FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BR 2B23(067), ETC.		1
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS

FINAL PLANS

DATE CONTRACT LETTING: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK COMPLETED & ACCEPTED: _____

CONTRACTOR: _____

USED ____ OF ____ ALLOTTED DAYS _____

FINAL CONTRACT COST : $ _____

FINAL AS BUILT PLANS

THE CONSTRUCTION WAS PERFORMED UNDER MY SUPERVISION IN ACCORDANCE WITH THE PLANS AND CONTRACT

_____ DATE

_____ AREA ENGINEER

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. BR 2B23(067), ETC.

LOCATION	ROADWAY	BRIDGE	TOTAL
CSJ: 2653-01-016	1612.00 FT = 0.305 MI	90.00 FT = 0.017 MI	1702.00 FT = 0.322 MI
CSJ: 2653-01-017	24019.00 FT = 4.549 MI	400.00 FT = 0.076 MI	24419.00 FT = 4.625 MI
TOTAL	25631.00 FT = 4.854 MI	490.00 FT = 0.093 MI	26121.00 FT = 4.947 MI

FM 2658
RUSK COUNTY

LIMITS: AT PANTHER CREEK (CSJ: 2653-01-016)
FROM 1.57 MI S OF SH 43, S
TO 0.42 MI N OF FM 1251 (CSJ: 2653-01-017)

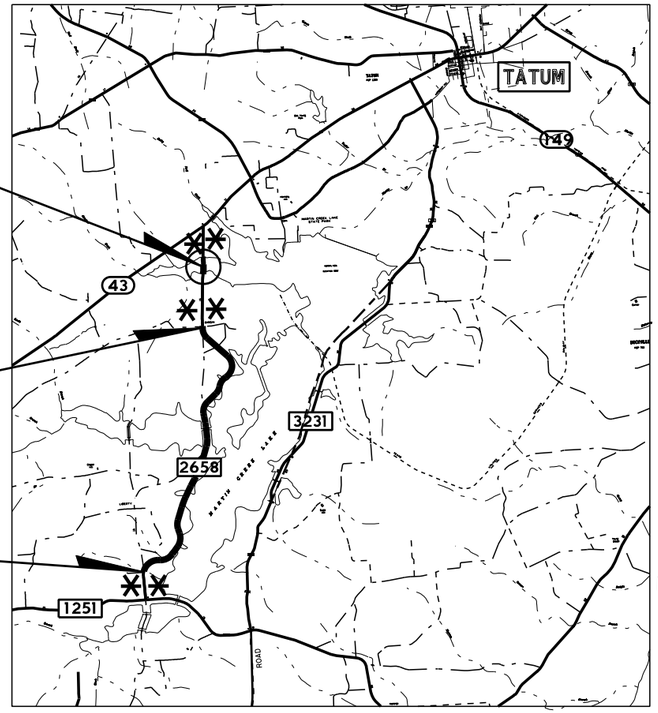
FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT, ETC.

CONSISTING OF REWORKING BASE, TREAT EXISTING MATERIAL, PRIME COAT, ACP BASE, TCST, STRUCTURES, BRIDGE RAIL, MBGF, SIGNS AND PAVEMENT MARKINGS.

BEGIN PROJECT
CSJ: 2653-01-016
STA: 25+50.00
REF MRK: 294+0.419
END PROJECT
CSJ: 2653-01-016
STA: 42+52.00
REF MRK: 294+0.687

BEGIN PROJECT
CSJ: 2653-01-017
STA: 83+11.00
REF MRK: 294+1.501

END PROJECT
CSJ: 2653-01-017
STA: 327+30.00
REF MRK: 298+1.911



N. T. S.

NO EXCEPTIONS
NO EQUATIONS
NO RAILROAD CROSSINGS

✳ SIGN IN ACCORDANCE WITH THE STANDARD BC SHEETS AND PART 6 OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 5, 2022)

CSJ: 2653-01-016

DESIGN SPEED:
55 MPH

FUNCTIONAL CLASS:
RURAL MAJOR COLLECTOR

TRAFFIC DATA:
2021 ADT = 1248 VPD
2041 ADT = 1747 VPD

CSJ: 2653-01-017

FUNCTIONAL CLASS:
RURAL MAJOR COLLECTOR

TRAFFIC DATA:
2021 ADT = 251 VPD
2041 ADT = 351 VPD

LOCHNER | 5767 Eagles Nest Blvd
Tyler, Texas 75703
TBPE Firm Reg. No. 10488

SUBMITTED FOR LETTING: DATE: 05/17/2023

Richard P. Mathis

RICHARD P. MATHIS, P.E.
PROJECT MANAGER, LOCHNER

Texas Department of Transportation

SUBMITTED FOR LETTING: DATE: 5/24/2023

DocuSigned by: Rolando Mendez 8F5FF12B97E484...

DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: DATE: 5/24/2023

DocuSigned by: 61491B4A8C654...

DISTRICT ENGINEER

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SHEET NO.				DESCRIPTION
GENERAL				
1				TITLE SHEET
2				SUPPLEMENTAL INDEX OF SHEETS
3	-	7		TYPICAL SECTIONS
8, 8A	-	8I		GENERAL NOTES
9, 9A	-	9B		ESTIMATE & QUANTITY SHEETS
10	-	15		QUANTITY SUMMARY
16				SUMMARY OF SMALL SIGNS (SOSS)
17				EARTHWORK QUANTITIES REPORT
TRAFFIC CONTROL PLAN				
18				CONSTRUCTION SEQUENCE
19	-	20		TRAFFIC CONTROL PLAN DETOUR LAYOUT
21				TREATMENT FOR VARIOUS EDGE CONDITIONS
TCP STANDARDS				
22	-	33	*	BC(1)-21 THRU BC(12)-21
34	-	35	*	TCP(1-1)-18, TCP(1-2)-18
36	-	37	*	TCP(2-1)-18, TCP(2-2)-18
38	-	39	*	TCP(3-1)-13, TCP(3-3)-14
40			*	TCP(7-1)-13
41	-	42	*	TCP(S-1)-08A, TCP(S-2)-08A
43	-	44	*	TCP(SC-1)-22, TCP(SC-4)-22
45			*	TCP(SC-7)-22
46			*	WZ(STPM)-23
47			*	WZ(UL)-13
48			*	WZ(RCD)-13
ROADWAY				
49	-	50		SURVEY CONTROL DATA SHEET
51	-	53		HORIZONTAL ALIGNMENT DATA
54	-	55		PLAN & PROFILE
56	-	66		PLAN LAYOUTS
67	-	68		MISC DETAILS
ROADWAY STANDARDS				
69			*	GF(31)-19
70	-	71	*	GF(31) TR TL3-20
72			*	GF(31)MS-19
73			*	BED-14
74			*	SGT(10S)31-16
75			*	SGT(11S)31-18
76			*	SGT(12S)31-18
77			*	SGT(15)31-20
DRAINAGE				
78				PANTHER CREEK DRAINAGE AREA MAP AND COMPUTATIONS
DRAINAGE STANDARDS				
79	-	80	*	SRR

SHEET NO.				DESCRIPTION
BRIDGE				
81				BRIDGE LAYOUT FM 2658 OVER PANTHER CREEK
82				ESTIMATED QUANTITIES FM 2658 OVER PANTHER CREEK
83				RIPRAP LAYOUT & SOIL BORING LOGS FM 2658 OVER PANTHER CREEK
84				BRIDGE REPAIR GENERAL NOTES
85				BRIDGE LAYOUT FM 2658 OVER DRY CREEK
86				REPAIR LOCATION PHOTOS FM 2658 OVER DRY CREEK
87				CLEANING AND SEALING BRIDGE JOINTS (MOD)
BRIDGE STANDARDS				
88	-	90	**	AIG-40
91			**	BAS-A
92	-	93	**	CSAB
94	-	95	**	FD
96	-	97	**	IGD
98	-	100	**	IGEB
101	-	102	**	IGMS
103	-	104	**	IGSD-40
105			**	IGSK
106			**	IGTS
107	-	108	**	MEBR (C)
109	-	112	**	PCP
113			**	PCP-FAB
114	-	115	**	PMDF
116			**	SEJ-M
117	-	118	**	SIG-40
119	-	120	**	TYPE T551
121	-	122	*	TYPE T631
TRAFFIC				
123	-	134		SIGN & PAVEMENT MARKING LAYOUT
TRAFFIC STANDARDS				
135	-	139	*	D & OM(1)-20 THRU D & OM(5)-20
140			*	D & OM(VIA)-20
141	-	143	*	TSR(3)-13, TSR(4)-13, TSR(5)-13
144			*	SMD (GEN)-08
145	-	147	*	SMD(SLIP-1)-08, SMD(SLIP-2)-08, SMD(SLIP-3)-08
148	-	149	*	PM(1)-22, PM(2)-22
150	-	151	*	RS(2)-23, RS(4)-23
ENVIRONMENTAL ITEMS				
152				EPIC
153	-	154		SWP3
155				SWP3 LAYOUT (AT PANTHER CREEK)
156				CONCRETE WASHOUT DETAIL
ENVIRONMENTAL STANDARDS				
157			*	EC(1)-16
158			*	EC(2)-16

