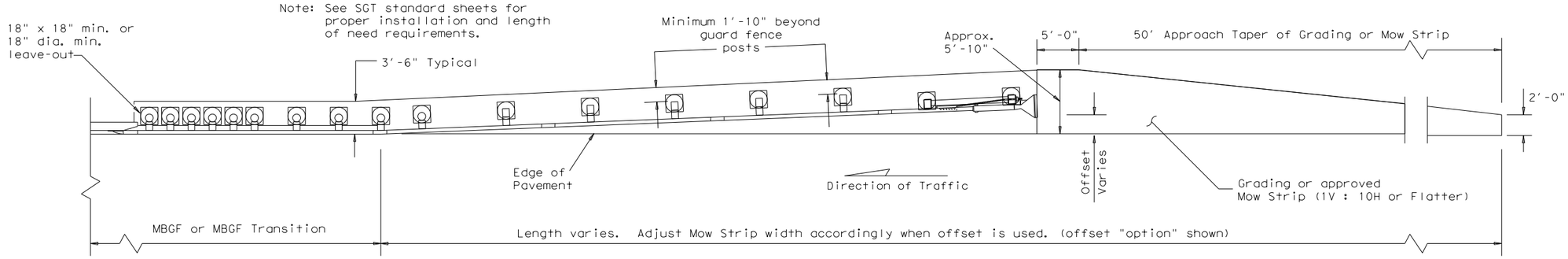
NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

Texas Department of Transportation — Design Division Standard

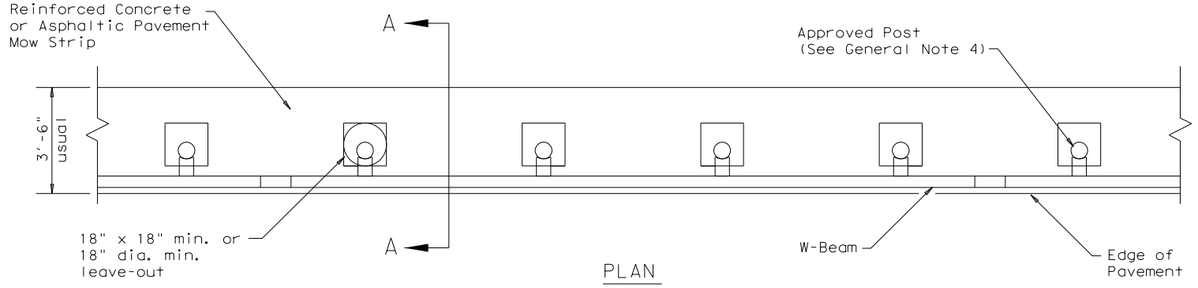
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0035	05	061	US 83	
	DIST	COUNTY		SHEET NO.	
	SJT	MENARD		31	

DATE: 5/27/2021
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba

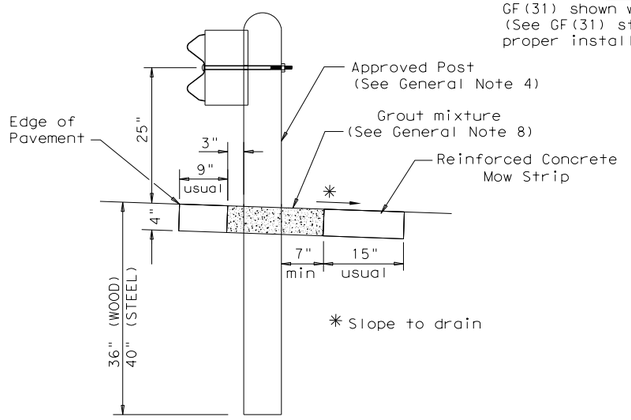


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



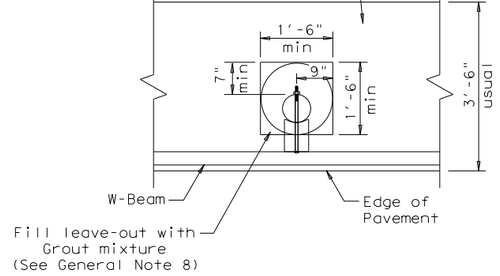
PLAN

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



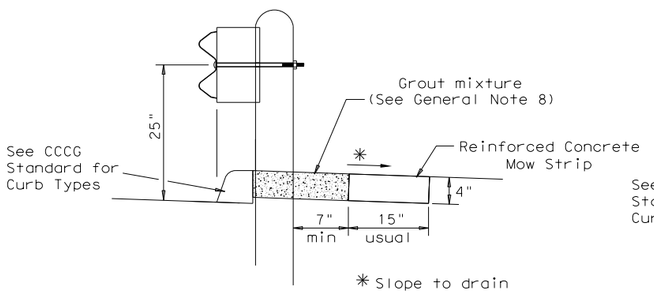
SECTION A-A

Typical



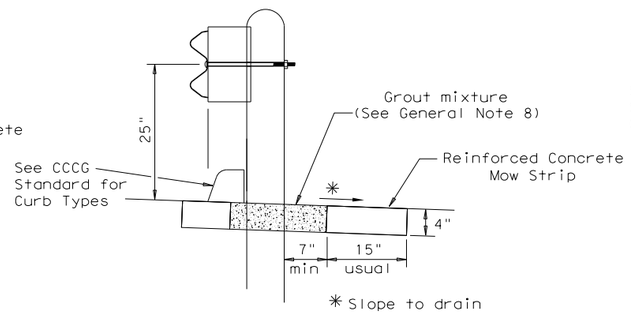
MOW STRIP DETAIL

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



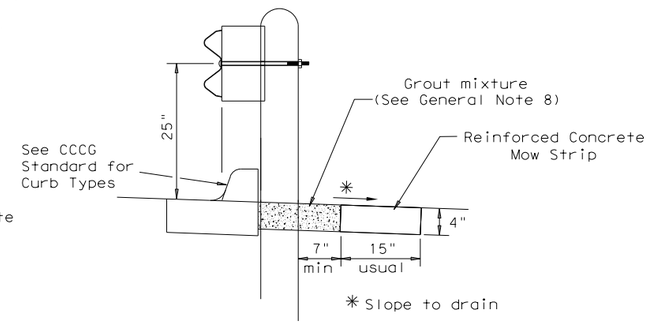
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

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 reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
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 ½" 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 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.

Texas Department of Transportation

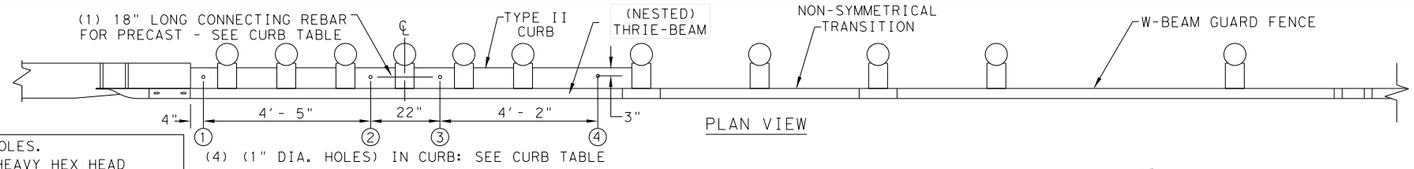
Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		32

DATE: 5/27/2021
FILE: pw:\\DataPWINT01.cpyone.com:pw-cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba



PLAN VIEW

(4) (1" DIA. HOLES) IN CURB: SEE CURB TABLE

(5) 1" DIA. HOLES.
(5) ⅞" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
(10) 1 ¾" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
(5) ⅞" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

THRIE-BEAM CONNECTOR TO CONCRETE RAIL

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE ⅞" 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.

DIRECTION OF TRAFFIC

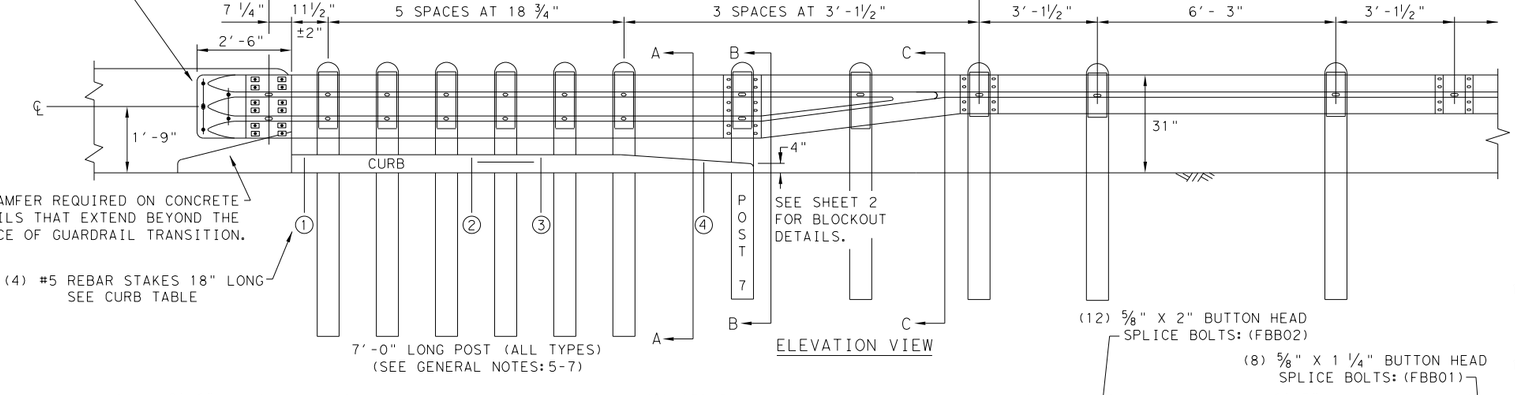
END PAYMENT FOR THRIE-BEAM TRANSITION.

18'- 9" THRIE-BEAM TRANSITION (EA)

BEGIN PAYMENT FOR METAL BEAM GUARD FENCE. (SEE GF(31)STANDARD)

6'-3" NON-SYMMETRICAL TRANSITION TO W-BEAM

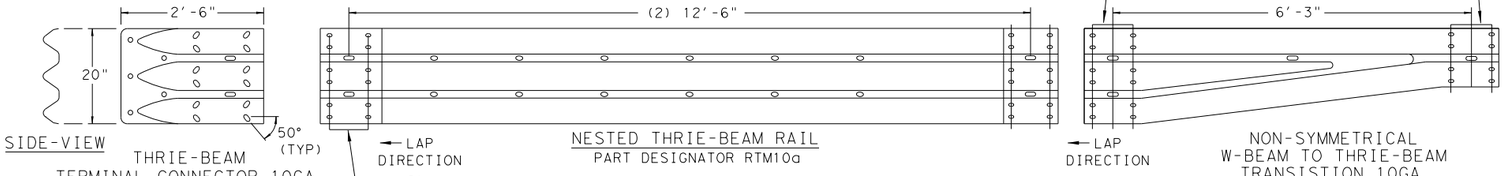
(IF CURB CONTINUES PAST POST 7 SEE SHT.2 AND GN:17)



ELEVATION VIEW

(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS: (FBB02)

(8) ⅝" X 1 ¼" BUTTON HEAD SPLICE BOLTS: (FBB01)



SIDE-VIEW

THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b
NOTE: SEE GENERAL NOTE: 9

NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10a

NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSISTION 10GA.
PART DESIGNATOR RWT02a OR RWT02b

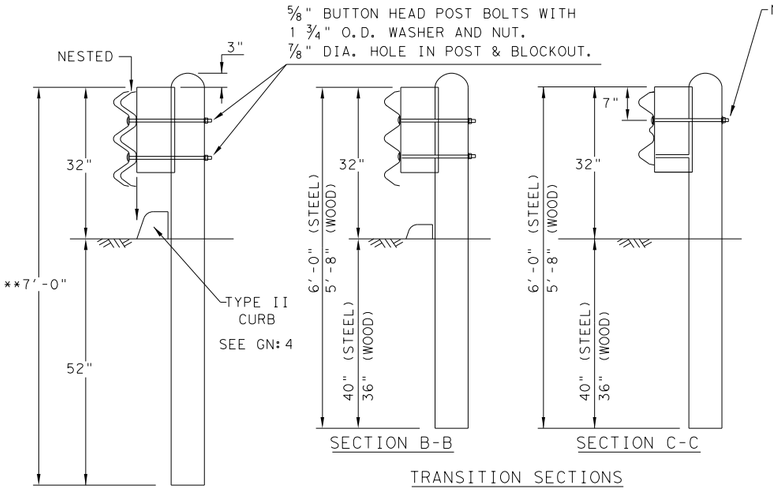
(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

PLATE WASHER INSTRUCTIONS

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

⅝" BUTTON HEAD POST BOLTS WITH 1 ¾" O.D. WASHER AND NUT. ⅞" DIA. HOLE IN POST & BLOCKOUT.

NOTE: ONLY (1) ⅝" BOLT REQUIRED AT THIS POST LOCATION.



SECTION A-A

SECTION B-B

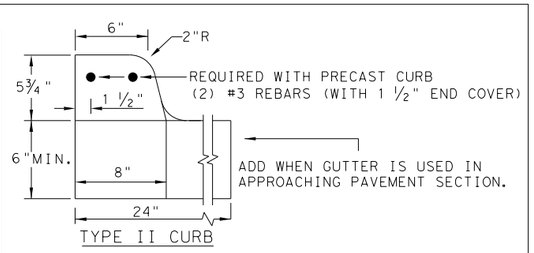
SECTION C-C

TRANSITION SECTIONS

NOTE: ALL POST TYPES, SEE GENERAL NOTE: 5 & 6

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

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 ½" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

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

* 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.

TYPE II CURB DETAILS

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- ¾" HEIGHT); SEE CURRENT CCCG 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 ½" 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 ⅝" 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 ⅝" WASHER (FWC16a) 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

Texas Department of Transportation

Design Division Standard

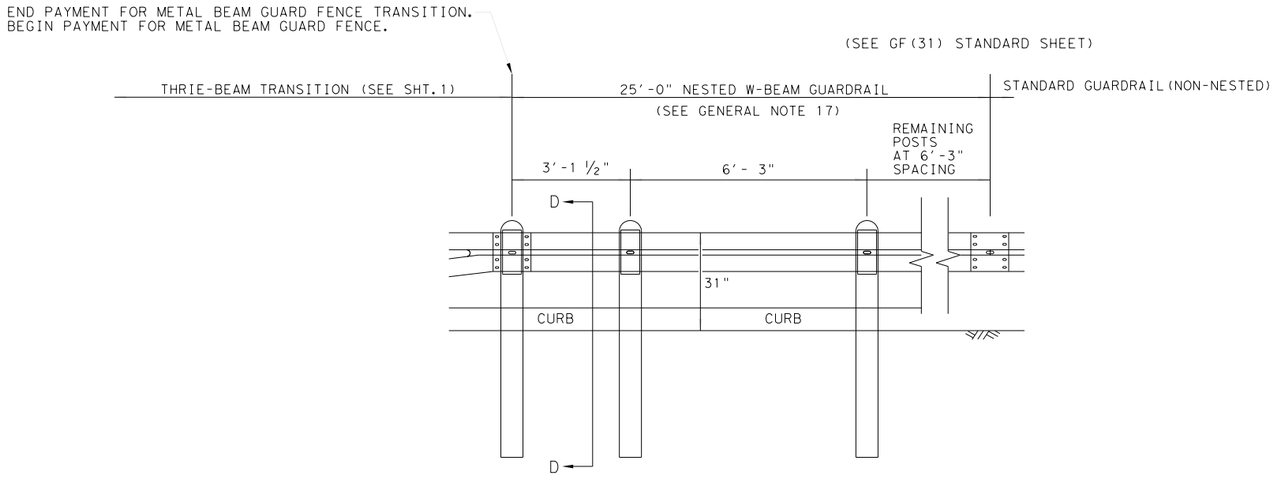
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

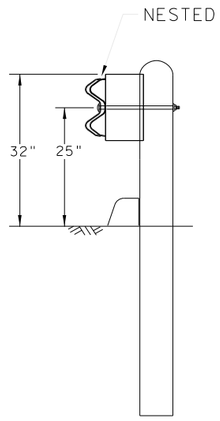
FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		33

DATE: 5/27/2021
FILE: pw:\\DotPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba

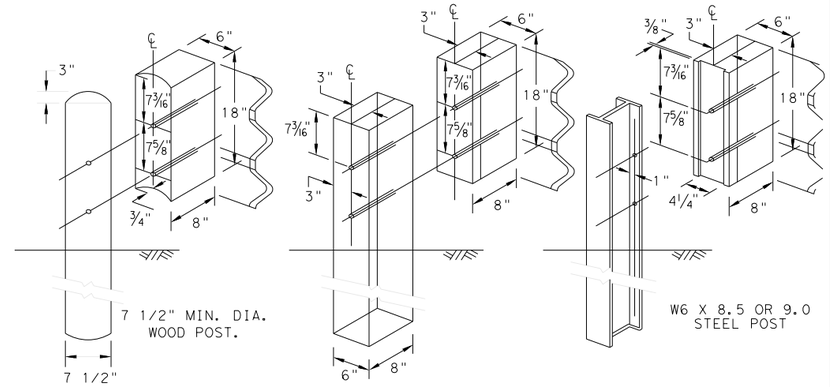
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

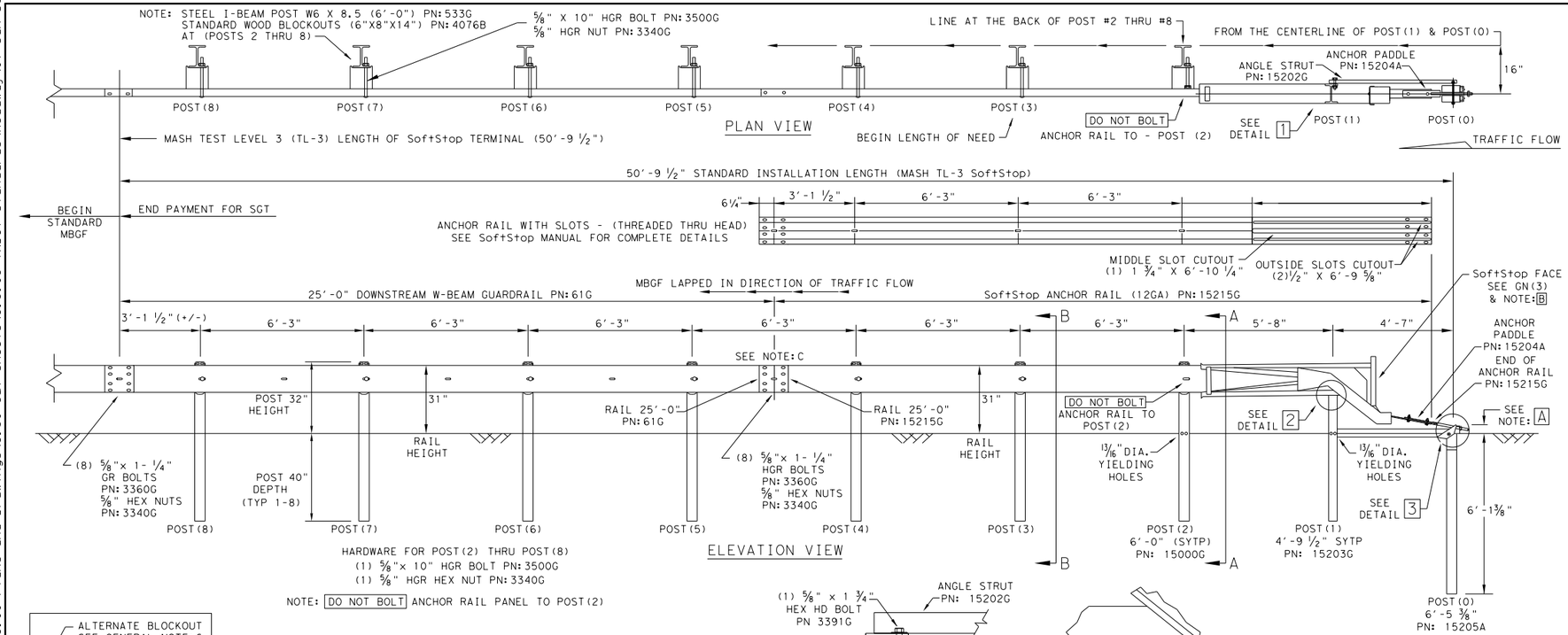
Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0035	05	061	US 83	
	DIST	COUNTY		SHEET NO.	
	SJT	MENARD		34	

DATE: 5/27/2021
FILE: pw:\\DotPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba



GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. 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.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT 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.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. 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.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-3/4" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 5/8")
15203G	1	POST #1 - (SYTP) (4'- 9 1/2")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 1/2" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	3/4" x 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" x 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" x 10" HGR POST BOLT A307
3391G	1	5/8" x 1 3/4" HEX HD BOLT A325
4489G	1	5/8" x 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/16" x 2 1/2" HEX HD BOLT GR-5
105286G	1	5/16" x 1 1/2" HEX HD BOLT GR-5
3240G	6	5/16" ROUND WASHER (WIDE)
3245G	3	5/16" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

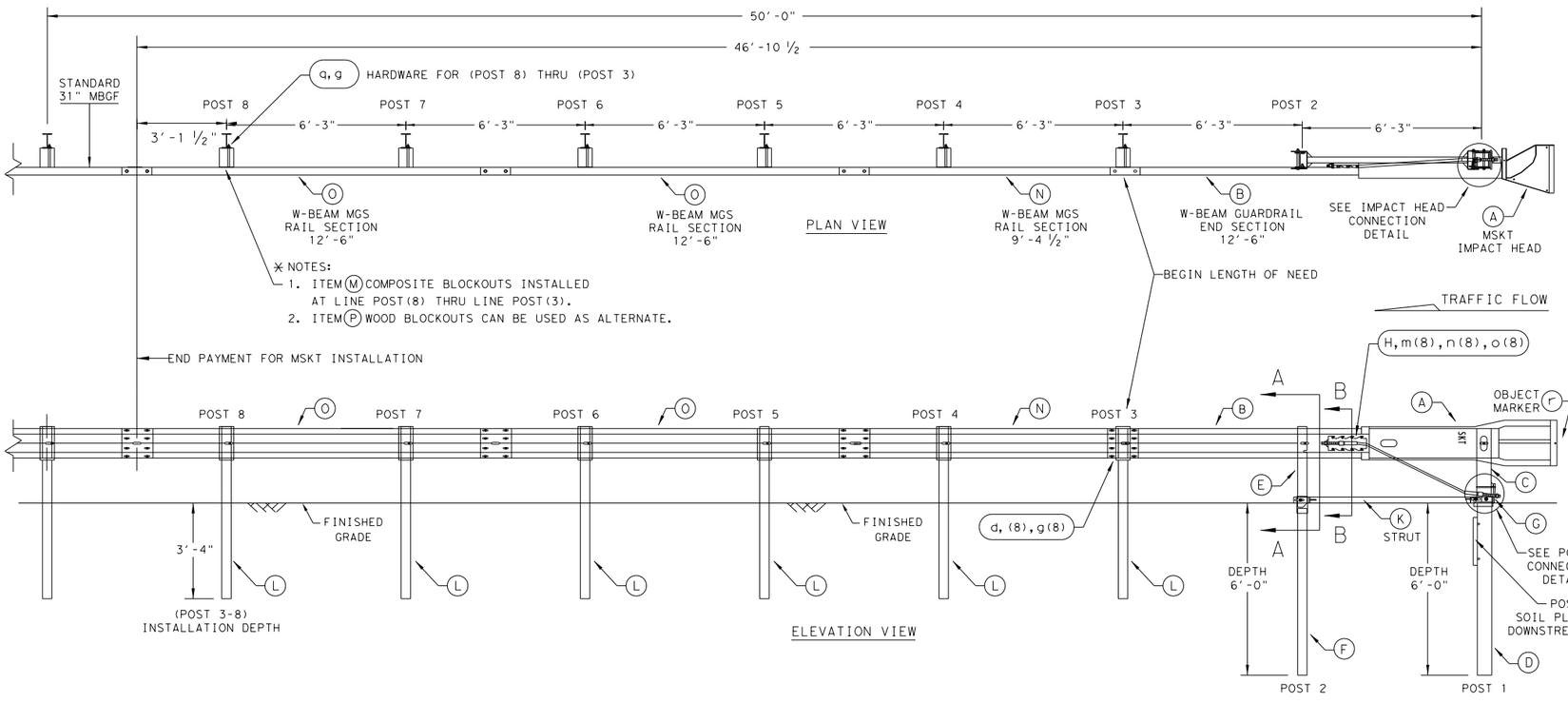
Texas Department of Transportation

Design Division Standard

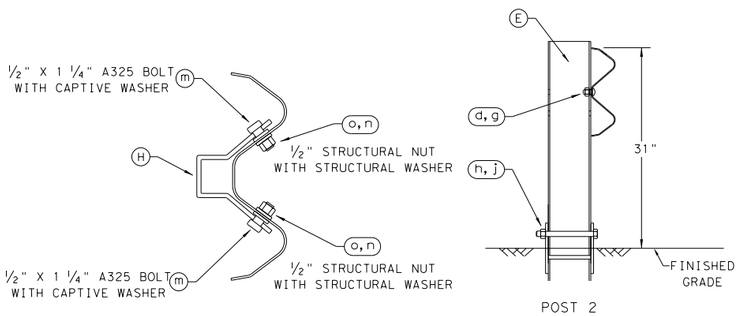
TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

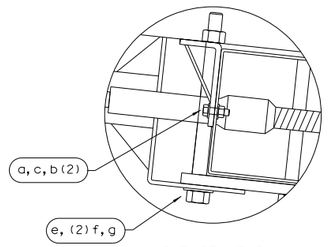
FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		35

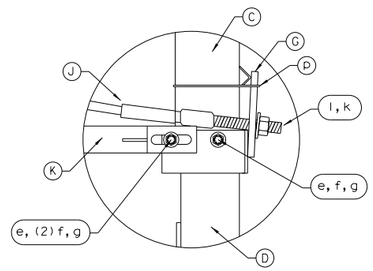
DATE: 5/27/2021
FILE: pw:\\DataPWINT01.cbyone.com:pw_cby\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba

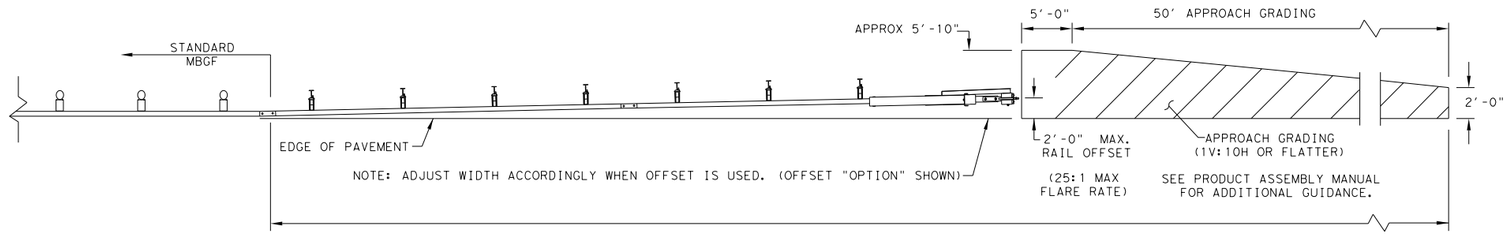


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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.

GENERAL NOTES

1. 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
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. 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.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. 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.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. 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.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. 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.

SEE NOTES: ✳

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	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	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" 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 1/16" O.D. x 5/16" 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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

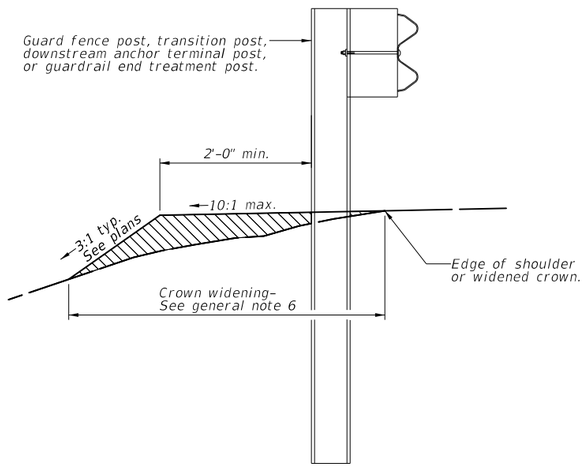
MSKT-MASH-TL-3

SGT(12S)31-18

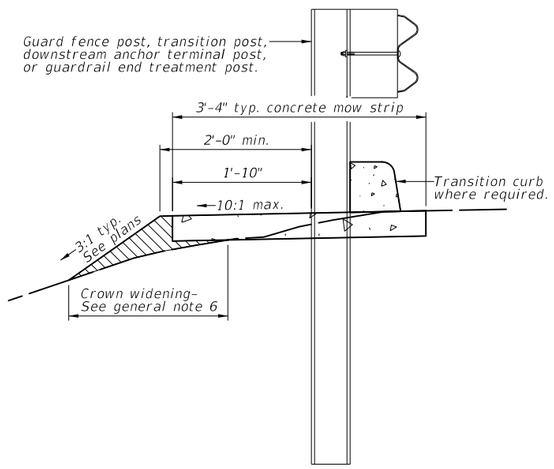
FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0035	05	061	US 83	
	DIST	COUNTY		SHEET NO.	
	SJT	MENARD		36	

KEYED NOTES

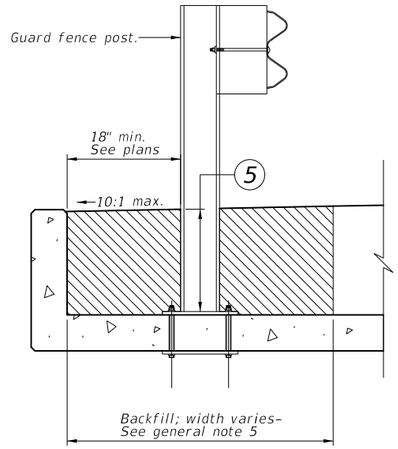
1. Transition curb. See general note 12 for measurement and payment.
2. Mow strip. Measure and pay as Item 432, "Riprap".
3. Transition curb height. Taper to 4 in. max. at terminal point if there is no adjacent curb; otherwise taper to adjacent curb height.
4. Extension of mow strip, if there is no adjacent curb.
5. 9" min. 36" max.
6. Extension of mow strip, if slope exceeds 3:1.



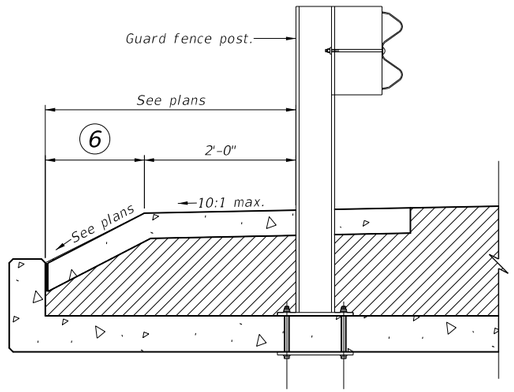
CROWN WIDENING DETAILS WITHOUT CONCRETE MOW STRIP



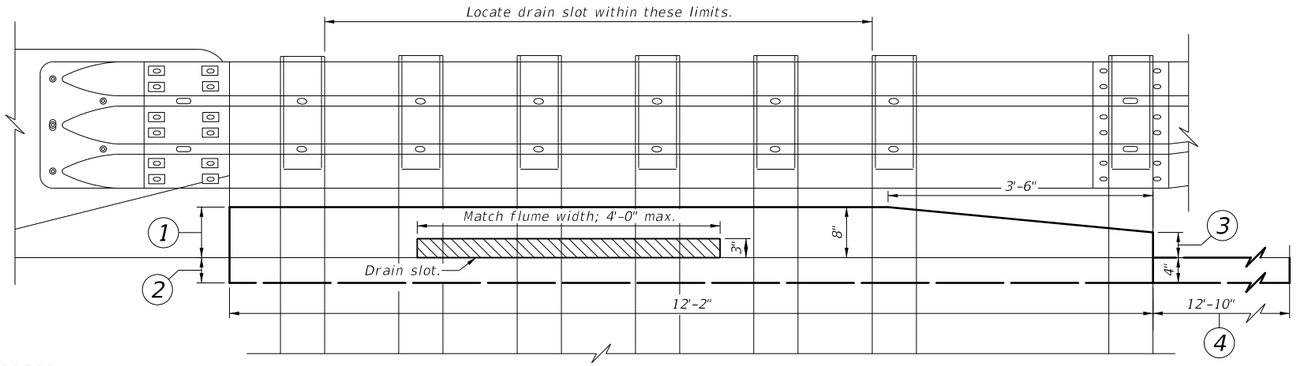
CROWN WIDENING DETAILS WITH CONCRETE MOW STRIP



LOW FILL CULVERT POST DETAILS



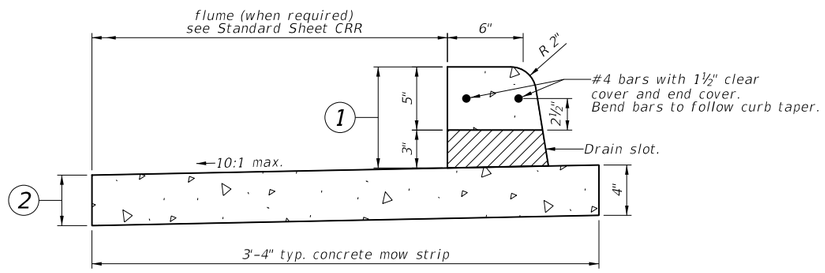
LOW FILL CULVERT POST DETAILS WITH CONCRETE MOW STRIP



ELEVATION OF MOW STRIP AND TRANSITION CURB WITH OPTIONAL DRAIN SLOT

GENERAL NOTES

1. Rail elements to be removed may have metal components coated with lead-containing paint (hazardous materials). Any such elements will be identified on the Environmental Permits, Issues, and Commitments (EPIC) plan sheet. Remove the metal components by mechanical dismantling and/or by hydraulic cutting. Do not use a flame cutting torch or any other means that will produce fumes or will strip paint. Segregate the metal components from other construction waste and dispose of properly. Follow applicable safety standards.
2. Steel posts to be removed may have concrete foundations.
3. Where posts are removed, backfill holes using approved materials and methods.
4. Sawcut and remove existing materials where required for installation of posts, mow strip, or transition curb. This work will not be measured or paid separately.
5. Where installing low fill culvert posts on existing structures, backfill excavations using approved materials and methods. The work and materials will be included in payment for this item.
6. Widen crown to accommodate guardrail, guardrail end treatments, downstream anchor terminals, and transitions as shown. Unless otherwise shown on the plans, this will be measured and paid for as Item 132, "Embankment".
7. Furnish steel posts for guard fence transitions.
8. Furnish and install object markers Type OB-3F on the front of the impact heads of single guardrail terminals as shown on Standard Sheet D&OM(VIA).
9. Transition curbs shall use Class B concrete and shall be cast-in-place monolithically with mow strip.
10. Transition curbs installed with new thrie-beam transitions will not be measured or paid for separately but will considered as included in payment for Item 540, "Metal Beam Guard Fence".
11. Drain slots are required where shown on the plans or as directed.
12. Synthetic fibers may be used in lieu of steel reinforcing in transition curb and mow strip.
13. Reinforcing steel shall conform to the requirements of Item 440, "Reinforcement for Concrete".
14. See Standard Sheets GF(31), CCCG, GF(31)TR, and CRR for additional information.
15. Concrete quantity for one 25 ft. mow strip is 1.0 CY.
16. Guard fence post spacing is 6'-3" usual and maximum. Non-standard rail sections are required for guard fence post spacing less than 6'-3".



SECTION THRU MOW STRIP AND TRANSITION CURB WITH OPTIONAL DRAIN SLOT

PAY ITEMS

0132 6017	EMBANKMENT (VEHICLE)(ORD COMP)(TY A)	CY
0432 6045	RIPRAP (MOW STRIP)(4 IN)	CY
0540 6002	MTL W-BEAM GD FEN (STEEL POST)	LF
0540 6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA
0540 6007	MTL BEAM GD FEN TRANS (TL2)	EA
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA
0540 6020	MTL W - BEAM GD FEN (LOW FILL CULVERT)	LF
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA

STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

Texas Department of Transportation

San Angelo District

GUARD FENCE DETAILS

NOT TO SCALE

SHEET ISSUED OR LAST REVISED
11-19

CONT	SECT	JOB	HIGHWAY
0035	05	061	US 83
DIST	COUNTY		SHEET NO.
SJT	MENARD		37

DATE: 5/27/2021 11:20:02 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR1700484.00\TXBR1700484.15\8.00 Plans and Drawings\8.30 Cut Sheets\8.3.09 TxDOT Standards\Roadway\01 San Saba River\037 GUARD FENCE DETAILS

TABLE OF ESTIMATED BRIDGE QUANTITIES

BRIDGE ELEMENT / ITEM	420 6066	427 6006	429 6007	442 6007	446 6002	450 6004	776 6041
	CL C CONC (RAIL FOUNDATION)	EPOXY WATERPROOF FINISH (2)	CONC STR REPAIR (VERTICAL & OVERHEAD) (1)	STR STEEL (MISC NON – BRIDGE)	CLEAN & PAINT EXIST STR (SYSTEM II)	RAIL (TY T221)	REPAIR (STEEL RAIL)
	CY	SF	SF	LB	LS	LF	LF
2 – ABUTMENTS	1.8	806	30			12	
38 – INTERIOR BENTS		17807	2483 (3)				
6 – STEEL BEAM SPANS			15	1950	1		32
32 – CONCRETE GIRDER SPANS			263	7780			
TOTAL	1.8	18613	2790	9730	1	12	32

(1) INCLUDES A 50% INCREASE FROM FIELD OBSERVED QUANTITIES.

(2) CLEAN AND APPLY EPOXY COATING TO THE TOP, SIDES AND ENDS OF BENT NOS. 2 THROUGH 38 AND TO FACE OF BACKWALL, TOP AND SIDES OF EXPOSED CAP OF ABUTMENT NOS. 1 AND 39 (SURFACE AREA IV).

(3) SOME REPAIR AREAS ON THE EXISTING BENT CAPS WILL REQUIRE REMOVAL OF STEEL PLATES TO REPAIR. THE PAYMENT TO REMOVE THE STEEL PLATES WILL BE CONSIDERED SUBSIDIARY TO ITEM 429, "CONC STR REPAIR (VERTICAL & OVERHEAD)". THE STEEL PLATES DO NOT NEED TO BE REATTACHED TO THE BENT CAPS AFTER THE REPAIR. THE STEEL PLATES WILL BECOME PROPERTY OF THE CONTRACTOR.

NO.	REVISION	BY	DATE

CP&Y

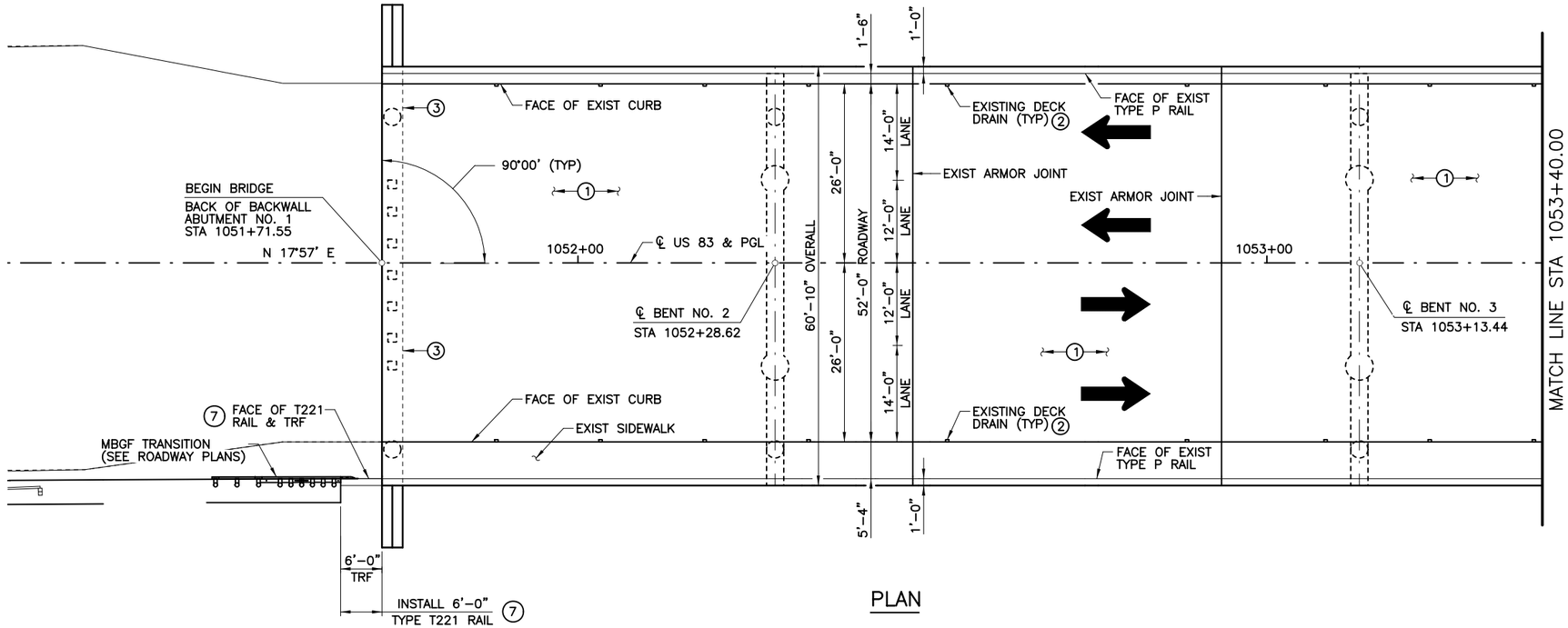
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE ESTIMATED QUANTITIES

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061		38

SHEET 1 OF 1



PLAN

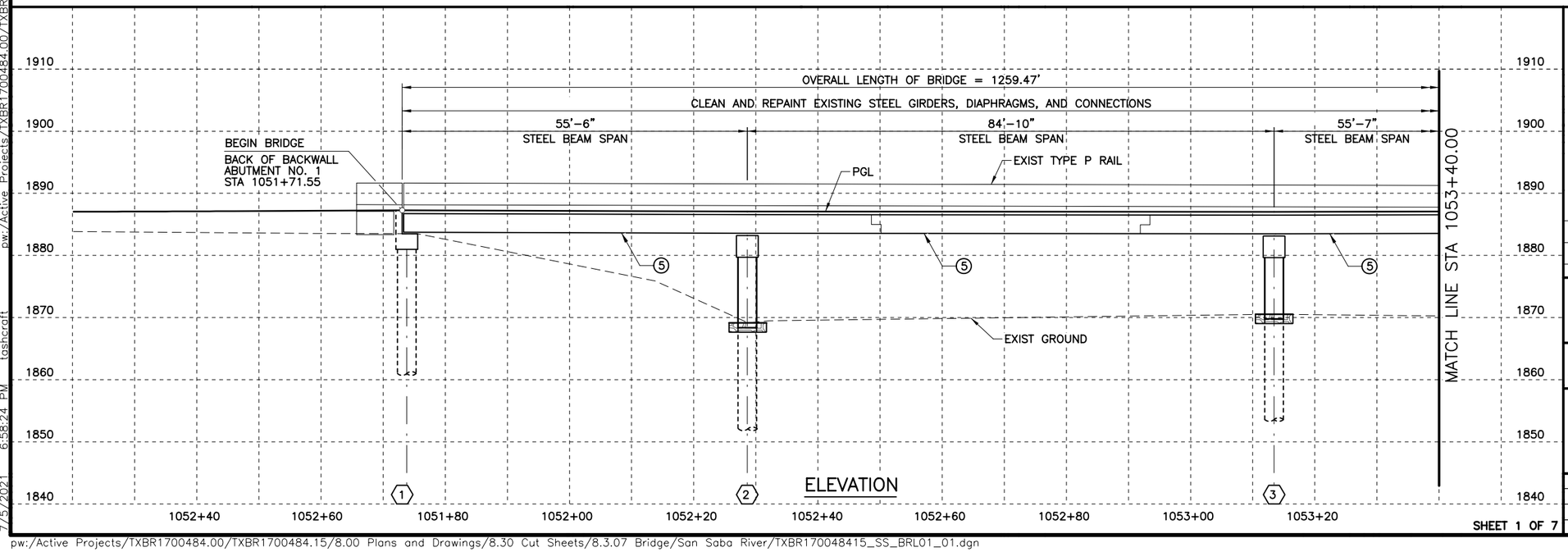
10 5 0 10 20
SCALE FEET

GENERAL NOTES:

1. SEE ESTIMATED QUANTITIES FOR SCOPE OF BRIDGE REHABILITATION.
2. US 83 CENTERLINE BEARING AND STATIONING IS BASED ON AS-BUILT DRAWINGS (CSJ 0035-05-026) AND IS FOR REFERENCE ONLY. SPAN LENGTHS SHOWN IN ELEVATION ARE APPROXIMATE.
3. REPAIR LOCATIONS NOTED ARE APPROXIMATE AND ARE PROVIDED AS A VISUAL AID. ACTUAL REPAIR LOCATIONS TO BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING REPAIR WORK. PERFORM ALL CONCRETE REPAIRS IN ACCORDANCE WITH CHAPTER 3 OF THE CONCRETE REPAIR MANUAL UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. SEE TRAFFIC RAIL FOUNDATION (TRF) AND TYPE T221 RAIL STANDARDS FOR DETAILS, NOTES AND DIMENSIONS NOT SHOWN.
5. BATS ARE PRESENT IN THE EXPANSION JOINTS BETWEEN THE CONCRETE GIRDER SPANS FROM FEBRUARY TO OCTOBER. AVOID DISTURBANCE OF THESE AREAS DURING THIS TIME PERIOD.
6. APPROXIMATE NORMAL WATER LEVEL TAKEN FROM AS-BUILT DRAWINGS (CSJ-0035-05-026).
7. SEE EXISTING BRIDGE INFORMATION SHEETS FOR AS-BUILT PLANS SHOWING DETAILS OF EXISTING STEEL BEAMS, DIAPHRAGMS AND BEARINGS.

