FEDERAL AID PROJECT NO.			
BPM 6469-87-001			
CONT	SECT	JOB	HIGHWAY
6469	87	001, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	COOKE, ETC.		1

SEE SHEET 2 FOR INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

BPM 6469-87-001

VARIOUS BRIDGES DISTRICTWIDE
GAINESVILLE AREA OFFICE COUNTIES

LIMITS: VARIOUS LOCATIONS

TOTAL LENGTH OF PROJECT =

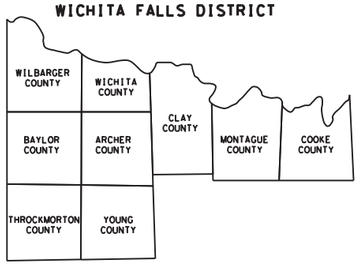
BRIDGE	FT. =	2063.50	MI. =	0.391
ROADWAY	FT. =	0.00	MI. =	0.000
TOTAL	FT. =	2063.50	MI. =	0.391

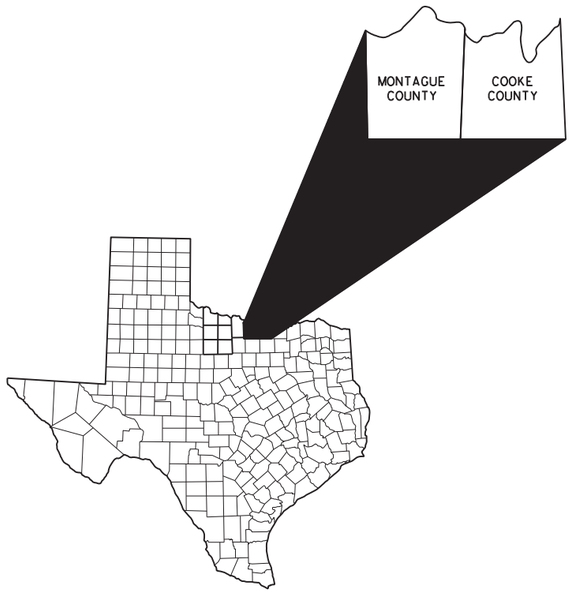
TYPE OF WORK: FOR ROUTINE MAINTENANCE OF BRIDGE PREVENTATIVE MAINTENANCE CONSISTING OF CONCRETE SPALL REPAIR, BRIDGE DECK REPAIR, CONCRETE CRACK INJECTION, SCOUR PROTECTION, CULVERT CLEANING, CHANNEL RESHAPING

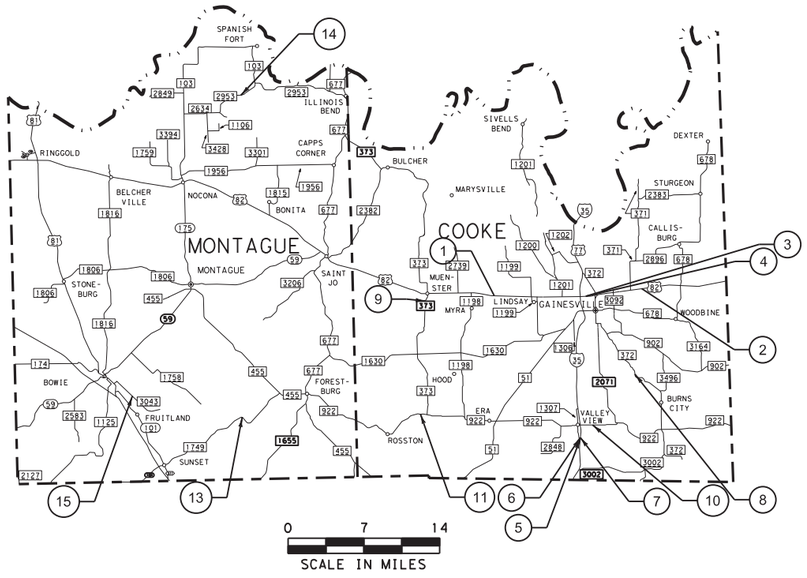
	REF. NO.	NBI	ROADWAY	FEATURE CROSSED
*	1	03-049-0044-08-113	US 82 WB	DRY ELM CREEK
*	2	03-049-0045-01-002	US 82 EB	ROCK CREEK
*	3	03-049-0045-01-109	US 82 WB	PECAN CREEK
*	4	03-049-0045-01-110	US 82 EB	PECAN CREEK
*	6	03-049-0195-01-028	IH 35 SB	SPRING CREEK
*	7	03-049-0195-01-105	IH 35 NB	SPRING CREEK
*	8	03-049-0195-01-106	IH 35 NB	SPRING CREEK RELIEF
*	9	03-049-0815-01-021	FM 372	DRAW
*	10	03-049-0823-02-006	FM 373	BRUSHY ELM CREEK
*	11	03-049-0845-03-007	FM 922	DRAW
*	12	03-049-0845-03-105	FM 922	WILLIAM CREEK
*	13	03-169-0351-03-009	FM 1749	DENTON CREEK
*	14	03-169-2706-02-002	FM 2953	LAKE NOCONA SPILLWAY
*	15	03-169-3073-01-001	FM 3043	BRUSHY CREEK

* PROJECT LIMIT SIGNS AS SHOWN ON BC(2)-21 WILL BE REQUIRED UNLESS WAIVED BY THE ENGINEER

WICHITA FALLS DISTRICT







CONTRACTOR NAME: _____
CONTRACTOR ADDRESS: _____
LETTING DATE: _____
DATE TIME CHARGES BEGAN: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE OF ACCEPTANCE: _____
FINAL CONTRACT COST: _____

Texas Department of Transportation ®

RECOMMENDED FOR LETTING: 06/25/2024
Colby D. Shelton, P.E.
AREA ENGINEER

SUBMITTED FOR LETTING: 06/25/2024
_____, P.E.
DISTRICT DIRECTOR OF OPERATIONS

APPROVED FOR LETTING: 06/25/2024
_____, P.E.
DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED SHALL GOVERN ON THIS PROJECT.

EXCEPTIONS: N/A
EQUATIONS: N/A
RAILROAD CROSSINGS: N/A

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INDEX OF SHEETS

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A ## HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Andrew Mosley, P.E. — NAME

06/20/2024 — DATE

Texas Department of Transportation — Bridge Division

GAINESVILLE BPM

INDEX OF SHEETS

SHEET 1 OF 1

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		2

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DATE:
FILE:

General Requirements

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

Colby Shelton, P.E.: Colby.Shelton@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

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

Bid Item Specific General Notes

Item 4 - Scope of Work

For the preconstruction conference submit a work schedule; temporary water pollution control plan; material sources; the person responsible for the SW3P; written utility coordination plan; certification statements; request for proposed subcontractors and letters designating the project superintendent, safety officer, and payroll officer at the preconstruction conference.

Item 5 - Control of the Work

Provide the Engineer a minimum 24 hours' notice for work requiring inspection or testing.

Item 6 - Control of the Materials

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

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

The Buy America Material Classification Sheet is located at the below link. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Item 7 - Legal Relations and Responsibilities

Lane closures are prohibited on Friday, Saturday, and Sunday for references located along IH 35.

The Contractor's responsible person as described in item 7.2.6.1 must be able to respond within 45 minutes of being notified.

Item 8 - Prosecution and Progress

Each contract awarded by the Department stands on its own and as such, is separate from other contracts. A contractor awarded multiple contracts, must be capable and sufficiently staffed to concurrently process any or all contracts at the same time.

For this project, contract time will be computed as described in Item 8 based on a Standard Workweek (8.3.1.4.)

Item 429 - Concrete Structure Repair

All repair locations shall be marked by contractor for approval by Engineer prior to beginning repairs.

Areas to be repaired at each location shall be repaired in accordance with the Department's Concrete Repair Manual. The Contractor must prepare and submit formal procedures outlining repair plans a minimum of 2 weeks prior to performing repairs. The Engineer must approve in writing any procedures that differ from those in the Concrete Repair Manual or materials that are not included on the Department's MPL.

Moist curing will be required unless curing membrane is approved by the Engineer. If curing membrane is approved for use, the Contractor must use a curing membrane that is recommended for use by the repair material manufacturer.

The Contractor shall maintain a hardcopy of the Department's Concrete Repair Manual on-site when concrete repair work is taking place.

Damage to sound concrete or to reinforcement outside the repair area will be repaired at no cost to the department.

Item 446 - Field Cleaning and Painting Steel

The steel girders, type-A diaphragms, and type-B diaphragms for Reference #3 (03-049-0045-01-109) and Reference #4 (03-049-0045-01-110) are the only members to be cleaned and painted, unless directed by the Engineer. See zone painting detail sheet for the estimated surface area and additional details for painting.

Location	Roadway/Channel	Contamination	Paint Description and Sample Location
REF #3, NBI: 03-049-0045-01-109	US 82 WB at Pecan Creek	Lead containing paint	Gray Paint on steel beams and cross members
REF #4, NBI: 03-049-0045-01-110	US 82 EB at Pecan Creek	Lead containing paint	Gray Paint on steel beams and cross members

For cleaning and painting of the listed bridge(s) above, follow the guidelines below:
A) The purpose of the washing should be to clean the structure of dirt and debris, not paint removal.
B) The wash water should be potable water that does not contain blasting grit, chemicals, or soaps.
C) The pressure of the power washer should be < 6000 psi.
D) The discharge should be to the ground as "irrigation". A direct stream discharge should be avoided without specific authorization from TCEQ.
E) There should be measures to avoid the release of solids such as paint chips

The Contractor shall use System I-B, use of abrasive blast cleaning should be limited to removal of pack rust locations.

Item 502 - Barricades, Signs, and Traffic Handling

The Traffic Control Plan (TCP) for this project includes the plans, the Texas Manual on Traffic Control Devices, Barricade and Construction Standard Sheets, Standard TCP Sheets, and as otherwise required by the Engineer.

Work will not be permitted without adequate traffic control devices in place. Work will only be permitted on one side of the roadway at any time, or as permitted by the Engineer.

Perform all construction work in daylight hours unless the Engineer approves nighttime work in writing. Do not allow any construction equipment to be placed on the roadway until 30 minutes after sunrise and ensure that all construction equipment is removed from the roadway 30 minutes before sunset. Sunrise and sunset times will be as determined by NOAA at the following website https://gml.noaa.gov/grad/solcalc/sunrise.html

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.

Work vehicles within 30 feet of the traveled way shall have strobe lights or rotating beacons in use.

Wear appropriate personal protective equipment at all times while outside of vehicles and equipment on the project.

The Contractor shall not set up traffic control at multiple locations unless a written request is submitted and approved by the respective engineer, 48 hours prior to work occurring. All work and traffic control operations shall be completed prior to advancing to next location unless otherwise directed by the Engineer.

Provide adequate flagging on side roads to ensure that traffic flow is not compromised during one way traffic control operations.

Repair barricades within 48 hours after barricade report has been delivered to the Contractor. Failure to comply will cease all work until barricades are repaired to the satisfaction of the Department. Replace all damaged traffic control devices immediately. Remove any damaged traffic control devices from the project within 24 hours.

Failure to make necessary corrections to Traffic Control items based on barricade inspections will be cause for withholding the monthly estimate until such corrections are made.

Remove from the roadway and store in a central location approved by the Engineer all temporary traffic control devices, such as cones, barrels, portable signs, vertical panels, etc., which will not be used within 24 hours. This includes removal of temporary traffic control devices from the roadway over the weekend.

The use of Portable Traffic Signals is not required, but may be used as an option to the contractor. This will be considered subsidiary to Item 502.

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls

It is anticipated that there will be minimal erosion control devices required for this project. However, in the event that additional erosion control measures are needed, the storm water pollution and prevention plan (SW3P) for this project shall consist of using the following items:

Erosion control logs, Sediment Control Fence, Permanent seeding, and Vegetative watering

Verify locations and dimensions of BMP's and obtain the Engineer's approval prior to placement. BMP locations indicated on the plans are approximate and may be adjusted as necessary by the Engineer.

If it is determined that other erosion control devices are needed, payment for the work will be determined in accordance with Article 4.4, "Changes in the Work".

The Contractor shall take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. If sediment escapes the construction site, immediately stop all work on the project, remove the sediment, and modify the SW3P site plan to prevent future non-compliance issues.

The Contractor shall construct concrete truck washouts for all concrete items. This work including materials and labor will not be measured or paid for directly but will be subsidiary to Item 506.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6469-87-001 **DISTRICT** Wichita Falls **COUNTY** Cooke
HIGHWAY US0082

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**6469-87-001**			
		PROJECT ID		**A00210634**			
		COUNTY		**Cooke**			
		HIGHWAY		**US0082**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6028	REMOVING CONC (MISC)	SY	12.000		12.000	
	104-6067	REMOVING CONC (SAWCUT)	LF	12.000		12.000	
	401-6001	FLOWABLE BACKFILL	CY	8.500		8.500	
	429-6004	CONC STR REPAIR(RAPID DECK REP(PRT DPT)	SF	20.000		20.000	
	429-6006	CONC STR REPR(RAPID DECK REP(FULL DPT))	SF	23.000		23.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	458.000		458.000	
	432-6006	RIPRAP (CONC)(CL B)	CY	4.170		4.170	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	50.000		50.000	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	107.000		107.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	650.000		650.000	
	438-6003	CLEANING AND SEALING EXIST JOINTS(CL5)	LF	240.000		240.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	454.000		454.000	
	446-6034	CLEAN AND PAINT EXIST STR (REF NO. 3)	EA	1.000		1.000	
	446-6035	CLEAN AND PAINT EXIST STR (REF NO. 4)	EA	1.000		1.000	
	451-6019	RETROFIT RAIL (TY T631)	LF	340.000		340.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000		5.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	325.000		325.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	325.000		325.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000	
	752-6005	TREE REMOVAL (4" - 12" DIA)	EA	22.000		22.000	
	778-6001	CONCRETE RAIL REPAIR (IN-KIND)	LF	8.000		8.000	
	780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	96.000		96.000	
	785-6004	BRIDGE JOINT REPAIR (ARMOR)	LF	152.000		152.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	60.000		60.000	
	6185-6002	TMA (STATIONARY)	DAY	45.000		45.000	
	7000-6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	5.000		5.000	

SUMMARY OF ROADWAY ITEMS

GAINESVILLE AREA OFFICE	104 6028	104 6067	401 6001	429 6004	429 6006	429 6007	432 6006	432 6031	432 6035	438 6002	438 6003	438 6004	446 6034	446 6035	451 6019	540 6001	542 6001
	REMOVING CONC (MISC)	REMOVING CONC (SAWCUT)	FLOWABLE BACKFILL	CONC STR REPAIR(RAPID DECK REP(PRT DPT)	CONC STR REPR(RAPID DECK REP(FULL DPT))	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC)(CL B)	RIPRAP (STONE PROTECTION)(12 IN)	RIPRAP (STONE PROTECTION)(24 IN)	CLEANING AND SEALING EXIST JOINTS(CL3)	CLEANING AND SEALING EXIST JOINTS(CL5)	CLEANING AND SEALING EXIST JOINTS(CL7)	CLEAN AND PAINT EXIST STR (REF NO. 3)	CLEAN AND PAINT EXIST STR (REF NO. 4)	RETROFIT RAIL (TY T631)	MTL W-BEAM GD FEN (TIM POST)	REMOVE METAL BEAM GUARD FENCE
	SY	LF	CY	SF	SF	SF	CY	CY	CY	LF	LF	LF	EA	EA	LF	LF	LF
COOKE																	
REF # 1 - NBI: 03-049-0044-08-113					23	41						264					
REF # 2 - NBI: 03-049-0045-01-002			2			27				280							
REF # 3 - NBI: 03-049-0045-01-109						26		12		76	104	38	1				
REF # 4 - NBI: 03-049-0045-01-110		12	0.5				2.67	13			136			1			
REF # 5 - NBI: 03-049-0195-01-028										76		38					
REF # 6 - NBI: 03-049-0195-01-105				20		8				38		38					
REF # 7 - NBI: 03-049-0195-01-106						88						76					
REF # 8 - NBI: 03-049-0815-01-021			1						15	88							
REF # 9 - NBI: 03-049-0823-02-006								19									
REF # 10 - NBI: 03-049-0845-03-007						40											
REF # 11 - NBI: 03-049-0845-03-105			3						22	92							
MONTAGUE																	
REF # 12 - NBI: 03-169-0351-03-009	8		1			32	1								340	325	325
REF # 13 - NBI: 03-169-2706-02-002	4		1			196	0.5	6									
REF # 14 - NBI: 03-169-3073-01-001									70								
PROJECT TOTALS	**12**	**12**	**8.5**	**20**	**23**	**458**	**4.17**	**50**	**107**	**650**	**240**	**454**	**1**	**1**	**340**	**325**	**325**

SUMMARY OF ROADWAY ITEMS CONT...

GAINESVILLE AREA OFFICE	544 6001	544 6003	752 6005	778 6001	780 6002	785 6004	6001 6001	6185 6002	7000 6001
	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	TREE REMOVAL (4"-12" DIA)	CONCRETE RAIL REPAIR (IN-KIND)	CNC CRACK REPAIR (DISCRETE) (INJECT)	BRIDGE JOINT REPAIR (ARMOR)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	REML & DISPL DRIFTWOOD & DEBRIS
	EA	EA	EA	LF	LF	LF	DAY	DAY	CY
COOKE									
REF # 1 - NBI: 03-049-0044-08-113			15					2	
REF # 2 - NBI: 03-049-0045-01-002								2	
REF # 3 - NBI: 03-049-0045-01-109				3		38		4	
REF # 4 - NBI: 03-049-0045-01-110				5		76		6	
REF # 5 - NBI: 03-049-0195-01-028					15		20	2	
REF # 6 - NBI: 03-049-0195-01-105					65	38	20	4	
REF # 7 - NBI: 03-049-0195-01-106							20	2	
REF # 8 - NBI: 03-049-0815-01-021								1	
REF # 9 - NBI: 03-049-0823-02-006			7					1	5
REF # 10 - NBI: 03-049-0845-03-007					16			2	
REF # 11 - NBI: 03-049-0845-03-105								1	
MONTAGUE									
REF # 12 - NBI: 03-169-0351-03-009	4	4						15	
REF # 13 - NBI: 03-169-2706-02-002								1	
REF # 14 - NBI: 03-169-3073-01-001								2	
PROJECT TOTALS	**4**	**4**	**22**	**8**	**96**	**152**	**60**	**45**	**5**

Texas Department of Transportation

Wichita Falls District

US 82, ETC.

QUANTITY SUMMARY

SHEET 1 OF 1

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		7

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		8

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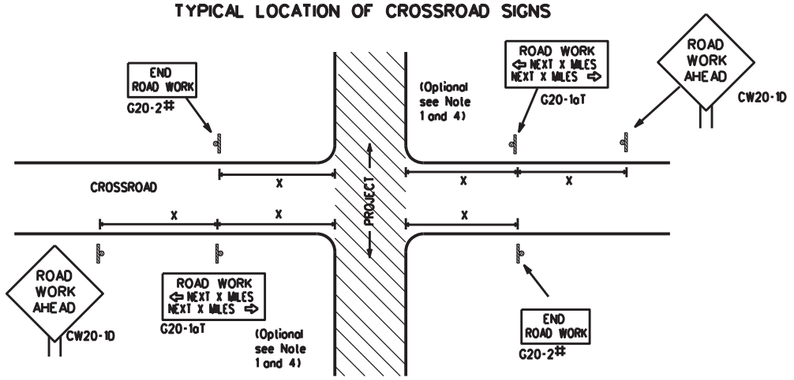
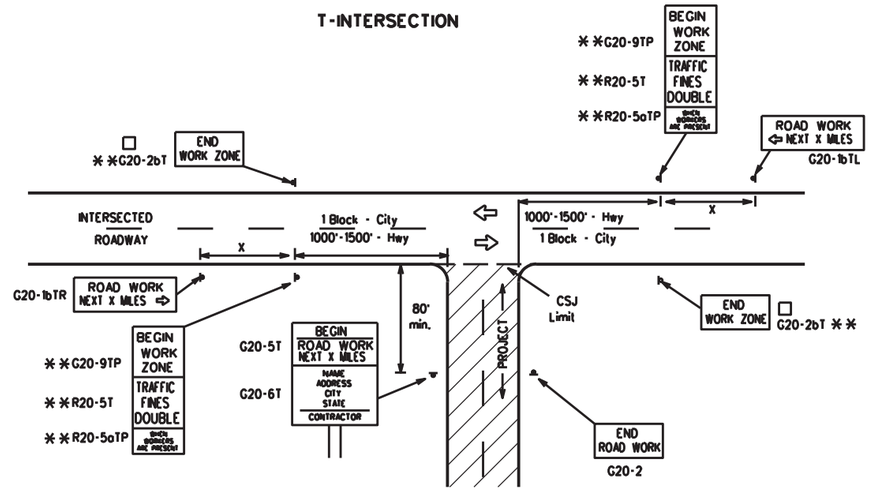
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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]

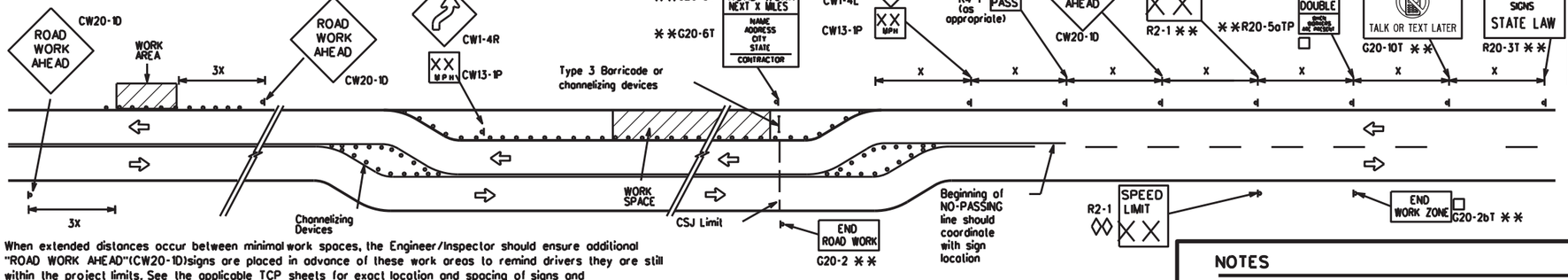
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

* 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.

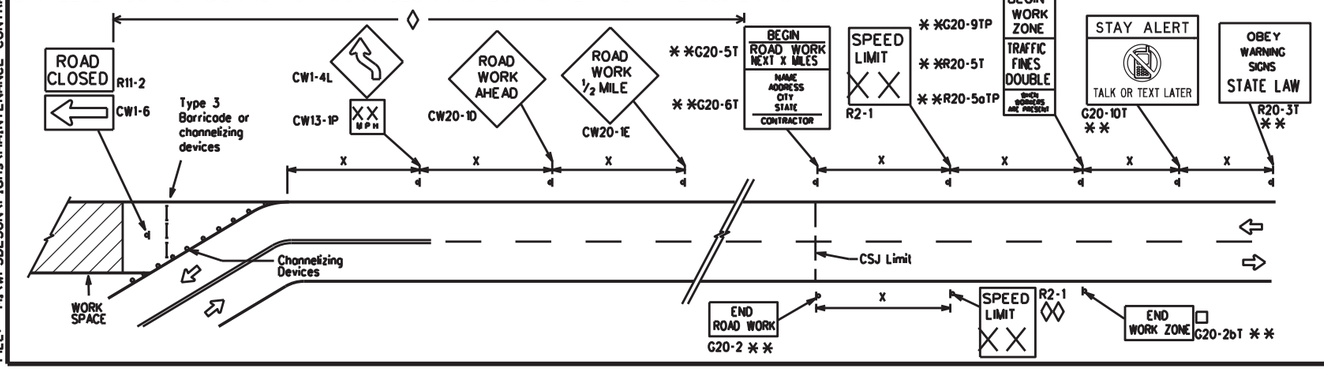
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12

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	6469	87	001, ETC.	US 82, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	COOKE, ETC.		9

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.

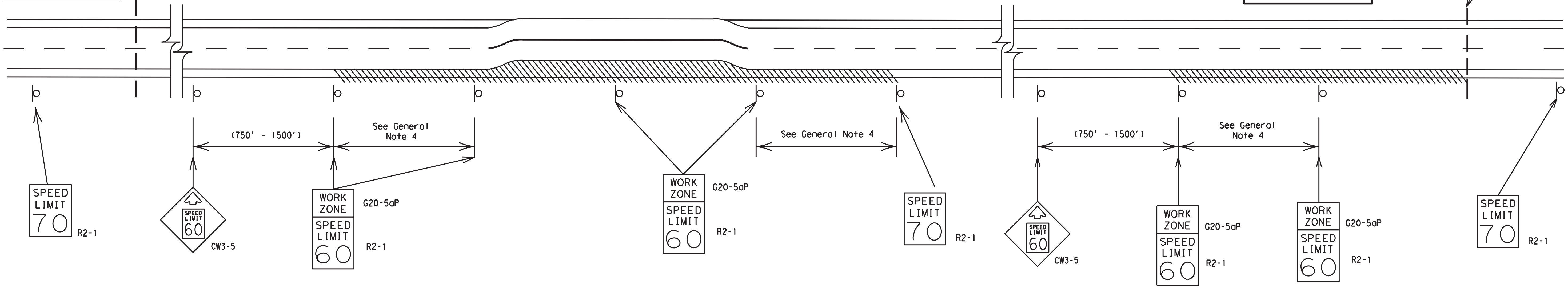
Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.

Signing shown for one direction only. See BC(2) for additional advance signing.

CSJ LIMITS

Signing shown for one direction only. See BC(2) for additional advance signing.

CSJ LIMITS



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.

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SHEET 3 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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© TxDOT November 2002		CONT	SECT	JOB		HIGHWAY	
REVISIONS		6469	87	001, ETC.		US 82, ETC.	
9-07 8-14		DIST		COUNTY		SHEET NO.	
7-13 5-21		WFS		COOKE, ETC.		10	

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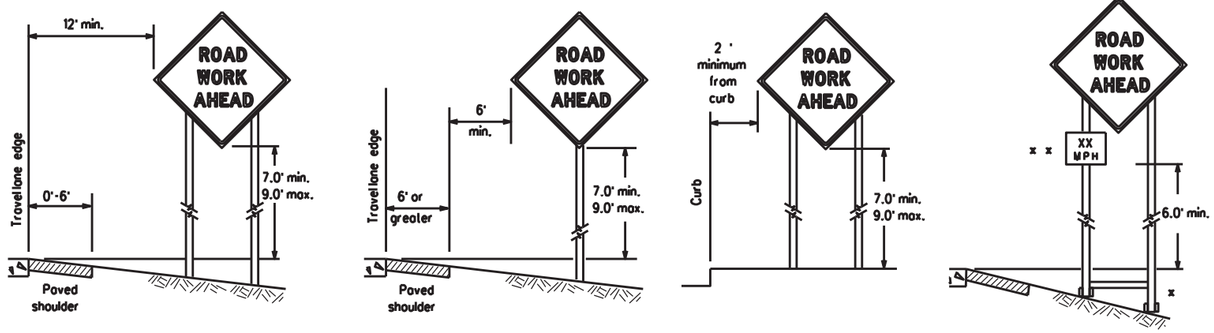
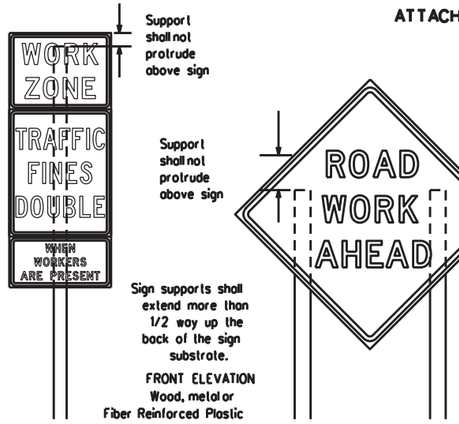
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

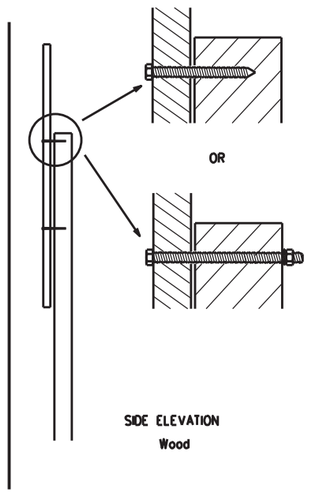


x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

x x When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travellane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





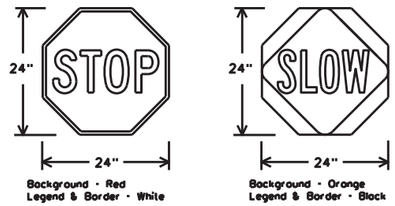
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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 lightness 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 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

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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7-13 5-21	WFS	COOKE, ETC.		11

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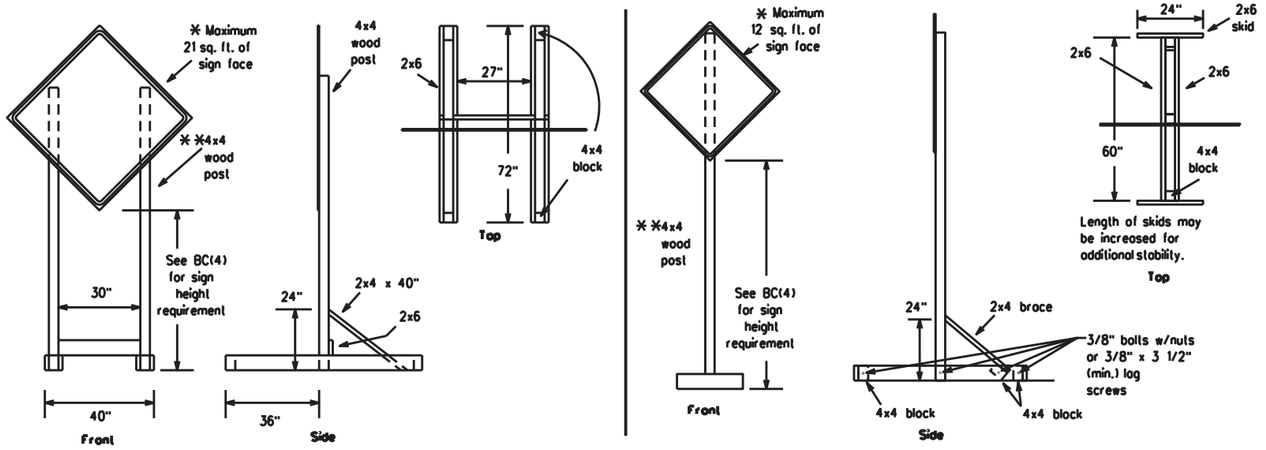
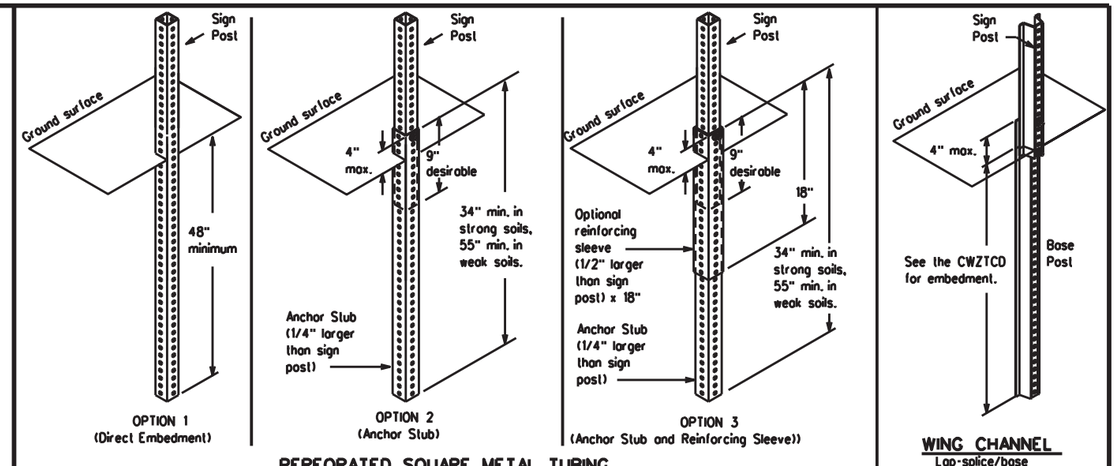


SKID MOUNTED WOOD SIGN SUPPORTS

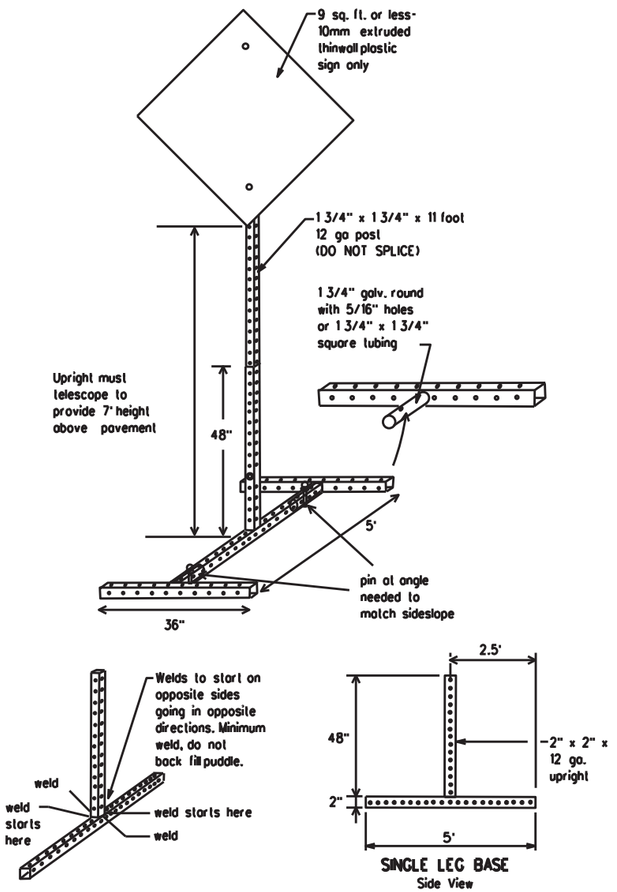
*** LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS**

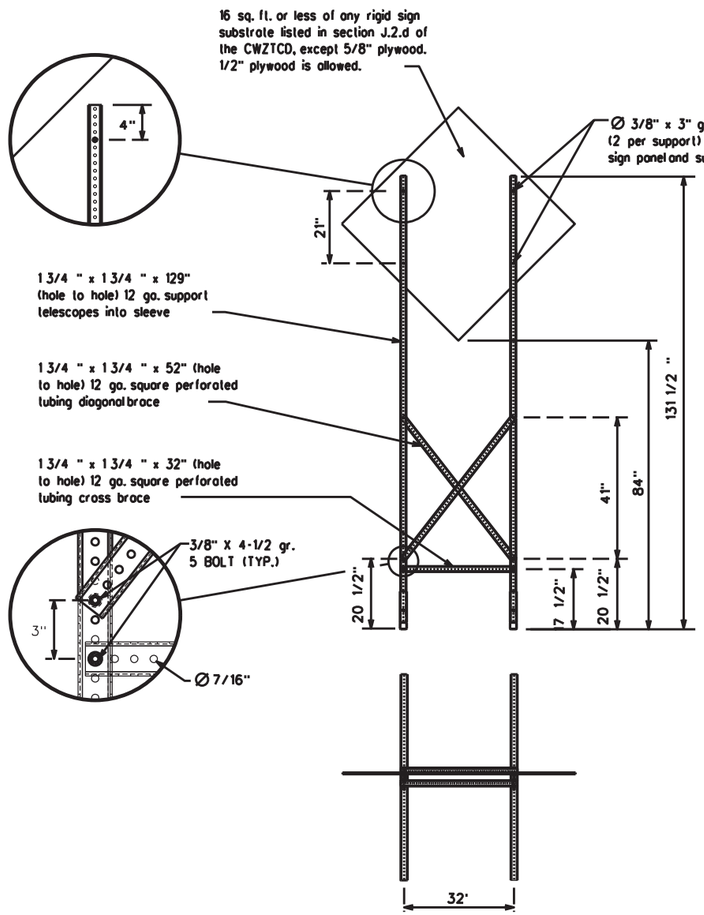


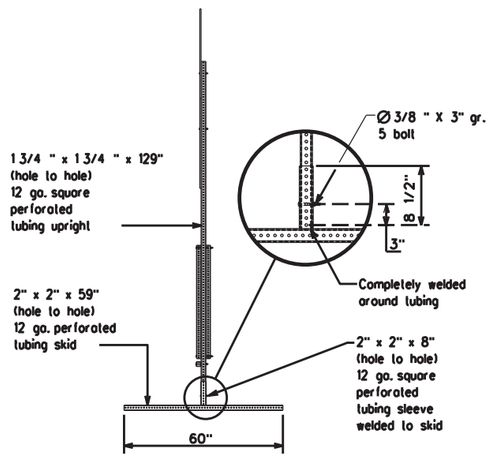
PERFORATED SQUARE METAL TUBING

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.

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	COOKE, ETC.		12

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

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		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

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

** 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	6469	87	001, ETC.	US 82, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	COOKE, ETC.		13

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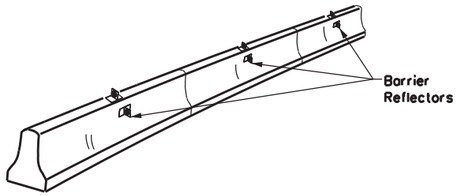
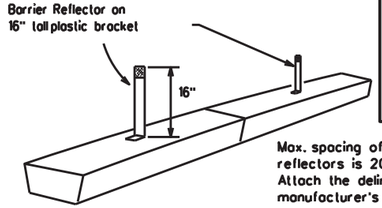
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

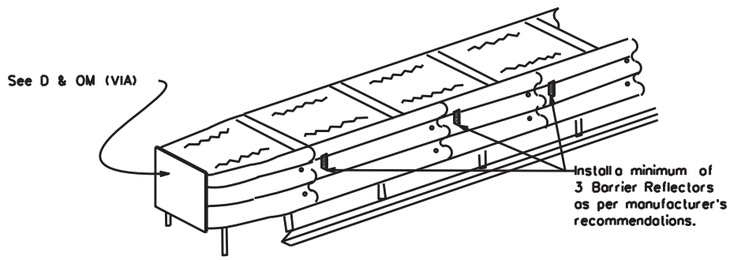


Max. spacing of barrier reflectors is 20 feet.
Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

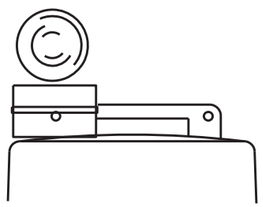
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

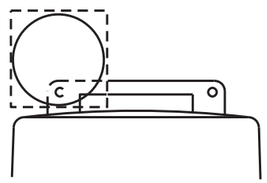
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this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



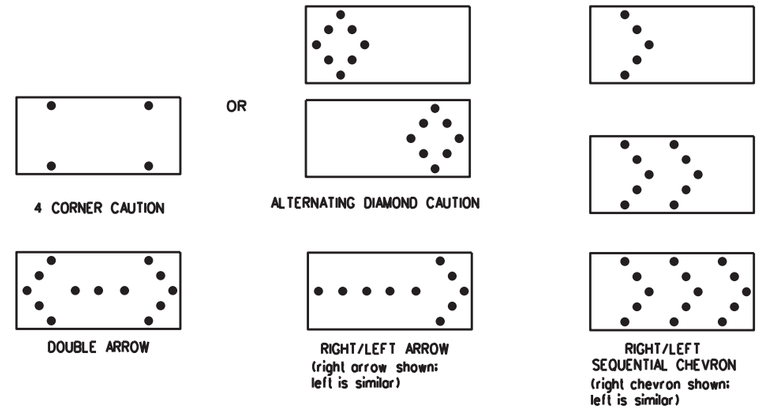
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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:



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 on 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	6469	87	001, ETC.	US 82, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	COOKE, ETC.		14

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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:

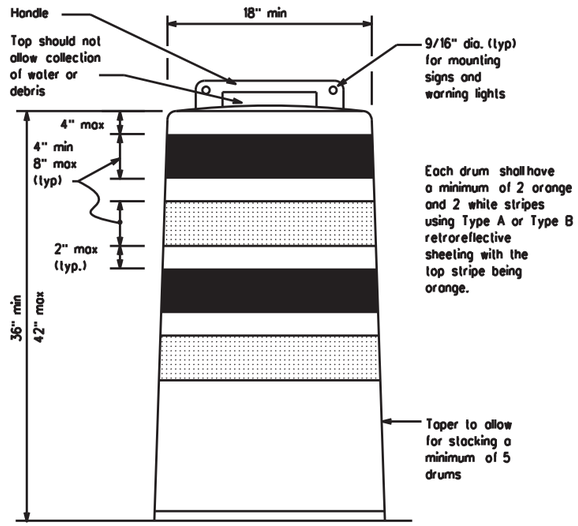
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

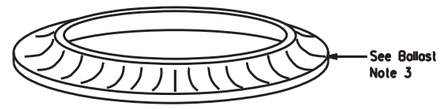
RETROREFLECTIVE SHEETING

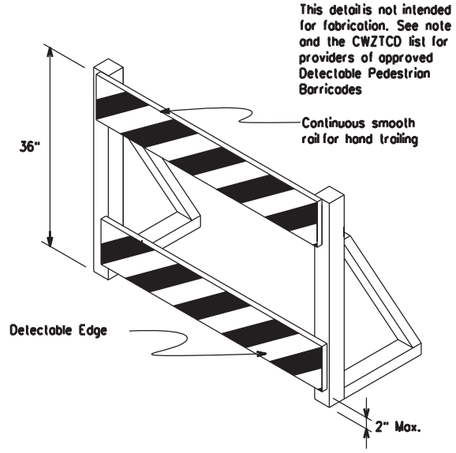
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

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9-07 5-21	WFS	COOKE, ETC.		15
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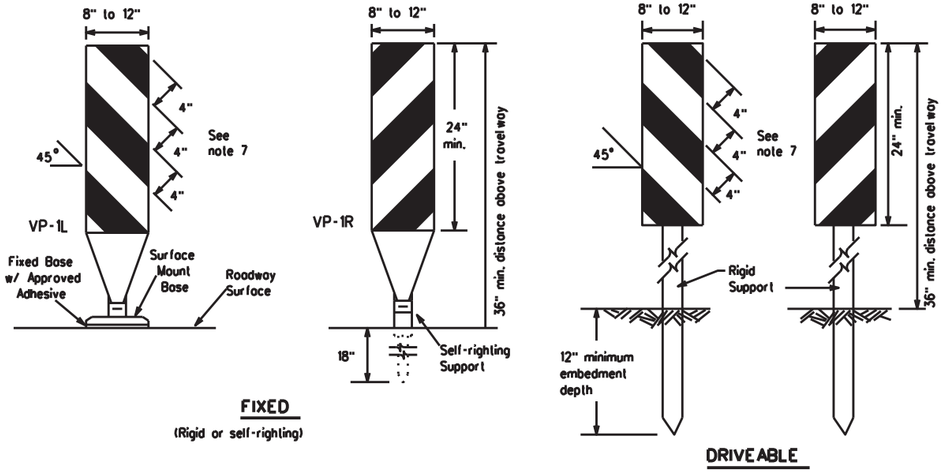
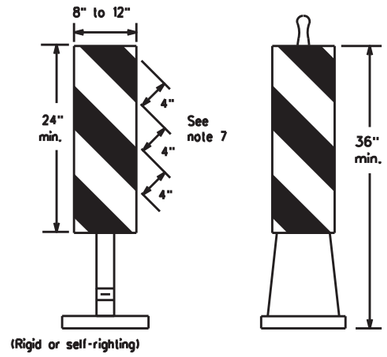


FIXED
(Rigid or self-righting)

DRIVEABLE

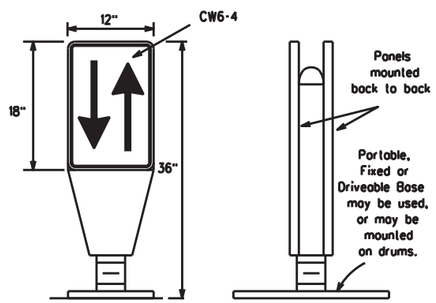


(Rigid or self-righting)

PORTABLE

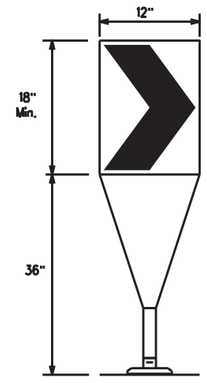
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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 or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



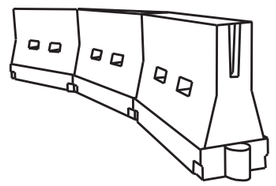
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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 or Type C 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

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.



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

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
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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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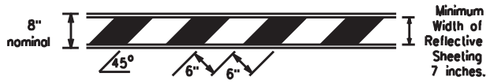
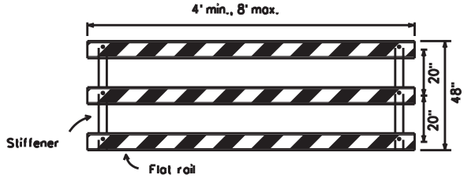
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



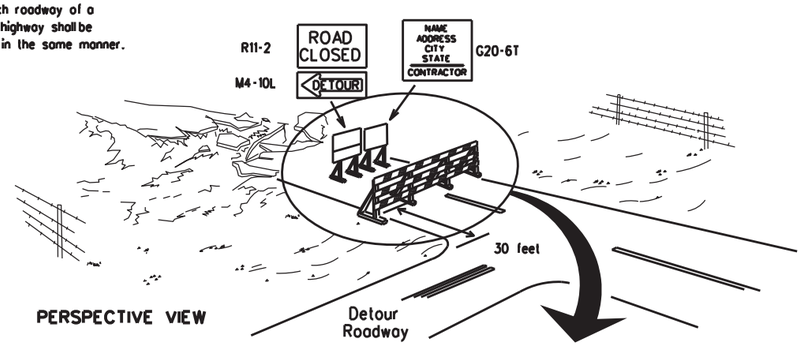
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

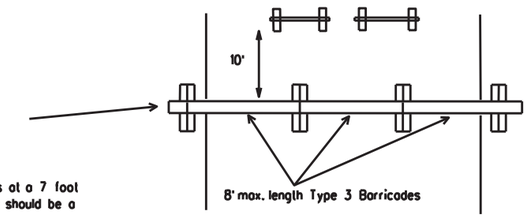
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

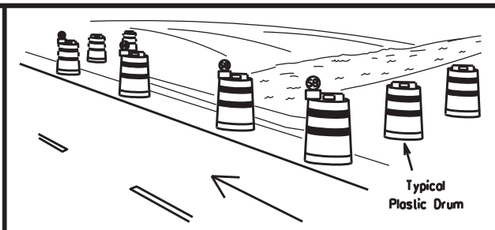
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

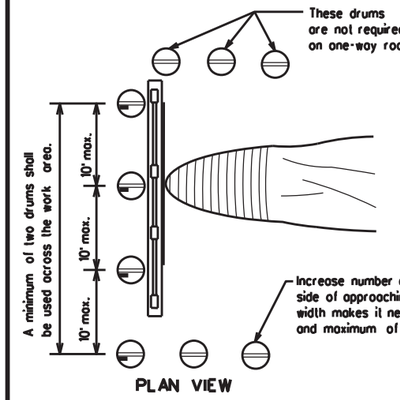
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

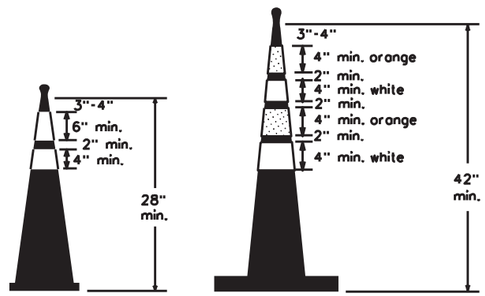
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



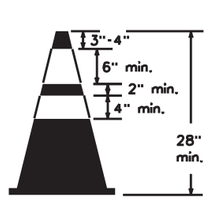
PLAN VIEW

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

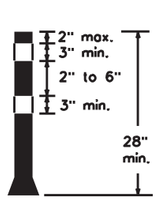
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

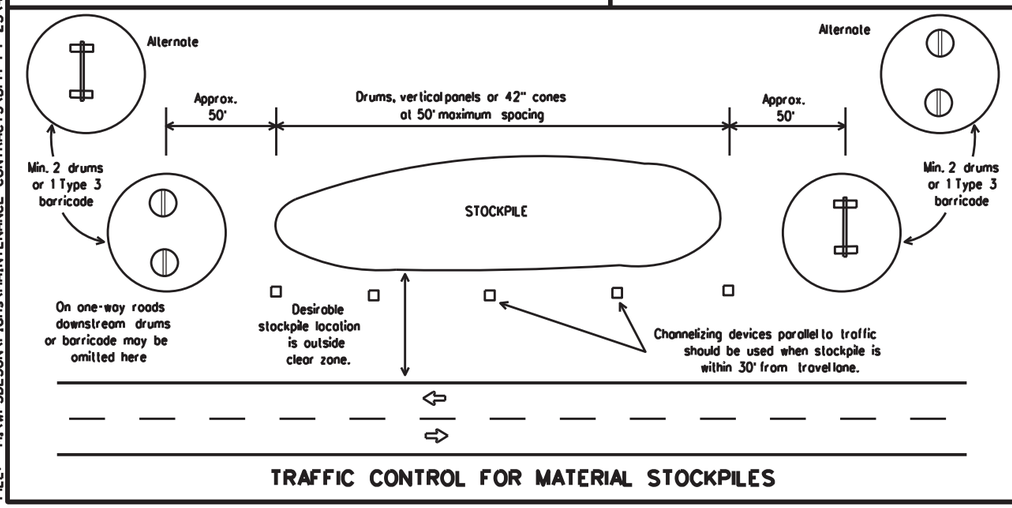


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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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.