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

STATE OF TEXAS
TIMOTHY J. ROSS
98465
LICENSED
PROFESSIONAL ENGINEER
5/17/23

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

05/17/2023
STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

SUPPLEMENTAL INDEX OF SHEETS

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		2
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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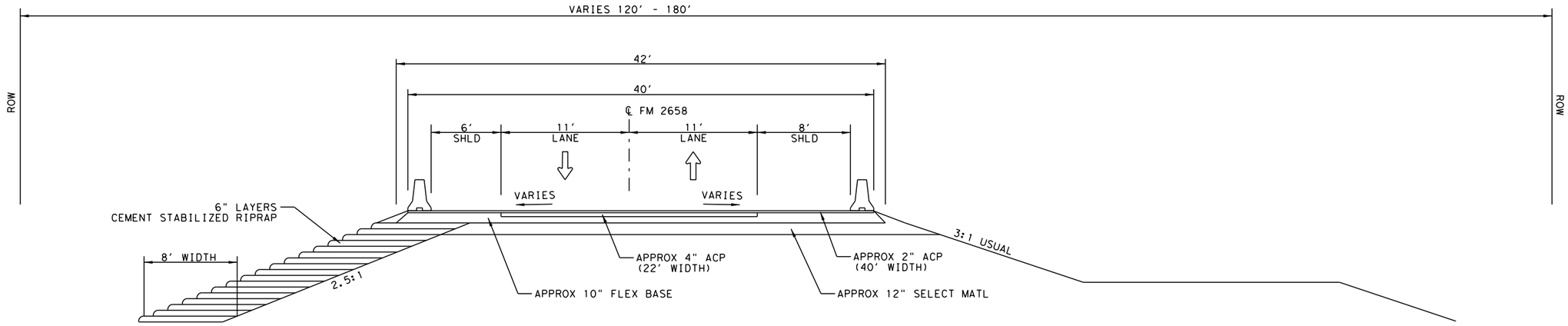
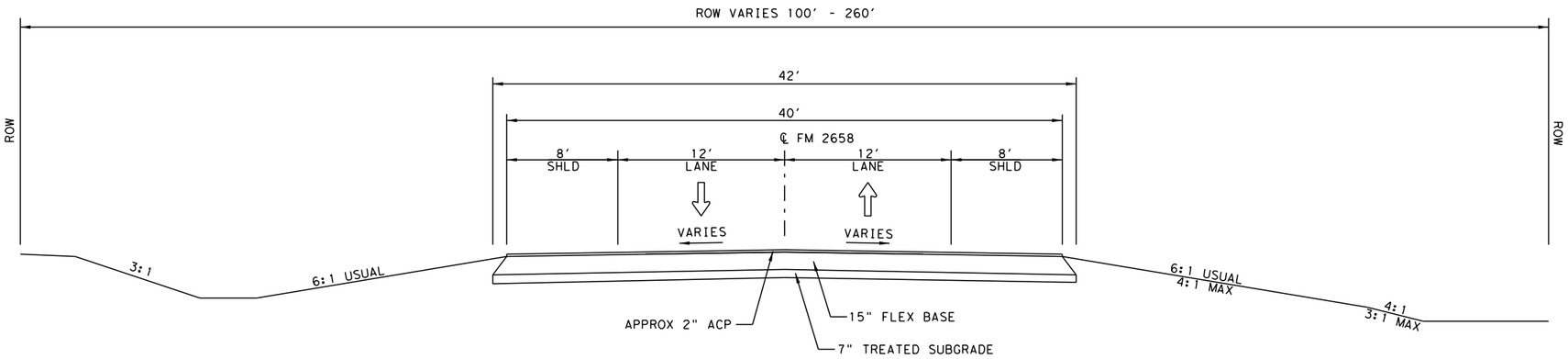


1

EXISTING SECTION AT PANTHER CREEK

STA 25+50 TO STA 42+52



2

EXISTING SECTION

STA 83+11 TO STA 88+50 (SEE NOTE)
STA 88+50 TO STA 170+50
STA 170+50 TO STA 175+06 (SEE NOTE)

NOTE: MAY ENCOUNTER THICK LAYER OF ACP MATERIAL (11"+)

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

TYPICAL SECTIONS

0 5 10 FT
HORIZONTAL SCALE

SHEET 1 OF 5

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		3
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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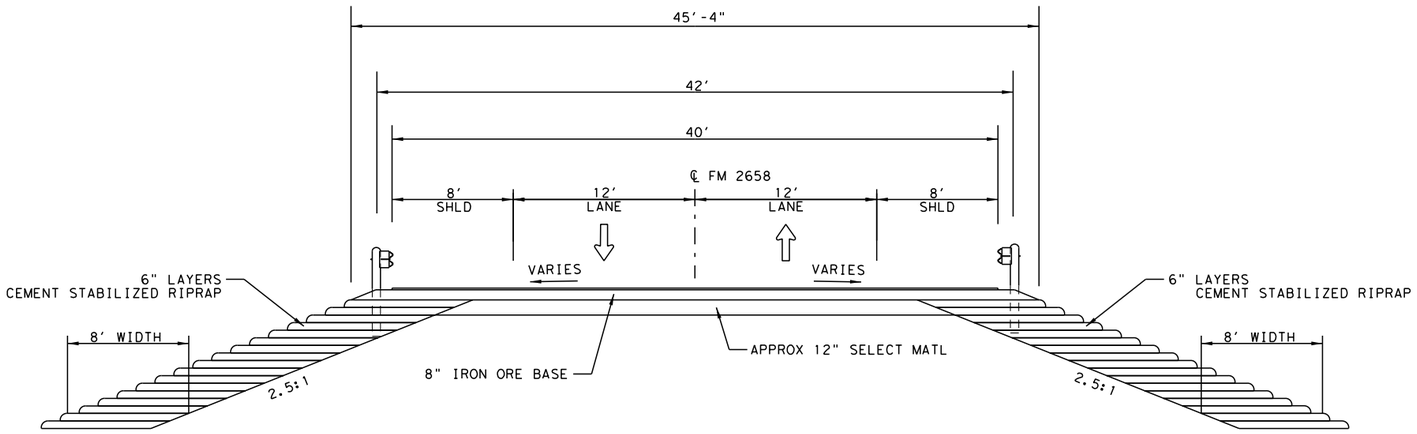
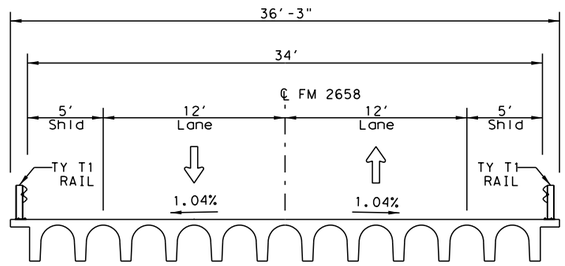


3

EXISTING SECTION

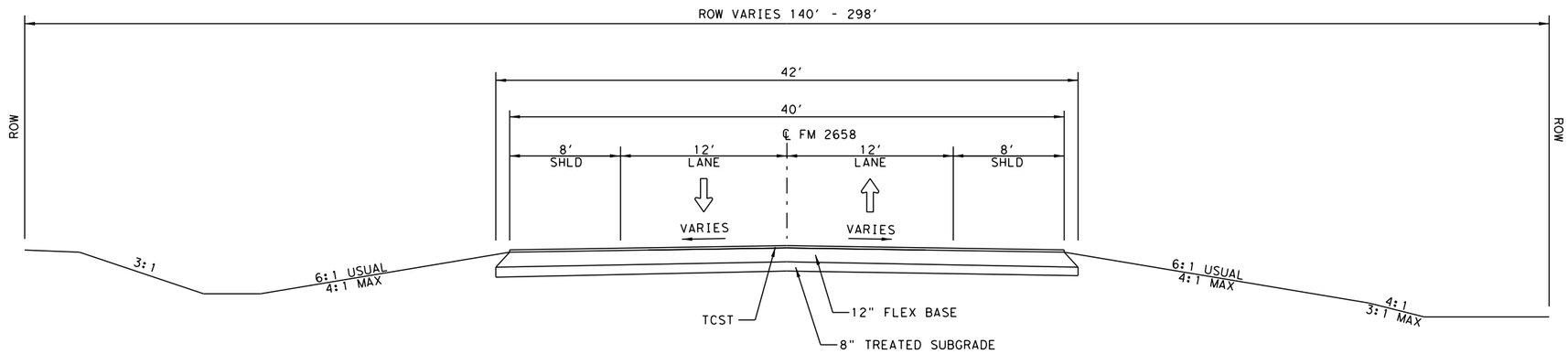
STA 175+06 TO STA 183+75
STA 183+75 TO STA 186+06 (ROADWAY WIDTH 40′ TO 34′)
STA 188+46 TO STA 190+78 (ROADWAY WIDTH 34′ TO 40′)
STA 190+78 TO STA 202+06