(1) REPAIR SPALLS ON BOTTOM OF CONCRETE DECK WHERE REINFORCEMENT IS EXPOSED.
(2) REPAIR EXISTING DECK DRAINS.
(3) REPAIR CONCRETE SPALLS AND CRACKS AT ABUTMENT.
(5) CLEAN AND REPAINT EXISTING STEEL GIRDERS, DIAPHRAGMS AND CONNECTIONS.
(7) INSTALL WINGWALL PORTION OF T221 RAIL ON TRF FOUNDATION.

EXIST NBI NO.: 07-164-0-0035-05-021



ELEVATION

SHEET 1 OF 7

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED
PROFESSIONAL ENGINEER
7/6/2021

NO.	REVISION	BY	DATE

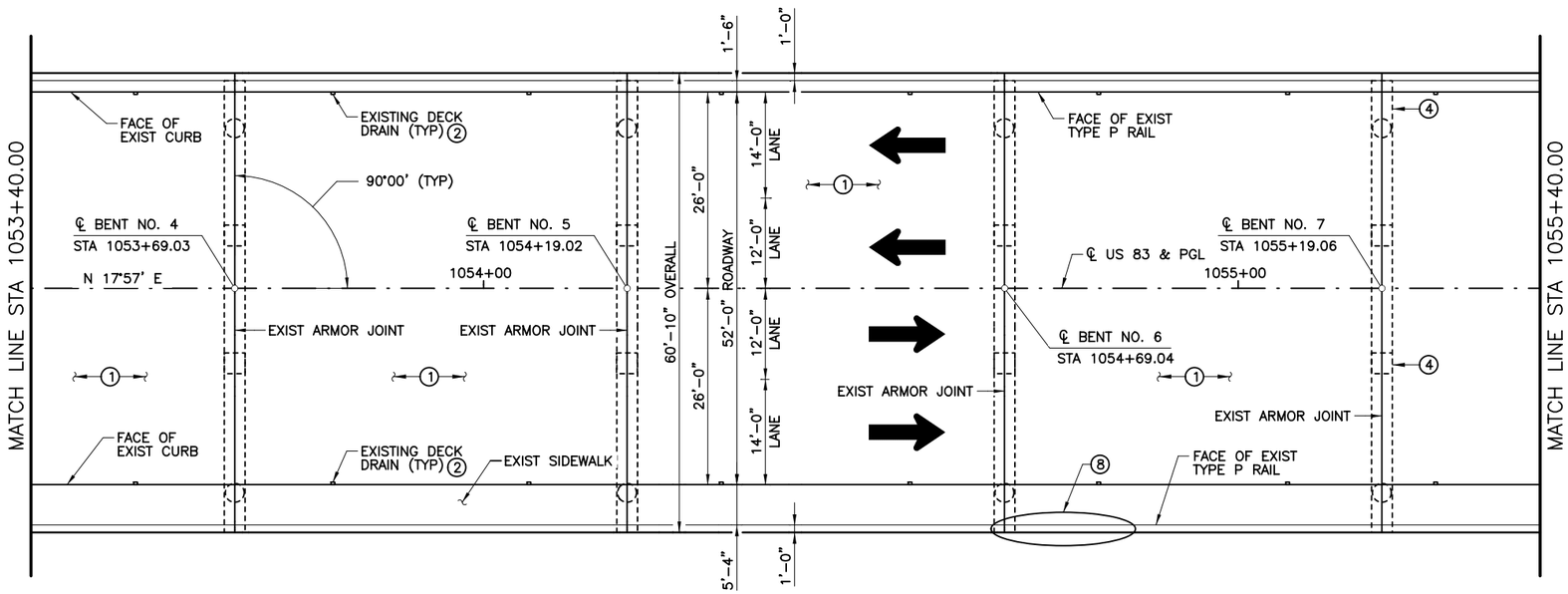
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE REPAIR LAYOUT

SAN SABA RIVER BRIDGE

Designed: TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked: TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn: KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked: TGA	SJT	MENARD	0035	05	061	39

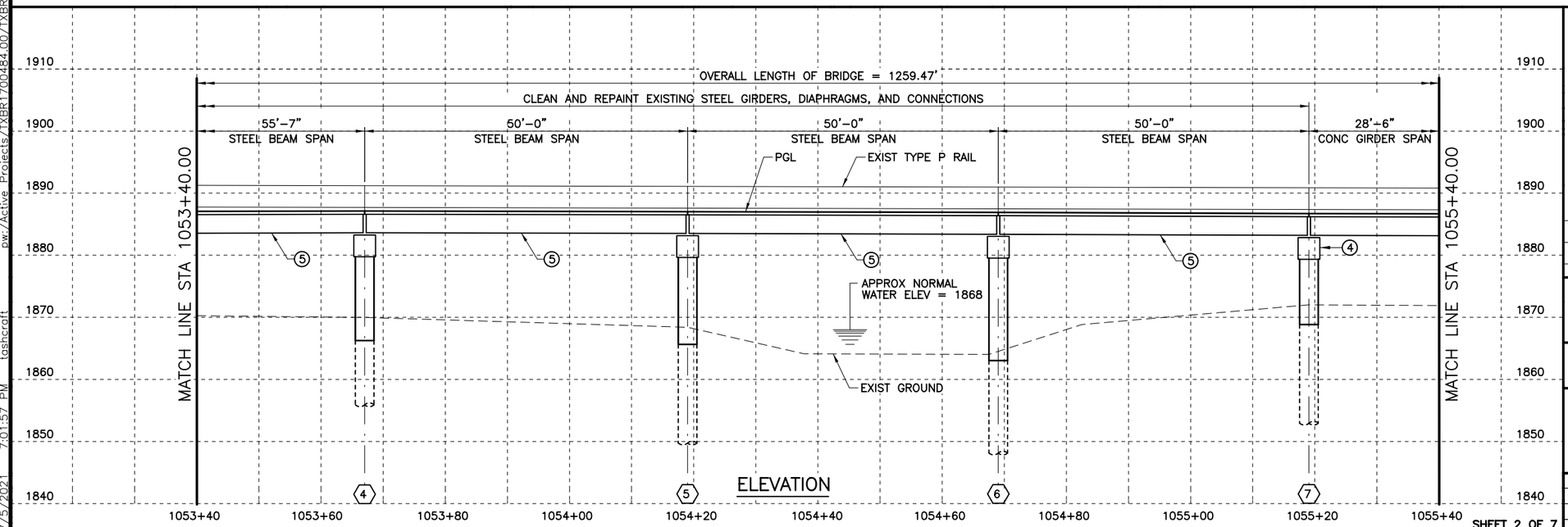


PLAN

10 5 0 10 20
SCALE FEET

(1) REPAIR SPALLS ON BOTTOM OF CONCRETE DECK WHERE REINFORCEMENT IS EXPOSED.
(2) REPAIR EXISTING DECK DRAINS.
(4) REPAIR CONCRETE SPALLS AND CRACKS ON BENT CAP.
(5) CLEAN AND REPAINT EXISTING STEEL GIRDERS, DIAPHRAGMS AND CONNECTIONS.
(8) REPAIR RAIL IMPACT DAMAGE. SEE RAIL REPAIR DETAILS.

EXIST NBI NO.: 07-164-0-0035-05-021



ELEVATION

SHEET 2 OF 7

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED PROFESSIONAL ENGINEER
7/6/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

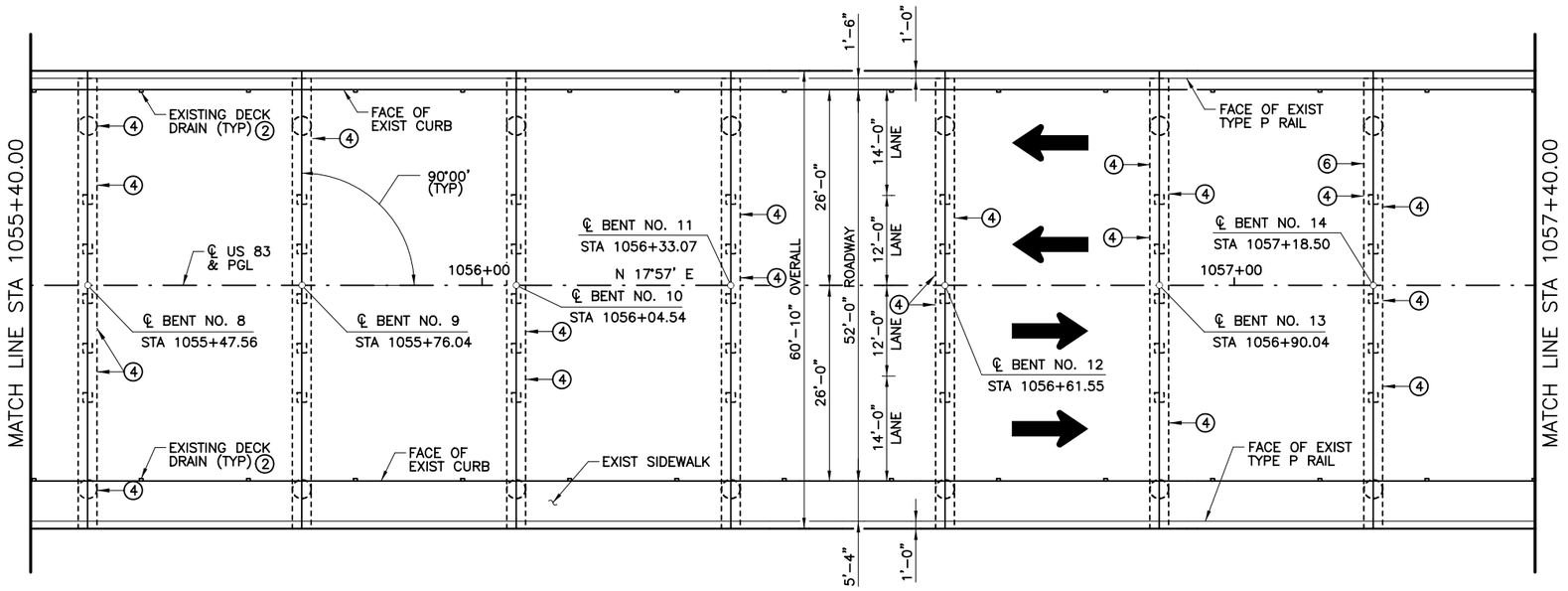
 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE REPAIR LAYOUT

SAN SABA RIVER BRIDGE

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	TGA	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061	40
Checked:	TWS						

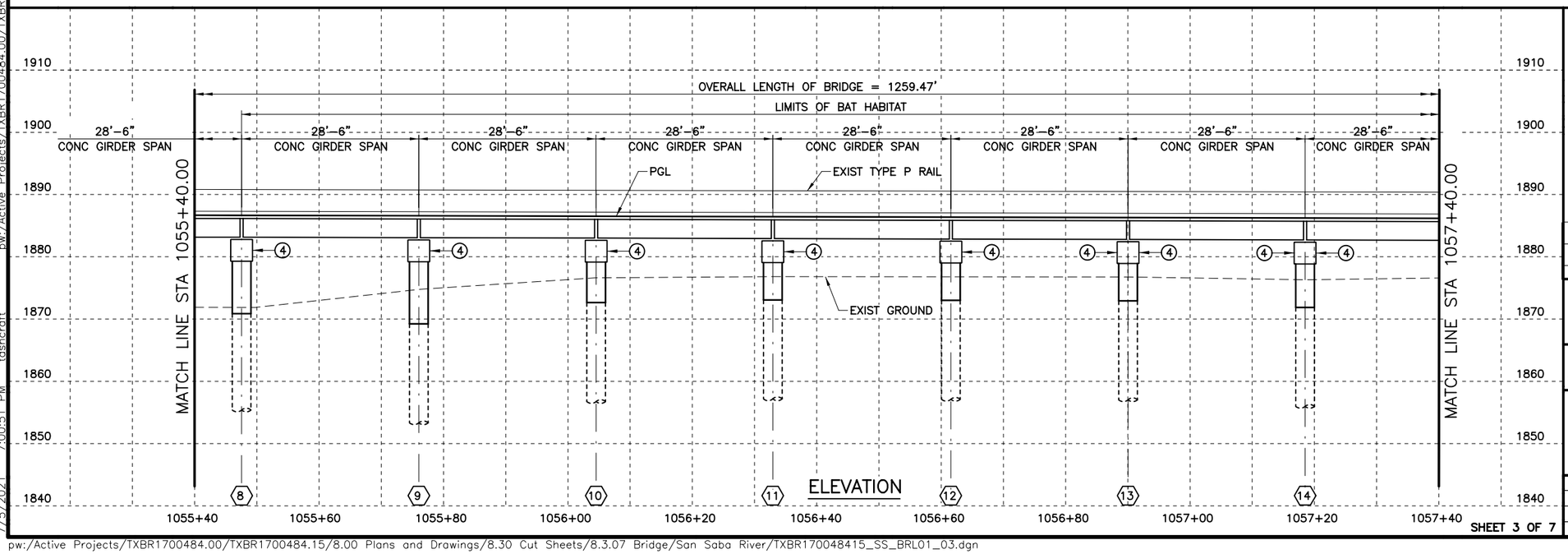


PLAN

10 5 0 10 20
SCALE FEET

(2) REPAIR EXISTING DECK DRAINS.
(4) REPAIR CONCRETE SPALLS AND CRACKS ON BENT CAP.
(6) REPAIR CONCRETE SPALLS IN CONCRETE GIRDER.

EXIST NBI NO.: 07-164-0-0035-05-021



ELEVATION

THOMAS G. ASHCRAFT 81411 REGISTERED PROFESSIONAL ENGINEER STATE OF TEXAS 7/6/2021

NO.	REVISION	BY	DATE

CP&Y TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE REPAIR LAYOUT

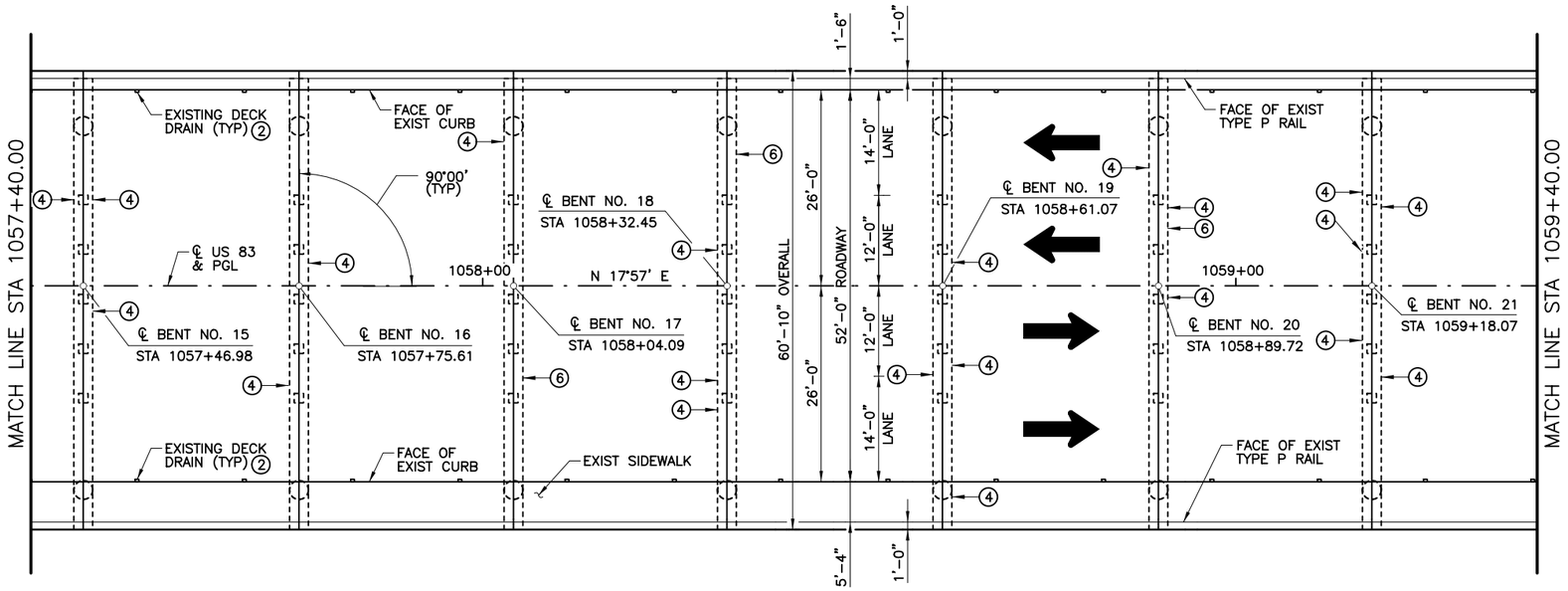
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061		41

SHEET 3 OF 7

cpybw_ANSIB.tbl
cpydf_ANSIB.pltcfg
pw:/Active Projects/TXBR1700484.00/TXBR1700484.15/8.00 Plans and Drawings/8.30 Cut Sheets/8.3.07 Bridge/San Saba River/TXBR170048415_SS_BRL01_03.dgn
tashcraft
7:00:51 PM
7/5/2021

pw:/Active Projects/TXBR1700484.00/TXBR1700484.15/8.00 Plans and Drawings/8.30 Cut Sheets/8.3.07 Bridge/San Saba River/TXBR170048415_SS_BRL01_03.dgn

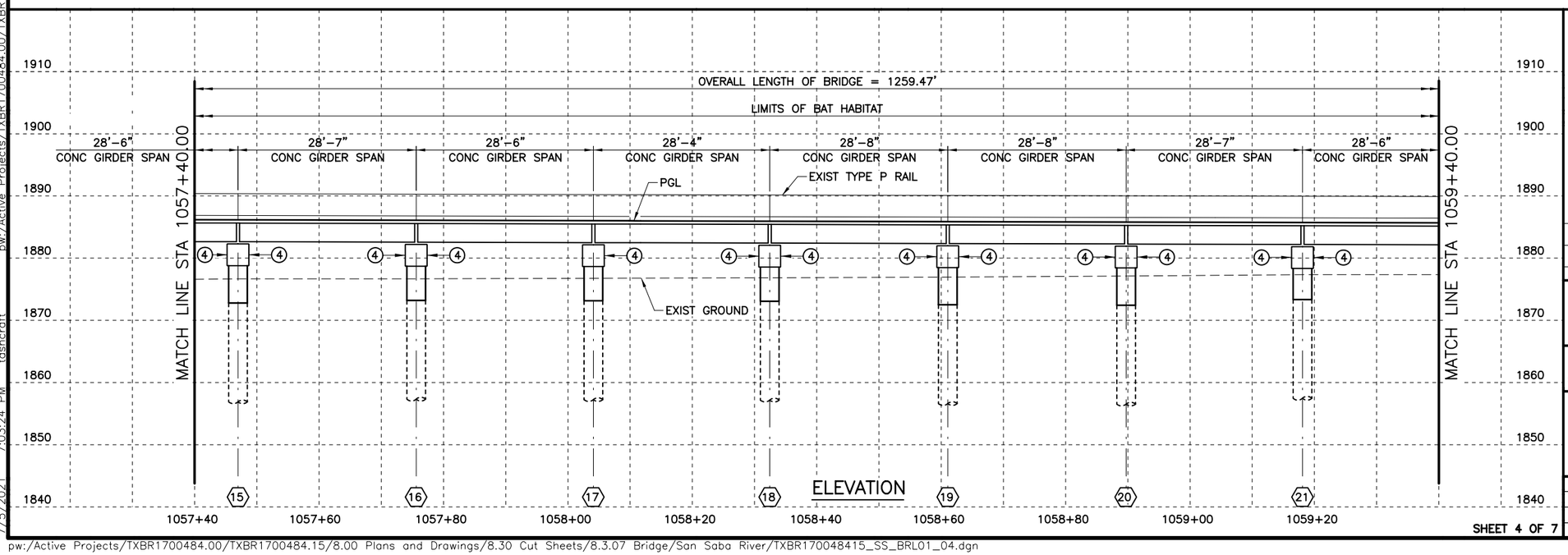


PLAN

10 5 0 10 20
SCALE FEET

(2) REPAIR EXISTING DECK DRAINS.
(4) REPAIR CRACKS, DELAMINATION, AND SPALLS AT BENT.
(6) REPAIR CONCRETE SPALLS IN CONCRETE GIRDER.

EXIST NBI NO.: 07-164-0-0035-05-021



ELEVATION

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED PROFESSIONAL ENGINEER
7/6/2021

NO.	REVISION	BY	DATE

TEXAS REGISTERED ENGINEERING FIRM F-1741

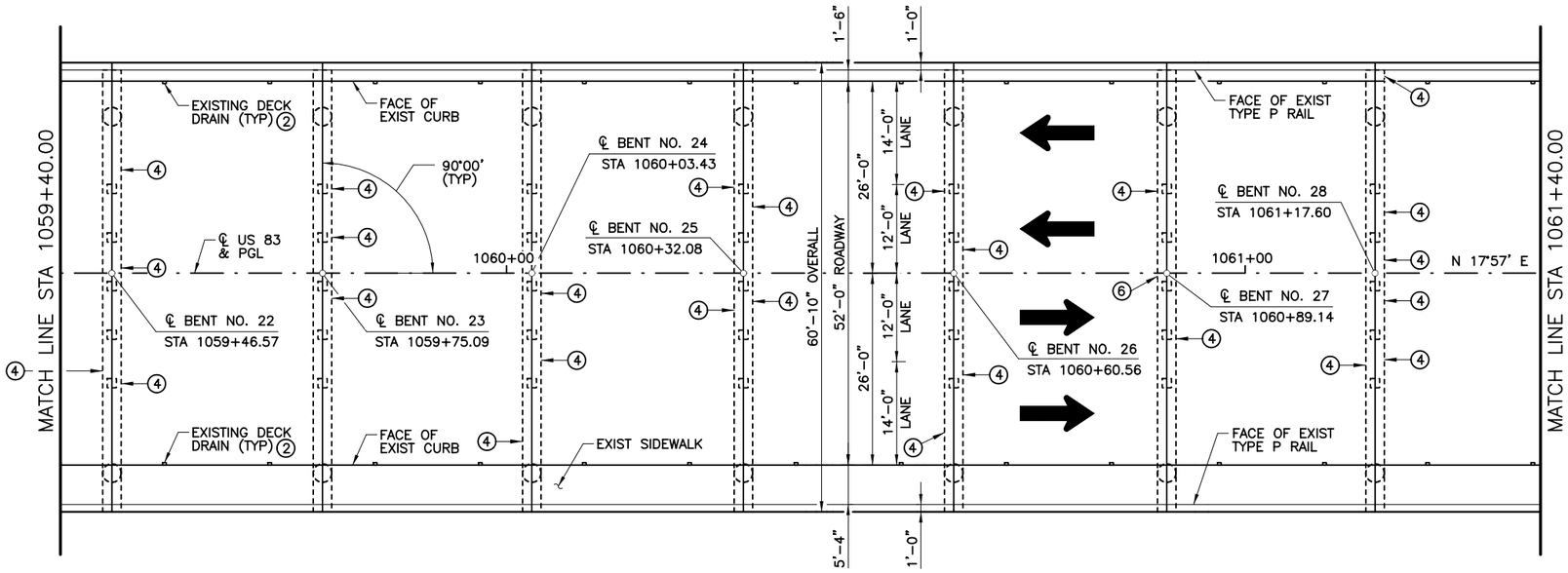
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE REPAIR LAYOUT

SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.	
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83	
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.	
Checked:	TGA	SJT	MENARD	0035	05	061		42	

SHEET 4 OF 7

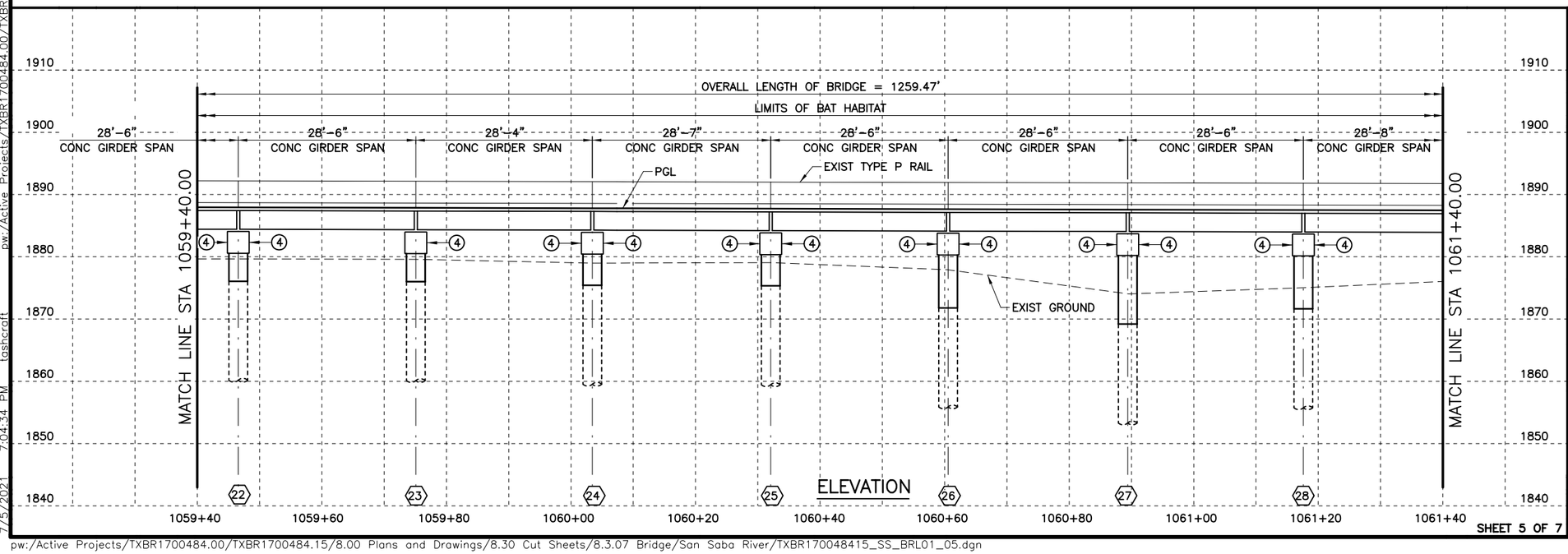


PLAN

2 REPAIR EXISTING DECK DRAINS.

4 REPAIR CONCRETE SPALLS AND CRACKS ON BENT CAP.

6 REPAIR CONCRETE SPALLS IN CONCRETE GIRDER.



ELEVATION

EXIST NBI NO.: 07-164-0-0035-05-021

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED PROFESSIONAL ENGINEER

7/6/2021

NO.	REVISION	BY	DATE

TEXAS REGISTERED ENGINEERING FIRM F-1741

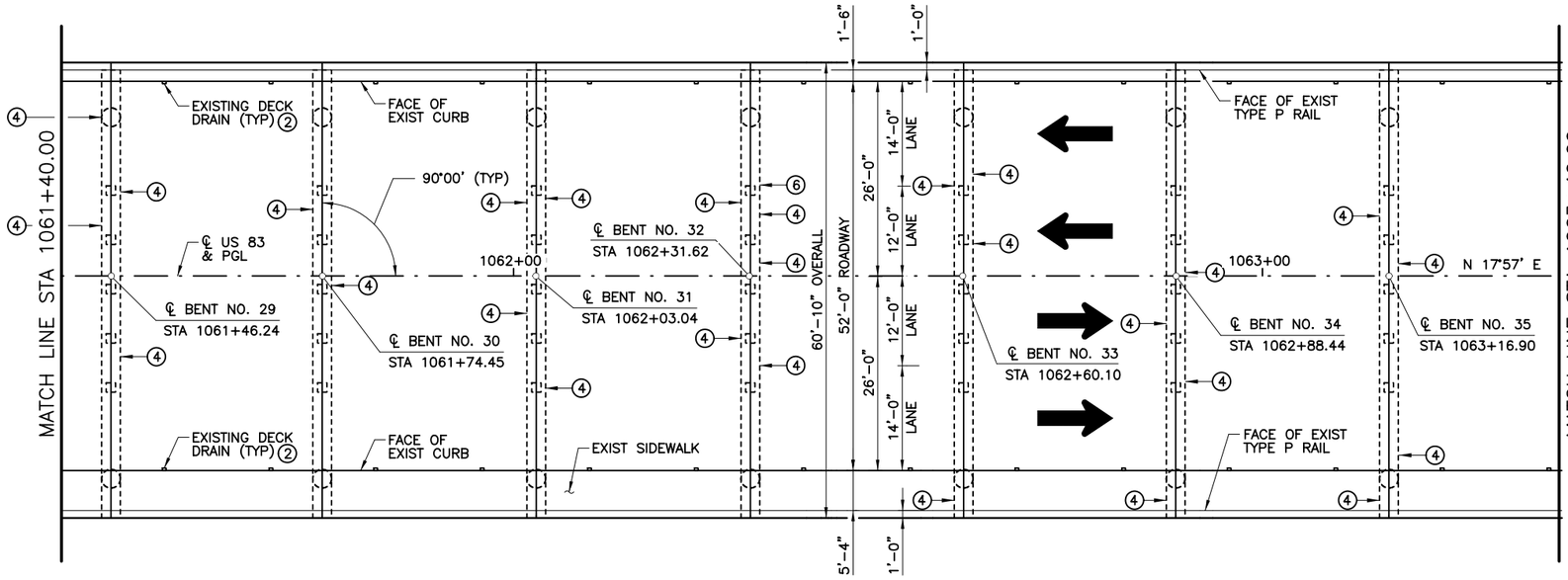
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE REPAIR LAYOUT

SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.	
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83	
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.	
Checked:	TGA	SJT	MENARD	0035	05	061		43	

SHEET 5 OF 7

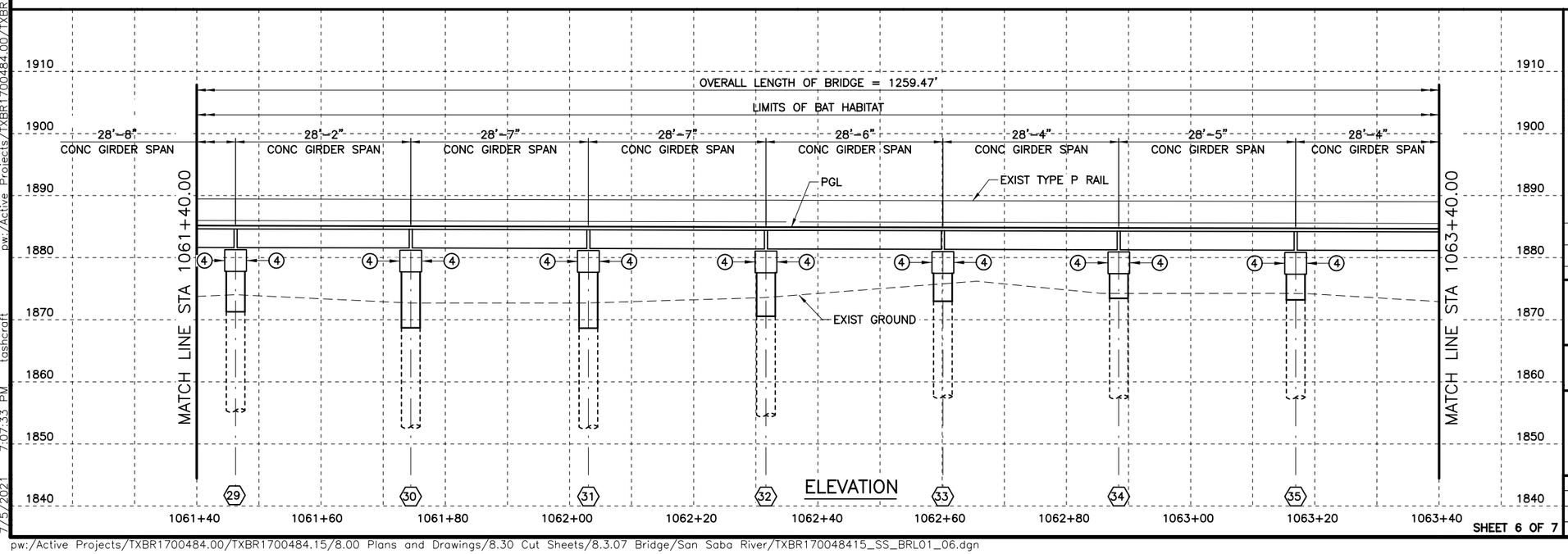


PLAN

10 5 0 10 20
SCALE FEET

(2) REPAIR EXISTING DECK DRAINS.
(4) REPAIR CONCRETE SPALLS AND CRACKS ON BENT CAP.
(6) REPAIR CONCRETE SPALLS IN CONCRETE GIRDER.

EXIST NBI NO.: 07-164-0-0035-05-021



ELEVATION

SHEET 6 OF 7

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED PROFESSIONAL ENGINEER
7/6/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

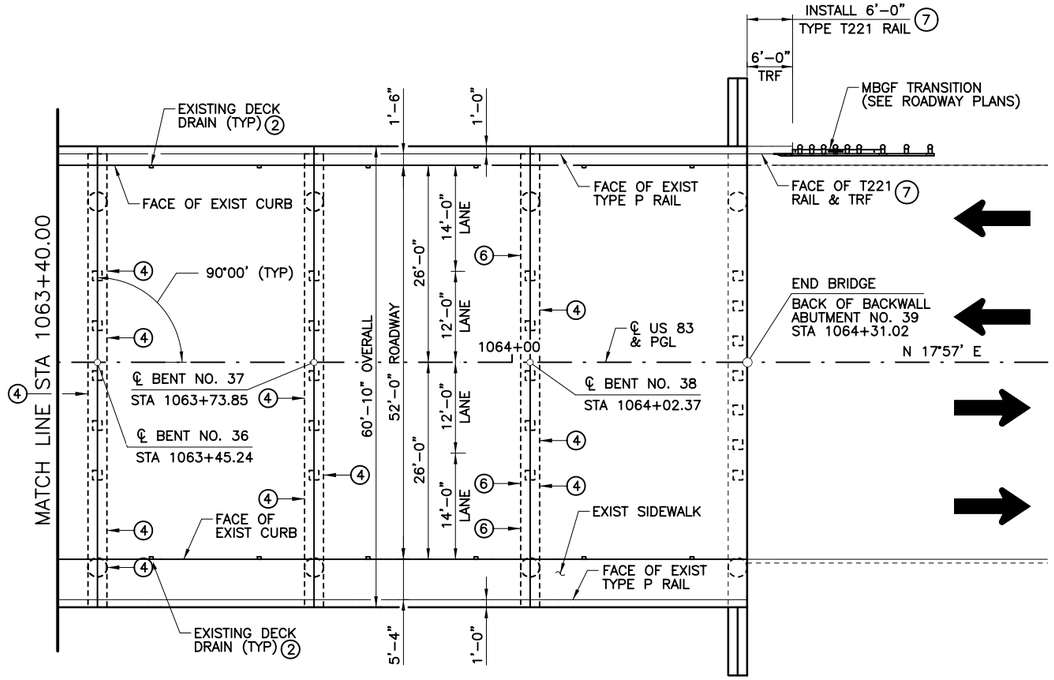
 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

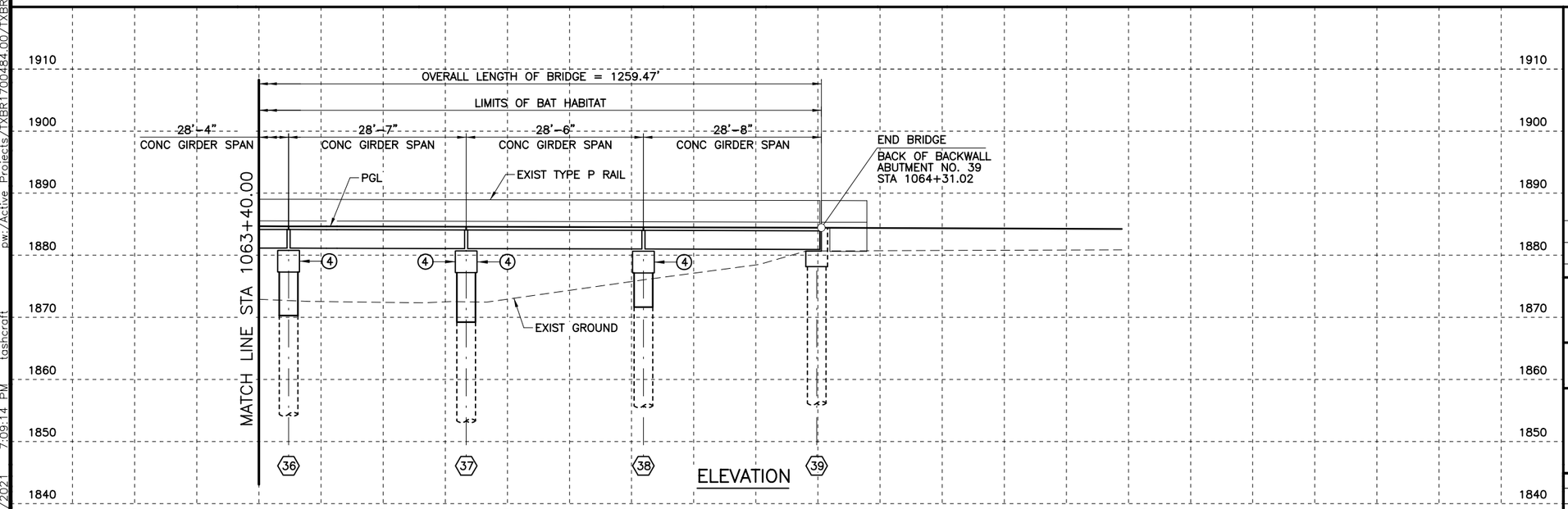
BRIDGE REPAIR LAYOUT

SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061		44



PLAN



ELEVATION

10 5 0 10 20
SCALE FEET

(2) REPAIR EXISTING DECK DRAINS.

(4) REPAIR CONCRETE SPALLS AND CRACKS ON BENT CAP.

(6) REPAIR CONCRETE SPALLS IN CONCRETE GIRDER.

(7) INSTALL WINGWALL PORTION OF T221 RAIL ON TRF FOUNDATION.