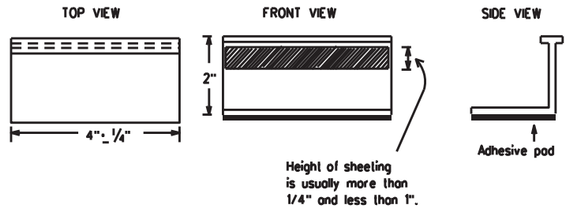
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

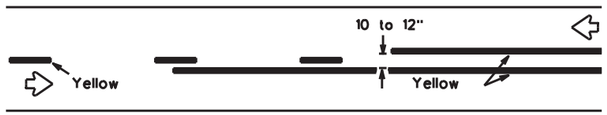
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

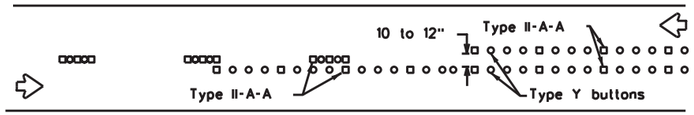
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		18

DATE: 6/20/2024 7:58:17 AM
FILE: M:\WFSDESGN\Plans\MAINTENANCE CONTRACTS\BPM FY 2514 - Design\Plan Set\Gainesville BPMX2, TCP\BC(1)-21.dgn

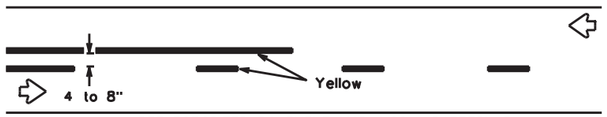
PAVEMENT MARKING PATTERNS



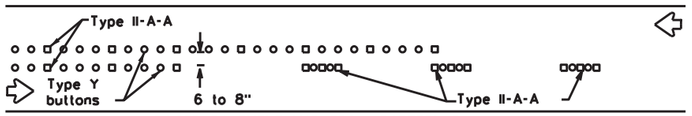
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



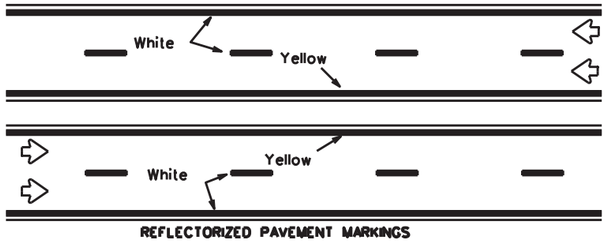
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



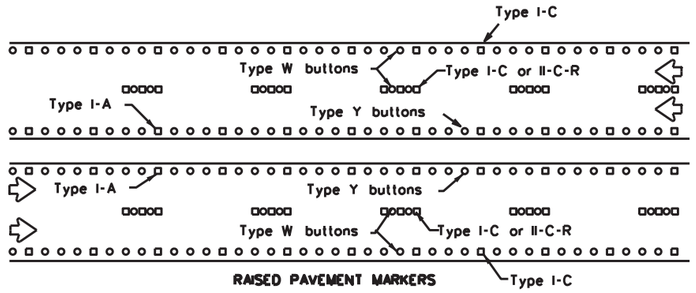
RAISED PAVEMENT MARKERS - PATTERN B

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

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



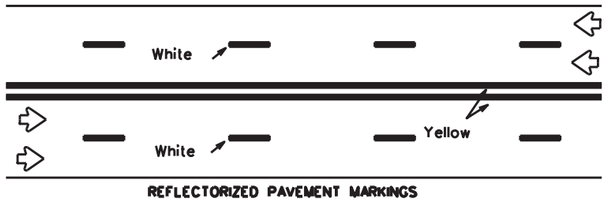
REFLECTORIZED PAVEMENT MARKINGS



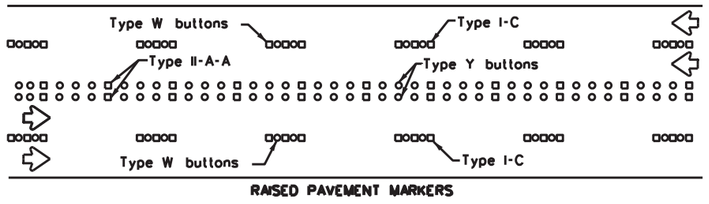
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



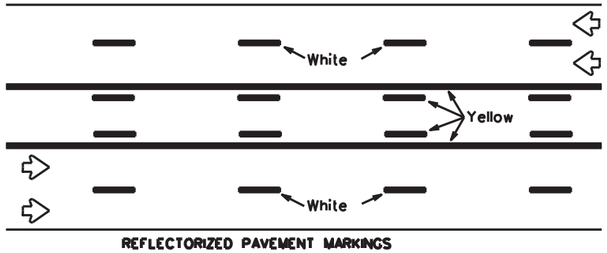
REFLECTORIZED PAVEMENT MARKINGS



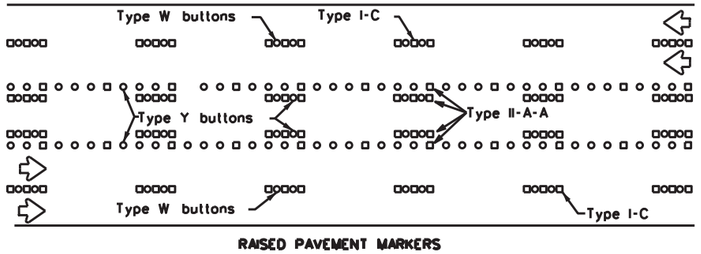
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

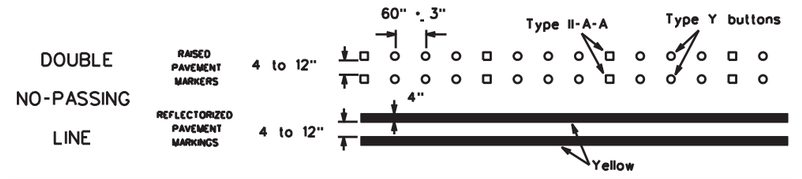
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

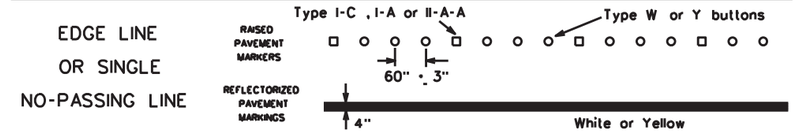
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

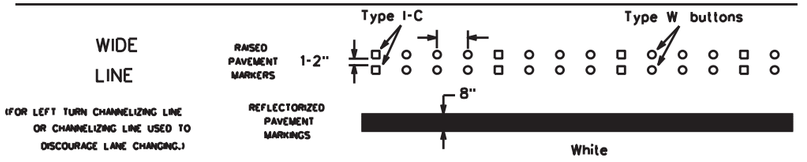


EDGE LINE OR SINGLE NO-PASSING LINE



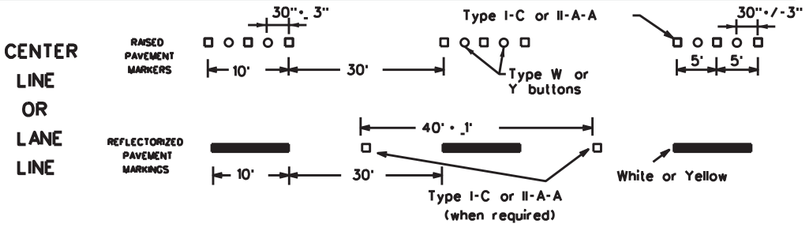
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

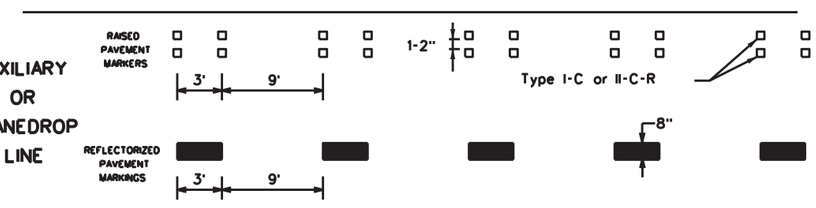


BROKEN LINES

CENTER LINE OR LANE LINE

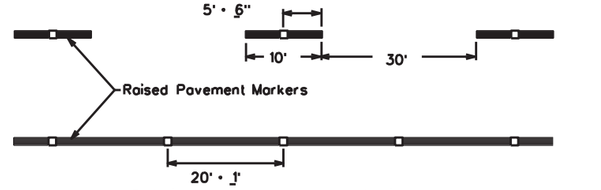


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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."

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	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		19

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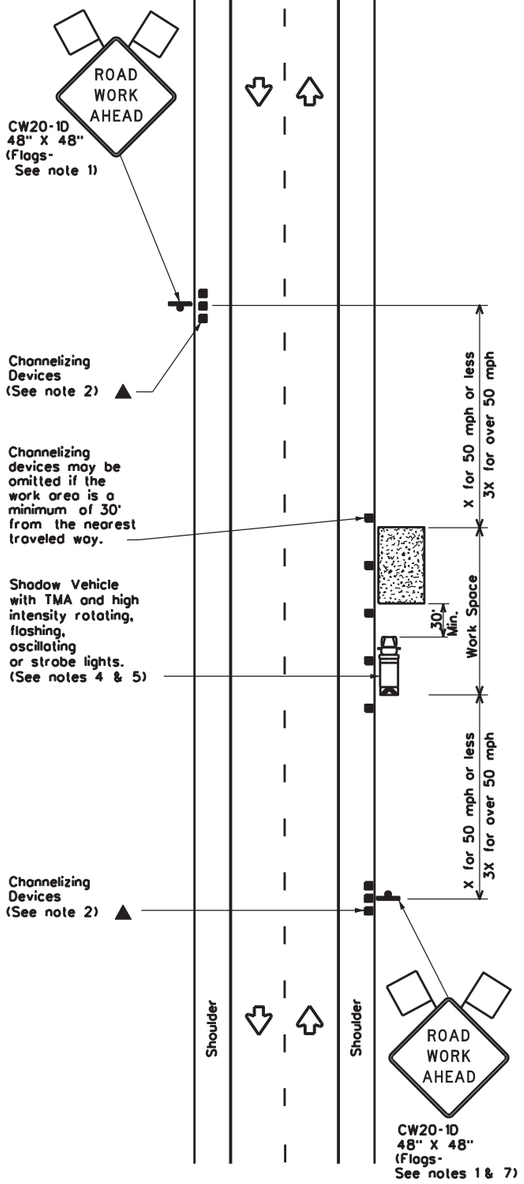
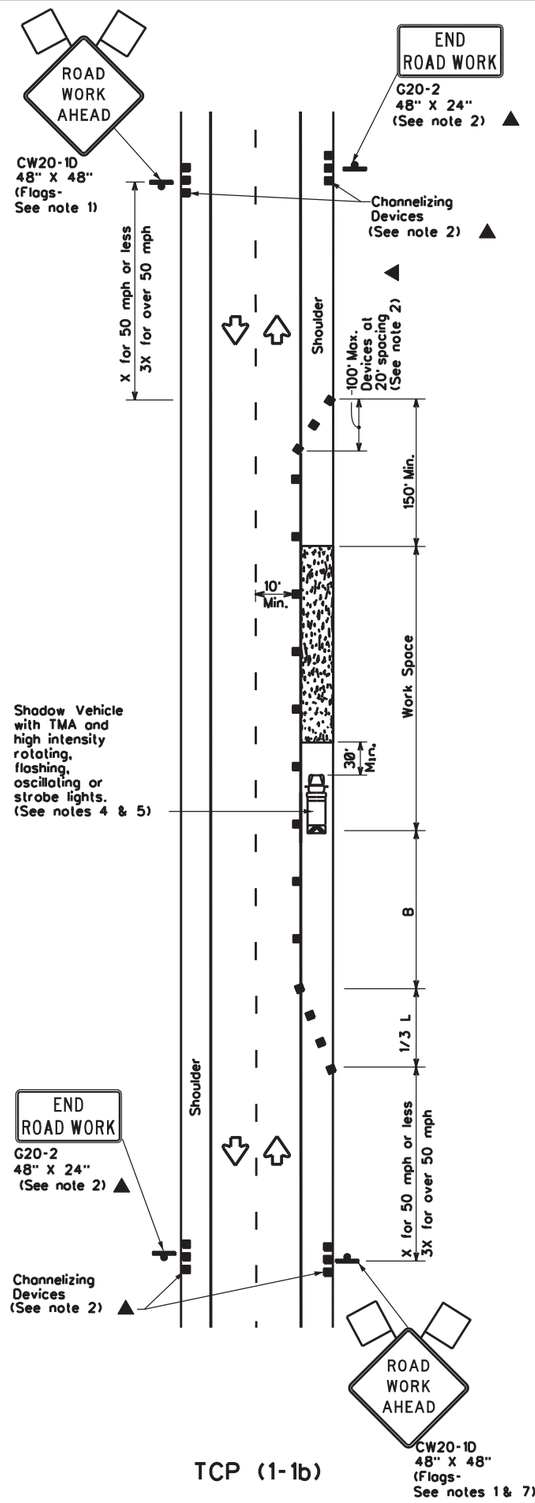


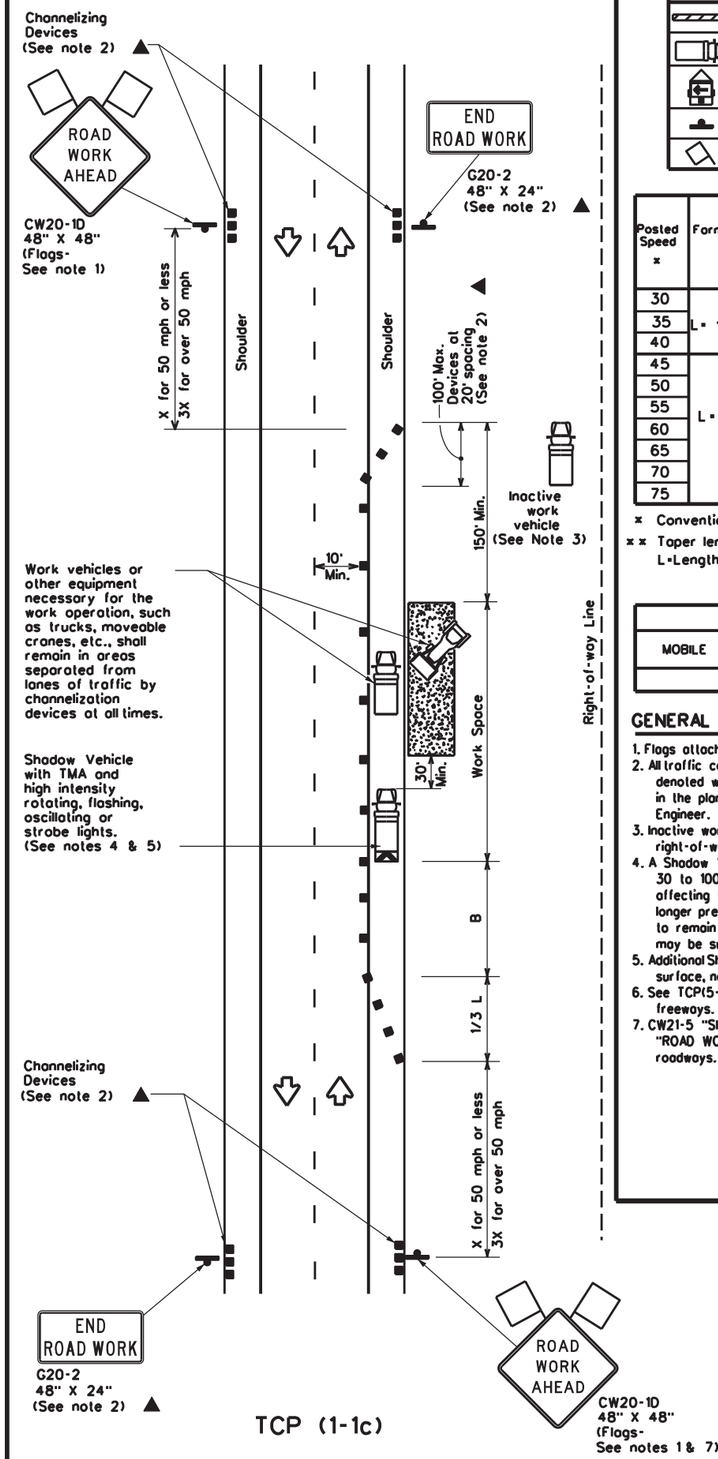
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 / 8-95 2-12 / 1-97 2-18	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		20

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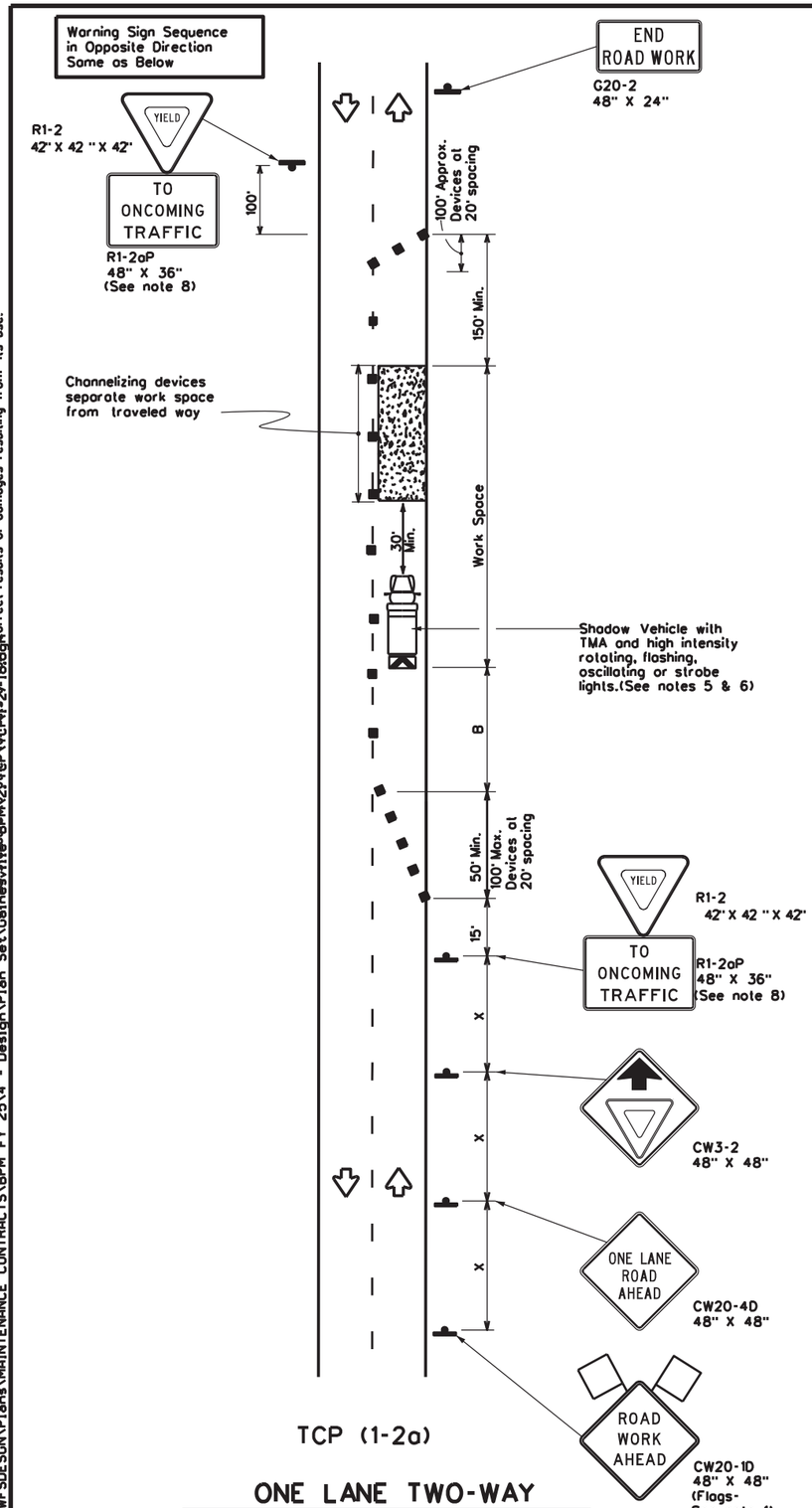
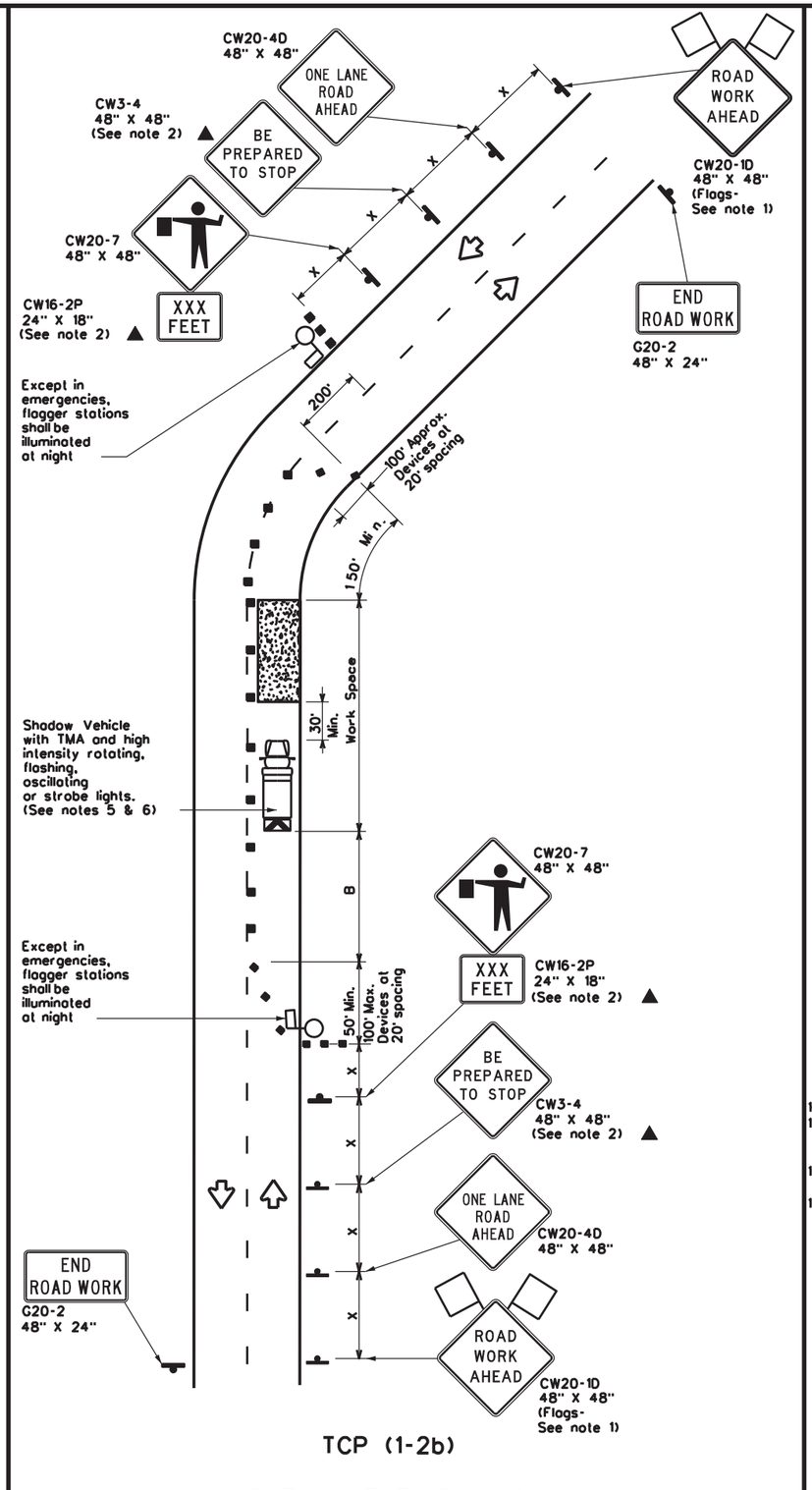


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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"	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'

* 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. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		21

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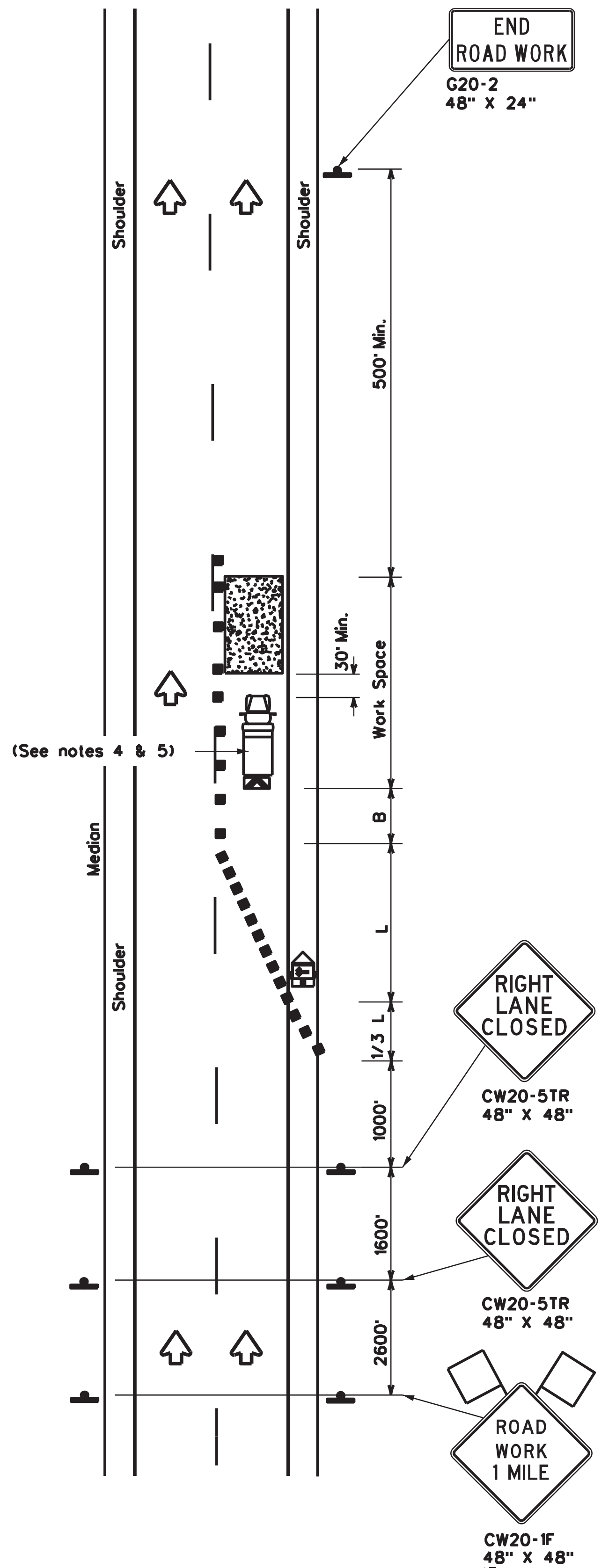
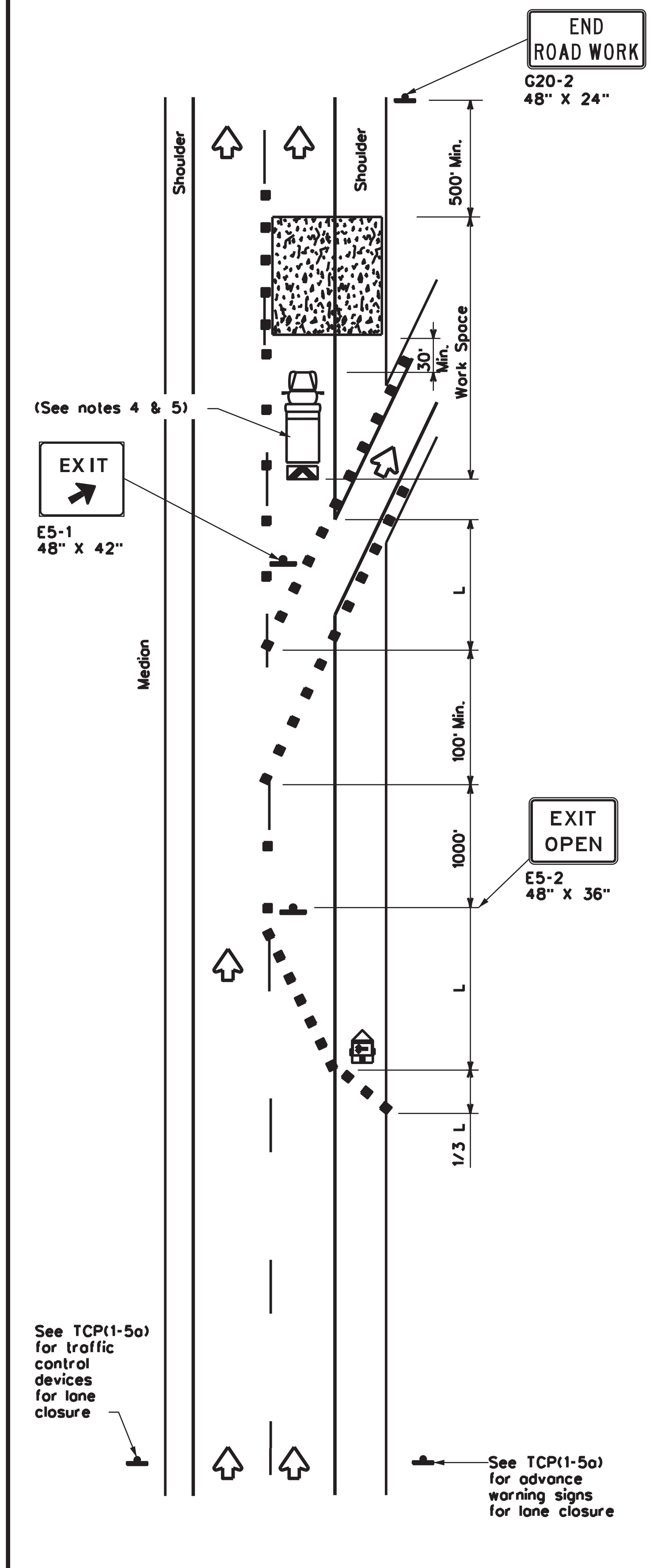


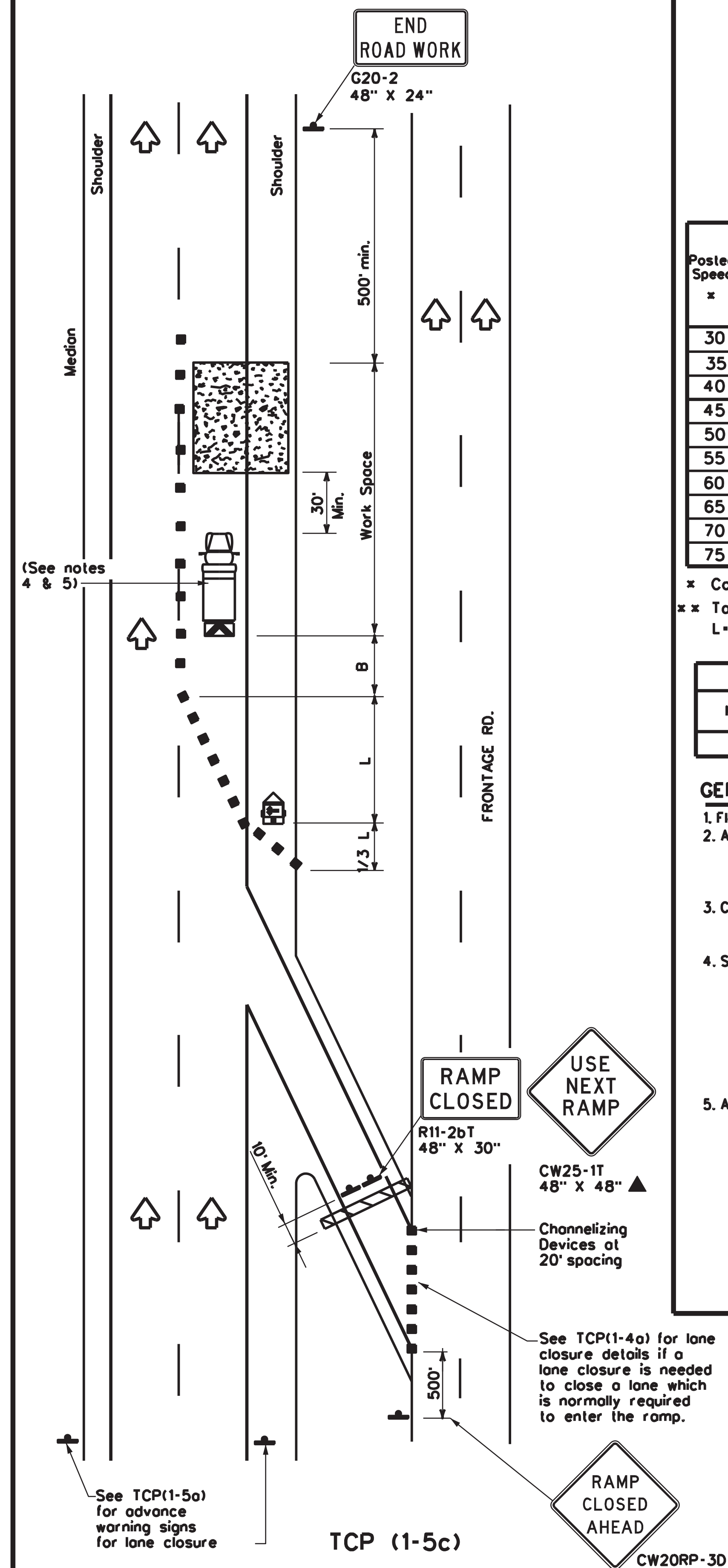
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:		CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB		HIGHWAY
REVISIONS 2-18	6469	87	001, ETC.		US 82, ETC.
	DIST		COUNTY		SHEET NO.
	WFS		COOKE, ETC.		22

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DATE:
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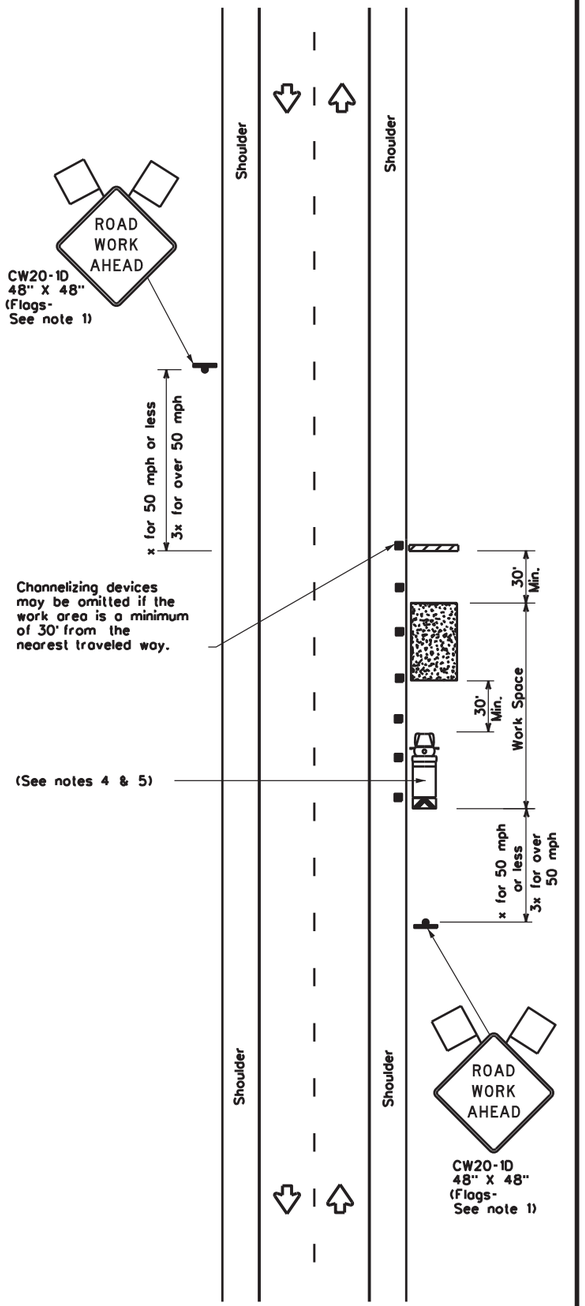
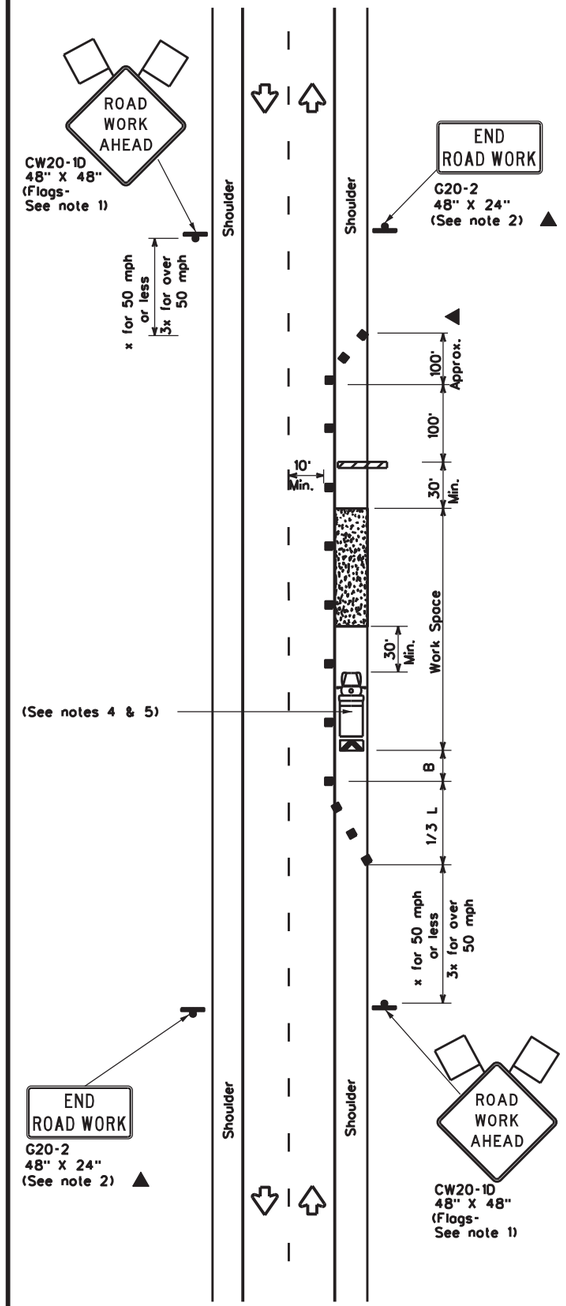


TCP (2-1a)

WORK SPACE NEAR SHOULDER

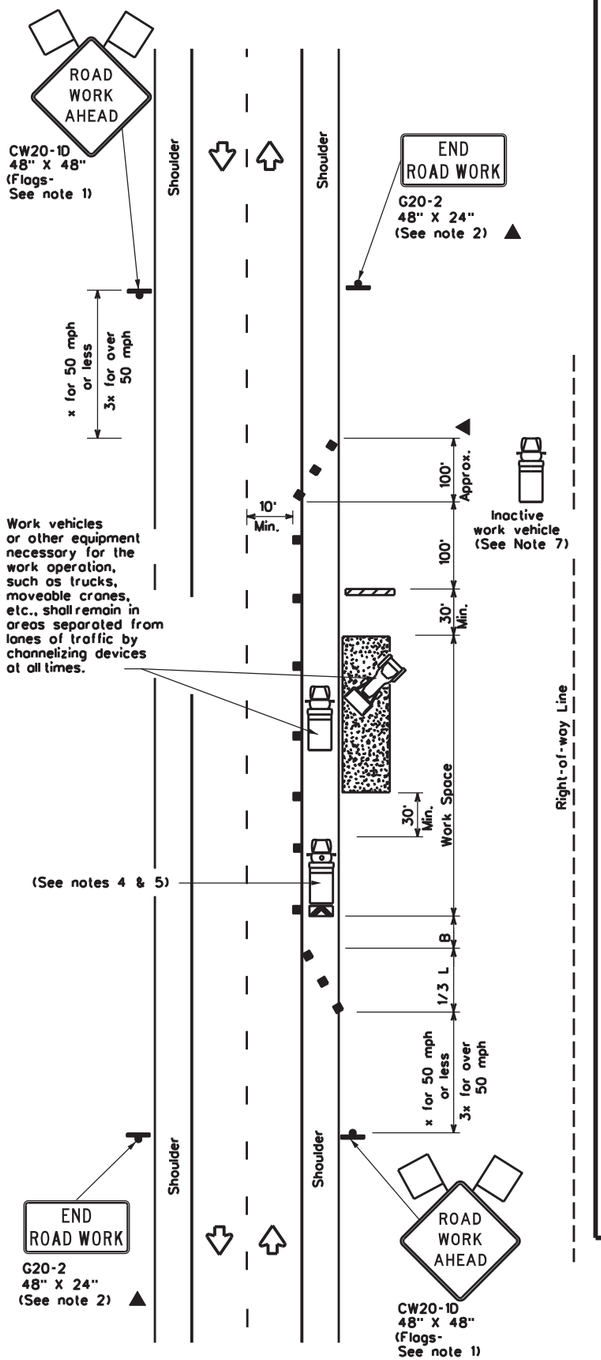
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

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 in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT.	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WFS	COOKE, ETC.		23
1-97 2-18				

DATE:
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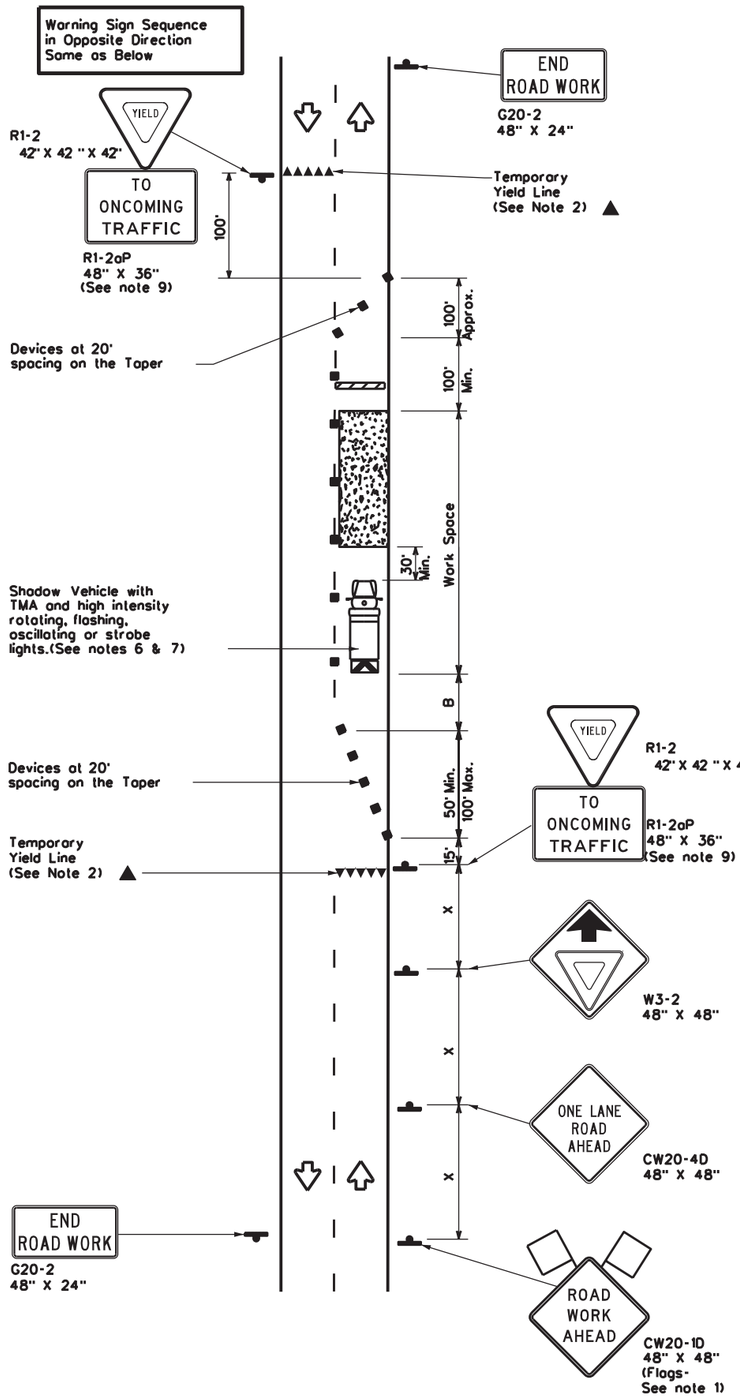
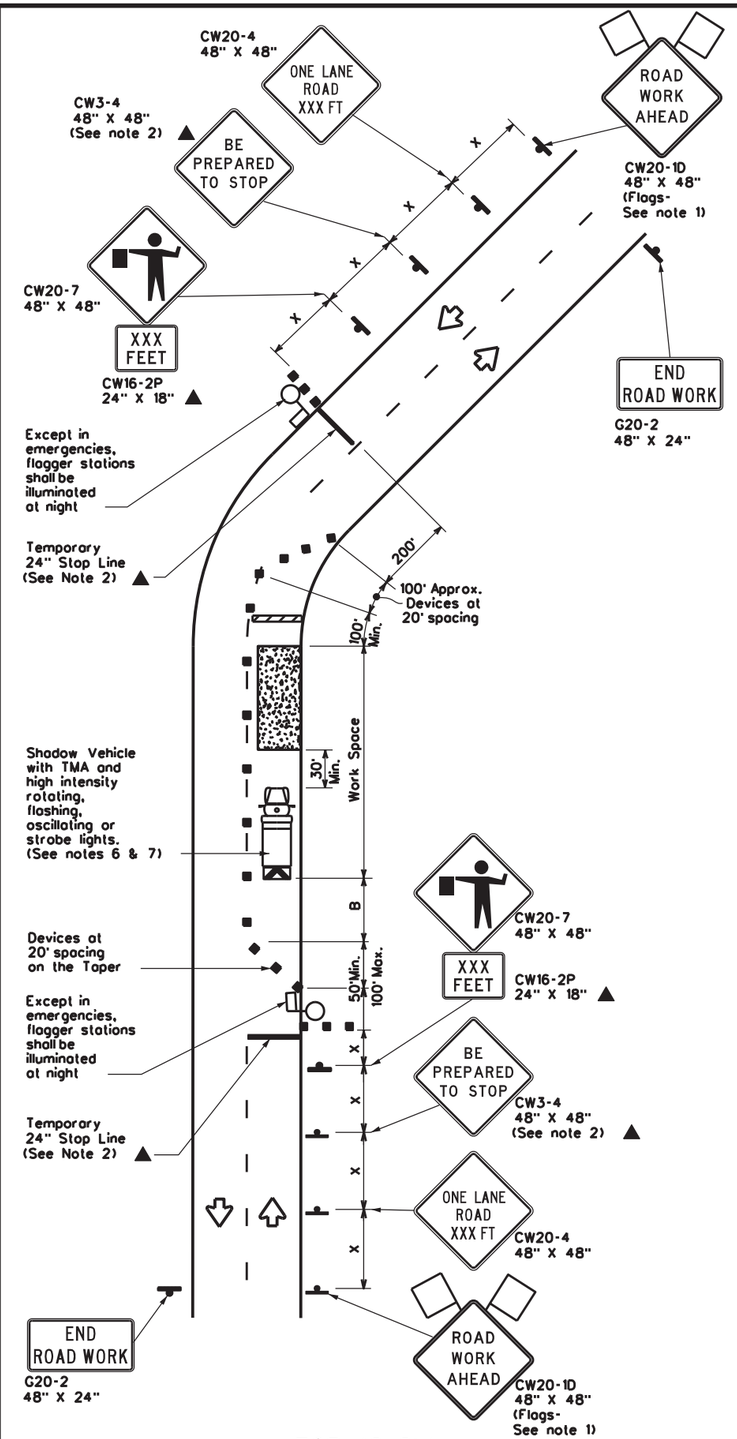


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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"	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'

* 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. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	646	987	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		24

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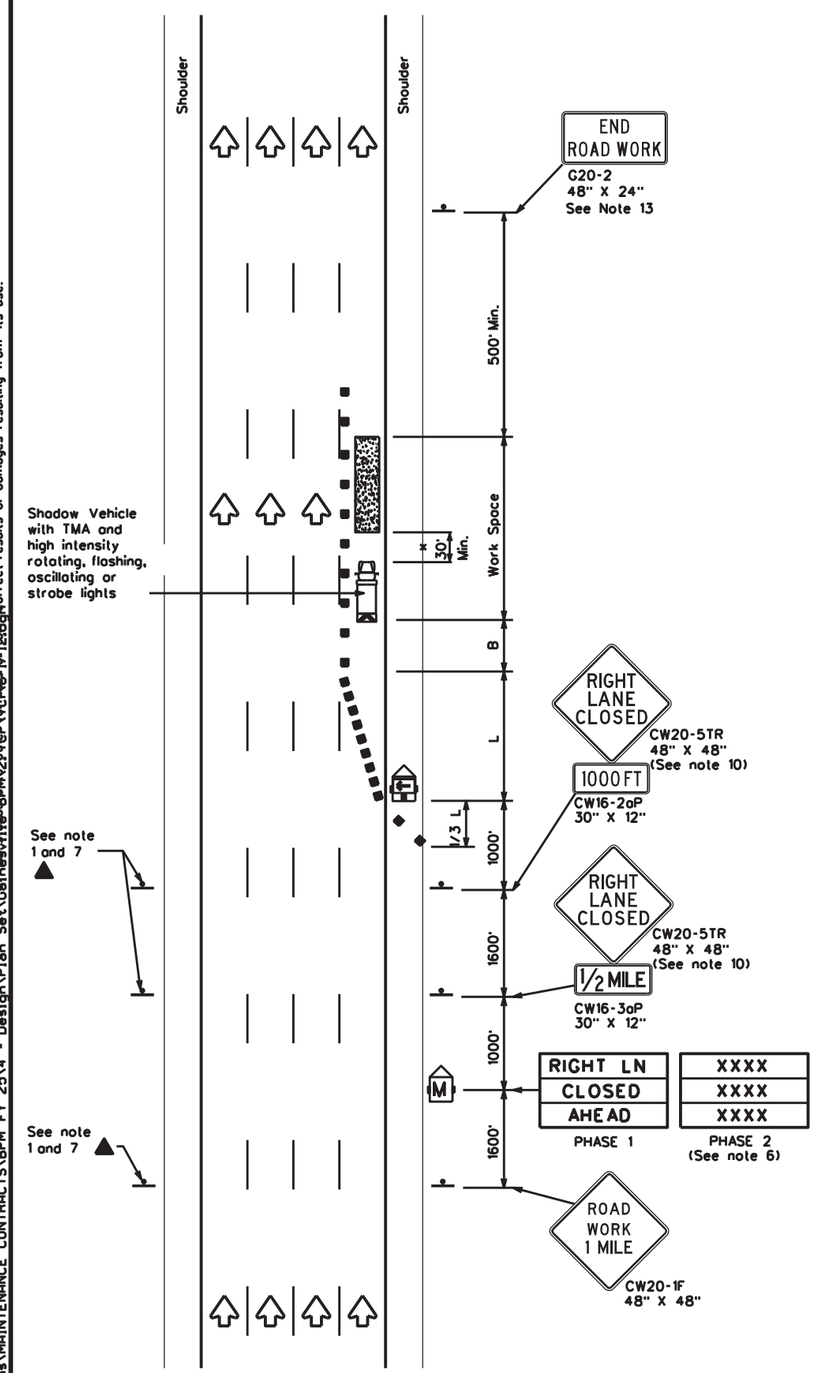
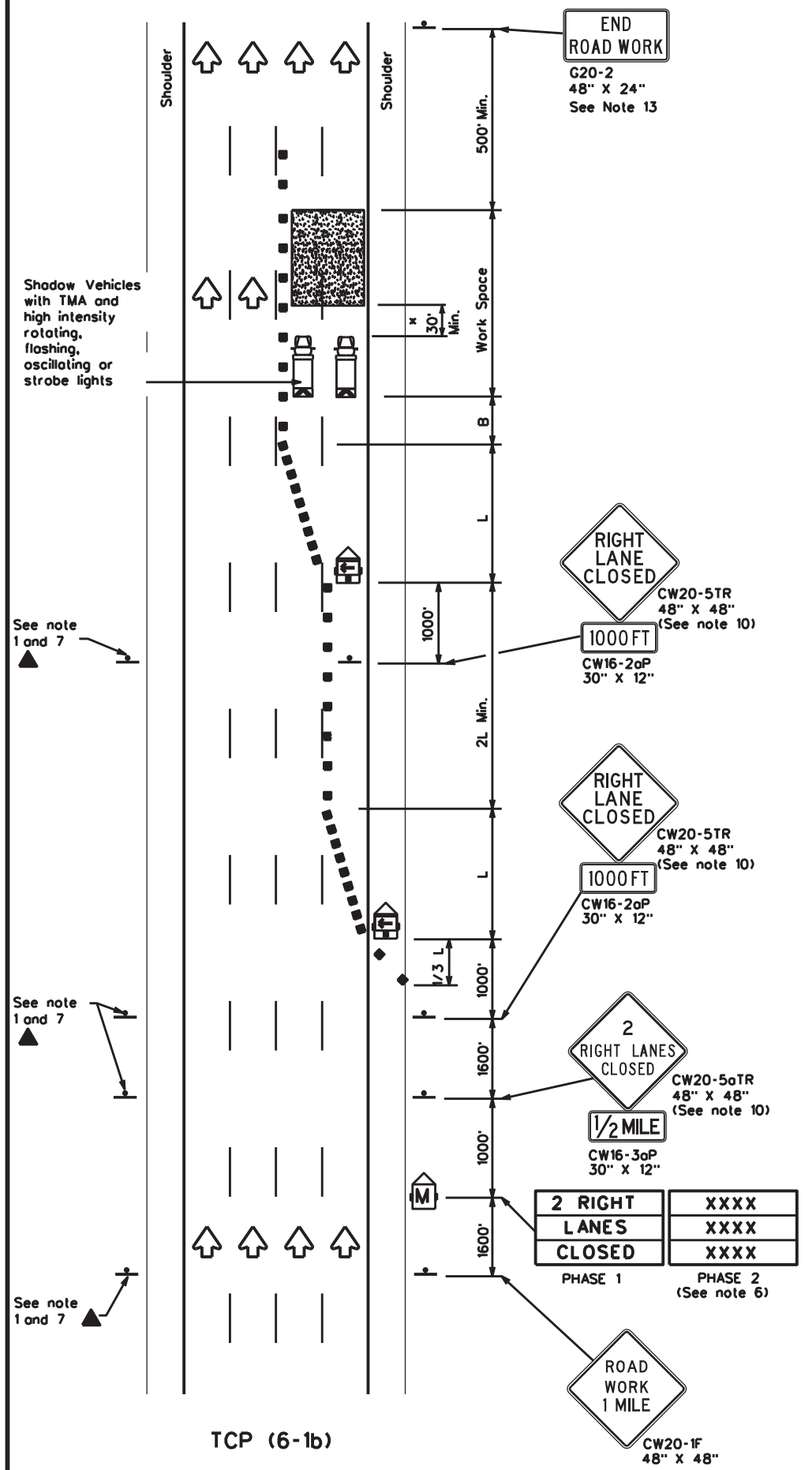


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safely during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate 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.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

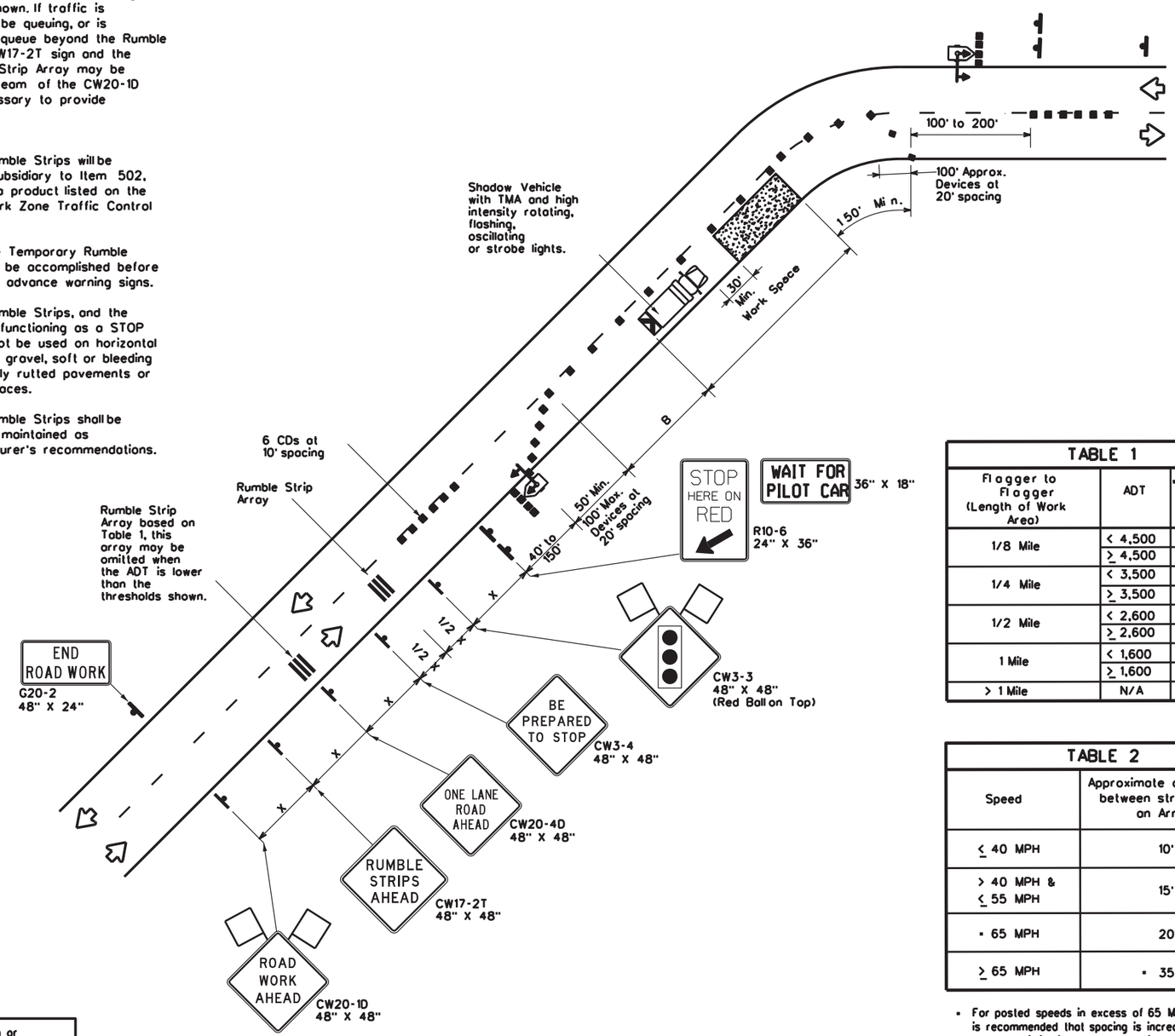
TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		25

RUMBLE STRIP GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Removal of the Temporary Rumble Strips should be accomplished before removing the advance warning signs.
5. Temporary Rumble Strips, and the rumble strip functioning as a STOP bar, should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.