4

EXISTING SECTION

STA 186+06 TO STA 188+46
(DRY CREEK BRIDGE)



5

EXISTING SECTION

STA 202+06 TO STA 244+04
STA 244+04 TO STA 245+45 (MARTIN CREEK TRIBUTARY BRIDGE & BAS)
STA 245+45 TO STA 292+97
STA 292+97 TO STA 294+38 (MARTIN CREEK BRANCH BRIDGE & BAS)
STA 294+38 TO STA 327+30

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

TYPICAL SECTIONS

0 5 10 FT
HORIZONTAL SCALE

SHEET 2 OF 5

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		4
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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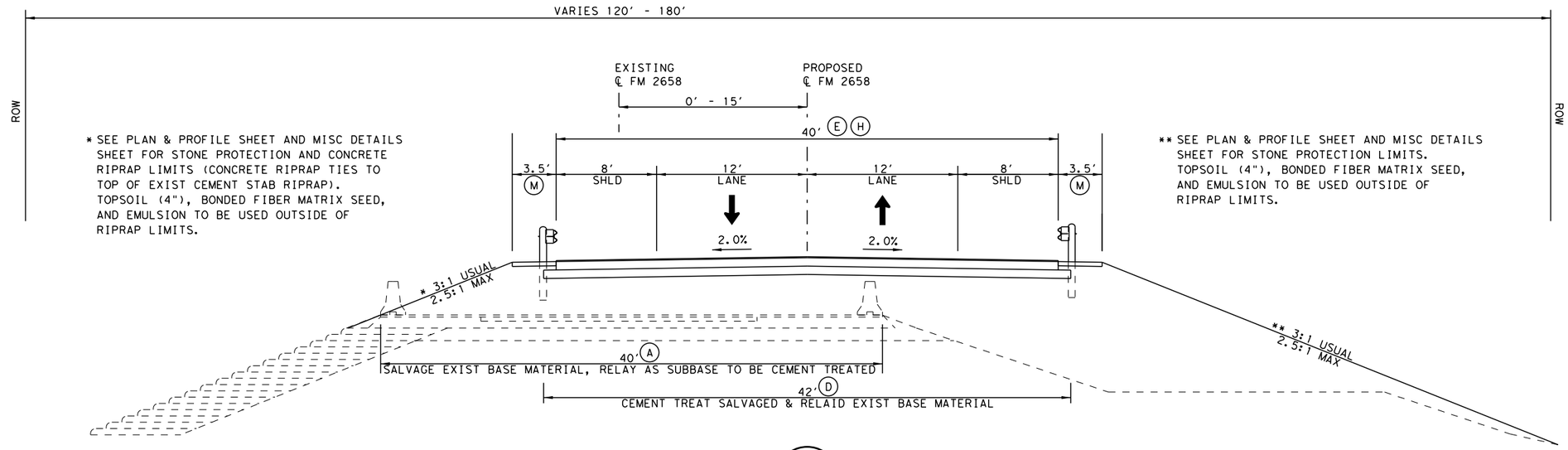


(1)

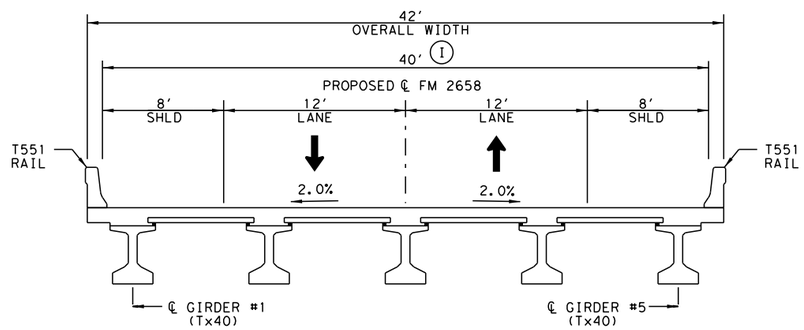
PROPOSED SECTION AT PANTHER CREEK

STA 25+50 TO STA 26+60 (TRANSITION FROM EXISTING)
STA 26+60 TO STA 33+30
STA 33+30 TO STA 33+50 (BRIDGE APPROACH SLAB)
STA 34+40 TO STA 34+60 (BRIDGE APPROACH SLAB)
STA 34+60 TO STA 41+50
STA 41+50 TO STA 42+52 (TRANSITION TO EXISTING)

SALVAGE EXIST PAVEMENT. EXCAVATE OR ADD EMBANKMENT TO 16" BELOW PROPOSED GRADE LINE. RELAY 8" OF SALVAGED (REWORKED) BASE MATERIAL AND CEMENT TREAT. USE ANY EXCESS SALVAGED MATERIAL AS EMBANKMENT.

LEGEND

- (A) REWORK BS MATL (TY B) (12") (ORD COMP)
- (B) REWORK BS MATL (TY B) (8") (ORD COMP)
- (C) CEMENT TREAT (SUBGRADE) (10") (EXIST MATL BELOW SALVAGED BASE)
- (D) CEMENT TREAT (EXIST MATL) (8") (SALVAGED & RELAID EXIST BASE)
- (E) 8" SUPERPAVE (TY C) BASE (PLACE IN APPROX 3 EQUAL LIFTS)
- (F) PRIME COAT (RC 250 - GR 5)
- (G) SURFACE TREAT (1ST COURSE - GR 3)
- (H) SURFACE TREAT (2ND COURSE - GR 4)
- (I) PENETRATING CONCRETE SURF TREAT
- (J) BLADING
- (K) BONDED FIBER MATRIX SEED
- (L) EMULSION
- (M) RIPRAP (MOW STRIP) (4")



(2)

PROPOSED BRIDGE AT PANTHER CREEK

STA 33+50 TO STA 34+40

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

TYPICAL SECTIONS

0 5 10 FT
HORIZONTAL SCALE

SHEET 3 OF 5

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		5
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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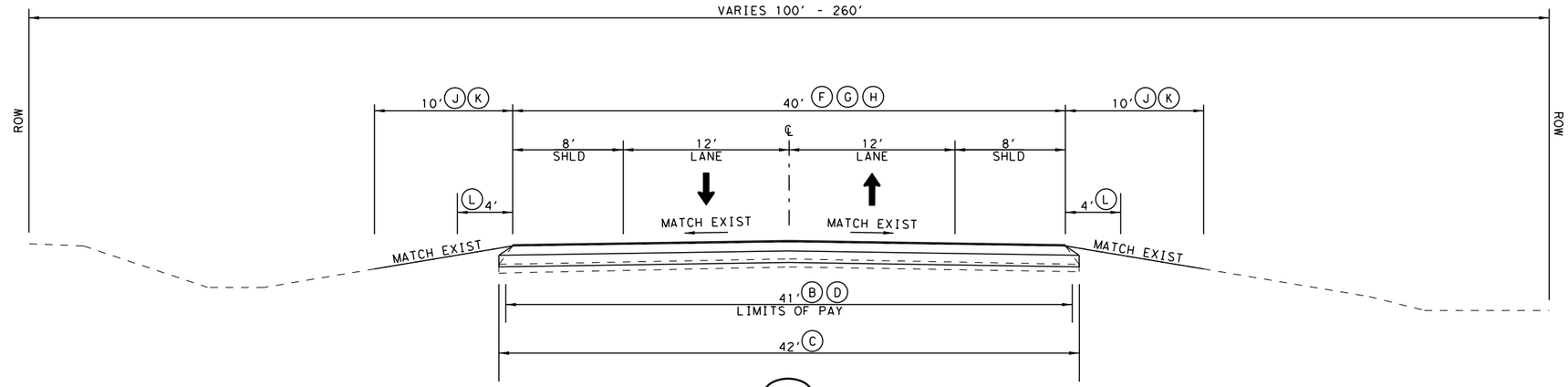
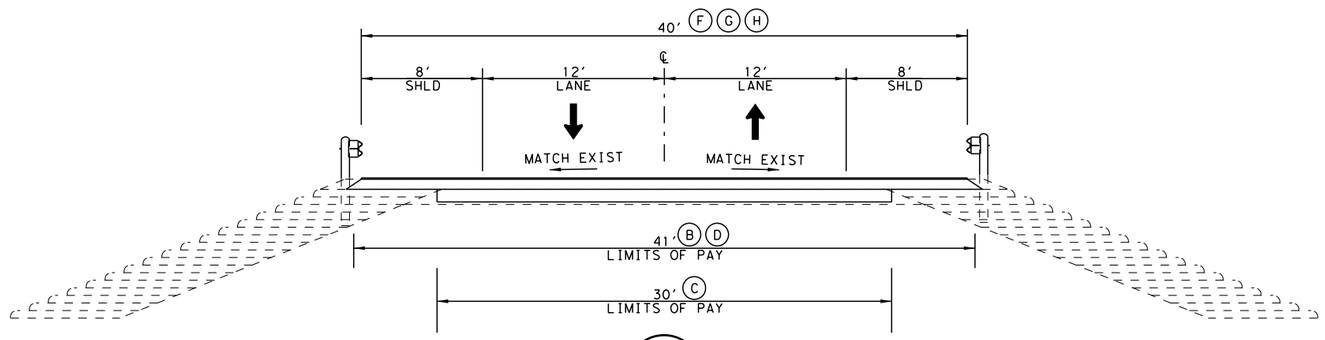