EXIST NBI NO.: 07-164-0-0035-05-021

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED PROFESSIONAL ENGINEER
7/6/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

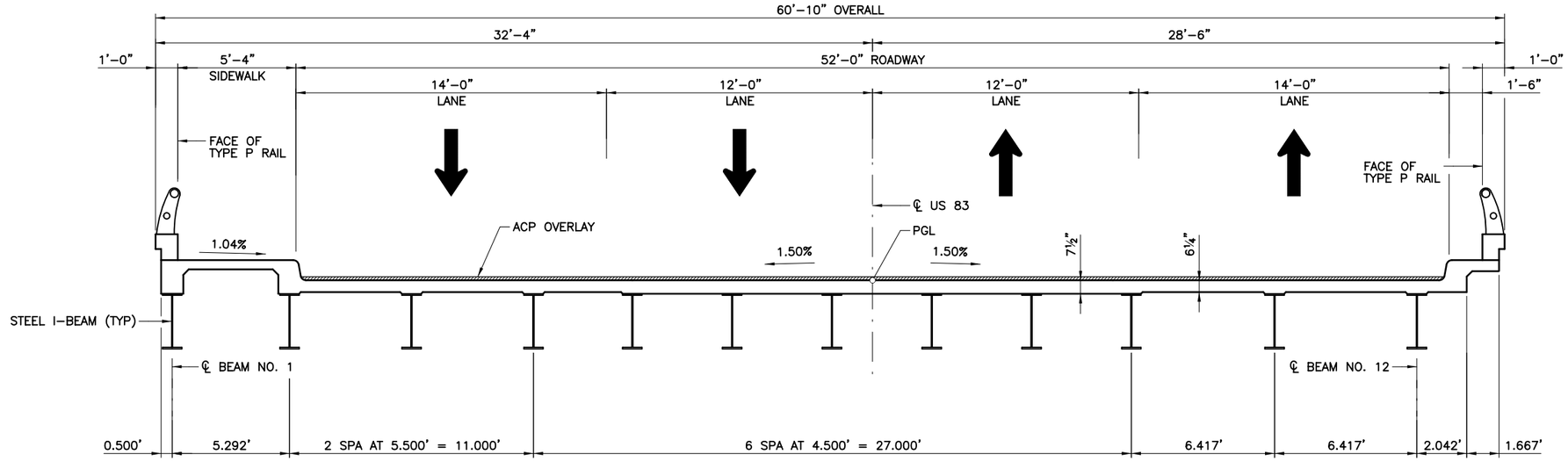
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BRIDGE REPAIR LAYOUT

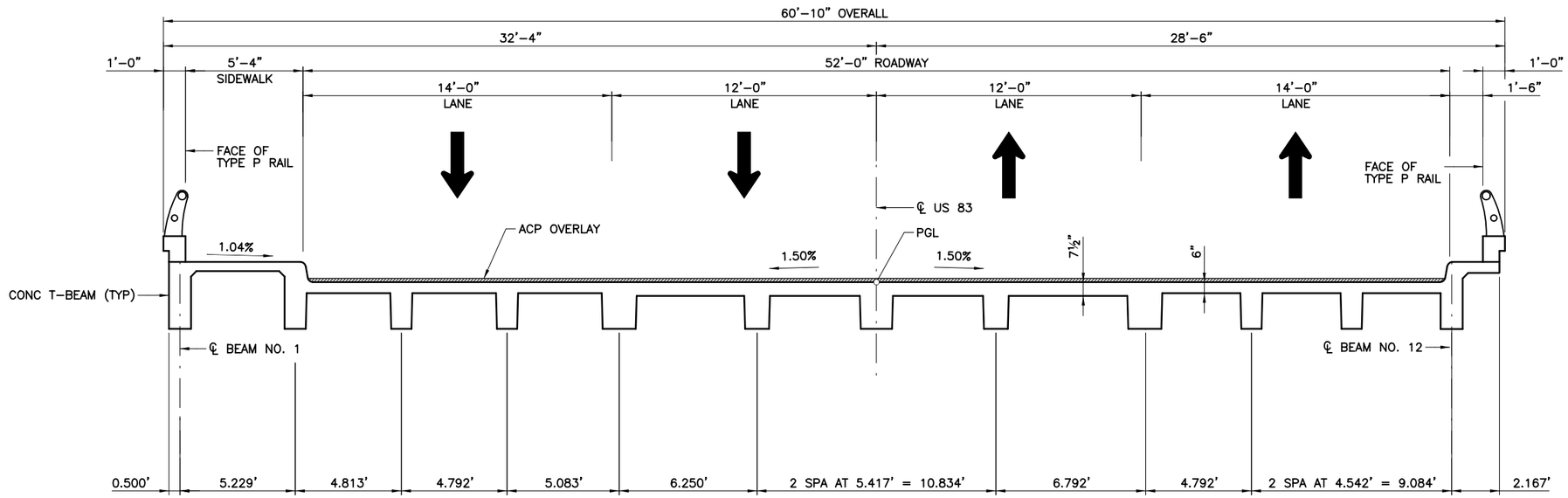
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061	45

SHEET 7 OF 7



TYPICAL TRANSVERSE SECTION
SPAN NOS. 1 – 6



TYPICAL TRANSVERSE SECTION
SPAN NOS. 7 – 38

EXIST NBI NO.: 07–164–0–0035–05–021

STATE OF TEXAS
THOMAS G. ASHCRAFT
81411
REGISTERED
PROFESSIONAL ENGINEER

7/6/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

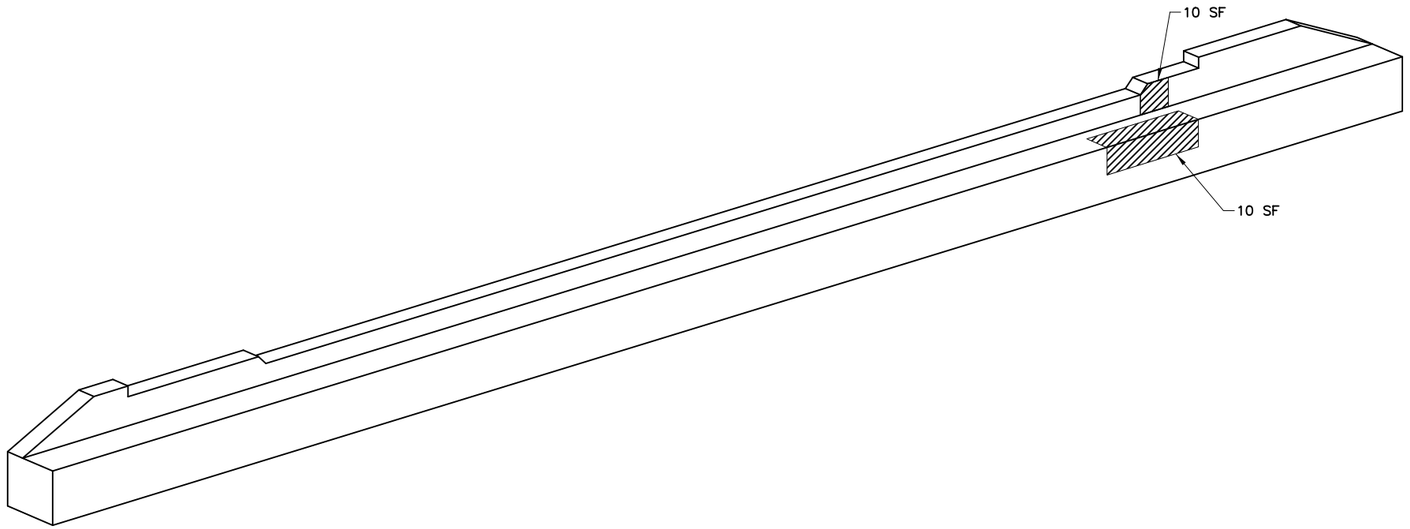
SAN ANGELO DISTRICT BRIDGE REHABILITATION

TYPICAL SECTIONS

SAN SABA RIVER BRIDGE

Designed:	TWS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TGA	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061		46

SHEET 1 OF 1



ABUTMENT NO. 1 – NORTH FACE

(ISOMETRIC VIEW FROM SOUTH)

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER

5/28/2021

Thomas W. Stephenson

NO.	REVISION	BY	DATE

CP&Y

TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

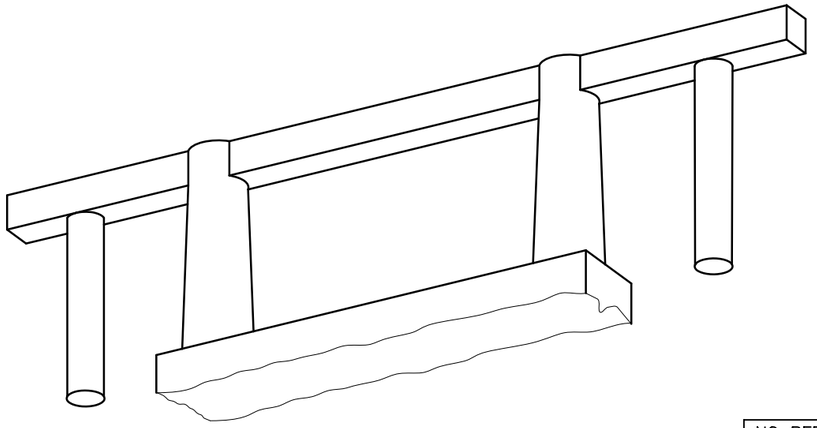
ABUTMENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

Designed:	TWS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TGA	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	KAD	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061		47

SHEET 1 OF 1

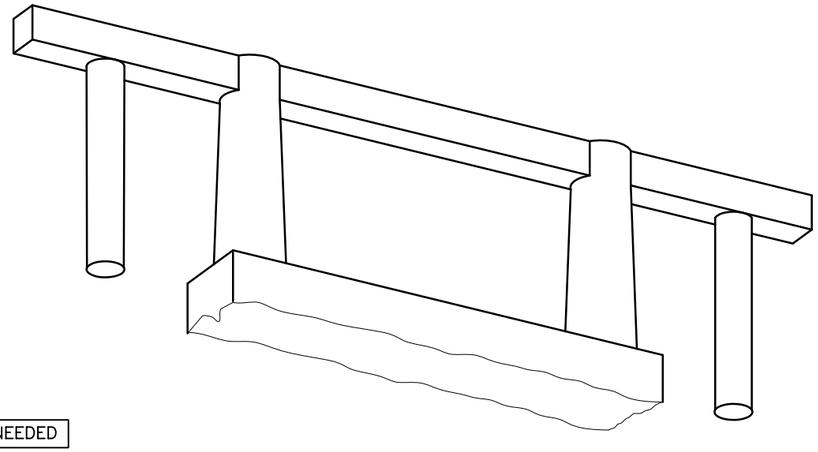
cpybw_ANSIB.tbl
cyppf_ANSIB.pltcfg
pw:/
5/27/2021 3:22:41 PM tvoshcroft
pw:/



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

NO REPAIRS NEEDED

INTERIOR BENT 2



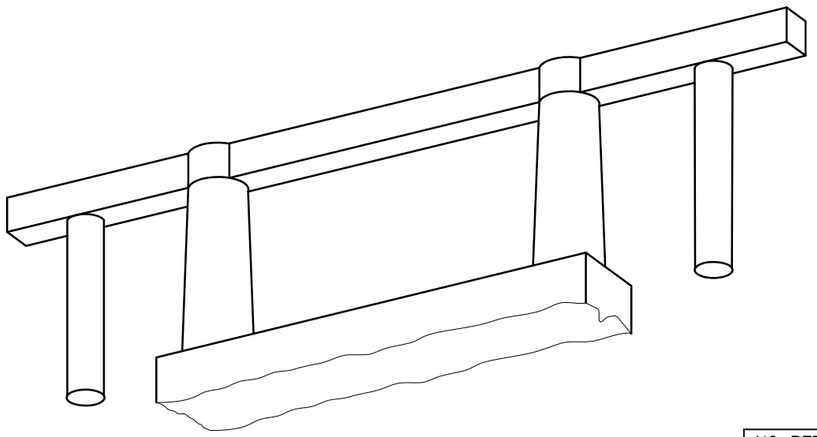
NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

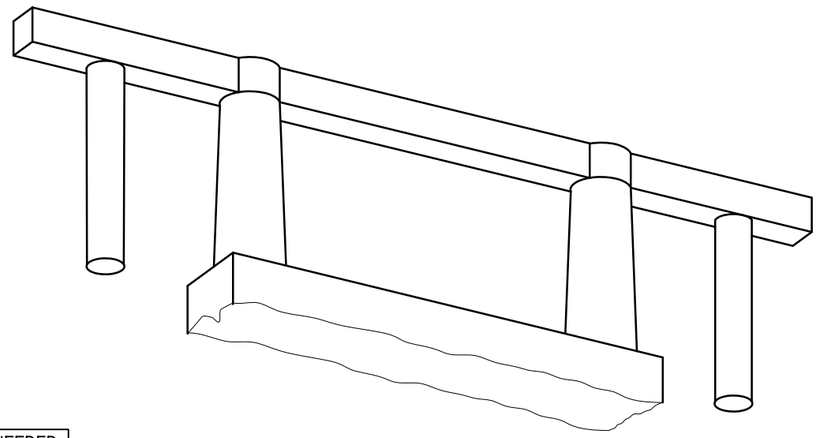
1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

NO REPAIRS NEEDED

INTERIOR BENT 3



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

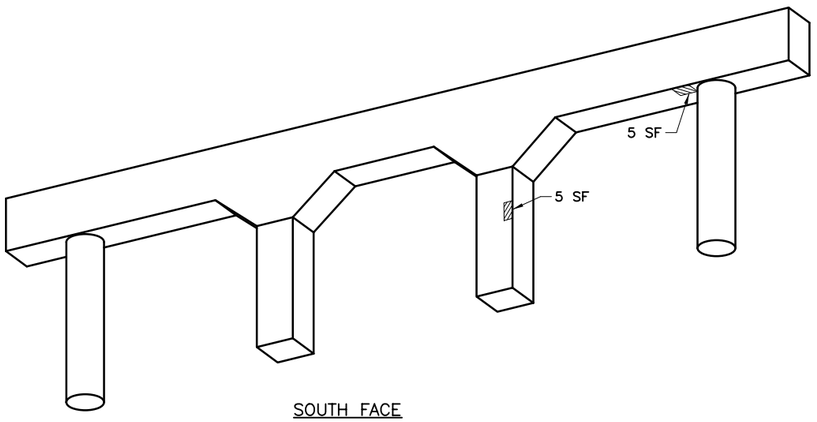
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

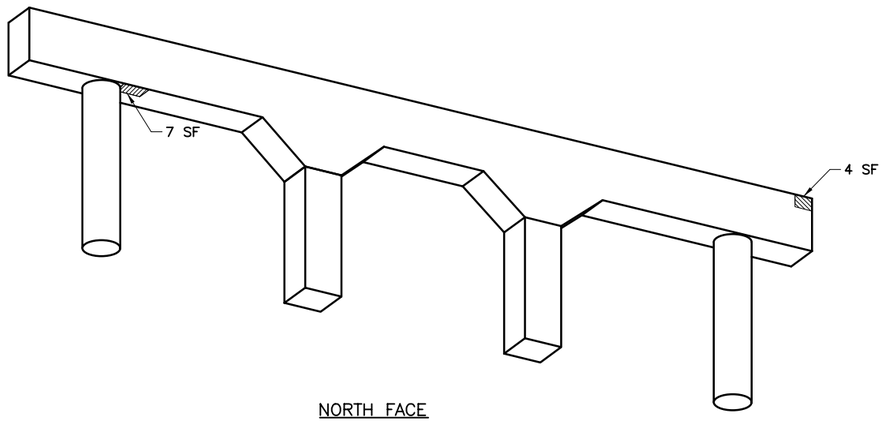
SAN SABA RIVER BRIDGE

Designed:	KAD	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	AL	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061		48

SHEET 1 OF 19

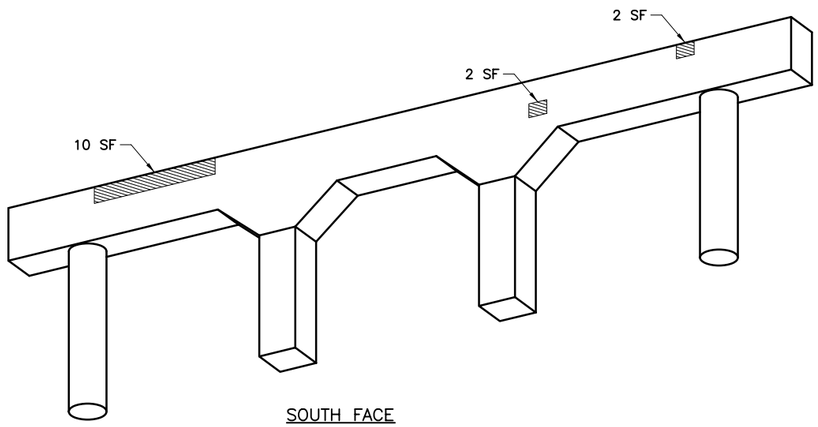


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

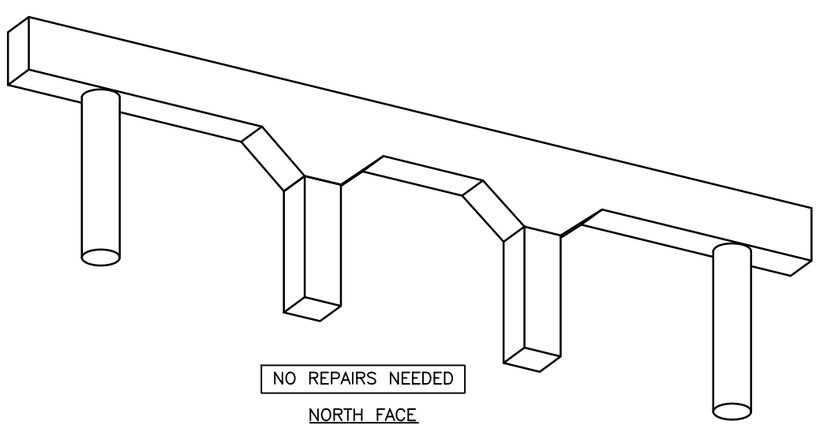


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 4



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 5

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

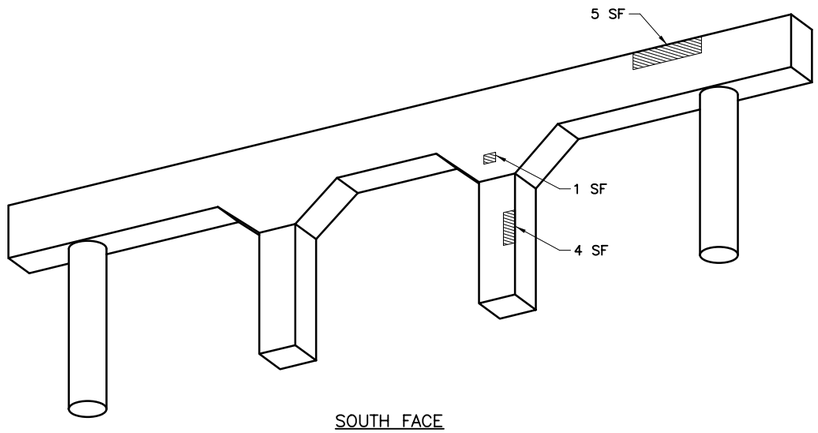
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

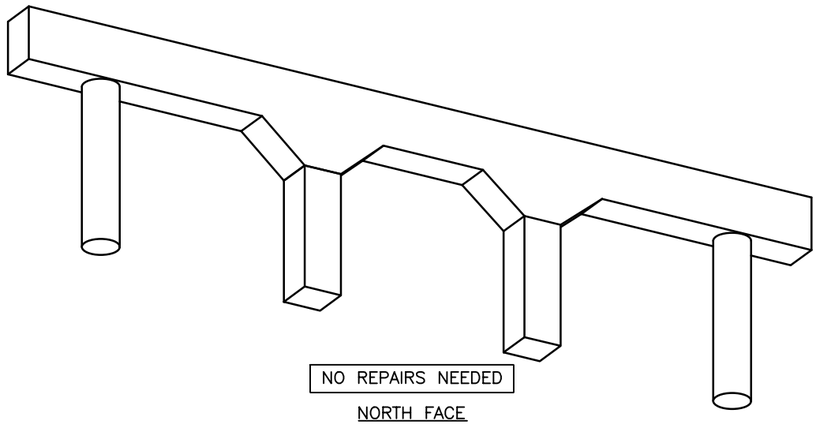
Designed:	KAD	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	LRJ	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	TGA	SJT	MENARD	0035	05	061	49

SHEET 2 OF 19

cpybw_ANSIB.tbl
cpypf_ANSIB.pltcfg
pw:/
5/27/2021 3:22:49 PM tvoshcraft
pw:/



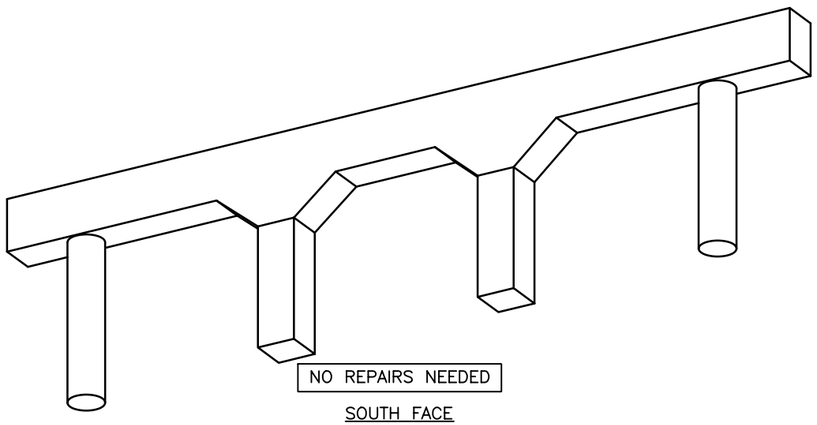
SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NO REPAIRS NEEDED

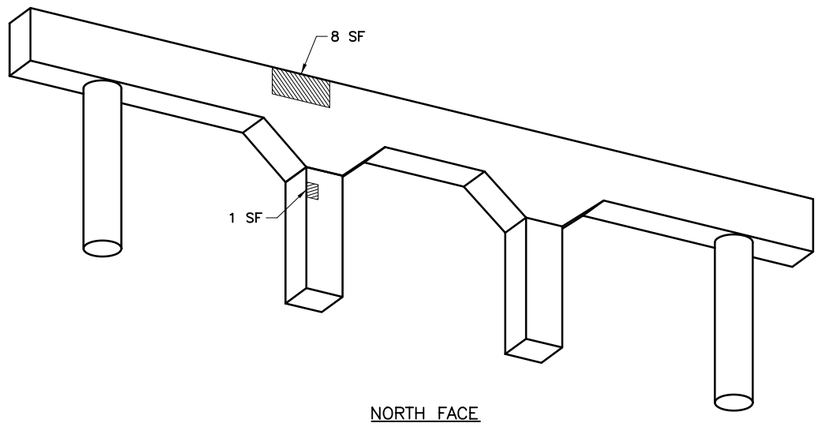
NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 6



NO REPAIRS NEEDED

SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 7

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

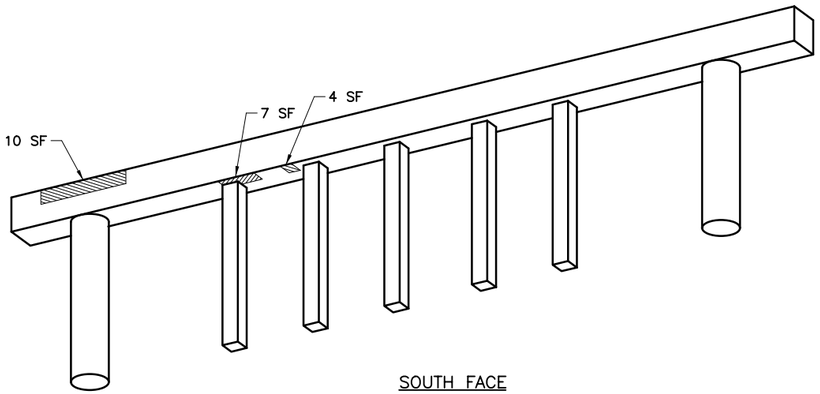
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

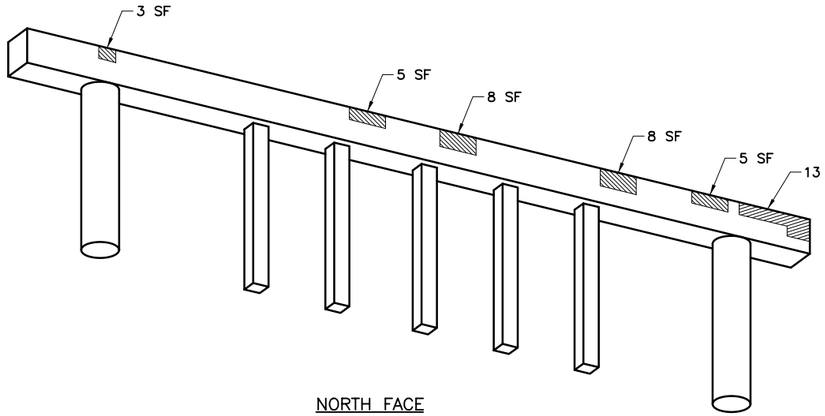
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		50

SHEET 3 OF 19

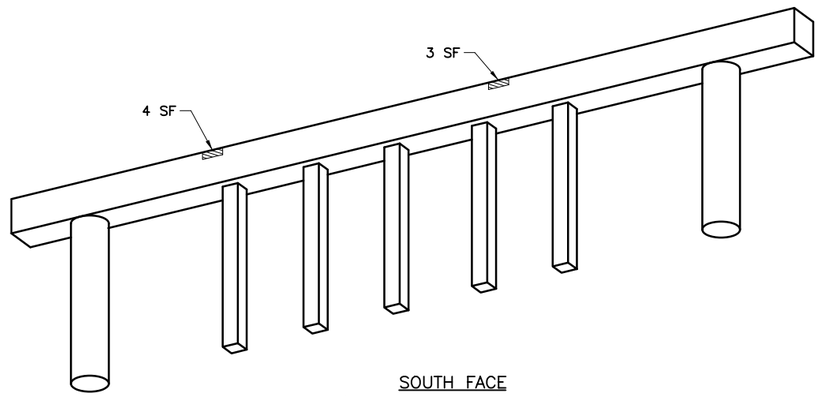


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

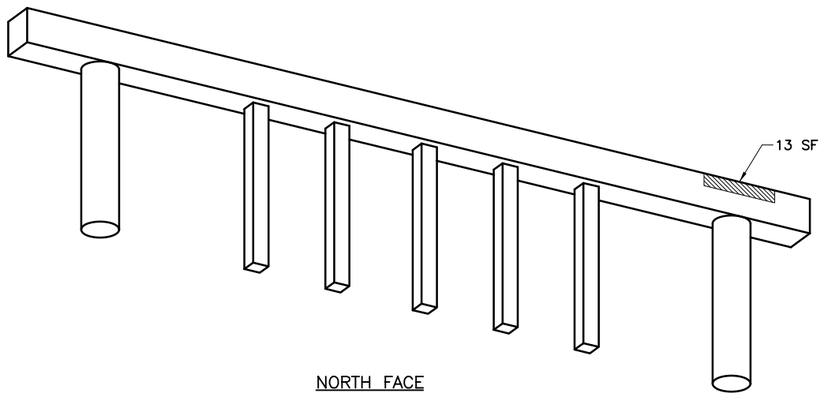


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 8



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 9

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

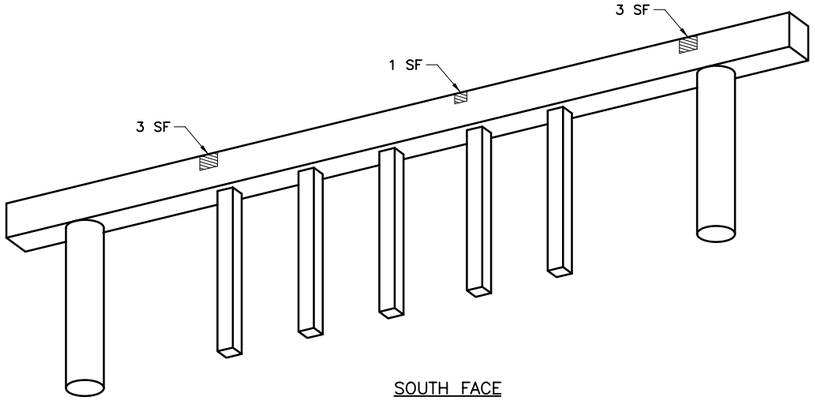
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

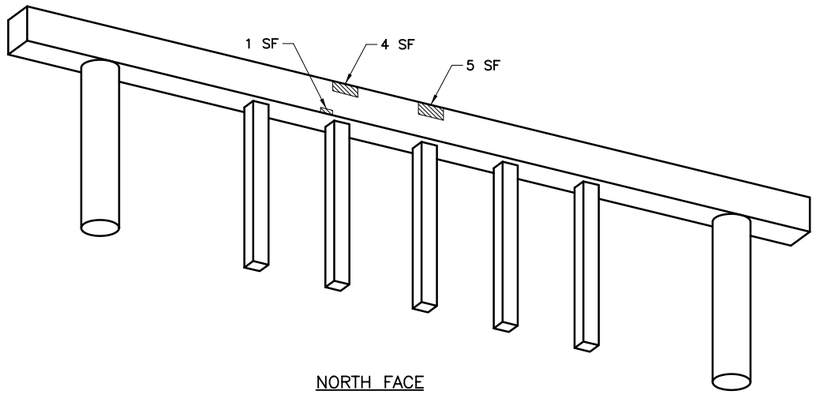
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		51

SHEET 4 OF 19

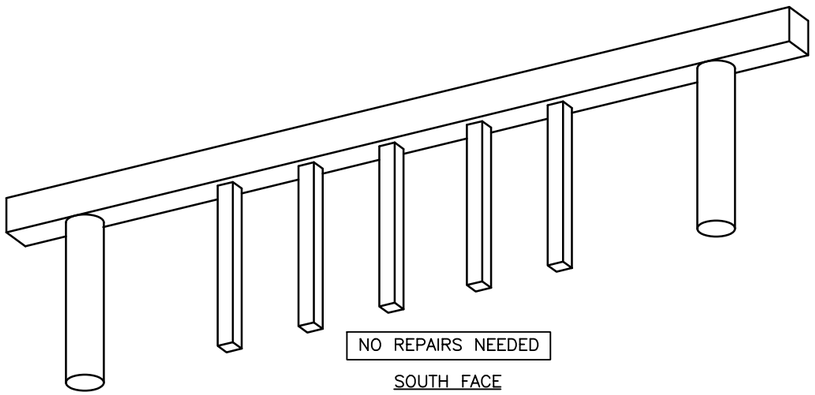


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

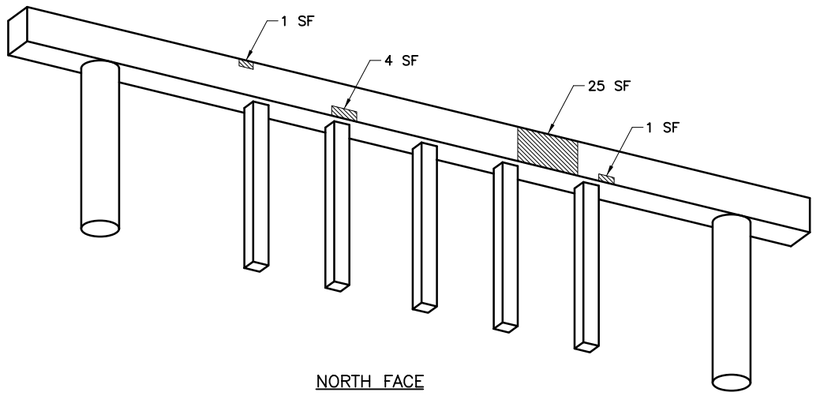


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 10



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 11

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

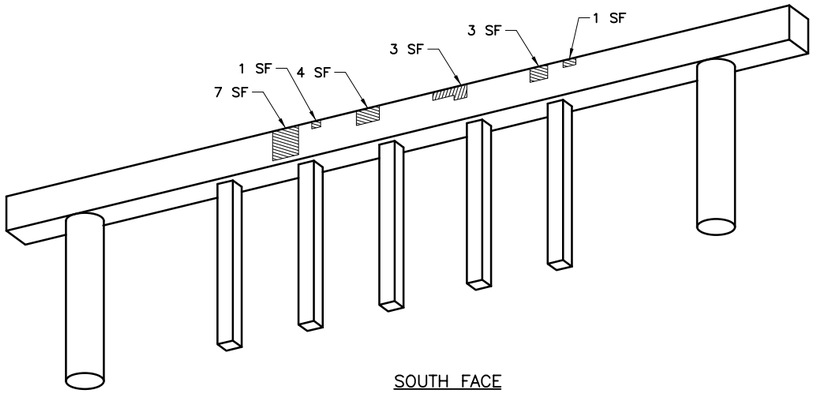
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

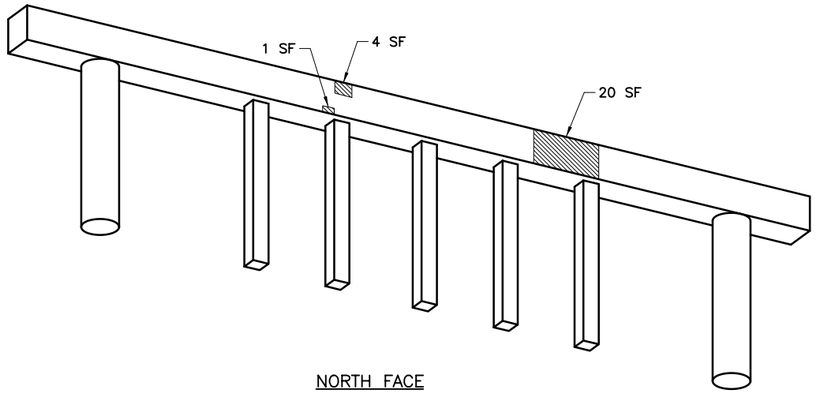
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	52

SHEET 5 OF 19

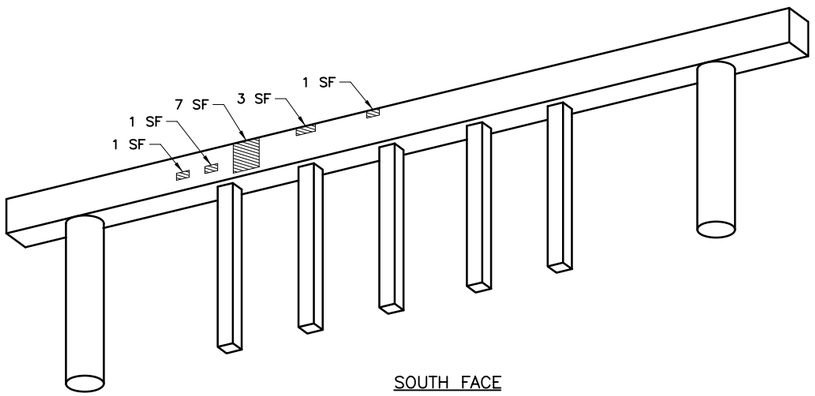


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

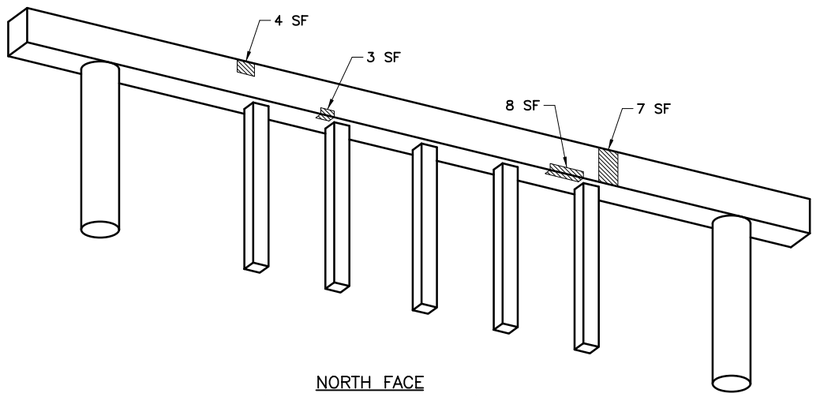


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 12



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 13

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

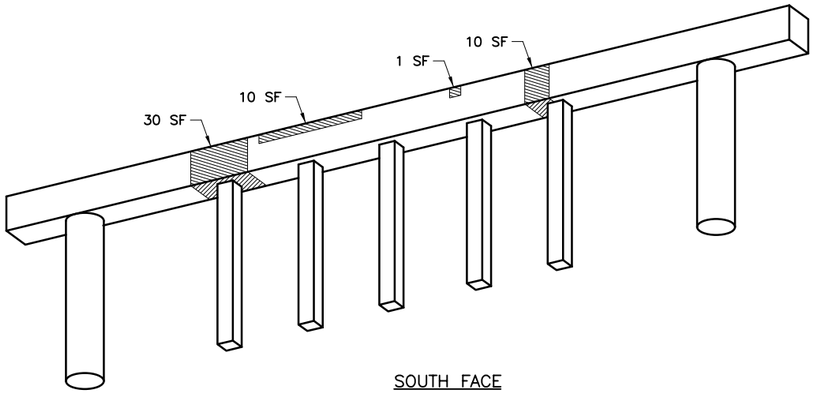
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

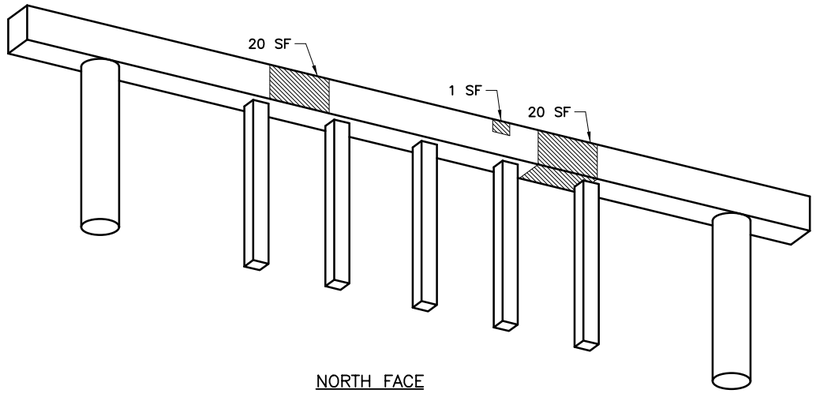
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	53

SHEET 6 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:04 PM tvoshcraft
pw:/

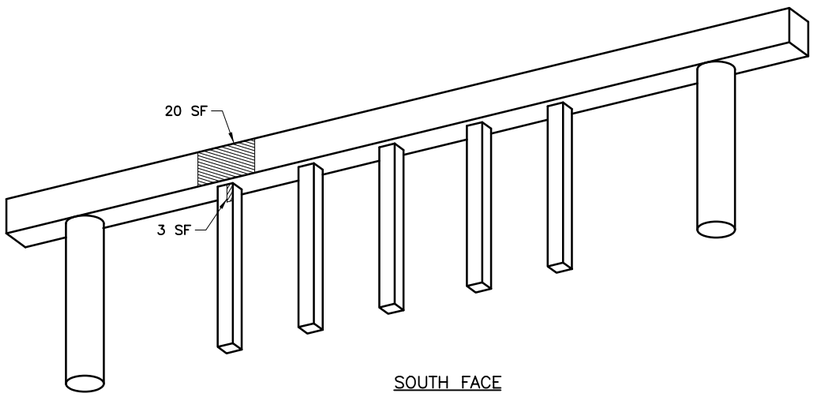


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

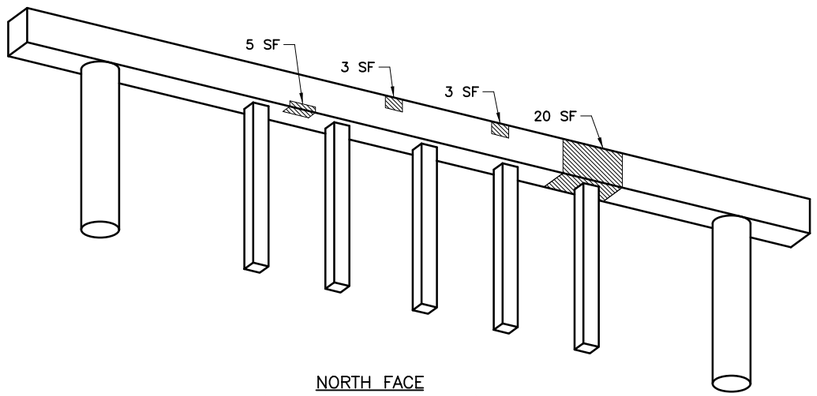


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 14



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 15

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

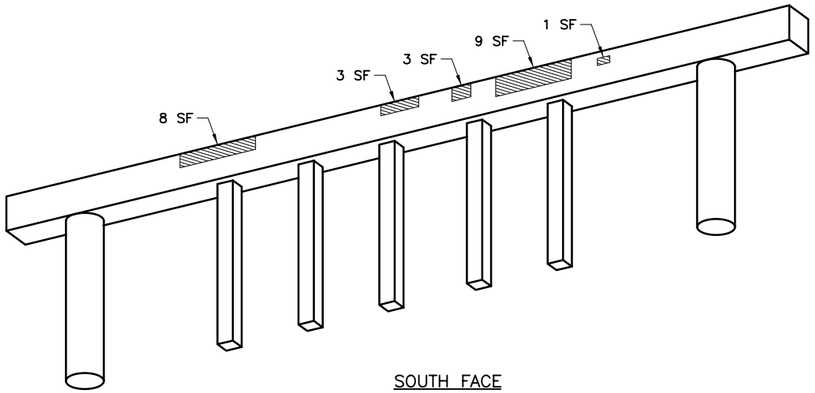
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

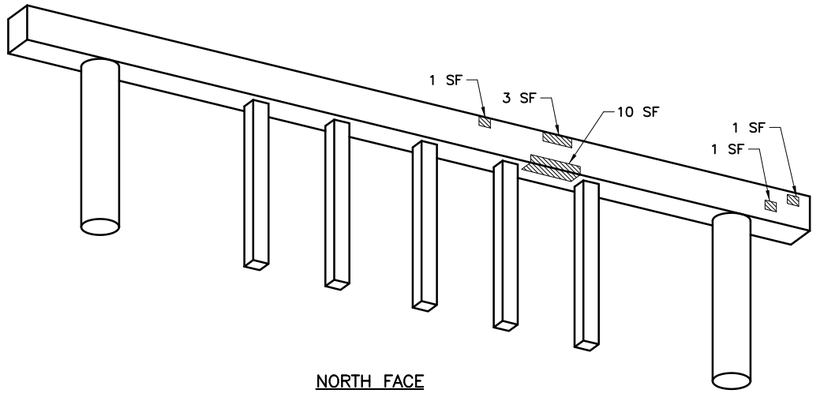
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		54

SHEET 7 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:08 PM tvoshcraft
pw:/

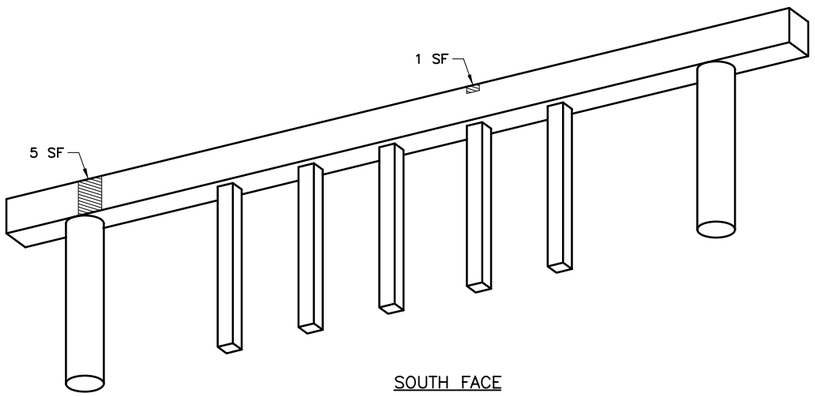


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

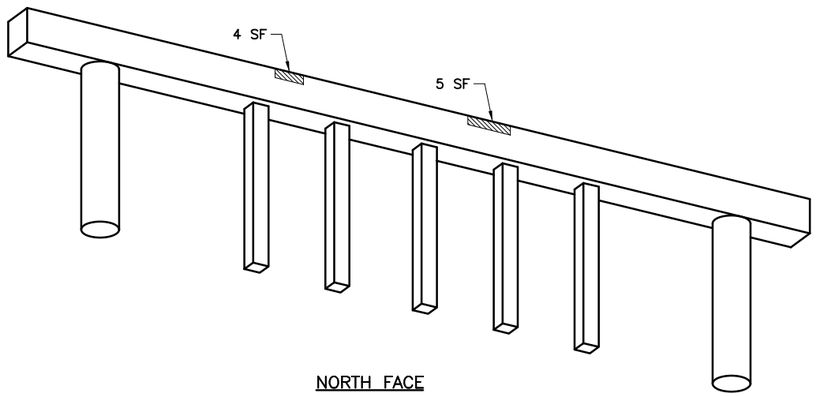


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 16



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 17

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

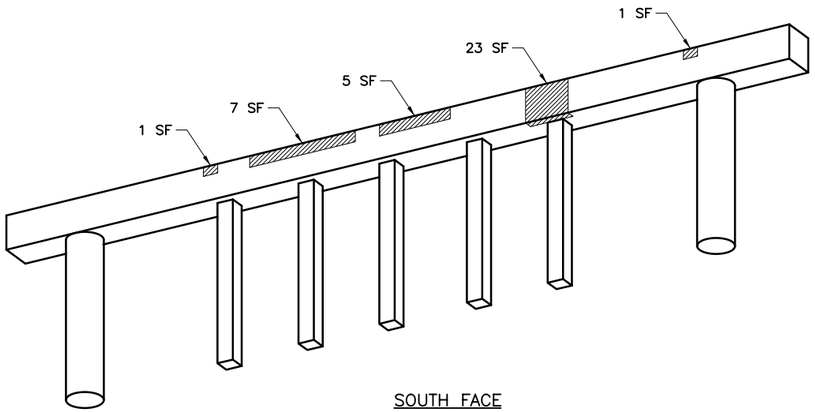
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

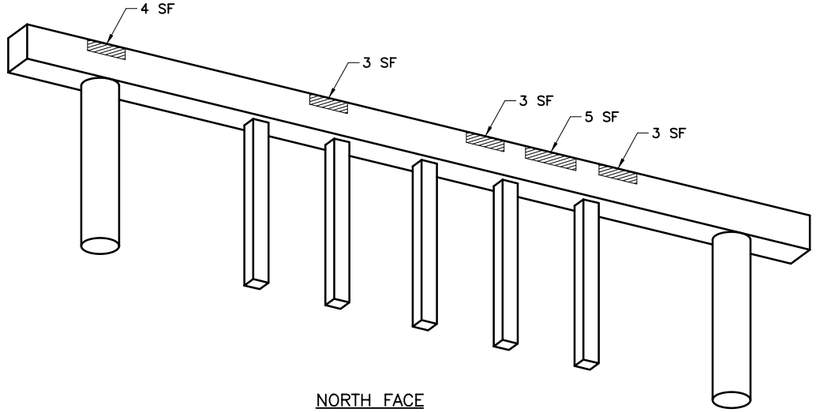
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	55

SHEET 8 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:11 PM tvoshcraft
pw:/

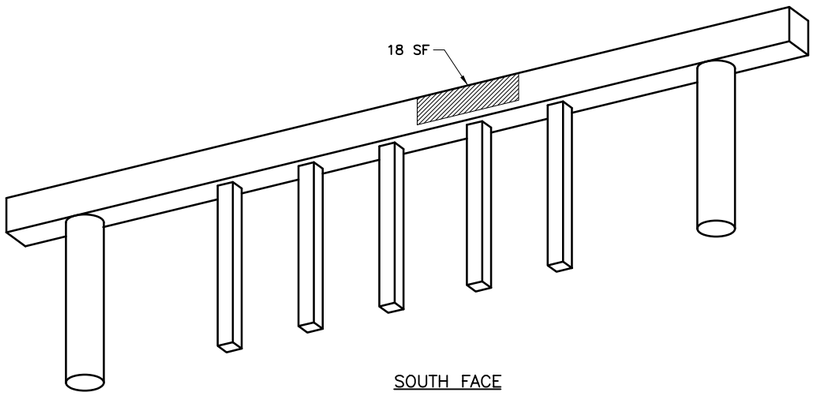


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

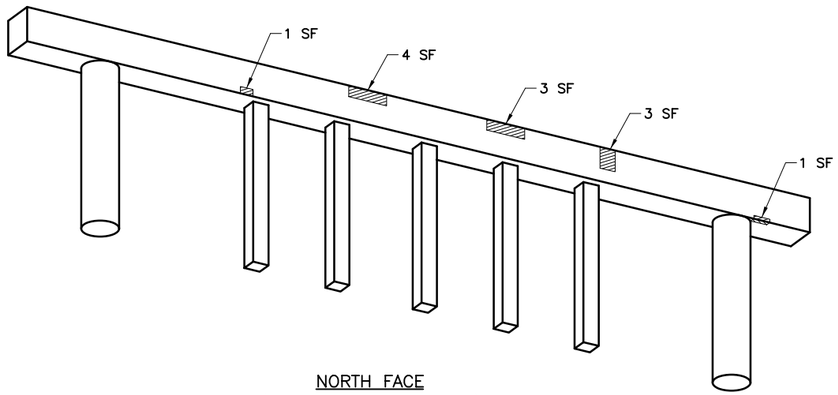


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 18



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 19

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER

5/28/2021

Thomas W. Stephenson

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

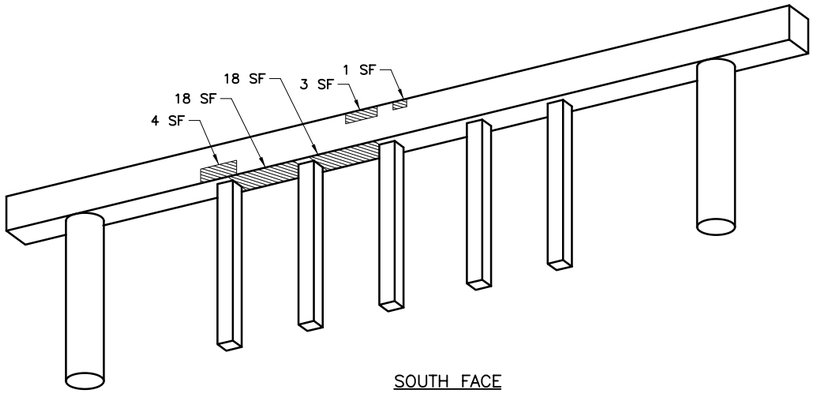
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