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



For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

ONE LANE TWO-WAY CONTROL WITH PORTABLE TRAFFIC SIGNAL & RUMBLE STRIPS

DATE:
FILE:

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Temporary or Portable Traffic Signal	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		

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'

* 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
	✓	✓		

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 65 MPH	20'
≥ 65 MPH	= 35'*

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

REVIEWED AND APPROVED BY DISTRICT SAFETY REVIEW TEAM 1-21-2022

TCP GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).
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 exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
5. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the Portable Traffic Signals.
6. Proper alignment of overhead signal with on-coming lane should be ensured.
7. For Short Duration and Short Term Stationary refer to WZ(RS)-22 for rumble strip placement and signs.
8. Use of a pilot car shall be required as directed by the Engineer, when a pilot car is being used it may control the operation of the signal and the "WAIT FOR PILOT CAR" sign is to be used as shown.
9. If pilot car is used to guide vehicles through traffic control zone, vehicle shall have an identification name displayed and "PILOT CAR FOLLOW ME" (G20-4) sign or message board mounted in a conspicuous position on rear.
10. Channelizing devices on the center-line may be ommitted when a pilot car is leading traffic and approved by the Engineer.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation
Wichita Falls District

TRAFFIC CONTROL PLAN
ONE LANE TWO-WAY CONTROL USING PORTABLE TRAFFIC SIGNAL & RUMBLE STRIPS

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
6469	87	001, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	COOKE, ETC.		26

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DATE: 6/20/2024 7:58:20 AM
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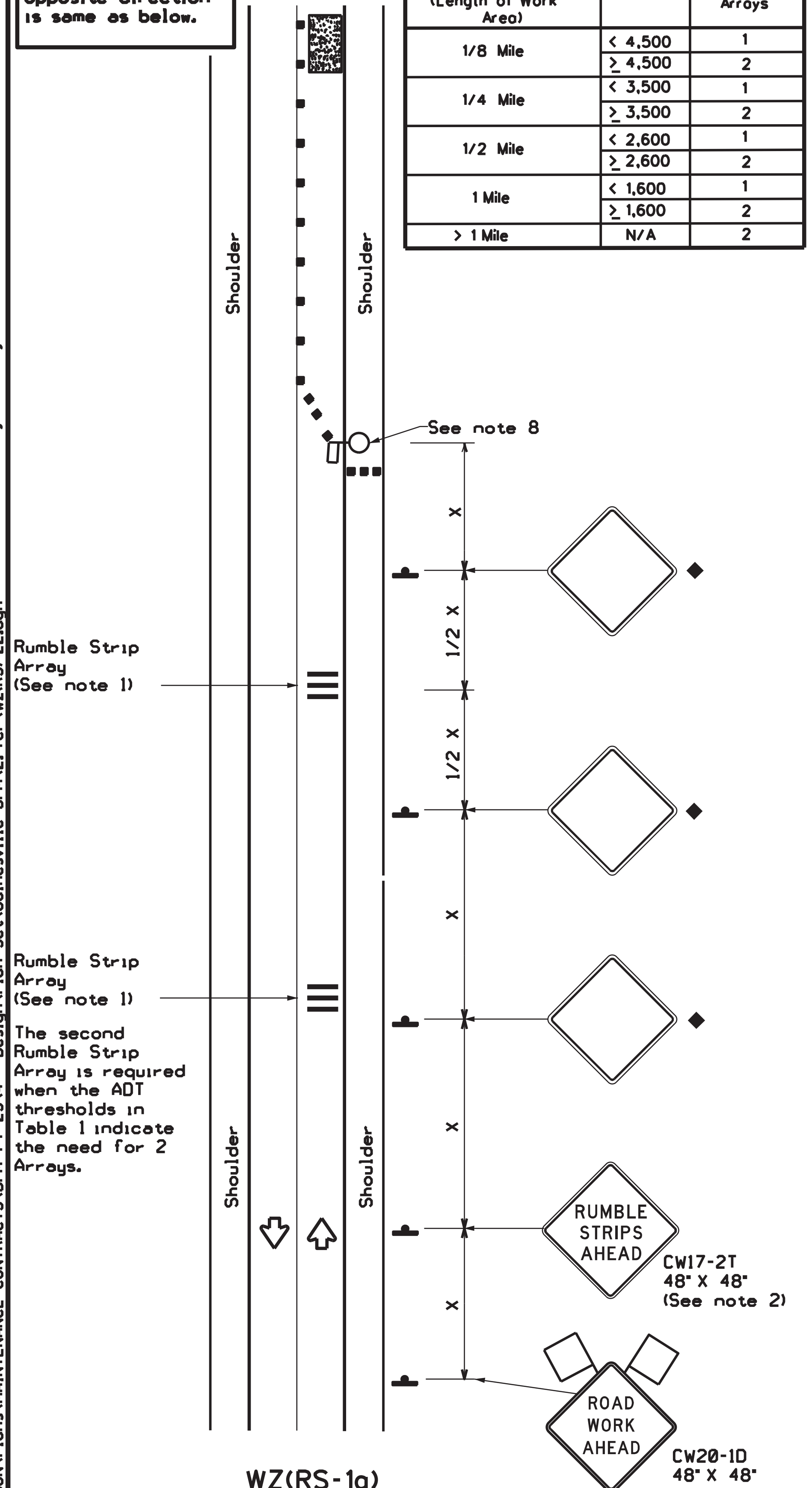
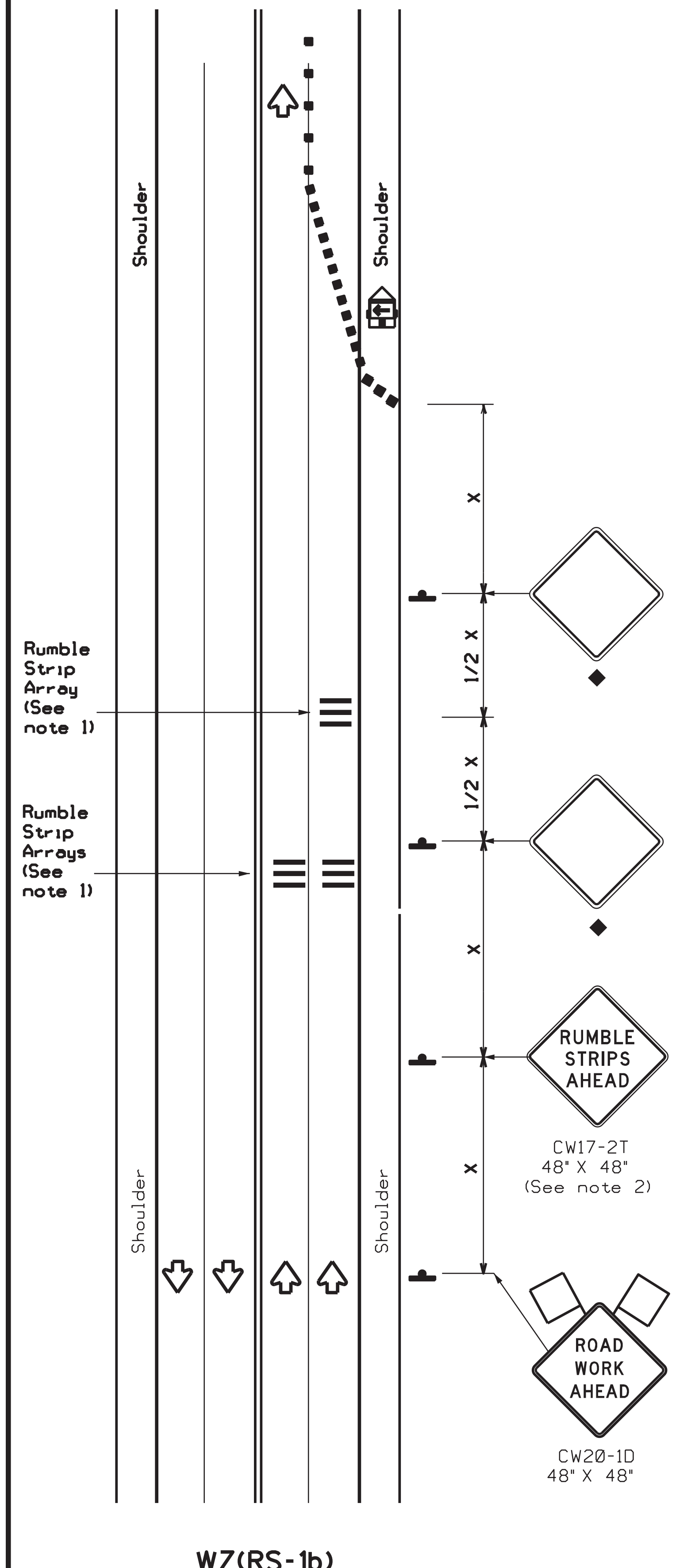
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1

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



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

TABLE 2

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

LEGEND

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

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

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

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

Texas Department of Transportation

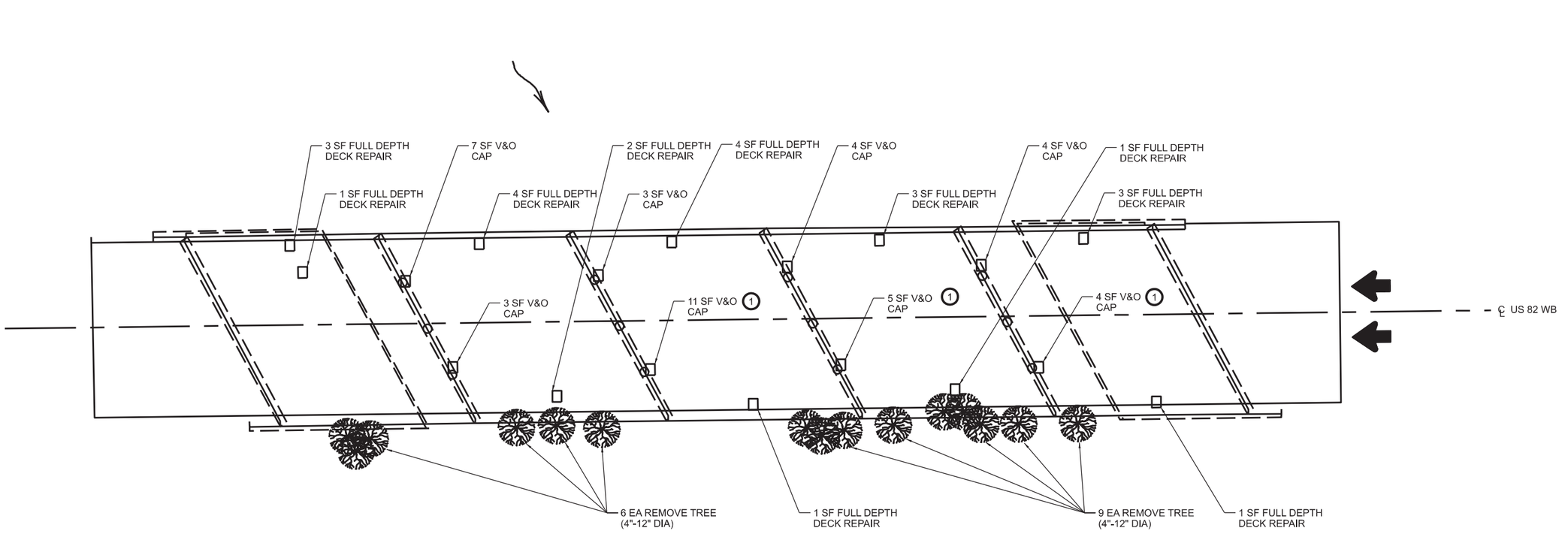
Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		27

LAT: 33.643539 LON:-97.279816



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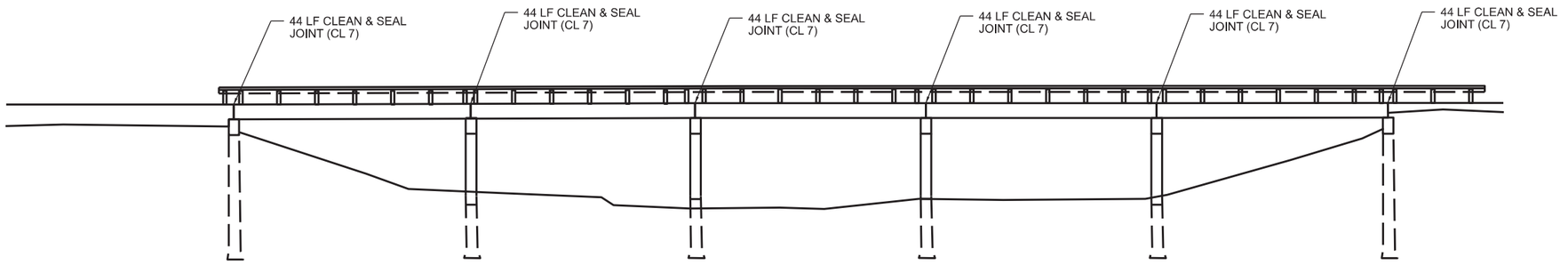


5 - SIMPLE SPAN PAN GIRDER (26° RF Skew)

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
FILE:

FOR AREA OFFICE USE ONLY				
#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
(1)	572558			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

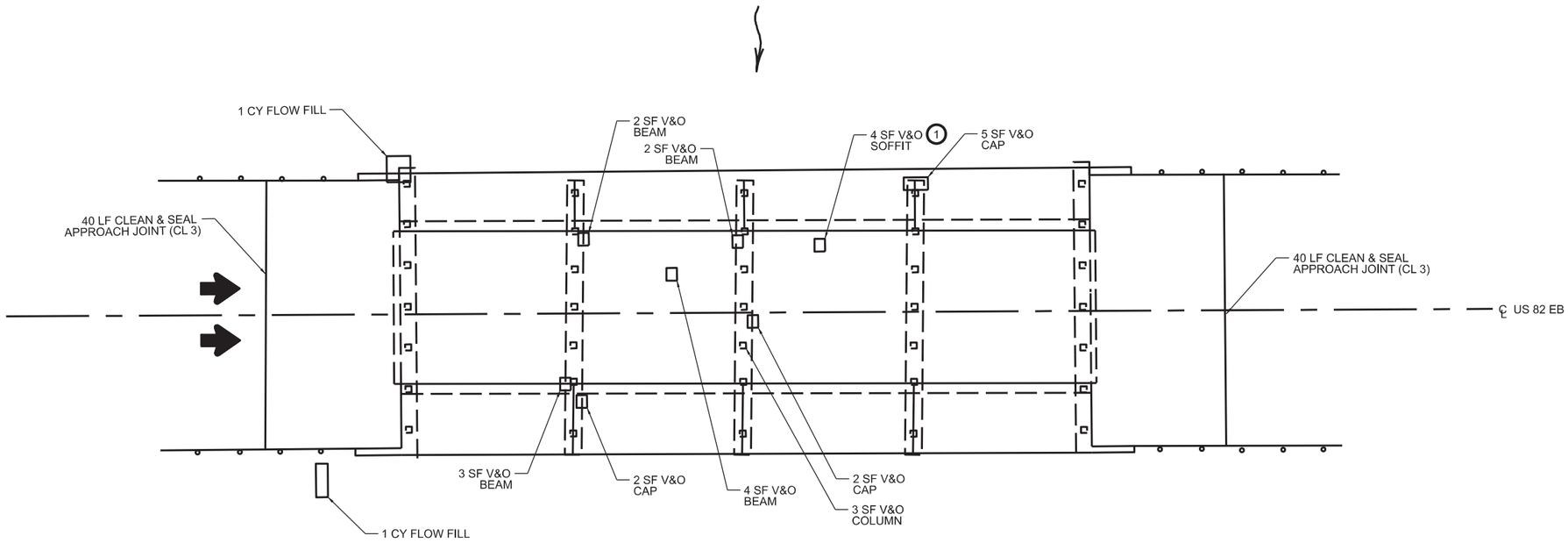
REFERENCE #1 BRIDGE LAYOUT

NBI: 03-049-0044-08-113

US 82 WB OVER DRY ELM CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		28

LAT: 33.644579 LON:-97.098269



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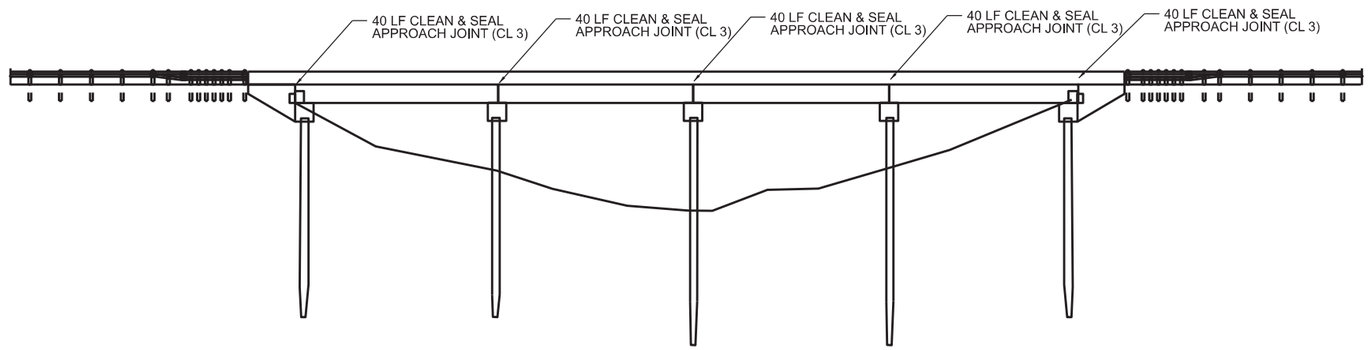

4 - SIMPLE SPAN CONC. T-BEAMS WIDENED WITH PAN GIRDERS

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION. CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	556494			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

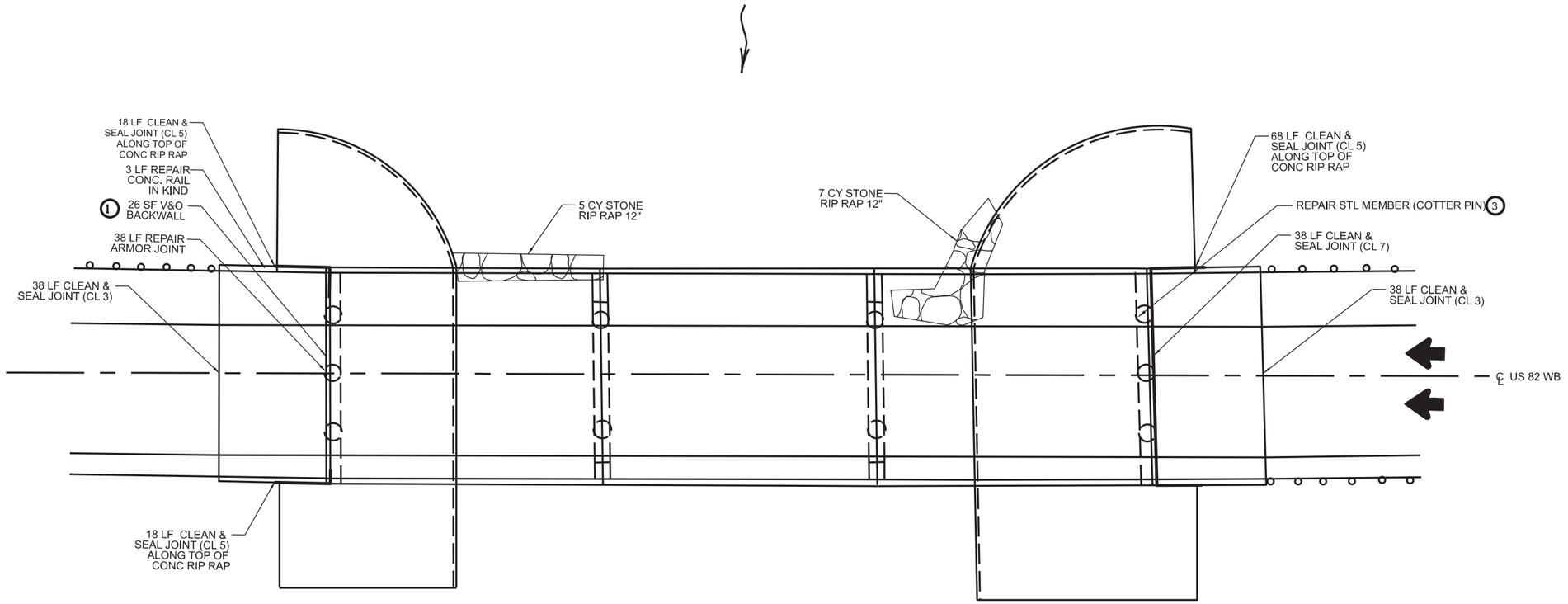
REFERENCE #2 BRIDGE LAYOUT

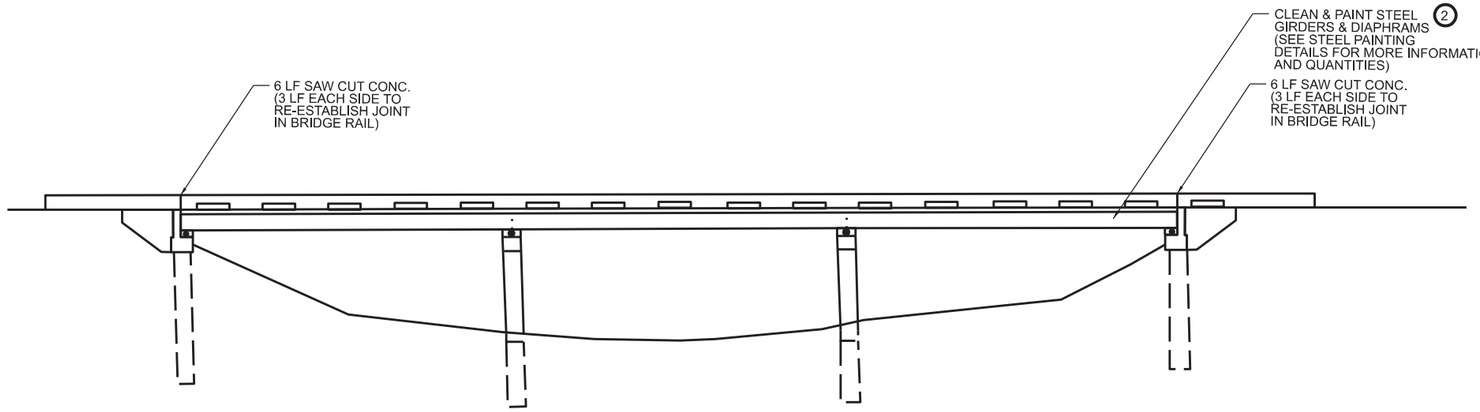
NBI: 03-049-0045-01-002

US 82 EB OVER ROCK CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		29

LAT: 33.641004 LON:-97.140666





3 - SPAN CONTINUOUS STEEL I-BEAM
WIDENED PS CONC. I-BEAMS

N.T.S.

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	571386			
2	714292			
3	714302			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

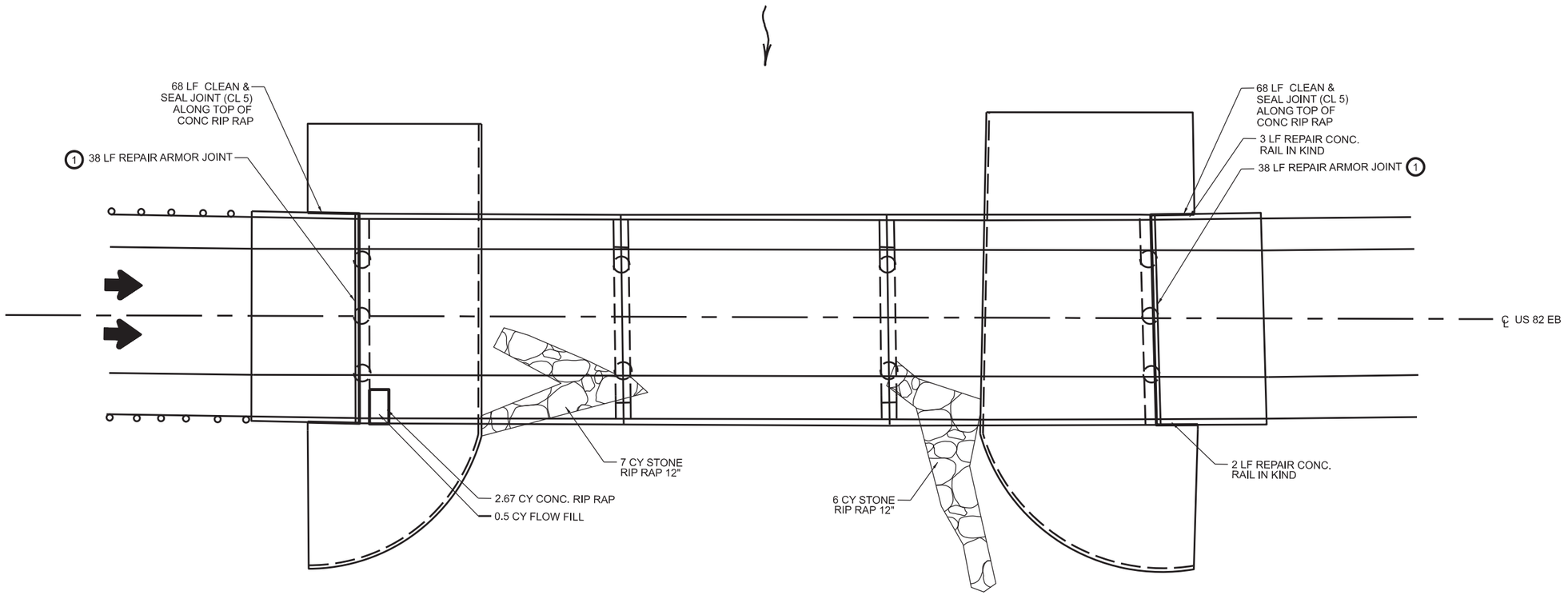
REFERENCE #3
BRIDGE LAYOUT

NBI: 03-049-0045-01-109

US 82 WB OVER PECAN CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		30

LAT: 33.640825 LON:-97.140641



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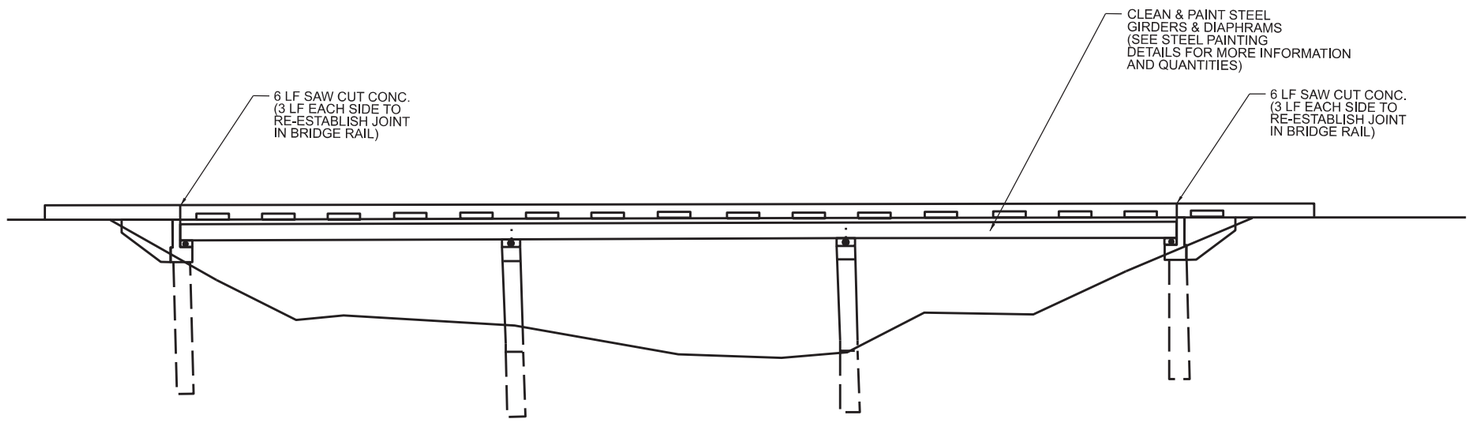

3 - SPAN CONTINUOUS STEEL I-BEAM
WIDENED PS CONC. I-BEAMS

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
FILE:

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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	571387			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

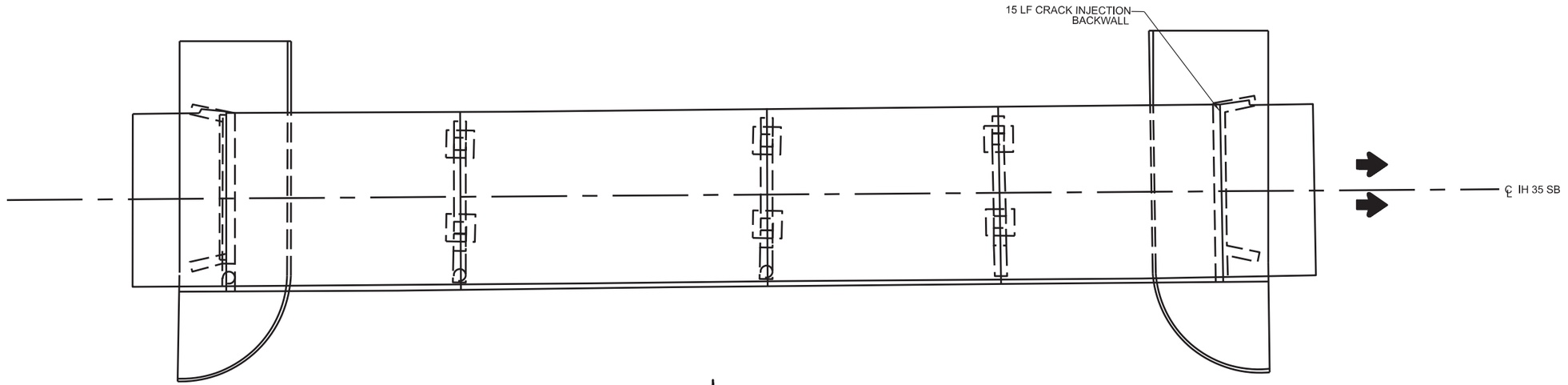
REFERENCE #4
BRIDGE LAYOUT

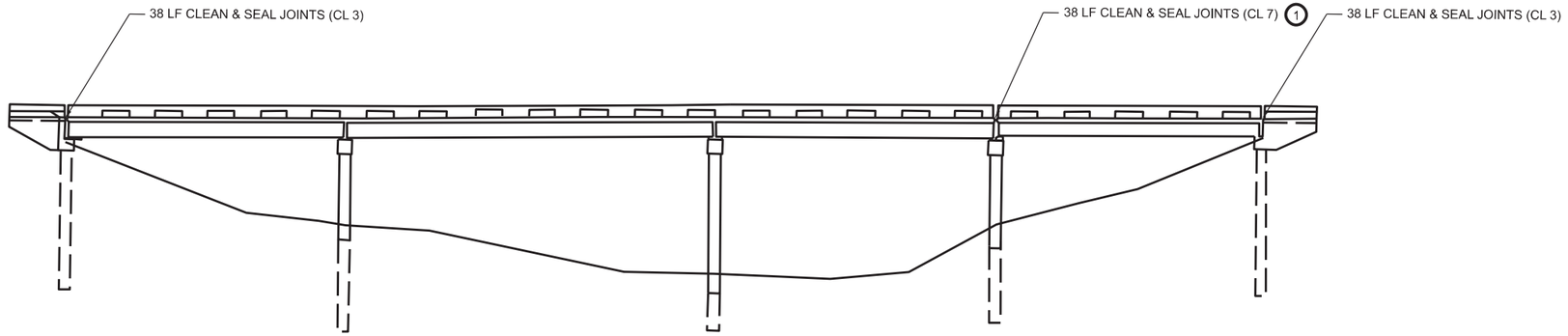
NBI: 03-049-0045-01-110

US 82 EB OVER PECAN CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		31

LAT: 33.470799 LON:-97.163367





4 - Span (3 - Continuous & 1 - Simple)
Steel I-Beam Bridge

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	551038			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
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PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

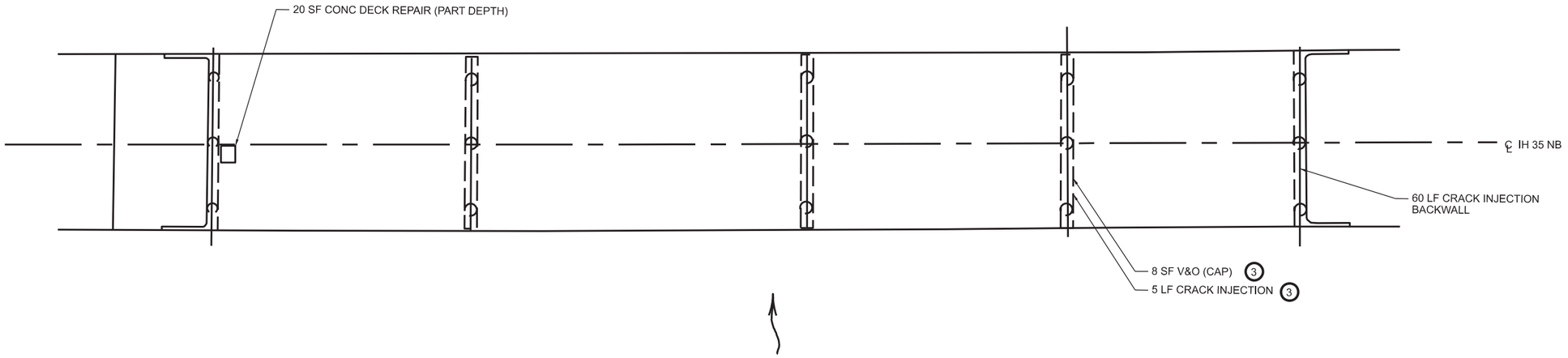
REFERENCE #5
BRIDGE LAYOUT

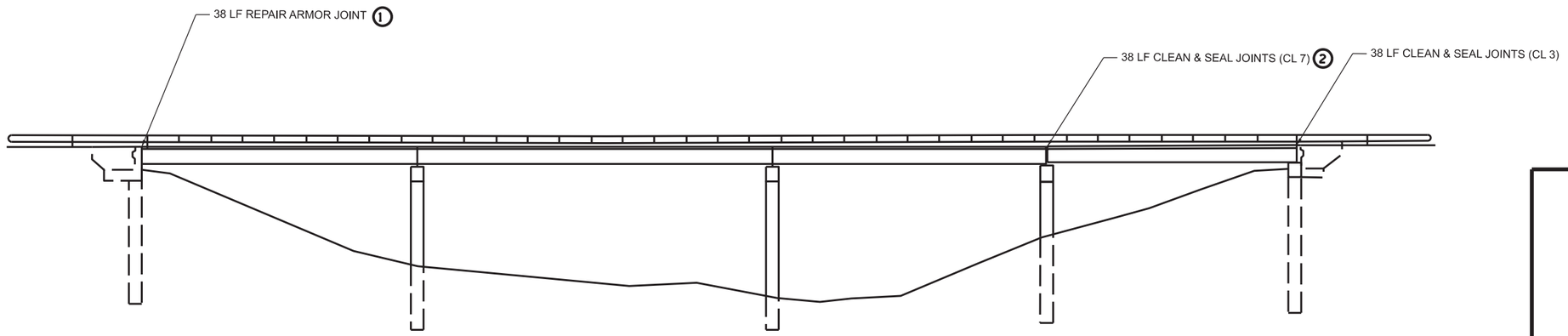
NBI: 03-049-0195-01-028

IH 35 SB AT SPRING CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		32

LAT: 33.470799 LON:-97.163150





N.T.S.

4 - SPAN (3 CONTINOUS, 1 SIMPLE)
STEEL I-BEAM

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	551344			
2	551347			
3	551535			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

REFERENCE #6
BRIDGE LAYOUT

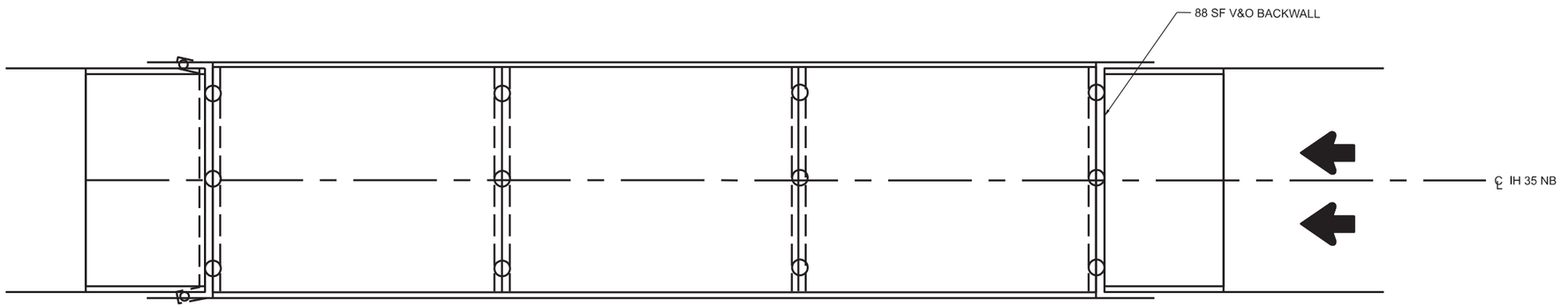
NBI: 03-049-0195-01-105

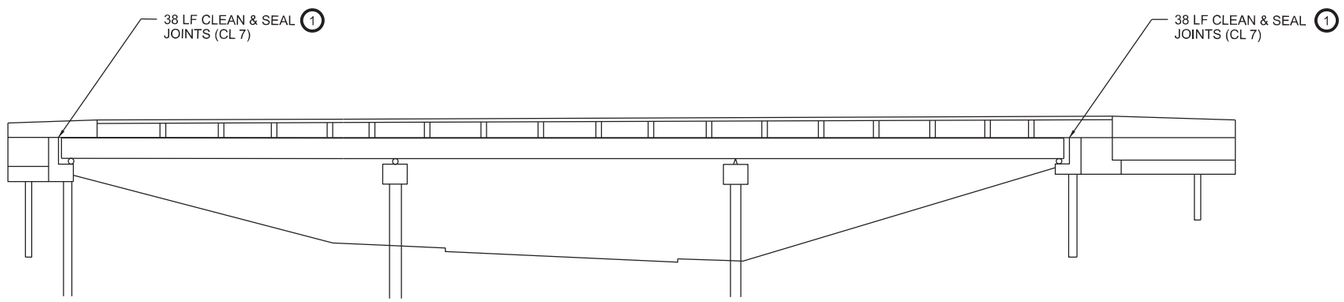
IH 35 NB OVER SPRING CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		33

DATE:
FILE:

LAT: 33.468791 LON:-97.163366





3 - Continuous Span Steel I-Beam Bridge

N.T.S.

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
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FOR AREA OFFICE USE ONLY				
#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	551384			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

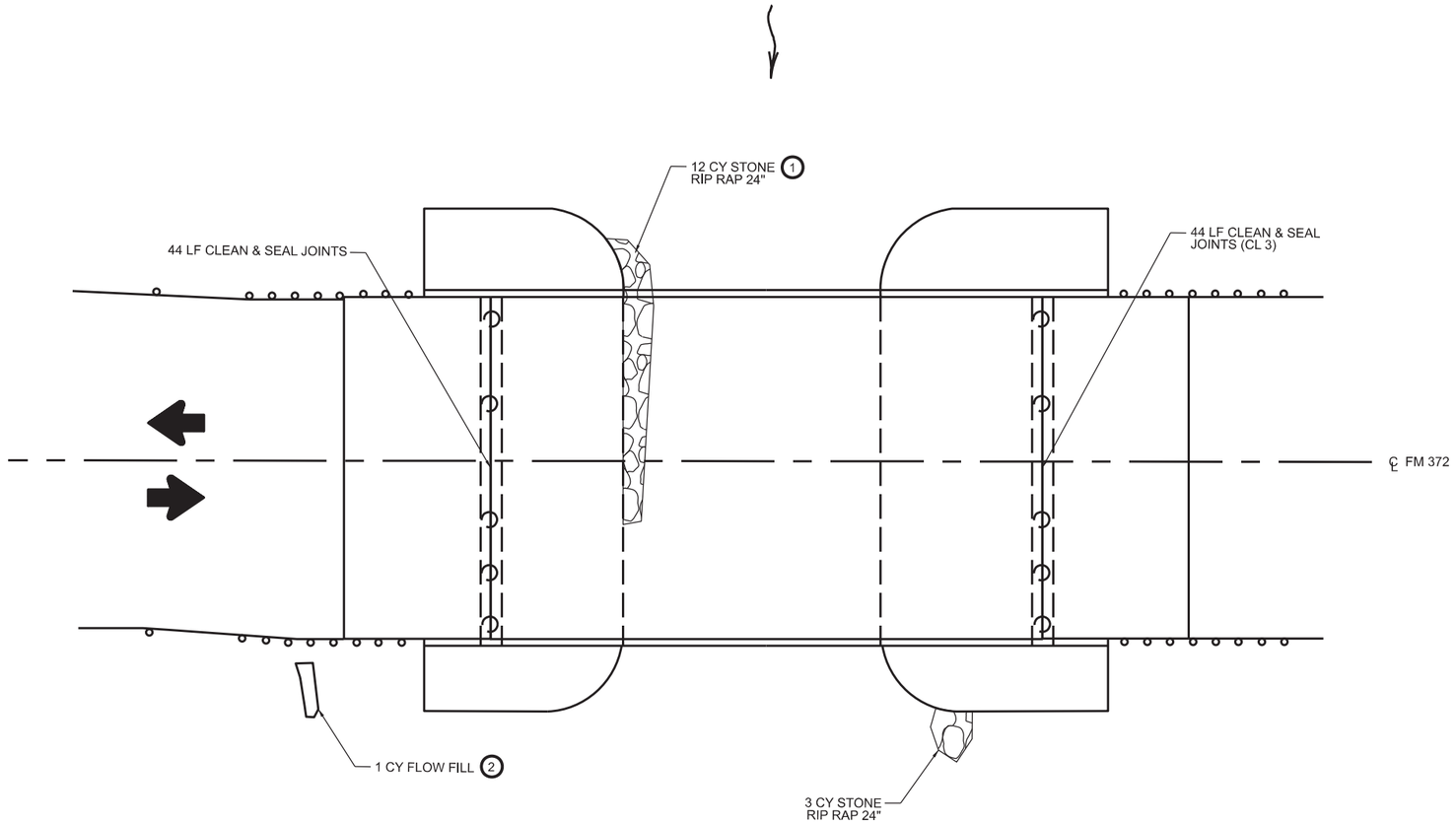
REFERENCE #7
BRIDGE LAYOUT

NBI: 03-049-0195-01-106

IH 35 NB OVER SPRING CREEK RELIEF

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		34

LAT: 33.574956 LON:-97.103095



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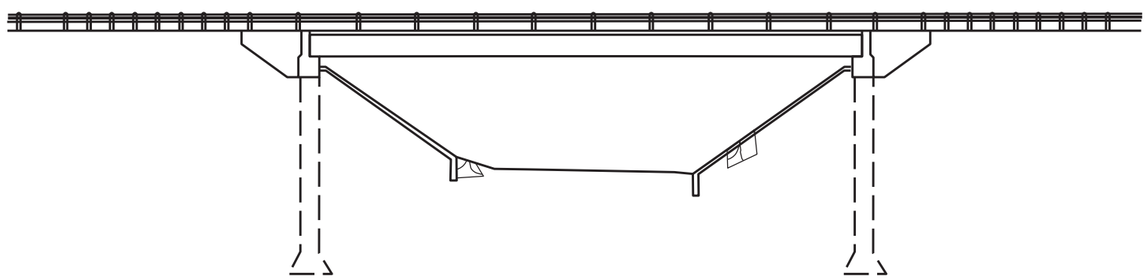

Single Span Prestressed Concrete
Beam Bridge

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
(1)	561250			
(2)	714992			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

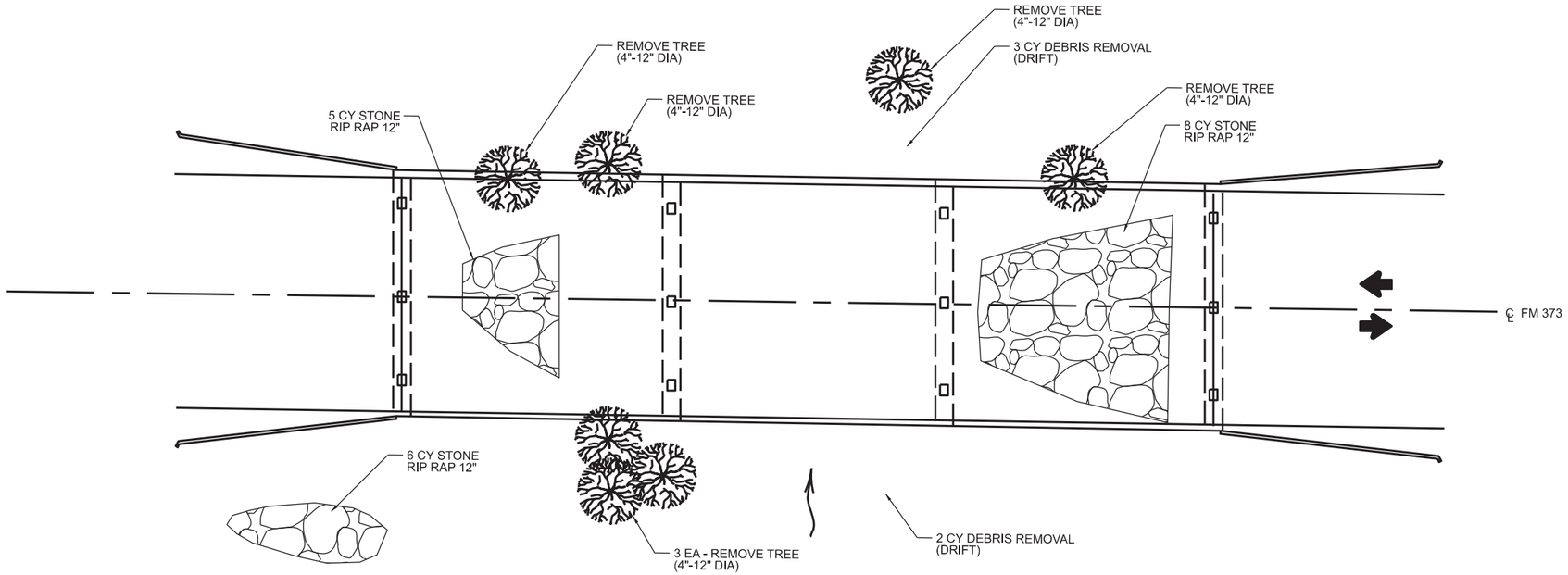
REFERENCE #8
BRIDGE LAYOUT

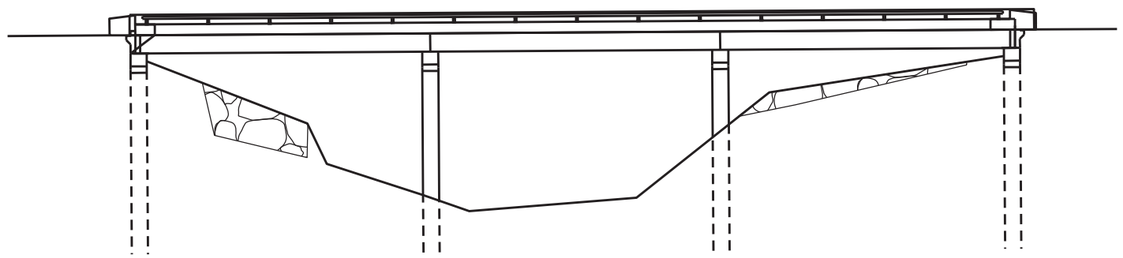
NBI: 03-049-0815-01-021

FM 372 OVER DRAW

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		35

LAT: 33.644491 LON:-97.377001





3 - Simple Span Reinforced Concrete Pan Formed
Girder Bridge on Concrete Substructure

N.T.S.