3

PROPOSED SECTION

STA 83+11 TO STA 88+50 (SEE NOTE)
STA 88+50 TO STA 170+50
STA 170+50 TO STA 175+06 (SEE NOTE)

NOTE: WHERE THICK LAYERS OF ACP ENCOUNTERED, IN LIEU OF REWORKING THE BASE, REMOVE 8" OF STAB BASE AND ASPH PAV AND INSTALL & CEMENT TREAT 8" OF NEW FLEX BASE



4

PROPOSED SECTION

STA 175+06 TO STA 183+75
STA 183+75 TO STA 186+06 (ROADWAY WIDTH 40' TO 34')
STA 188+46 TO STA 190+78 (ROADWAY WIDTH 34' TO 40')
STA 190+78 TO STA 202+06

LEGEND

- (A) REWORK BS MATL (TY B)(12")(ORD COMP)
- (*) (B) REWORK BS MATL (TY B)(8")(ORD COMP)
- (C) CEMENT TREAT (SUBGRADE)(10") (EXIST MATL BELOW SALVAGED BASE)
- (D) CEMENT TREAT (EXIST MATL)(8") (SALVAGED & RELAID EXIST BASE)
- (E) 8" SUPERPAVE (TY C) BASE (PLACE IN APPROX 3 EQUAL LIFTS)
- (F) PRIME COAT (RC 250 - GR 5)
- (G) SURFACE TREAT (1ST COURSE - GR 3)
- (H) SURFACE TREAT (2ND COURSE - GR 4)
- (I) PENETRATING CONCRETE SURF TREAT
- (J) BLADING
- (K) BONDED FIBER MATRIX SEED
- (L) EMULSION
- (M) RIPRAP (MOW STRIP)(4")

(*) COMPACT WINDROWED MATERIAL ON OPPOSITE LANE TO MAKE IT TRAVERSABLE FOR LOCAL TRAFFIC

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

TYPICAL SECTIONS

0 5 10 FT
HORIZONTAL SCALE

SHEET 4 OF 5

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		6
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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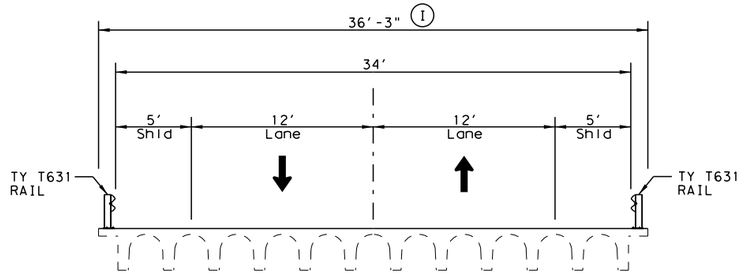


(5)

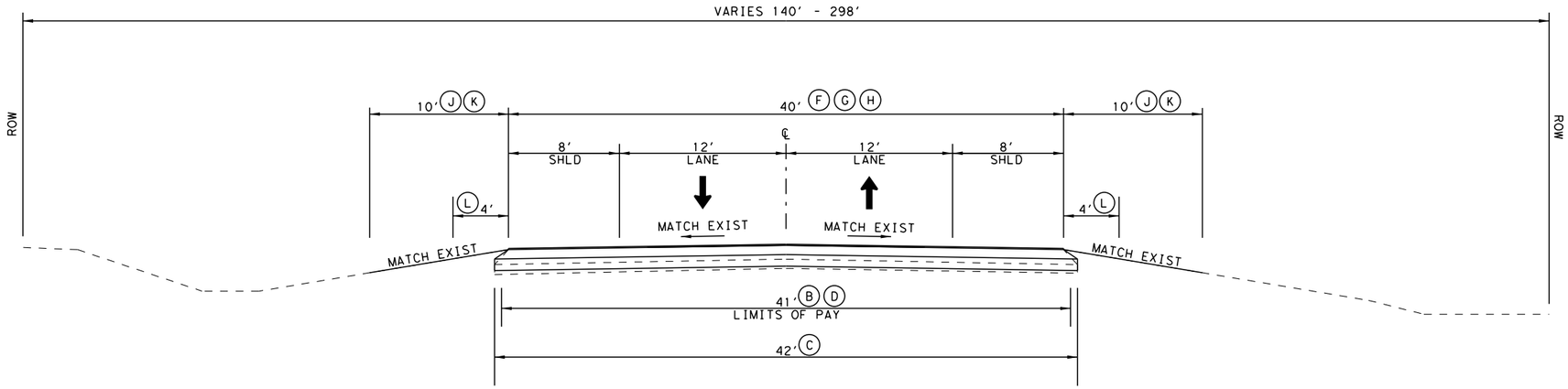
PROPOSED SECTION

STA 186+06 TO STA 188+46
(DRY CREEK BRIDGE)

LEGEND

- (A) REWORK BS MATL (TY B)(12")(ORD COMP)
- (*) (B) REWORK BS MATL (TY B)(8")(ORD COMP)
- (C) CEMENT TREAT (SUBGRADE)(10") (EXIST MATL BELOW SALVAGED BASE)
- (D) CEMENT TREAT (EXIST MATL)(8") (SALVAGED & RELAID EXIST BASE)
- (E) 8" SUPERPAVE (TY C) BASE (PLACE IN APPROX 3 EQUAL LIFTS)
- (F) PRIME COAT (RC 250 - GR 5)
- (G) SURFACE TREAT (1ST COURSE - GR 3)
- (H) SURFACE TREAT (2ND COURSE - GR 4)
- (I) PENETRATING CONCRETE SURF TREAT
- (J) BLADING
- (K) BONDED FIBER MATRIX SEED
- (L) EMULSION
- (M) RIPRAP (MOW STRIP)(4")

(*) COMPACT WINDROWED MATERIAL ON OPPOSITE LANE TO MAKE IT TRAVERSABLE FOR LOCAL TRAFFIC



(6)

PROPOSED SECTION

STA 202+06 TO STA 244+04
STA 244+04 TO STA 245+45 (MARTIN CREEK TRIBUTARY BRIDGE & BAS)
STA 245+45 TO STA 292+97
STA 292+97 TO STA 294+38 (MARTIN CREEK BRANCH BRIDGE & BAS)
STA 294+38 TO STA 327+30

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

TYPICAL SECTIONS

0 5 10 FT
HORIZONTAL SCALE

SHEET 5 OF 5

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		7
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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GENERAL NOTES:

GENERAL.

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

Kyle Dykes, P.E. Kyle.Dykes@txdot.gov

Stacy Wylie, P.E. Stacy.Wylie1@txdot.gov

For Q&A on Proposals navigate to:

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

Use 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 and click on the link in the window that pops up to view the Q&A.

All relevant project documentation including CTDs and cross sections will still be posted to the districts FTP website.

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All stockpiles within TxDOT right of way, must not exceed 12 ft. in height and must have 3:1 slope unless otherwise directed. Place stockpiles in a manner that will be outside the horizontal clear zone, will not obstruct traffic or sight distance, and will not interfere with roadway drainage.

Remove all vegetation from pavement edges, intersections, and driveways prior to planing operations, seal coat, or ACP operations. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

ATTN: Provide a 20-ft. length per 1-in. depth temporary taper at all transverse joints in the travel lane before opening to traffic. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

Provide all-weather surface for temporary ingress and egress to adjacent property, as directed. Materials, labor, equipment and incidentals necessary to provide temporary ingress and egress will not be paid for directly, but will be subsidiary to various bid items.

Project Number: **Sheet 8**

County: RUSK **Control:** 2653-01-016, ETC

Highway: FM 2658

PROJECT MOWING

Mow the highway right of way in the project limits a maximum of 2 cycles per year, as directed. Mowing will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Provide approved mowing equipment capable of mowing on slopes without unduly marring finished slope surfaces or damaging existing growth. The minimum cutting width should not be less than 5 ft. unless otherwise approved.

Mow all areas of existing vegetation and vegetation placed during the project, as directed. The mowing height should be 5 in. unless otherwise directed. Repair portions of sod or grass which are damaged during mowing operations in an acceptable manner.

Mow as close as possible to all fixed objects, exercising extreme care not to damage trees, plants, shrubs, signs, delineators or other appurtenances which are part of the facility. Hand trim around such objects, unless otherwise specified.

Use safety chains or other manufacturer's safety devices to prevent injury to people or damage to property caused by flying debris propelled out from under rotary mowers. Chains should be a minimum size of 5/16 in. and links spaced side by side around the front, sides and rear of mower. When mowing at the specified cutting height, the chains should be long enough to drag the ground. If at any time it is determined that mowing or trimming equipment is defective to the point that it may affect the quality of work or create unsafe conditions, then immediately repair or replace the equipment.