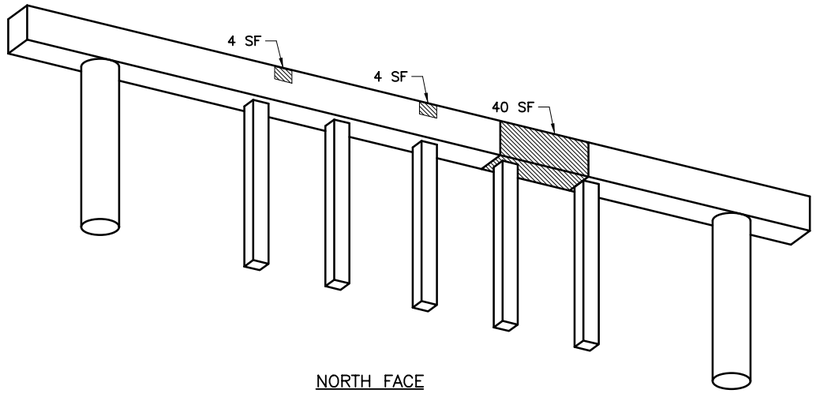
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	56

SHEET 9 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:15 PM tyoshcraft
pw:/

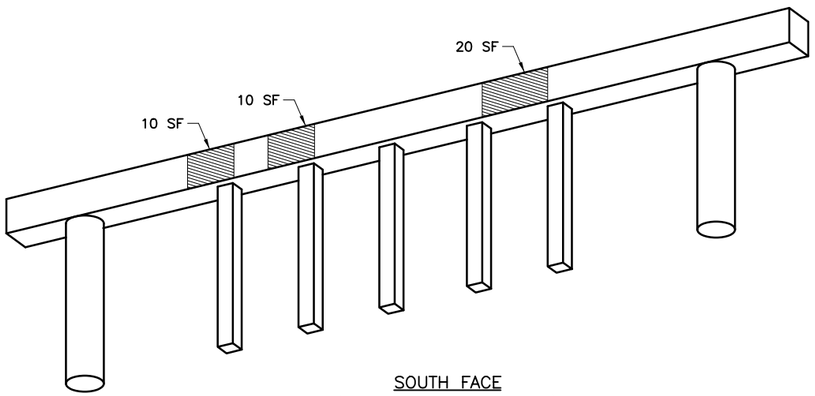


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

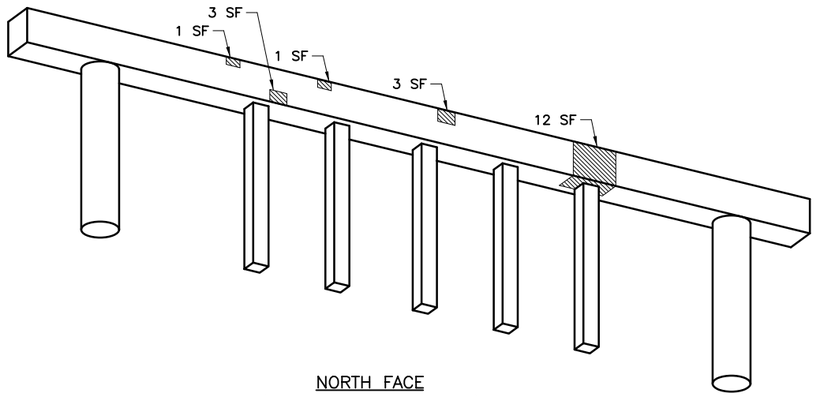


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 20



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 21

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

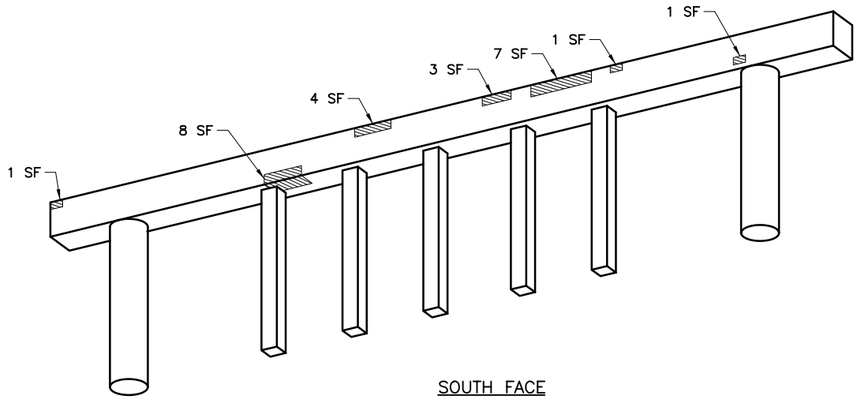
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

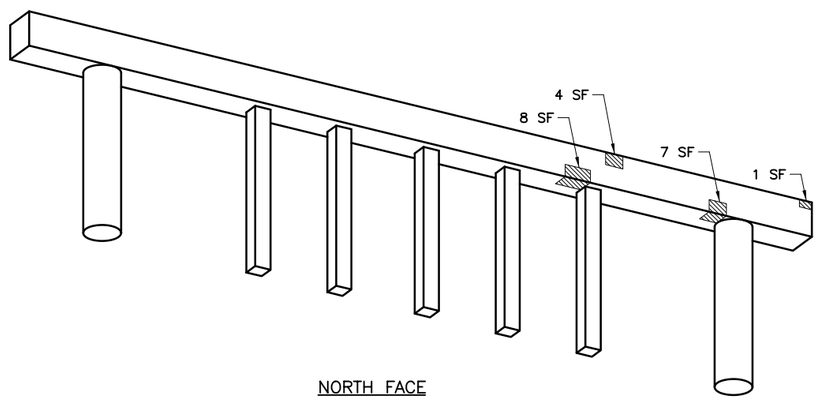
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		57

SHEET 10 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:18 PM tyoshcraft
pw:/

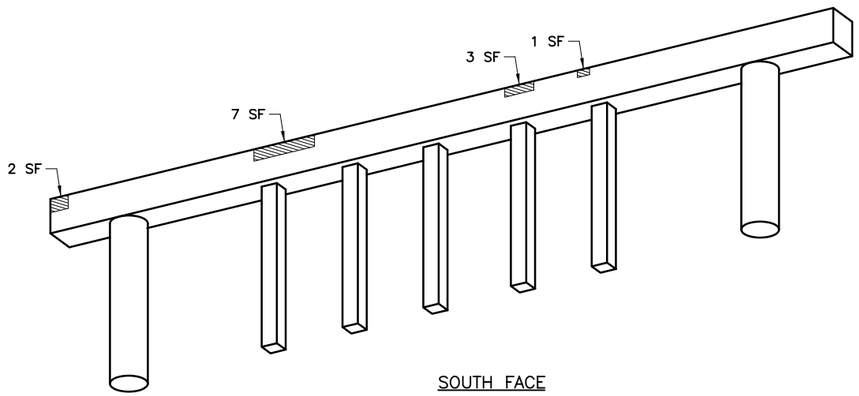


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

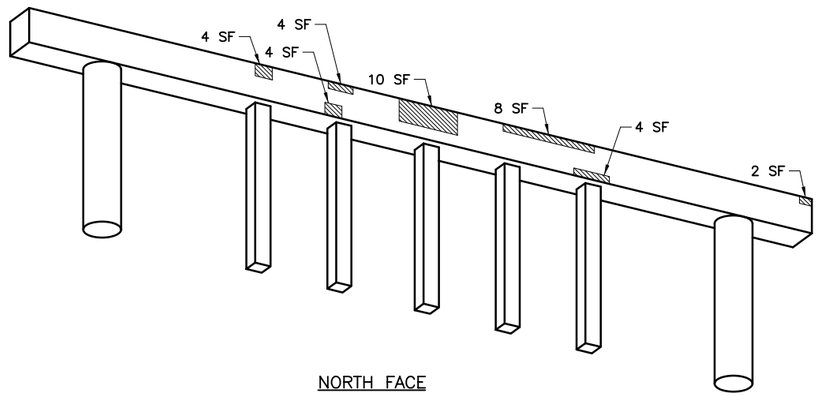


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 22



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 23

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

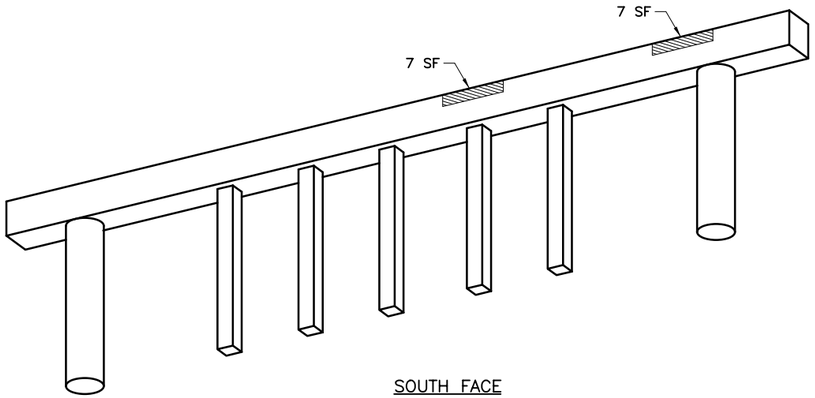
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

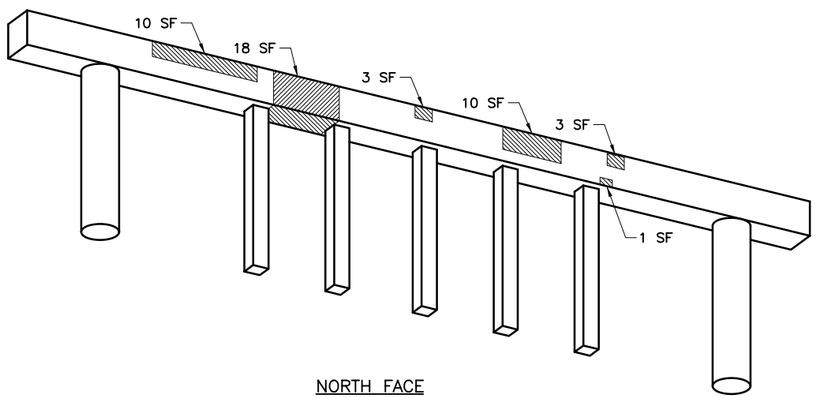
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	58

SHEET 11 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:24 PM tvoshcraft
pw:/

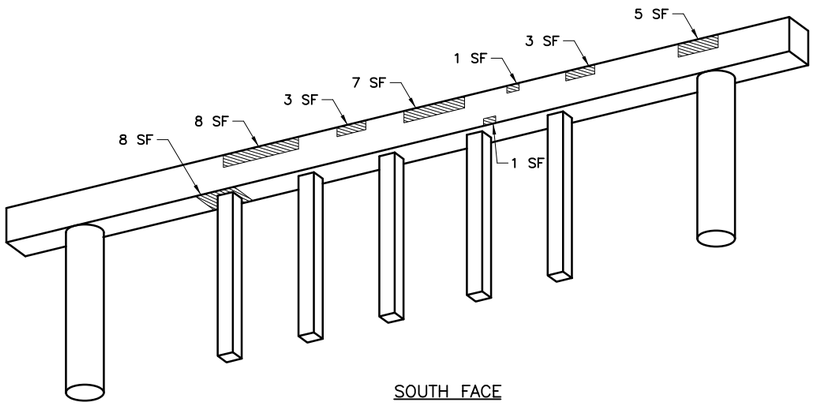


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

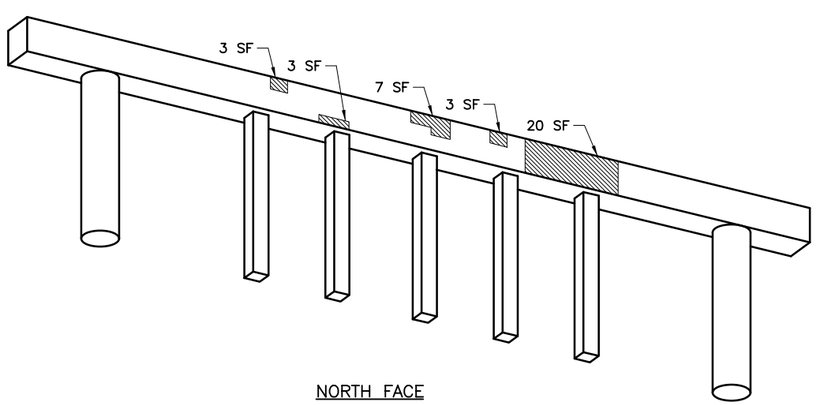


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 24



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 25

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

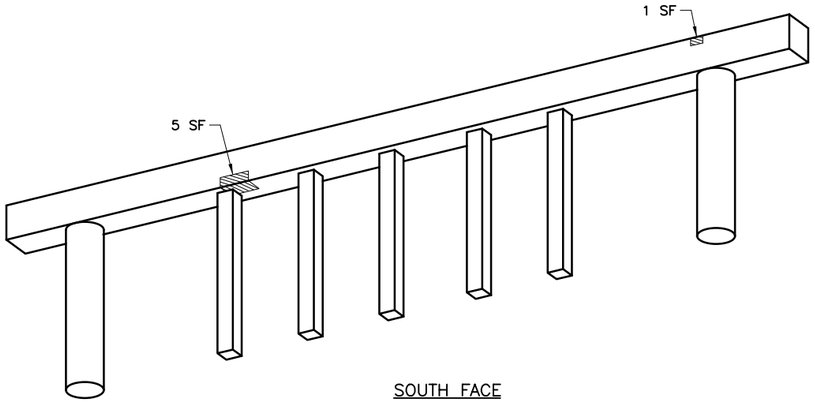
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

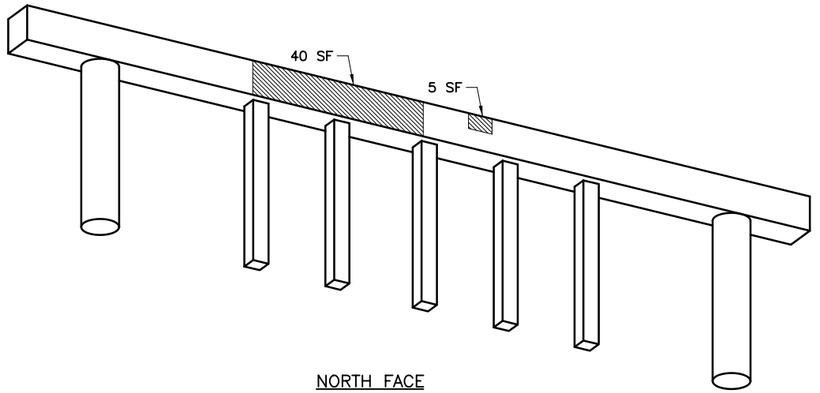
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	59

SHEET 12 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:28 PM tvoshcraft
pw:/

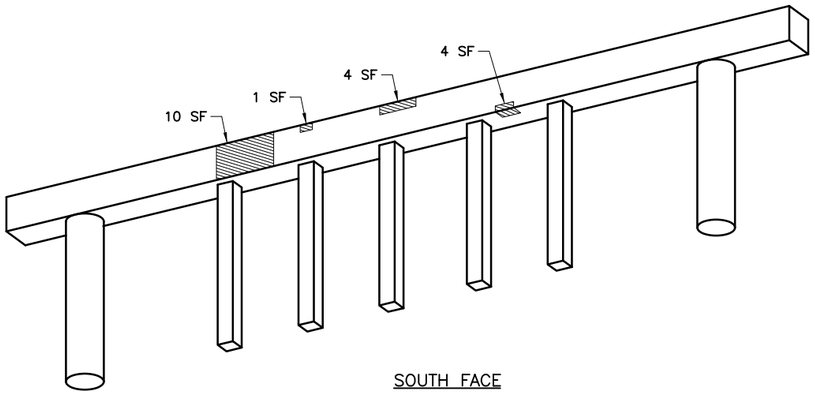


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

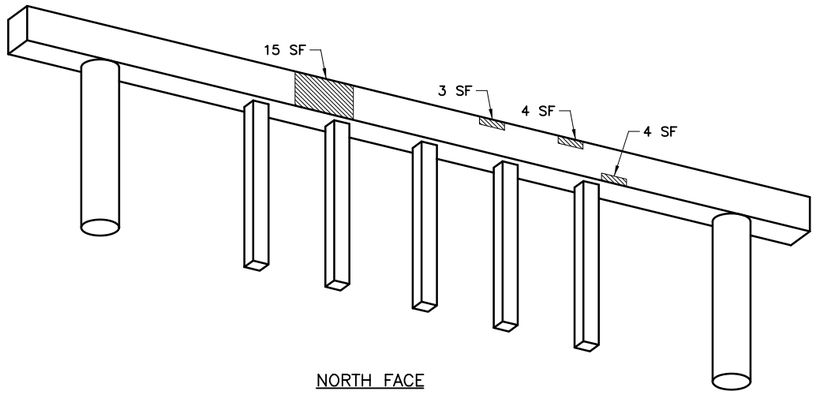


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 26



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 27

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

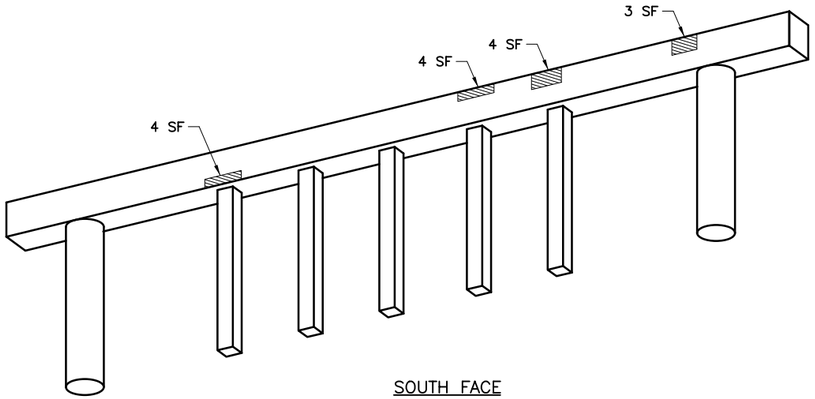
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

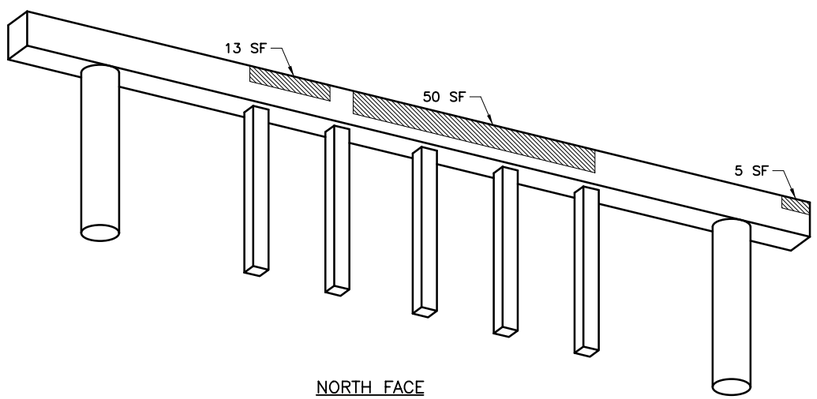
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	60

SHEET 13 OF 19

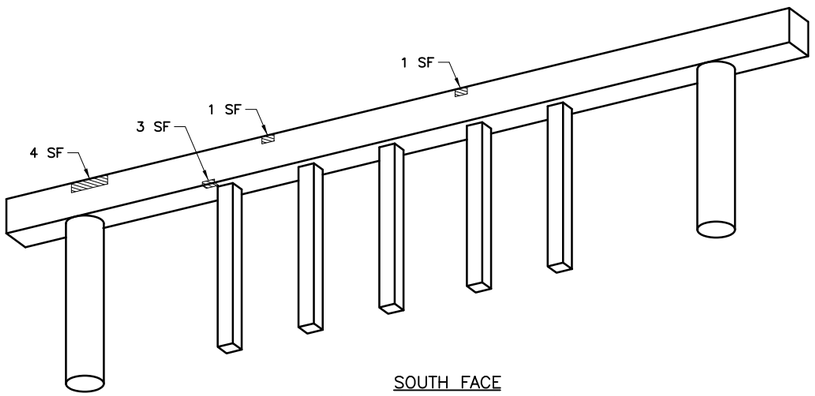


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

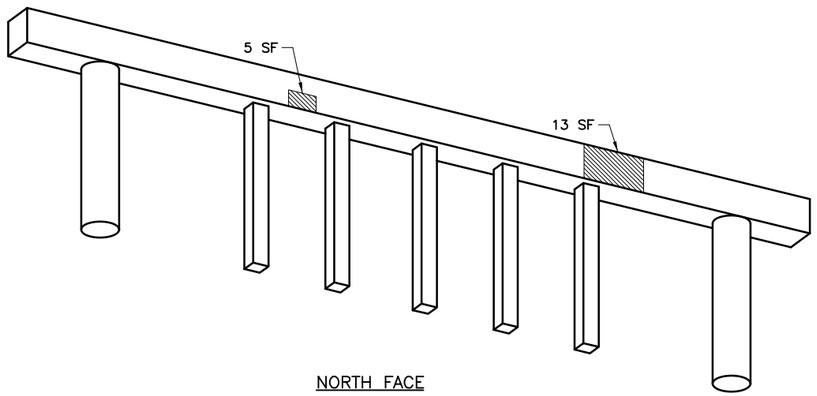


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 28



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 29

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

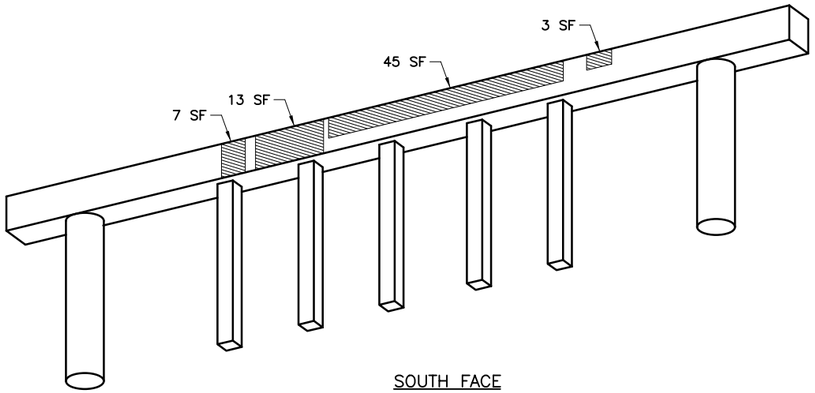
SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

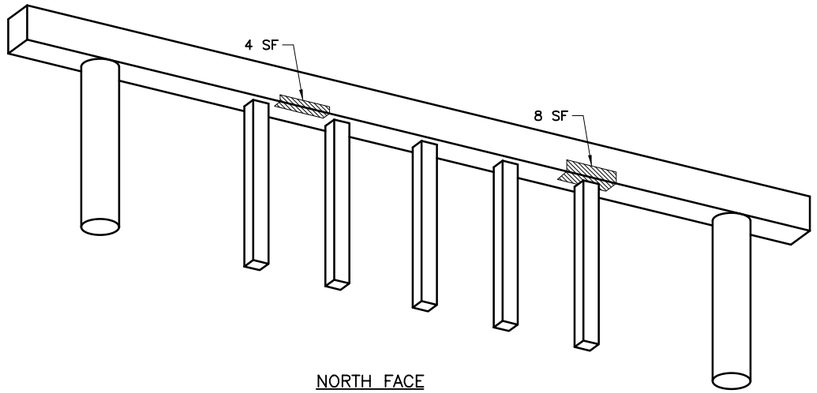
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	61

SHEET 14 OF 19

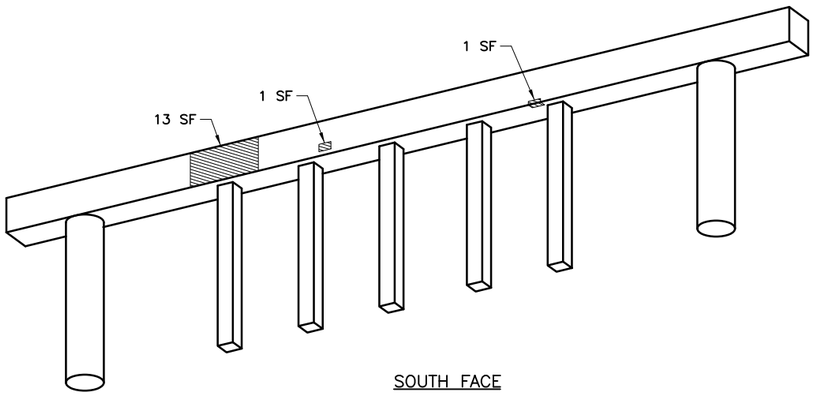


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

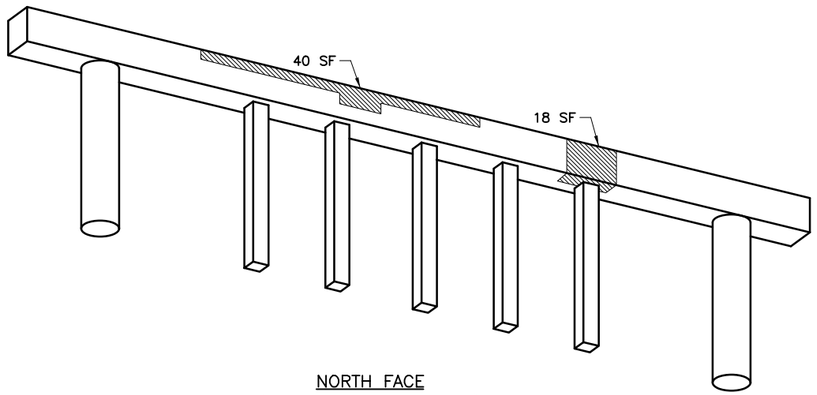


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 30



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 31

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

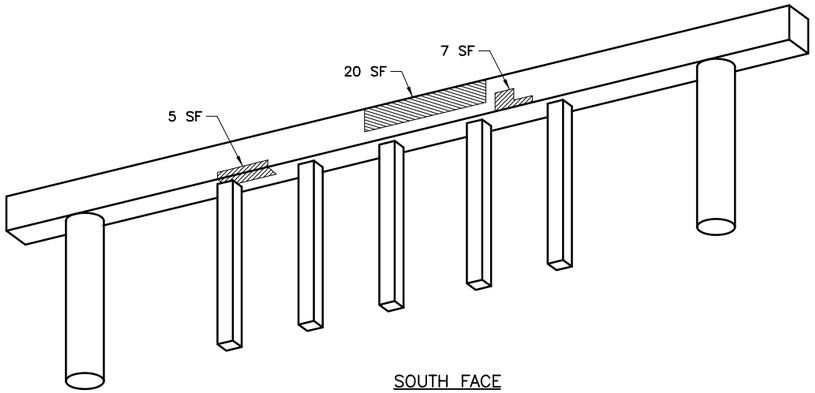
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

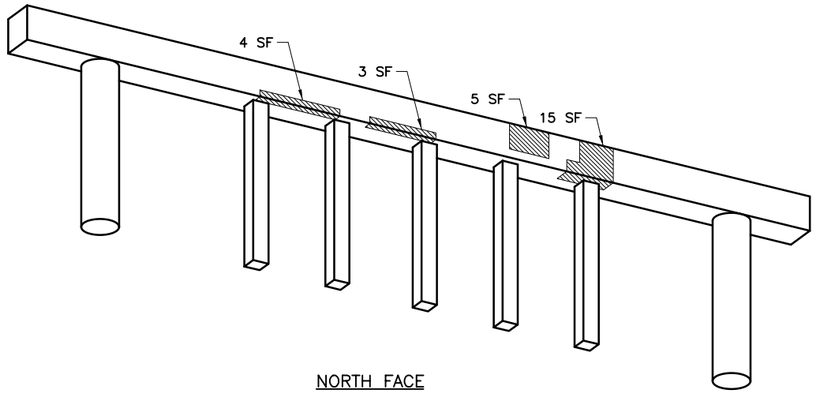
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		62

SHEET 15 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:40 PM tvoshcraft
pw:/

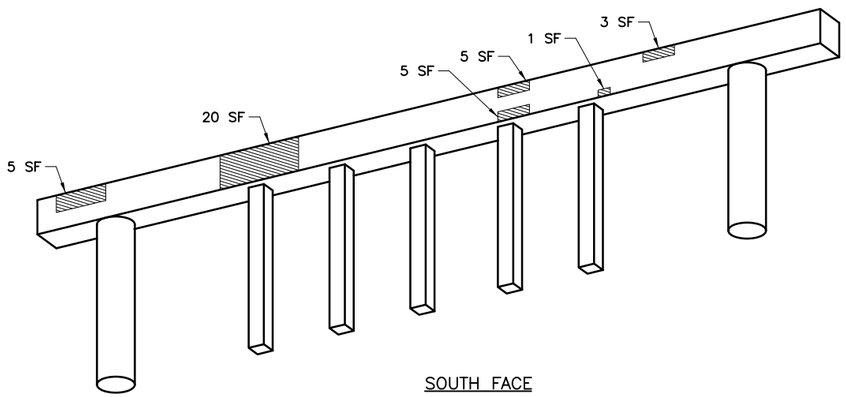


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

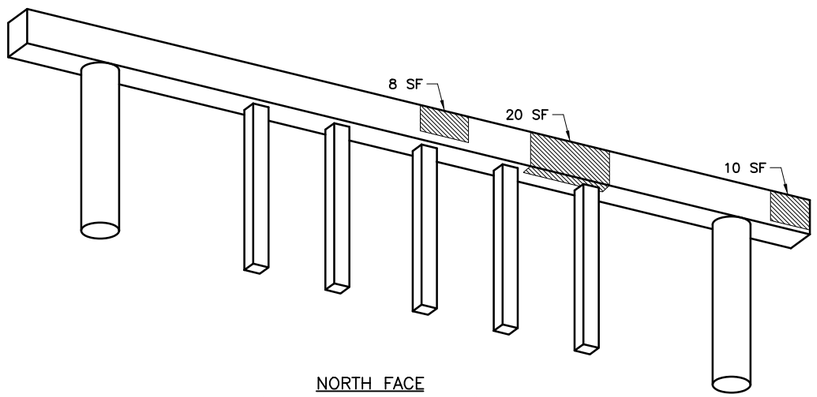


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 32



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 33

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

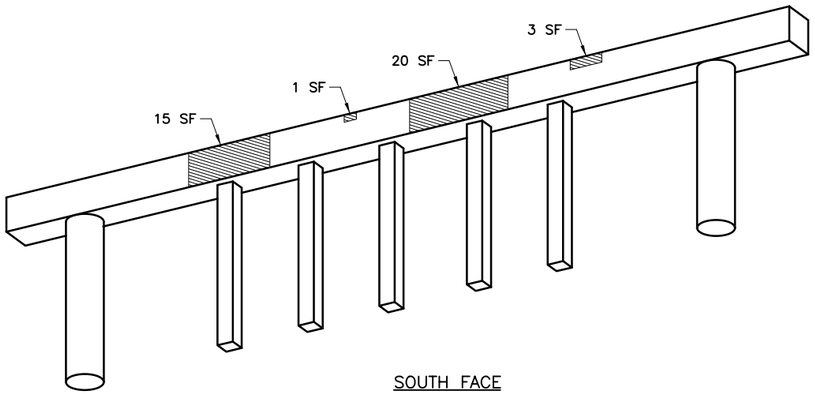
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

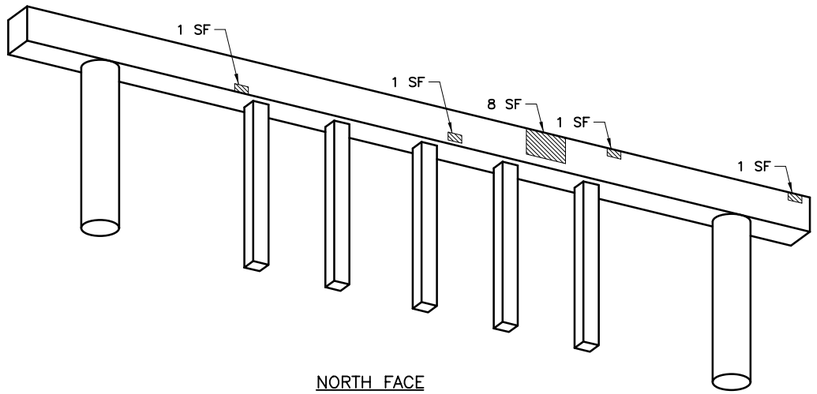
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		63

SHEET 16 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:43 PM tvoshcroft
pw:/

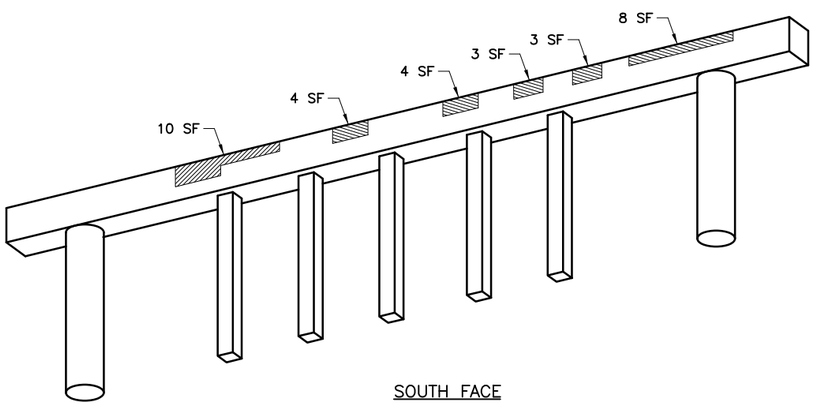


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

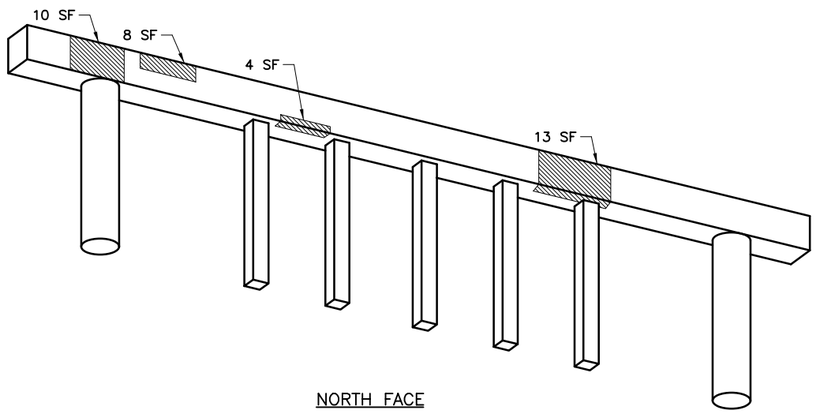


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 34



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 35

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

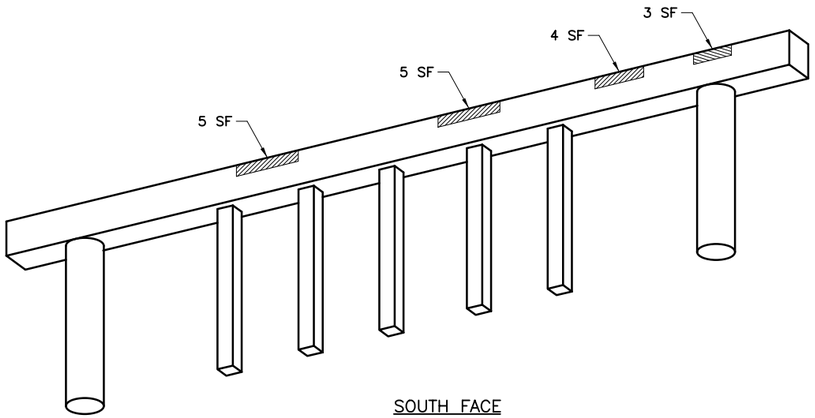
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

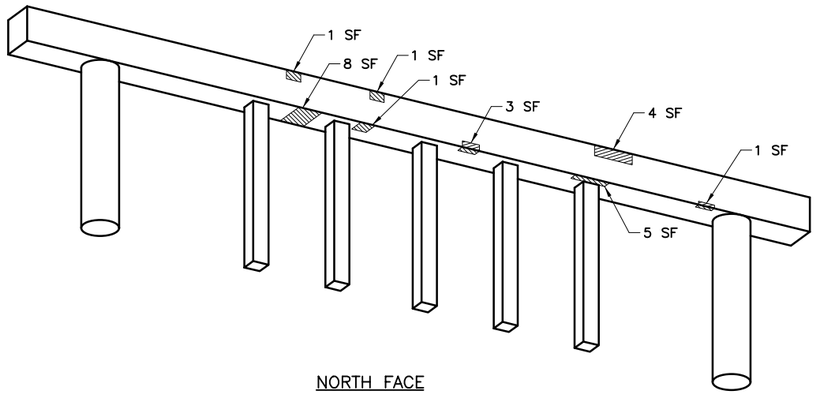
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		64

SHEET 17 OF 19

cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:48 PM tvoshcraft
pw:/

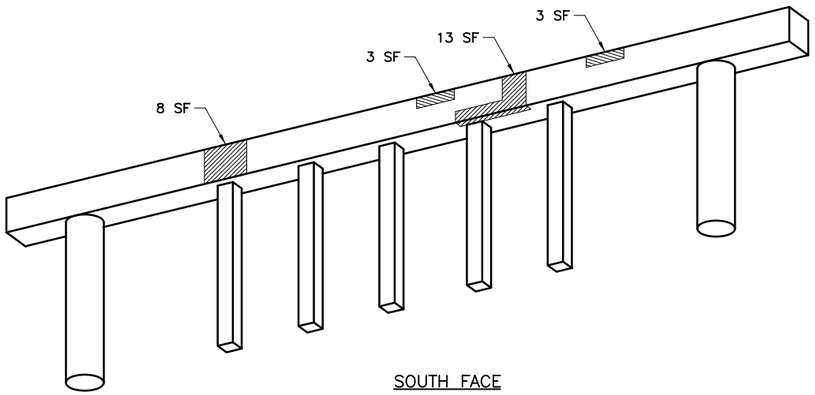


SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)

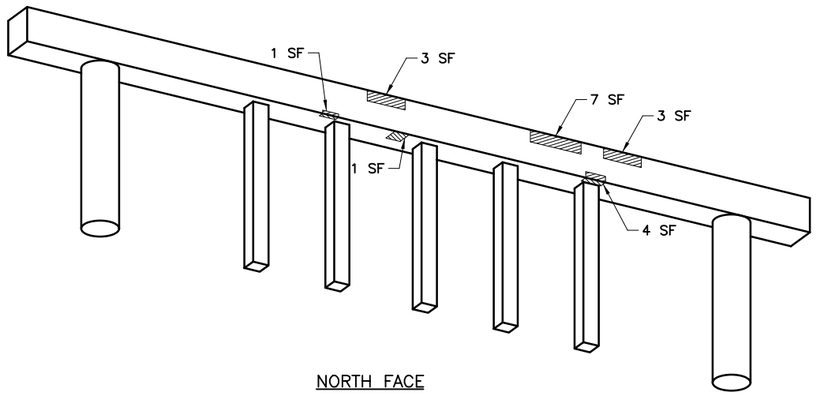


NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 36



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 37

LEGEND

INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	65

SHEET 18 OF 19

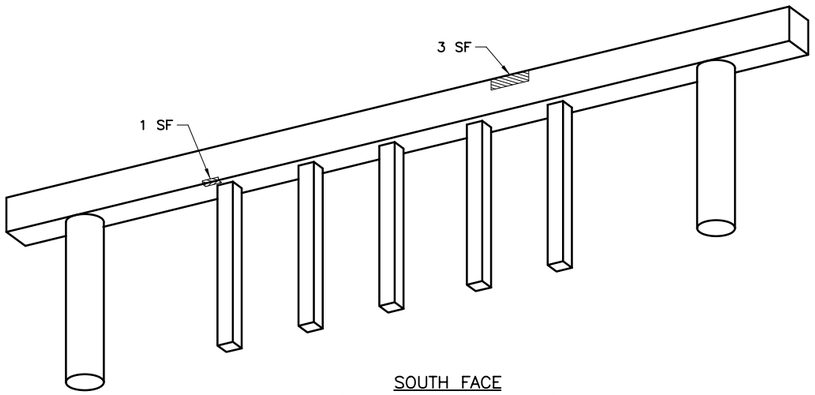
cpybw_ANSIB.tbl
cpypdf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:52 PM tvoshcraft
pw:/

LEGEND

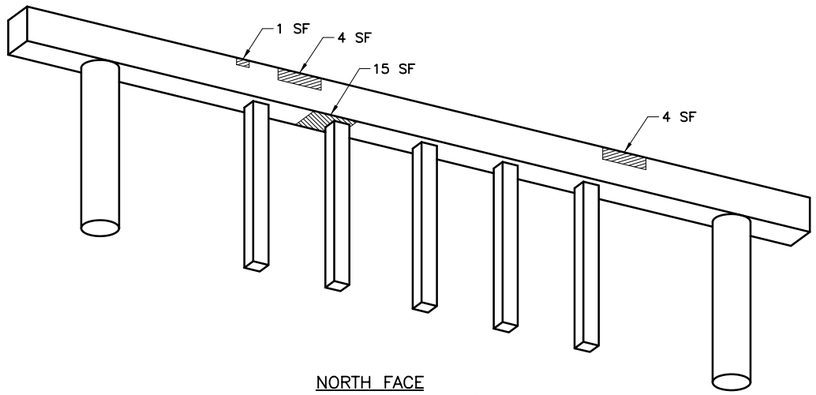
▨ INTERMEDIATE SPALL REPAIR

CONCRETE REPAIR NOTES:

1. DAMAGE LOCATIONS AND QUANTITIES ARE BASED ON OCTOBER 17, 2019 CONDITION ASSESSMENT. IMMEDIATELY NOTIFY TXDOT IF ANY DISCREPANCIES ARE NOTED BETWEEN THE PLANS AND ACTUAL CONDITIONS.
2. SUBMIT DETAILED REPAIR PROCEDURES, INCLUDING PROPOSED PROPRIETARY MATERIALS, FOR APPROVAL PRIOR TO COMMENCING WORK. REPAIRS ARE CONSIDERED "INTERMEDIATE SPALLS" AND SHALL BE REPAIRED IN ACCORDANCE WITH CHAPTER 3, SECTION 2 OF THE TXDOT CONCRETE REPAIR MANUAL.
3. SOUND ALL SURFACES TO IDENTIFY AND MARK ALL DELAMINATED AREAS FOR REVIEW AND APPROVAL BY THE ENGINEER. CONFIRM SQUARE FOOTAGE OF REPAIR AREAS PRIOR TO COMMENCING REMOVAL AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
4. NOTIFY ENGINEER ONCE EXISTING CONCRETE IS REMOVED AND REPAIR AREAS FOR EACH BENT HAVE BEEN PREPARED. PROVIDE ACCESS TO THE ENGINEER FOR VERIFICATION OF PREPARED REPAIR AREAS.