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
FILE:

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

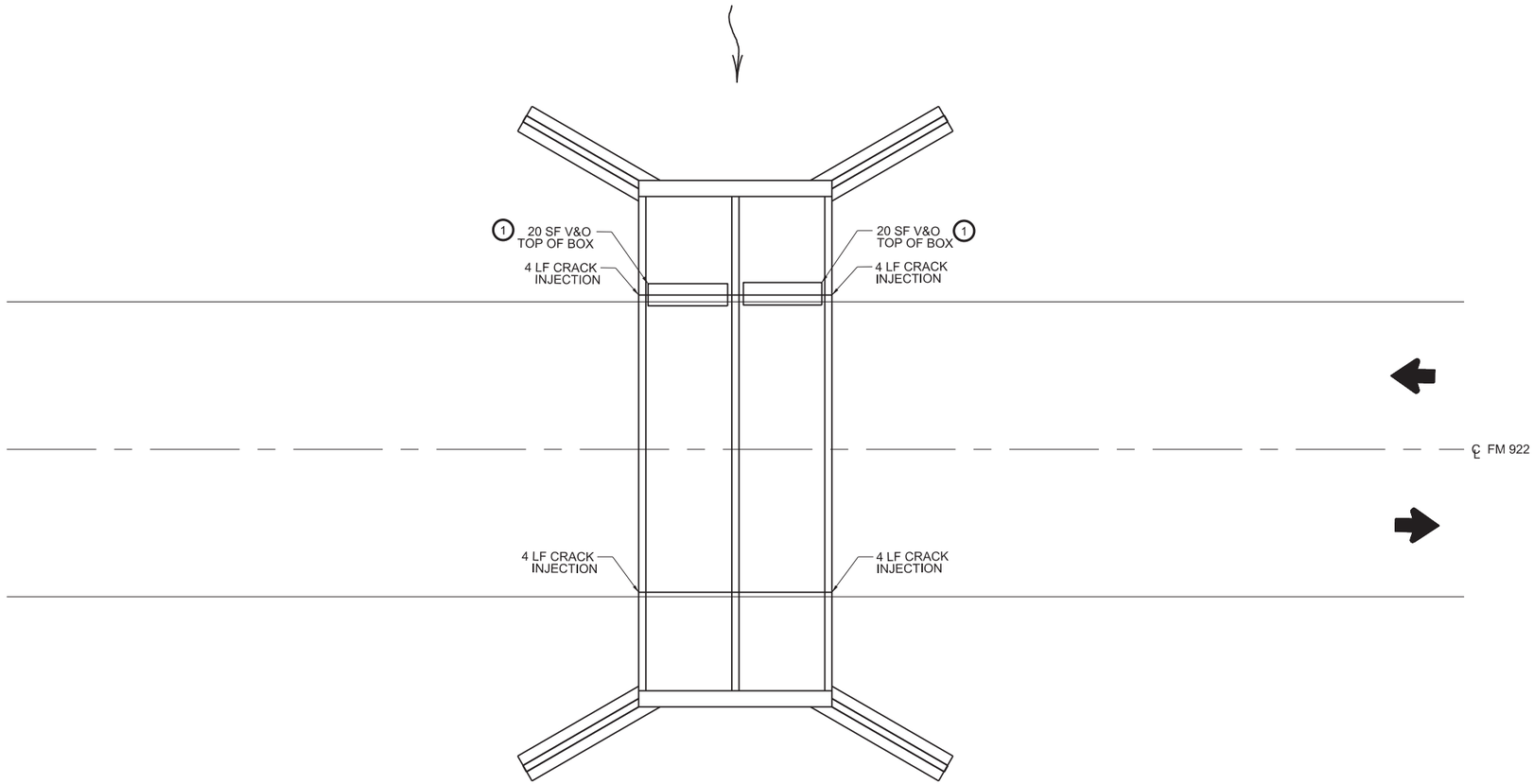
REFERENCE #9
BRIDGE LAYOUT

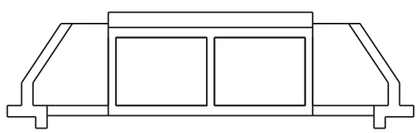
NBI: 03-049-0823-02-006

FM 373 OVER
BRUSHY ELM CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		36

LAT: 33.488126 LON:-97.159176





EXISTING 2 - 10' X 4' X 49.7'

N.T.S.

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

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FILE:

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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	556518			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

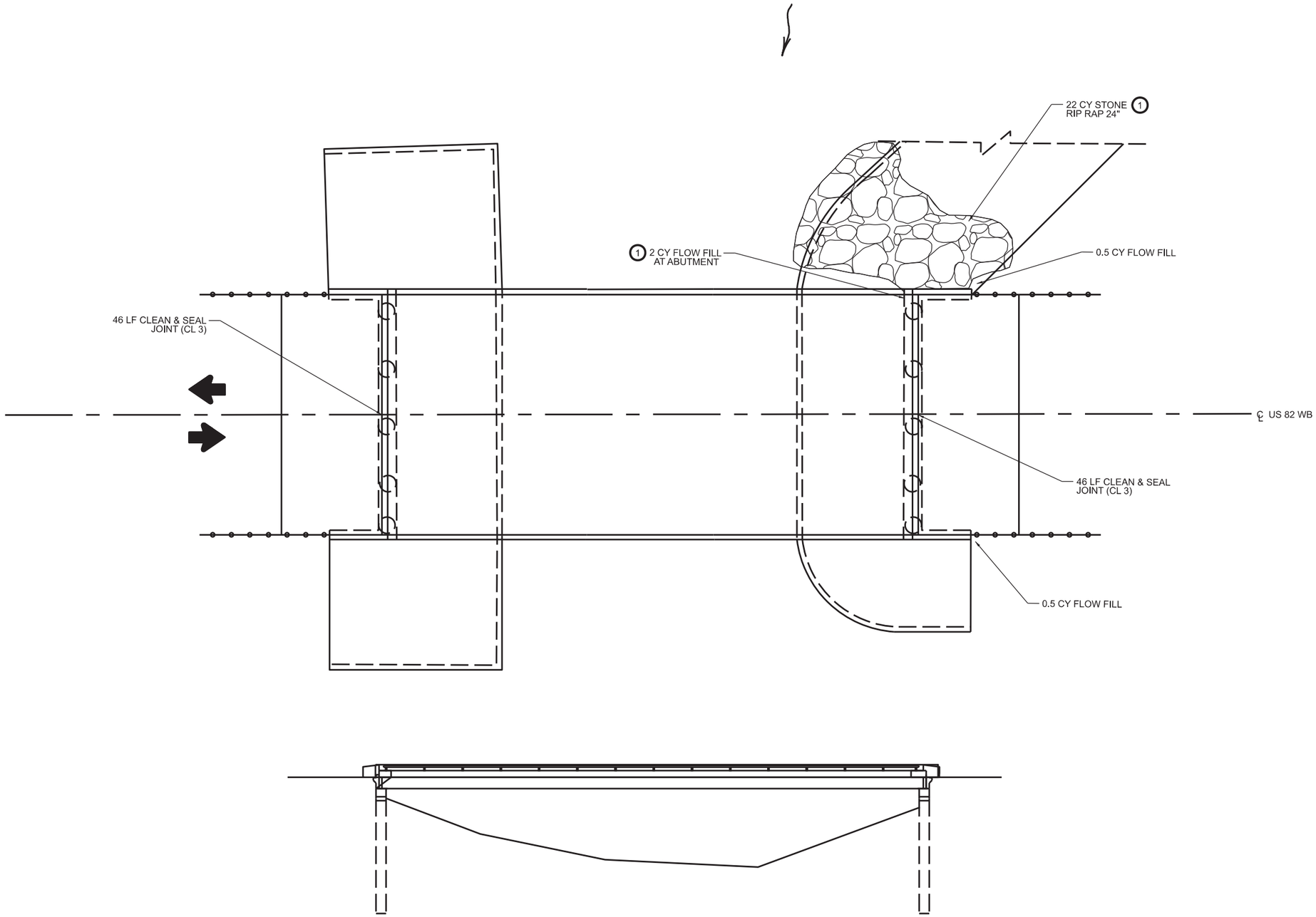
REFERENCE #10
BRIDGE LAYOUT

NBI: 03-049-0845-03-007

FM 922 AT DRAW

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		37

LAT: 33.505738 LON:-97.386210



N.T.S.

Single Span Prestressed Concrete
I-Beam Bridge

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
(1)	572428			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

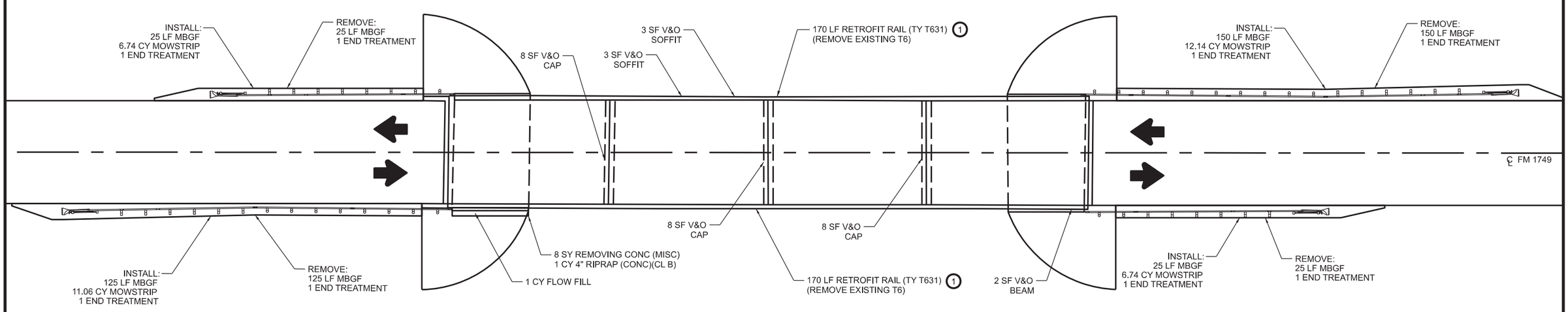
REFERENCE #11
BRIDGE LAYOUT

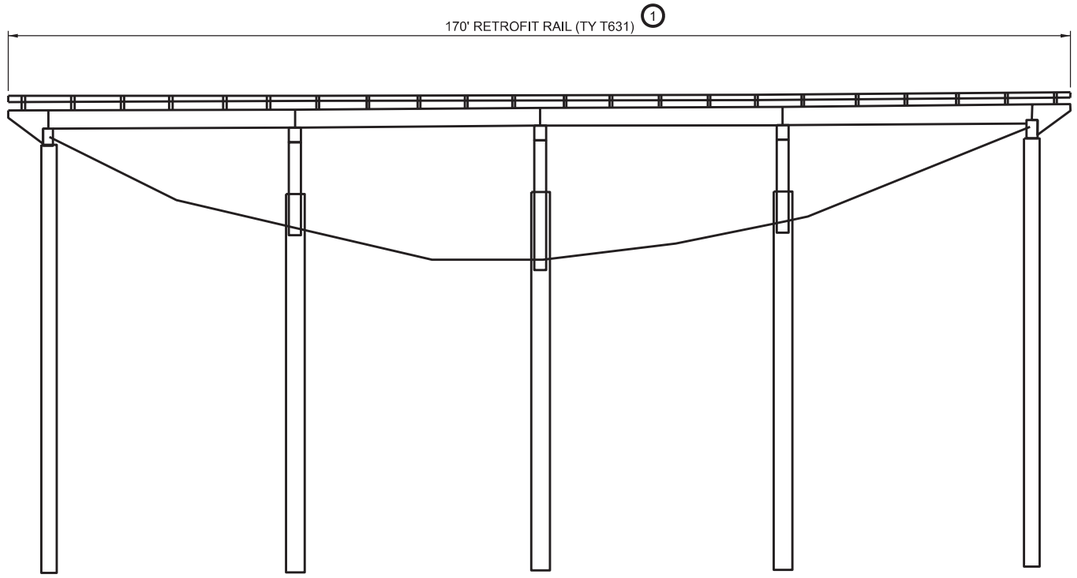
NBI: 03-049-0845-03-105

FM 922 OVER WILLIAM CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		38

LAT: 33.506338 LON:-97.654926





4 Simple Concrete Pan Girder Spans on Concrete Substructure

N.T.S.

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	542921			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

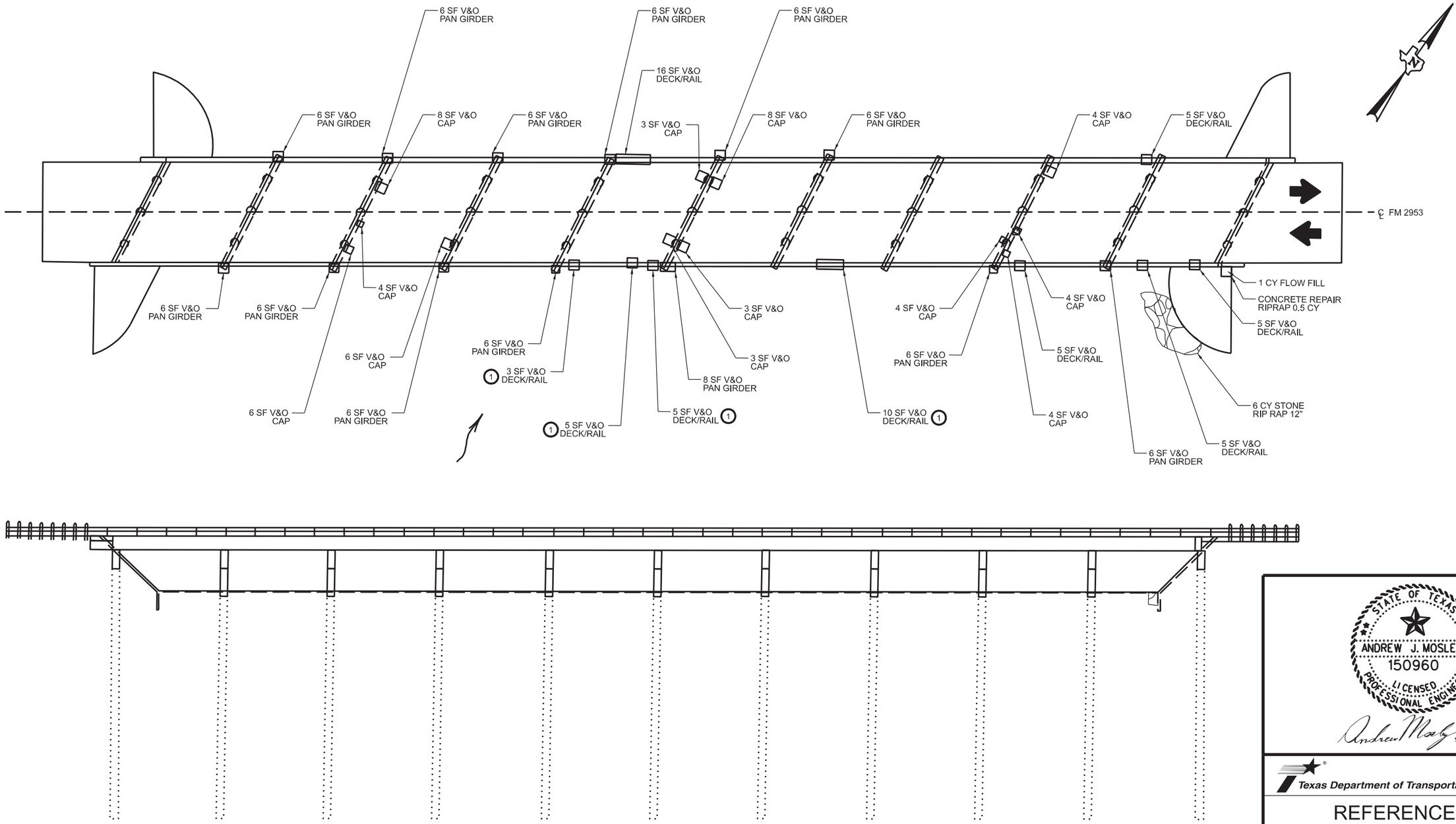
REFERENCE #12
BRIDGE LAYOUT

NBI: 03-169-0351-03-009

FM 1749 OVER DENTON CREEK

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		39

LAT: 33.88087704 LON:-97.66118584



N.T.S.

10 - Simple Span Concrete Pan Formed Girder Bridge With a 27 Degree Left Forward Skew

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
FILE:

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#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	704676			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

REFERENCE #13 BRIDGE LAYOUT

NBI: 03-169-2706-02-002

FM 2953 AT LAKE NOCONA SPILLWAY

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	5469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		40

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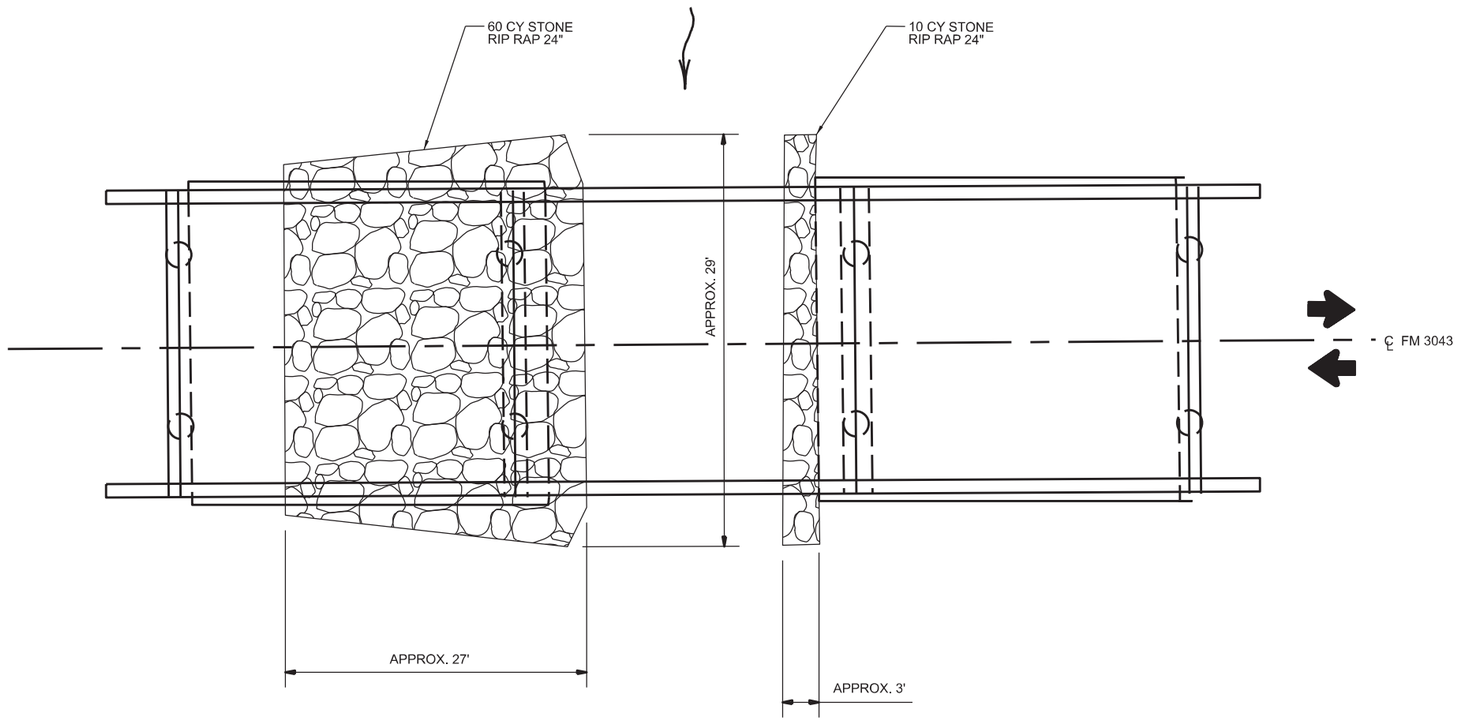

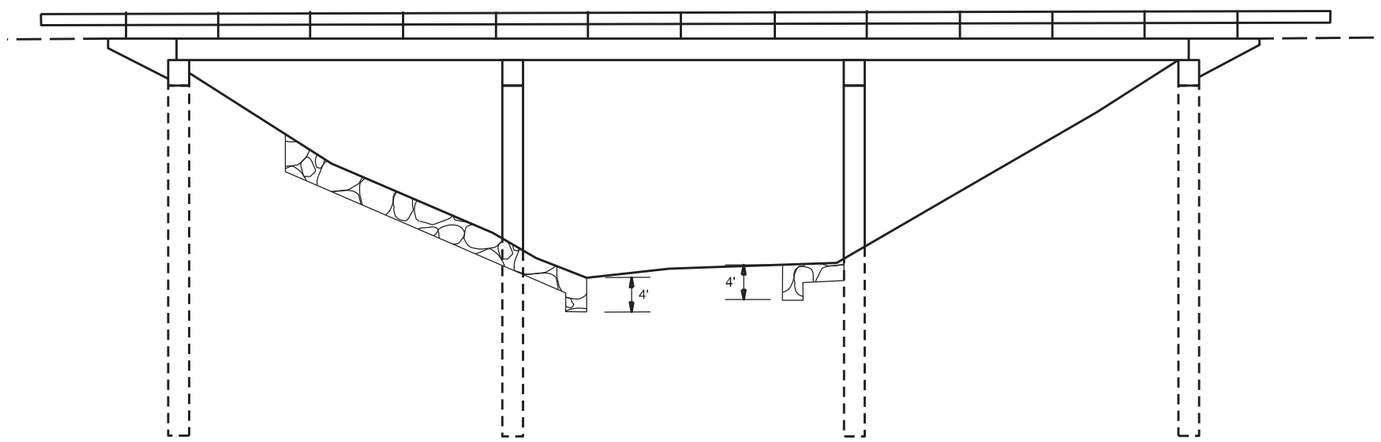

3 - Simple Concrete Pan Girder Spans on Concrete Substructure

N.T.S.

NOTES:

1. QUANTITIES ARE APPROXIMATE AND FIELD CONDITIONS MAY HAVE CHANGED FROM TIME OF INSPECTION, CONTRACTOR SHALL FIELD VERIFY QUANTITIES PRIOR TO BEGINNING WORK.
2. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED FOR ALL MATERIAL AND METHODS OF APPLICATION PRIOR TO THE BEGINNING OF THE REPAIR WORK.

DATE:
FILE:

FOR AREA OFFICE USE ONLY				
#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	580692			

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

Texas Department of Transportation

Wichita Falls District

REFERENCE #14
BRIDGE LAYOUT

NBI: 03-169-3073-01-001

FM 3043 AT
BRUSHY CREEK

FILE:		DN:	CK:	DW:	CK:
©TxDOT JULY 2021		CONT	SECT	JOB	HIGHWAY
REVISIONS		5469	87	001, ETC.	US 82, ETC.
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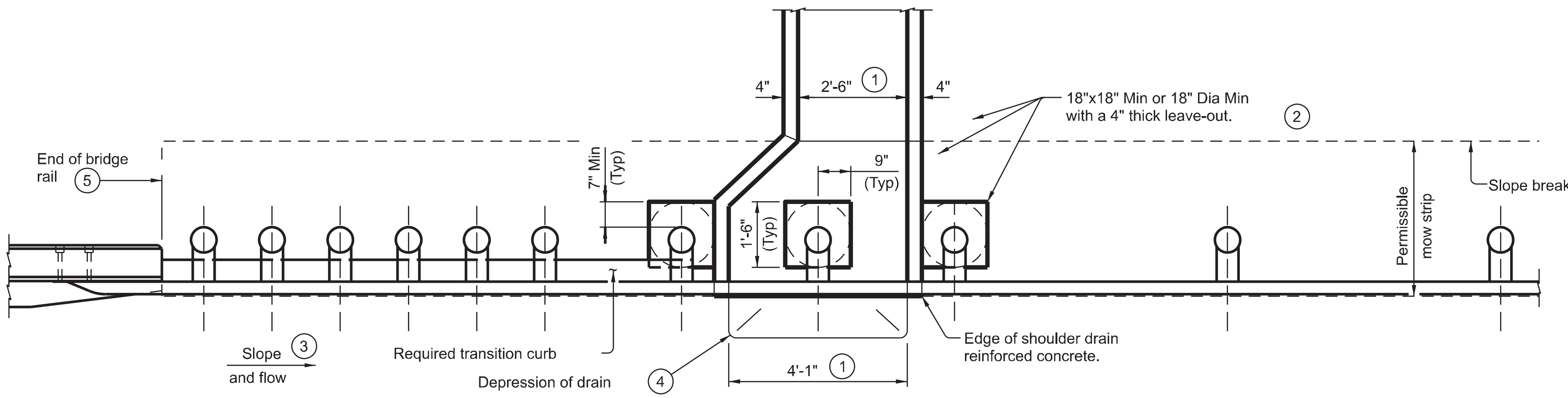
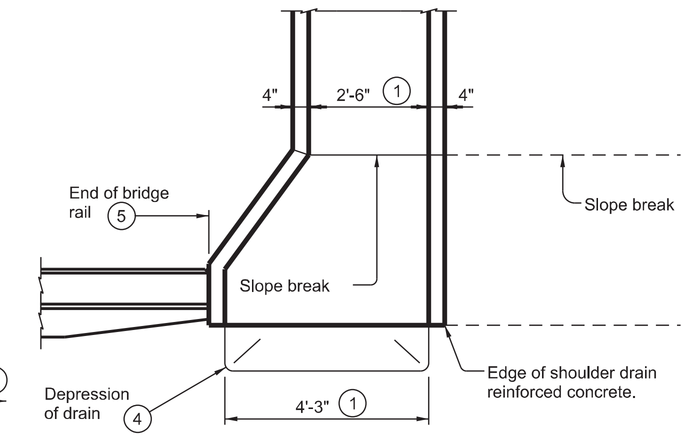
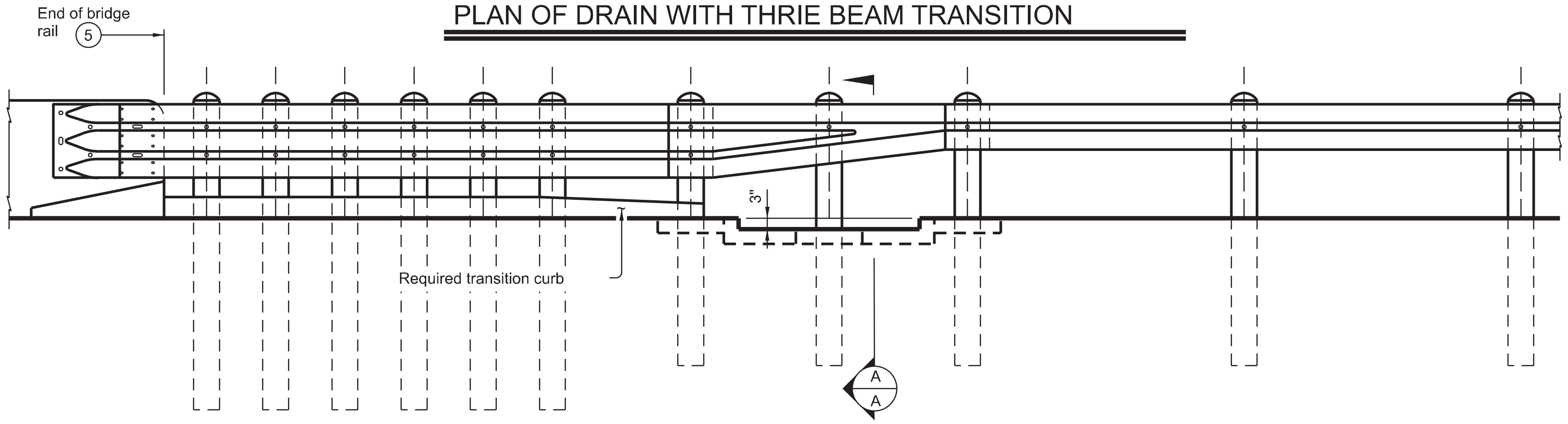
		WFS	COOKE, ETC.		41



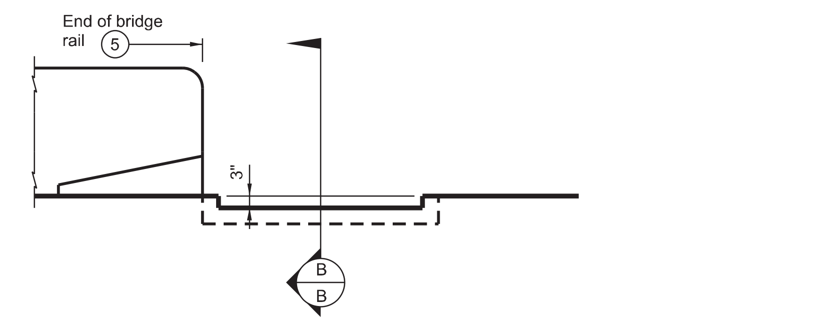
PLAN OF DRAIN WITH THRIE BEAM TRANSITION



PLAN OF DRAIN WITHOUT MBGF TRANSITION



ROADWAY ELEVATION OF DRAIN WITH THRIE BEAM TRANSITION



ROADWAY ELEVATION OF
DRAIN WITHOUT MBGF TRANSITION

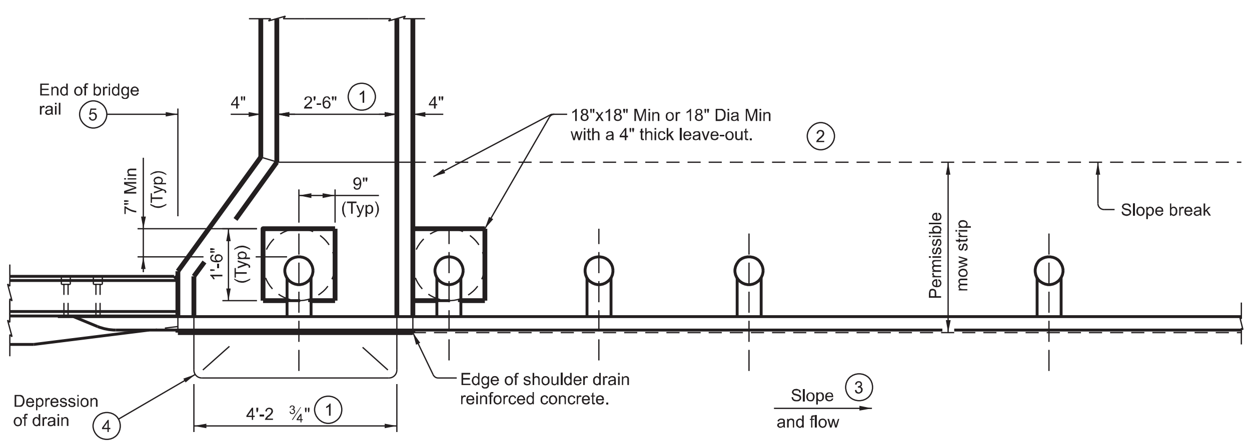
1 Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer. Location of shoulder drain must consider limitation imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

2 Fill leave-outs with no more than a 2-sack grout mixture (1 part cement, 5 parts water, and 14 parts sand by volume) with a 28-day compressive strength of approximately 120 psi or less. Provide grout of 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 (20" Max leave-out).

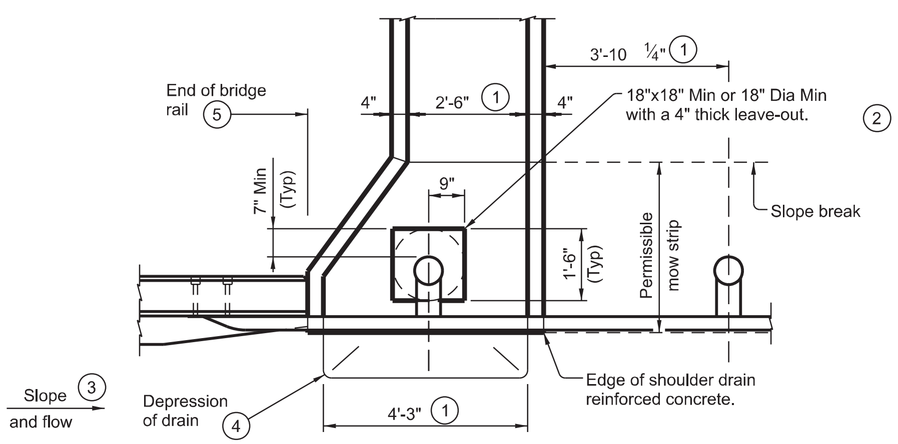
3 For other slope and flow directions drain configuration may be mirrored wider or tapered wider if shown elsewhere in the plans or directed by the Engineer.

4 Form depression into concrete, asphalt pavement, or approach slab.

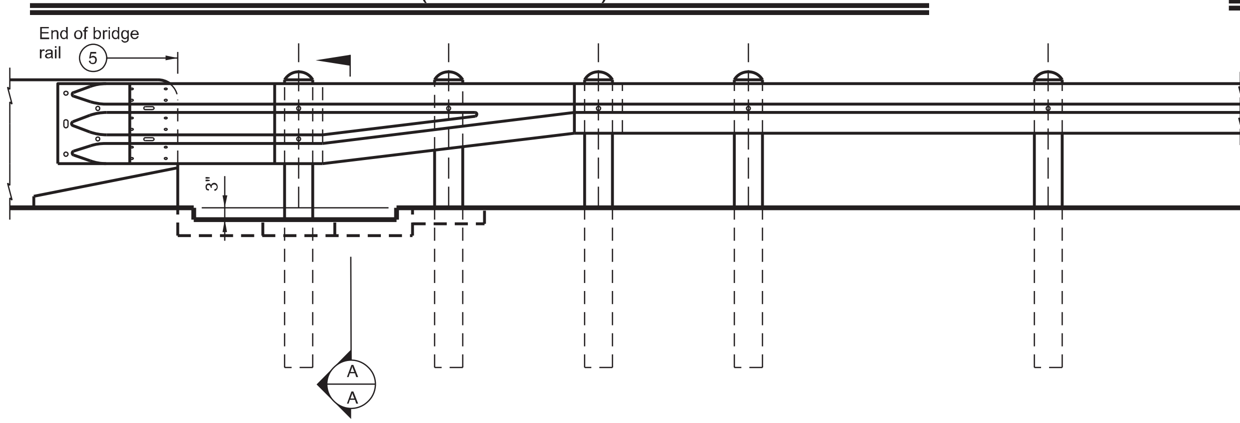
5 See Bridge Layout for rail type.



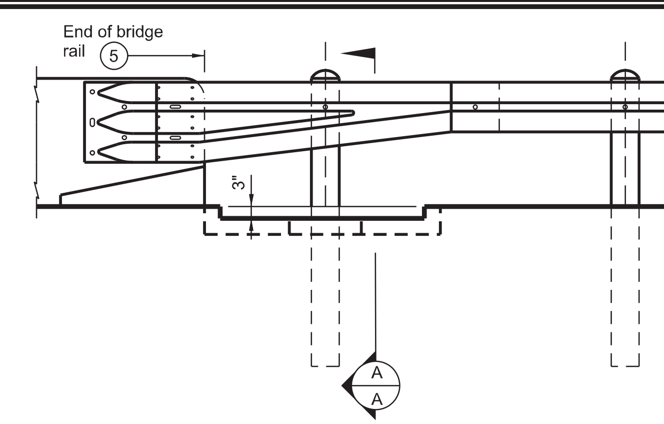
PLAN OF DRAIN WITH TL-2 (LOW SPEED) TRANSITION



PLAN OF DRAIN WITH DOWNSTREAM ANCHOR TERMINAL



ROADWAY ELEVATION OF DRAIN
WITH TL-2 (LOW SPEED) TRANSITION



ROADWAY ELEVATION OF DRAIN
WITH DOWNSTREAM ANCHOR TERMINAL

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SHOULDER DRAIN AT END OF BRIDGE RAIL

SD-EBR

FILE: sdebr001-19.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST		COUNTY	SHEET NO.
	WFS		COOKE, ETC.	42

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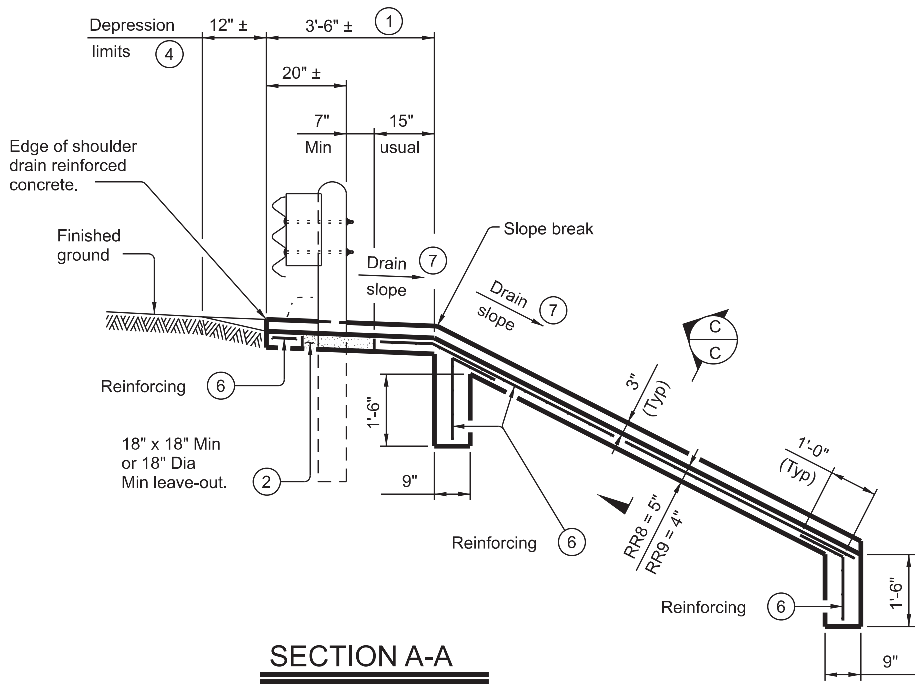
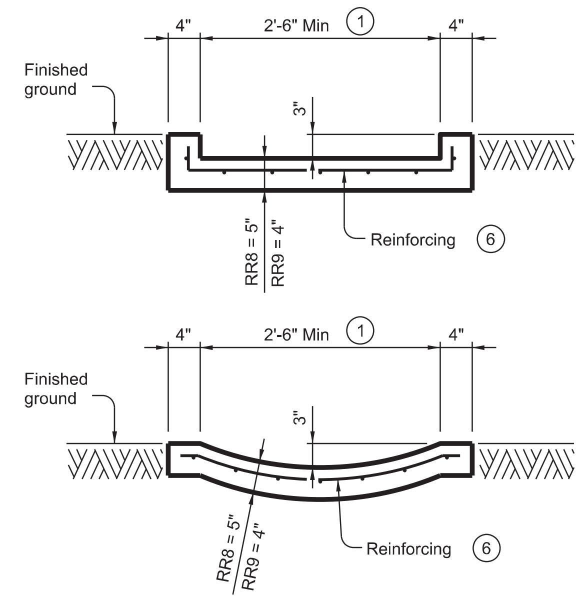
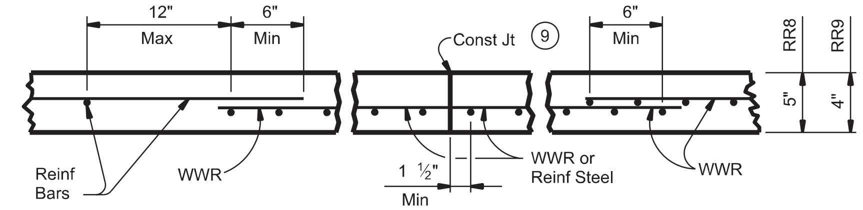


SECTION A-A



SECTION C-C

Sections shown without integrated riprap.



REINFORCEMENT DETAILS (6)

See General Notes for optional synthetic fiber reinforcement.

(1) Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer. Location of shoulder drain must consider limitation imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

(2) Fill leave-outs with no more than a 2-sack grout mixture (1 part cement, 5 parts water, and 14 parts sand by volume) with a 28-day compressive strength of approximately 120 psi or less. Provide grout of 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 (20" Max leave-out).

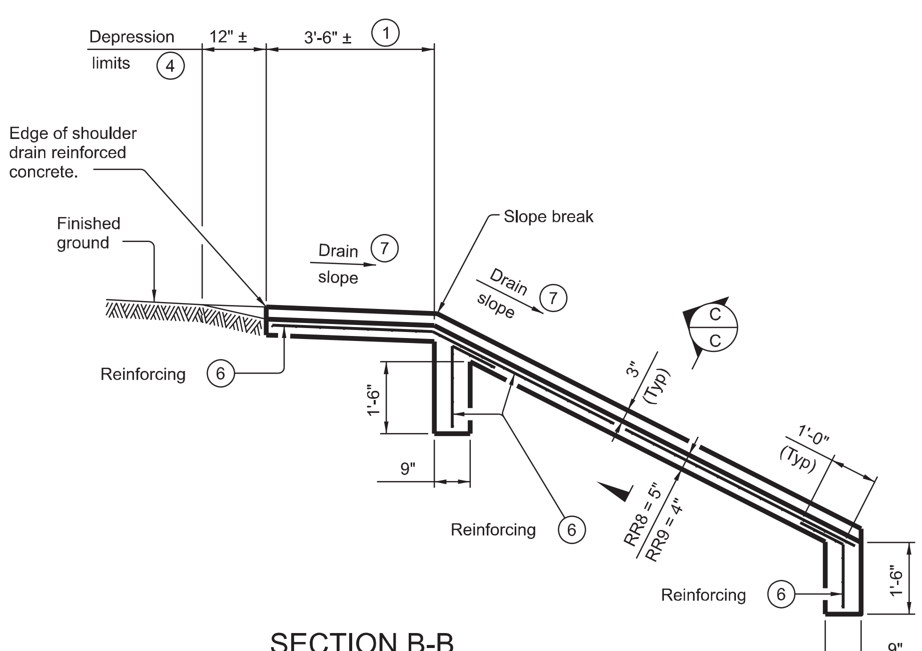
(4) Form depression into concrete, asphalt pavement, or approach slab.

(6) Provide (#3) reinforcing bar at 18" spacing c-c or welded wire reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars, unless shown otherwise.

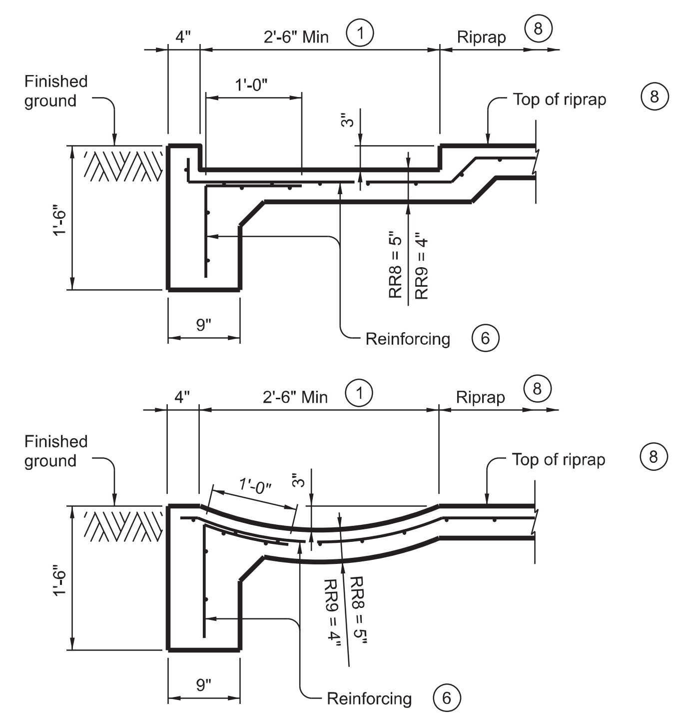
(7) See elsewhere in plans or as directed by the Engineer.

(8) See CRR standard for details and notes not shown.

(9) WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic fiber is utilized.



SECTION B-B



SECTION C-C

Sections shown with integrated riprap.

GENERAL NOTES

Provide Class "B" concrete with a minimum compressive strength of 2,000 psi unless noted elsewhere in plans.
Provide Grade 60 reinforcing steel.
Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
See Metal Beam Guard Fence (Mow Strip) standard for details and notes not shown.
Payment for furnishing and placing 2-sack grout mixture will be subsidiary to shoulder drain.
Payment for shoulder drain will be as per Item 420, "Cl B Conc (Flume)". All details shown herein are subsidiary to shoulder drain.
See Layout for limits of shoulder drain.
RR8 is to be used on stream crossings.
RR9 is to be used on other embankments.

Texas Department of Transportation | Bridge Division Standard

SHOULDER DRAIN AT END OF BRIDGE RAIL

SD-EBR

FILE: sdebr001-19.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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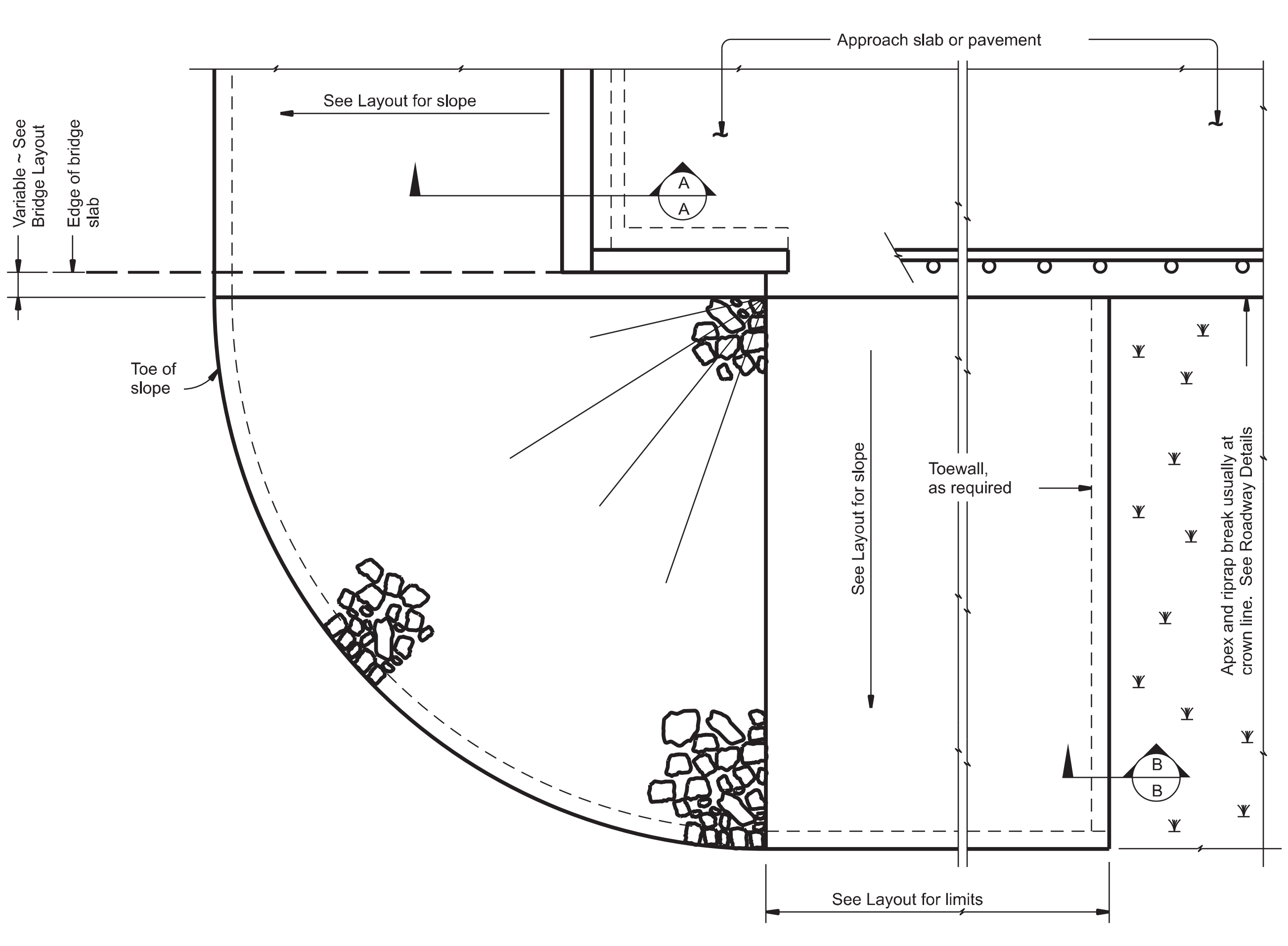
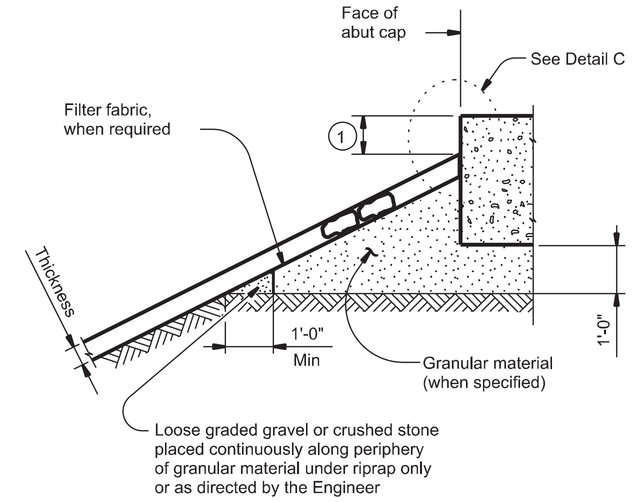
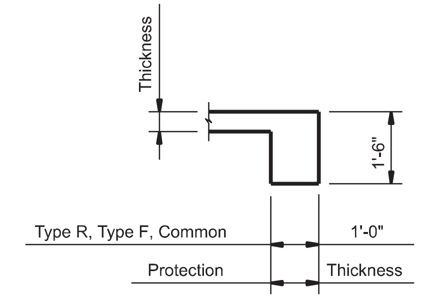
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		43



PLAN

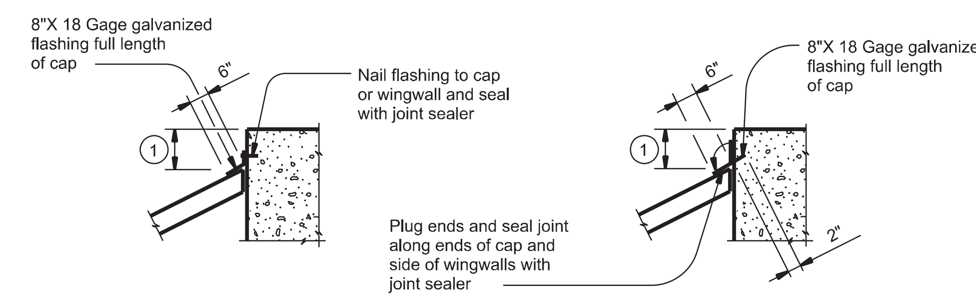


SECTION A-A AT CAP



SECTION B-B

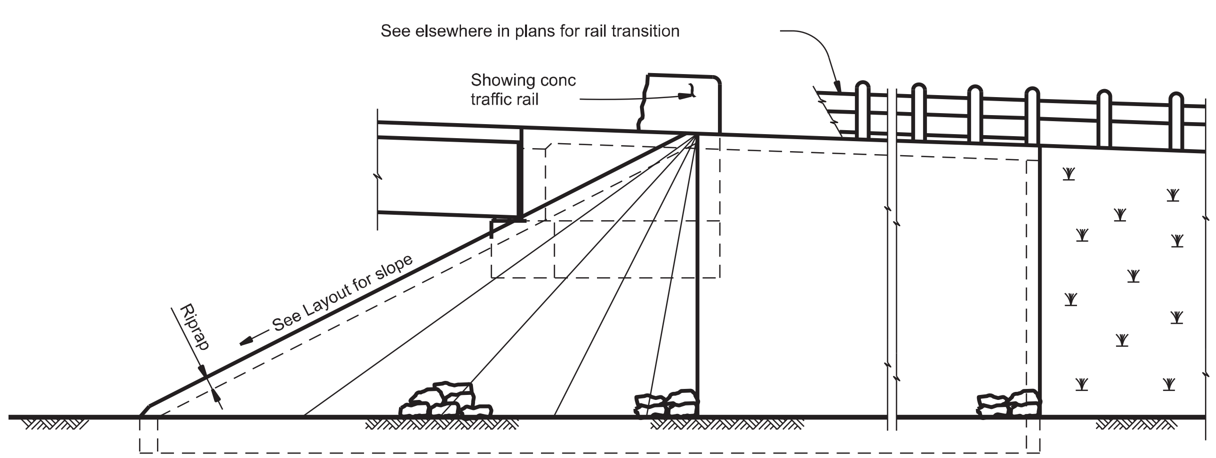
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

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SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