LITTER PICKUP

Remove litter from the right of way in the project limits a maximum of 3 cycles per year as directed. Litter pickup will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Equipment used for litter pickup must be approved.

Collect and properly dispose of all litter deposited by construction operations or the traveling public from within the right of way as directed. This includes cans, bottles, paper, plastic items, metal scraps, lumber, etc. Do not dump or stockpile collected litter on Department property.

ITEM 4. SCOPE OF WORK

Upon completion of the work and before final acceptance, remove all foreign material, stains, and marks from concrete surfaces. Sandblast clean concrete surfaces as directed. Clean existing concrete structures that are marked or stained by the Contractor's operations. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

During final clean up, remove all foreign material that has accumulated at bridge abutments and bent caps as approved. All work and equipment involved in the removal of this material is subsidiary to the bid items of the Contract.

ITEM 5. CONTROL OF THE WORK

If utility lines need adjustments during construction operations, modify operations and continue the work in a manner that will allow others to make the utility adjustments. Additional working time may be allowed for delays caused by these utility adjustments.

Place and maintain construction hubs near the right of way line in accordance with Article 5.9., “Construction Surveying” on both sides of the roadway until the final item of work is complete.

Establish proposed centerlines throughout the project from control points and alignment data as shown on the plans.

Use “Method C” for construction surveying in accordance with Section 5.9.3.

Refer to the horizontal and vertical alignment data summaries for satellite-control point information.

Utility locations shown on the plans are approximate. Contact utilities in accordance with Article 5.6., “Cooperating With Utilities.”

Verify survey control for accuracy before beginning construction.

Notify the Engineer if there are conflicts with survey control accuracy.

Before beginning work, profile the centerline of the existing roadway. Set horizontal and vertical control points to provide for the required thickness of materials.

Prior to beginning driveway and intersection work, submit a detailed construction sequence to be approved by the Engineer. Driveway and intersection completion includes existing surface removal, structure removal, removal of debris from the project site, installing the new RCP and SETs, backfilling, grading ditches to drain, and installing the permanent driveway or intersection surface (or all-weather drive surface as allowed).

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

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ITEM 6. CONTROL OF MATERIALS

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, 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 link below:

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html

ITEM 7. LEGAL RELATIONS AND RESPONSIBILITIES

Do not initiate activities in a project specific location (PSL) associated with a U.S. Army Corps of Engineers (COE) permit area that has not been previously evaluated by the COE as part of the permit review of this project. Such activities include haul roads, equipment staging areas, borrow pits, and disposal sites. “Associated,” defined here, means “materials are delivered to or from the PSL.” The permit area includes all waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for this work. The Contractor is responsible for all consultations with the COE regarding activities (including PSL) that have not been previously evaluated by the COE. Provide the Department with a copy of all consultations or approvals from the COE before initiating activities.

Proceed with activities in PSL that do not affect a COE permit area if Contractor determines that the PSL is non-jurisdictional or proper COE clearances have been obtained in jurisdictional areas or have been previously evaluated by the COE as part of the permit review of this project. The Contractor is responsible for documenting his determination that his activities do not affect a COE permit area. Maintain copies of determination for review by the Department or any regulatory agency.

Concrete truck drivers and concrete pump operators are required to wash out only in designated areas specifically constructed for eliminating run-off. Dispose of materials in accordance with federal, state, and local requirements.

Placement of any fill material within the channel is not allowed. A temporary crossing must clear span from channel bank to channel bank.

Maintain positive drainage for permanent and temporary work for the duration of the project. The Contractor will be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work will be subsidiary to various bid items.

The total disturbed area for this project is 9.2 acres. The disturbed area in this project and the Contractor Project Specific Locations (PSL's) within 1 mile of the project limits for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSL for construction support activities on or off the ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceed 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the ROW and within 1 mile of the project limits to the Engineer and to any local government that operates a Municipal Separate Storm Sewer System (MSSS).

In accordance with Article 7.9, provide and maintain adequate, neat and sanitary toilet accommodations within the project limits for employees, including State employees.

No significant traffic generator events identified.

ITEM 8. PROSECUTION AND PROGRESS

During Milestone 1, working days will be computed and charged in accordance with Section 8.3.1.5., "Calendar Day." Following the completion of Milestone 1, working days will be computed and charged in accordance with Section 8.3.1.4., "Standard Workweek."

The road-user cost liquidated damages for Milestone 1 is $3,253 per day.

Substantially complete Milestone 1 in 120 working days.

The time charges for Milestone 1 will begin on November 1, 2023.

The time charges for Milestone 1 will end on February 28, 2024.

Prepare the progress schedule as a bar chart.

ITEM 9. MEASUREMENT & PAYMENT

In accordance with Article 9.1., "Measurement of Quantities," furnish the tare and maximum gross weights as well as the volume capacity of all vehicles, trucks, truck-tractors, trailers, semi-trailers, or combination of such vehicles used to deliver materials for this Contract. Also, furnish calculations supporting these weights and capacities. Provide all measurements required for pay a minimum of 2 days before the trucks are used.

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ITEM 100. PREPARING RIGHT OF WAY

Perform work as necessary off the right of way on temporary or drainage easements and at those locations where improvements have been taken or partially taken by right of way acquisition. Review these locations with the Area Engineer. The cost of this work will be included in the unit price bid for this Item.

ITEM 104. REMOVING CONCRETE

Blasting will not be permitted on this project.

ITEMS 110 & 132. EXCAVATION & EMBANKMENT

In a cut section, if the soil encountered in the subgrade is unsuitable for reasons other than excess moisture, this material will be declared "waste" and the Contractor will be required to undercut for a minimum depth of 1 ft. and a maximum depth as determined and replaced with a material having a plasticity index of 6 to 18. This required undercutting will be paid for under Item 110, "Excavation."

ITEM 132. EMBANKMENT

Furnish Type C embankment consisting of suitable earth material (rock, loam, clay, or other approved materials) that will form a stable embankment. The top 2 ft. of embankment material should have a plasticity index between 6 and 18.

Test borrow sources and furnish results to the Engineer for select embankment, the Engineer will then run confirmation testing.

ITEM 150. BLADING

Any required mowing and pulverizing before blading will not be paid for directly, but will be subsidiary to Item 150.

Compact blading material as directed.

ITEM 164. SEEDING FOR EROSION CONTROL

The rates, types of seed, asphalt, and locations for the straw mulch and broadcast seed items will be determined if temporary erosion control is needed.

Mow tall vegetation prior to placement of erosion control measures in order to provide optimal growing conditions. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

The season and seed mixture for "Broadcast Seeding (Temporary Erosion Control) (Cool Season)" and "Broadcast Seeding (Temporary Erosion Control) (Warm Season)" is specified below:

Cool Season - September 1 thru November 30
Warm Season - May 15 thru August 31

Permanent Planting Mixture	
Species and Rates	
(lb. PLS/ac.)	
(Season: February 1 to May 15)	
Green Sprangletop	0.5
Bermudagrass	5.0
Weeping Lovegrass (Ermelo)	0.5
Sand Lovegrass	0.5
Lance-Leaf Coreopsis	1.0
(Season: September 1 to February 1)	
Bermuda (unhulled)	12
Crimson Clover	10

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Temporary Seeding for Erosion Control	
Warm Season	
(Season: May 15 to August 31)	
Bermudagrass	10
Foxtail Millet	30
Cool Season	
(Season: September 1 to November 30)	
Tall Fescue	4.5
Oats	24
Wheat	34

Place topsoil before temporary seeding unless otherwise directed.

Do not use Bahiagrass.

Use additional temporary seeding if permanent seeding is placed outside the optimum growing season shown for this Item as directed.

Provide a Bonded Fiber Matrix that meets the current requirements of the Approved Products List for Item 169, "Soil Retention Blanket, Class 1, Type D, Spray Type Blanket," for both permanent and temporary seeding. Install according to manufacturer's recommendations based on a slope steeper than 3:1 with sandy soils. This Item will be paid for under Item 164.

ITEM 166. FERTILIZER

Place fertilizer at the rate of 1 lb. per 9 sq. yd. on areas prepared for seeding.

ITEM 168. VEGETATIVE WATERING

Apply water to all newly placed sod or seeded areas the same day of installation. Maintain the sod or seeded areas in a sufficiently watered condition. Do not allow sod or seeded areas to dry out so that water stress is evident.

ITEM 247. FLEXIBLE BASE

Blade and sprinkle flexible base for a minimum of 7 days after it achieves density unless otherwise approved or directed.

Flex base material must meet the minimum compressive strength requirements.

Furnish base material with a minimum bar linear shrinkage of 2 percent as determined by Tex-107-E, Part II.

Sandstone flexible base is not allowed.