SOUTH FACE
(ISOMETRIC VIEW FROM NORTH)



NORTH FACE
(ISOMETRIC VIEW FROM SOUTH)

INTERIOR BENT 38

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

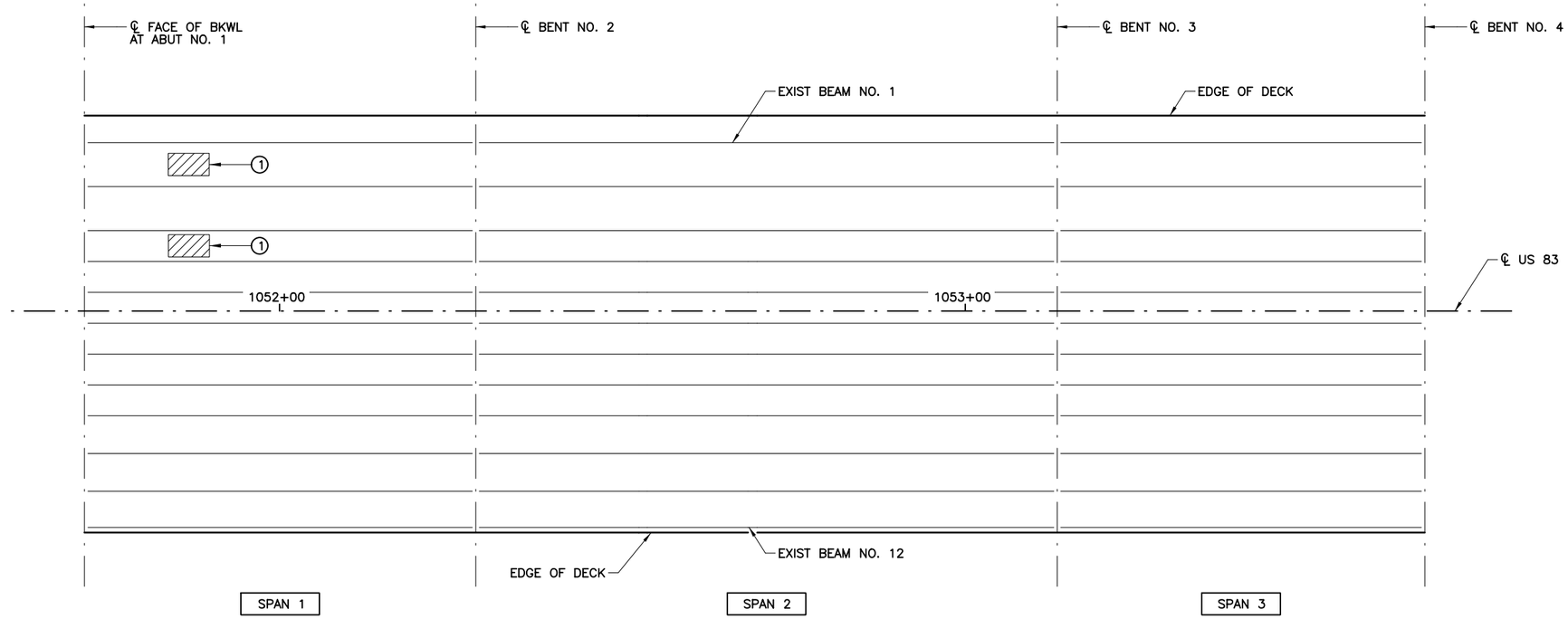
BENT REPAIR DETAILS

SAN SABA RIVER BRIDGE

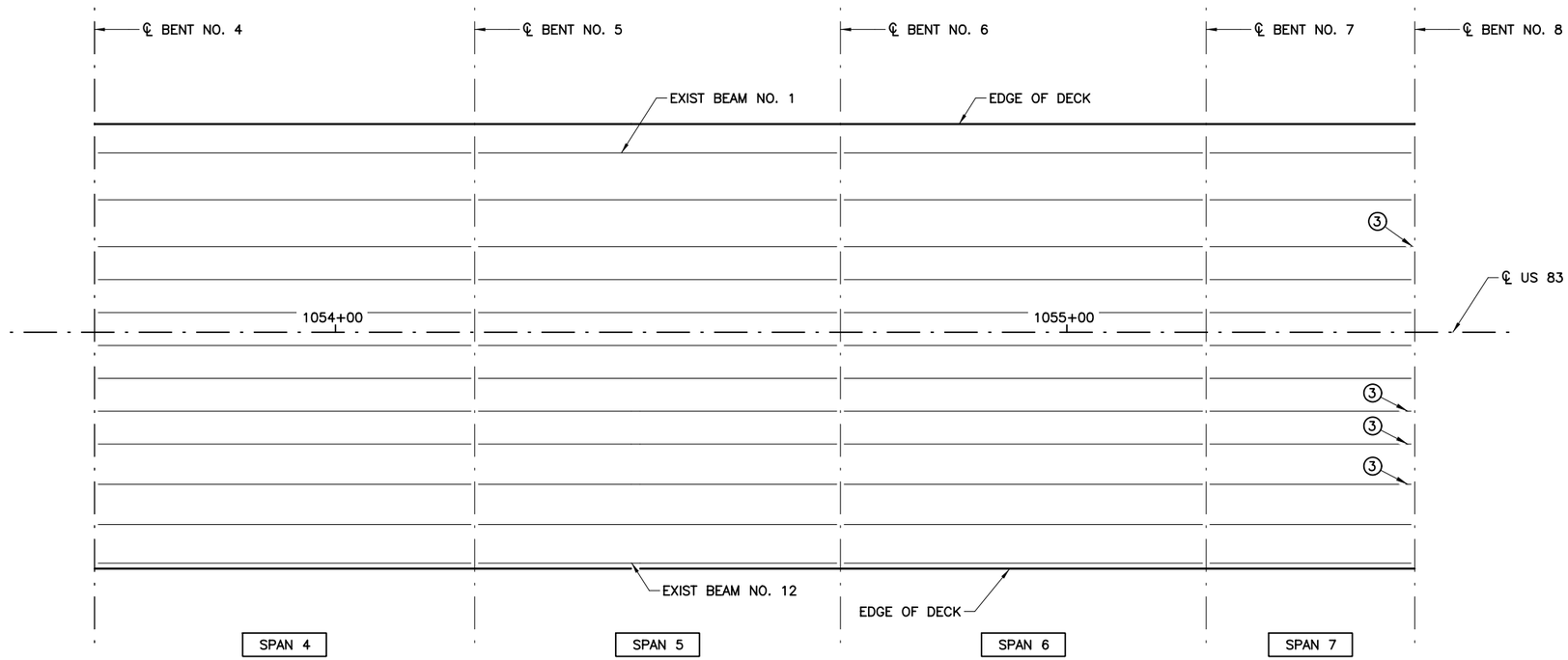
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	66

SHEET 19 OF 19

cpybw_ANSIB.tbl
cpydf_ANSIB.pltcfg
pw:/
5/27/2021 3:23:56 PM tyashcroft
pw:/



BOTTOM VIEW



BOTTOM VIEW

GENERAL NOTES:

1. REPAIR LOCATIONS NOTED ARE APPROXIMATE AND ARE PROVIDED AS A VISUAL AID. ACTUAL REPAIR LOCATIONS TO BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING REPAIR WORK.
2. EACH BEAM REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
3. EACH DECK SOFFIT REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
4. EACH DECK DRAIN REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 4: BRIDGE DECK REPAIR.

(1) REPAIR SPALLS AT DECK SOFFIT. SEE TYPICAL DECK REPAIR DETAIL.

(2) REPAIR SPALL AT DECK DRAIN. SEE DECK DRAIN REPAIR DETAIL.

(3) REPAIR SPALL AT T–BEAM. SEE BEAM REPAIR DETAIL.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

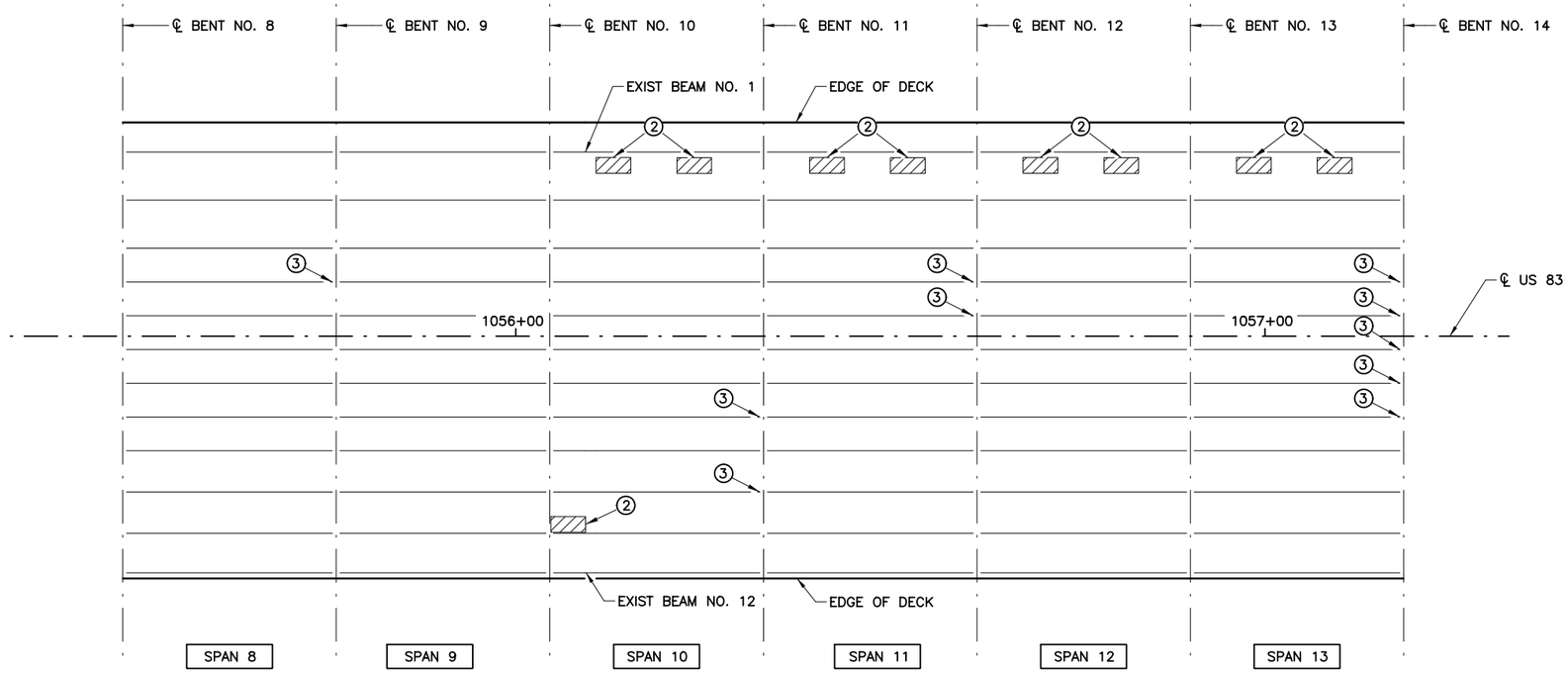
SAN ANGELO DISTRICT BRIDGE REHABILITATION

DECK REPAIR DETAILS (SPANS 1 – 7)

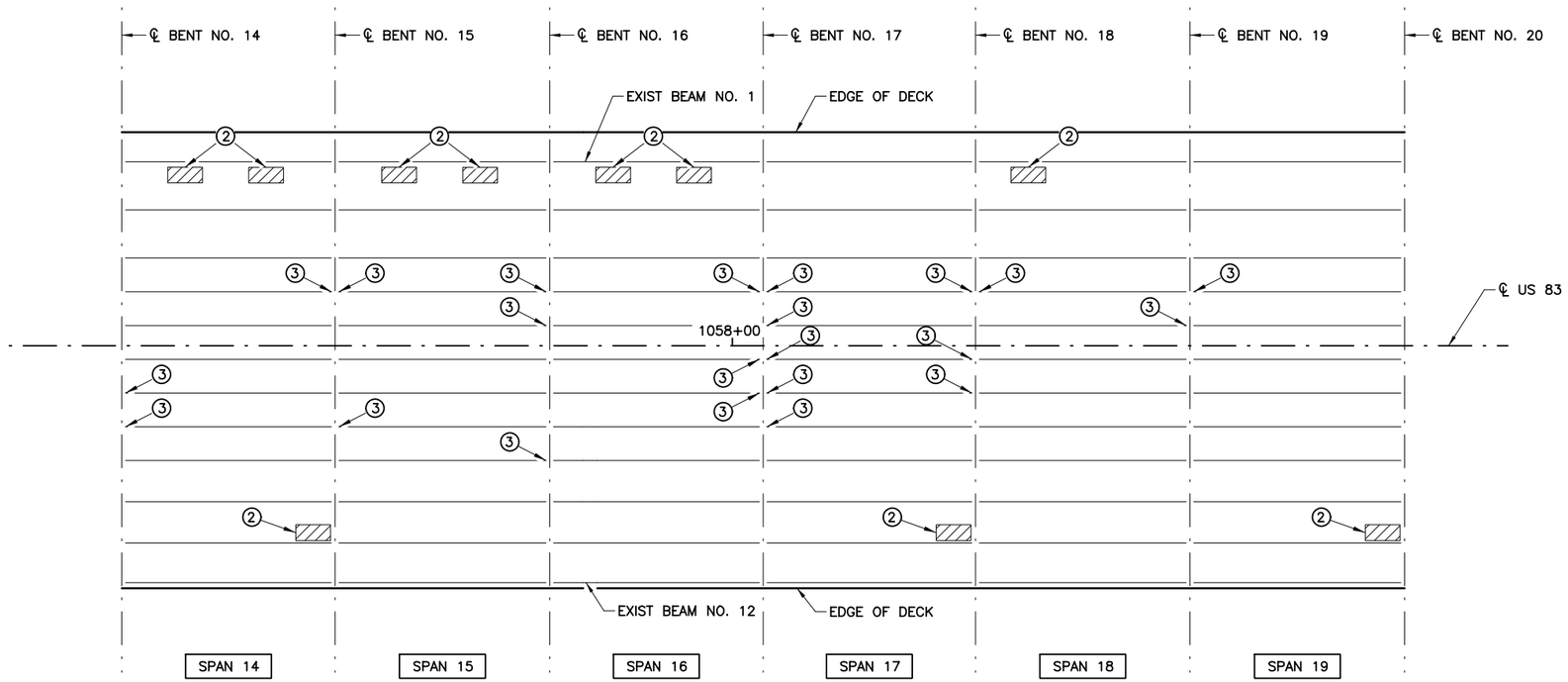
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		67

SHEET 1 OF 5



BOTTOM VIEW



BOTTOM VIEW

GENERAL NOTES:

1. REPAIR LOCATIONS NOTED ARE APPROXIMATE AND ARE PROVIDED AS A VISUAL AID. ACTUAL REPAIR LOCATIONS TO BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING REPAIR WORK.
2. EACH BEAM REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
3. EACH DECK SOFFIT REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
4. EACH DECK DRAIN REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 4: BRIDGE DECK REPAIR.

(1) REPAIR SPALLS AT DECK SOFFIT. SEE TYPICAL DECK REPAIR DETAIL.

(2) REPAIR SPALL AT DECK DRAIN. SEE DECK DRAIN REPAIR DETAIL.

(3) REPAIR SPALL AT T–BEAM. SEE BEAM REPAIR DETAIL.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

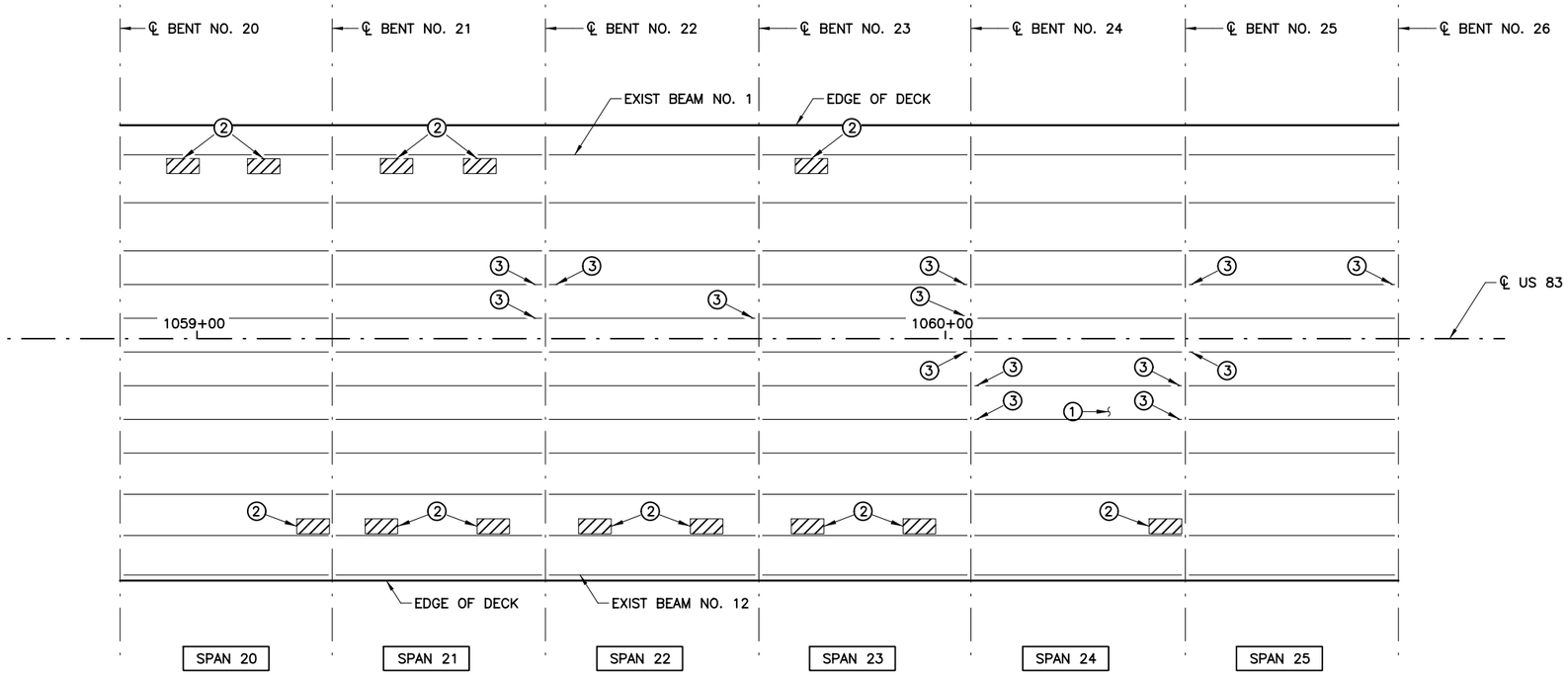
SAN ANGELO DISTRICT BRIDGE REHABILITATION

DECK REPAIR DETAILS (SPANS 8 – 19)

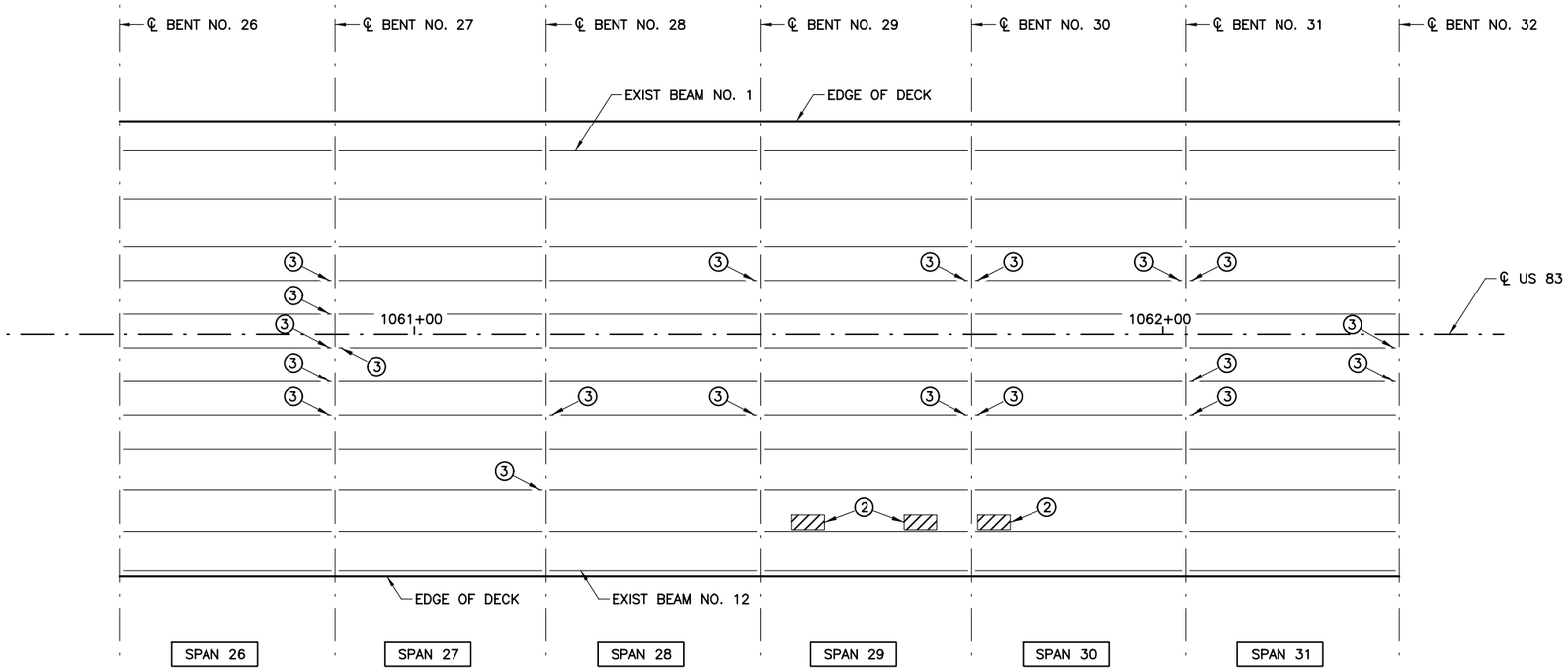
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CMB	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		68

SHEET 2 OF 5



BOTTOM VIEW



BOTTOM VIEW

GENERAL NOTES:

1. REPAIR LOCATIONS NOTED ARE APPROXIMATE AND ARE PROVIDED AS A VISUAL AID. ACTUAL REPAIR LOCATIONS TO BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING REPAIR WORK.
2. EACH BEAM REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
3. EACH DECK SOFFIT REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
4. EACH DECK DRAIN REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 4: BRIDGE DECK REPAIR.

(1) REPAIR SPALLS AT DECK SOFFIT. SEE TYPICAL DECK REPAIR DETAIL.

(2) REPAIR SPALL AT DECK DRAIN. SEE DECK DRAIN REPAIR DETAIL.

(3) REPAIR SPALL AT T–BEAM. SEE BEAM REPAIR DETAIL.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

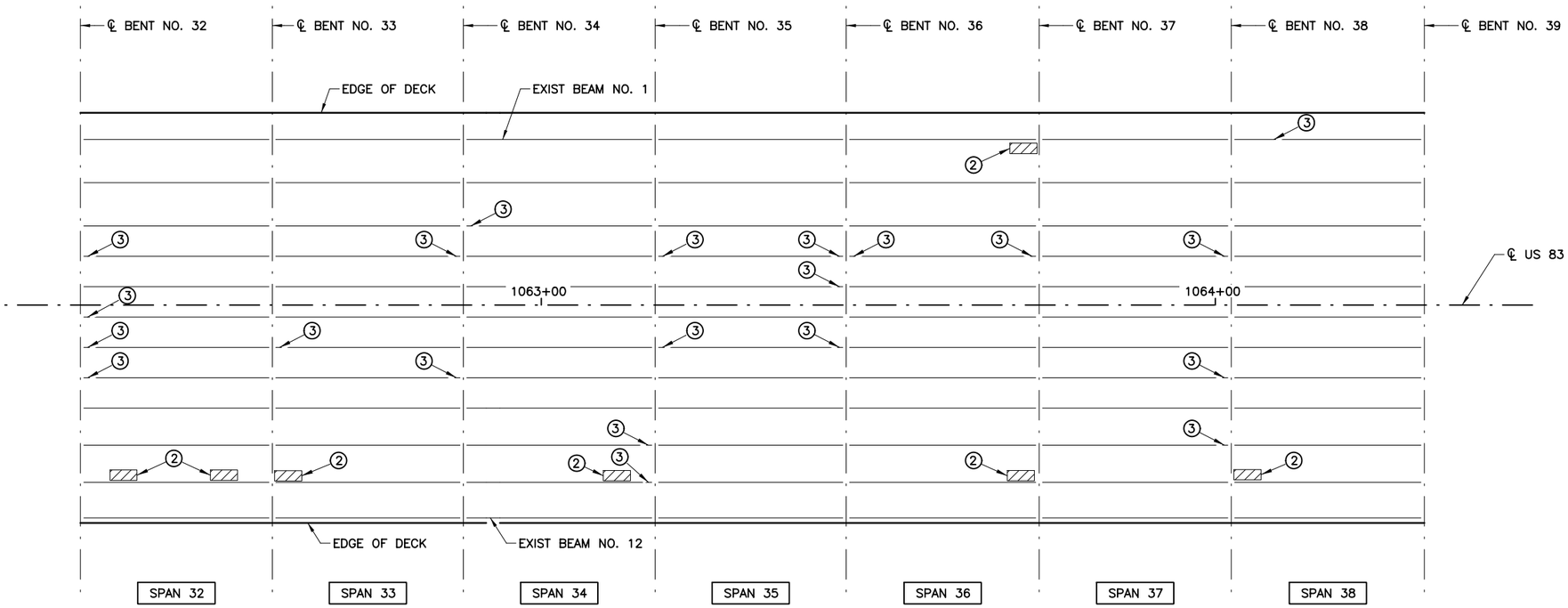
DECK REPAIR DETAILS (SPANS 20 – 31)

SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	AL	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		69

SHEET 3 OF 5

cpybw_ANSIB.tbl
cpypf_ANSIB.pltcfg
pw:/
5/27/2021 3:24:09 PM tvoshcraft
pw:/



BOTTOM VIEW

GENERAL NOTES:

1. REPAIR LOCATIONS NOTED ARE APPROXIMATE AND ARE PROVIDED AS A VISUAL AID. ACTUAL REPAIR LOCATIONS TO BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING REPAIR WORK.
2. EACH BEAM REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
3. EACH DECK SOFFIT REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 2: INTERMEDIATE SPALL REPAIR.
4. EACH DECK DRAIN REPAIR TO BE PERFORMED IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL, CHAPTER 3, SECTION 4: BRIDGE DECK REPAIR.

(1) REPAIR SPALLS AT DECK SOFFIT. SEE TYPICAL DECK REPAIR DETAIL.

(2) REPAIR SPALL AT DECK DRAIN. SEE DECK DRAIN REPAIR DETAIL.

(3) REPAIR SPALL AT T–BEAM. SEE BEAM REPAIR DETAIL.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
5/28/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

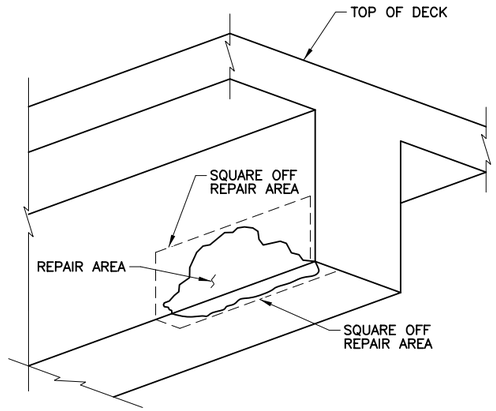
SAN ANGELO DISTRICT BRIDGE REHABILITATION

DECK REPAIR DETAILS
(SPANS 32 – 38)

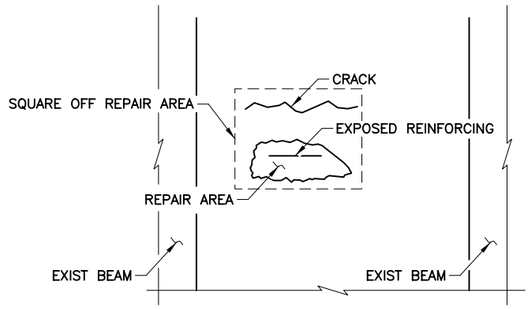
SAN SABA RIVER BRIDGE

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	TGA	6	TEXAS	SEE TITLE SHEET			US 83
Checked:	TWS						
Drawn:	AL	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	70

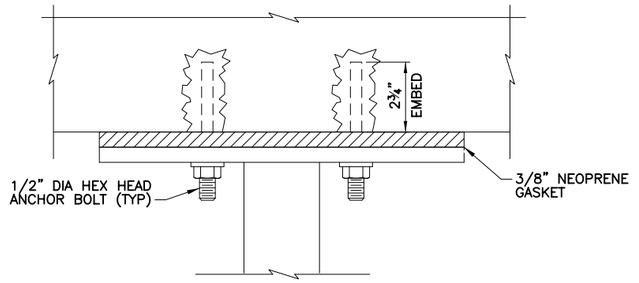
SHEET 4 OF 5



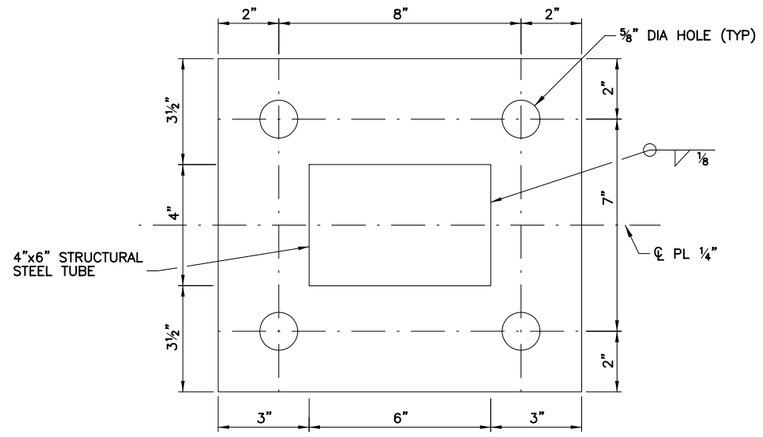
TYPICAL BEAM REPAIR DETAIL



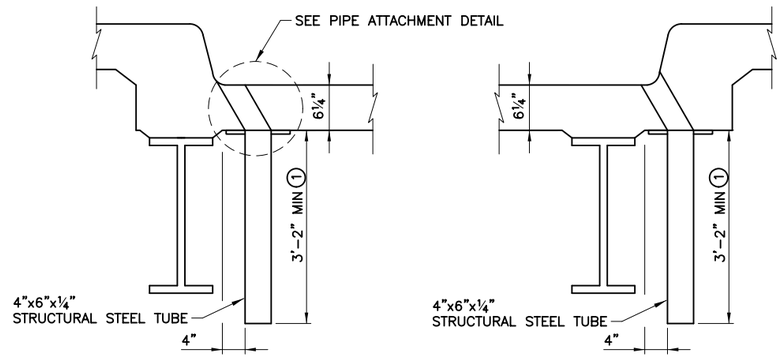
TYPICAL DECK SOFFIT SPALL REPAIR DETAIL



PIPE ATTACHMENT DETAIL



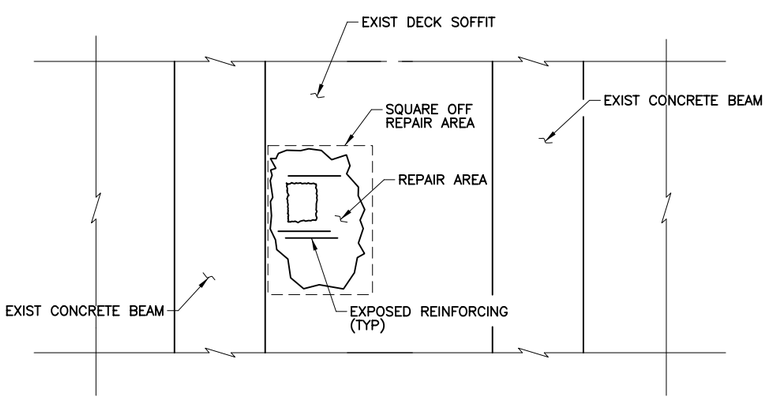
FLANGE DETAIL



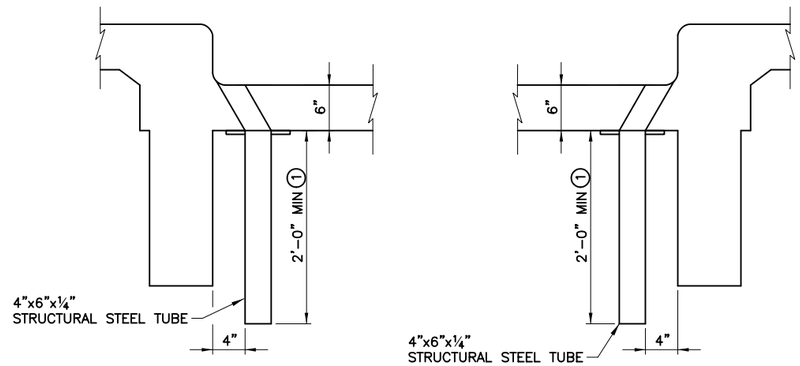
DRAIN DETAIL EAST SIDE
(STEEL BEAM)

DRAIN DETAIL WEST SIDE
(STEEL BEAM)

(WEIGHT OF 3'-2" STEEL DRAIN = 56 LBS/EA)



TYPICAL DECK DRAIN SPALL REPAIR DETAIL



DRAIN DETAIL EAST SIDE
(CONCRETE BEAM)

DRAIN DETAIL WEST SIDE
(CONCRETE BEAM)

(WEIGHT OF 2'-0" STEEL DRAIN = 37 LBS/EA)

DECK DRAIN NOTES:

1. GALVANIZE ALL STEEL COMPONENTS IN ACCORDANCE WITH ITEM 445 "GALVANIZING" UNLESS NOTED OTHERWISE. GALVANIZING OF STEEL COMPONENTS IS TO BE PAID SUBSIDARY TO ITEM "STR STEEL (MISC NON-BRIDGE)".

SPALL REPAIR NOTES:

1. REMOVE ANY DAMAGED OR LOOSE CONCRETE. AVOID DAMAGE TO SOUND CONCRETE THAT IS TO REMAIN IN PLACE.
2. SAW-CUT THE PERIMETER OF REPAIR APPROXIMATELY ½ TO ¾ INCHES BUT DO NOT CUT EXISTING REINFORCING STEEL. ADJUST DEPTH AS NECESSARY TO AVOID DAMAGING REINFORCEMENT.
3. USE ONLY HAND TOOL OR POWER-DRIVEN CHIPPING TOOLS (15-LB HAMMER MAXIMUM) TO REMOVE CONCRETE.
4. WHERE MORE THAN ½ THE PERIMETER OF REINFORCEMENT IS EXPOSED OR REINFORCEMENT EXHIBITS SIGNIFICANT CORROSION, REMOVE CONCRETE FROM AROUND THE BAR SUCH THAT 1 INCH MIN OF CLEARANCE BETWEEN THE BAR AND THE SURROUNDING CONCRETE IS PROVIDED.
5. REMOVE ALL RUST AND OTHER DELETERIOUS MATERIAL FROM THE EXISTING REINFORCING STEEL TO ENSURE PROPER BONDING WITH THE REPAIR MATERIAL.
6. FOLLOW THE TXDOT "CONCRETE REPAIR MANUAL", CHAPTER 3, SECTION 2 INTERMEDIATE SPALL REPAIR, FOR CONCRETE SURFACE PREPARATION.
7. USE REPAIR MATERIALS MEETING THE REQUIREMENTS OF TXDOT DMS-4655 FOR ALL REPAIRS.
8. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR CURING OF REPAIR MATERIAL.
9. NEOPRENE GASKET TO BE PAID FOR SUBSIDIARY TO THE ITEM, "STR STEEL (MISC NON-BRIDGE).

(1) ADJUST LENGTH AS NEEDED TO MAINTAIN A 4" MINIMUM LENGTH BEYOND BOTTOM OF BEAM.

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED PROFESSIONAL ENGINEER
7/06/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

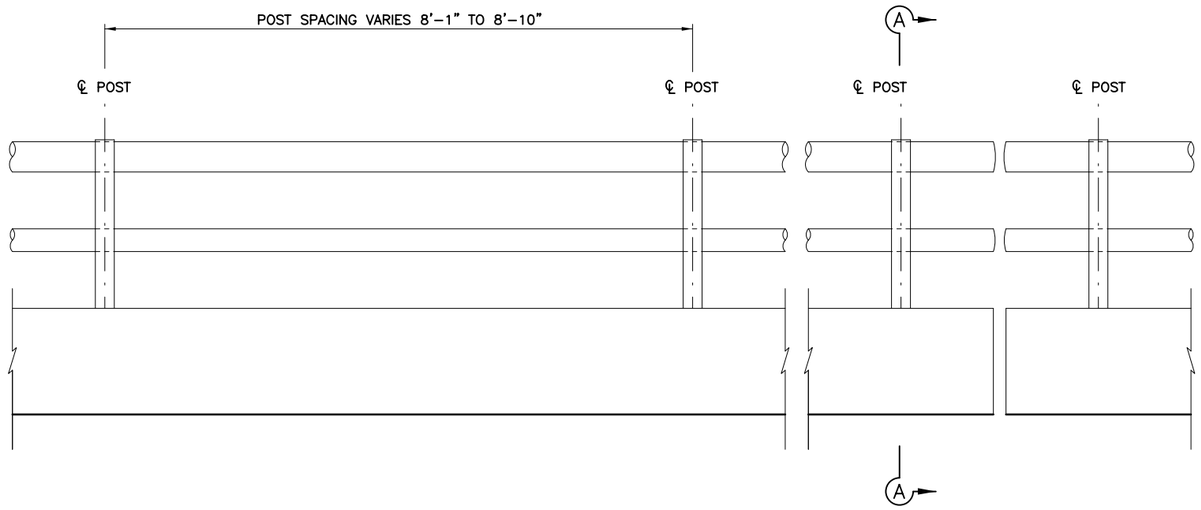
SAN ANGELO DISTRICT BRIDGE REHABILITATION

DECK REPAIR DETAILS

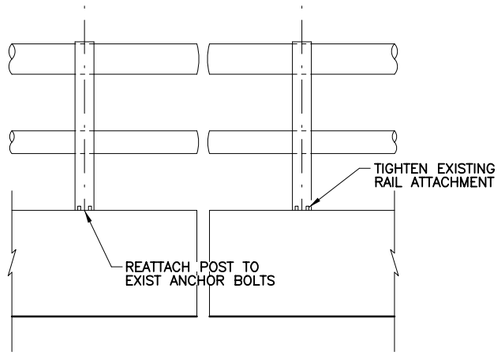
SAN SABA RIVER BRIDGE

Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	AL	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061		71

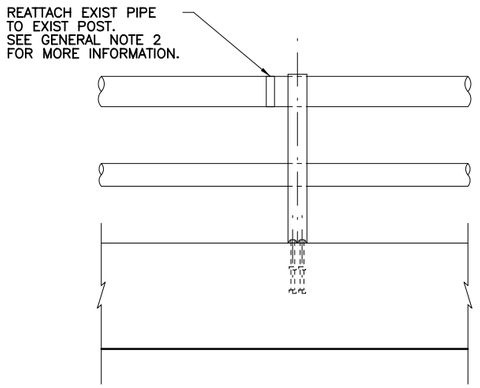
SHEET 5 OF 5



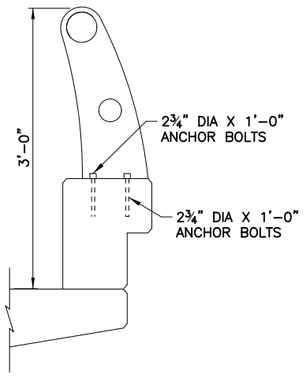
ELEVATION



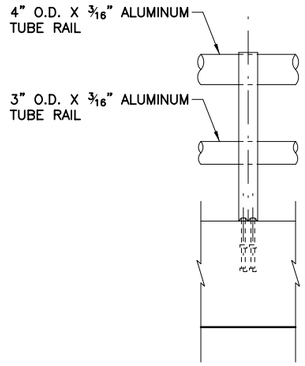
RAIL REPAIR AT BENT NO. 6



REPAIR OF 2 POSTS NORTH OF BENT NO. 6



SECTION A–A



ELEV. OF POST AT RAIL SPLICE

RAIL REPAIR CONSTRUCTION NOTES:

1. EXISTING ANCHOR BOLTS, POSTS AND HORIZONTAL PIPE TO BE REUSED.
2. SLIDE EXIST ALUMINUM TUBE RAILS INTO RAIL POST OPENINGS. ADJUST TUBE RAIL AT ADJACENT POSTS AS NEEDED TO FACILITATE PLACEMENT OF THE TUBE RAILS INTO THE RAIL POSTS.
3. FACE OF RAIL AND POSTS MUST BE VERTICAL TRANSVERSELY UNLESS OTHERWISED APPROVED. POSTS MUST BE PERPENDICULAR TO ADJACENT ROADWAY GRADE.

RAIL REPAIR MATERIAL NOTES:

1. REUSE EXISTING RAILING ANCHOR BOLTS AND FASTEN WITH ONE HEX NUT (ATSM A563) AND ONE HARDENED STEEL WASHER (ASTM F436) EACH.

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY RAIL CONDITION AND RAIL REPAIR NEEDED PRIOR TO ORDERING MATERIALS OR COMMENCING WORK.
2. PAYMENT FOR RAIL REPAIR SHALL BE IN ACCORDANCE WITH THE ITEM 786, "REPAIR (STEEL RAIL)".

STATE OF TEXAS
THOMAS W. STEPHENSON
91178
LICENSED
PROFESSIONAL ENGINEER
7/06/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

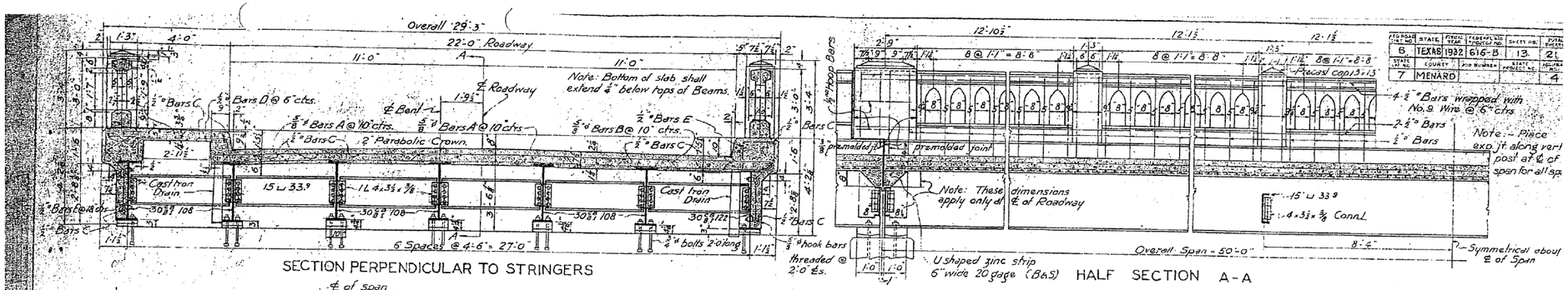
SAN ANGELO DISTRICT BRIDGE REHABILITATION

RAIL REPAIR DETAILS

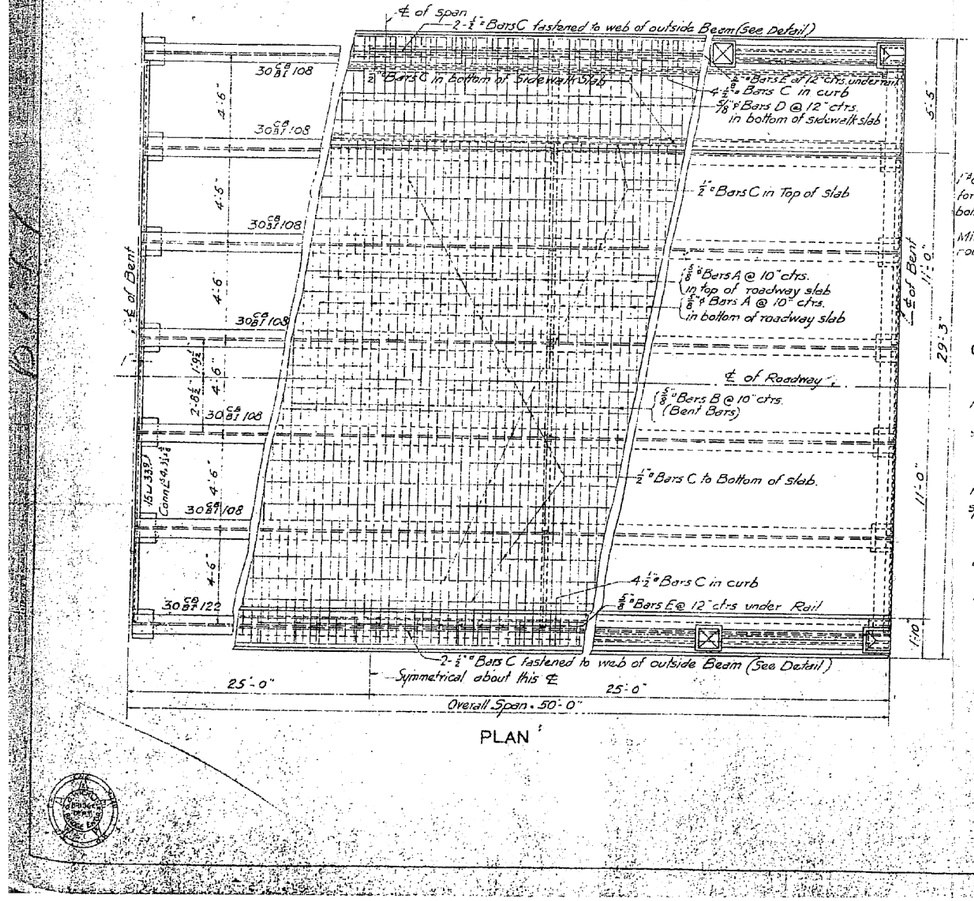
SAN SABA RIVER BRIDGE

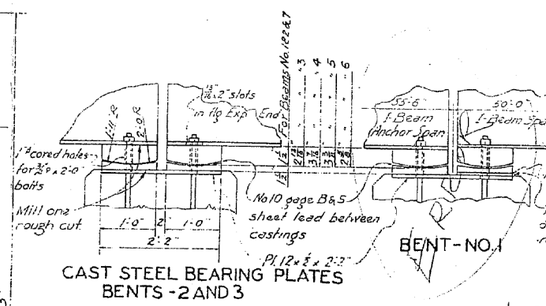
Designed:	TGA	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	TWS	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	AL	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	KAD	SJT	MENARD	0035	05	061	72

SHEET 1 OF 1



FED.ROAD DIV. NO.	STATE	FISCAL YEAR	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
6	TEXAS	1932	616-B	13.	21.
STATE DIST. NO.	COUNTY	JOB NUMBER	STATE PROJECT NO.		REGIONAL INCL.
7	MENARD				4





BILL OF REINFORCING

Location	Mark	No.	Size	Spac.	Length	Wt.
Slab Trans.	A	120	⅝" ℄	10"	25'-2"	131
" Bent	B	59	⅝" ℄	10"	26'-5"	162
Longitudinal	C	62	½" ℄	—	25'-10"	136
Sidewalk Trans.	D	50	⅝" ℄	12"	6'-0"	31
Curb Trans.	E	100	⅝" ℄	12"	7'-1"	74
				Total Reinforcing		718
Total Class A Concrete					441.7 Cu.Yds.	
Total Structural Steel					44,500 lbs.	