STONE RIPRAP

SRR

FILE:	srrstde1-19.dgn	DN: AES	CK: JGD		DW: BWH		CK: AES	
©TxDOT	April 2019	CONT	SECT	JOB		HIGHWAY		
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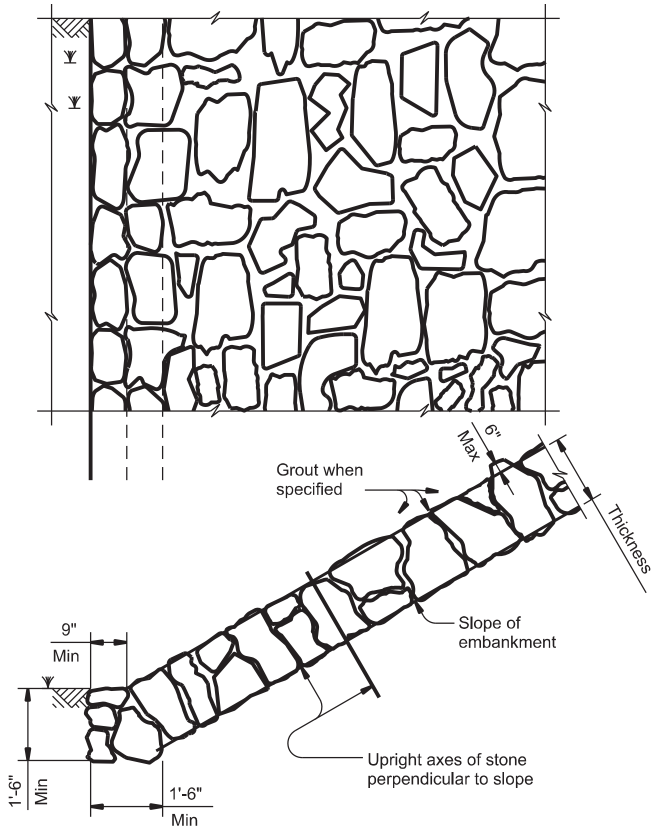


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

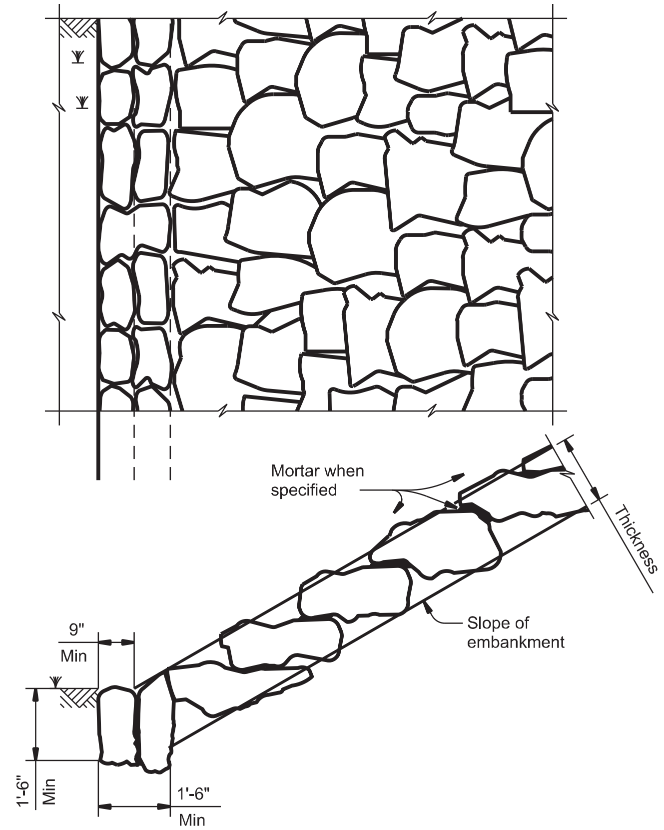


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

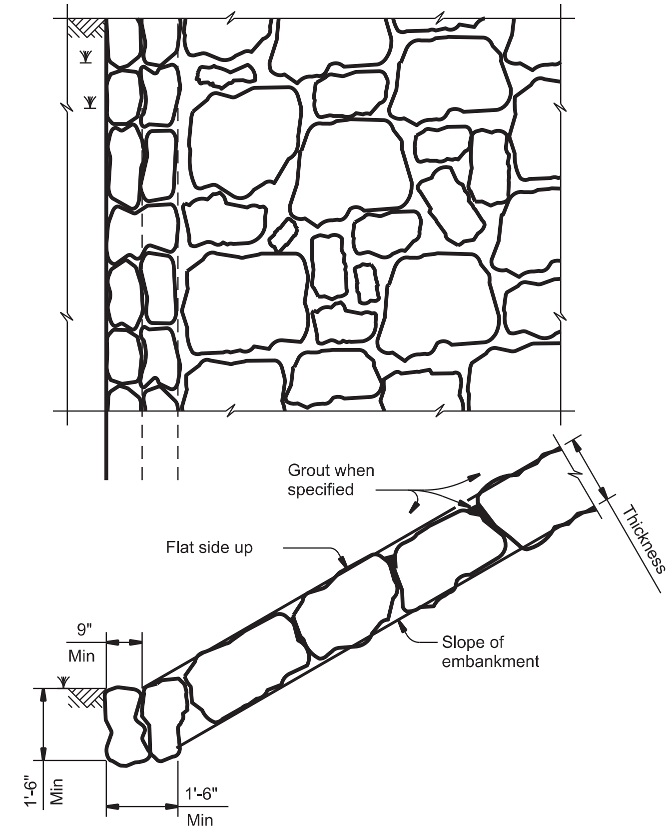


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

2. Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

3. Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

4. "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

5. List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.

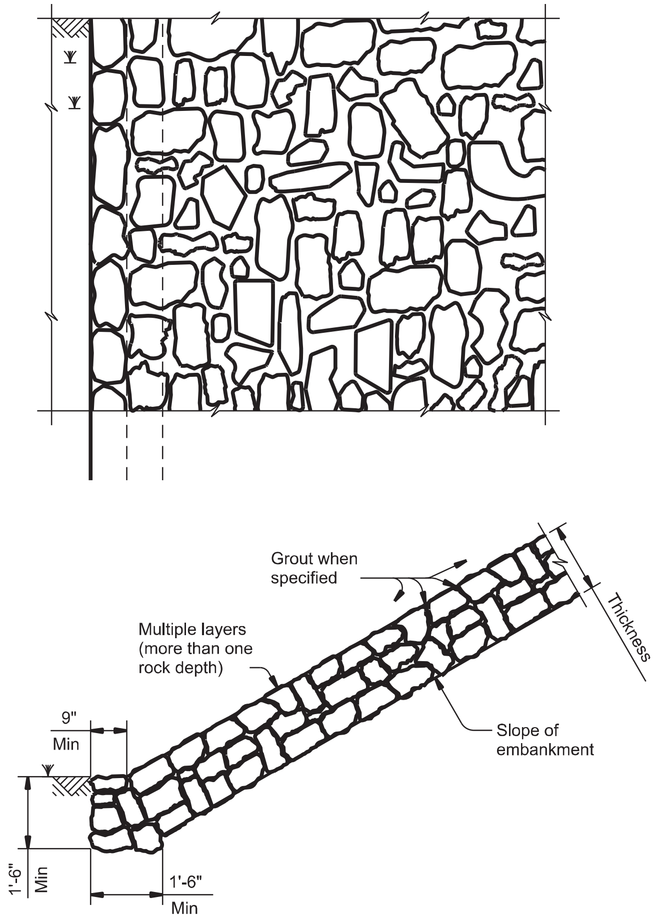


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

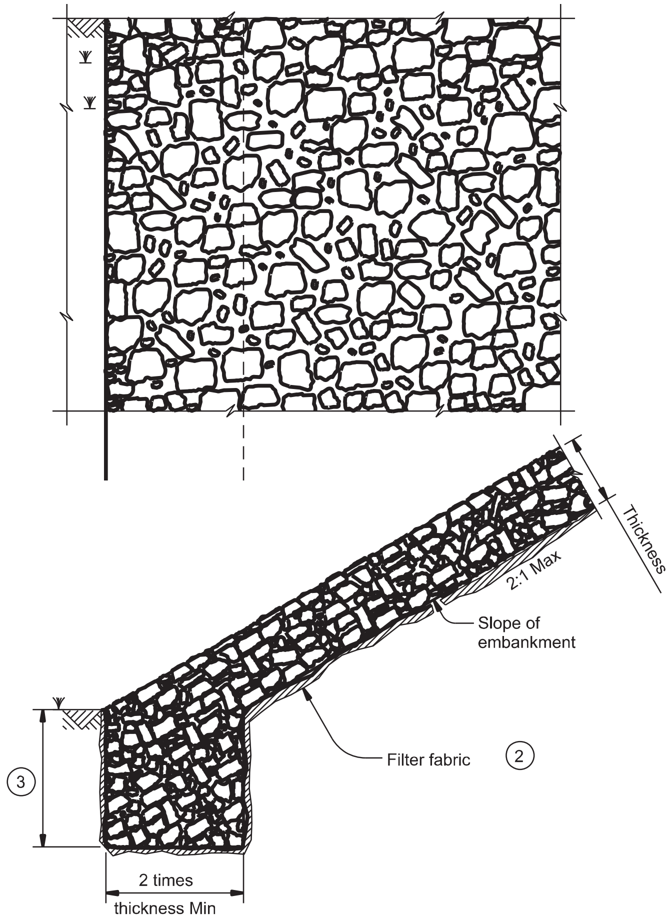
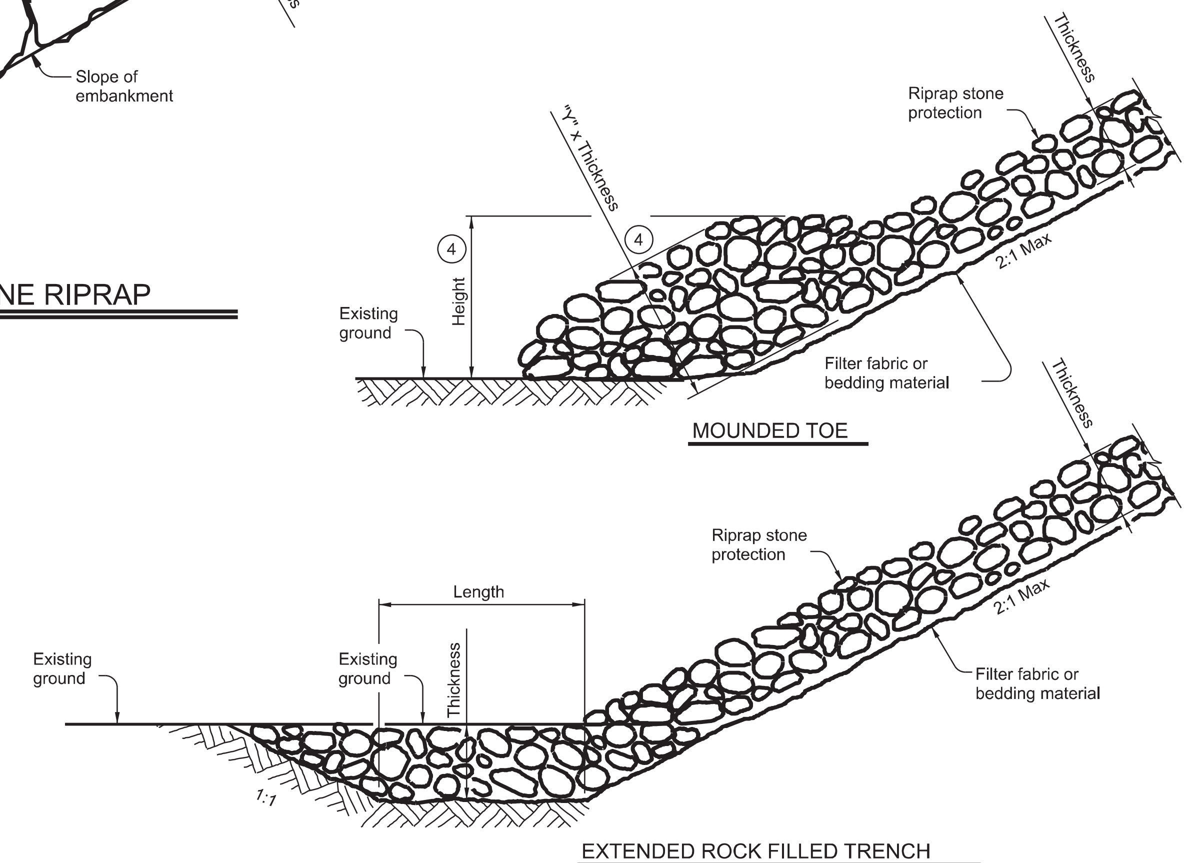


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)



PROTECTION STONE RIPRAP TOE OPTIONS (5)

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

STONE RIPRAP

SRR

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
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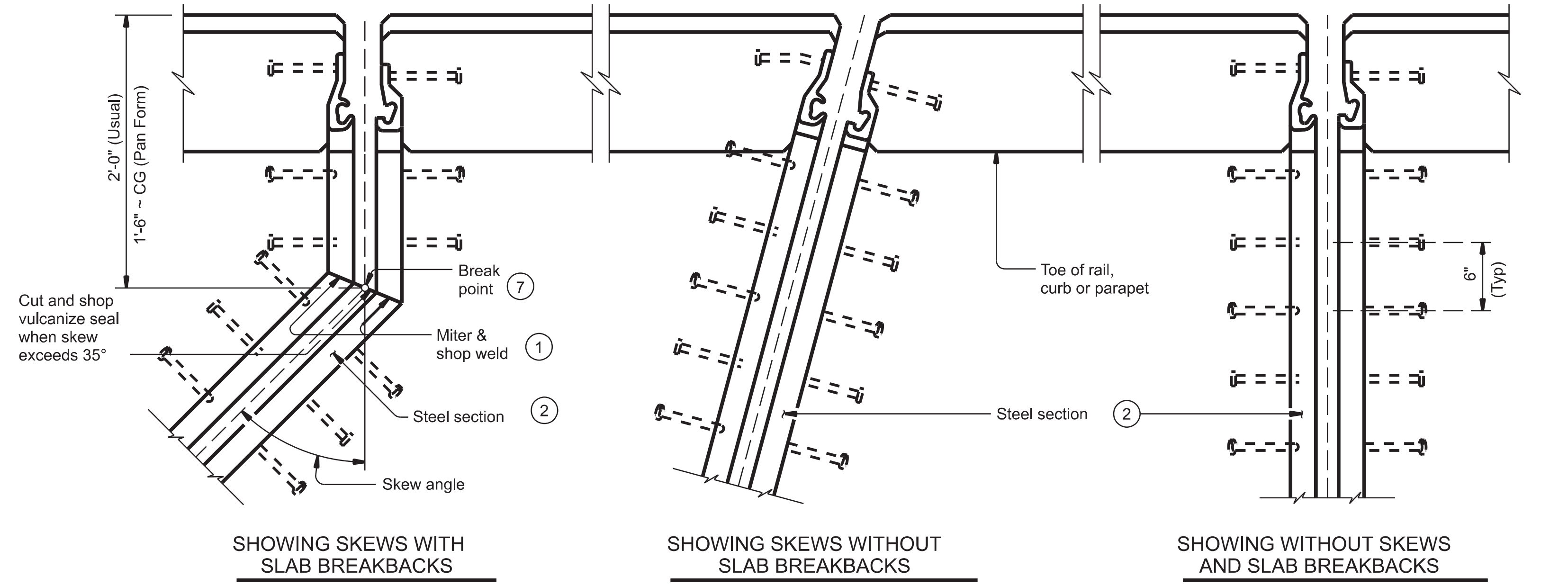
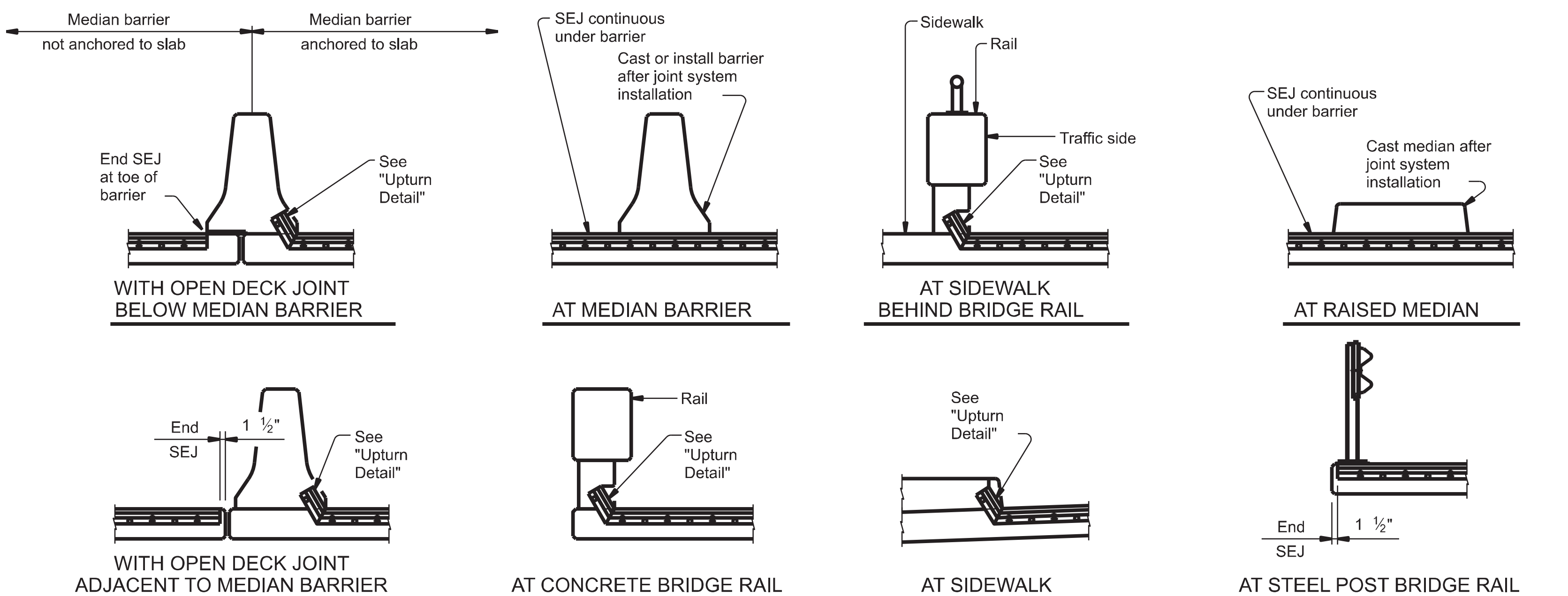


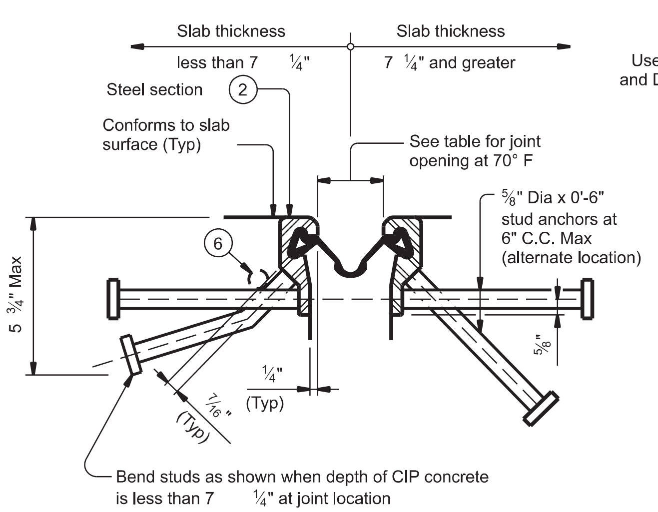
PLANS OF END CONDITIONS

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems. Shown with upturns

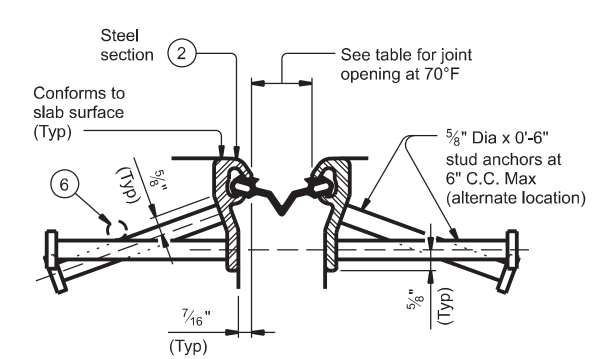


TYPICAL SECTIONS (5)

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



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



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

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"
Watson Bowman Acme	As Shown	SPS-400	2"	N/A	N/A
R.J. Watson	As Shown	SF-400	2 1/2"	N/A	N/A

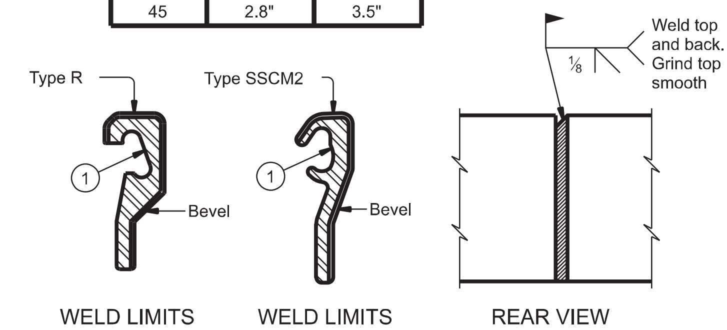
REDUCED LONGITUDINAL MOVEMENT RANGE

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

DESIGN NOTES:

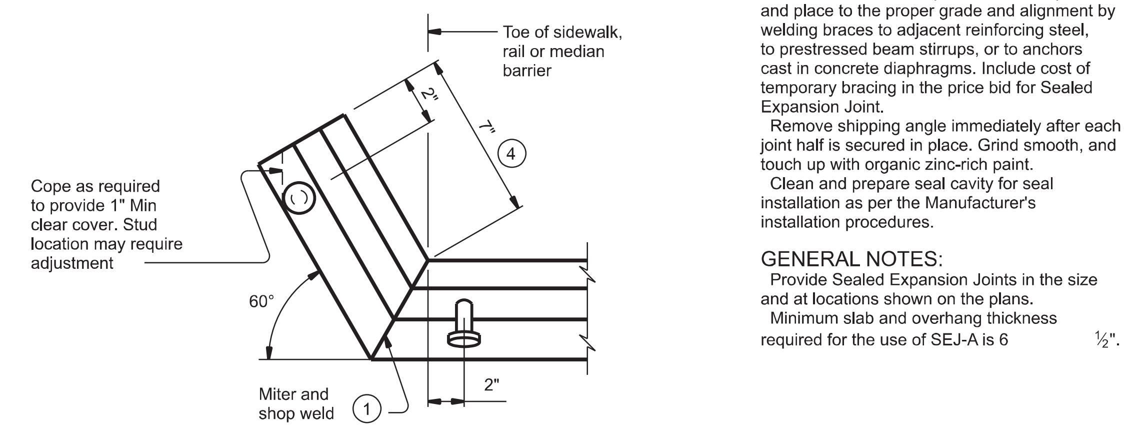
Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).



FIELD SPLICE DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



UPTURN DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of Sealed Expansion Joints, check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for Sealed Expansion Joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint portions of steel sections not in contact with concrete with the primer specified for System II paint.

Shop drawings for the fabrication of Sealed Expansion Joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the Sealed Expansion Joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Sealed Expansion Joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide Sealed Expansion Joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-A is 6 1/2".

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

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
01-16: Addition of strip seal type, dimension armor plate. Joint Seal splice note.	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		46

DATE: 6/20/2024 7:58:28 AM
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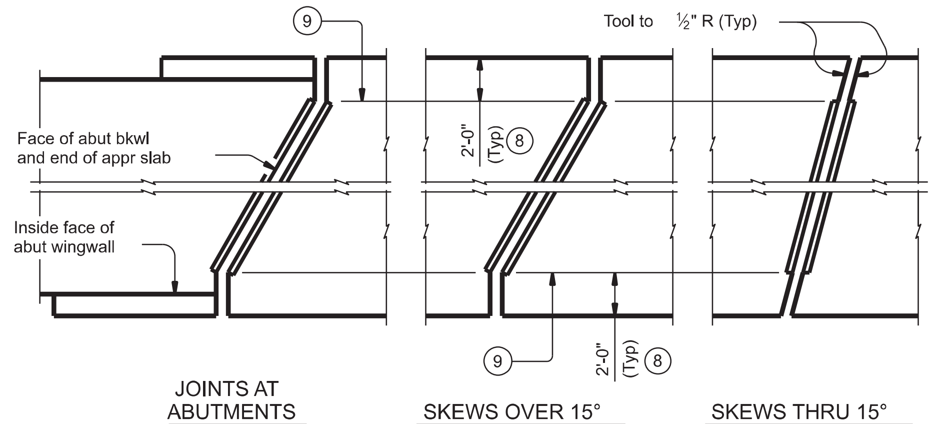
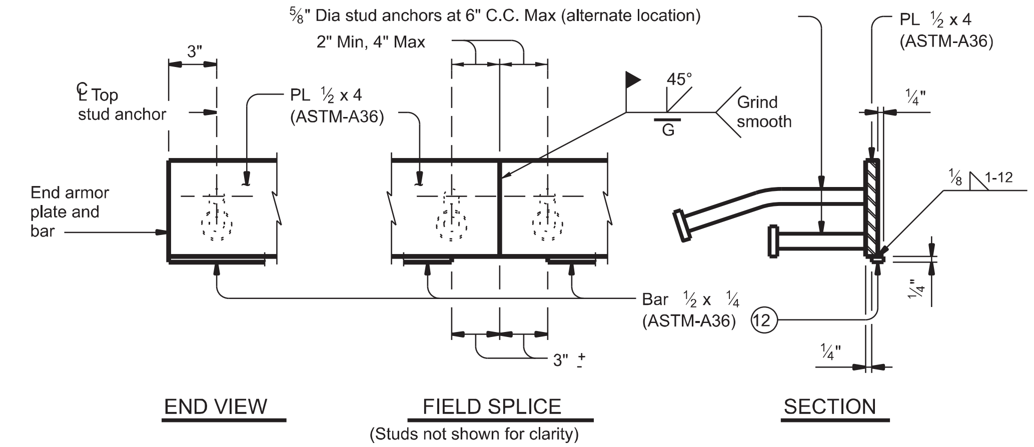


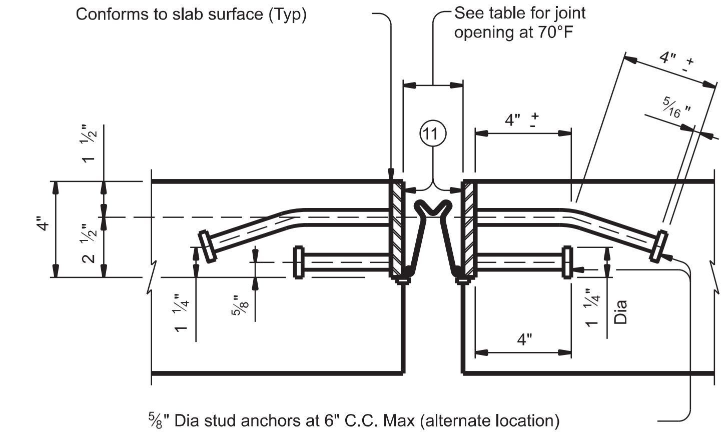
PLANS OF ARMOR PLATES

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems

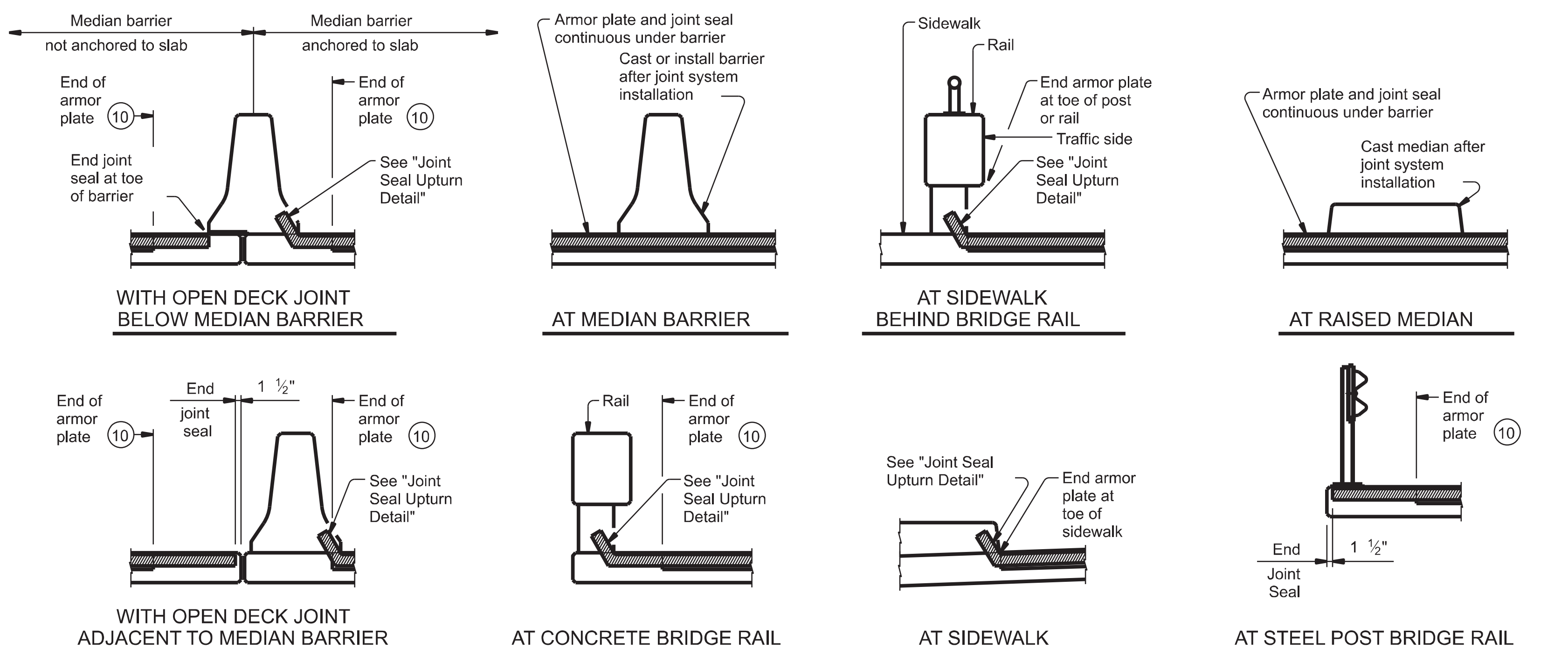


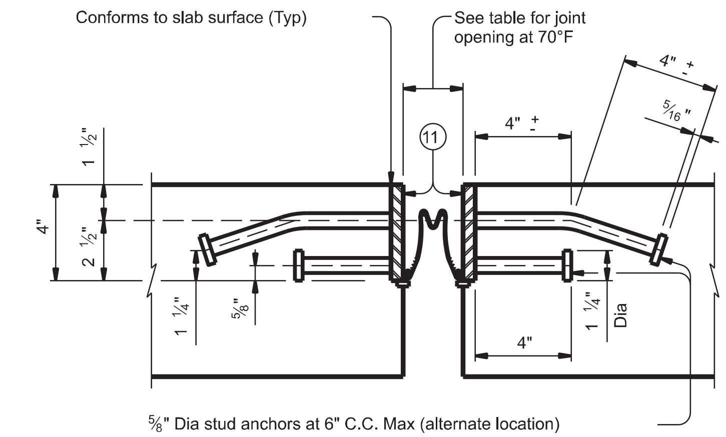
ELEVATION OF ARMOR PLATE

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



SECTION THRU R J WATSON (SF-400) JOINT



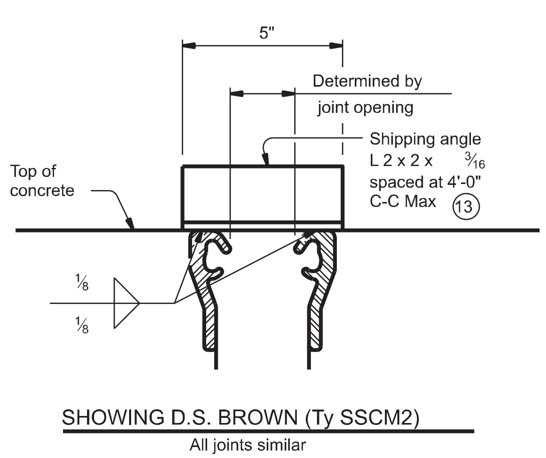


SECTION THRU WATSON BOWMAN ACME (SPS-400) JOINT

TYPICAL SECTIONS OF ARMOR PLATES & SEALS (5)

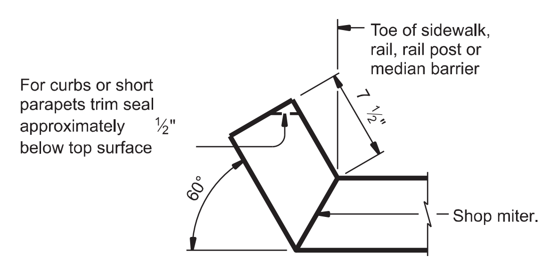
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems

CONSTRUCTION NOTE FOR R.J. WATSON (SF-400) AND WATSON BOWMAN ACME (SPS-400) JOINTS:
Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer.
Splice in joint seal may be performed in the field.



SHIPPING ANGLE

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



JOINT SEAL UPTURN DETAIL

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems.
Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."

(5) Other conditions affecting the joint profile should be noted elsewhere.

(8) Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.

(9) At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.

(10) See "Plans of Armor Plates".

(11) Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.

(12) In lieu of bar, use ¾", 16 gauge, stainless steel strap. Attach to armor plate with a fastener for attaching steel to steel base material, such as Hilti X-EGN or X-S13.

(13) Align shipping angle perpendicular to joint.

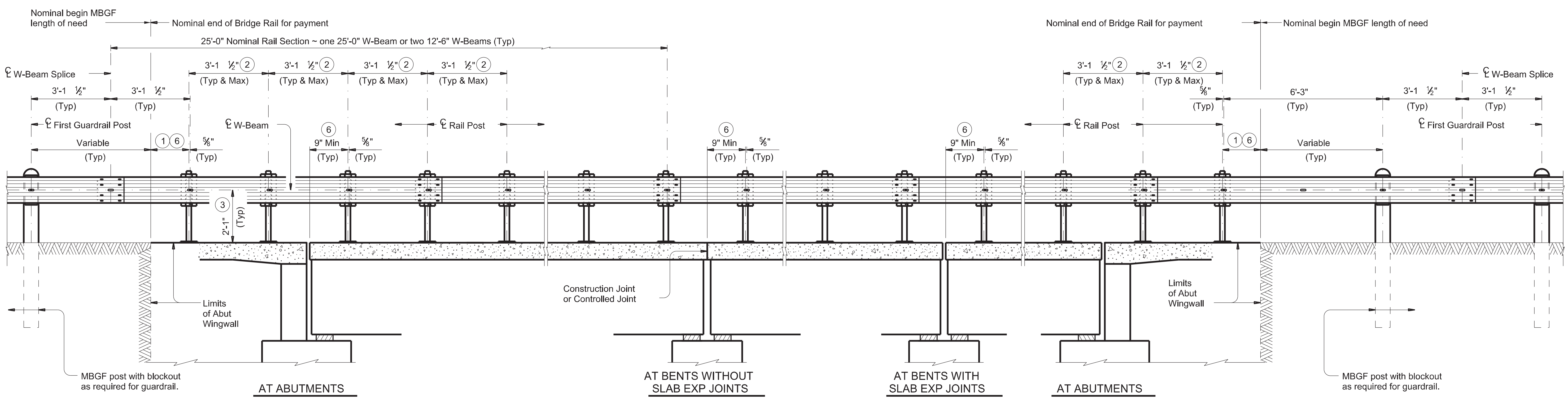
SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SEALED EXPANSION JOINT TYPE A
WITHOUT OVERLAY

SEJ-A

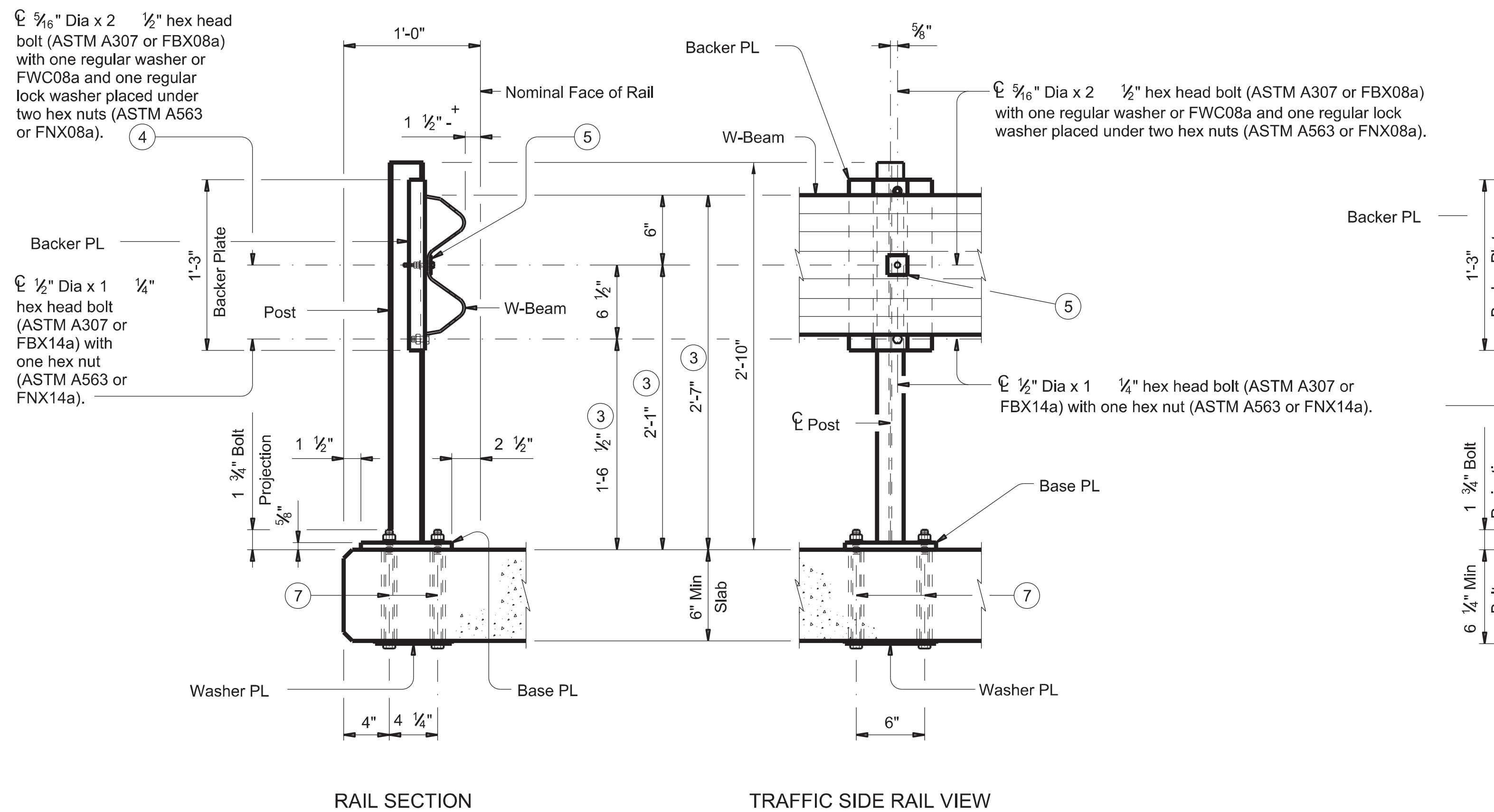
FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
01-16: Addition of strip seal type, dimension armor plate, Joint Seal splice note.	DIST		COUNTY	SHEET NO.
	WFS		COOKE, ETC.	47



ROADWAY ELEVATION OF RAIL

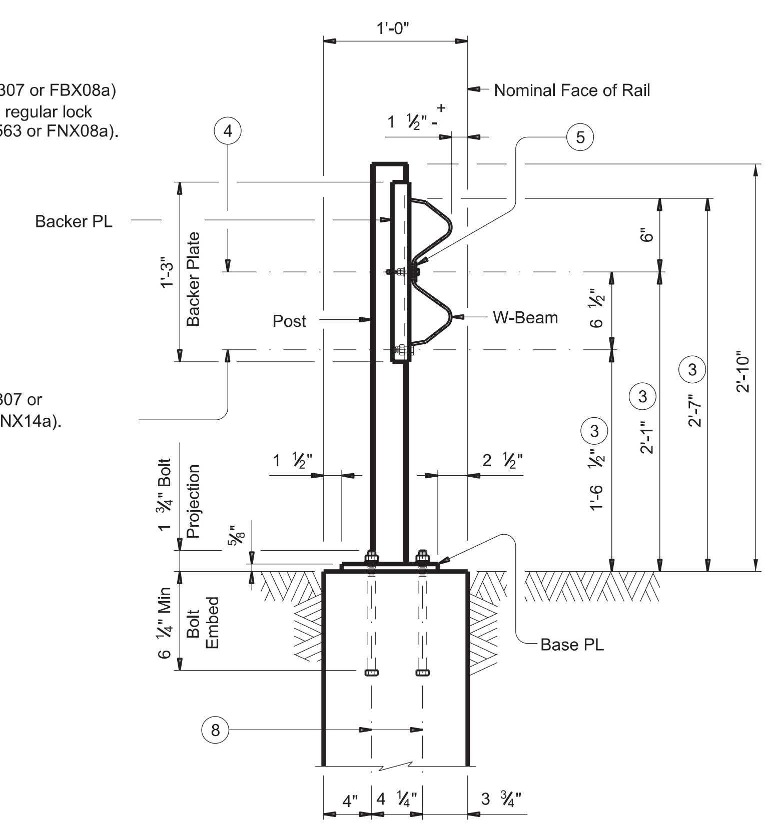
Showing without overlay.

1. 9" Min, 5'-9" Max
2. Maintain 3'-1 ½" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.
3. Increase 2" for structures with overlay.
4. Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.
5. PL ⅛ x 1 ¾ x 1 ¾ with ⅜ Dia Hole centered in PL (ASTM A36). Square Guardrail Washer (FWR01).
6. The post nearest to a slab joint or end of structure may be shifted up to 9" in order to satisfy the minimum offset dimension. Drill a new ¾" Dia hole on the centerline of W-beam for shifted post. Paint hole with two coats of zinc-rich paint conforming to the Item "Galvanizing". All other posts must remain on the typical spacing.
7. ⅞" Dia formed holes for ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack weled for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".
8. ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack weled for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".



RAIL DETAILS ON BRIDGE SLAB

Showing without overlay.



RAIL SECTION ON ABUTMENT WINGWALL

Showing without overlay.

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE: rlstd038-20.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
07-20: Allowing 9'-4 ⅞" or 6'-3" W-Beam sections.	DIST		COUNTY	SHEET NO.
	WFS		COOKE, ETC.	48

DATE: 6/20/2024 12:18:39 PM
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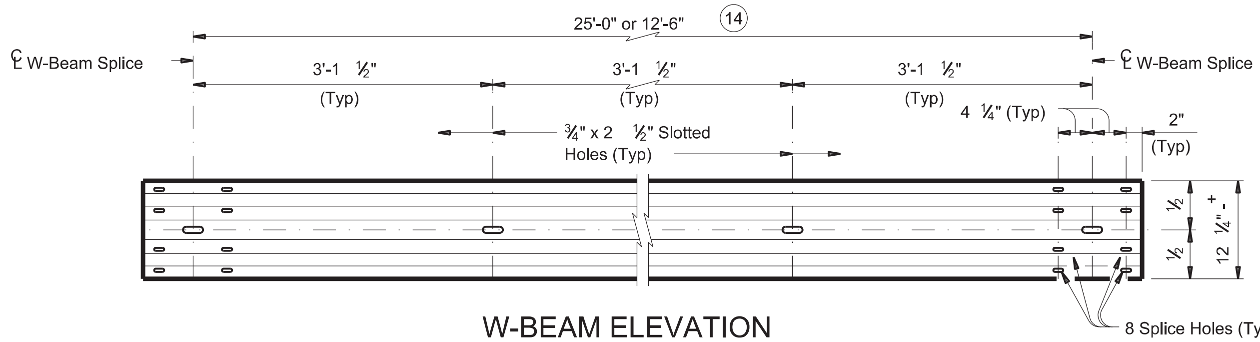
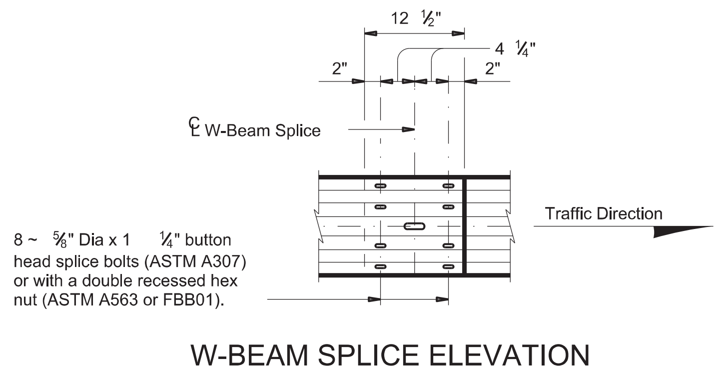
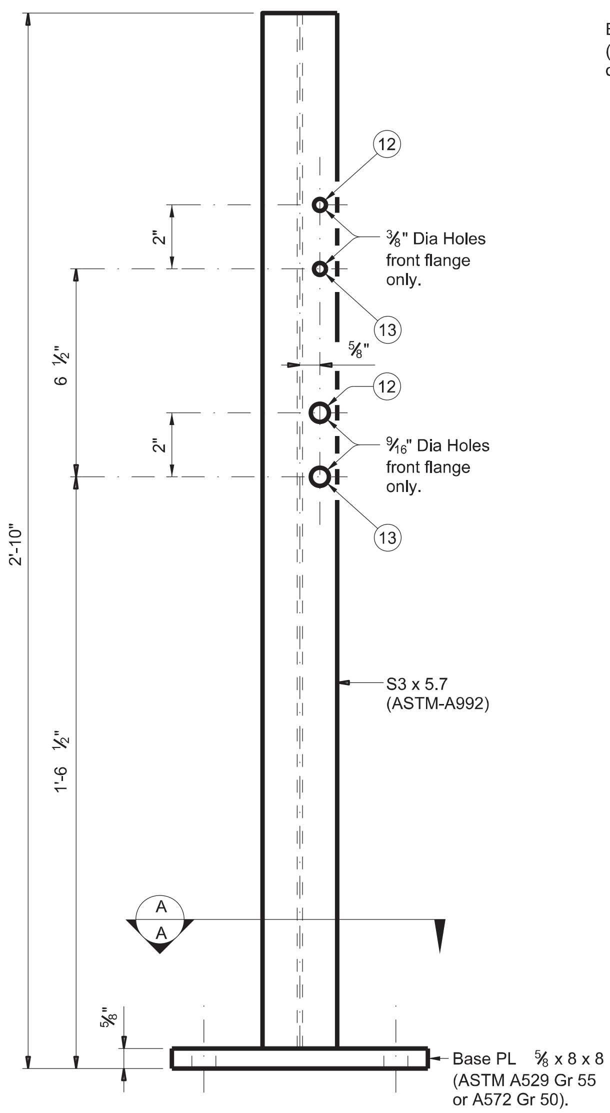


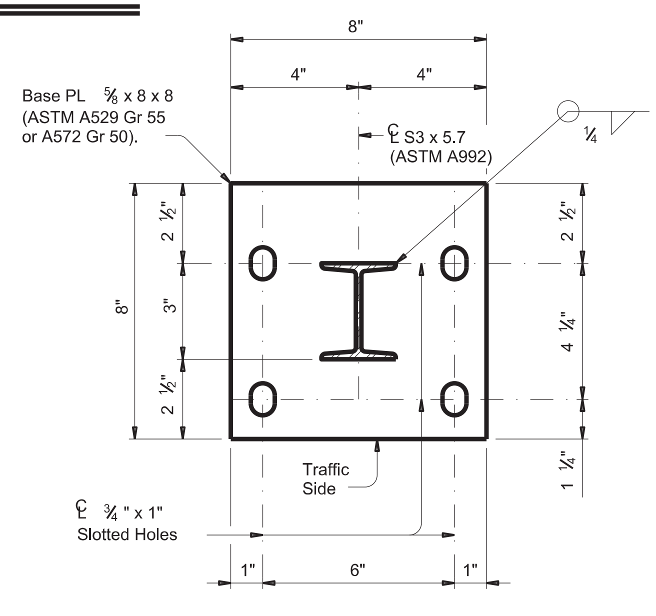
W-BEAM ELEVATION



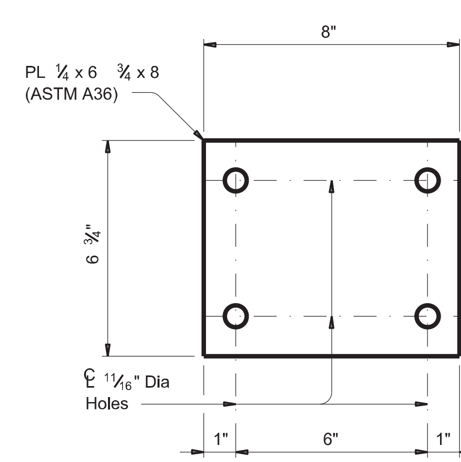
W-BEAM SPLICE ELEVATION



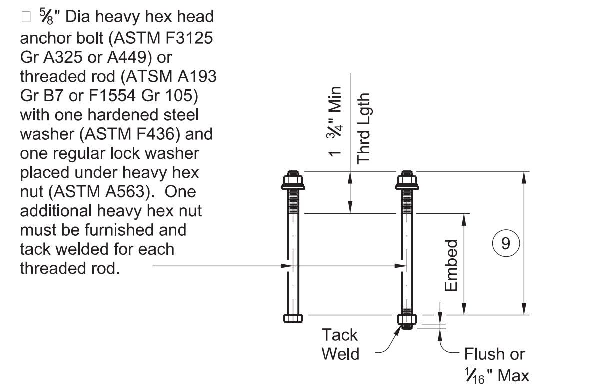
POST ELEVATION



SECTION A-A



WASHER PLATE DETAIL



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS (10)

(9) See "Rail Details On Bridge Slab" and/or "Rail Section On Abutment Wingwall".

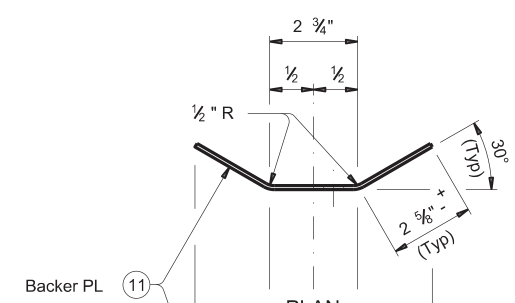
(10) See "Material Notes" for anchor bolt information.

(11) Backer PL ⅛ x 8 x 1'-3" (ASTM A1011 CS or SS Gr 33, or A1008 CS or SS Gr 33 (11 Gage acceptable)).

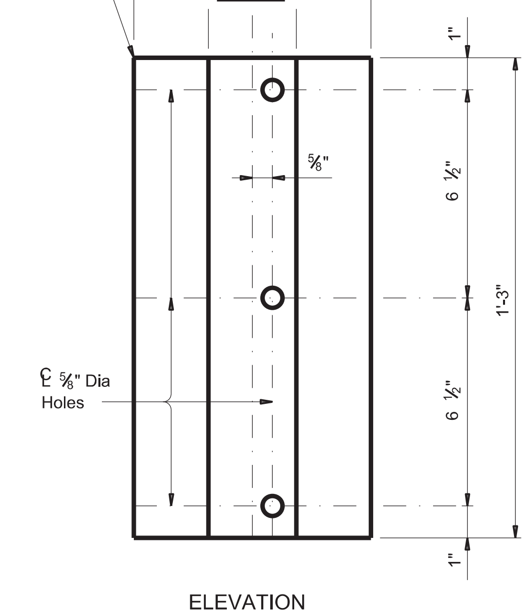
(12) Used for structures with overlay.

(13) Used for structures without overlay.

(14) At the nominal end of the bridge rail for payment, one 9'-4 ½" or 6'-3" W-beam section is permitted in order to achieve the required W-Beam splice location on the MBGF.



PLAN



ELEVATION

BACKER PLATE

MBGF AND END TREATMENT NOTES:

This traffic railing must be anchored by metal beam guard fence (MBGF) and guard fence end treatments. Determine MBGF length of need in accordance with the Roadway Design Manual, unless otherwise specified. The minimum MBGF length of need required for anchoring the railing is 25' of MBGF plus the appropriate end treatment.

CONSTRUCTION NOTES:

Face of rail post must be plumb unless otherwise approved by the Engineer. Post must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than ¹⁄₁₆" exist.

Fully anchored guardrail must be attached to each end of rail. A metal beam guard fence transition is not used with this rail.

At the Contractor's option anchor bolts may be an adhesive anchor system. See "Material Notes".

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

It is recommended to show a Rail Layout with rail posts and W-beam splices. Fabricator must submit erection drawings to the Engineer for approval.