ITEM 251. REWORKING BASE COURSES

If patches of cement-stabilized base are encountered when reconditioning the existing base, remove and dispose of this material as directed. This work will not be paid for directly, but will be subsidiary to Item 251.

Quantities of salvageable flexible base as indicated on the plans are for estimating purposes only. Salvage all material encountered in the existing base, including intersection areas, as directed. This work will be paid for as specified in Item 251.

Before or during scarifying of the existing pavement, remove all base failures, undercut if required, and backfill with flexible base. Spread the existing base to the proposed width throughout the work area. Haul and dump the additional base material required for each 100-ft. section. Provide a motor grader or other suitable power equipment to spread the piles of material during dumping. Sprinkle material, if necessary, in order to maintain traffic safely through the project. Provide a roadway surface suitable to carry traffic the full roadway width by the end of the day.

ITEM 310. PRIME COAT

A minimum curing time of 10 days is required before application of Item 316 when using bituminous material unless otherwise authorized or directed in writing.

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ITEM 314. EMULSIFIED ASPHALT TREATMENT

Before application, dilute the emulsion with water up to a maximum dilution of 50% at a distribution rate of 0.30 gal. per sq. yd.

ITEM 316. SEAL COAT

Protect all existing bridges, curbs, and other exposed concrete surfaces from asphaltic materials by any acceptable method. Removal of excessive asphaltic materials deposited on these surfaces will be at the Contractor’s expense.

During surface treatment application, if existing conditions warrant, vary the lane widths, transitions, and intersection areas as directed.

Perform rolling as directed with equipment complying with Section 210.2.4.2, “Medium Pneumatic Tire.” This work will not be paid for directly, but will be subsidiary to pertinent Items.

Do not apply asphalt later than 1 hour before sunset unless otherwise approved.

The Engineer will approve stockpile sites for materials. Locate stockpile site a minimum of 30 ft. from the roadway unless otherwise authorized. Place stockpiles in a manner that will not interfere with access from abutting property and will not obstruct traffic or sight distance. Avoid stockpiling at intersections. Notify the Engineer at least 5 working days prior to stockpiling material to secure approval of the site. The Engineer may approve stockpiling of materials closer than 30 ft. from the travelway if adequate barricades and devices are furnished and approved. Keep stockpile clear of debris and vegetative growth as approved.

Clearly sign stockpile locations with Contractor’s name & project name, as approved. This will not be paid for directly, but will be subsidiary to Item 316.

Provide aggregate for shoulders and mainlanes from the same source unless otherwise directed.

Place surface treatments between May 1 and August 31 unless otherwise directed.

The rates shown on the plans for asphalt and aggregate are for estimating purposes only. The rates may be varied as directed.

ITEM 320. EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Provide either a material transfer vehicle or material transfer paver for the surface course of this project as approved.

ITEMS 420 & 427. CONCRETE SUBSTRUCTURES & SURFACE FINISHES FOR CONCRETE

Provide the following surface finishes as listed: Surface Area II Rub Finish.

Do not use membrane curing for structural elements.

ITEM 421. HYDRAULIC CEMENT CONCRETE

The Engineer will provide strength-testing equipment.

Provide the Engineer with a mixture design report using Department-provided software in accordance with Section 421.4.1., "Classification of Concrete Mix Designs," of the standard specifications. Include in the report the producer's plant, all materials sources, and a unique identification number for the design.

Air is not required on concrete cast-in-place elements on this project. If the Contractor proposes the use of an existing concrete design containing air, the Engineer must approve the design in writing before placement. If used, air testing will be performed in accordance with the specifications.

ITEM 422. CONCRETE SUPERSTRUCTURES

Once bridge beams/girders are in place, provide the Engineer in an acceptable electronic format, finished slab elevations, bottom of slab elevations with and without deflection, beam/girder field shot profiles, and the required calculated grading for the panels or PMD forms if used. Include elevations on each beam/girder across each span at 1/4, 1/2, and 3/4 points as well as at the beginning and ending of each span. Depending on conditions the Engineer may require each beam/girder edge to be included. Provide this information to the Engineer a minimum of 7 days prior to placing bridge slab concrete. Costs associated with this work will be subsidiary to pertinent Items.

ITEM 427. SURFACE FINISHES FOR CONCRETE

Provide an ordinary surface finish for Surface Area III.

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ITEMS 429. CONCRETE STRUCTURE REPAIR

On the Dry Creek bridge (NBI No. 10-201-0-2653-01-004) where concrete structure repair is required, an asbestos-containing coating is present. Abate the asbestos-containing coating as necessary to complete the concrete structure repair work. Abatement of asbestos-containing coatings is subsidiary to Item 429.

ITEM 432. RIPRAP

Locations and quantities may be varied as directed by the Engineer to accommodate field conditions.

ITEM 451. RETROFIT RAILING

All rail is deemed non-salvageable and is the property of the Contractor.

Refinish the outside face of the concrete slabs and curbs on the underpasses where railing is removed to leave a neat surface. Grind the existing anchor bolts flush with the concrete. Paint the ends of the anchor bolts 2 coats of zinc dust-zinc rich oxide paint as described under Item 450. This work will not be paid for directly, but will be subsidiary to this Item.

Clean the drill holes for the T631 retrofit traffic rail anchor bolts in accordance with Section 420.4.7.10., "Installation of Dowels and Anchor Bolts."

ITEMS 451 & 496. RETROFIT RAILING & REMOVING STRUCTURES

Remove structural steel railing and posts. Removed railing and posts are the property of the Contractor in accordance with Items 451 and 496.

ITEM 496. REMOVING STRUCTURES

Submit a demolition plan for the existing bridge in accordance with Item 496.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

The traffic control plan for this Contract consists of: the installation and maintenance of warning signs and other traffic control devices shown on the plans; specification data, which may be included in the general notes; applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD); traffic control plan sheets included on the plans; standard BC sheets; Compliant Work Zone Traffic Control Device List, and Item 502 of the standard specifications.

Use ground-mounted sign mounts with two posts for all temporary work zone signs unless otherwise directed.

Inspect and correct deficiencies each day throughout the duration of the Contract. In accordance with Article 502.4., "Payment," no payment will be made for the month if the Contractor fails to provide or properly maintain signs and devices in compliance with Contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

Provide at least one employee on call nights and weekends (or any other time that work is not in progress) for maintenance of signs and traffic control devices. This employee must have an address and telephone number near the project, as approved. Notify the Engineer in writing of the name, address, and telephone number of this employee. The Engineer will furnish this information to local law enforcement officials.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 30 minutes.

Sign all roads intersecting the project in accordance with current BC standards.

Refer to the traffic control plan sheets for traffic handling through the work area. Contractor may vary the signing arrangement and spacing as necessary to fit field conditions; however, any proposed changes in the traffic control plan must be approved before implementation.

When the sequence of work is shown on the plans, the Contractor may submit an alternate proposal for approval. Submit in writing all proposed variations and revisions.

High-visibility safety apparel is required for workers in accordance with the General Notes on current BC standards.

Place and maintain signs, channelizing devices, and flaggers to direct and route traffic at any location and for any period of time as may be required or directed.

When operations require a lane closure, provide cones, vertical panels, drums, signs, flaggers, and flashing arrow panels as necessary to route traffic around the closed lane as shown on the plans and as directed. Lane closures will be limited to one specific lane as directed.

Unless otherwise approved, construction operations will not be allowed on Good Friday, Easter weekend, the Friday before Memorial Day thru Memorial Day, July 4th, the Friday before Labor Day thru Labor Day, the Wednesday before Thanksgiving Day thru Sunday, Christmas Eve, Christmas Day, New Year's Eve, New Year's Day, or on any other high traffic days or holidays as determined by the Engineer.

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Maintain existing roadside signs within this project's limits during this Contract. In order to accommodate the grading or other operations, temporarily relocate these signs in accordance with the TMUTCD as directed. Use ground-mounted sign mounts with two posts for all relocated signs unless otherwise directed. This work will not be paid for directly, but will be subsidiary to Item 502.

Provide truck-mounted attenuators (TMA) as shown on the appropriate traffic control plan sheets. Provide a letter certifying that all TMA used on this project meet NCHRP 350 or AASHTO Manual for Assessing Safety Hardware (MASH) requirements.

Regulate all construction activities and equipment to minimize inconvenience to the traveling public. At points where it is necessary for trucks to stop, load, or unload, provide warning signs and flaggers to protect the traveling public.

The pavement must be entirely open to traffic each night. Remove or clearly barricade all material stockpiles, equipment left overnight, or any obstruction within 30 ft. of a travelway as approved.

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

Provide flaggers at county roads, commercial driveways, and other intersecting roadways deemed necessary by the Engineer to maintain control of the work zone during one-lane two-way operations. Provide communication radios to each flagger in the work zone and the pilot vehicle operator.

Refer to the traffic control details for surfacing operations shown on the plans. Install signs as required by this standard or plan sheet. Keep signs in place until after completion of the surface course operation and until placement of the standard pavement markings. Place standard pavement markings within 7 days of surface treatment application. The placement of acceptable permanent pavement markings and the completion of the final cleanup will be considered a part of the surface course operation. These signs are in addition to the signs and barricades that may be required on standard BC sheets. Short-term stationary/short duration portable signs will be required during the removal of the temporary pavement markings.