GENERAL NOTES:-

Loading 2-15 Ton Trucks 30% Impact

All concrete except railing to be class "A" (1:2:4 mix)

Rail concrete to be class D.

All concrete surfaces shall have a Class 1 surface finish

Reinforcing to be deformed bars, not square twisted.

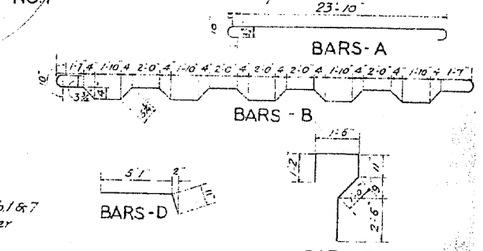
All structural steel except the outside face of beams No. 1 & 7 to be given one shop coat and 2 field coats of paint as per specifications

Standard specifications of the Texas State Highway Department.

All field connections for structural members shall be riveted using ¾" "rivets.

For details and No. of drains required and Light Post Details see detail Sheet No 2 of Cantilever Span in these plans.

All corners to be chamfered 1" thus



TEXAS STATE HIGHWAY DEPARTMENT

50'-0" I-BEAM SPAN

22'-ROADWAY 4'-SIDEWALK

NOVEMBER 1931.

164-0035-05-021

Rev. 1-18-33

TEXAS REGISTERED ENGINEERING FIRM F-1741

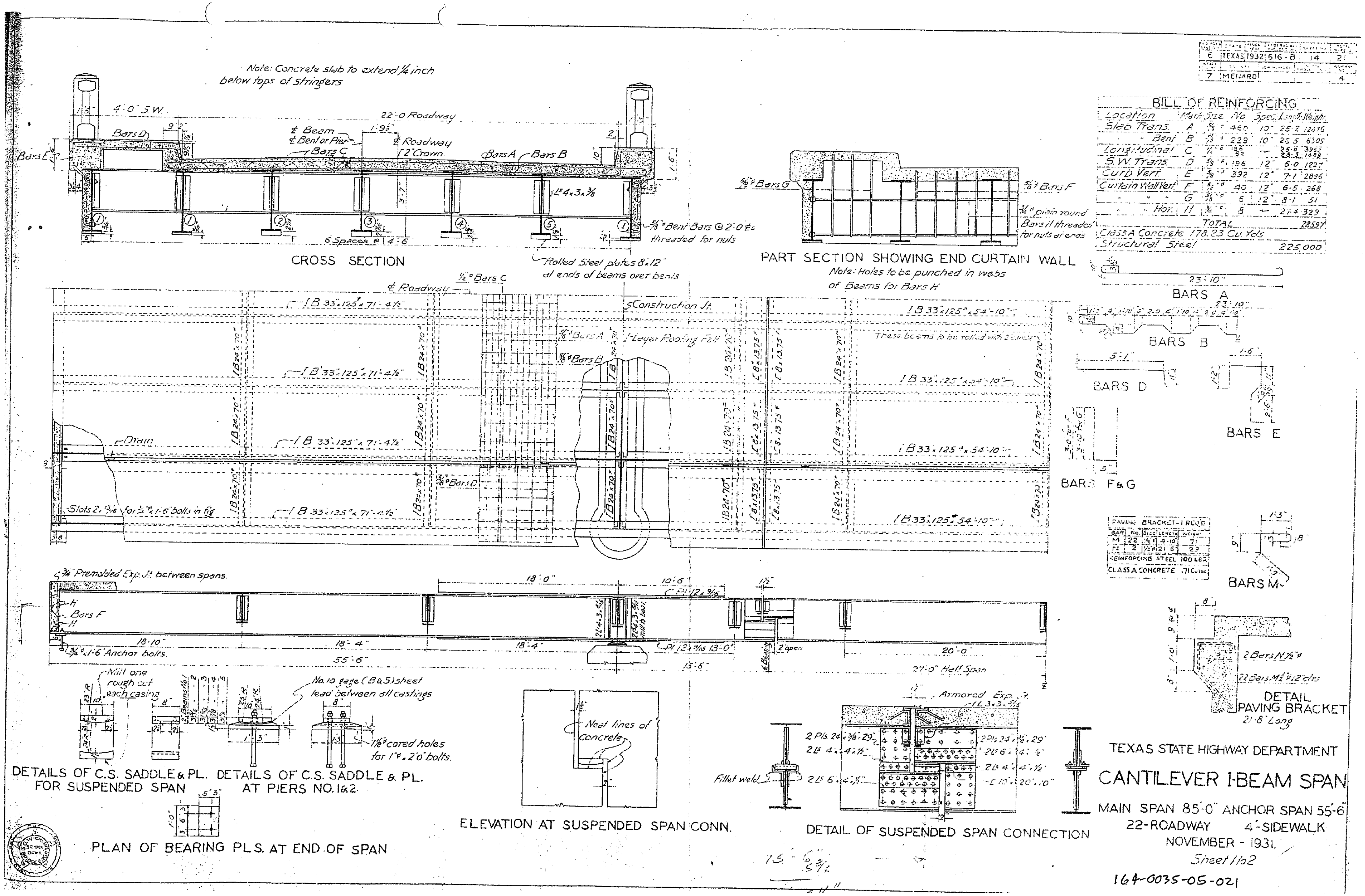
SAN ANGELO DISTRICT BRIDGE REHABILITATION

EXISTING BRIDGE INFORMATION

(STEEL DETAILS - 1932 ORIGINAL BRIDGE)

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	73

SHEET 1 OF 5



TEXAS REGISTERED ENGINEERING FIRM F-1741

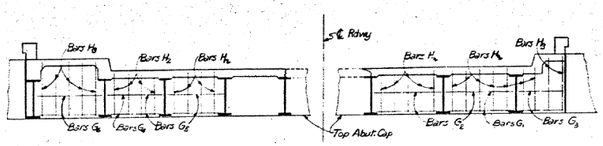
 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

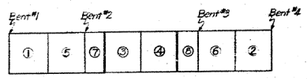
EXISTING BRIDGE INFORMATION
(STEEL DETAILS - 1932 ORIGINAL BRIDGE)

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	74

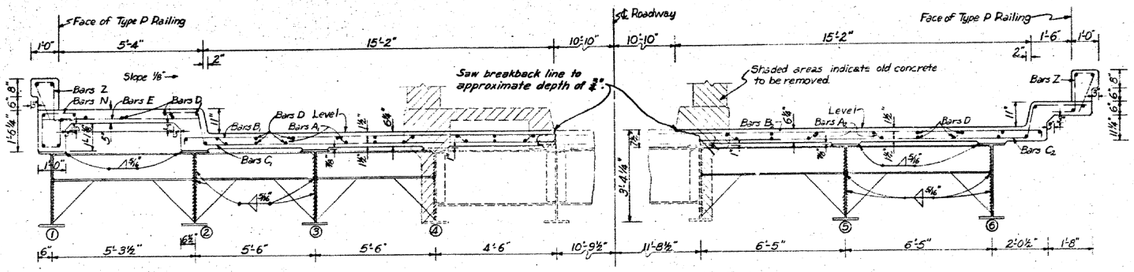
SHEET 2 OF 5



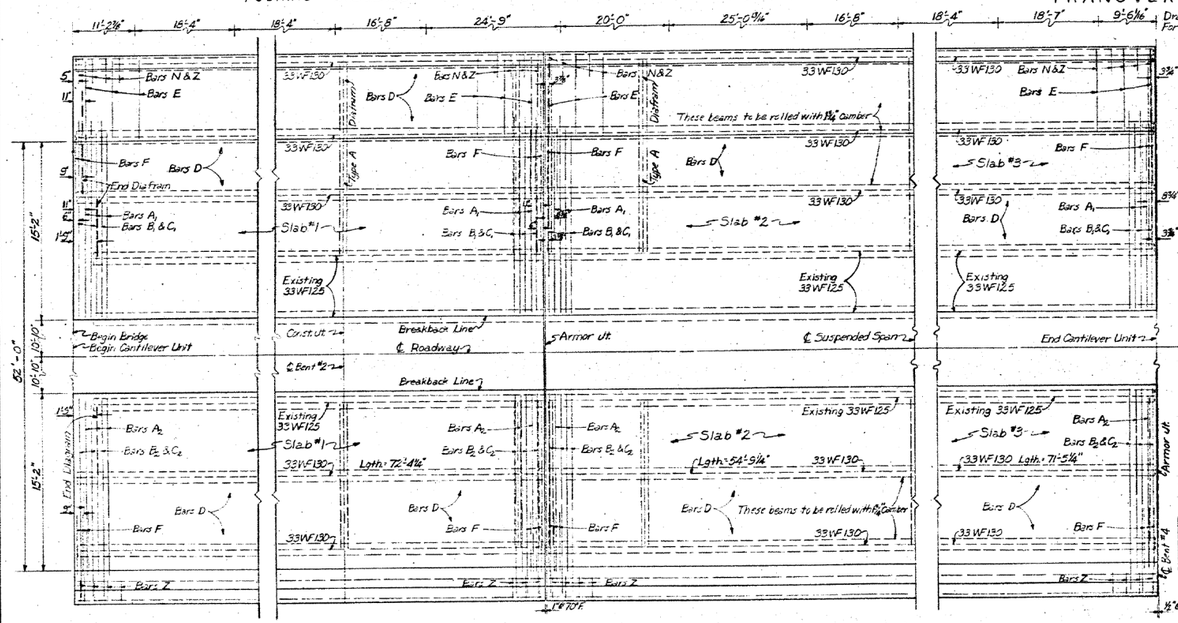
SECTION SHOWING END DIAFRAM



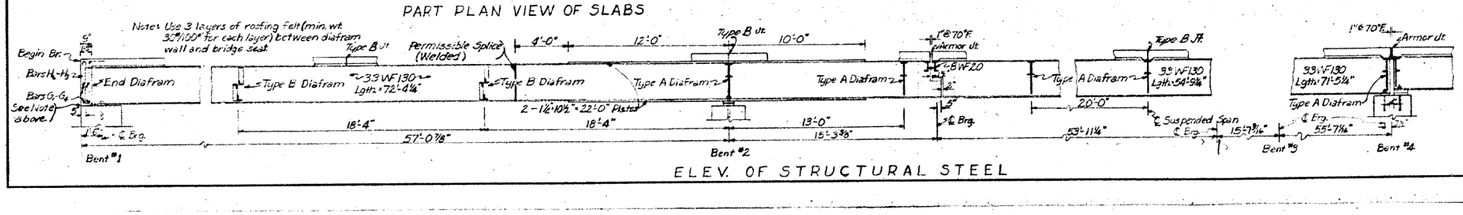
POURING SEQUENCE



TRANSVERSE SECTION



PART PLAN VIEW OF SLABS



ELEV. OF STRUCTURAL STEEL

Note:
See layout for Rail Post Spacing.
See Bridge Lighting Detail Sheet for light bracket and conduit location and details.
See Shoe Detail Sheet for shoe types, location and details.

BILL OF REINF. STEEL

BAR	NO.	SIZE	SPACING	LENGTH	WEIGHT
SLAB #1					
A_1	65	#5	10"	16'-10⅛"	1,454
A_2	66	#5	10"	15'-10⅛"	1,407
B_1	96	#5	10"	15'-9⅜"	1,413
B_2	66	#5	10"	15'-5"	1,360
C_1	66	#5	10"	17'-7⅞"	1,523
C_2	66	#5	10"	17'-5¼"	1,504
D	53	#5	~	* 72'-7"	4,012
E	72	#5	12"	5'-10"	438
F	13	#6	6'-1	6'-1"	84
G_1	2	#5	~	16'-3⅛"	34
G_2	4	#5	~	6'-5"	26
G_3	2	#5	~	3'-6⅜"	7
G_4	2	#5	~	21'-0⅜"	44
J	4	#5	~	5'-3"	22
G_5	2	#5	~	11'-0⅜"	11
H_1	11	#5	12'-"	10'-11"	125
H_2	13	#5	12'-"	9'-11"	134
H_3	7	#5	12'-"	11'-9"	86
N	72	#4	12"	5'-2½"	256
Z	144	#4	12"	4'-6¼"	439
			TOTAL =		14,258
SLAB #2					
A	65	#5	10"	16'-10⅛"	1,143
A_2	65	#5	10"	15'-10⅛"	1,076
E	66	#5	10"	15'-5⅜"	1,088
E_2	66	#5	10"	15'-2"	1,044
C	66	#5	10"	17'-7⅞"	1,215
C_2	66	#5	10"	17'-5¼"	1,200
D	53	#5	~	* 71'-4"	3,370
F	56	#5	12"	5'-10"	341
F	12	#5	6'-1	6'-1"	76
N	50	#4	12"	5'-2½"	177
Z	110	#4	12"	4'-6¼"	535
			TOTAL =		12,547
SLAB #3					
A_1	64	#5	10"	16'-10⅛"	1,127
A_2	64	#5	10"	15'-10⅛"	1,381
B	93	#5	10"	15'-9⅜"	1,402
B_2	65	#5	10"	15'-5"	1,342
C	90	#5	10"	17'-7⅞"	1,562
C_2	90	#5	10"	17'-5¼"	1,540
D	29	#5	~	* 71'-4"	1,343
E	72	#5	12"	5'-10"	438
F	12	#5	6'-1	6'-1"	76
N	71	#4	12"	5'-2½"	256
Z	142	#4	12"	4'-6¼"	433
			TOTAL =		13,463
			GRAND TOTAL =		52,268

* Includes One 2.0 dia. lap
See General Notes on Sheet 2 of 2.

SUMMARY OF ESTIMATED QUANTITY

ITEM	UNIT	QUANTITY
Class A Concrete, Slabs	CY	181.34
Reinf. Steel	Lb.	38,302
Structural Steel	Lb.	167,914

WIDENING DETAILS
CANTILEVER I BEAM UNIT
(55'-6" 65'-0" 55'-6")
22' ROADWAY 4' SIDEWALK TO
52' ROADWAY 5'-4" SIDEWALK
SAN SABA RIVER
SHEET 1 OF 2

Rev. 10-13-61
Rev. 10-11-61

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.		SHEET NO.
6	TEXAS	F-161(1)		29
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
7	MENARD	35	5	26	83 (20)

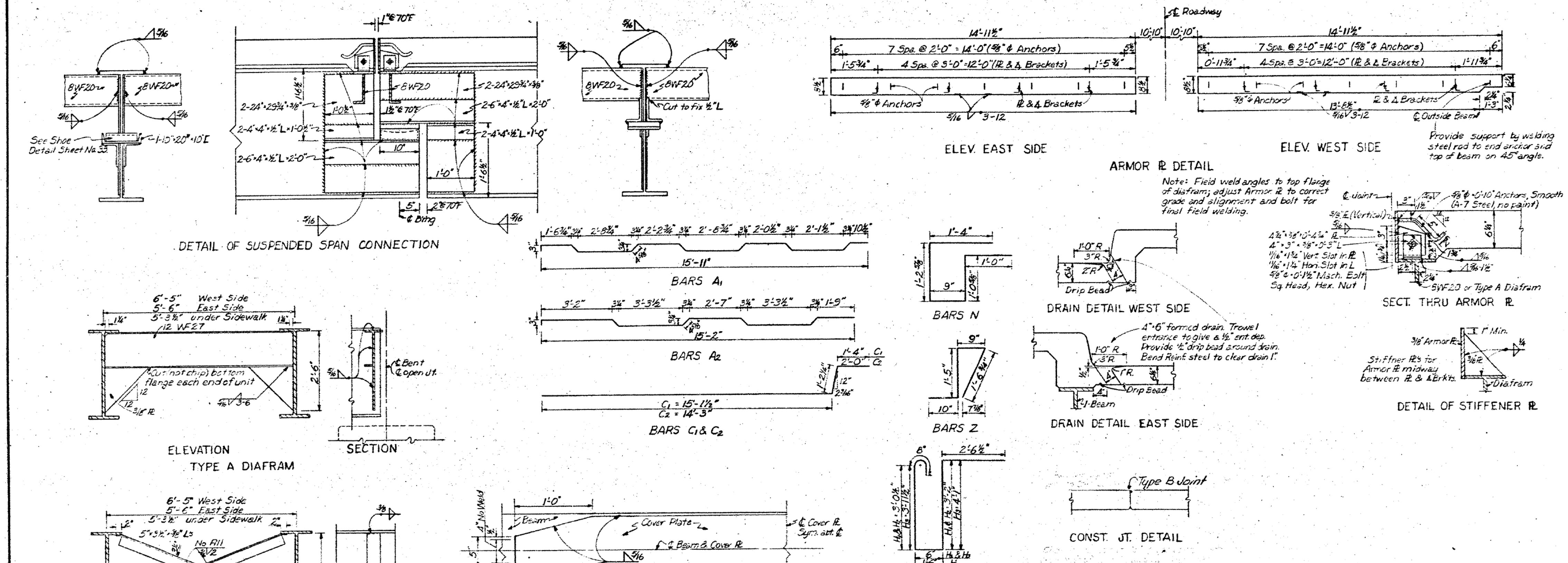
SHEET 3 OF 5

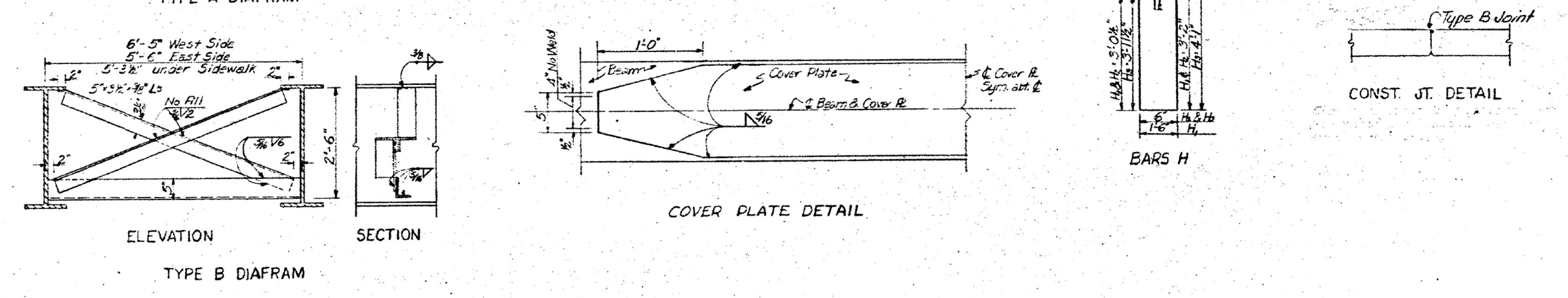
CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

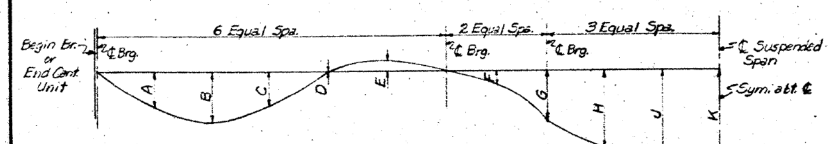
SAN ANGELO DISTRICT BRIDGE REHABILITATION

EXISTING BRIDGE INFORMATION
(STEEL DETAILS - 1962 BRIDGE WIDENING)

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Checked:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Drawn:	CPY	7	MENARD	0035	05	061	75
Checked:	CPY	SJT					







GENERAL NOTES:

Design: H-20 Loading under A.A.S.H.O. 1957 Standard Specifications.

All concrete shall be Class "A." Chamfer exposed corners 3/4" unless otherwise noted.

All dimensions relating to reinforcing steel are to centers of bars.

No concrete shall be placed until all structural steel is erected and all welding completed in the unit.

Cost of removing designated portions of existing deck will not be paid for directly but will be considered subsidiary to the bid item "Class A Conc. for Ext. Str. (Slabs)."

Design stress for reinforcing steel = 20,000 psi.

DEAD LOAD DEFLECTION DIAGRAM

BEAM NO.	A	B	C	D	E	F	G	H	J	K
1	1/16"	3/32"	1/16"	0	1/16"	5/16"	15/32"	3/4"	13/16"	1"
2	1/16"	3/32"	1/16"	0	1/16"	5/16"	7/16"	23/32"	23/32"	31/32"
3	1/16"	3/32"	1/16"	0	1/32"	1/8"	11/32"	17/32"	11/16"	3/4"
4	1/16"	3/32"	1/16"	0	1/16"	5/32"	11/32"	9/16"	27/32"	23/32"
5	1/16"	3/32"	1/16"	0	1/16"	5/32"	13/32"	21/32"	13/16"	1 1/32"
6	1/8"	3/32"	1/8"	0	1/16"	3/32"	23/32"	1 3/32"	1 3/8"	1 13/32"

(Due to Concrete, Surfacing and Railing Only)

CONSTRUCTION PROCEDURE: After all structural steel is erected and welded, an accurate measurement shall be made of the elevations of the beam flanges at all control points. Subsequent setting of forms, placing and finishing of concrete shall be governed by these measurements only, taking into account the deflections shown at the left.

WIDENING DETAILS
CANTILEVER I-BEAM UNIT
(55'-6" 85'-0" 55'-6")
22' ROADWAY 4' SIDEWALK TO
52' ROADWAY 5'-4" SIDEWALK
SAN SABA RIVER
SHEET 2 OF 2

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	F 616 (11)			30
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
7	MENARD	35	5	26	US 83

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

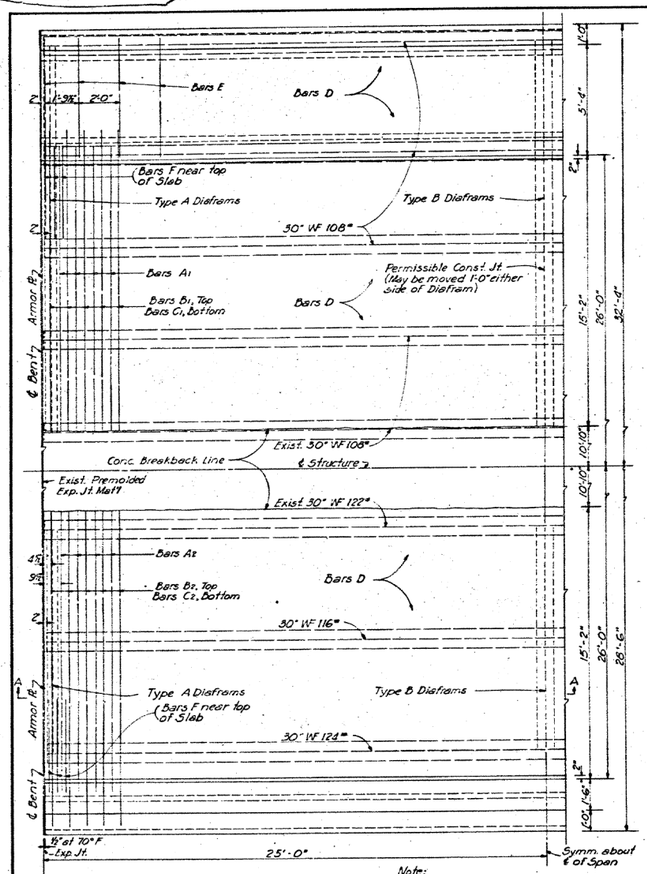
 Texas Department of Transportation

SAN ANGELO DISTRICT BRIDGE REHABILITATION

EXISTING BRIDGE INFORMATION
(STEEL DETAILS - 1962 BRIDGE WIDENING)

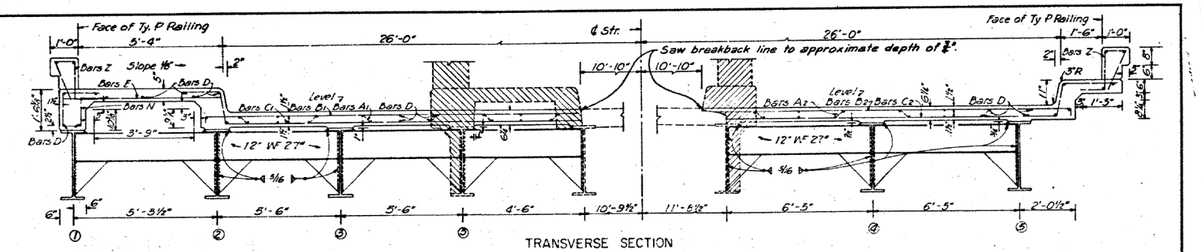
Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	76

SHEET 4 OF 5

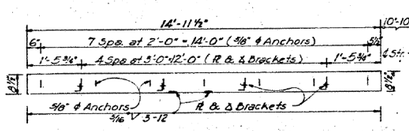


PLAN HALF SPAN

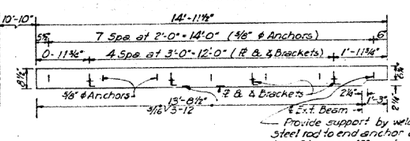
Note:
See layout for Rail Post Spacing.
See Bridge Lighting Detail Sheet for Light bracket and conduit location and detail.
See Shoe Detail Sheet for shoe Types, location and detail.



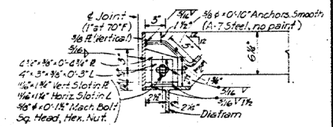
TRANSVERSE SECTION



ELEV. EAST SIDE

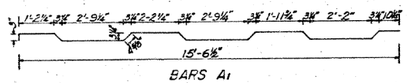


ELEV. WEST SIDE

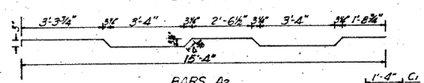


SECT. THRU ARMOR PL

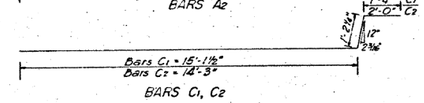
ARMOR PL DETAIL



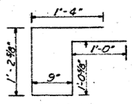
BARS A1



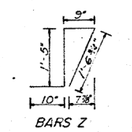
BARS A2



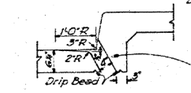
BARS C1, C2



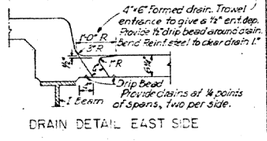
BARS N



BARS Z

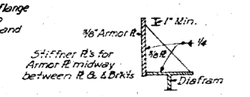


DRAIN DETAIL WEST SIDE



DRAIN DETAIL EAST SIDE

Note: Field weld angles to top flange of diafram; adjust Armor PL to correct grade and alignment and bolt for final field welding.



DETAIL OF STIFFENER PL

BILL OF REINFORCING STEEL

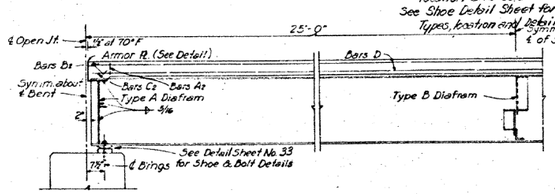
Bar	No.	Size	Spa.	Length	Weight
A1	59	#5	10"	16'-3 1/2"	1,014
A2	59	#5	10"	16'-1 1/2"	987
B1	60	#5	10"	15'-9 1/2"	980
B2	60	#5	10"	15'-2"	945
C1	60	#5	10"	17'-7 1/2"	1,104
C2	60	#5	10"	17'-3 1/2"	1,091
D	136	#5	Shown	25'-4"	2,401
E	20	#5	12"	5'-10"	304
F	12	#5	5"±	5'-6"	56
N	51	#4	12"±	5'-4 1/2"	182
Z	102	#4	12"±	2'-6 1/2"	317
T O T A L					9,566

QUANTITIES PER SPAN

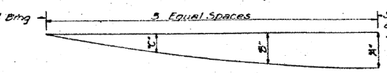
ITEM	UNIT	QUANTITY
Class 'A' Concrete	C. Y.	45.5
Reinforcing Steel	Lb.	9,566
Structural Steel	Lb.	32,251

Note: Add 10% to Struct. Steel quantity shown above for the 50 Ft. span that joins the Cantilever span on Bent ℄ due to difference in Shoes. See Shoe Details sheet No. 33.

GENERAL NOTES:
Design: H20 Loading under AASHO 1957 S48 Specifications.
All concrete shall be Class 'A'. Chamfer exposed corners 3/4" unless otherwise noted.
All dimensions shown for reinforcing steel are to ctrs of bars.
No concrete shall be placed until all structural steel is erected and all welding completed in the unit.
Cost of removing designated portions of existing structure will not be paid for directly, but will be considered subsidiary to the Item "Class A Conc. for Ext. Str. (Slabs)".
Design stress for reinforcing steel = 20,000 psi.



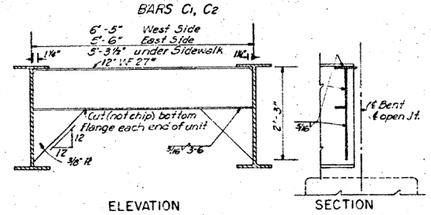
SECTION A-A



BEAM No.	1"	15"	5"
1	3/16"	13/32"	25/32"
2	7/32"	7/16"	1/4"
3	13/32"	11/32"	9/16"
4	7/16"	5/8"	9/32"
5	25/32"	3/16"	5/16"

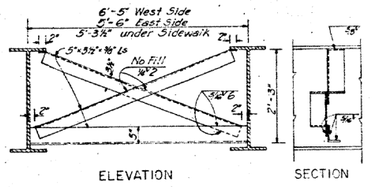
DEAD LOAD DEFLECTION DIAGRAM
(Due to Conc. and Railing only)

CONSTRUCTION PROCEDURE:
After all structural steel is erected and welded, an accurate measurement shall be made of the elevations of the beam flanges at all control points. Subsequent setting of forms, placing and finishing of concrete shall be governed by these measurements only, taking into account the deflections shown in the table at left.



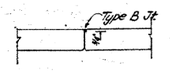
ELEVATION
TYPE A DIAFRAM

SECTION



ELEVATION
TYPE B DIAFRAM

SECTION



CONST. JT. DETAIL

WIDENING DETAILS
50'-0" I-BEAM SPAN
22' ROADWAY, 4' SIDEWALK TO
52' ROADWAY, 5'-4" SIDEWALK
SAN SABA RIVER

Rev. 10-13-61
Rev. 10-11-61

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	Federal			31
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
7	MENARD	35	5	1c	US 83

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

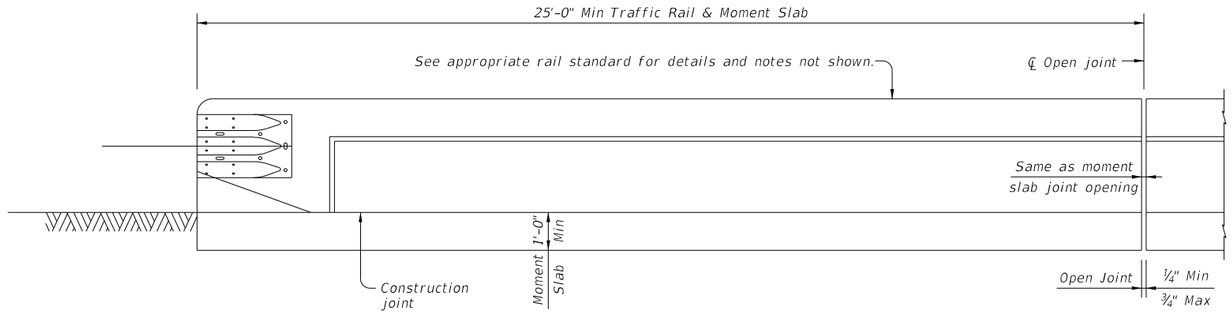
SAN ANGELO DISTRICT BRIDGE REHABILITATION

EXISTING BRIDGE INFORMATION
(STEEL DETAILS - 1962 BRIDGE WIDENING)

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
Designed:	CPY						
Checked:	CPY	6	TEXAS	SEE TITLE SHEET			US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061	77

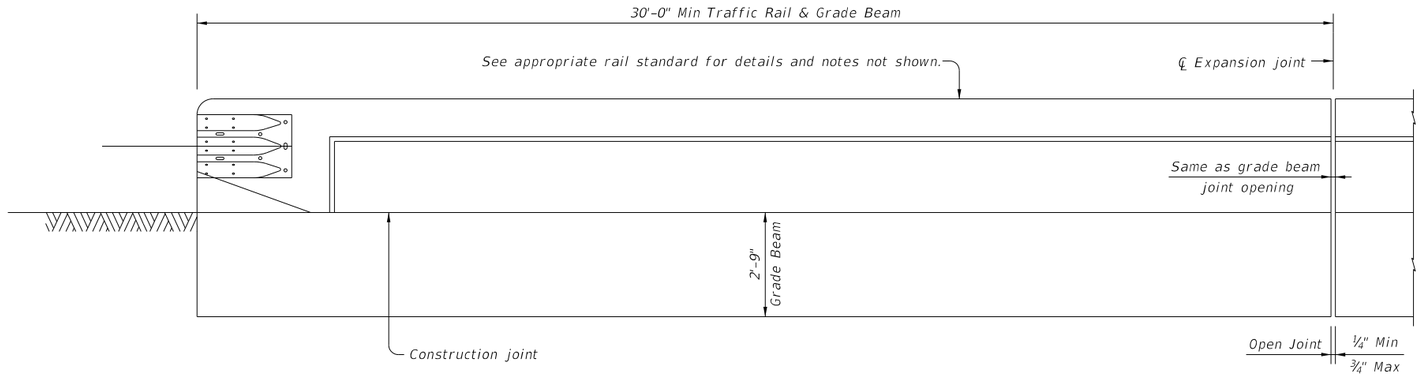
SHEET 5 OF 5

DATE:
FILE:



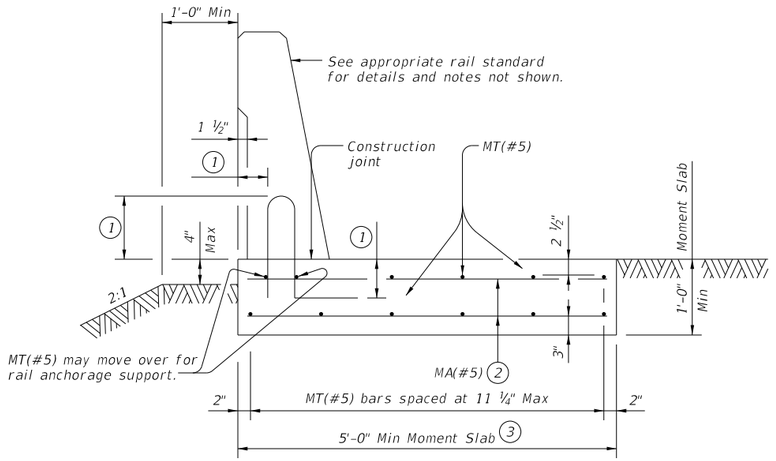
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



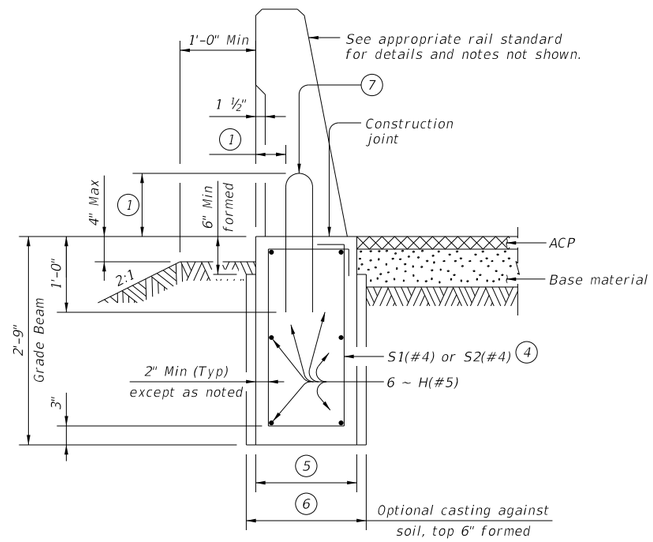
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



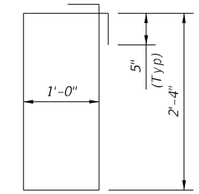
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

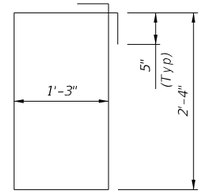
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
   Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
   Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

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 required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

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

Texas Department of Transportation

Bridge Division Standard

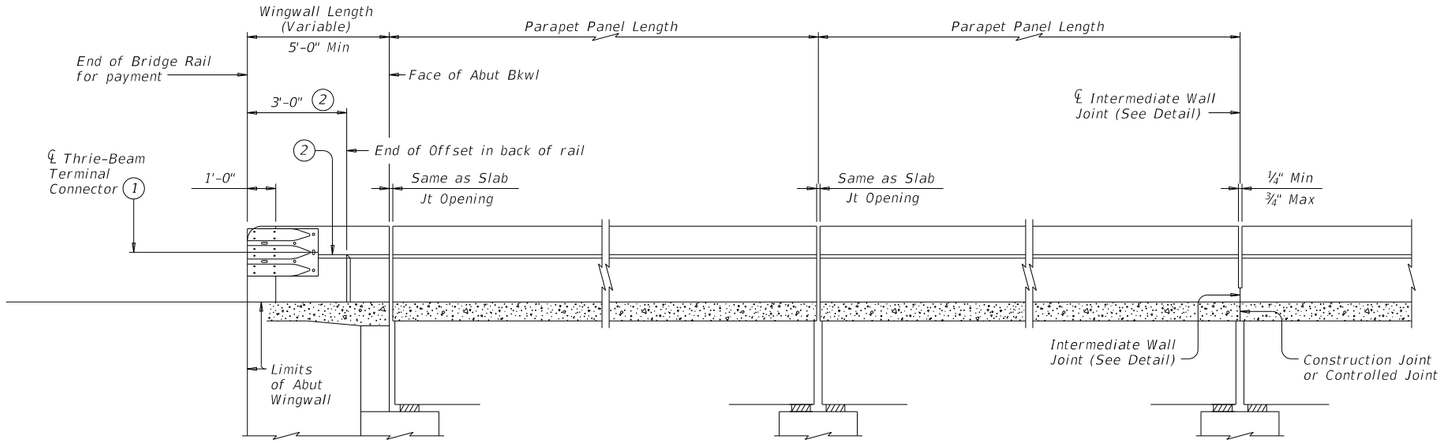
TRAFFIC RAIL FOUNDATIONS

FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

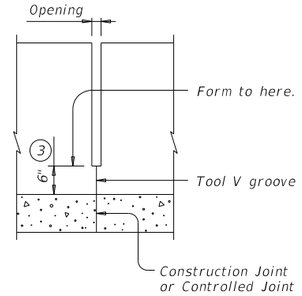
TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 07-20: Added moment slab with rail foundation lengths.	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		78

DATE:
FILE:

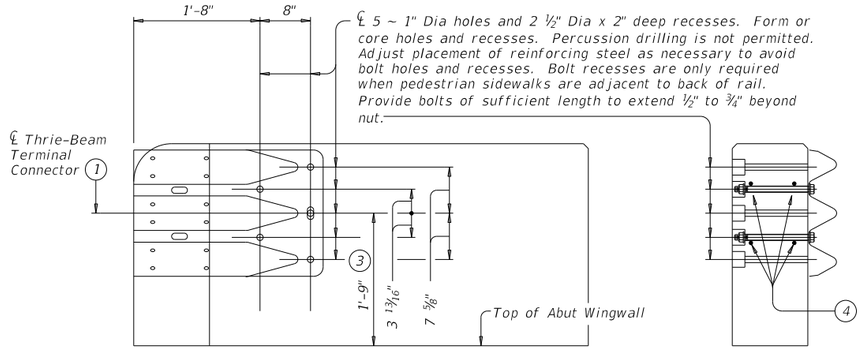


ROADWAY ELEVATION OF RAIL



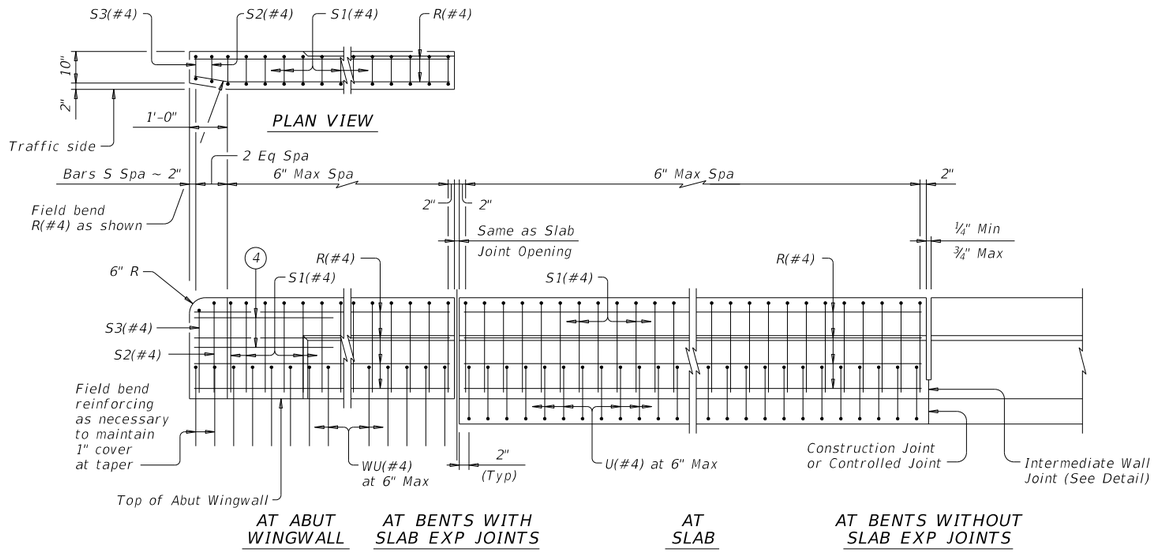
INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

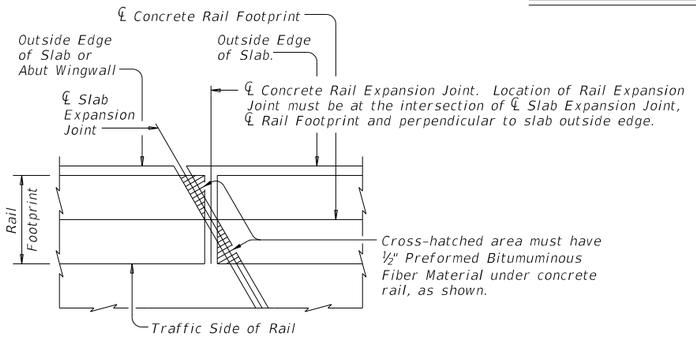


TERMINAL CONNECTION DETAILS

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. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
3. Increase 2" for structures with overlay.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

SHEET 1 OF 2

Texas Department of Transportation

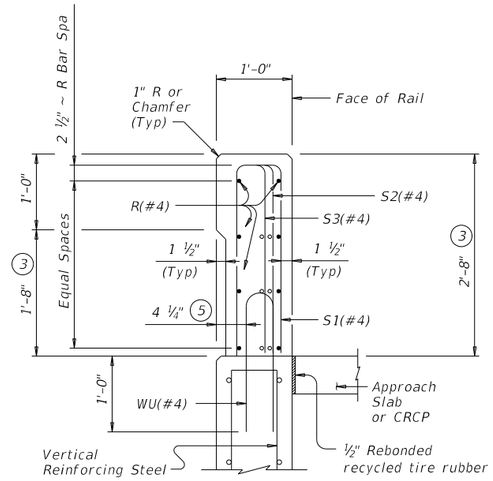
Bridge Division Standard

TRAFFIC RAIL

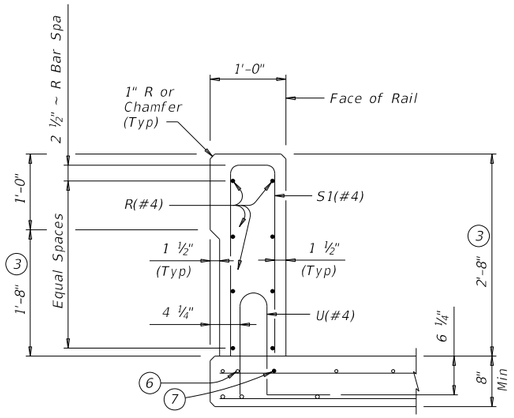
TYPE T221

FILE: rlstd004-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		79

DATE:
FILE:



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(3) Increase 2" for structures with overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars will be furnished at the Contractors expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) Bend or cut as required to clear drain slots.