Round or chamfer exposed edges of rail post and backer plate to approximately ¹⁄₁₆" by grinding.

Shop drawings are not required for this rail.

MATERIAL NOTES:

Galvanize all steel components.

Anchor bolts for base plate must be ⅝" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

W-beam must 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" (Nominal) lengths and a single rail element of 9'-4 ½" or 6'-3" (Nominal) length. W-Beam must have slotted holes at 3'-1 ½".

Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

GENERAL NOTES:

This railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This railing can be used for speeds of 50 mph and greater.

This rail is designed to deflect approximately 4' to 4'-6" as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.

Repairs to impact-damaged post and base plate unit are not permitted. Replace all impact-damaged posts with a new post and base plate unit.

Average weight of railing with no overlay: 20 plf total.

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE: rlstd038-20.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT 6469	SECT 87	JOB 001, ETC.	HIGHWAY US 82, ETC.
REVISIONS: 07-20: Allowing 9'-4 ½" or 6'-3" W-Beam sections.	DIST WFS		COUNTY COOKE, ETC.	SHEET NO. 49

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DATE: 6/20/2024 12:18:40 PM
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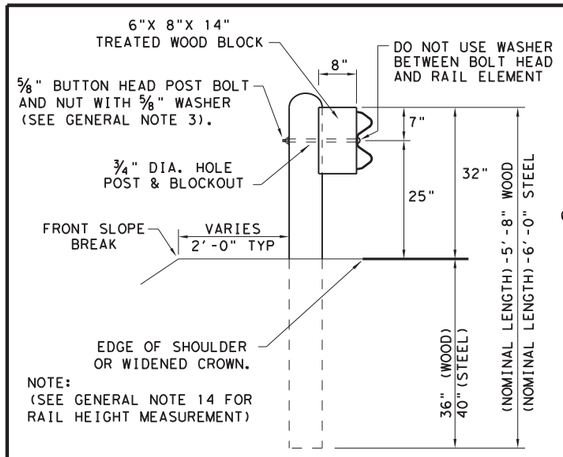
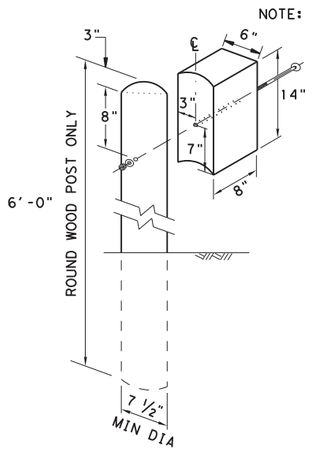
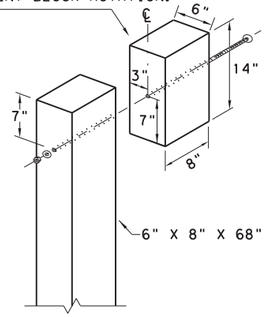


TYPICAL POST PLACEMENT

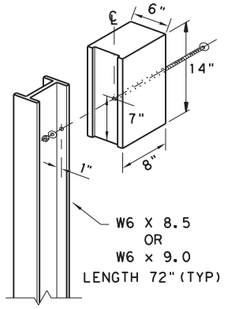


WOOD BLOCK TO ROUND WOOD POST

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

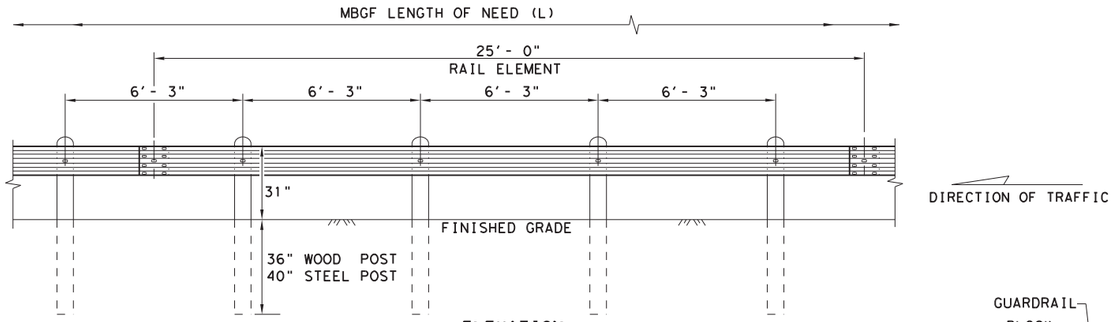


WOOD BLOCK TO RECTANGULAR WOOD POST



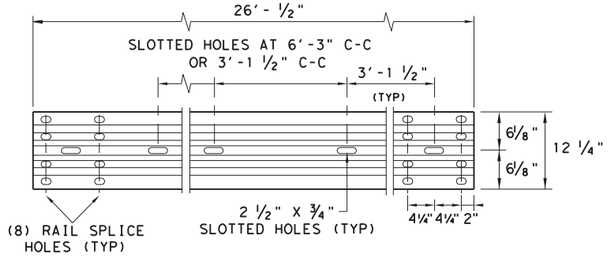
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



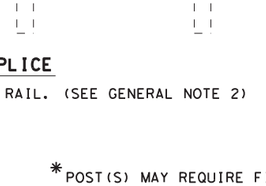
ELEVATION
MID-SPAN RAIL SPLICE

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



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

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



LOW FILL CULVERT POST

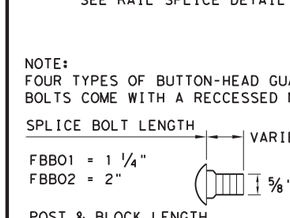
NOTE: TWO INSTALLATION OPTIONS.

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.

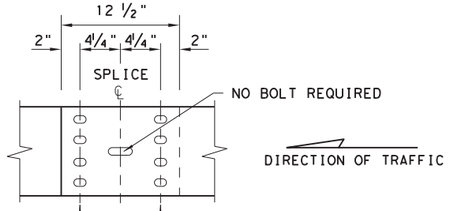
NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

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

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

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	6469	87	001, ETC.	US 82, ETC.	
	DIST	COUNTY		SHEET NO.	
	WFS	COOKE, ETC.		50	

DATE: 6/20/2024
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NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(1) POST(0)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

BEGIN LENGTH OF NEED

TRAFFIC FLOW

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT
(1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT
(2) 1½" X 6'-9 ⅝"

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

SoftStop FACE SEE GN(3) & NOTE: B

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

SEE NOTE: C

POST 32" HEIGHT

31" RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

31" RAIL HEIGHT

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

(8) ⅝"× 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"× 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

6'-1⅜"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"× 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

B B A A

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3
AT POST(0)

6'-5 ⅜" (W6 X 15)
I-BEAM POST PN: 15205A

TRAFFIC FLOW

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST HEIGHT 17"- ½"

4'- 9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

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

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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 3-¾" 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 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
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 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" 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	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

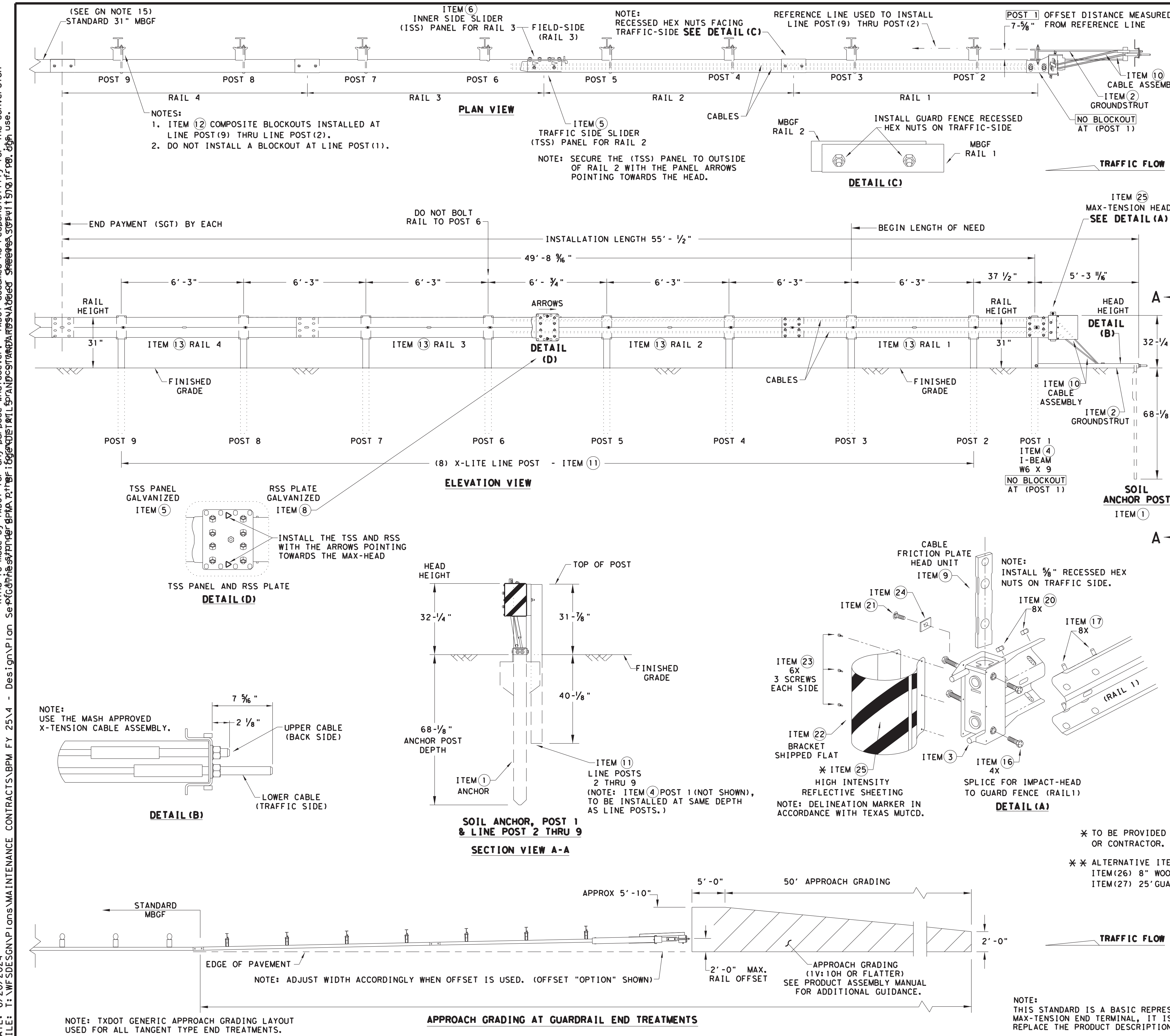
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

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	6469	87	001, ETC.	US 82, ETC.	
	DIST	COUNTY		SHEET NO.	
	WFS	COOKE, ETC.		51	



GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
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. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM#	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL, 8-SPACE, 12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25' GUARD FENCE PANELS

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

Texas Department of Transportation — Design Division Standard

MAX-TENSION END TERMINAL MASH - TL-3

SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST		COUNTY	SHEET NO.
	WFS		COOKE, ETC.	52

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DATE: 6/20/2024
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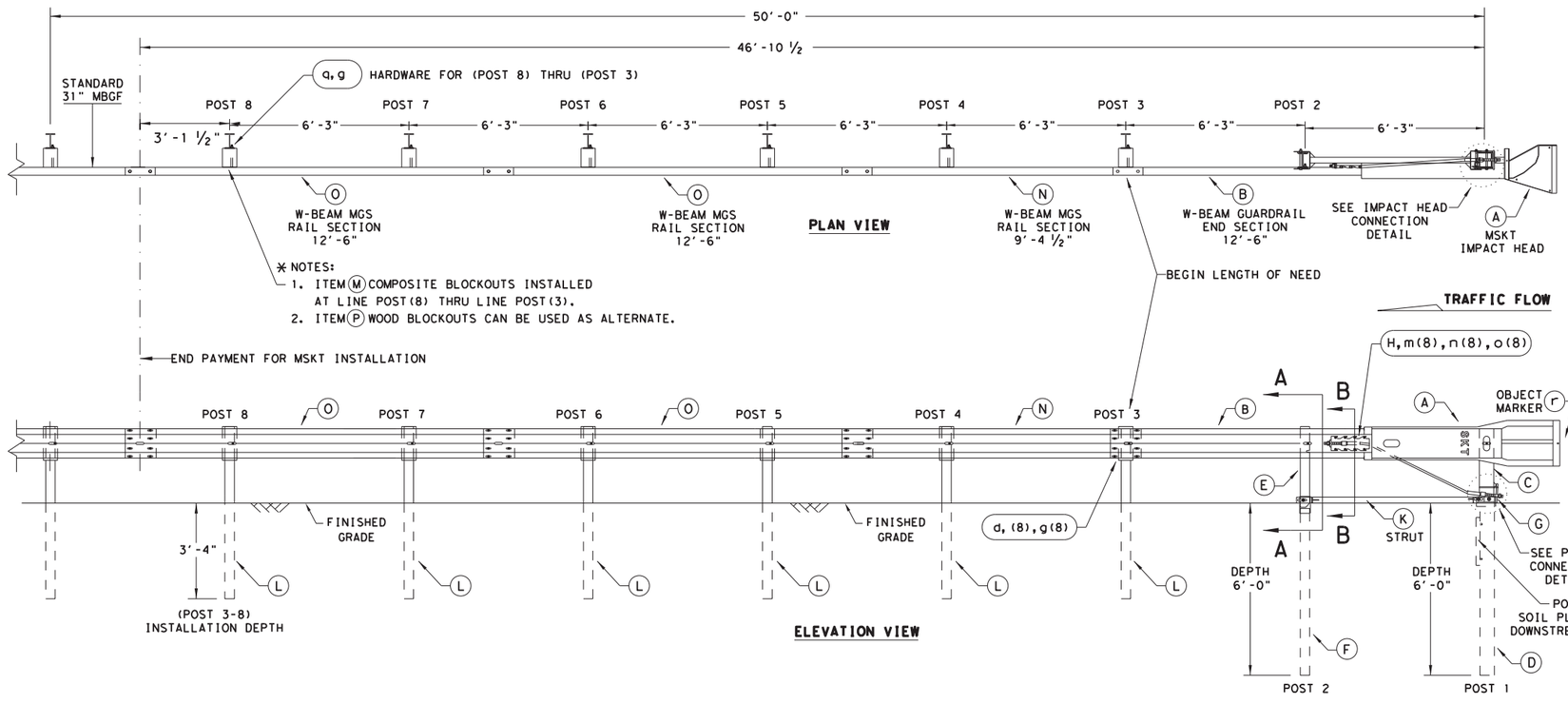
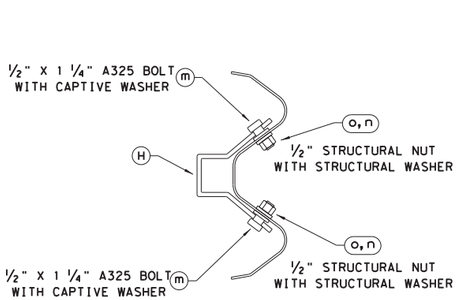
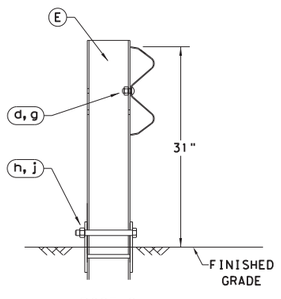
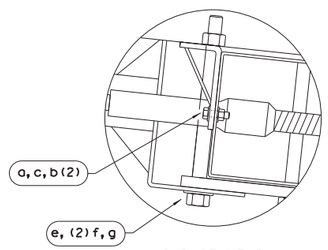
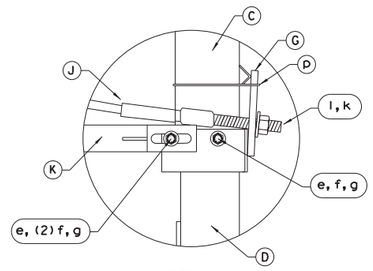


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









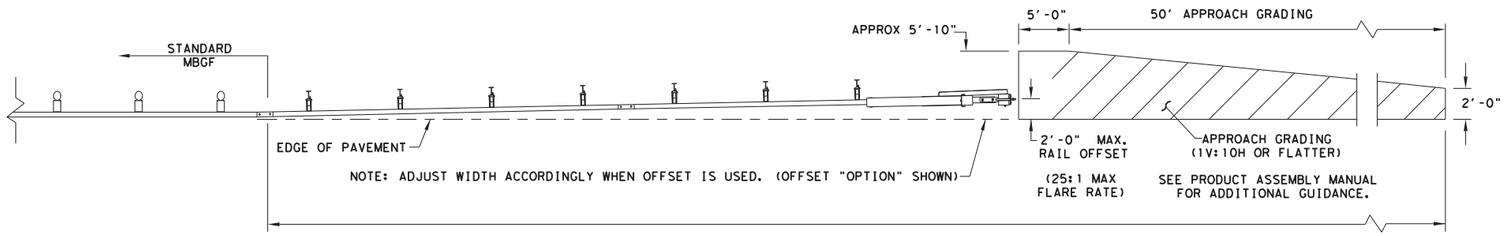
GENERAL NOTES

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: *

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 ⅛" 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 ½")	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	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

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



NOTE: 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.

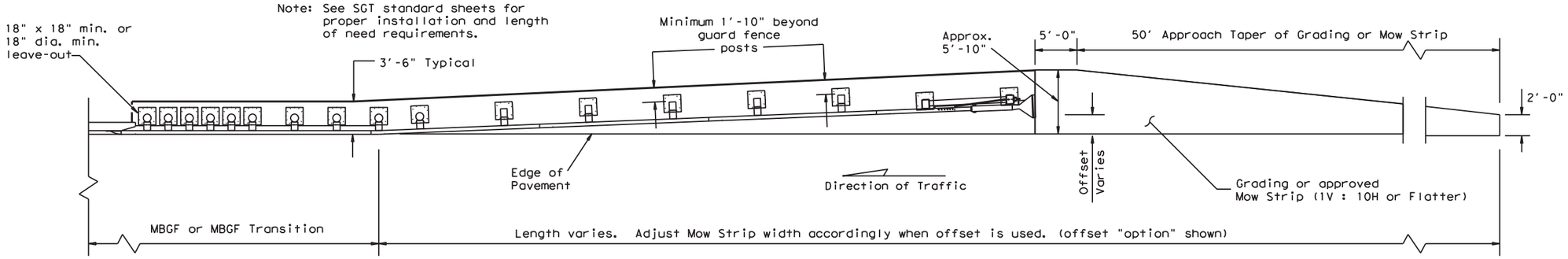
Texas Department of Transportation

Design Division Standard

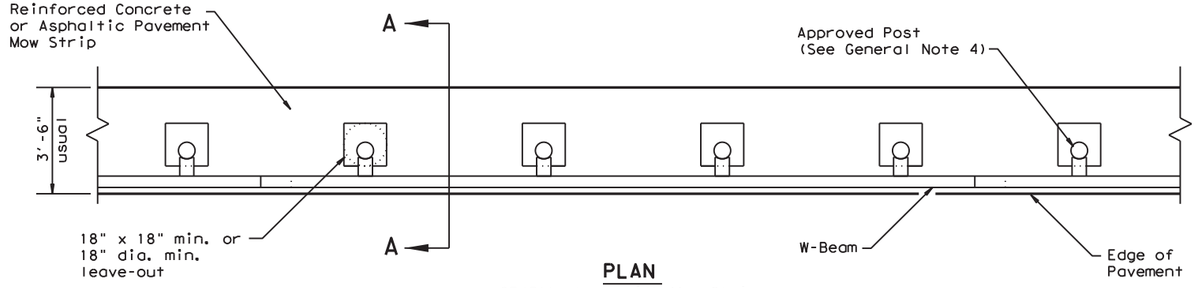
SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		53

DATE: 6/20/2024
FILE: T:\WFSDESGN\Plans\MAINTENANCE CONTRACTS\BPM FY 25\4 - Design\Plan Set\Gainesville BPM\7. Bridge\DETAILS AND STANDARDS\Added Sheets\GF(31)MS-19.dgn

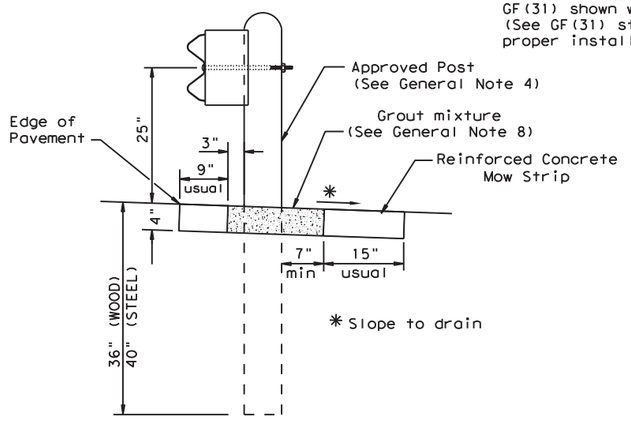


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

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

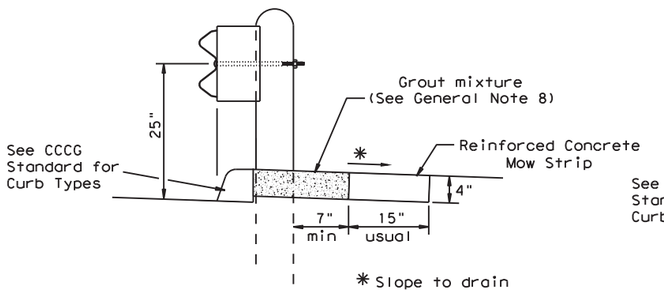


SECTION A-A

Typical

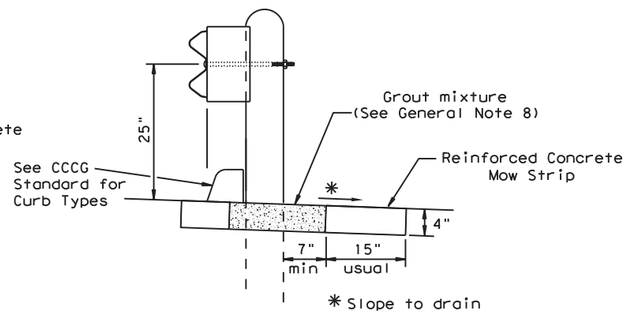
MOW STRIP DETAIL

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



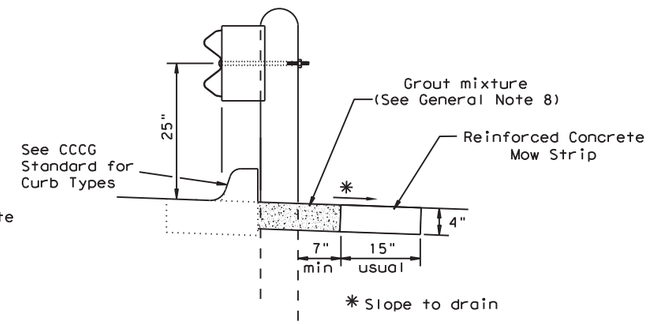
CURB OPTION (1)

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

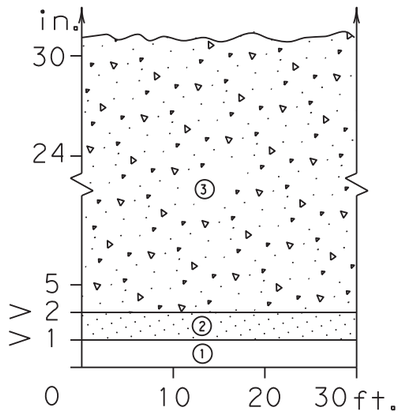
GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6469	87	001, ETC.	US 82, ETC.	
	DIST	COUNTY		SHEET NO.	
	WFS	COOKE, ETC.		54	

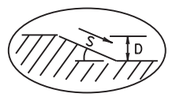
DATE:
FILE:

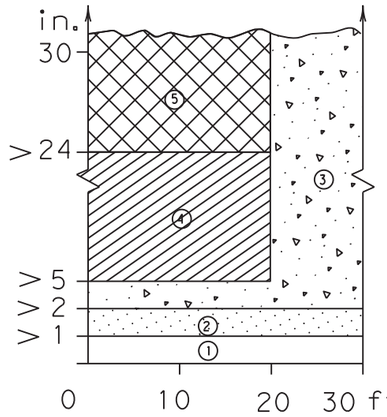
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

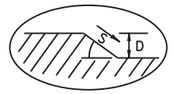


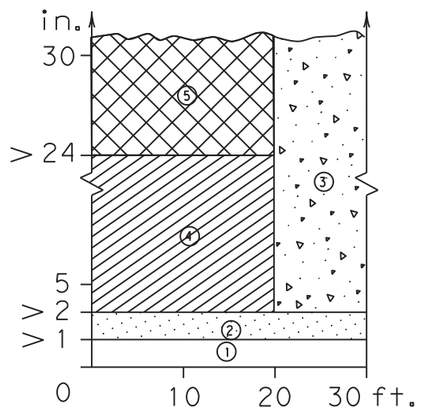
Edge Condition I
S = (3:1) (or flatter)



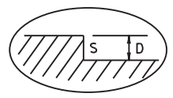


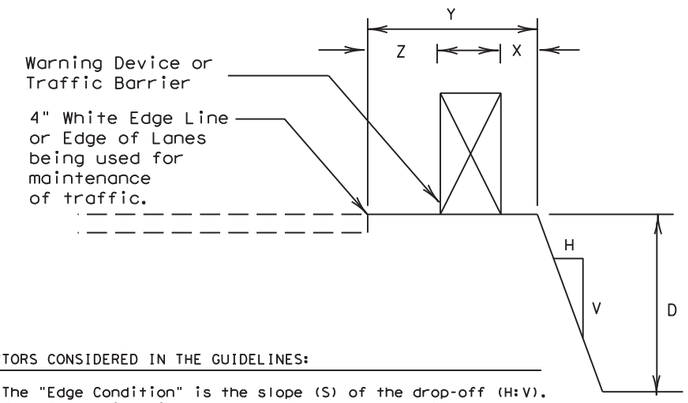
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

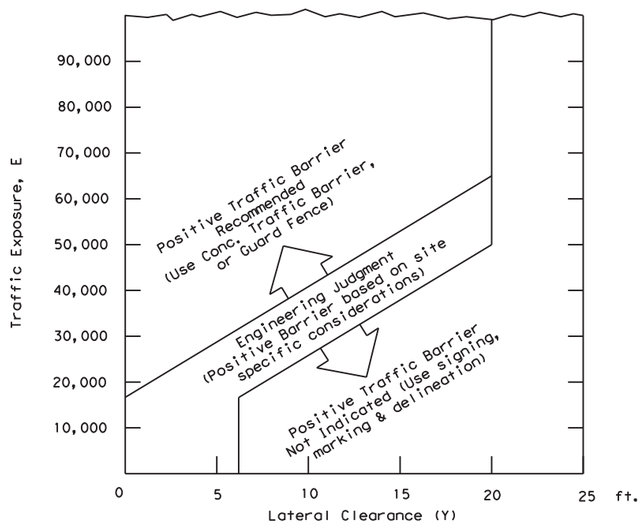
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2 Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
03-01
08-01 correct typos

CONT	SECT	JOB	HIGHWAY
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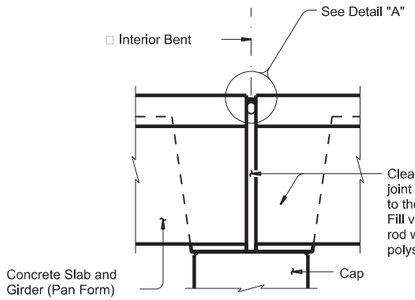
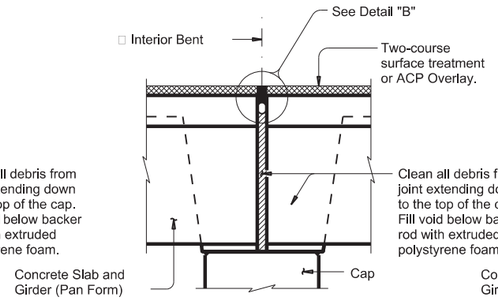
DIST	COUNTY		SHEET NO.
WFS	COOKE, ETC.		55



JOINT WITH SILICONE SEAL
(used without ACP Overlay)



JOINT WITH HOT POURED RUBBER SEAL
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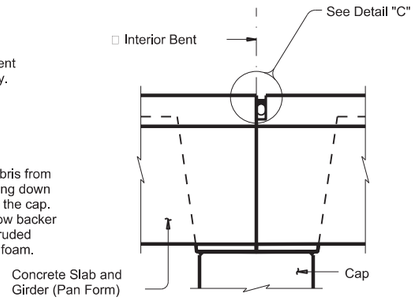


FIXED JOINT

EXISTING CONCRETE SLAB & GIRDER JOINT REPAIR

PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH SILICONE SEAL:

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.

2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

3) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening. Fill void below backer rod with extruded polystyrene foam.

4) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH HOT POURED RUBBER SEAL:

1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

3) Place backer rod into joint opening 1" below the top of concrete. Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F. The backer rod must be 25% larger than the joint opening. Fill void below backer rod with extruded polystyrene foam.

4) Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING FIXED JOINTS:

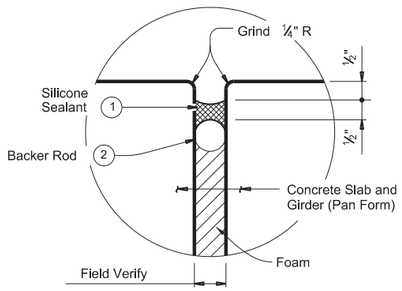
1) Remove existing seal and debris from recess.

2) Abrasive blast clean existing surfaces where silicone seal is to be placed.

3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

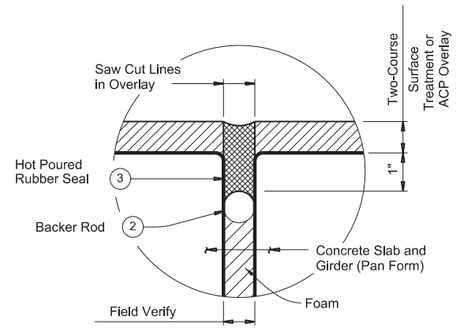
4) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening.

5) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.



DETAIL "A"

1. Use Class 7 silicone sealant. Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
2. Backer rod must be 25% larger than joint opening and must be compatible with the sealant.
3. Use Class 3 hot poured rubber seal. Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
4. Backer rod may be omitted if existing joint depth is less than 1 ½".



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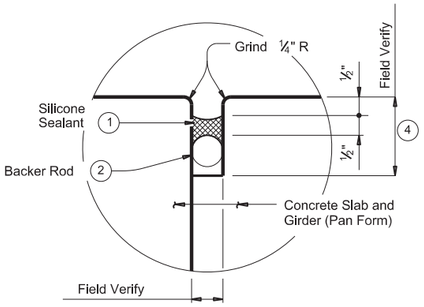


DETAIL "C"

GENERAL NOTES

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting asphalt overlay, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the linear foot.

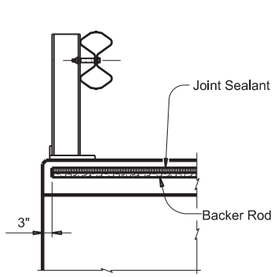
Obtain approval for all tools, equipment, materials and techniques proposed for use to prepare the joint.

For Class 3 Hot Poured Rubber Seal, provide backer rod compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

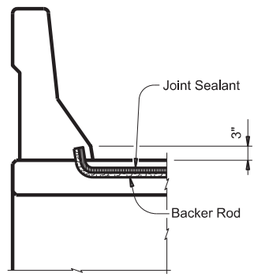
Provide Class 3 sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay.

Provide Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.

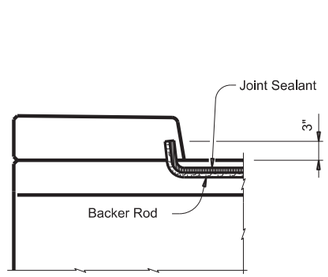
Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 Sealant cannot be effectively placed in the vertical position, a Class 4 Sealant compatible with the Class 7 sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with manufacturer's specifications.



SHOWN AT STEEL RAIL



SHOWN AT BARRIER RAIL



SHOWN AT CURB

JOINT SEALANT TERMINATION DETAILS

REF #	NBI #	JOINT TYPE	ITEM	DESCRIPTION	NUMBER OF JOINTS	TOTAL QUANTITY (LF)
1	03-049-0044-08-113	CLASS 7	438-6004	CLEANING AND SEALING EXIST JOINTS	6	264
2	03-049-0045-01-002	CLASS 3	438-6002	CLEANING AND SEALING EXIST JOINTS	5	280

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

SHEET 1 OF 1

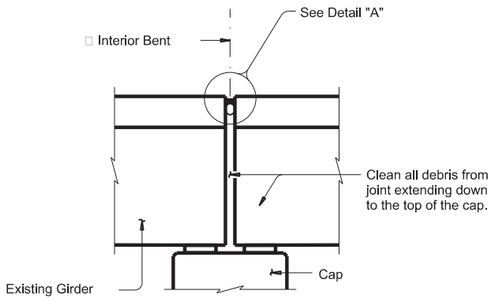
Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

(PAN GIRDER BRIDGES)

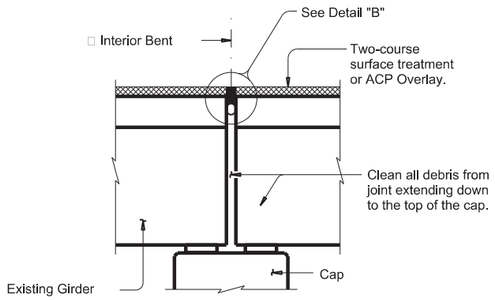
FILE: cleansealjts pangirder.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT OCTOBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		56

DATE:
FILE:



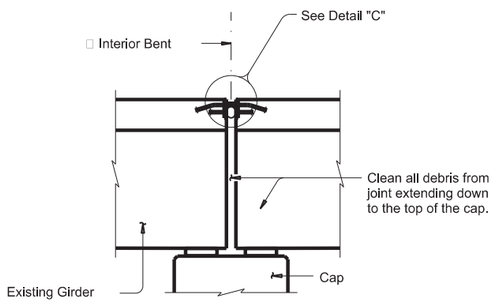
JOINT WITH SILICONE SEAL

(used without ACP Overlay)



JOINT WITH HOT POURED RUBBER SEAL

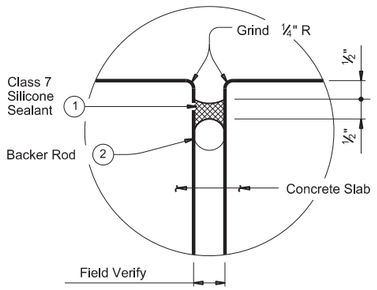
(used with ACP Overlay)



ARMOR JOINT

(used without ACP Overlay)

1. Use Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
2. Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
3. Use Class 3 hot poured rubber seal in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
4. Condition of existing steel angle, plate, or rail will be determined prior to placing joint seal material. The entire length of existing joint will be checked and any portion that is determined unsound by the Engineer will be removed as directed by the Engineer.



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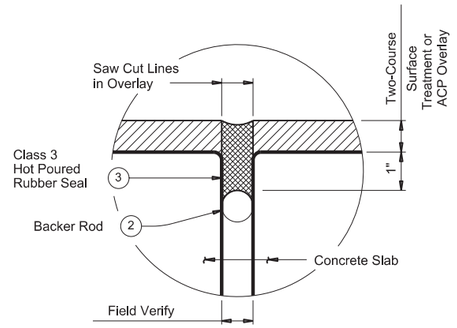

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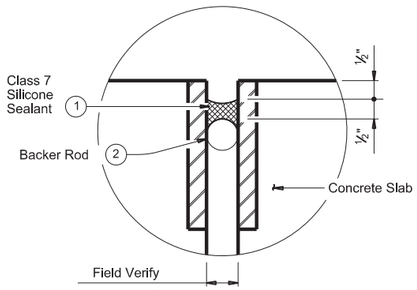

(4) DETAIL "C"

(Stud anchors not shown for clarity)

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH SILICONE SEAL

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.

2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

3) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.

4) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH HOT POURED RUBBER SEAL

1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

3) Place backer rod into joint opening 1" below the top of concrete. Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.

4) Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS

1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Abrasive blast clean existing steel surface where silicone seal is to be placed.

3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

4) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.

5) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

(One Time Use)

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REVISIONS	6469	87	001, ETC.	US 82, ETC.
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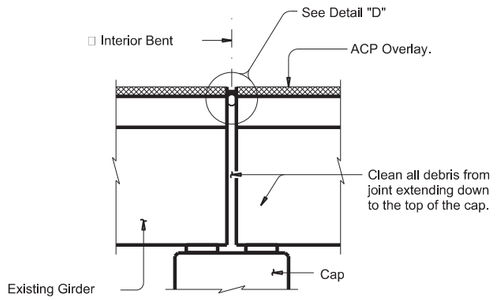
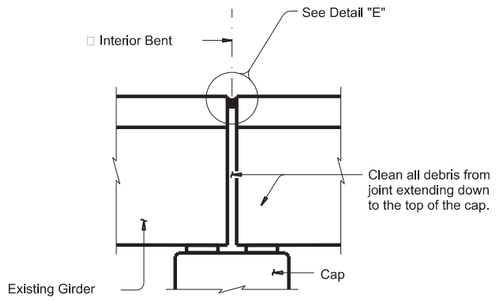


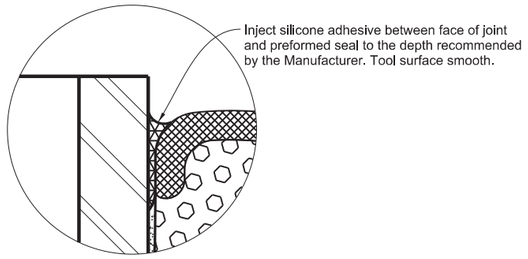
HEADER JOINT WITH SILICONE SEAL

(used with ACP Overlay with joints more than 100 ft apart)



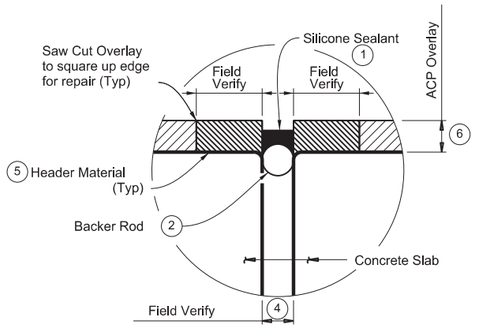
JOINT WITH PRECOMPRESSED FOAM WITH SILICONE SEAL

(used without ACP Overlay)

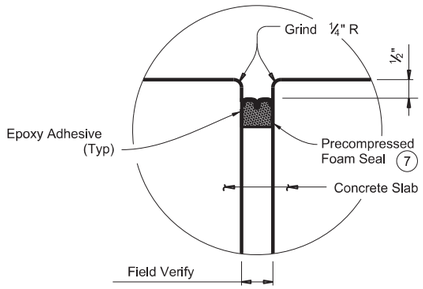


SILICONE INJECTION

1. Use Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
2. Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
4. Match existing joint opening or set at a minimum:
   a. 1" at 70°F when the distance between joints is 150 ft or less
   b. 2" at 70°F when the distance between joints is greater than 150 ft.
   c. As directed by the Engineer.
5. Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but not to exceed 4". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."
6. Maximum thickness is 4".
7. See Table of Approved Foam Seal Manufacturers on Sheet 3 of 3.



DETAIL "D"



DETAIL "E"

PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH SILICONE SEAL AND HEADER JOINT REPAIR

1) Clean joint opening of all old expansion materials/devices, dirt, and all other delterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Saw cut and remove damaged portions of existing header material to neat lines. Repair deck spalls that leave less than 6" of original deck in accordance with Item 785, "Bridge Joint Repair or Replacement." Shallower spalls may be filled with header material.

3) Clean the voided region of all materials that could inhibit the bond between header material and concrete or steel.

4) Form the joint opening to the reqired width and place header material to fill voided region. Repair header material in accordance with Item 785, "Bridge Joint Repair or Replacement."

5) Place backer rod into joint opening 1" below the top of header material. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.

6) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of header in travel lanes and ⅛" below top of header in shoulders.

PROCEDURE FOR CLEANING AND SEALING JOINT WITH PRECOMPRESSED FOAM WITH SILICONE SEAL

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below proposed seal with extruded polystyrene foam.

2) Correctly size joint seal based on field measurement and in accordance with Manufacturer's specifications. Multiple seal widths may be required. Ensure proper seal is selected for each joint.

3) Abrasive blast clean existing joint surfaces where seal is to be applied.

4) Wipe down joint surfaces to remove contaminates.

5) Mask areas adjacent to joint opening sufficiently to keep epoxy off deck surface.

6) Apply epoxy to joint opening side surfaces.

7) While epoxy is still tacky, remove shrink wrap from seal and install in joint opening.

8) Recess top of joint seal 1/2" in travel lanes and 1/4" in shoulders.

9) Inject silicone adhesive along top interface of seal with joint side surface according to Manufacturer's recommendations. Tool to spread adhesive as necessary. See Detail "F".

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

(One Time Use)

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FILE:

TABLE OF APPROVED FOAM SEAL MANUFACTURERS	
MANUFACTURER	SEAL TYPE
Watson Bowman Acme	Wabo FS
SSI	Silspec SES
Sealtite	Sealtite 50N
EMSEAL	BEJS

REF #	NBI #	JOINT TYPE	ITEM	DESCRIPTION	NUMBER OF JOINTS	TOTAL QUANTITY (LF)
3	03-039-0045-01-109	CLASS 3	438-6002	CLEANING AND SEALING EXIST JOINTS	2	76
3	03-039-0045-01-109	CLASS 7	438-6004	CLEANING AND SEALING EXIST JOINTS	1	38
5	03-049-0195-01-028	CLASS 3	438-6002	CLEANING AND SEALING EXIST JOINTS	2	76
5	03-049-0195-01-028	CLASS 7	438-6004	CLEANING AND SEALING EXIST JOINTS	1	38
6	03-169-0195-01-105	CLASS 3	438-6002	CLEANING AND SEALING EXIST JOINTS	1	38
6	03-169-0195-01-105	CLASS 7	438-6004	CLEANING AND SEALING EXIST JOINTS	1	38
7	03-169-0195-01-106	CLASS 7	438-6004	CLEANING AND SEALING EXIST JOINTS	2	76
8	03-169-0815-01-021	CLASS 3	438-6002	CLEANING AND SEALING EXIST JOINTS	2	88
11	03-049-0845-03-105	CLASS 3	438-6002	CLEANING AND SEALING EXIST JOINTS	2	92

GENERAL NOTES

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting joint opening, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the foot of "Cleaning and Sealing of Existing Joints."

Repair of existing header joint material is paid for by Item 785-6006, "Bridge Joint Repair (Header)." Provide header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems."

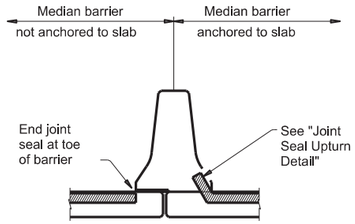
Obtain approval for all tools, equipment, materials and techniques proposed for use to prepare the joint.

For Class 3 Hot Poured Rubber Seal, provide backer rod compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

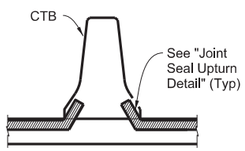
Provide Class 3 sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay.

Provide Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.

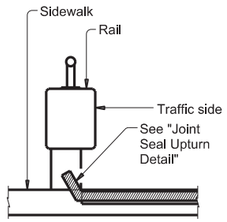
Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 Sealant cannot be effectively placed in the vertical position, a Class 4 Sealant compatible with the Class 7 sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with manufacturer's specifications.



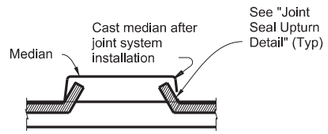
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



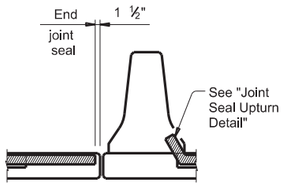
AT CONCRETE TRAFFIC BARRIER



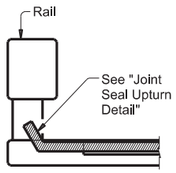
AT SIDEWALK BEHIND BRIDGE RAIL



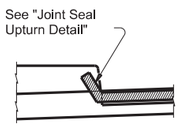
AT RAISED MEDIAN



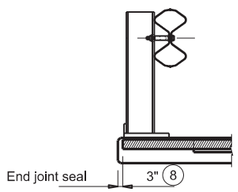
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



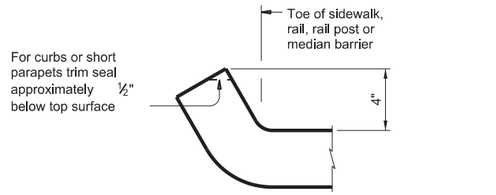
AT SIDEWALK



AT STEEL POST BRIDGE RAIL

JOINT SEALANT TERMINATION DETAILS

(8) 1½" for Precompressed Foam and Silicone Seal



JOINT SEAL UPTURN DETAIL

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

SHEET 3 OF 3

Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

(One Time Use)

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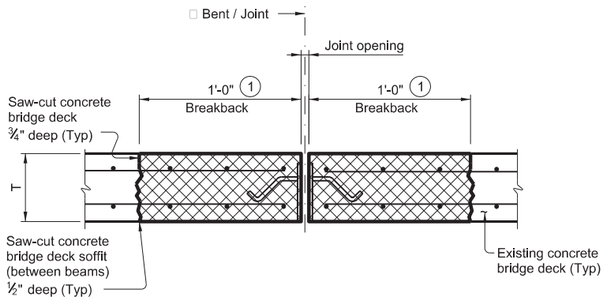
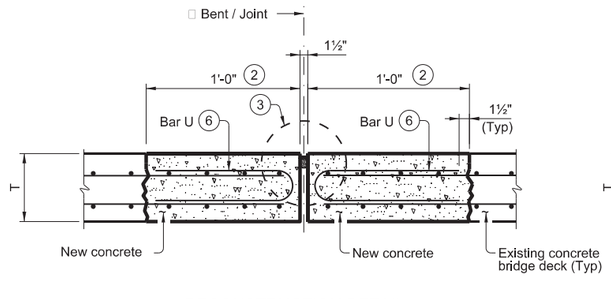
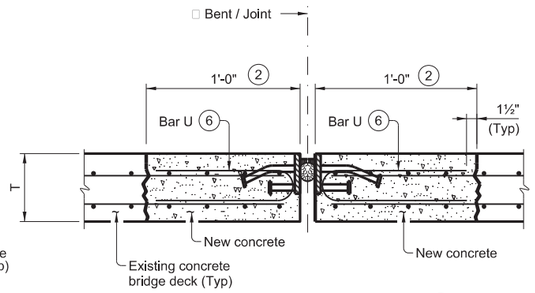


REMOVAL DETAIL



RECONSTRUCTION DETAIL

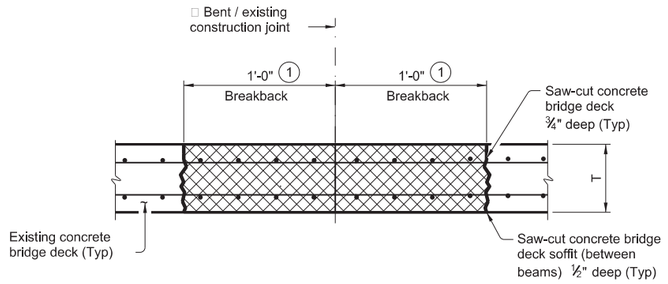
Silicone Joint Seal



RECONSTRUCTION DETAIL (4)

Showing armor joint. SEJ Similar

EXPANSION JOINT DETAILS



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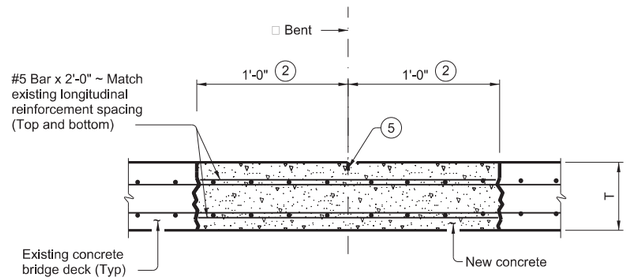
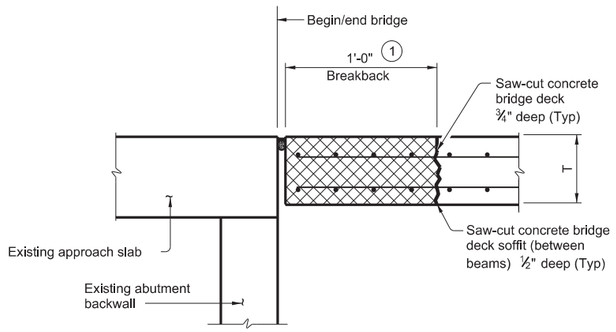


RECONSTRUCTION DETAIL

CONTINUOUS SLAB DETAILS



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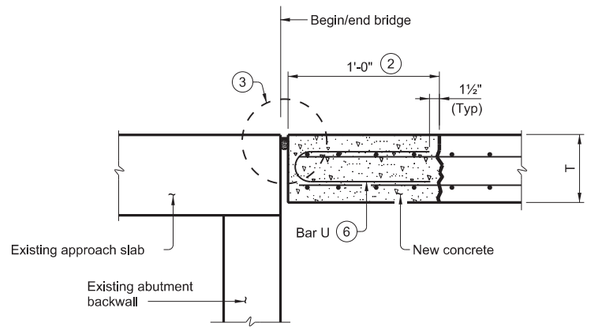
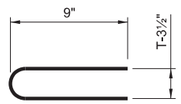


RECONSTRUCTION DETAIL

BEGIN/END OF BRIDGE SLAB DETAILS

With Pourable Joint Seal



BARS U (#5)

1. Saw cut deck ¾" at the breakback line prior to concrete removal. Remove concrete bridge deck as shown. Use hand tools, power driven chipping hammers (30-lb class maximum), or hydro-demolition to remove concrete. Do not damage existing reinforcing, existing beams, or any other portion of the structure to remain.
2. Clean and extend existing reinforcing. Repair damaged coating for epoxy coated or galvanized rebar. Contractor may opt for replacing transverse reinforcing at no additional cost to the Department. Provide minimum lap according to Reinforcing Bar Table if bars are cut. Extend repair concrete to be flush with existing surface. Removal of expansion joint, if present, is subsidiary to Item 785, "Bridge Joint Repair or Replacement."
3. See elsewhere in plans for joint seal information.
4. Provide replacement armor joint or SEJ as shown on the plans. Position to be flush with riding surface. See applicable standard for notes and details not shown.
5. 1½" vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer).
6. Space Bars U at 12" maximum, center to center. Bars may be bundled with existing longitudinal reinforcing. Adjust Bars U spacing as needed to avoid joint anchorage.

REINFORCING BAR TABLE

Size	Bar Laps	
	Uncoated	Coated
#4	1'-7"	2'-5"
#5	2'-0"	3'-0"

Reinforcing steel is approximately 3 lbs/sf per mat

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide Class K or Class S concrete (f'c=4,000 psi, Course Aggregate Grades 2-5). Alternatively, if approved by the Engineer, provide Type A or D concrete repair materials meeting the requirements of DMS 4655, "Concrete Repair Materials." Achieve a minimum compressive strength fc = 3,600 psi prior to opening to traffic.

GENERAL NOTES:

Perform work in accordance with the TXDOT Concrete Repair Manual, Chapter 3, Section 4 and Item 785, "Bridge Joint Repair or Replacement." A copy of the Concrete Repair Manual must be available onsite during all concrete repair operations. All work to remove existing joint and install new joint, including repair concrete and installing new reinforcing steel, is paid in accordance with Item 785 and measured by the linear foot.