Provide a pilot vehicle.

The Contractor and the Engineer should agree on the allowable length of roadway sections for scarifying and reshaping the existing base and hauling base material. Provide qualified flaggers at each end of the section being processed to instruct and direct the traveling public.

Prior to beginning work, the Contractor and Engineer must agree on the allowable length of lane closure.

Place Type 3 barricades and road closed signs as shown on current BC standards across the closed roadway or the new location at each road, street, closed bridge, and along the closed roadway or new location at 3/4-mi. intervals.

All work required by these general notes, except as provided for by Item 502, will not be paid for directly, but will be subsidiary to Item 502 unless otherwise shown on the plans.

ITEM 504. FIELD OFFICE AND LABORATORY

Provide a facility at the asphalt concrete pavement plant for use by the Engineer as a laboratory. This is an existing requirement of Item 6, Article 5, "Plant Inspection and Testing," of the Standard Specifications. Provide a facility meeting the requirements of Item 504. At a minimum meet the requirements of 504.2.2.4, "Ty D Structure (Asphalt Mix Control Laboratory)" and 504.2.2.4.1, "Asphalt Content by Ignition Method." In addition, provide the following: At least one exterior door opening with a 48-in. minimum width. If steps are required to gain access to the facility's 48-in. door, provide a landing dock with minimum dimensions of 60 in. wide by 60 in. deep. The strong floor and landing of the facility should support the weight of all equipment and personnel providing a stable, essentially zero deflection during testing operations, acceptable to the Engineer. Provide a printer/fax/scan copier capable of printing 8.5" x 11" and 11" x 17" paper sizes and internet connectivity with a minimum of 100 mbps. This facility will be required of all projects with plant produced asphalt concrete pavement.

No direct payment will be made for Engineer field labs. All construction, maintenance, utilities, custodial services, security, and permits necessary to establish and maintain readiness of this facility is the responsibility of the Contractor. This building/facility is required by the standard specifications and is considered a standard part of any asphalt concrete pavement plant producing materials for Department projects.

Furnish a Superpave Gyratory Compactor calibrated in accordance with Tex-241-F for molding production samples. The Superpave Gyratory Compactor will not be paid for directly, but will be subsidiary to the asphalt concrete pavement Items of work.

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ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

Remove dirt, silt, rocks, debris, and other foreign matter that accumulates in all structures due to project erosion and Contractor's operations. Keep stream channels open at all times. This work will not be paid for directly, but will be subsidiary to this Item.

The total disturbed area for this project is 9.2 acres. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs) within 1 mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSLs for the construction support activities on or off right of way. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the right of way to the Engineer (to the appropriate MS4 operator when on an off-State system route).

The Engineer will provide copies of documents to meet TxDOT's posting requirements. Laminate, post, and maintain these documents at the project limits and at major roadways intersecting the project as directed. Post required Contractor documents in the same manner and location. This work will be subsidiary to Item 506.

ITEM 540. METAL BEAM GUARD FENCE

All work involved in placement of timber posts in soil cement riprap must be included in the price bid for Item 540.

Do not paint treated timber posts.

ITEMS 540 & 542. METAL BEAM GUARD FENCE & REMOVING METAL BEAM GUARD FENCE

Prior to removal of existing MBGF and associated appurtenances, submit to the Engineer for approval a work plan, including a detailed timeline, outlining removal and reinstallation of safety features. It is the intent that the Contractor has the necessary materials and labor force available to reinstall the safety features prior to beginning the removal process.

Regardless of when the Contractor installs proposed MBGF, set the rail height to account for any subsequent surfacing work in order to be in accordance with standard MBGF upon completion of the Contract.

When replacing guard rail, ensure that all segments of guard rail removed are replaced the same work day before opening to traffic.

ITEM 542. REMOVING METAL BEAM GUARD FENCE

All metal beam guard fence is non-salvageable and will become the property of the Contractor.

ITEM 585. RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type B pay adjustment schedule 3 to evaluate ride quality of the travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.”

ITEM 636. SIGNS

Install signs in accordance with the Department of Transportation’s “Sign Crew Field Book,” latest edition, or as directed.

All signs removed from the project are deemed salvageable and become the property of the Department. Stockpile salvageable material at the Henderson Maintenance Section located at 3100 FM 225 Henderson, TX 75652.

ITEM 644. SMALL ROADSIDE SIGN ASSEMBLIES

Sign types for which details are not shown on the plans must conform to “Standard Highway Sign Designs for Texas,” latest edition.

Before construction begins, locate all Texas Reference Marker (TRM) signs and Adopt-a-Highway signs using survey control methods for accuracy. Provide the survey data to the Engineer. If either type of sign is relocated during construction activities, survey the sign location and notify the Engineer before placement of the permanent sign.

Stake all sign locations for approval prior to placement.

ITEM 658. DELINEATOR AND OBJECT MARKER ASSEMBLIES

Accept ownership of unsalvageable delineator and object marker assemblies and remove from the right of way.

ITEM 662. WORK ZONE PAVEMENT MARKINGS

Contractor may use paint and beads for work zone pavement markings (non-removable).

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Dispose of all empty paint containers and unused paint in accordance with federal, state, and local requirements.

Use tape for short-term removable pavement markings on hot mix & PFC surfacing applications.

Tabs may be used before surface treatment application.

Furnish and place work zone pavement markings (short term)(tab) on center lines and lane lines in accordance with WZ(STPM), and provide warning signs in accordance with TCP (7-1). Place tabs within 1 in. of the proper alignment as established by the Contractor and approved by the Engineer. Remove tabs after placement of permanent markings. Tab removal will be subsidiary to Item 662.

ITEM 666. RETROREFLECTORIZED PAVEMENT MARKINGS

Use the spray method for application of the thermoplastic compound for lane lines, barrier lines, edge lines and channelizing lines.

Extrude hot to the pavement surface thermoplastic compound for arrows, stop lines, yield triangles, transverse lines, crosswalk lines, words and symbols.

For lengths greater than 300-ft, provide guide markings that will not leave a permanent mark on the roadway. Have the guide marking material and equipment used for placement approved prior to use. Provide adequate notification for approval of the guide markings prior to placement of the permanent pavement markings.

Provide a crew experienced in the work of installing pilot guideline markings and in the necessary traffic control. Supply all the equipment, personnel, traffic control, and materials necessary for the placement of pilot guideline markings as directed. All work will be in conformance with Part 6 of the TMUTCD.

The Engineer will establish beginning and ending points of no passing zones.

Correct deficiencies in the alignment of pavement markings at Contractor’s expense, as directed. Use a strip seal with aggregate and asphalt types and rates as directed to eliminate the deficient pavement markings.

Static lane closures are required for all profile stripe operations. These operations will require a pilot car for all two-lane roadways, unless otherwise directed.

ITEM 672. RAISED PAVEMENT MARKERS

Provide dispensing equipment such that the bituminous material can be directly applied from the melting pot to the pavement surface without secondary handling. Dispensing material from the melting pot into a separate container and then to the pavement surface will not be permitted. Intermittent agitation of the bituminous material will be by a method approved by the Engineer to ensure even heat distribution and must be such that the adhesive is agitated at approved and consistent intervals.

ITEM 677. ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Furnish a high-pressure water blasting system for removing paint, thermoplastic, epoxy and preformed tape material from the following surfaces without causing any grooves or trenching of the surface: asphalt, concrete, permeable friction course, grooved asphalt and grooved concrete.

Use a high-pressure water blasting system that consists of a vacuum recovery system that must provide for a nearly dry surface eliminating the possibility of uncontained run-off blasting water or debris, or the need for any secondary clean-up vehicles or operations.

All components required for the complete operation of the water blasting system (ultra-high-pressure pump, vacuum system, clean water supply, vacuum recovery storage, primary truck-mounted and optional secondary tractor-mounted blasting components) must be mounted and transported on a single, fully self-contained and supporting single truck chassis, thereby eliminating the need for any additional water, vacuum or other transport vehicles.

ITEM 3077. SUPERPAVE MIXTURES

When using crushed gravel as a coarse aggregate for ACP, use 1% lime as an antistripping agent.

Provide coarse aggregate for the final surface course from the same source or blended sources unless otherwise directed.

Give the State inspector at the spreading and finishing machine one weight ticket for each load of material. When directed, weigh asphaltic concrete loads on public scales to ensure the proper weight of material.

For materials paid for by the ton, provide a summary spreadsheet in accordance with Article 520.2, “Equipment.”

Use an electrical impedance (non-nuclear) measurement gauge to determine mat segregation and joint density for Part V and Part VIII of test procedure Tex-207-F. Do not use nuclear density

Project Number: **Sheet 8I**

County: RUSK **Control:** 2653-01-016, ETC

Highway: FM 2658

gauges or thin lift gauges for segregation or joint density determinations. Data reporting for mat segregation and joint density must be performed on Department templates.