(9) No longitudinal wires may be in top center of cage.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Chamfer all exposed concrete 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 Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested 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.

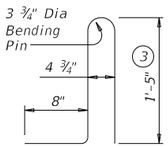
Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

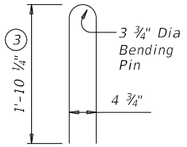
Shop drawings are not required for this rail.

Average weight of railing with no overlay is 370 plf.

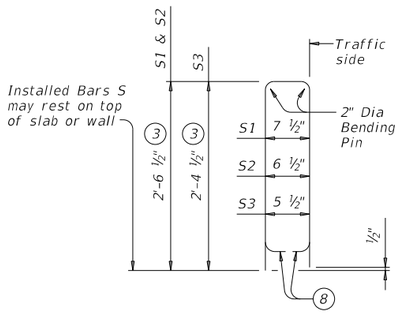
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



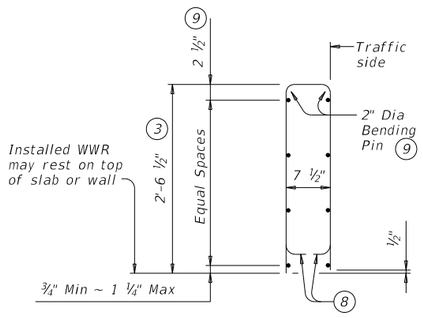
BARS U (#4)



BARS WU (#4)

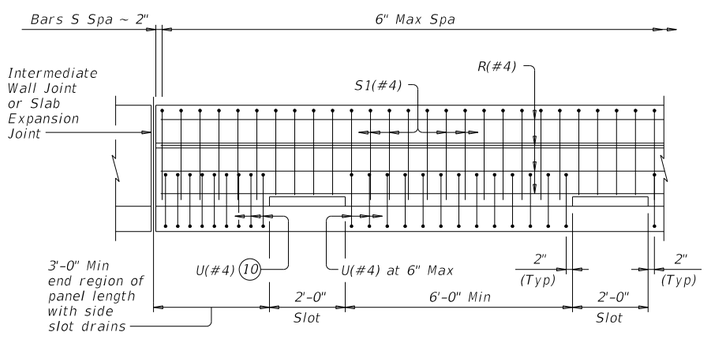


BARS S (#4)



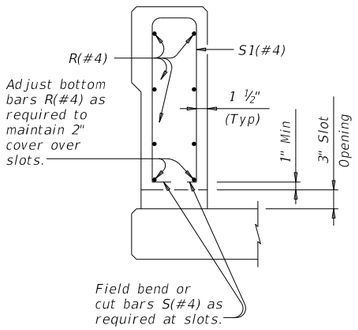
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

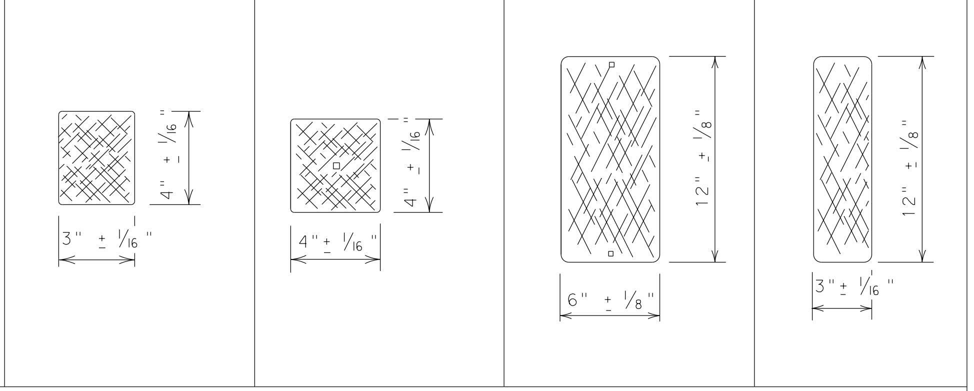
TRAFFIC RAIL

TYPE T221

FILE:	rlstd004-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019		CONT	SECT	JOB	HIGHWAY
REVISIONS		0035	05	061	US 83
		DIST	COUNTY		SHEET NO.
		SJT	MENARD		80

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

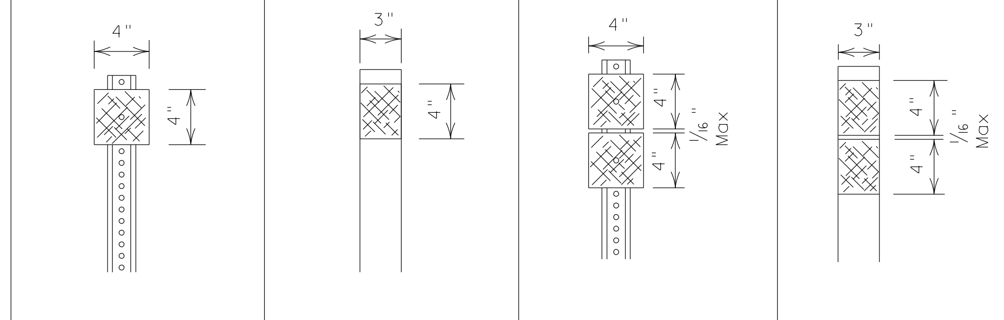


NOTE

1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx).
2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.

DELINEATORS

	SINGLE		DOUBLE	
DEVICE	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF



D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- YFLX = Yellow Flexible Post
- WFLX = White Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
- If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
- 1, 2, 3, or 4

NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker only)

TYPE OF POST
- WC = Wing Channel Post
- WFLX = White Flexible Post
- TWT = Thin Walled Tubing

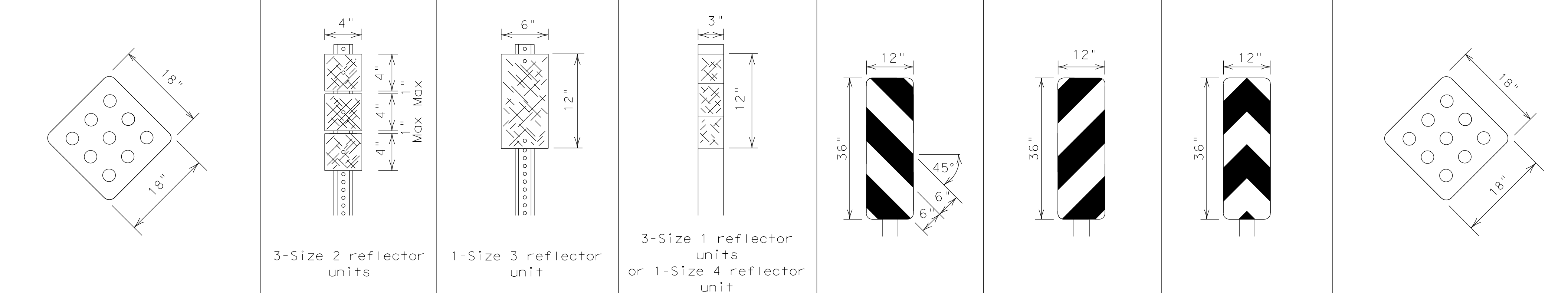
TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

DIRECTION
- If Required
- BI = Bi-Directional

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

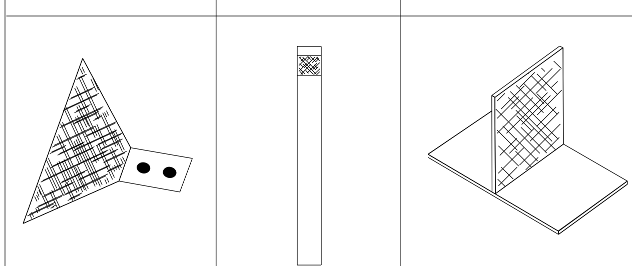
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective 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



BARRIER REFLECTORS (BRF)

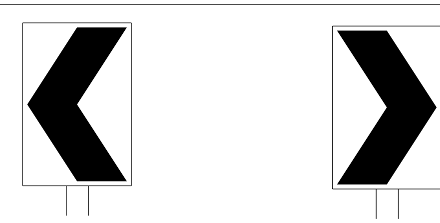
	GF1	GF2	CTB
DEVICE			
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		



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.

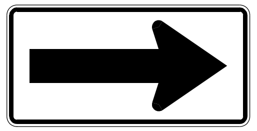
CHEVRONS

DEVICE	W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	



ONE DIRECTION LARGE ARROW

DEVICE	W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
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).

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.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: doml-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
10-09 3-15	DIST		COUNTY	SHEET NO.
4-10 7-20	SJT		MENARD	81

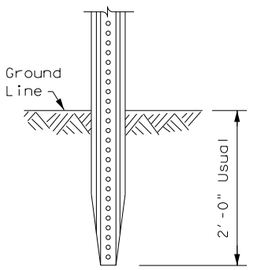
20A

DATE: 5/27/2021 11:20:49 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR17004841\...

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

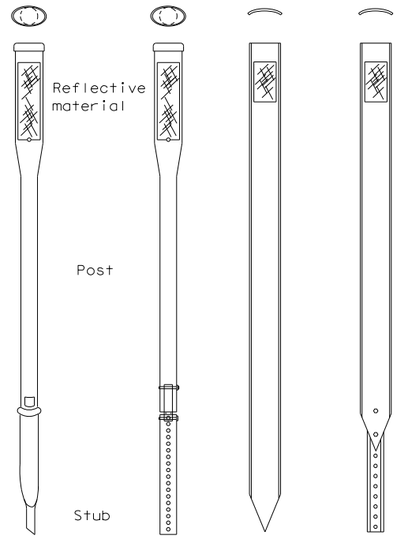


NOTES

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.

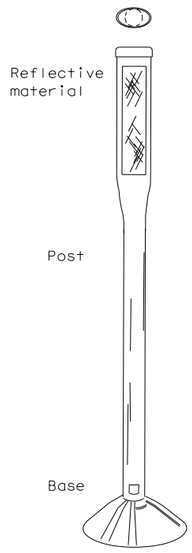
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



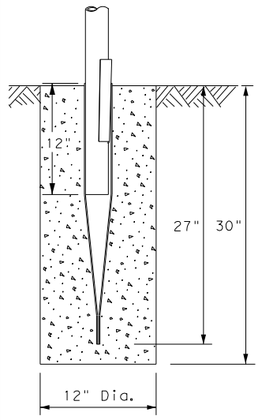
SURFACE MOUNT

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.

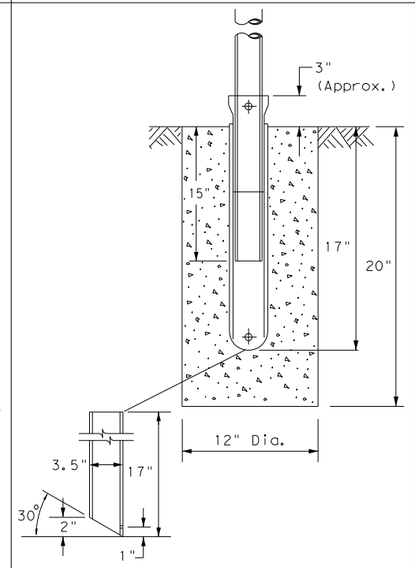
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

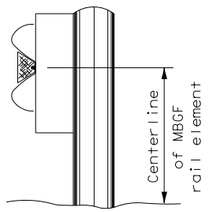
NOTE

1. Install per manufacturer's recommendations.

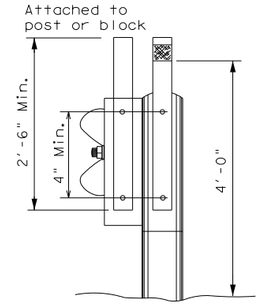
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

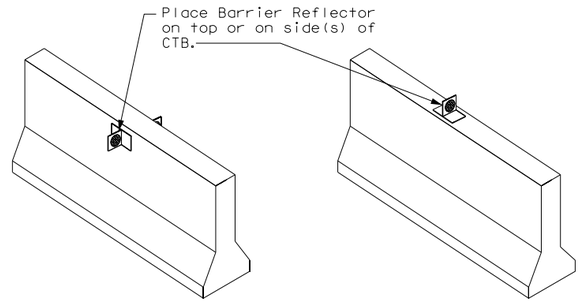
GF1



GF2



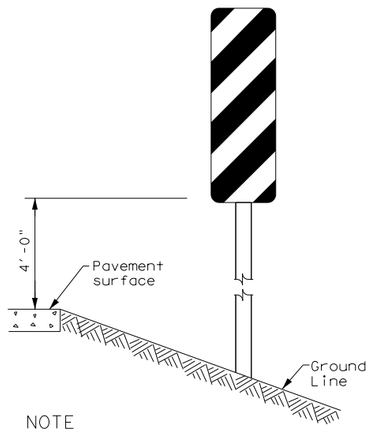
CONCRETE TRAFFIC BARRIER (CTB)



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.

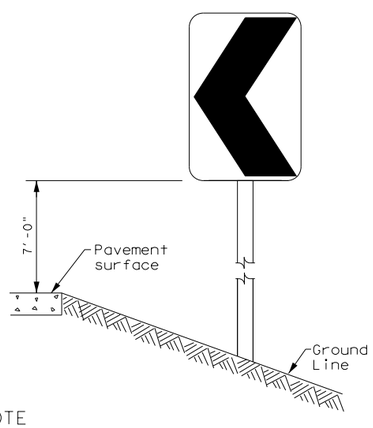
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

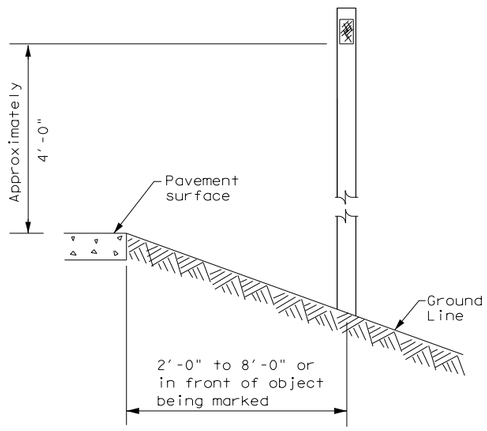
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

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	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SJT	MENARD		82

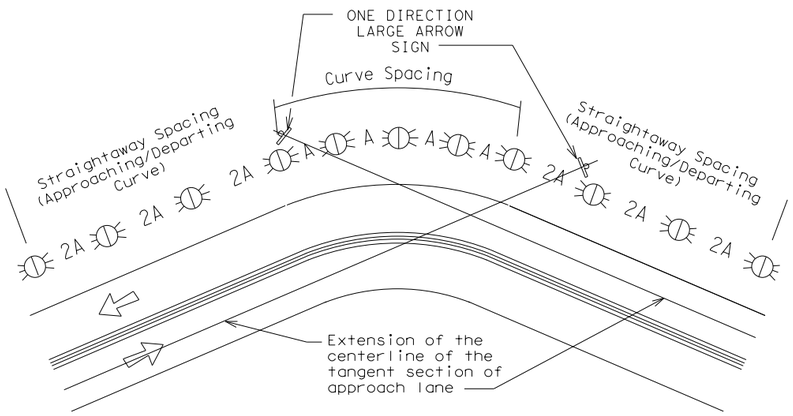
20B

DATE:
FILE:

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

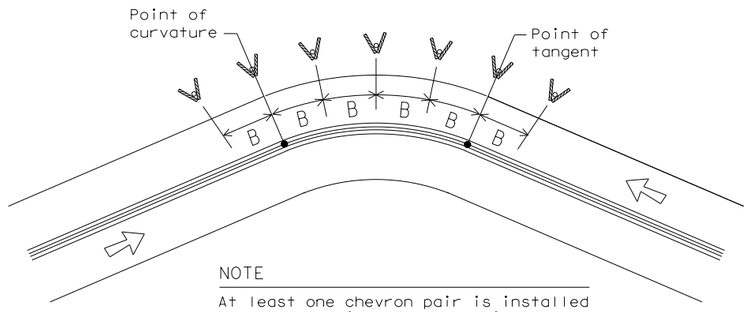
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

1. 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.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

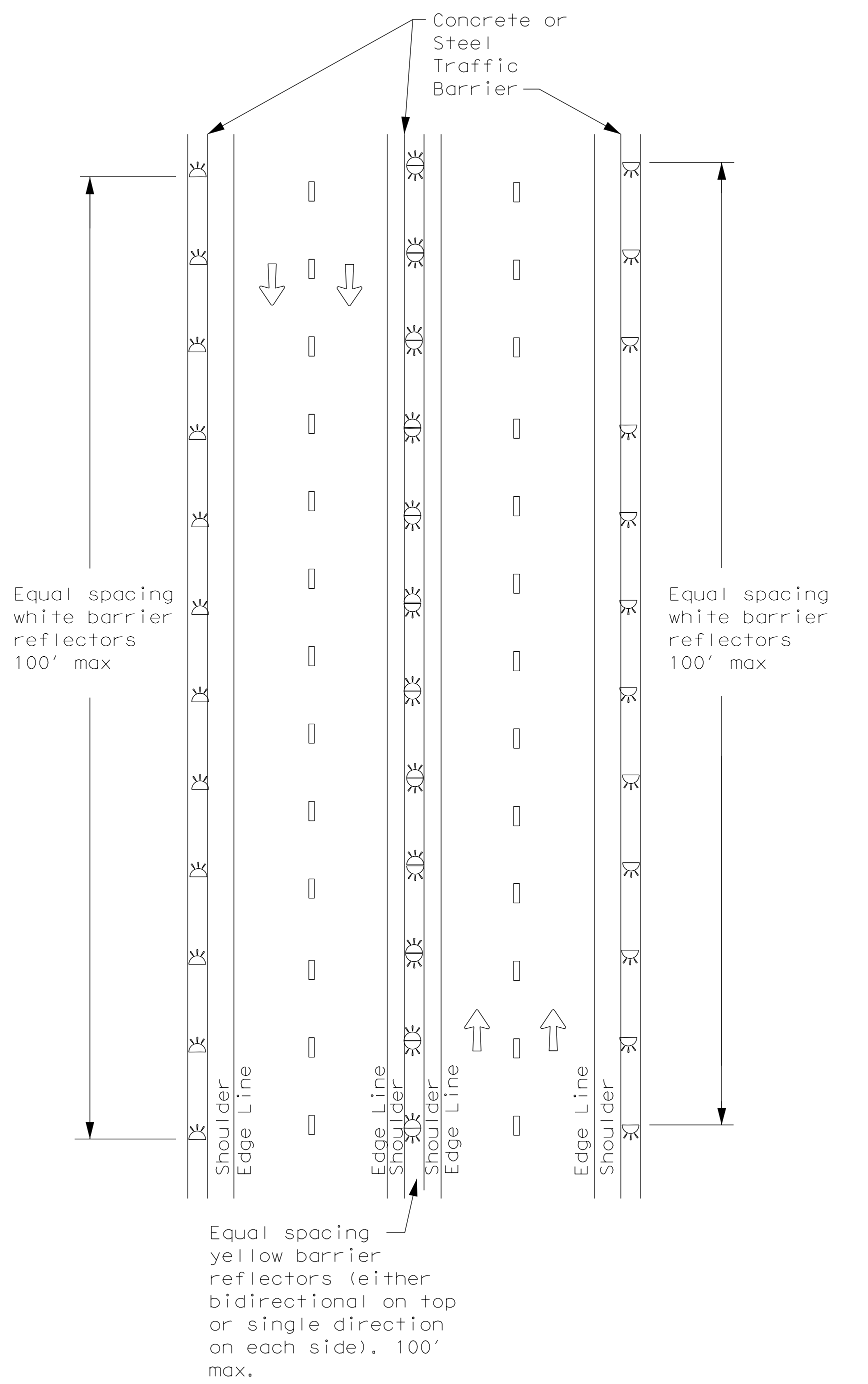
FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	SJT	MENARD		83

DATE:
FILE:

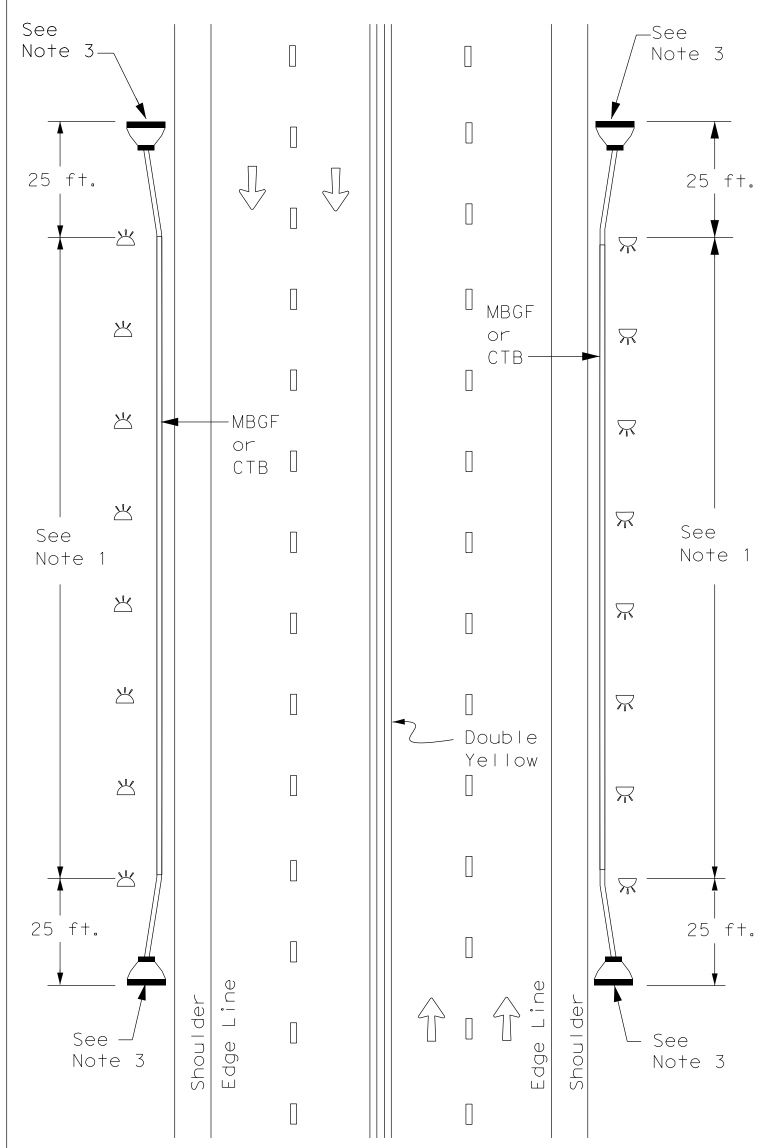
20C

DATE: 5/27/2021 11:21:00 AM
FILE: pw:\\DataPWINT01.cpyone.com:pw_cpy\Documents\Active Projects\TXBR17004

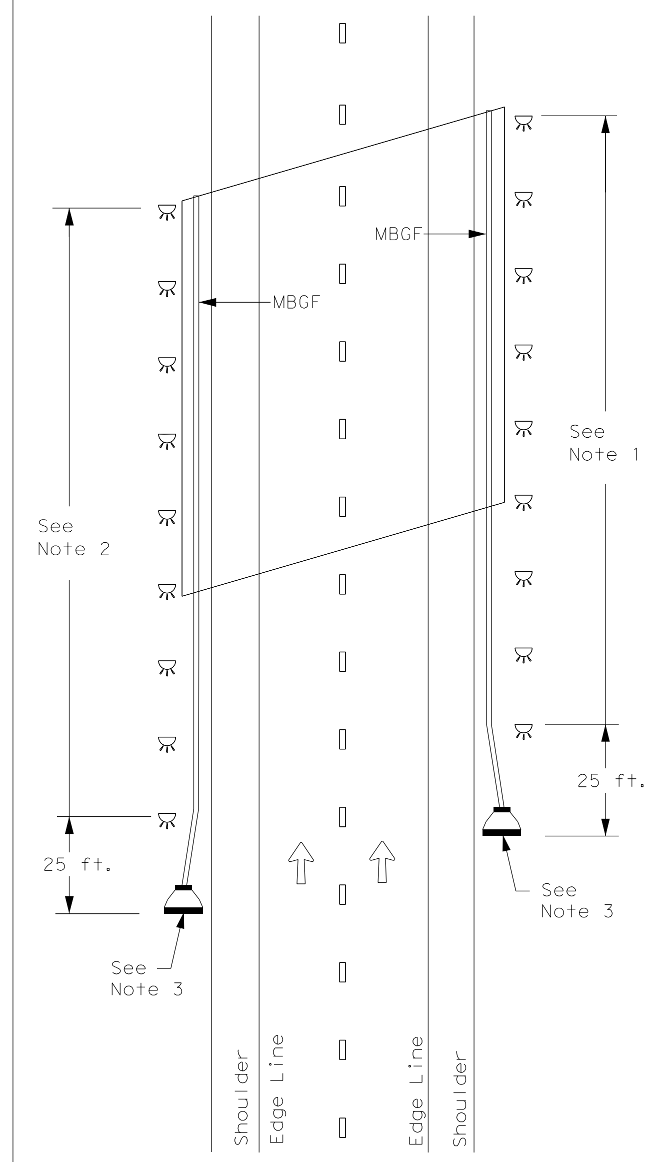
CONTINUOUS CONCRETE OR STEEL BARRIER



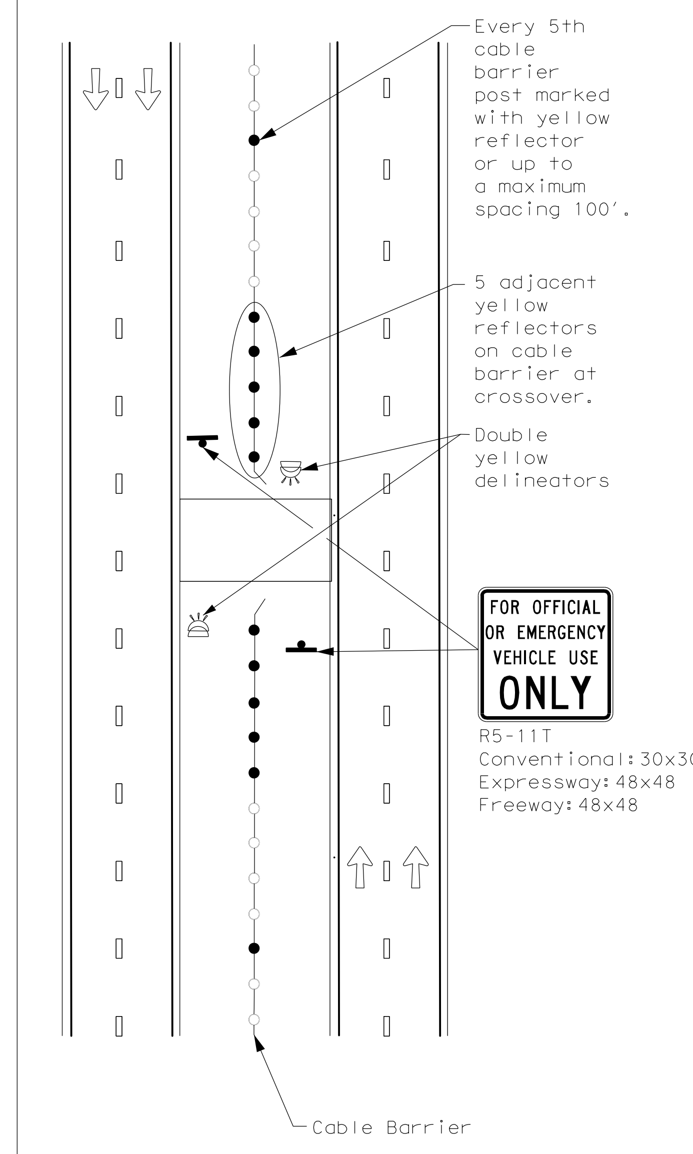
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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 Continuos 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	

Texas Department of Transportation

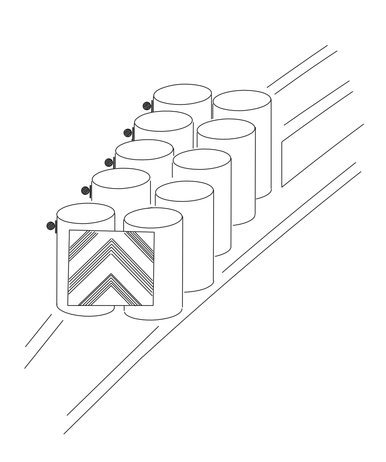
Traffic Safety Division Standard

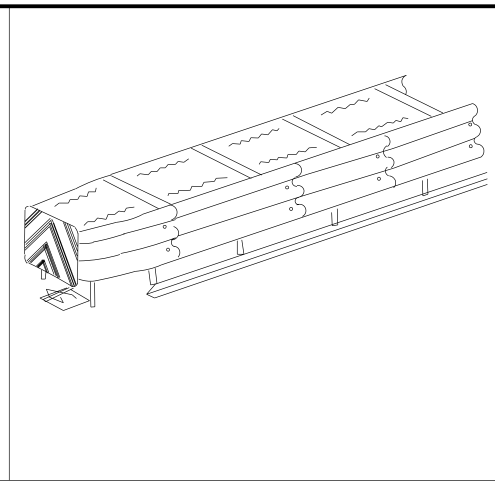
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

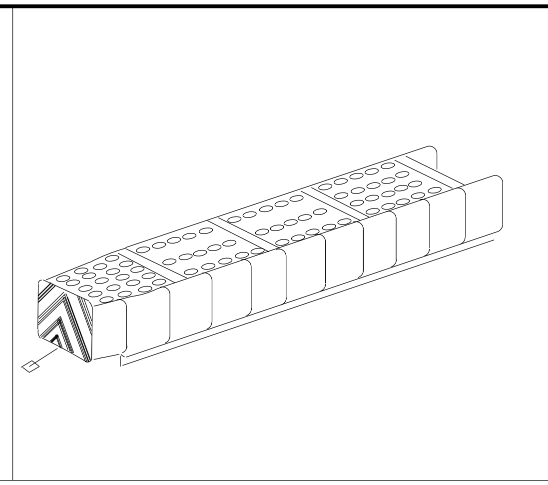
D & OM(6)-20

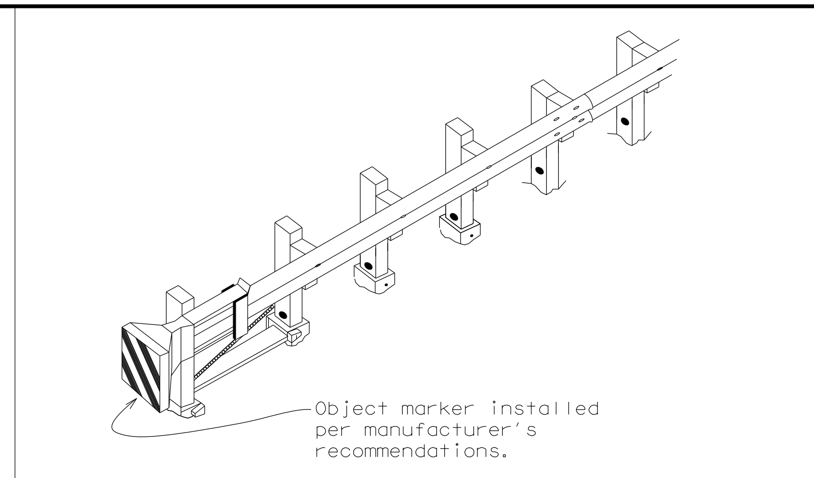
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
7-20	DIST		COUNTY	SHEET NO.
	SJT		MENARD	84

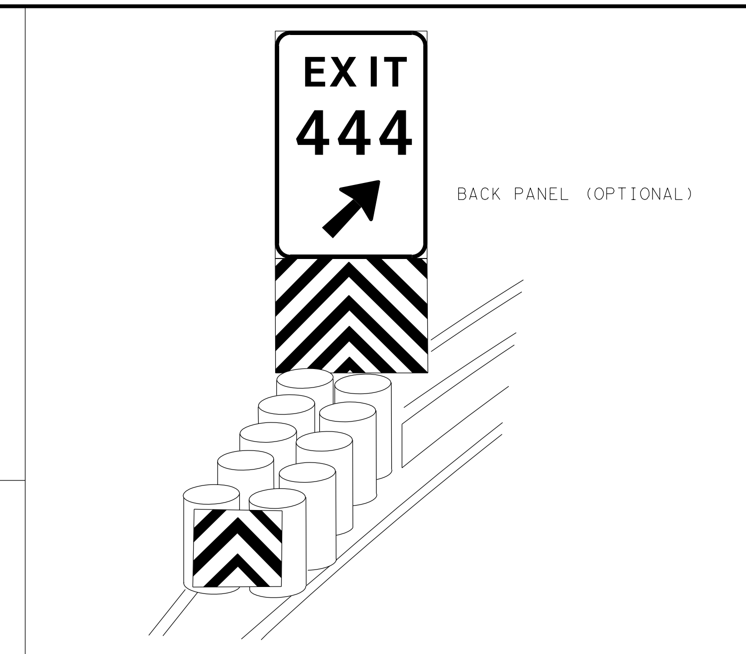
20F

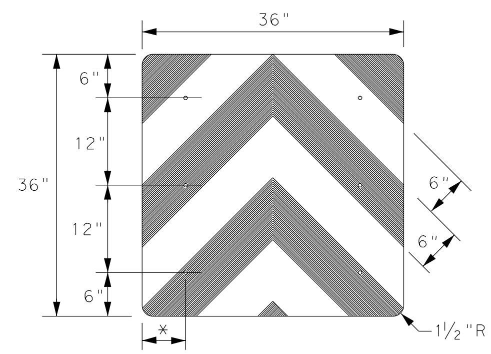


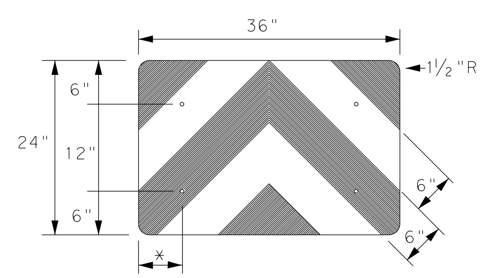




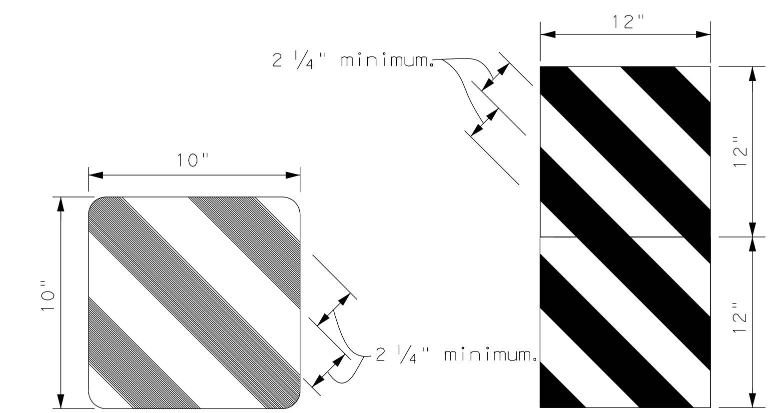




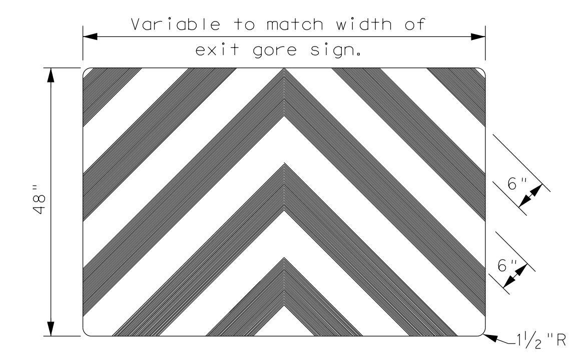


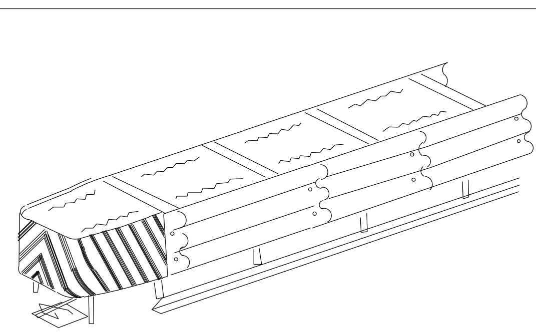


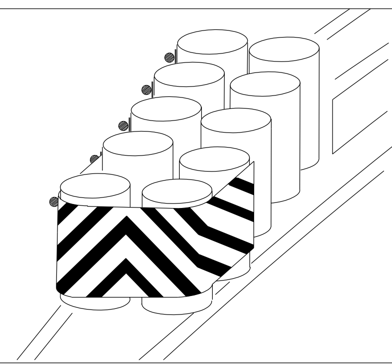
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

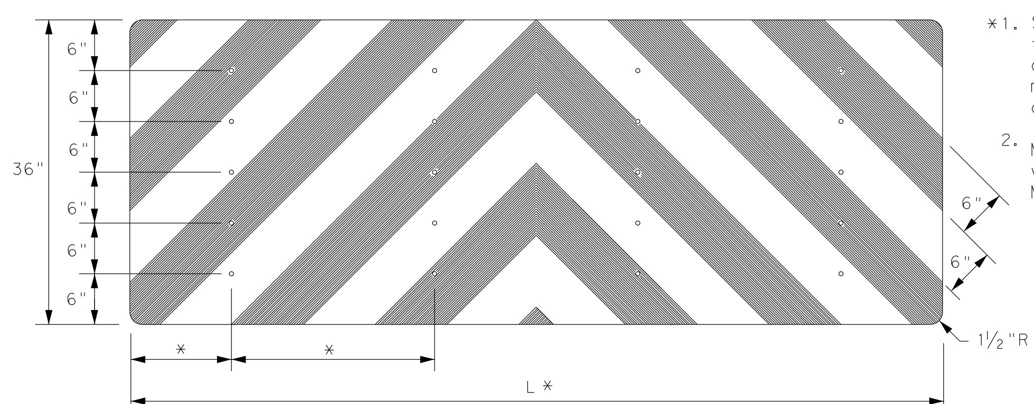


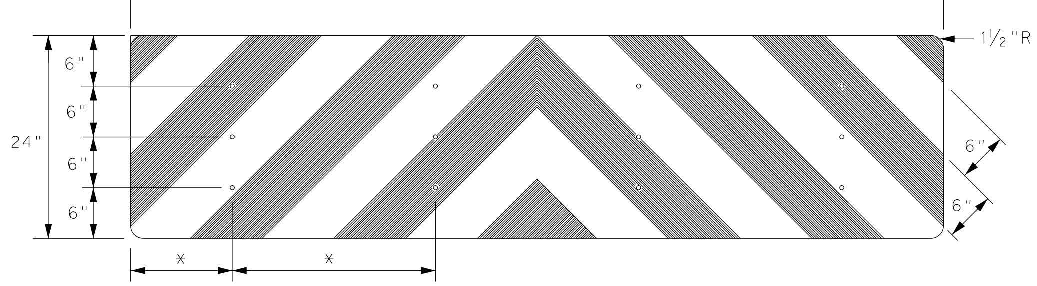
OBJECT MARKERS SMALLER THAN 3 FT^2











NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

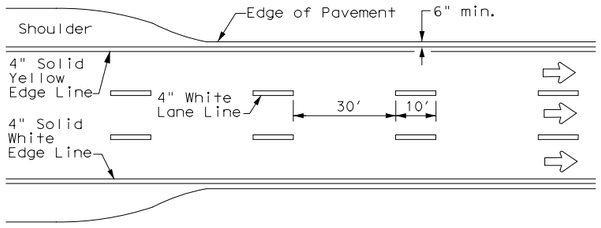
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

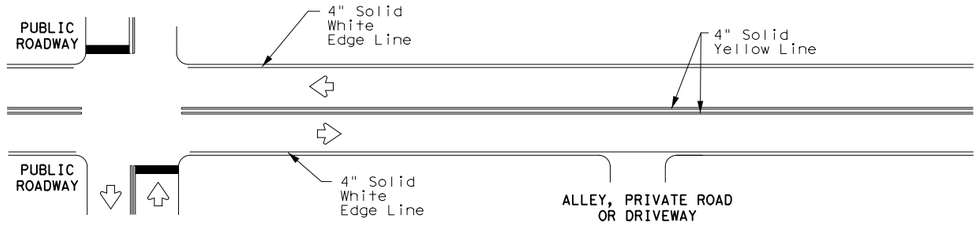
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0035	05	061	US 83
4-92 8-04 / 8-95 3-15 / 4-98 7-20	DIST		COUNTY	SHEET NO.
	SJT		MENARD	85

20G

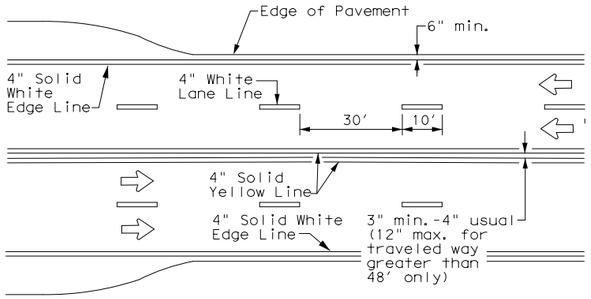
DATE:
FILE:



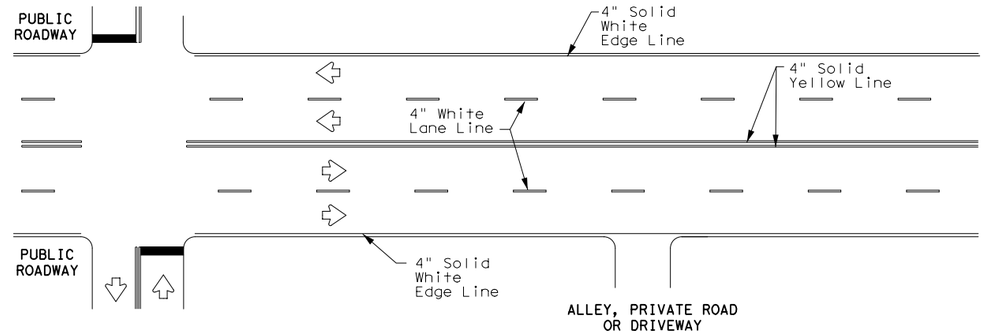
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



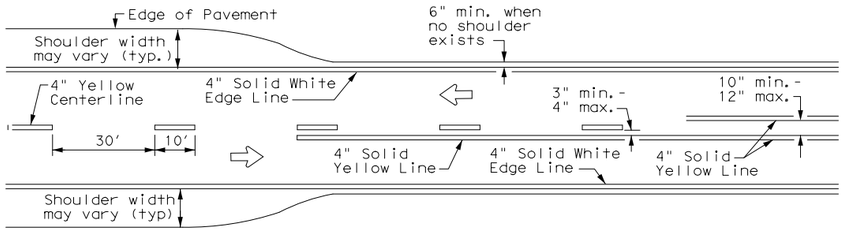
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



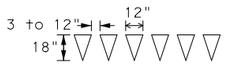
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



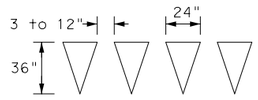
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

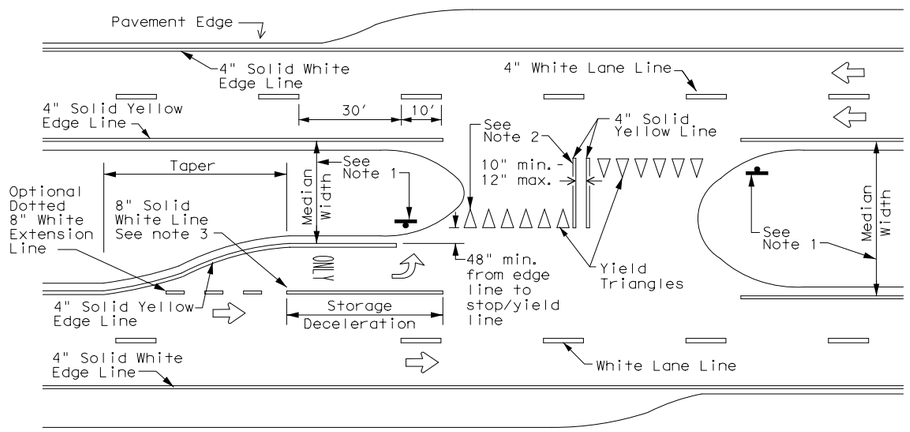


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. 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 are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

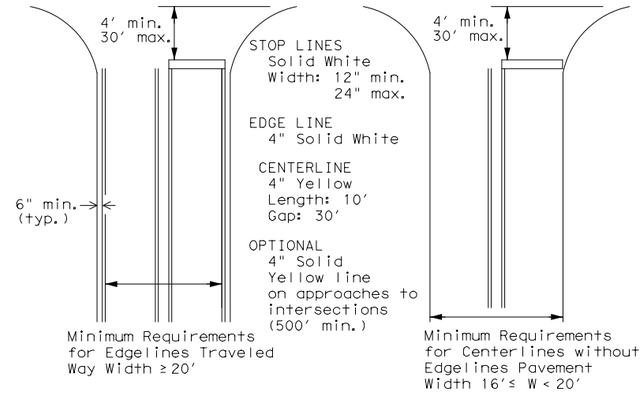
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. 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 inside of edgeline to the inside of edgeline 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.



GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths
for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

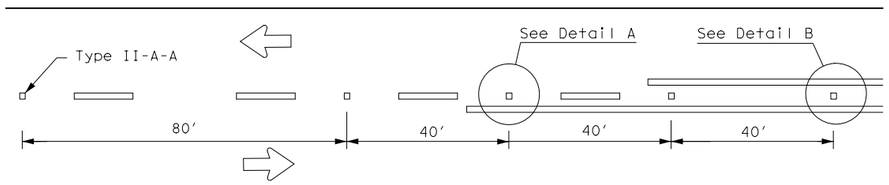
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

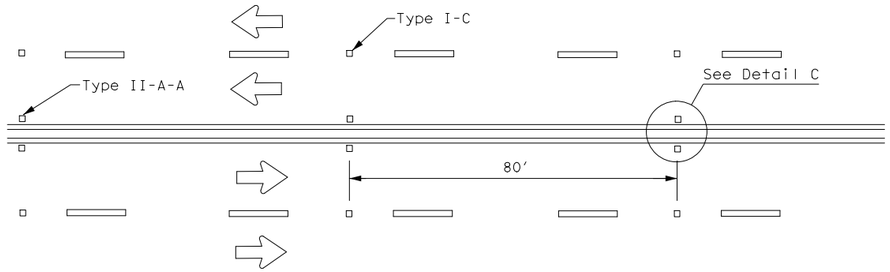
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0035	05	061	US 83
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SJT	MENARD		86

22B

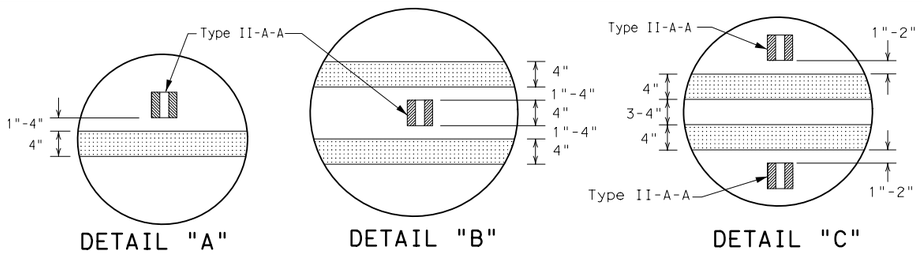
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



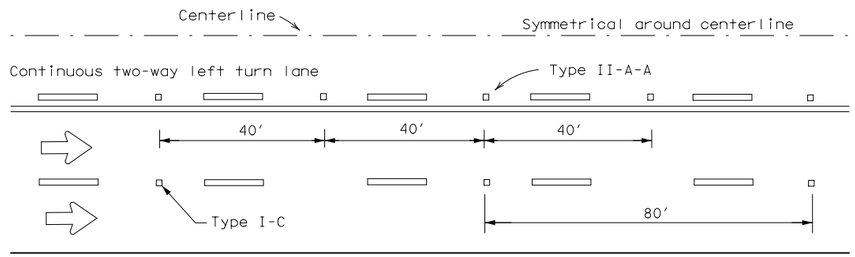
CENTERLINE FOR ALL TWO LANE ROADWAYS



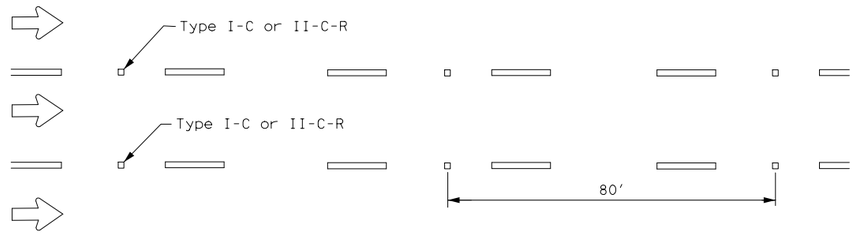
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

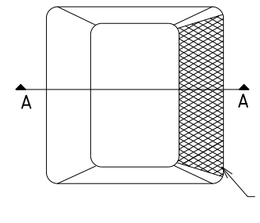


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

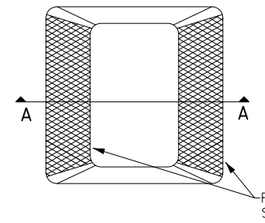
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

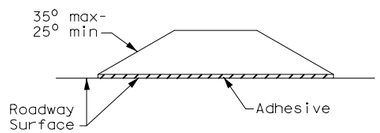
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

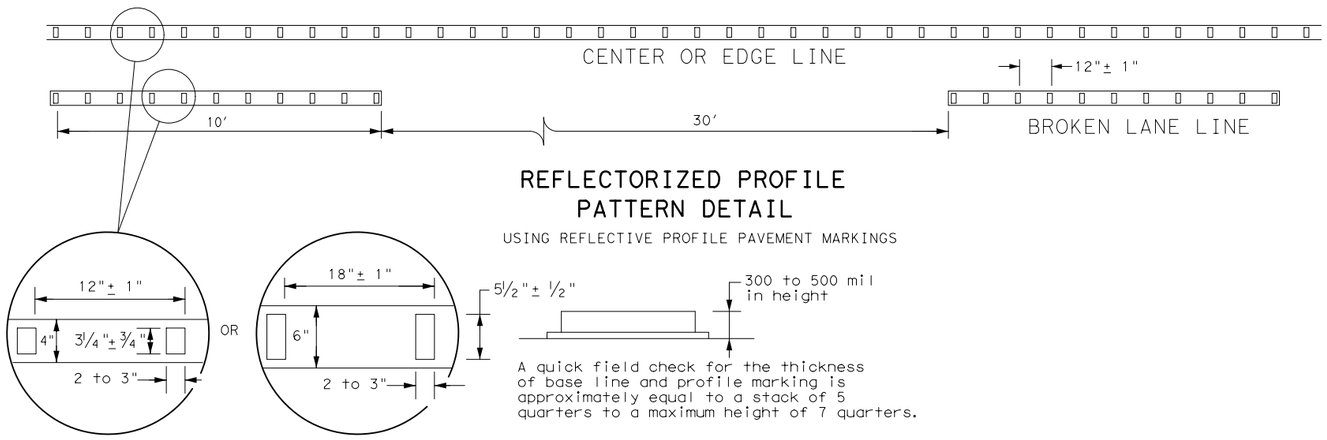


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

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 in 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.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0035	05	061	US 83
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SJT	MENARD		87

22B

DATE:
FILE:

SITE DESCRIPTION

PROJECT LIMITS: VARIES (SEE PLANS FOR INDIVIDUAL SITE LIMITS.

PROJECT DESCRIPTION: BRIDGE REHABILITATION, ROADWAY TIE-IN CONSTRUCTION, MBGF INSTALLATION, TRAFFIC RAIL AND ATTENUATOR INSTALLATION.

MAJOR SOIL DISTURBING ACTIVITIES: EXCAVATION, GRADING, MBGF INSTALLATION, TRAFFIC RAIL INSTALLATION, AND DETOUR CONSTRUCTION.

TOTAL PROJECT AREA: 3.152 ACRES (SEE PLANS FOR SITE LIMITS)

TOTAL AREA TO BE DISTURBED: 0.202 ACRES (SEE GRADING PLANS FOR SITE AREAS)

WEIGHTED RUNOFF COEFFICIENT
(BEFORE CONSTRUCTION):
(AFTER CONSTRUCTION):

EXPLANATION OF THE TECHNICAL BASIS USED TO SELECT THE PRACTICES TO CONTROL POLLUTION WHERE FLOWS EXCEED PRE-DEVELOPMENT LEVELS
N/A

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
IN-SITU SOILS ARE IN GOOD CONDITION AND 80% COVER OF EXISTING VEGITATION

NAME OF RECEIVING WATERS: SAN SABA RIVER

FILENAME 96SW3P.dgn

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [X] SOIL RETENTION BLANKET
- [ ] BUFFER ZONES
- [ ] PRESERVATION OF NATURAL RESOURCES

OTHER:

STRUCTURAL PRACTICES:

Permanent	Temporary	
	X	SILT FENCES
		HAY BALES
		ROCK BERMS
		DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
		DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
		DIVERSION DIKE AND SWALE COMBINATIONS
		PIPE SLOPE DRAINS
		PAVED FLUMES
		ROCK BEDDING AT CONSTRUCTION EXIT
		TIMBER MATTING AT CONSTRUCTION EXIT
		CHANNEL LINERS
		SEDIMENT TRAPS
		SEDIMENT BASINS
		STORM INLET SEDIMENT TRAP
		STONE OUTLET STRUCTURES
		CURBS AND GUTTERS
		STORM SEWERS
		VELOCITY CONTROL DEVICES

OTHER: EROSION CONTROL LOGS

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

SW3P AND EROSION CONTROL DEVICES WILL BE PLACED AS INDICATED ON THE PLANS OR AT THE DISCRETION OF THE ENGINEER PRIOR TO IMPLEMENTATION OF THE TRAFFIC CONTROL PLANS. EROSION CONTROL DEVICES WILL BE REMOVED ONCE STABILIZATION IS ACHIEVED.

STORM WATER MANAGEMENT:

SEE EROSION CONTROL PLAN SHEETS

DESCRIPTION OF ANY MEASURES INSTALLED DURING THE CONSTRUCTION PROCESS TO CONTROL STORM WATER DISCHARGES AFTER CONSTRUCTION OPERATIONS HAVE BEEN COMPLETED:

N/A

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: *All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment.*

INSPECTION: *An inspection will be performed by a TxDOT inspector of the construction site at least once every 7 calendar days regardless of rainfall. An inspection and Maintenance Report will be made per each inspection. Based on the inspection results, the controls shall be revised per the inspection report.*

WASTE MATERIALS: *All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will meet all state and local city solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulation, and the trash will be hauled to a permitted landfill. No construction waste material will be buried on site.*

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): *At a minimum, any products in the following catagories are considered to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt products, Chemical additives for soil stabilization, or Concrete curing compounds and additives. In the event of a spill which may be hazardous, the TxDOT Area Engineer should be contacted immediately.*

SANITARY WASTE: *All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.*

OFF SITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: *Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed. Stockpiles shall be located no closer than 100ft from the river. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.*

STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED PROFESSIONAL ENGINEER
5/27/2021

SHEET 1 OF 1

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		88
STATE	DIST.	COUNTY	
TEXAS	SJT	MENARD	
CONT.	SECT.	JOB	HIGHWAY NO.
0035	05	061	US 83

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or CGP 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 that may receive discharges from this project. The MS4 Operator may need to be notified prior to construction activities.

1. N/A

☐ NO ACTION REQUIRED ☑ ACTION REQUIRED

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post CSN with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When 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.

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# 3a

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.

Required Actions: List waters of the U.S. that the permit applies to, the location in project, and check BMP's planned to control erosion, sedimentation and post-construction TSS.

1. San Saba River

BEST MANAGEMENT PRACTICES

EROSION

☑ SEEDING OR SODDING
☐ MULCHING
☐ SOIL RETENTION BLANKETS
☑ BIODEGRADABLE EROSION CONTROL LOGS
☐ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
☐ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
☐ TOPSOIL OR COMPOST
☐ FLEXIBLE CHANNEL LINERS
☐ GROUND COVER

SEDIMENTATION

☐ ROCK FILTER DAMS
☑ TEMPORARY SEDIMENT CONTROL FENCES
☐ TRIANGULAR FILTER DIKES
☐ TOPSOIL OR COMPOST
☑ BIODEGRADABLE EROSION CONTROL LOGS
☐ SEDIMENT BASINS
☐ SAND BAG BERMS
☐ STRAW BALE DIKES
☐ BRUSH BERMS
☐ STORM INLET SEDIMENT TRAPS

POST-CONSTRUCTION TSS

☐ VEGETATIVE FILTER STRIPS
☐ RETENTION/IRRIGATION SYSTEMS
☐ EXTENDED DETENTION BASINS
☐ CONSTRUCTED WETLANDS
☐ WET BASINS
☐ TOPSOIL OR COMPOST
☐ BIODEGRADABLE EROSION CONTROL LOGS
☐ VEGETATION LINED DITCHES
☐ SAND FILTER SYSTEMS
☐ GRASSY SWALES

III. CULTURAL RESOURCES

Refer to the 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 ☐ ACTION REQUIRED

1. N/A

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

Adhere to specification requirements of Items 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 ☑ ACTION REQUIRED

1. Only remove woody vegetation between October 1 and March 1.

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

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.

☐ NO ACTION REQUIRED ☑ ACTION REQUIRED

1. The Migratory Bird Treaty Act of 1918 states that it is unlawful to 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 issued in accordance with the Act's policies and regulations. Migration patterns would not be affected by the proposed project. Remove non-active migratory bird nests from structures where work would be performed from September 1 through the end of February. Prevent migratory birds from building nests from March 1 to August 31. In the event that migratory birds are encountered on-site during project construction, avoid adverse impacts on protected birds, active nests, eggs, and/or young.

2. Avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD. If bats are encountered during project activities, contact District Environmental Specialist before continuing work.

3. Project specific locations (PSLs) proposed within ROW should be located in uplands away from aquatic features. Do not install PSLs within 100 feet of river or stream.

4. 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.

ABBREVIATIONS USED

BMP – Best Management Practice
CGP – Construction General Permit
CSN – Construction Site Notice
DSHS – Texas Department of State Health Services
EPA – U.S. Environmental Protection Agency
MS4 – Municipal Separate Stormwater Sewer System
MSDS – Material Safety Data Sheet
NOI – Notice of Intent
NWP – Nationwide Permit
PCN – Pre-Construction Notification
PSL – Project Specific Location
SW3P – Storm Water Pollution Prevention Plan
TCEQ – Texas Commission on Environmental Quality
TPDES – Texas Pollutant Discharge Elimination System
TSS – Total Suspended Solids
USACE – U.S. Army Corps of Engineers

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 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 labeling 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 TxDOT 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 ☐ ACTION REQUIRED

1. N/A

VII. OTHER ENVIRONMENTAL ISSUES

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

☑ NO ACTION REQUIRED ☐ ACTION REQUIRED

1. N/A

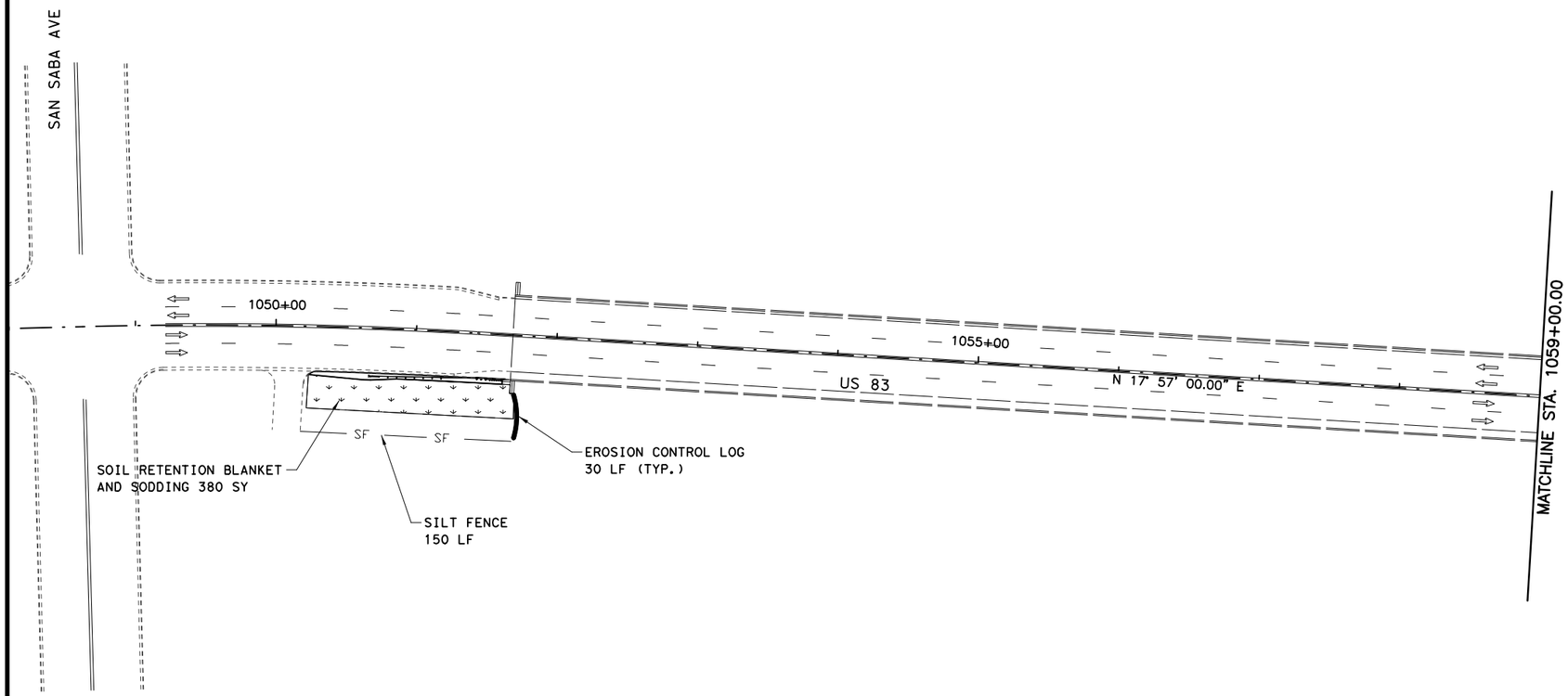
STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

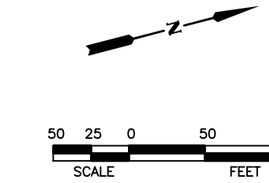
Texas Department of Transportation
San Angelo District

ENVIRONMENTAL PERMITS ISSUES AND COMMITMENTS

SHEET 1 OF 1 NOT TO SCALE

SHEET ISSUED OR LAST REVISED	CONT	SECT	JOB	HIGHWAY
11-19	0035	05	061	US 83
	DIST	COUNTY		SHEET NO.
	SJT	MENARD		89



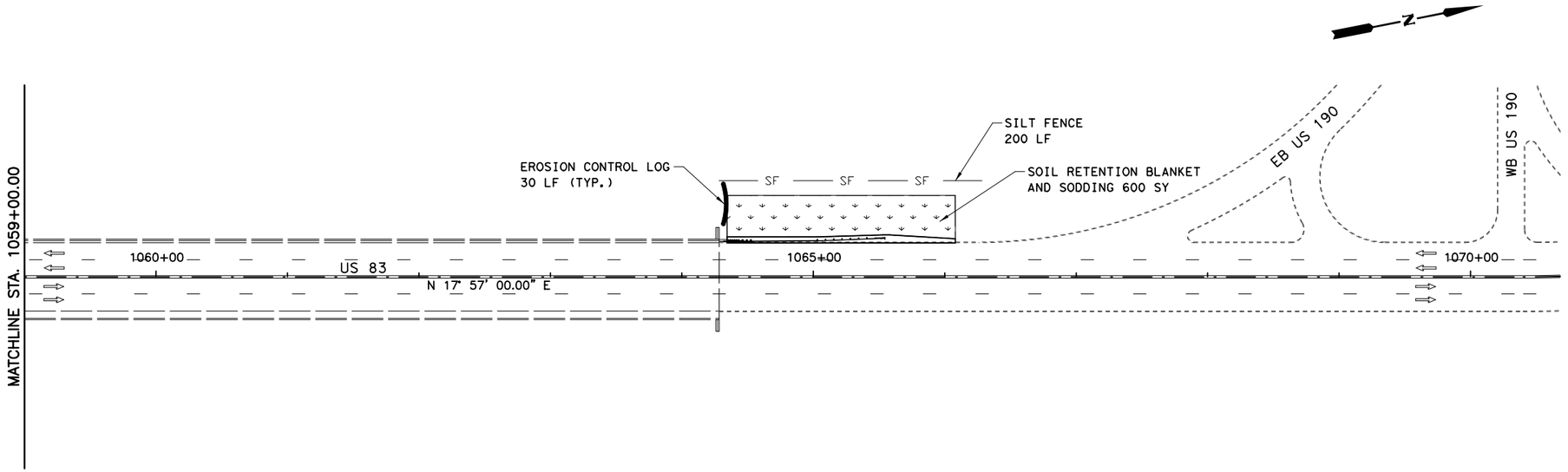


SW3P LEGEND

SOIL RET. BLANKET AND SODDING –

EROSION CONTROL LOG –

SILT FENCE – SF –



STATE OF TEXAS
MICHAEL J. KNAPIK
94563
LICENSED
PROFESSIONAL ENGINEER
5/27/2021

NO.	REVISION	BY	DATE

CP&Y
TEXAS REGISTERED ENGINEERING FIRM F-1741

SAN ANGELO DISTRICT BRIDGE REHABILITATION

EROSION CONTROL PLAN

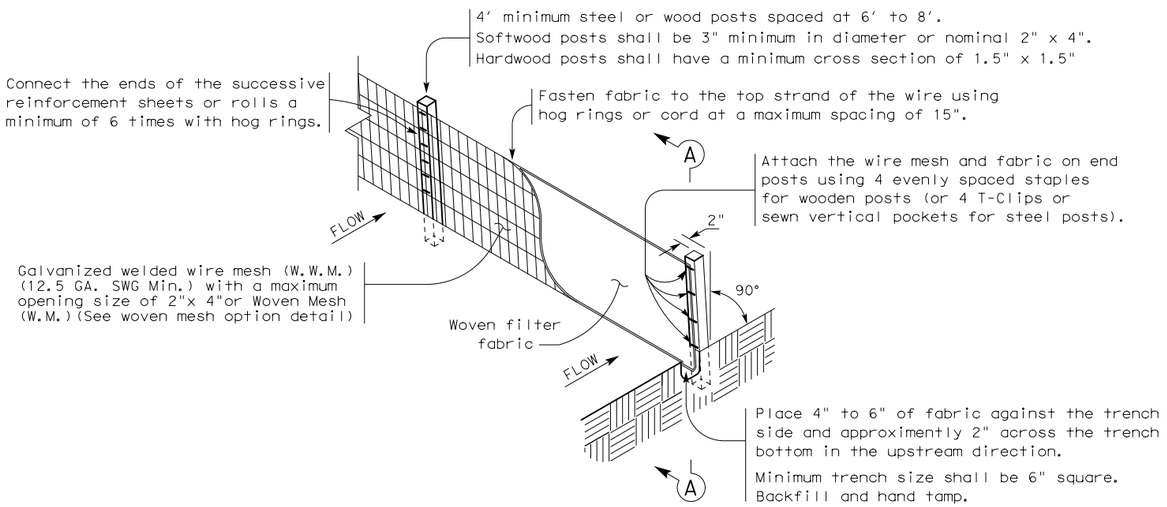
BEGIN PROJECT TO END PROJECT

Designed:	CPY	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
Checked:	CPY	6	TEXAS	SEE TITLE SHEET				US 83
Drawn:	CPY	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
Checked:	CPY	SJT	MENARD	0035	05	061		90

SHEET 1 OF 1

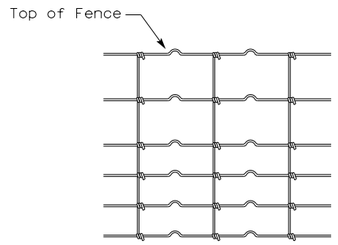
cpybw_ANSIB.tbl
cpypf_ANSIB.pltcfg
pw:/

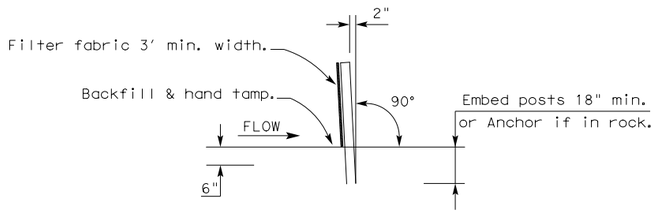
5/27/2021 11:22:09 AM mknapik
pw:/



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

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/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

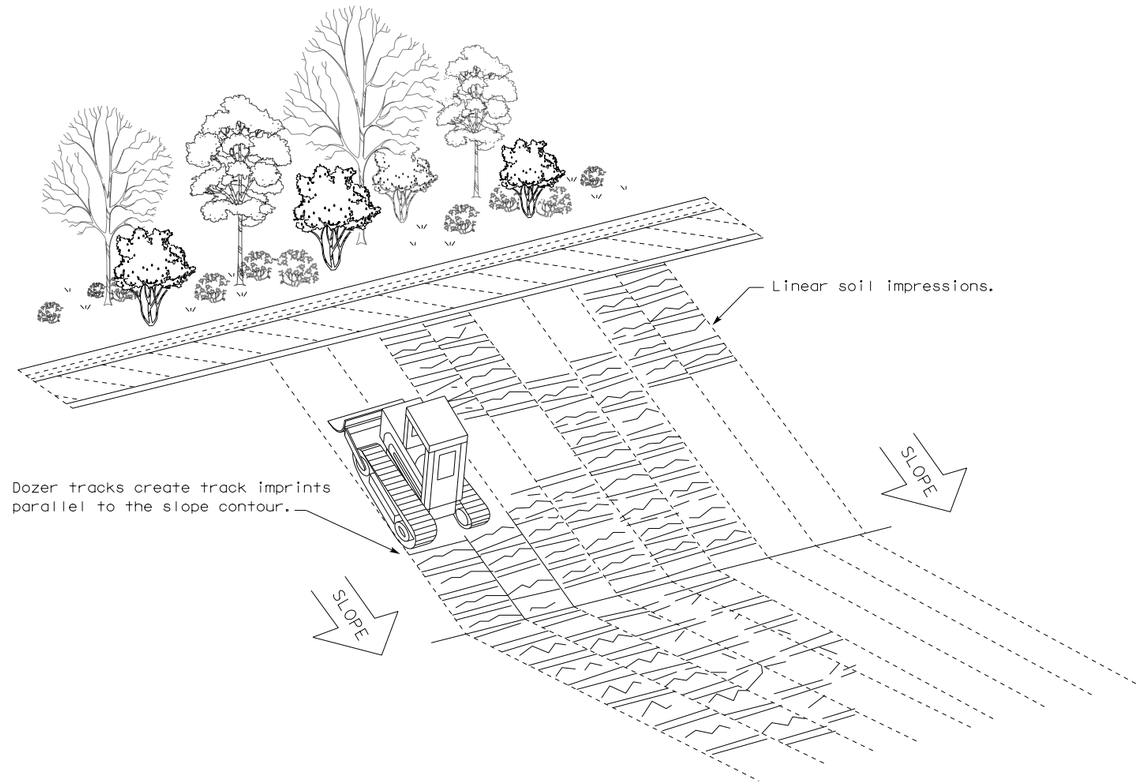
LEGEND

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 continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

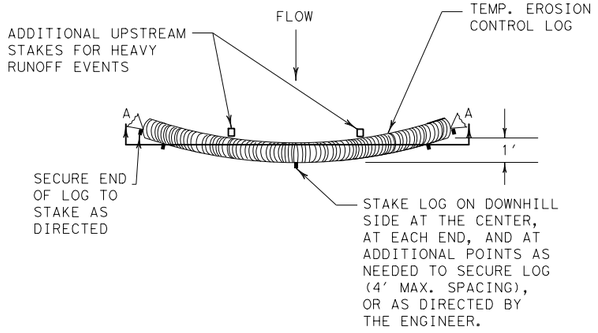
FENCE & VERTICAL TRACKING

EC(1)-16

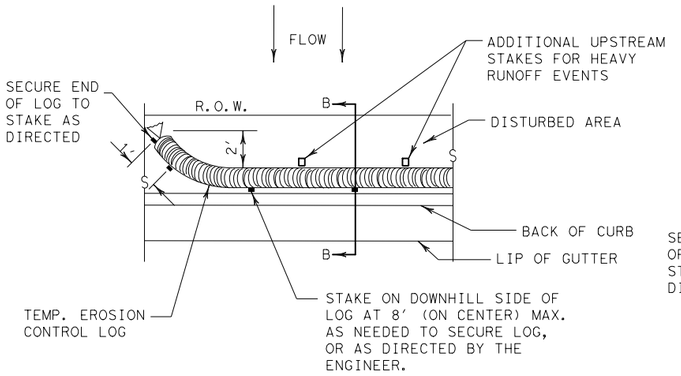
FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0035	05	061		US 83		
	DIST	COUNTY					SHEET NO.
	SJT	MENARD					91

DATE
FILE

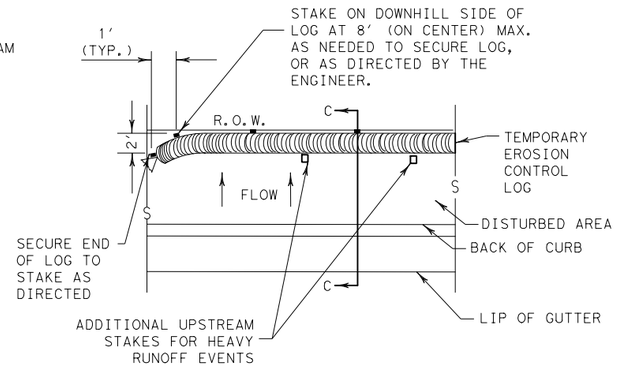
DATE:
FILE:



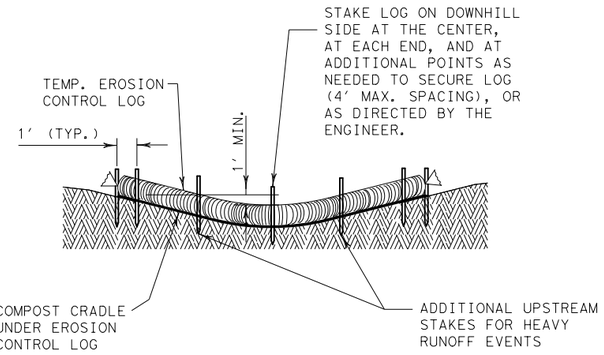
PLAN VIEW



PLAN VIEW



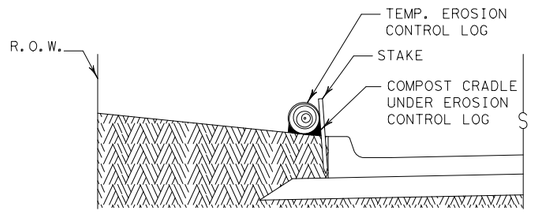
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

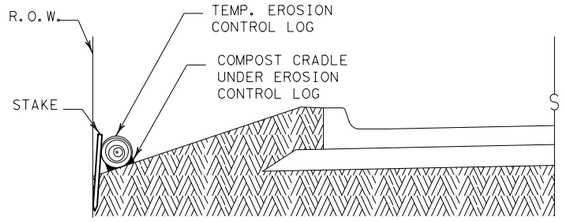
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



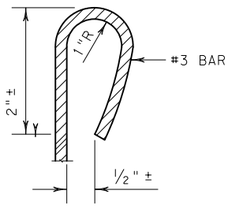
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

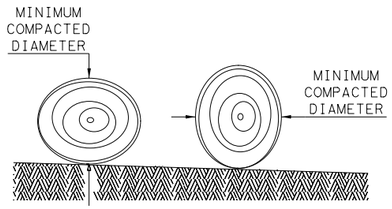
- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

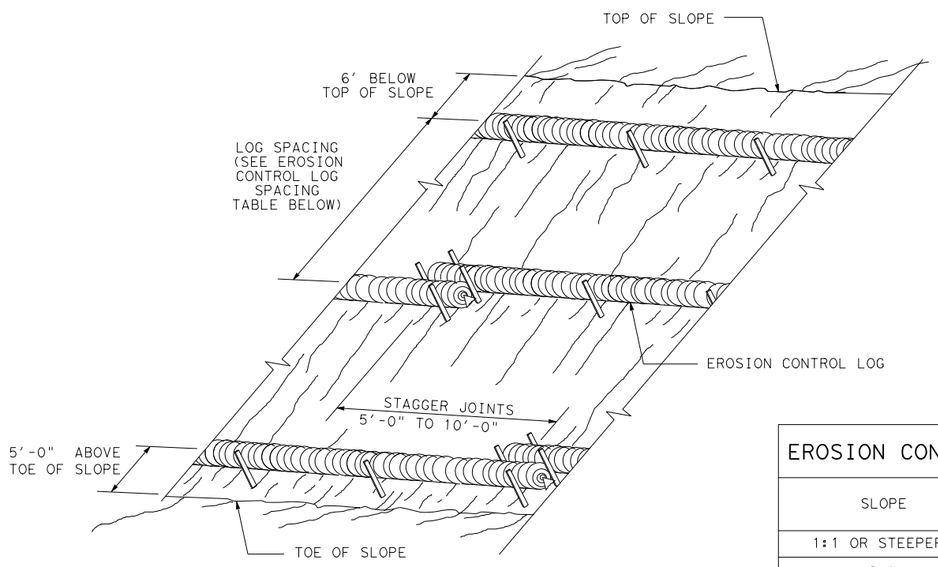
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

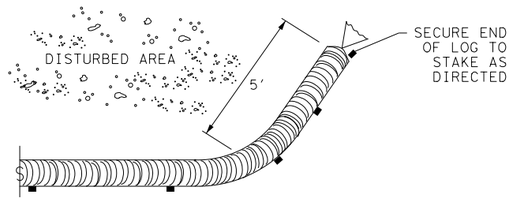
FILE: ec916		DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0035	05	061		US 83	
		DIST		COUNTY			SHEET NO.
		SJT		MENARD			92

DATE:
FILE:



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

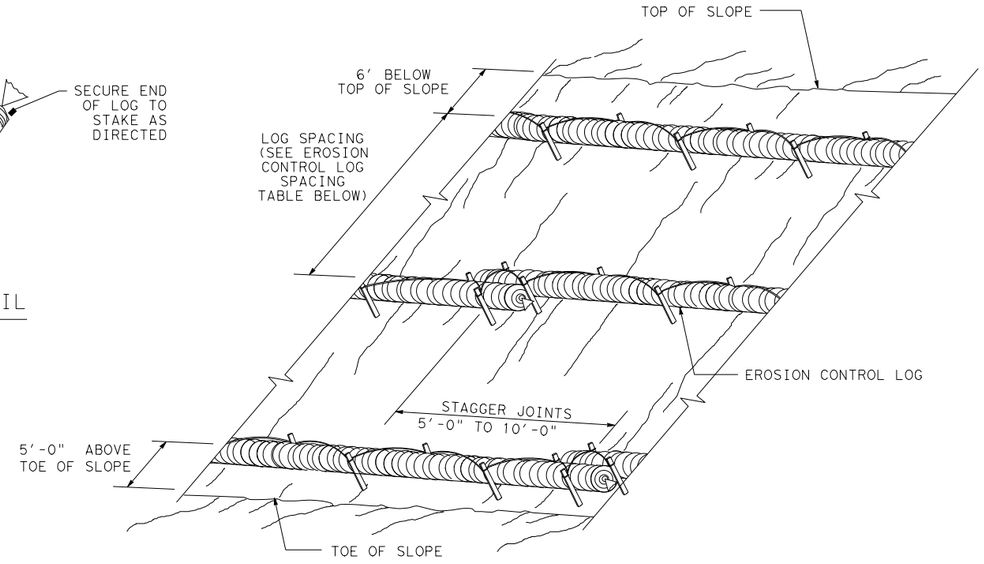
CL-SST



END SECTION RAP DETAIL

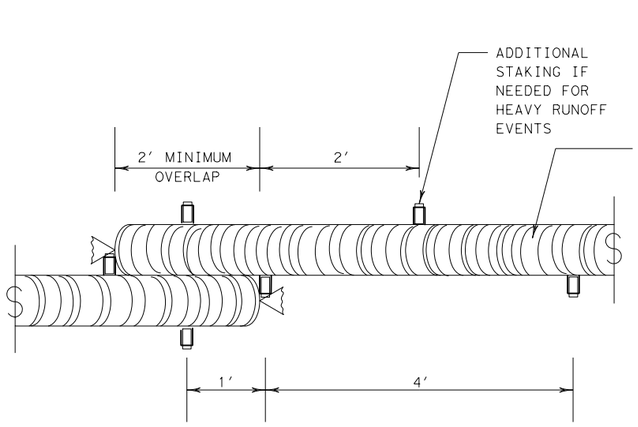
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

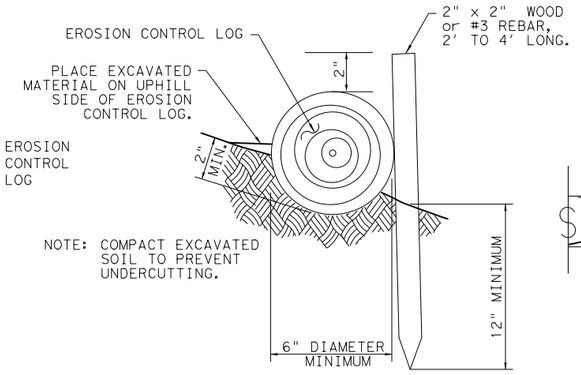
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

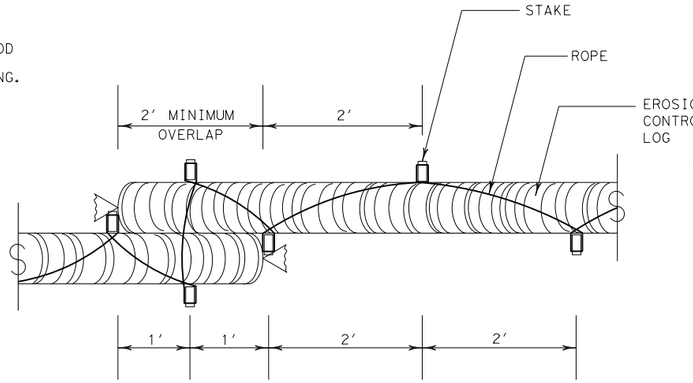


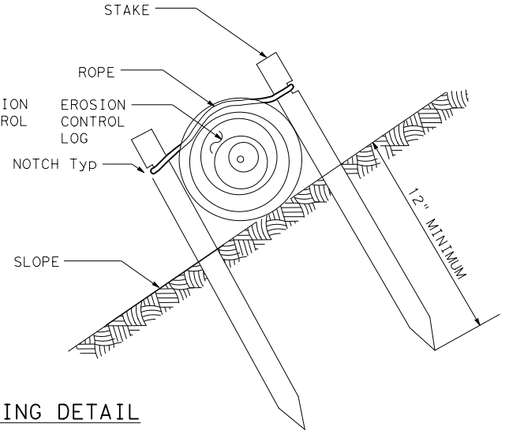


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

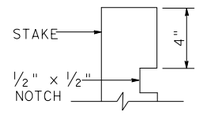
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



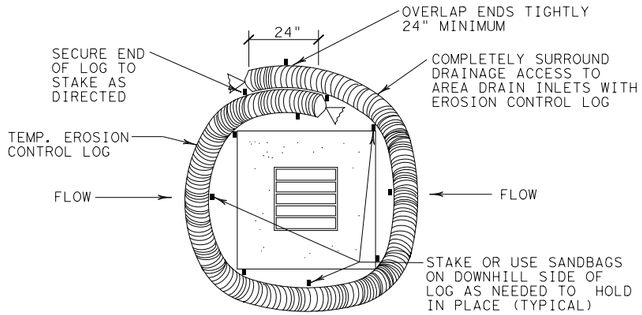
STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

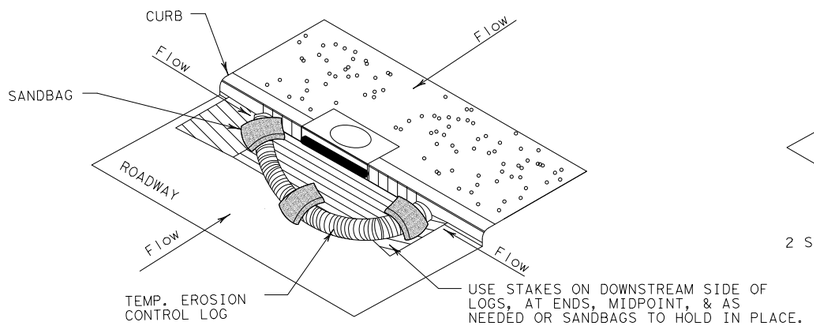
FILE: ec116	DN: TxDOT		CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0035	05	061	US 83	
	DIST	COUNTY		SHEET NO.	
	SJT	MENARD		93	

DATE:
FILE:



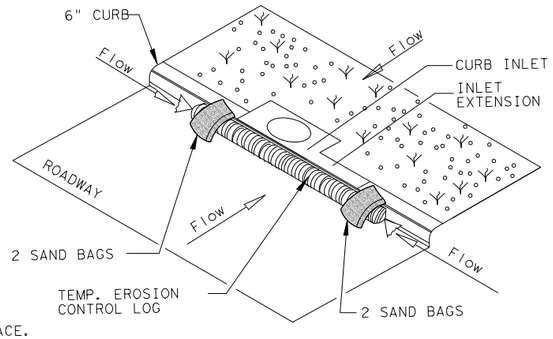
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

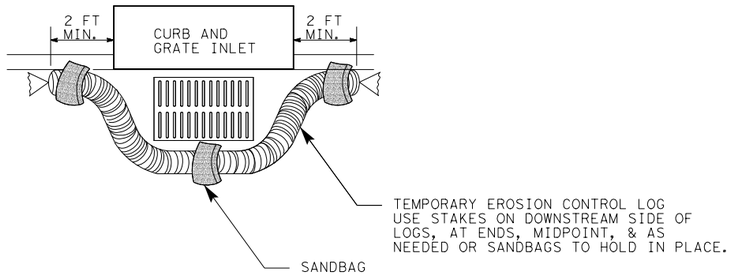
CL-CI



EROSION CONTROL LOG AT CURB INLET

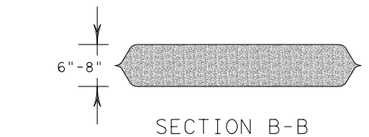
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

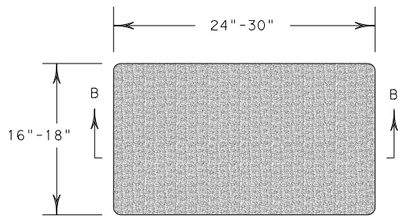


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0035	05	061		US 83		
	DIST	COUNTY				SHEET NO.	
	SJT	MENARD				94	