Obtain approval for all tools, equipment, materials and techniques proposed before beginning work.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation | Bridge Division

JOINT REPAIR AND REPLACEMENT DETAILS

BRIDGES WITHOUT ASPHALT OVERLAY

(One Time Use)

NBI: 03-049-0045-01-109

NBI: 03-049-0045-01-110

NBI: 03-049-0195-01-105

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	WFS	COOKE, ETC.		60

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DATE:
FILE:

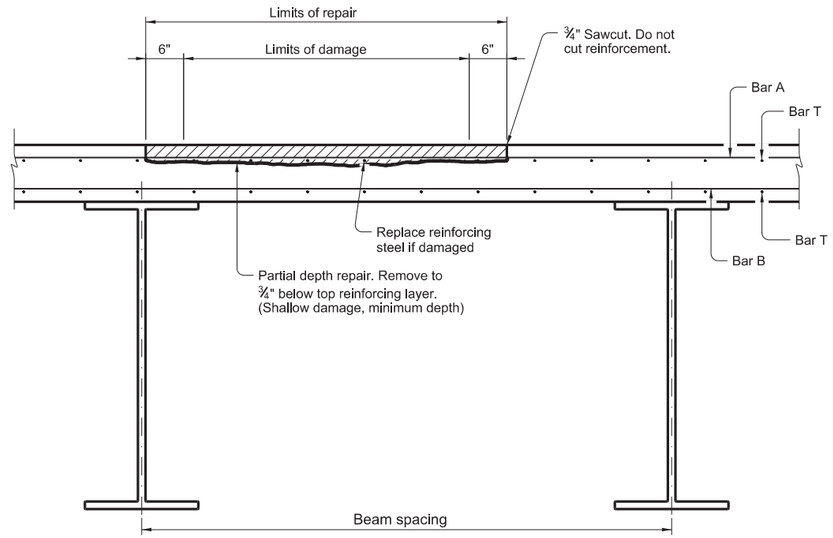
TABLE OF ESTIMATED QUANTITIES

Item	Description	Units	Quantity
429-6003	CONC STR REPAIR (DECK REP (PART DEPTH))	SF	20

REINFORCING BAR TABLE

Bar	Size	Max Spa	Bar Laps	
			Uncoated	Coated
A	#5	6"	2'-0"	3'-0"
T	#4	9"	1'-7"	2'-5"

Reinforcing steel is approximately 3 lbs/sf per mat



PARTIAL DEPTH DECK REPAIR WITHOUT PANELS

4 - SPAN (3 CONTINUOUS 1 SIMPLE) STEEL I-BEAM

REPAIR PROCEDURE

Refer to the TxDOT Concrete Repair Manual Chapter 3, Section 4 for detailed repair steps.

1) Sound repair area and mark limits using straight lines in the presence of the Engineer.
2) Saw cut the entire perimeter of the repair boundary ¾" deep without cutting into existing reinforcement. If damaged concrete rests atop PCP, ensure the panel is undamaged, and do not cut into the panel for repairs. If the panel is damaged, perform full-depth deck repairs.
3) Use power-driven chipping tools (up to 30lb. hammer) or hydro-demolition to remove remaining concrete to ¾" beneath top layer of reinforcement to ensure bonding between new concrete and existing reinforcement. Use 15lb. hammers near the repair boundaries to prevent damage caused to sound concrete outside of the repair limits.
4) Remove damaged reinforcement and install new reinforcement as directed by the Engineer.
5) For uncoated steel reinforcing, abrasive blast steel until all rust is removed and steel is clean. Do not abrasive blast coated reinforcing. Restore damaged epoxy coating in accordance with Item 440.3.6.3.
6) Create a ¼" surface profile (or conforming to ICRI CSP 9) of concrete surface to remain.
7) Pressure wash entire repair area until clean, and continue to pressure wash entire area until concrete within the boundaries achieves saturated surface dry (SSD) condition (at least 15 minutes of pressure washing to all repair surfaces of concrete).
8) Remove any standing water within repair limits.
9) Obtain approval of the prepared surface by the Engineer before placing concrete.
10) Place concrete according to Item 422, "Concrete Superstructures" and allow to cure.

PHOTOS SHOWING LIMITS OF REPAIR

Photos shown are for informational purposes and may not reflect exact site conditions or magnitude of repairs needed. Field verify magnitude of repairs prior to ordering materials.

MATERIAL NOTES

Provide Grade 60 reinforcing steel.
Provide Class S concrete (f'c = 4,000 psi).
Alternatively, Type A or D concrete repair materials conforming to DMS-4655 may be used if approved by the Engineer.
Do not open to traffic until repairs meet a minimum compressive strength of 3,600 psi.

GENERAL NOTES:

Do not damage existing reinforcing. Replace reinforcing steel if more than 25% of the cross sectional area of reinforcing is damaged. Provide laps per Reinforcing Bar Table.
Perform all concrete repairs in accordance with Item 422, "Concrete Superstructures" and Chapter 3, Section 4 of TxDOT's Concrete Repair Manual. A copy of the Concrete Repair Manual must be available on site during all concrete repair operations.
See elsewhere in plans for repair locations.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation — Bridge Division

PARTIAL DEPTH DECK REPAIR

REFERENCE #7
NBI: 03-049-0195-01-105

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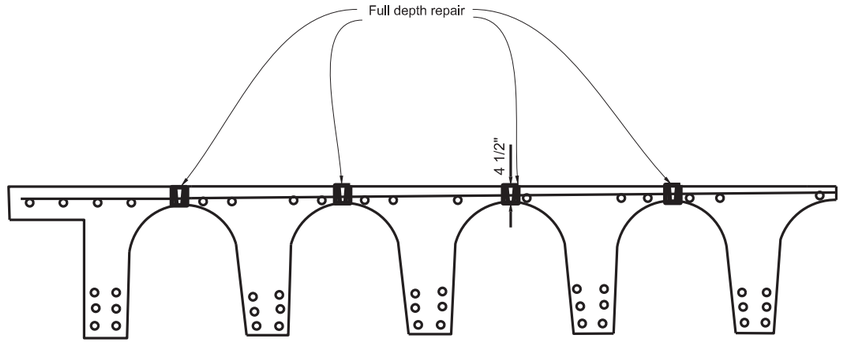
TABLE OF ESTIMATED QUANTITIES

Item	Description	Units	Quantity
429-6005	CONC STR REPAIR (DECK REP (FULL DEPTH))	SF	23

REINFORCING BAR TABLE

Bar	Size	Max Spa	Bar Laps	
			Uncoated	Coated
A	#5	6"	2'-0"	3'-0"
T	#4	9"	1'-7"	2'-5"
B	#5	6"	2'-0"	3'-0"
D	#4	9"	1'-7"	2'-5"

Reinforcing steel is approximately 3 lbs/sf per mat



FULL DEPTH DECK REPAIR

(Showing concrete pan girders)

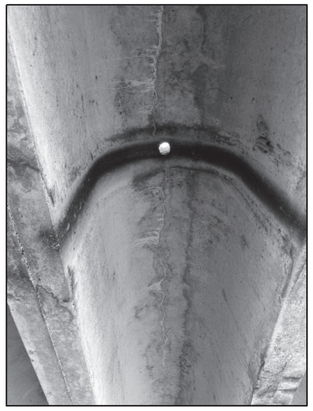
(1) See REINFORCING BAR TABLE for bar sizes and laps to provide if bars cannot be salvaged.

(2) Chip to remove deck material and panel (if present) using maximum 15lb hammer. Do not damage beam top flange. Remove enough deck material to provide for 6" minimum ledge on beam flange.

REPAIR PROCEDURE

Refer to the TxDOT Concrete Repair Manual Chapter 3, Section 4 for detailed repair steps.

1) Sound repair area and mark repair limits using straight lines in the presence of the Engineer.
2) Saw cut the entire perimeter of the repair boundary ¾" deep without cutting into existing reinforcement.
3) Use power-driven chipping tools (up to 30lb. hammer) to remove concrete. Use 15lb. hammers near the repair boundaries to prevent damage caused to sound concrete outside of the repair limits.
4) Remove damaged reinforcement and install new reinforcement as directed by the Engineer.
5) For uncoated steel reinforcing, abrasive blast steel until all rust is removed and steel is clean. Do not abrasive blast coated reinforcing. Restore damaged epoxy coating in accordance with Item 440.3.6.3.
6) Install formwork.
7) Prepare surfaces for concrete placement in accordance with Item 422.4.6.5.
8) Obtain approval of the prepared surface by the Engineer before placing concrete.
9) Place concrete according to Item 422, "Concrete Superstructures" and allow to cure.



PHOTOS SHOWING LIMITS OF REPAIR

Photos shown are for informational purposes and may not reflect exact site conditions or magnitude of repairs needed. Field verify magnitude of repairs prior to ordering materials.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide Class S concrete (f'c = 4,000 psi).
Alternatively, Type A or D concrete repair materials conforming to DMS-4655 may be used if approved by the Engineer.
Do not open to traffic until repairs meet a minimum compressive strength of 3,600 psi.

GENERAL NOTES:

Do not damage existing reinforcing. Replace reinforcing steel if more than 25% of the cross sectional area of reinforcing is damaged. Provide laps per Reinforcing Bar Table.
Perform all concrete repairs in accordance with Item 422 and Chapter 3, Section 4 of TxDOT's Concrete Repair Manual. A copy of the Concrete Repair Manual must be available on site during all concrete repair operations.
See elsewhere in plans for repair locations.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

Texas Department of Transportation

Wichita Falls District

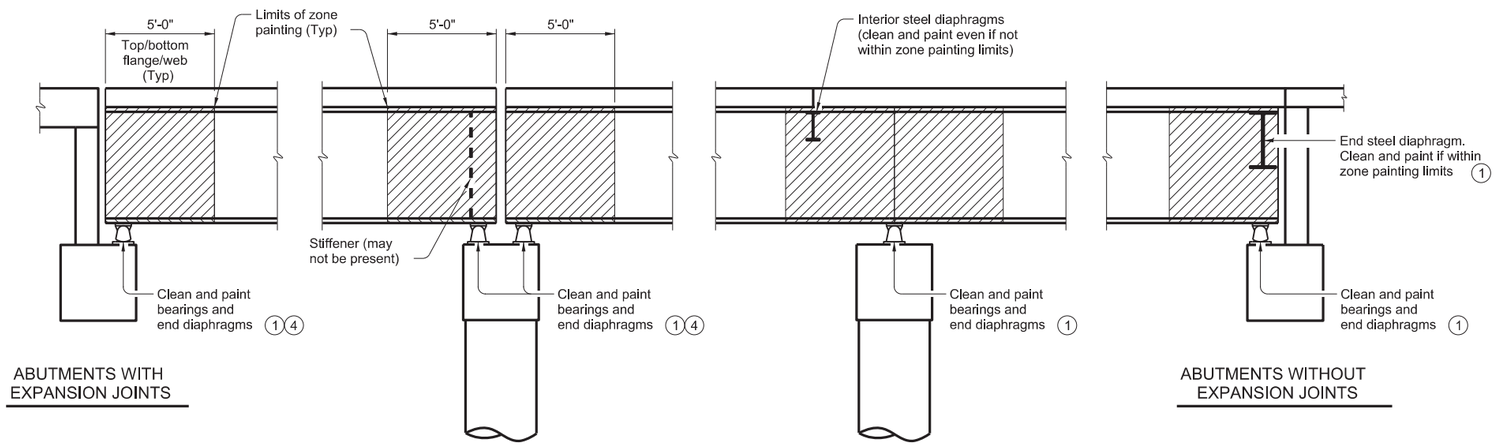
FULL DEPTH DECK REPAIR

(ONE TIME USE)

REFERENCE #1
NBI: 03-049-0045-01-002

FILE:		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6469	87	001, ETC.	US 82, ETC.	
	DIST	COUNTY		SHEET NO.	
	WFS	COOKE, ETC.		62	

DATE: 6/20/2024 12:19:10 PM
FILE: T:\WFSDESGN\Plans\MAINTENANCE CONTRACTS\BPM FY 25\4 - Design\Plan Set\Gainesville BPM\7. Bridge\DETAILS AND STANDARDS\ZONE PAINTING DETAILS.dgn



PARTIAL STEEL BEAM ELEVATION (3)

Dimensions shown are basis of paint estimate but do not define exact limits of repainting. Address deteriorated paint as directed by the Engineer. Painting perimeter does not need to be a vertical plane except on exterior surfaces of exterior beams.

TABLE OF ESTIMATED QUANTITIES (2)

STRUCTURE NUMBER (& FEATURE CROSSED)	REFERENCE NUMBER	QUANTITY PER STRUCTURE (SF)
03-049-0045-01-109 OVER PECAN CREEK	REF 3	1064
03-049-0045-01-110 OVER PECAN CREEK	REF 4	1064
	TOTAL QUANTITY (SF)	2128

(1) Bearings and diaphragms may vary from what is shown.

(2) Paint quantities shown include allowance for bearings, diaphragms and other minor areas as determined by the Engineer.

(3) Showing minimum areas of paint application. Spot clean and paint other locations on the bridge as directed by the Engineer.

(4) See "Cleaning at Expansion Bearings" detail.

ZONE PAINTING NOTES:

Prepare the surfaces to be cleaned by using hand tools, vacuuming, and water blasting as described in Item 446, "Field Cleaning and Painting Steel" for Default Special Protection System. Abrasive blast and achieve SSPC SP10/SP11 (near white metal) for the Alternate Special Protection System.

Water blast all bearings for a minimum of 1 minute each while moving nozzle to thoroughly clean all surfaces. Keep nozzle no further than 6 inches from the surface. Blast concealed surfaces of end diaphragms below bridge expansion joints.

Use oil-free compressed air to blow out tightly onfined locations. Probe around edges of remaining paint with hand scraper to ensure all delaminated paint is removed. For zone painting steel pilings, excavate a minimum of 1'-0" below existing ground level around each piling.
Re-establish ground level once topcoat is dry to the touch.

GENERAL NOTES:

Clean and paint the structure in accordance with Item 446, "Field Cleaning and Painting Steel." Provide potable water for water blasting steel. Water from municipal supplies approved by the Texas Department of Health will not require testing. When water is provided from another source, test for chlorides and provide water with a maximum chloride concentration of 500 ppm (500 mg/L). The default Special Protection System includes:
- Penetrating Sealer (DMS-8101)
- Top Coat (DMS-8105)

The Alternate Special Protection System includes:
- Epoxy Zinc Primer (DMS-8101)
- Top Coat (DMS-8105),

Provide a High Ratio Calcium Sulfonate (HRCSA) top coat for bearings. Provide compatible penetrating sealer and top coat from the same manufacturer.
Tint the proposed paint system to match the existing bridge paint color. Select the proposed paint color from the Federal Standard Colors list. Submit proposed paint color samples to the Engineer for approval before paint purchase.

STRUCTURE NOTES:

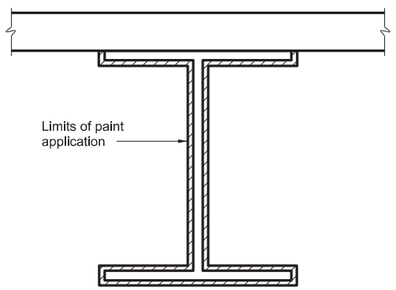
Ref Str #3: Clean beam ends, bearings, and steel end diaphragms and interior steel diaphrams at specified locations. Apply default special protection system. Address other areas along flanges and webs as directed.

Ref Str #4: Clean beam ends, bearings, and steel end diaphragms and interior steel diaphrams at specified locations. Apply default special protection system. Address other areas along flanges and webs as directed.

SPECIAL PROTECTION SYSTEM

DEFAULT:
- Apply 0.5-1.0 mil DFT of penetrating seal to specified surfaces.
- Apply minimum 4.0 mils DFT topcoat to specified surfaces.
- Apply an additional 14-18 WFT protection coat of HRCSA to all exposed bearing surfaces after other coats have cured and in accordance with manufacturer recommendations.

ALTERNATE:
- Apply 3.5 to 10 mils epoxy zinc primer to specified surfaces.
- Apply minimum 4.0 mils DFT topcoat to specified surfaces.
- Apply an additional 14-18 WFT protection coat of HRCSA to all exposed bearing surfaces after other coats have cured and in accordance with manufacturer recommendations.



STEEL BEAM CROSS SECTION WITH ZONE PAINT LIMITS

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division

ZONE PAINTING DETAILS
(ONE TIME USE)

NBI: 03-049-0045-01-109
NBI: 03-049-0045-01-110

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		63

DATE: 6/20/2024 12:19:12 PM
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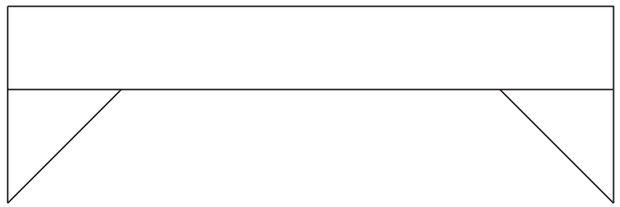
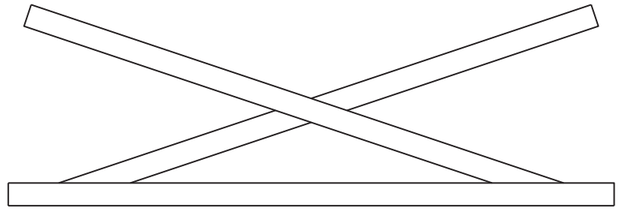


END DIAPHRAM DETAILS (5)

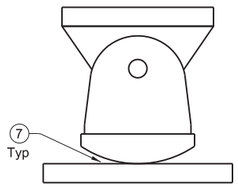


INTERIOR DIAPHRAM DETAILS (6)

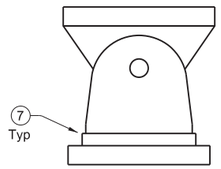
(5) Applies to all steel end diaphrams at abutments. Use Default Protection System.

(6) Applies to steel interior diaphrams at locations with corrosion or paint failure. Use Default Special Protection System.

(7) Completely remove all debris and pack rust from under bearings before applying special protection system. Use tools and methods that will not damage the existing bearing or cap. Engineer may request demonstration of the tools and methods before beginning work.



ROCKER BEARING



FIXED BEARING

CLEANING AT EXPANSION BEARINGS

Existing bearings may differ from those shown.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

SHEET 2 OF 2

Texas Department of Transportation | Bridge Division

ZONE PAINTING DETAILS
(ONE TIME USE)

NBI: 03-049-0045-01-109
NBI: 03-049-0045-01-110

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		64

DATE: 6/20/2024 12:19:13 PM
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

☐ No Action Required ☑ Required Action

Action No.

1. The project disturbs less than one acre of surface area. The contractor is responsible for the PSL as defined in the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges. The total disturbed acreage is the combined acreage to be disturbed on the project and the contractors PSL.
2. Prevent stormwater pollution by controlling erosion and sedimentation to the maximum extent practical. Comply with the SW3P and revise as necessary or as required by the Engineer.
3. This EPIC must be updated if the disturbed area increases to one or more acres during the course of construction.
4. It may become necessary to post a site notice and/or NOI for the project and/or PSL in a location accessible to the public and TCEQ, EPA, or other inspector if the disturbed area increases to more than 1 acre.

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

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

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

☐ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☑ Other Nationwide Permit Required: NWP# 3a

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

1. All channels, streams and draws are considered Waters of the U.S. (WOTUS). Work in WOTUS must comply with general conditions of the Nationwide Permit (NWP).
2. Impacts to any waters of the U.S. are limited to the minimum necessary to construct the work.
3. This project includes habitat for state and federally listed mussel species. A mussel survey is required at specific locations before channel excavation or riprap can be placed below the ordinary high water mark.
4. Products of debris removal and channel excavation needs to be stored at an upland location.
5. Equipment should not be placed in the channel.
6. When temporary stream crossings are unavoidable, remove stream crossings once they are no longer needed and stabilize banks and soils around the crossing.
7. If dewatering activities are necessary, the contractor would coordinate with the TPWD Kills and Spills Team (KAST) to obtain necessary permits. Contact Bregan Brown TPWD Region 2 KAST, by phone at (903)566-2518, Adam Whisenant TPWD Region 2 KAST, by phone at (903)566-8387 or call the 24-hour phone line at (512) 389-4848. The permitting process requires at least one month.
8. This pject includes habitat for state listed mussel species. A mussule survey is required at specific locations before temporary crossings of rip rap can be placed below the ordinary high water mark.

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.

III. CULTURAL RESOURCES

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

☐ No Action Required ☑ Required Action

Action No.

1. If burial remains and/or artifacts are discovered cease work and contact the WFS District ENV Coordinator. If discovered, tribes request immediate notification by TxDot.
2. No impacts off right-of-way are permitted without coordinating with the DEQC and/or EC.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☑ Required Action

Action No.

1. Vegetation disturbances should be limited to the minimum necessary to complete the work.
2. Prior to impacting trees and shrubs check for birds, bees, bats and other wildlife.
3. Re-vegetation of disturbed areas shall be done in accordance with TxDOT's standard practices for rural areas in compliance with the Executive Memorandm on Beneficial Landscaping.

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

☐ No Action Required ☑ Required Action

Action No.

1. Bird BMPs: Migratory birds may arrive in the project area to breed during construction of the proposed project. Per the Migratory Bird Treaty Act (MBTA), measures would be taken to avoid disturbing or killing of migratory birds. Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season, March through August. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests prior to 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.
2. Amphibian ans Aquatic Reptile BMPs: Contractors wil be advised of potential occurrence of the Woodhouse's Toad and Strecker's chorus frog in the project area, and to avoid harming them if encountered. Prject specific locations (PSLs) within state-owned ROW should be located in uplands away from aquatic features. Where work is directly adjacent to the water, minimize impacts to shoreline where feasible.
3. Bat BMPs: In all instances, avoid harm to bats. If bats are encontered during construction stop work in the area and contact district environmental coordinator (Nellie Bennett) at 940-720-7733. Bats should only be handled as a last resort and after communication with TPWD.
4. Terrestrial Reptile BMPs: Visually inspect excavation areas for trapped wildlife prior to backfilling. Inform contractors that is reptiles are found on project site, allow species to safely leave the project area.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):
Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.
Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.
Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup
of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☑ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

☑ Yes ☐ No

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

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

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

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

☐ No Action Required ☑ Required Action

1. If sheen of other contamination is visible in the waters of the US, or on the project site, the site shall be imediately cleaned up in accordance with local, state, and fereral regulations.
2. See item 446 in the general notes for details on structure with lead containing paint.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☑ Required Action

Action No.

1. Keep noise to a minimum. Reduce idling of vehicles and equipment.
2. Maintain project site. Minimize dust and airborne particles to the maximum extent practical.
3. Collect sanitary waste in accordance with local regulations by a sanitary waste collector. Portable units shall not be placed near a waterway or drainage area.
4. Collect all waste materials, trash, and debris from the construction site daily and deposit into a metal dumpster having a secure cover.
5. TxDOT EMS Policy Statement (English & Spanish) should be displayed at the construction site.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

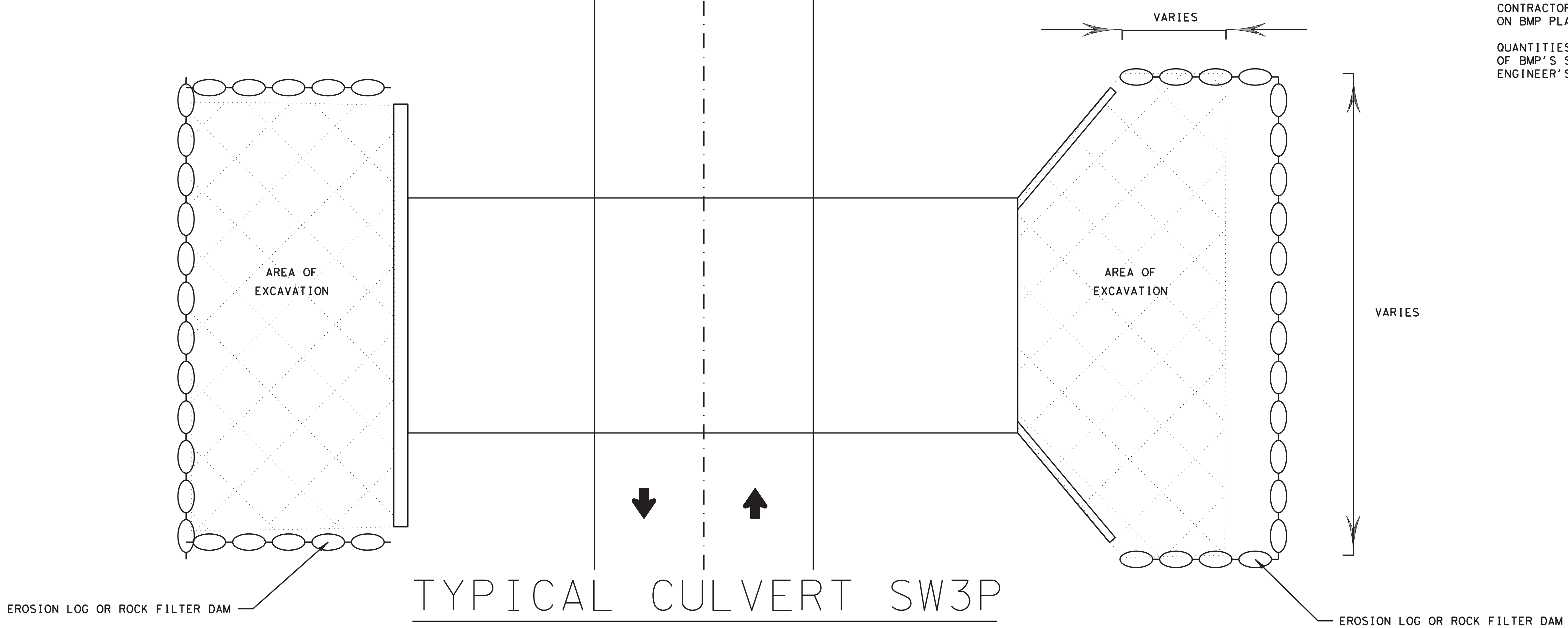
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	WFS	COOKE, ETC.		65
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

NOTES:

CONTRACTOR SHALL LIST INSTALL DATES AND REMOVE DATES ON BMP PLACEMENT LIST BELOW.

QUANTITIES ARE BASED ON TYPICAL LAYOUT SHOWN. PLACEMENT OF BMP'S SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. SEEK ENGINEER'S APPROVAL FOR PROPER PLACEMENT.



TYPICAL CULVERT SW3P

REFERENCE NO.	BMP PLACEMENT - UPSTREAM END					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

REFERENCE NO.	BMP PLACEMENT - DOWNSTREAM END					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.
06/20/2024

US 82, ETC.
TYPICAL SW3P
LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6469	87	001, ETC.	US 82, ETC.
DIST		COUNTY	SHEET NO.
WFS		COOKE, ETC.	66

DATE: 6/20/2024 12:19:14 PM
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DATE: 6/20/2024
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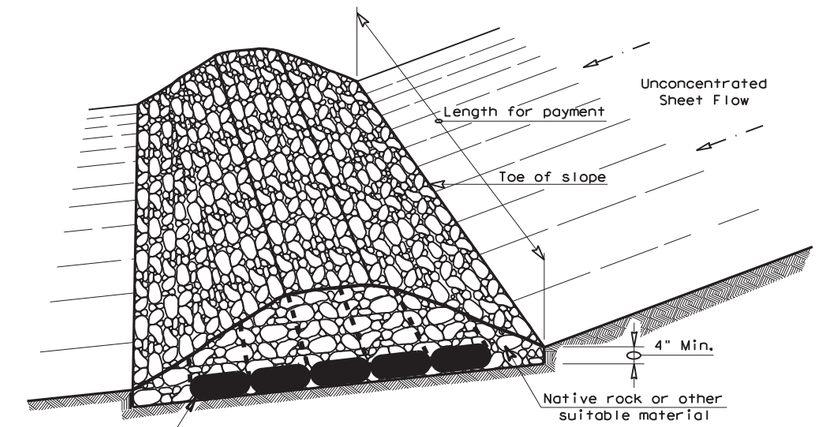
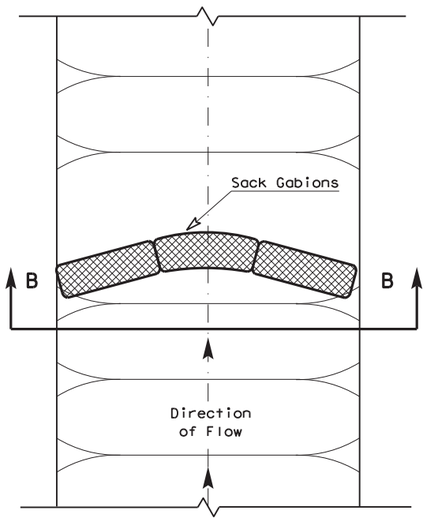
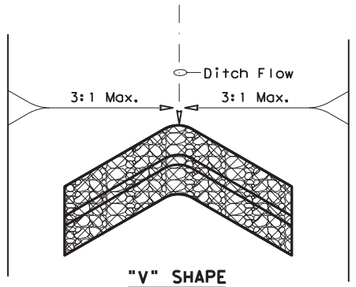


FILTER DAM AT TOE OF SLOPE

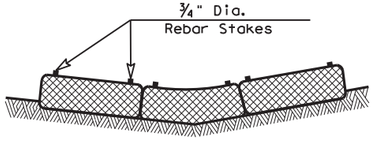
RFD1



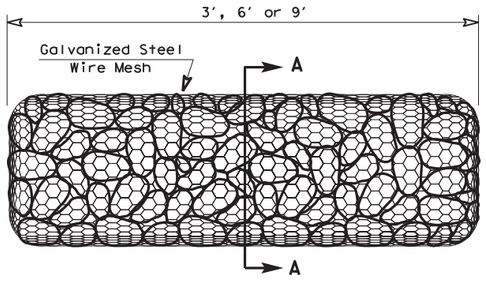
PLAN VIEW



"V" SHAPE
PLAN VIEW

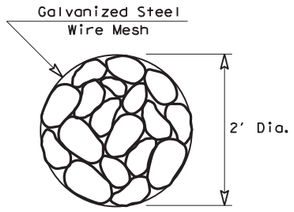


SECTION B-B

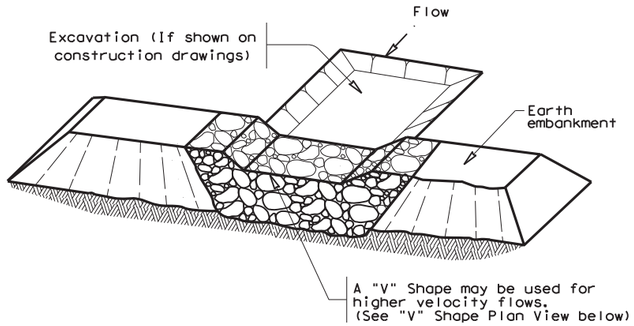


TYPE 4 (SACK GABIONS)

RFD4

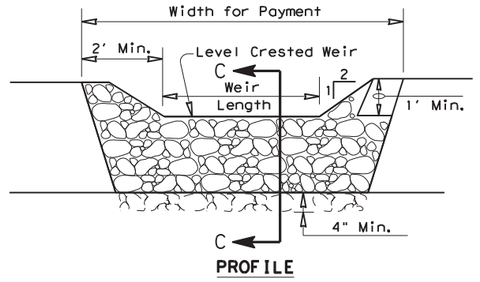


SECTION A-A

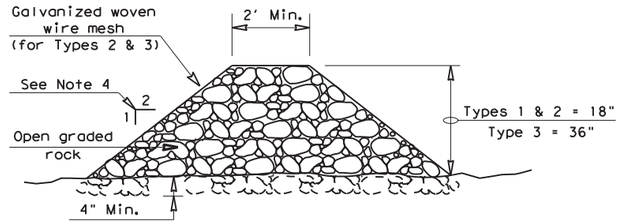


FILTER DAM AT SEDIMENT TRAP

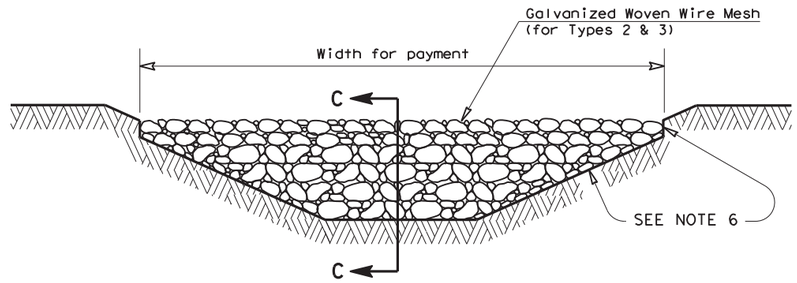
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		67

DATE: 6/20/2024
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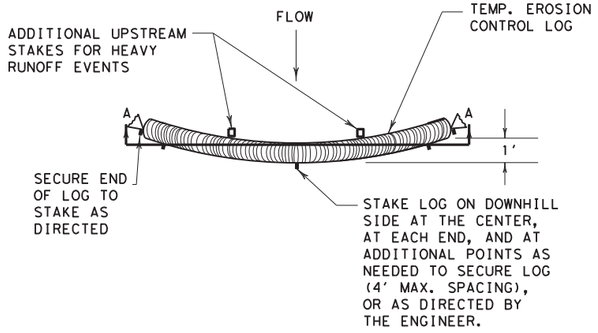
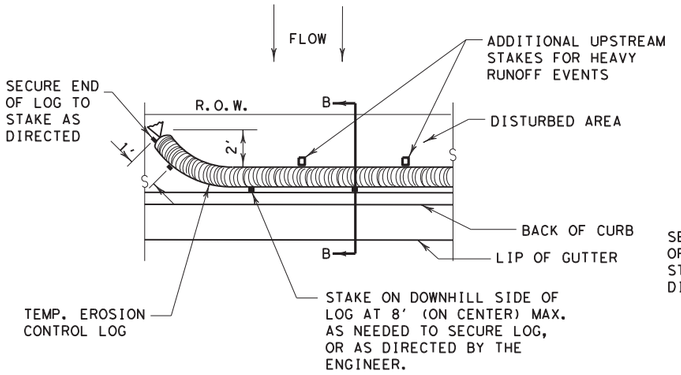
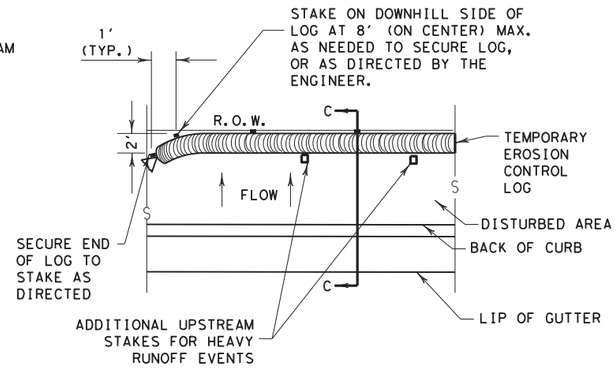


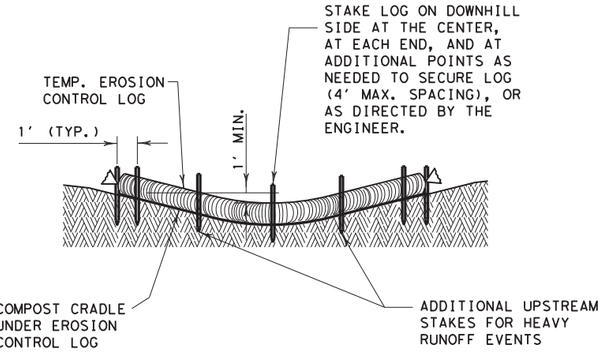
PLAN VIEW



PLAN VIEW



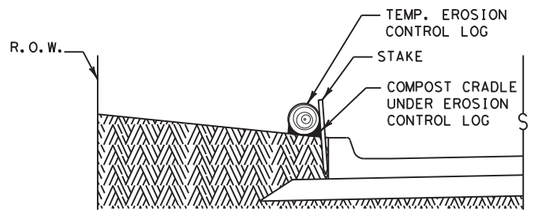
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

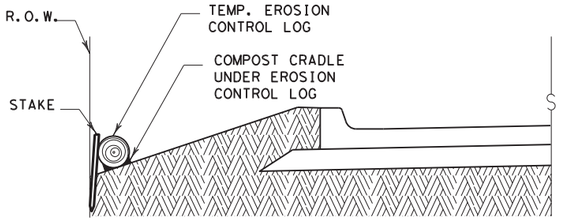
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

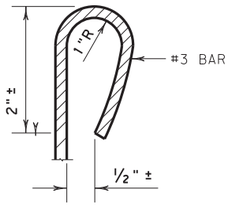
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



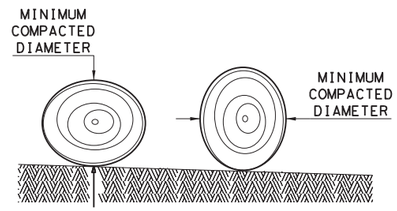
REBAR STAKE DETAIL

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

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	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		68

DATE: 6/20/2024
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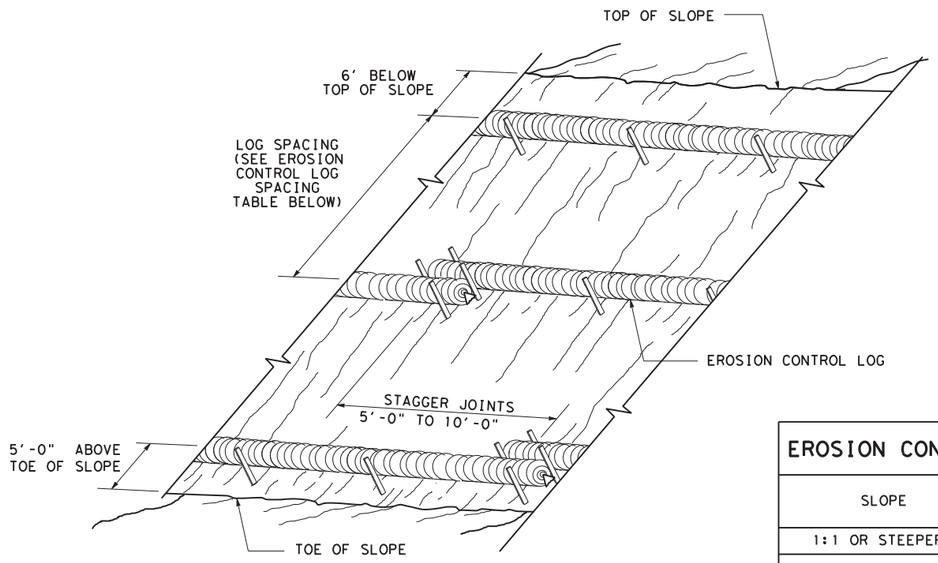
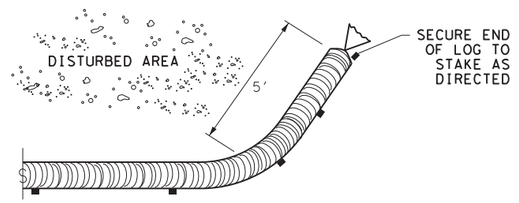


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

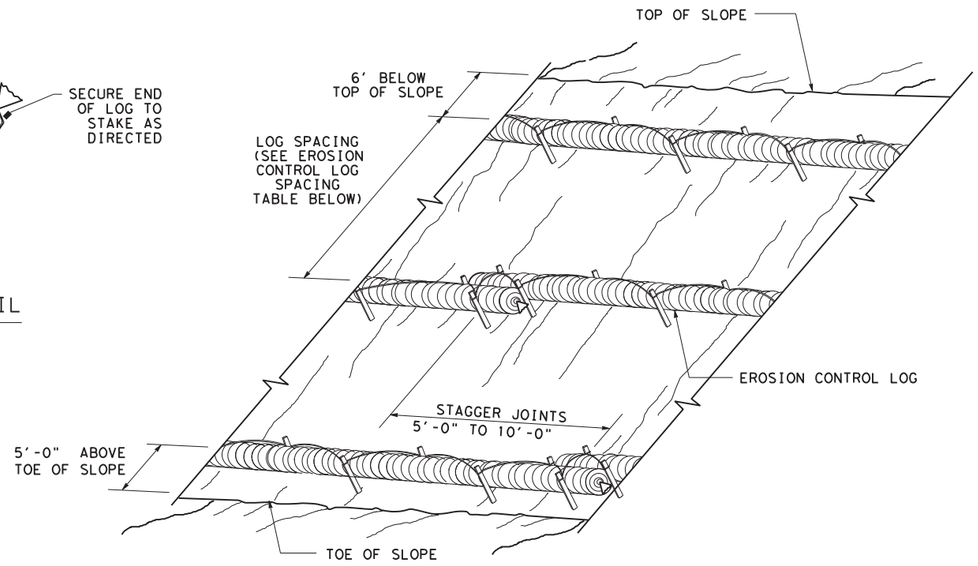
CL-SST



END SECTION RAP DETAIL

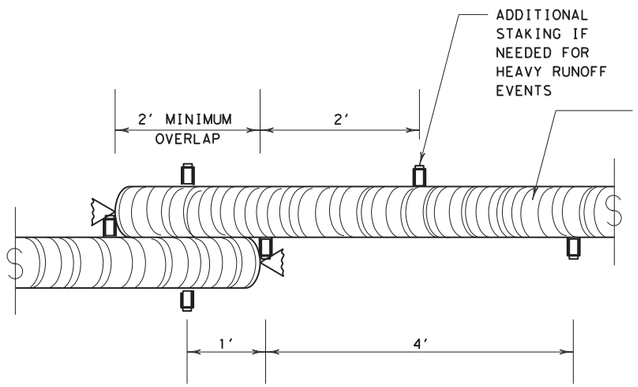
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

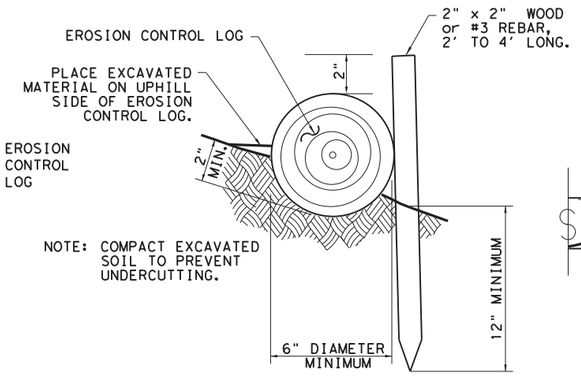
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

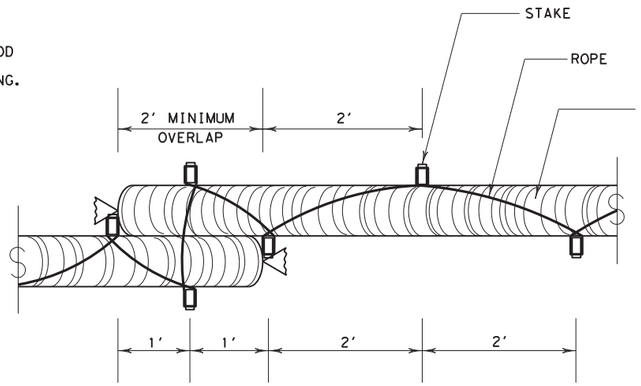


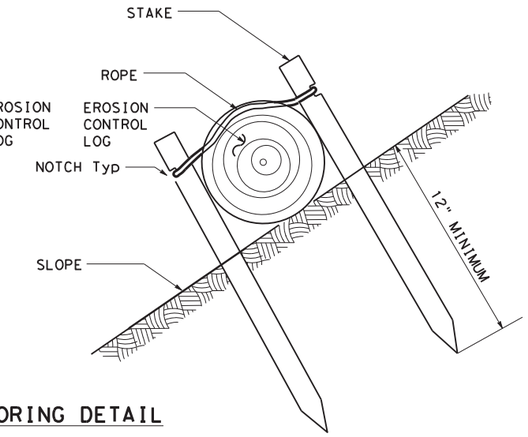


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

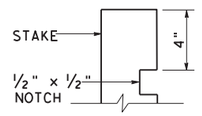
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





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
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	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		69

DATE: 6/20/2024
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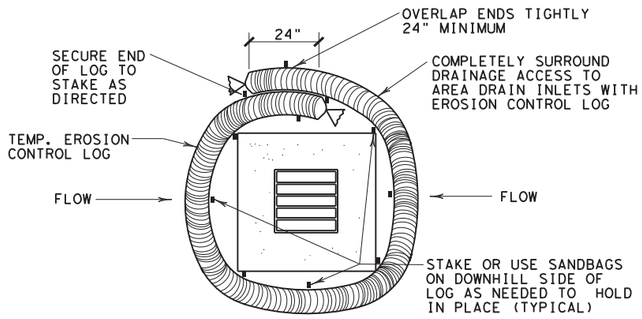
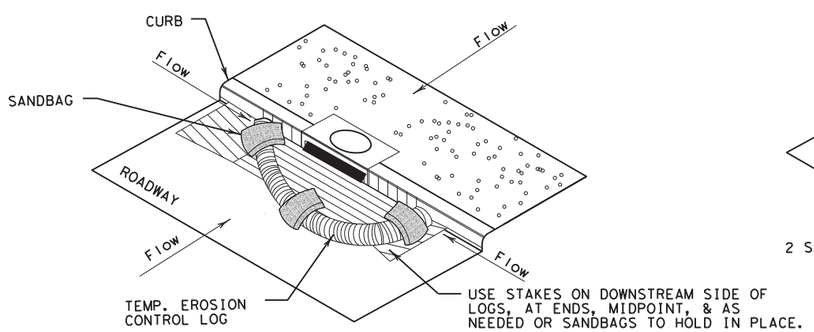


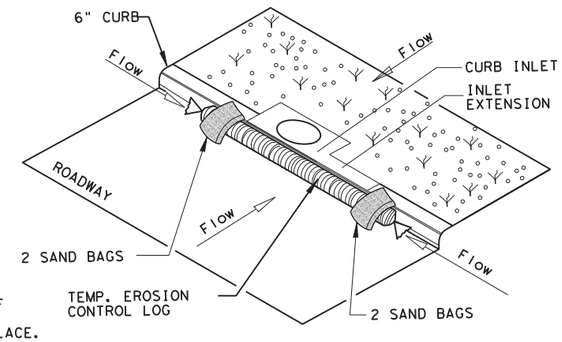
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

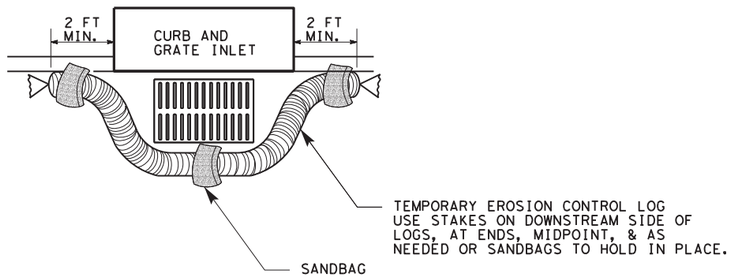
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

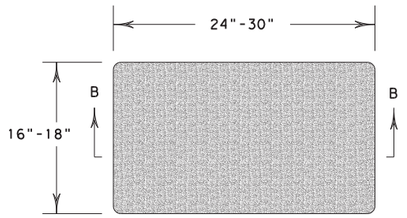
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



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
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REVISIONS	6469	87	001, ETC.		US 82, ETC.	
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	WFS	COOKE, ETC.				70

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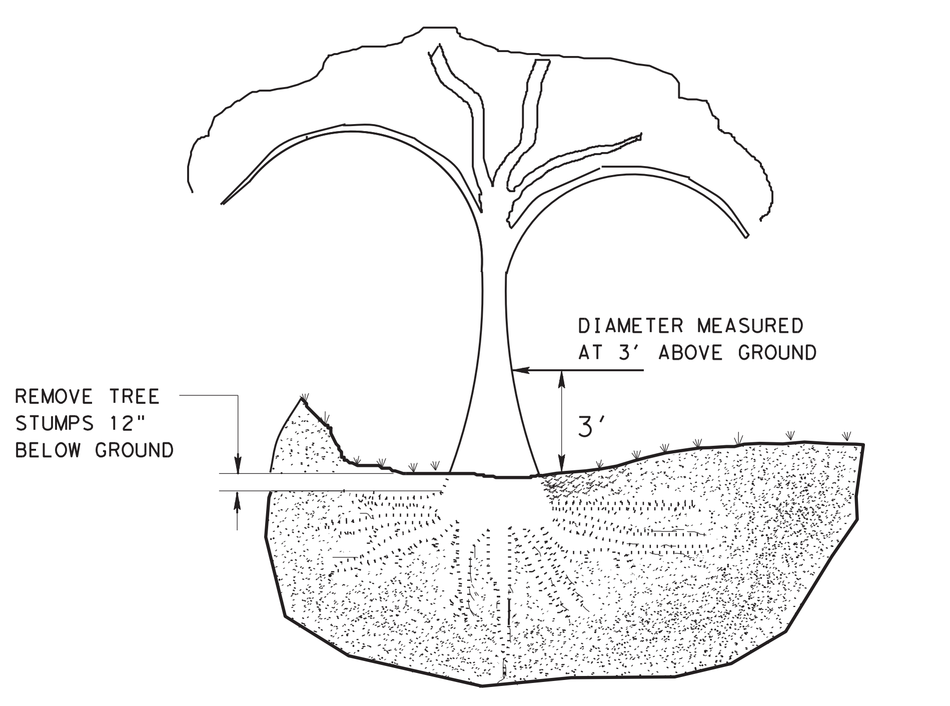
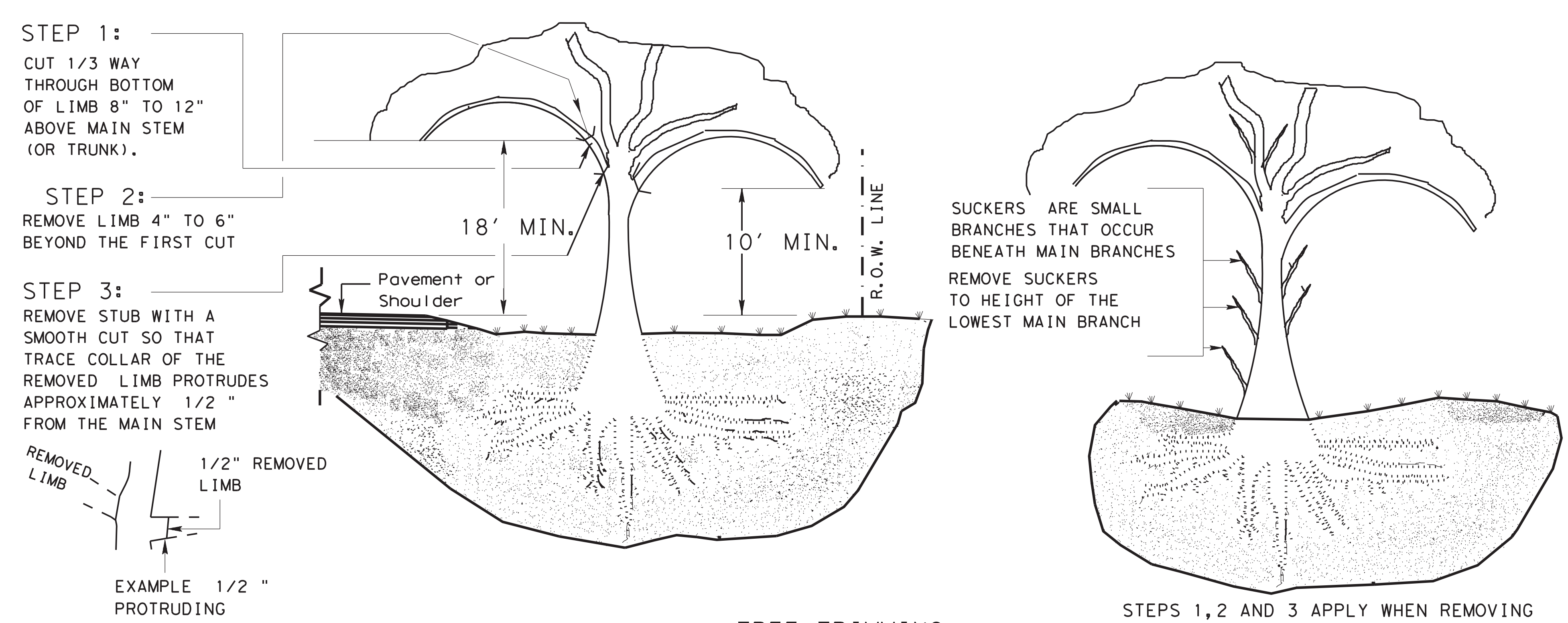
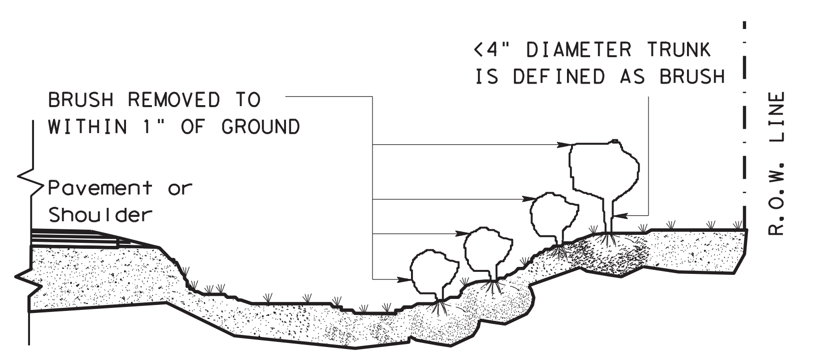


TREE REMOVAL

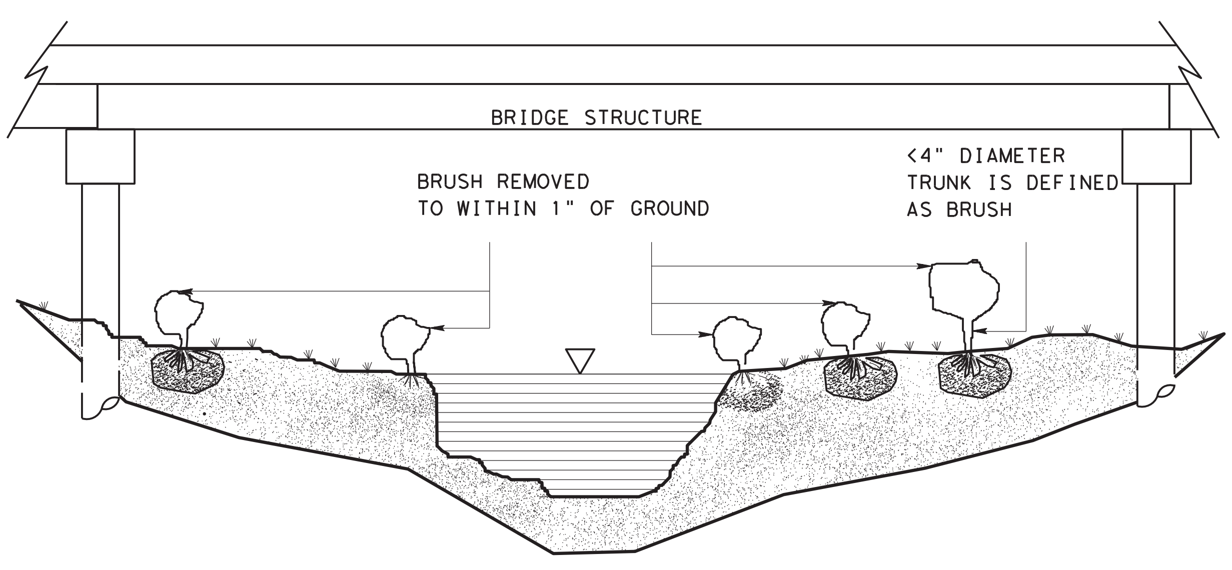


TREE TRIMMING

STEPS 1,2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

GENERAL NOTES:

TREE TRIMMING

1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.

4. MEASUREMENTS FOR PAYMENT OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.

TABLE 1
TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT

	RANGE FOR PAY ITEMS			
	TRUNK DIAMETER *		TRUNK CIRCUMFERENCE	
PAY ITEM	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

*SEE GENERAL NOTE #3.

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TREE AND BRUSH REMOVAL

TRB-15(1)

FILE:	DN: JEO	CK: LJB	DW: JEO	CK:
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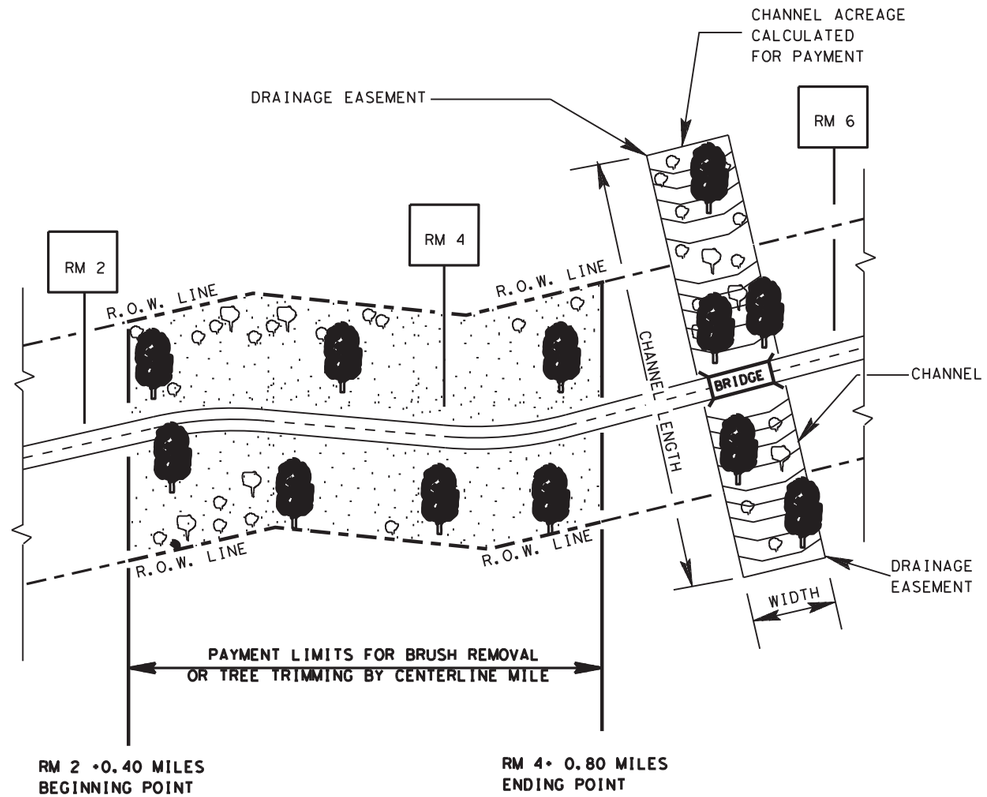
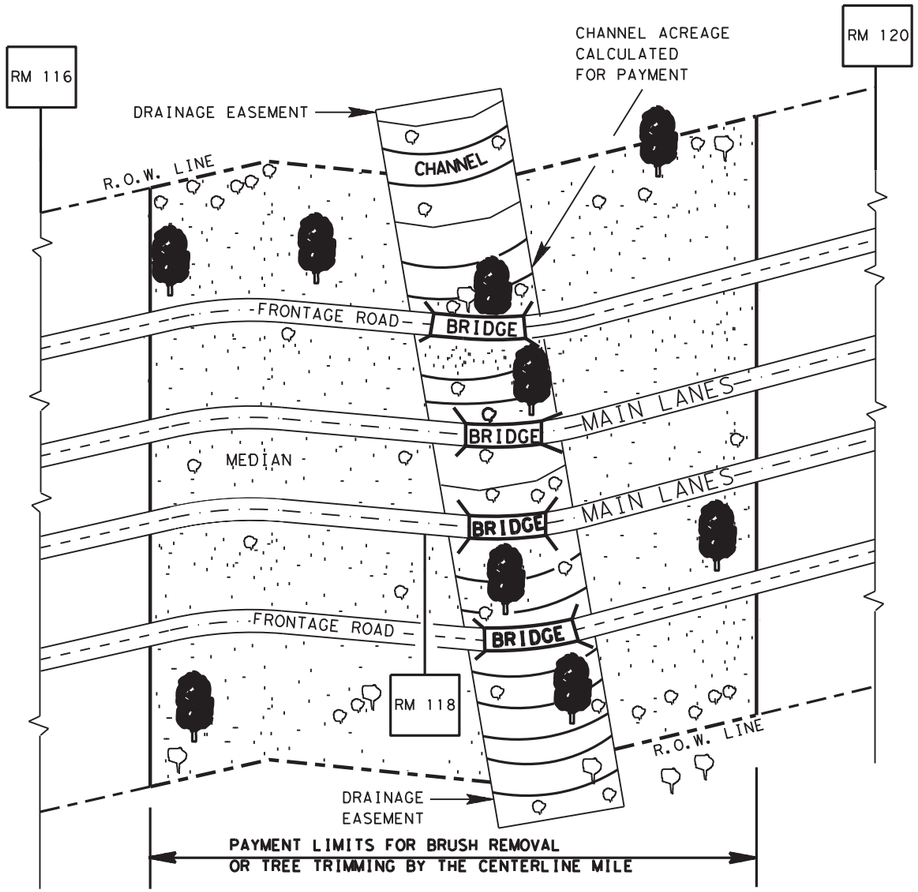
REVISIONS	6469	87	001, ETC.	US 82, ETC.
Revised table 1 to 2014 Specification	DIST		COUNTY	SHEET NO.
	WFS		COOKE, ETC.	71



BRUSH REMOVED TO
WITHIN 1" OF GROUND
<4" DIAMETER TRUNK
IS DEFINED AS BRUSH
UNLESS OTHERWISE DIRECTED

EXAMPLE: UNDIVIDED HIGHWAY



BRUSH REMOVED TO
WITHIN 1" OF GROUND
<4" DIAMETER TRUNK
IS DEFINED AS BRUSH
UNLESS OTHERWISE DIRECTED

EXAMPLE: DIVIDED HIGHWAY WITH FRONTAGE ROADS

LEVELS DISPLAYED
1

GENERAL NOTES:

TREE TRIMMING AND BRUSH REMOVAL

1. PAYMENT BY THE CENTERLINE MILE IS MADE TO THE NEAREST 1/100 (0.01) MILE.
2. LIMITS OF WORK ARE SHOWN AS DISTANCES FROM REFERENCE MARKERS (RM).
3. PAY ITEMS BY THE CENTERLINE MILE INCLUDE ALL TREE TRIMMING OR BRUSH REMOVAL IN THE RIGHT OF WAY ON BOTH SIDES OF THE HIGHWAY. FOR DIVIDED HIGHWAYS, THE MEDIAN IS INCLUDED. FOR HIGHWAYS WITH FRONTAGE ROADS, THE AREAS BETWEEN THE FRONTAGE ROADS AND MAIN LANES, AND THE AREAS OUTSIDE OF THE FRONTAGE ROADS ARE INCLUDED.
4. BRUSH REMOVAL AND TREE TRIMMING UNDER BRIDGES, IN AND ALONG CHANNELS AND EASEMENTS ARE PAID FOR BY THE ACRE FOR AREAS DESIGNATED ON THE PLANS.

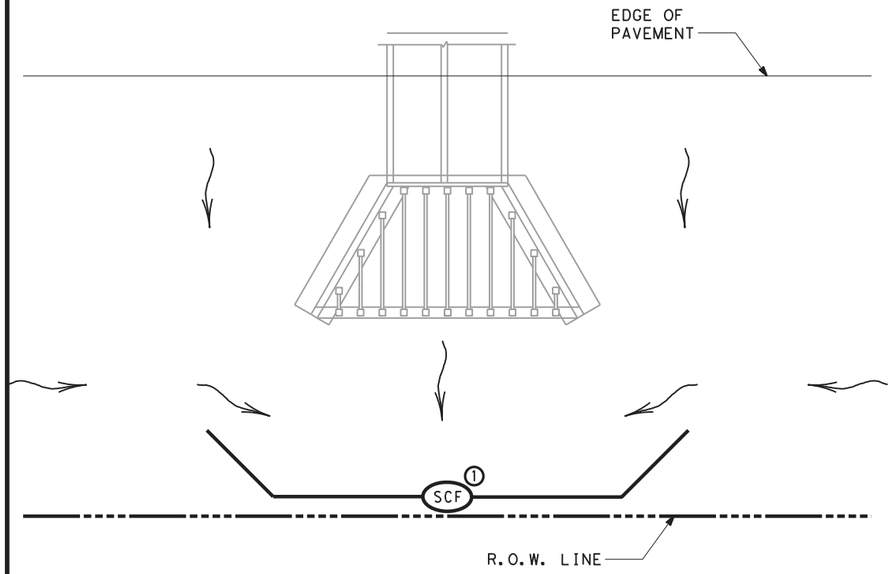
Texas Department of Transportation
Maintenance Division
Standard Plans

TREE AND BRUSH REMOVAL

TRB-15(2)

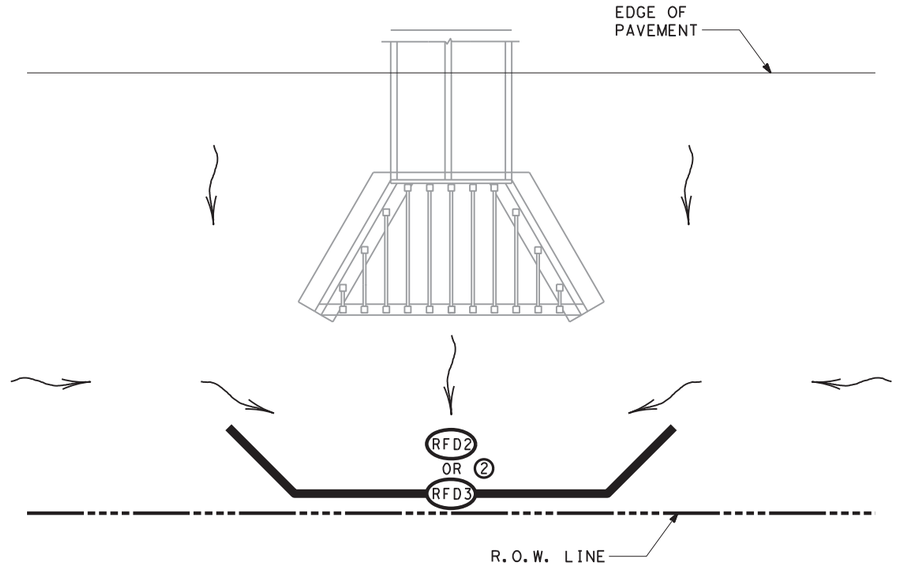
NOT TO SCALE — SHEET 2 OF 2

FILE: TRB-15(2).DGN	DRAWN: JEO	CHECKED: DM; LJB	DW: -	CK: -	NEG NO.:			
© TxDOT APRIL 2015	MODIFIED:	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #				SHEET
REVISED: 5/13/2004	LJB	WFS						72
REVISED: 9/24/2004	LJB	COUNTY			CONTROL	SECTION	JOB	HIGHWAY
REVISED: APRIL 2015	JEO	COOKE, ETC.			6469	801,	ETC.	US82, ETC.



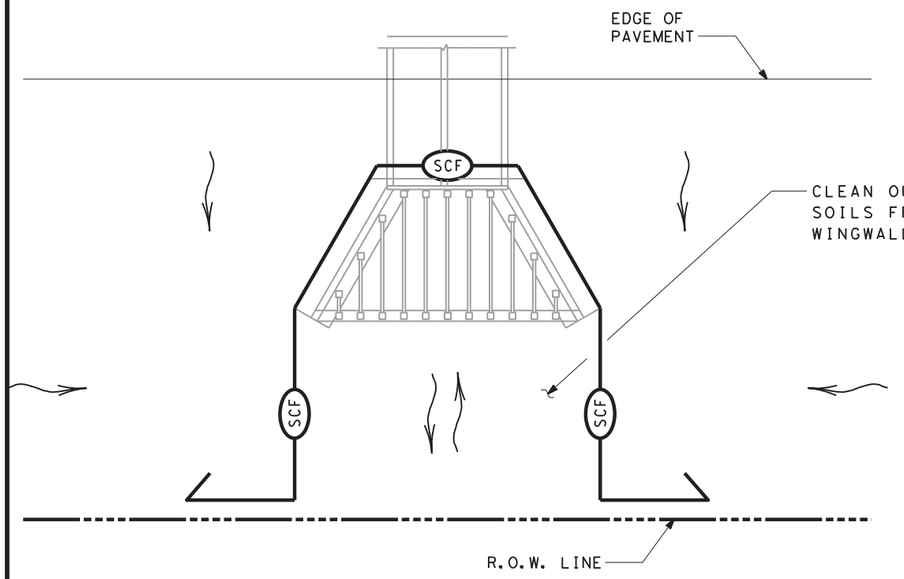
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



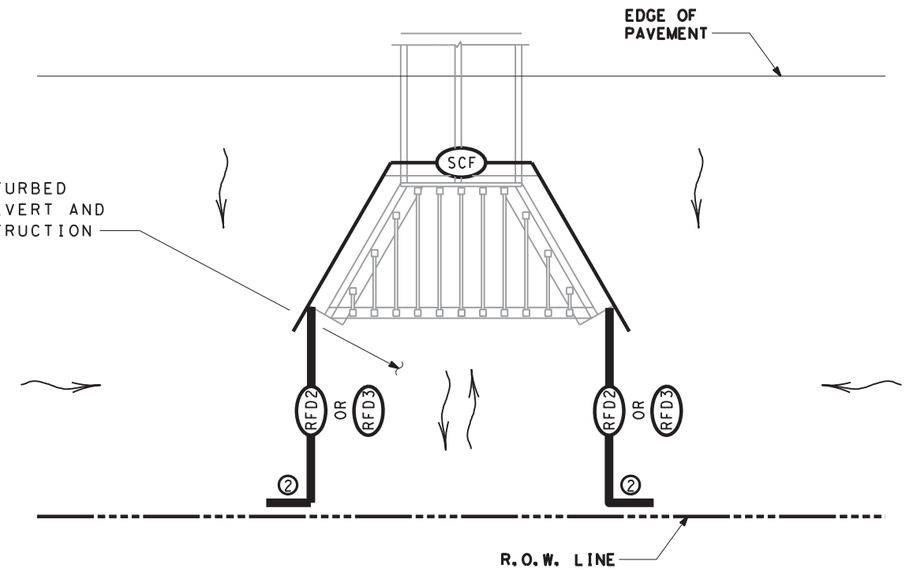
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

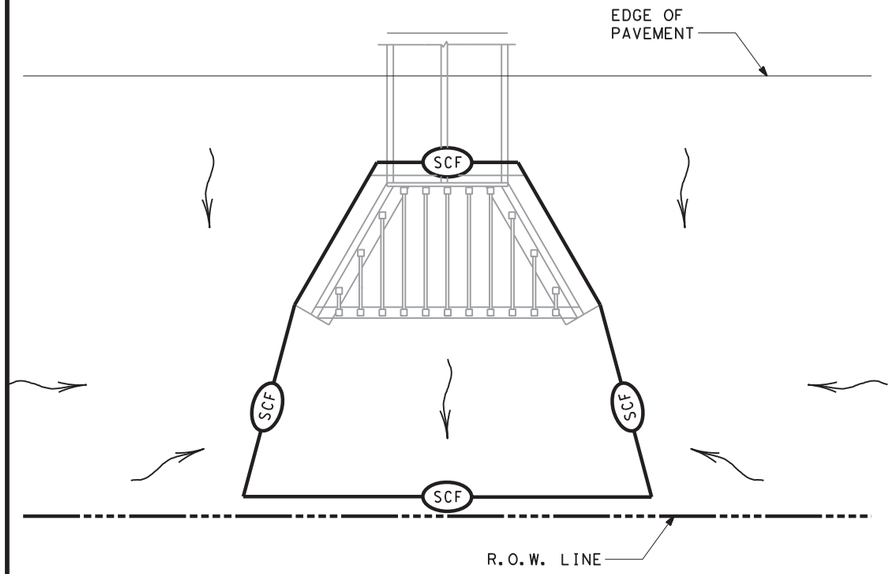
SCALE = NTS SHEET 1 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

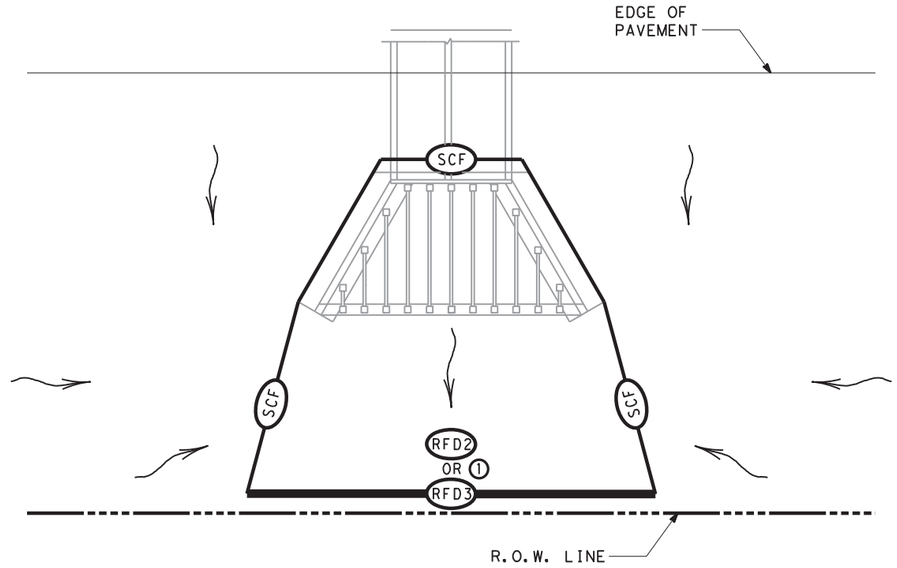
WFS-TA-BMP

FILE: BMPLAYOUTS.dgn			DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
		CONT	SECT	JOB		HIGHWAY	
REVISIONS JULY 2019		6469	87	001, ETC.		US 82, ETC.	
	DIST	COUNTY				SHEET NO.	
	WFS	COOKE, ETC.				73	



BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



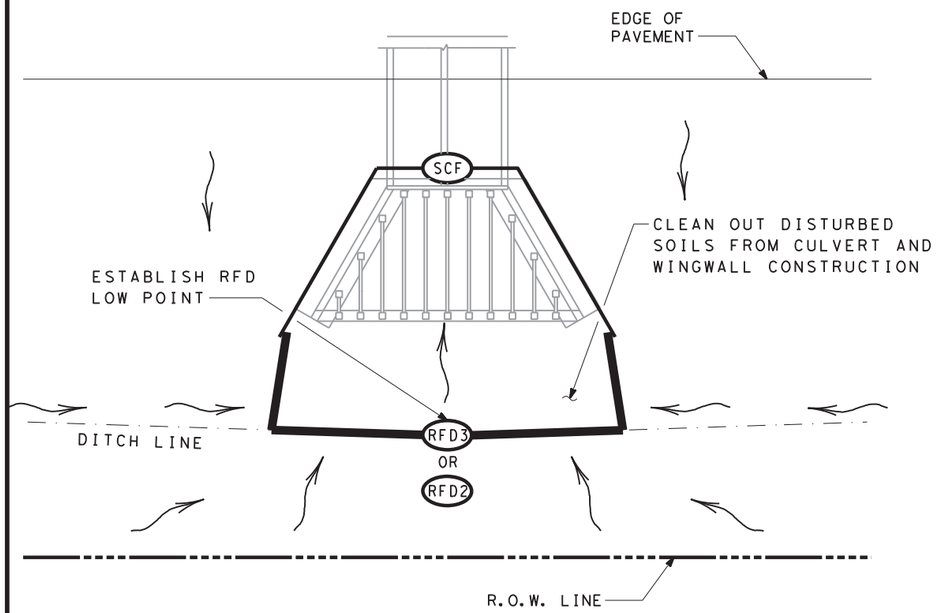
BEST MANAGEMENT PRACTICE (BMP) #6

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

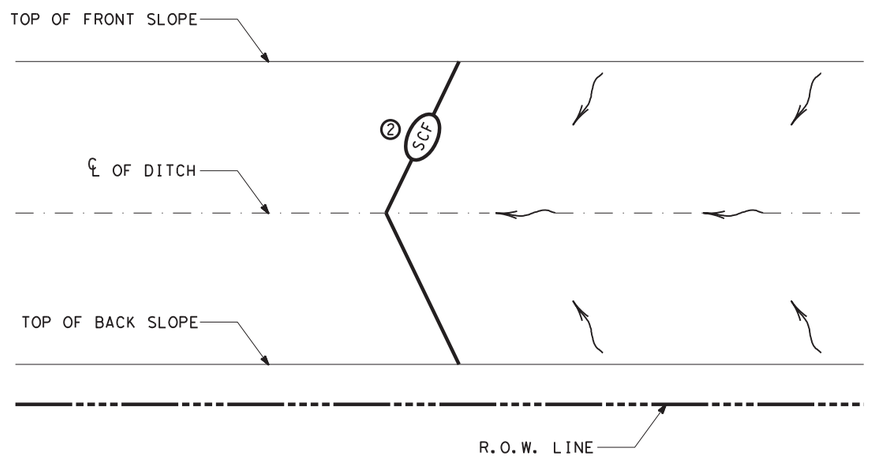
NOTES:

1. PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.
2. ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.



BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #8

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

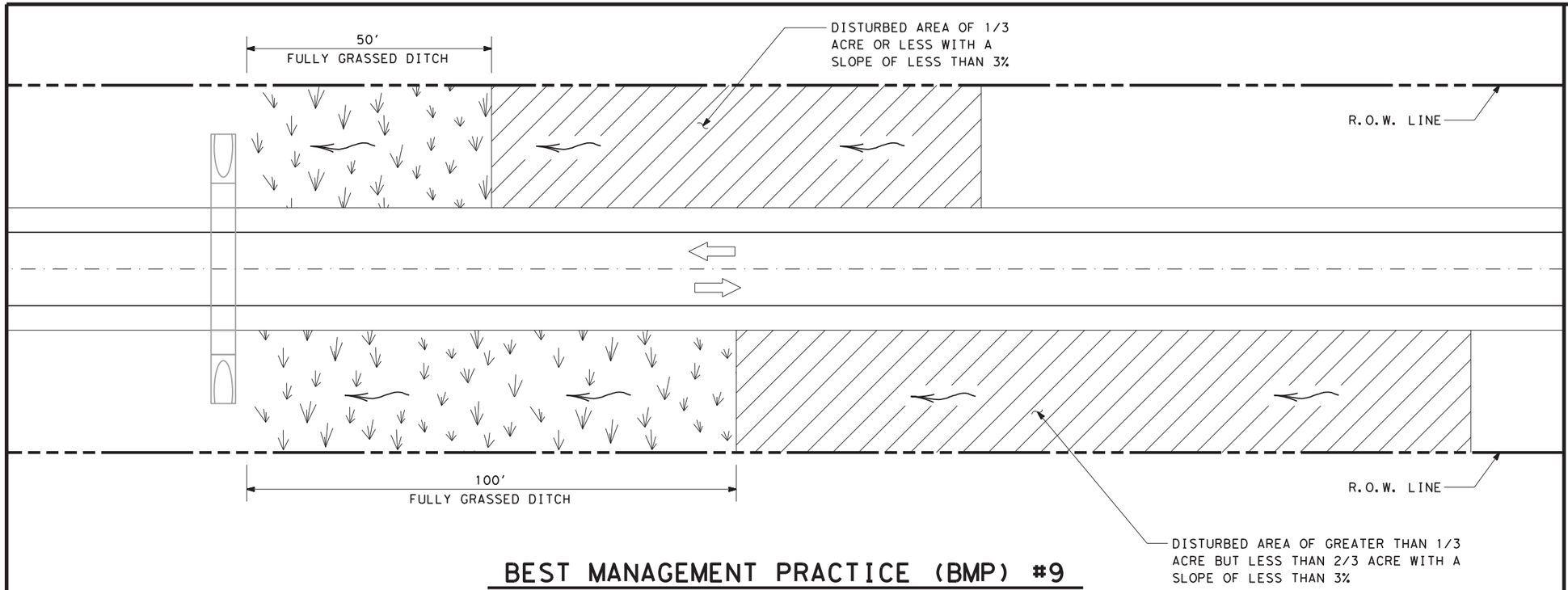
SCALE = NTS SHEET 2 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT		
		CONT	SECT	JOB	HIGHWAY		
REVISIONS JULY 2019		6469	87	001, ETC.	US 82, ETC.		
		DIST	COUNTY		SHEET NO.		
		WFS	COOKE, ETC.		74		



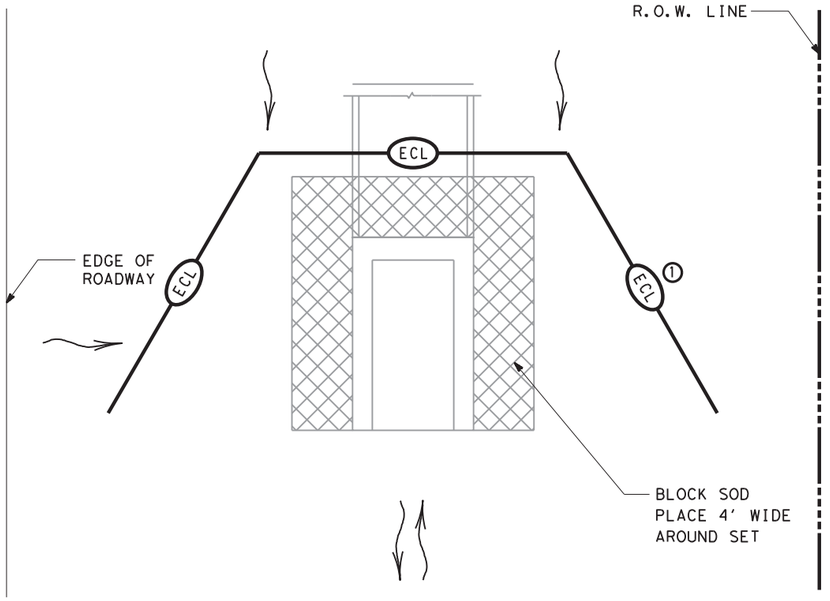
BEST MANAGEMENT PRACTICE (BMP) #9

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
ECL	EROSION CONTROL LOG
	SOD

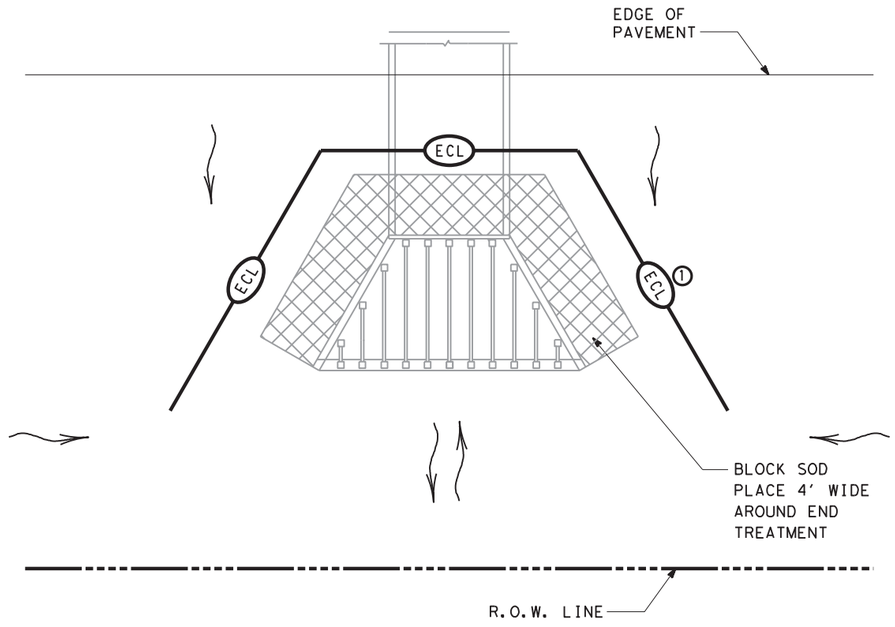
NOTES:

1. SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED BY THE ENGINEER.



BEST MANAGEMENT PRACTICE (BMP) #10

SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE/EXIT



BEST MANAGEMENT PRACTICE (BMP) #11

SEDIMENT CONTROL AT CROSS DRAINAGE STRUCTURE ENTRANCE/EXIT

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

SCALE = NTS SHEET 3 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT		
©TxDOT 2009		CONT	SECT	JOB		HIGHWAY	
REVISIONS		6469	87	001, ETC.		US 82, ETC.	
JULY 2019		DIST	COUNTY			SHEET NO.	
		WFS	COOKE, ETC.			75	

DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
WHITE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

SIGN GENERAL NOTES:

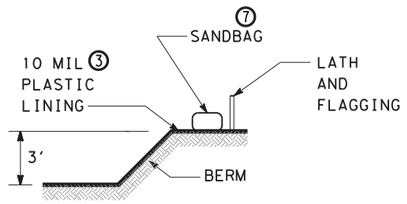
A. THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", (TMUTCD) LATEST EDITION, AND THE "COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST". LATERAL SPACING OF TEXT SHALL PROVIDE A BALANCED APPEARANCE. ALL MATERIALS SHALL CONFORM TO DEPARTMENT SPECIFICATIONS.

B. LEGEND AND BORDER MAY BE APPLIED BY REVERSE SCREENING PROCESS WITH TRANSPARENT COLORED INK, CUT-OUT WHITE REFLECTIVE SHEETING APPLIED TO COLORED BACKGROUND OR COMBINATION THEREOF. BACKGROUND SHALL BE REFLECTIVE SHEETING TYPE C.

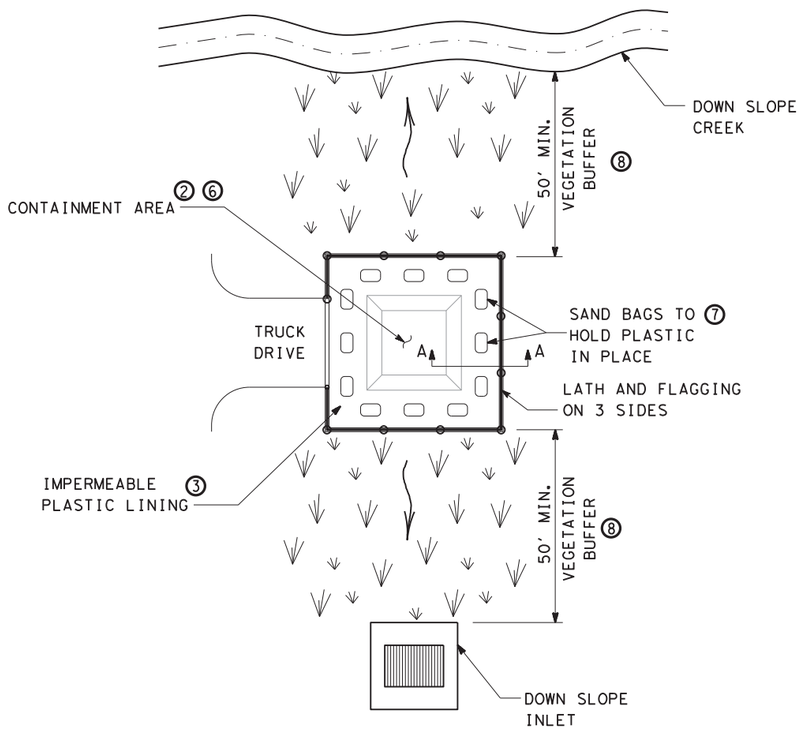
C. FINAL SIGN LOCATION SHALL BE AS APPROVED BY THE ENGINEER. IF THE SIGN CANNOT BE PLACED OUTSIDE THE CLEAR ZONE, IT MUST ADHERE TO THE TMUTCD. IF PLACED OUTSIDE THE CLEAR ZONE, SIGN MAY BE PLACED PERPENDICULAR OR PARALLEL TO ROW LINE.

D. SIGN DIMENSION IS 42" WIDE X 24" TALL WITH 5" BLACK LETTERS.

CONCRETE WASHOUT SIGN DETAIL (10)

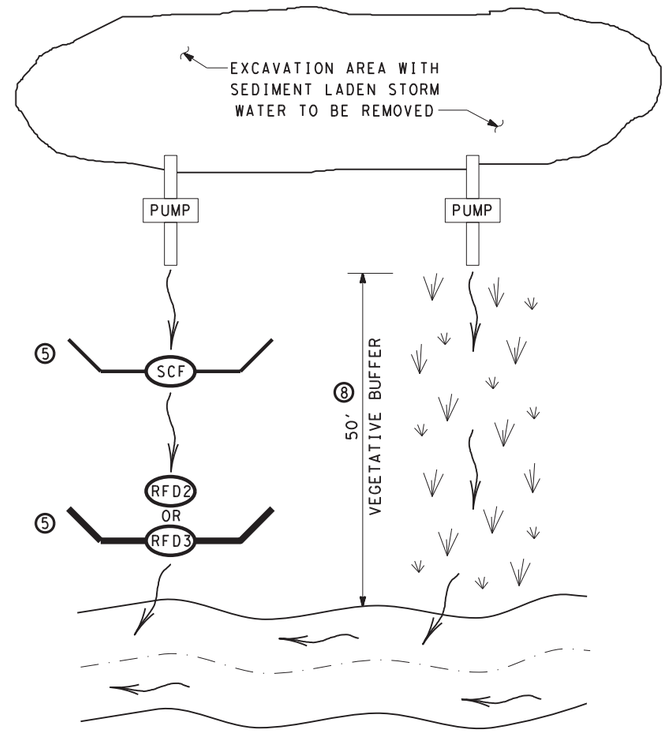


SECTION A-A



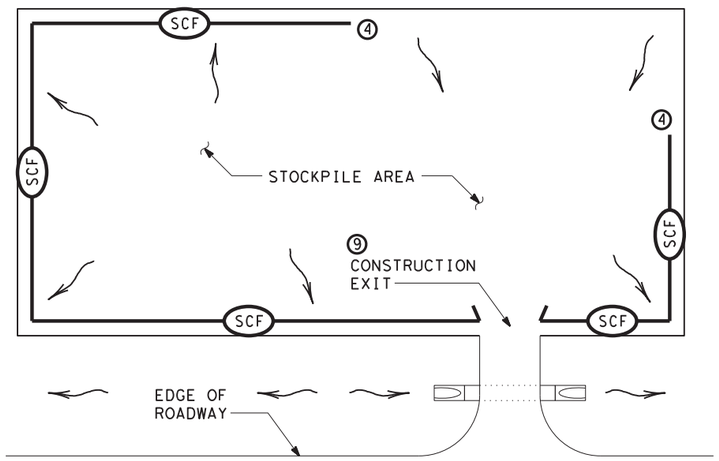
BEST MANAGEMENT PRACTICE (BMP) #12

CONCRETE TRUCK WASHOUT AREA (10)



BEST MANAGEMENT PRACTICE (BMP) #13

PUMPED STORM WATER SEDIMENT CONTROLS (1)



BEST MANAGEMENT PRACTICE (BMP) #14

STOCKPILE SEDIMENT CONTROL

	VEGETATIVE BUFFER
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

NOTES:

1. PUMPED STORM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS.
2. WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.
3. EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING. USE 10 MIL PLASTIC LINING MINIMUM.
4. START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
5. ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED.
6. ACTUAL SIZE, LAYOUT, & LOCATION WILL BE DETERMINED IN THE FIELD.
7. AN EARTHEN BERM MAY BE USED IN LIEU OF SANDBAGS.
8. VEGETATIVE BUFFER SHOULD HAVE AT A MINIMUM 70% VEGETATIVE COVERAGE
9. PLACEMENT OF DEVICES FOR OFFSITE TRACKING AS APPLICABLE AND/OR DIRECTED BY THE ENGINEER.
10. ALL ITEMS REQUIRED FOR CONCRETE WASHOUT AND SIGN SHALL BE SUBSIDIARY TO ITEM 506.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

SCALE = NTS SHEET 4 OF 5

Texas Department of Transportation
Wichita Falls District

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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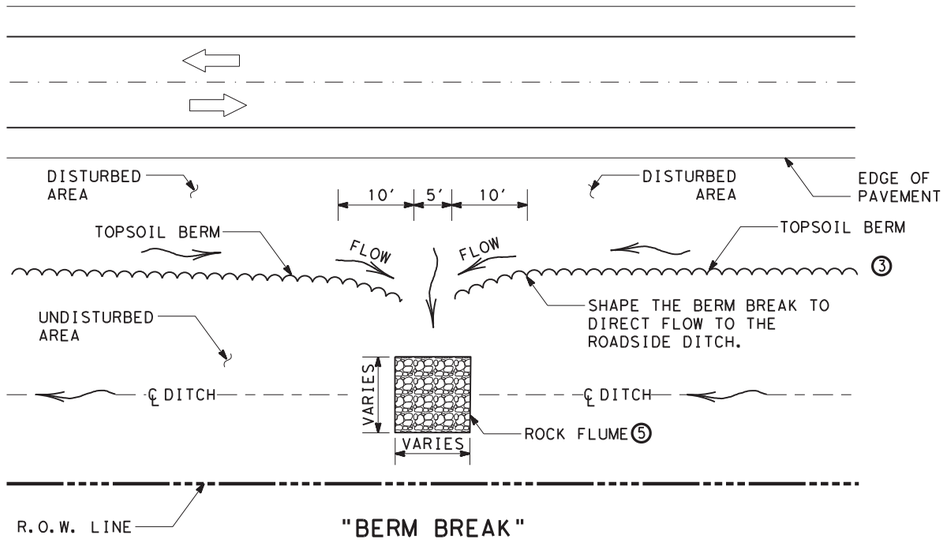
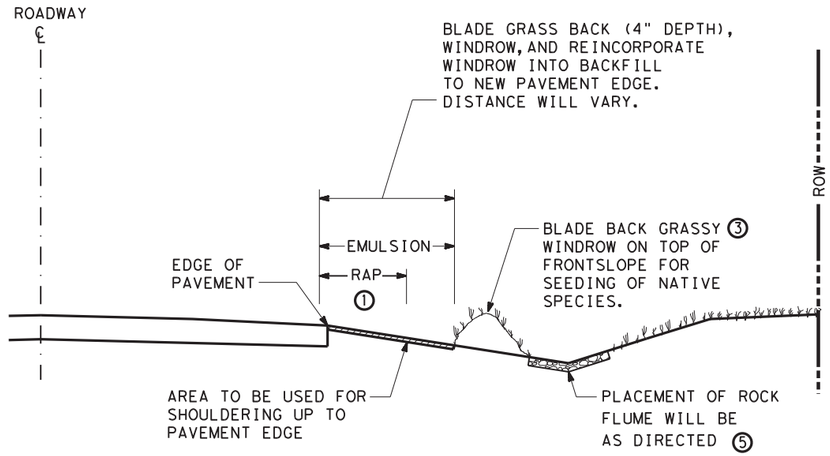
REVISIONS JULY 2019	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		76



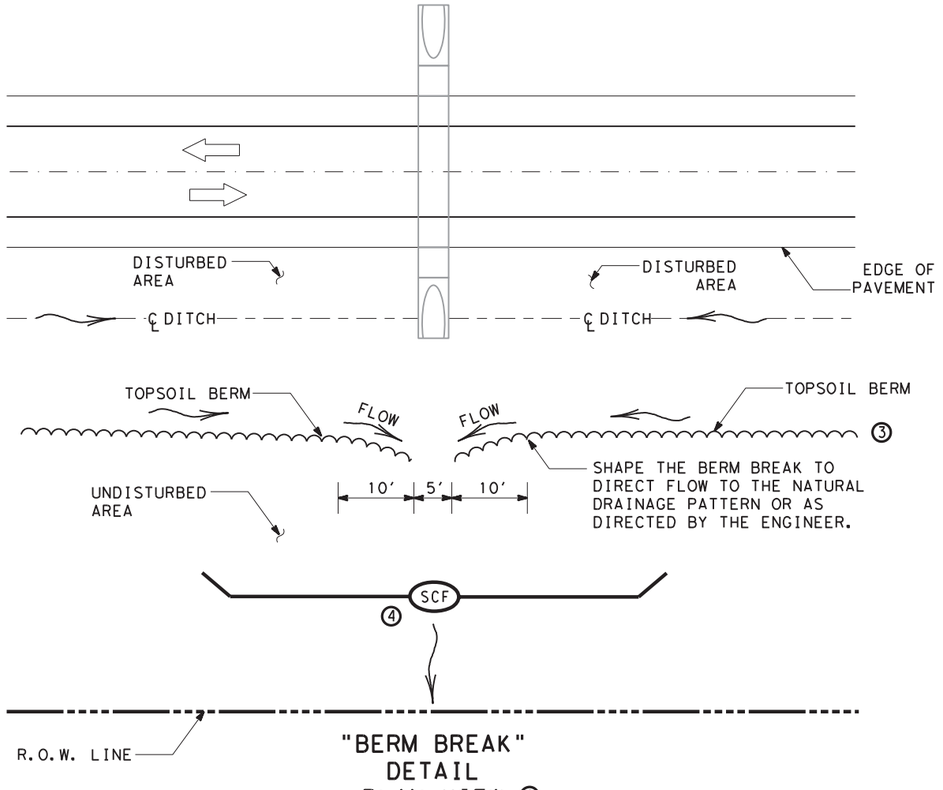
"BERM BREAK" DETAIL PLAN VIEW ②



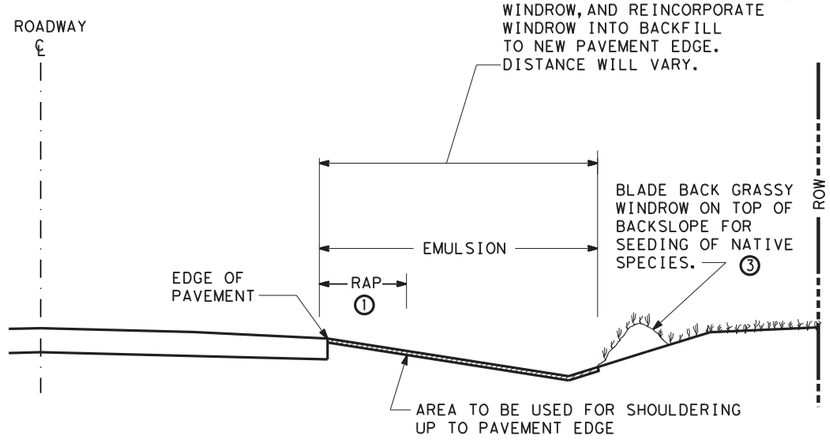
TYPICAL DITCH SECTION
SHOWING BERM/WINDROW OF TOPSOIL

BEST MANAGEMENT PRACTICE (BMP) #15

SEDIMENT CONTROL AND BERM DETAIL
WITH BERM ON FRONTSLOPE



"BERM BREAK" DETAIL PLAN VIEW ②



TYPICAL DITCH SECTION
SHOWING BERM/WINDROW OF TOPSOIL

BEST MANAGEMENT PRACTICE (BMP) #16

SEDIMENT CONTROL AND BERM DETAIL AT CROSS DRAINAGE STRUCTURE
WITH BERM ON BACKSLOPE

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
	ROCK FLUME~ENERGY DISSAPATOR
	BERM

NOTES:

① AS DIRECTED PLACE RAP ADJACENT TO EDGE OF PAVEMENT AS A BACKFILL MATERIAL. PLACEMENT DISTANCE IS TO BE A MINIMUM OF 4' OR AS NEEDED TO ACHIEVE SMOOTH TIE IN TO EXISTING FRONT SLOPE.

② BREAK BERM SO THAT MAXIMUM FLOW LENGTH ALONG THE BERM IS LESS THAN 1000'. BREAK BERM IN LOW AREAS WHERE FLOW MAY OVERTOP THE BERM. DO NOT BREAK BERM ON HILLTOPS OR WHERE RUNOFF AND SEDIMENT FLOW DIRECTLY OFF THE ROW.

③ LOCATION OF BERM WILL VARY. BERM COULD BE PLACED ON FRONTSLOPE OR BACKSLOPE DEPENDING ON FIELD CONDITIONS. SEE SPECIFIC SW3P LAYOUT SHEET FOR MORE DETAILS ON LOCATION OF BERM.

④ ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, EROSION CONTROL LOGS, ROCK FLUME, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED. DEVICE MAY NOT BE NEEDED IN ALL LOCATIONS. SEE SPECIFIC SW3P LAYOUT SHEET FOR MORE DETAILS ON LOCATION OF DEVICES.

⑤ PLACE ROCK FLUME DISSAPATOR AS DIRECTED BY THE ENGINEER. SIZE AND LOCATIONS OF ROCK FLUME WILL VARY. PROVIDE ROCK OR RUBBLE WITH A 3" TO 6" AGGREGATE. SECURE ROCK WITH 20-GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMTER HEXAGONAL OPENINGS. ROCK SHOULD BE PLACED ON THE MESH AND MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE ROCK AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES. PAYMENT WILL BE MADE BY ITEM TEMP PAVED FLUME (INSTALL).

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E. 06/20/2024

SCALE = NTS SHEET 5 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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REVISIONS JULY 2019	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		77

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (URBAN) (SAND or CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: BUFFALO GRASS (Texoka) COMMON BERMUDA GRASS (HULLED) BLUE GRAMA (NATIVE)	4.0 LBS PLS / ACRE 5.0 LBS PLS / ACRE 1.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP SIDEOATS GRAMA BUFFALOGRASS BERMUDA GRASS BLACKWELL SWITCHGRASS ILLINOIS BUNDLEFLOWER	1.5 LBS PLS / ACRE 1.5 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 0.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (SANDY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP BERMUDA GRASS SAND LOVEGRASS SAND DROPSEED WEEPING LOVEGRASS BLUE GRAMA PARTRIDGE PEAS (COMANCHE)	1.5 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) WARM SEASON SEEDING

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) FOXTAIL MILLET	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) WARM SEASON SEEDING

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP FOXTAIL MILLET	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 20. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. SEE NOTES ON TA-VES SHEET 2 OF 2 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

SCALE = NTS SHEET 1 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		78

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) TALL FESCUE ANNUAL RYE GRASS	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP WESTERN WHEATGRASS CANADA WILD RYE GRASS ELBON RYE GRASS	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. ALL SEED MIXTURE TYPES SHALL BE PURCHASED IN PRE- MIXED BAGS, "BY TYPE" BLENDED BY THE GROWER SHIPPER.
2. SOILS THAT ARE COMPACTED, HAVE CLODS, SHALL BE REWORKED UNTIL READY FOR SEEDING. AS DIRECTED.
3. ALL SOIL SURFACES SHALL BE LEVEL WITH NATURAL FLOWING SMOOTH GRADES. NO TIRE RUTS OR FURTHER TRAFFIC ALLOWED.
4. SOIL SURFACE SHALL BE FIRM BUT NOT COMPACTED, ALLOWING 1/4" DEPRESSION UNDER NORMAL FOOT TRAFFIC.
5. SEED 100% OF THE BED AREA. NO SKIPS OR VOID AREAS ALLOWED. EXAMPLE: AREAS AROUND SIGN POSTS AND INLETS.
6. SEED UP TO THE FIRST 6" OF THE EDGE OF PAVEMENT. AS DIRECTED, HAND RAKE ISOLATED SEEDED AREAS.
7. WEIGH ALL CALIBRATED SEED SAMPLES FOR ACCURACY AND PRESENT DOCUMENTATION TO ENGINEER.

FOR DRILL SEEDING

8. USE ONLY PROFESSIONAL NATIVE GRASS OR TURF GRASS (MULTI- 3 BIN) DRILL SEEDERS. NO DROP SEEDERS ALLOWED. OTHER TYPES OF SEEDERS AS APPROVED BY THE ENGINEER.
9. CALIBRATE DRILL SEEDER FOR SPECIFIED (PLS) PER ACRE BEFORE DRILL SEEDING.
10. DRILL SEEDER MUST BE EQUIPPED WITH THE LARGE FRONT CUTTING COULTERS DURING THE INSPECTION OF DRILL SEEDER.

FOR BROADCAST SEEDING

11. USE ONLY COMMERCIAL TYPE CYCLONE TYPE SPREADERS.
12. CALIBRATE CYCLONE SPREADER FOR 1000 Sq. Ft. (PLS) PER ACRE BEFORE SEEDING.
13. TO PREVENT SEED SEPARATION IN SPREADERS, SPREAD ALL SEED TYPES INDEPENDENTLY IN A SEPARATE APPLICATION.
14. IMMEDIATELY AFTER SEEDING, IN ONE OR TWO OPERATIONS, CULTI-PACK THE SEEDED SOILS AND FIRM SEED INTO SURFACE.
15. DISCONTINUE SEEDING IF WIND EXCEEDS 10 MPH.

ITEM 314 EMULSIFIED ASPHALT TREATMENT

TIME SCHEDULE	FUNCTIONAL USE:
IMMEDIATELY AFTER: SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.	SOIL EROSION CONTROL, OR MOISTURE RETENTION BARRIER.

NOTES:

1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.
2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.
3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.
4. USE MATERIALS AS SPECIFIED FOR EROSION CONTROL ON TABLE 18 IN ITEM 300 ASPHALTS, OILS, AND EMULSIONS, AT A RATE OF 0.25 GAL/SY.

ITEM 166 FERTILIZER

TIME SCHEDULE	FUNCTIONAL USE:
AFTER TOPSOIL PLOWING PREPARATIONS ARE COMPLETED, FERTILIZE ROW SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.	PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.

FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 100 LBS OF NITROGEN PER ACRE.
THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM.
ANALYSIS OF THE (NPK) IS: 3:1:1 OR AS DIRECTED BY THE AREA ENGINEER.

ITEM 166 NOTES:

1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.

2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE A EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.

3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED, DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT AREA ENGINEER.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

06/20/2024

SCALE = NTS SHEET 2 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS JULY 2019	6469	87	001, ETC.	US 82, ETC.
	DIST	COUNTY		SHEET NO.
	WFS	COOKE, ETC.		79