All RAP used on this project must be fractionated. If an existing mix design is submitted for use as Warm Mix Asphalt (WMA), then a new trial batch with passing Hamburg Wheel test results is required.

Apply a tack coat with a rate of 0.10 gal/sy of residual asphalt between each layer of ACP pavement unless otherwise directed.

On Table 1, under 3077.2.1.3, the Sand equivalent, % Min is voided and not replaced. The minimum percent for the sand equivalent must be 45 for the combined aggregate.

ITEM 6001. PORTABLE CHANGEABLE MESSAGE SIGN

Provide a non-erodible, stable surface to place the Portable Changeable Message Sign (PCMS) units adjacent to the roadway as directed. Payment for this surface is incidental to Item 6001.

ITEM 6185. TRUCK MOUNTED ATTENUATOR (TMA)

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The Contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project. Additional truck mounted attenuators (TMAs) may be required as deemed necessary by the Engineer.

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2653-01-016 **DISTRICT** Tyler **COUNTY** Rusk
HIGHWAY FM 2658

			CONTROL SECTION JOB	**2653-01-016**		**2653-01-017**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00188708**		**A00189529**			
			COUNTY	**Rusk**		**Rusk**			
			HIGHWAY	**FM 2658**		**FM 2658**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	17.020		40.000		57.020	
	104-6009	REMOVING CONC (RIPRAP)	SY	346.000				346.000	
	104-6023	REMOVING CONC (CTB)	LF	1,762.000				1,762.000	
	104-6028	REMOVING CONC (MISC)	SY	45.200				45.200	
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF			2,181.000		2,181.000	
	105-6041	REMOVING STAB BASE AND ASPH PAV(8")	SY			4,532.000		4,532.000	
	110-6001	EXCAVATION (ROADWAY)	CY	4,832.000				4,832.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	5,173.000				5,173.000	
	132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY			25.000		25.000	
	150-6001	BLADING	STA			206.080		206.080	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	3,260.000				3,260.000	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	1,630.000		22,754.000		24,384.000	
	164-6054	BOND FBR MTRX SEED (PERM)(RURAL)(SAND)	SY	3,260.000		45,508.000		48,768.000	
	164-6055	BONDED FBR MTRX SEED (TEMP)(WARM)	SY	1,630.000		22,754.000		24,384.000	
	164-6056	BONDED FBR MTRX SEED (TEMP)(COOL)	SY	1,630.000		22,754.000		24,384.000	
	168-6001	VEGETATIVE WATERING	MG	90.000		1,251.000		1,341.000	
	247-6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY			4,532.000		4,532.000	
	251-6026	REWORK BS MTL (TY B) (8") (ORD COMP)	SY			104,178.000		104,178.000	
	251-6106	REWORK BS MTL (TY B) (12")(ORD COMP)	SY	6,964.000				6,964.000	
	275-6001	CEMENT	TON	132.000		3,902.000		4,034.000	
	275-6009	CEMENT TREAT (NEW BASE) (8")	SY			4,532.000		4,532.000	
	275-6011	CEMENT TREAT(EXIST MATL)(8")	SY	7,313.000		104,178.000		111,491.000	
	275-6063	CEMENT TREAT (SUBGRADE)(10")	SY			108,086.000		108,086.000	
	314-6012	EMULS ASPH (EROSN CONT)(CSS-1)	GAL	89.000		2,599.000		2,688.000	
	316-6029	ASPH (RC-250)	GAL			21,211.000		21,211.000	
	316-6398	AGGR (TY-PD GR-4 OR TY-PL GR-4)(SAC-B)	CY	54.000		820.000		874.000	
	316-6406	ASPH (AC-20XP, AC-10-2TR, OR AC-20-5TR)	GAL	2,507.000		82,899.000		85,406.000	
	316-6407	AGGR (TY-PD GR-3 OR TY-PL GR-3)	CY			922.000		922.000	
	316-6449	AGGR (TY-PD GR-5 OR TY-PL GR-5)	CY			816.000		816.000	
	400-6005	CEM STABIL BKFL	CY	120.000				120.000	
	401-6001	FLOWABLE BACKFILL	CY			1.000		1.000	
	416-6004	DRILL SHAFT (36 IN)	LF	300.000				300.000	
	420-6013	CL C CONC (ABUT)	CY	51.400				51.400	
	422-6001	REINF CONC SLAB	SF	3,780.000				3,780.000	
	422-6015	APPROACH SLAB	CY	64.200				64.200	
	425-6037	PRESTR CONC GIRDER (TX40)	LF	447.500				447.500	
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	578.000		2,214.000		2,792.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2653-01-016 **DISTRICT** Tyler **COUNTY** Rusk
HIGHWAY FM 2658

			CONTROL SECTION JOB		**2653-01-016**		**2653-01-017**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00188708**		**A00189529**			
			COUNTY		**Rusk**		**Rusk**			
			HIGHWAY		**FM 2658**		**FM 2658**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF			5.000		5.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	70.100				70.100	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	3,010.000				3,010.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	83.700		89.300		173.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF			440.000		440.000	
	450-6014	RAIL (TY T551)	LF	220.000				220.000	
	451-6019	RETROFIT RAIL (TY T631)	LF			506.000		506.000	
	454-6018	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	LF	82.000				82.000	
	496-6001	REMOV STR (BOX CULVERT)	EA	1.000				1.000	
	500-6001	MOBILIZATION	LS	0.330		0.670		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		6.000		10.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	60.000		1,170.000		1,230.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF			60.000		60.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	60.000		1,230.000		1,290.000	
	506-6029	EARTHWORK (EROSN & SEDMT CONT, IN VEH)	CY	80.000		120.000		200.000	
	506-6030	BACKHOE WORK (EROSION & SEDMT CONT)	HR	15.000		30.000		45.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	3,420.000		22,300.000		25,720.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	3,420.000		22,300.000		25,720.000	
	506-6046	TRACKHOE WORK (EROSION & SEDMT CONT)	HR	10.000		20.000		30.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	1,550.000		6,550.000		8,100.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000				4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF			6,550.000		6,550.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		8.000		12.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA			8.000		8.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	4.000				4.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4.000				4.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	4.000				4.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	4.000				4.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	24.000		82.000		106.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	3,404.000		48,557.000		51,961.000	
	662-6035	WK ZN PAV MRK NON-REMOV (Y)6"(BRK)	LF			1,520.000		1,520.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	3,404.000		41,353.000		44,757.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	170.000		5,048.000		5,218.000	
	666-6225	PAVEMENT SEALER 6"	LF	520.000		1,987.000		2,507.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	580.000		3,003.000		3,583.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF			90.000		90.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	580.000		2,720.000		3,300.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2653-01-016 **DISTRICT** Tyler **COUNTY** Rusk
HIGHWAY FM 2658

		CONTROL SECTION JOB		**2653-01-016**		**2653-01-017**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00188708**		**A00189529**			
		COUNTY		**Rusk**		**Rusk**			
		HIGHWAY		**FM 2658**		**FM 2658**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	2,824.000		45,554.000		48,378.000	
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF			1,430.000		1,430.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	2,824.000		38,633.000		41,457.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	43.000		593.000		636.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF			1,987.000		1,987.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	520.000		1,987.000		2,507.000	
	3077-6021	SP MIXESSP-CPG70-22	TON	3,064.000				3,064.000	
	3077-6075	TACK COAT	GAL	1,393.000				1,393.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	240.000		670.000		910.000	
	6056-6002	PREFORMED CENTERLINE RUMBLE STRIP	LF			145.000		145.000	
	6185-6002	TMA (STATIONARY)	DAY	4.000		16.000		20.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	1.000		3.000		4.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000				1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	

BASIS OF ESTIMATE

	ITEM	DESCRIPTION	RATE	CSJ: 2653-01-016 DESIGN QUANTITY	DESIGN UNIT	PAY QUANTITY	CSJ: 2653-01-017 DESIGN QUANTITY	DESIGN UNIT	PAY QUANTITY	PROJECT TOTALS	PAY UNIT
[1]	166	FERTILIZER	1 LB/9 SY	3260	SY	**0.2**	45508	SY	**2.5**	**2.7**	TON
	168	VEGETATIVE WATERING	11 GAL/SY	8150	SY	**90**	113770	SY	**1251**	**1341**	MG
	275	CEMENT (5% BASED ON 120#/CF)	36 LB/SY	7313	SY	**132**	216796	SY	**3902**	**4034**	TON
	314	EMULS ASPH (EROSN CONT)(CSS-1)	0.15 GAL/SY	592	SY	**89**	17324	SY	**2599**	**2688**	GAL
	316	ASPH (RC-250)	0.2 GAL/SY	0	SY	**0**	106055	SY	**21211**	**21211**	GAL
	316	ASPH (AC-20XP, AC-10-2TR, OR AC-20-5TR)	0.36 GAL/SY	6964	SY	**2507**	106544	SY	**38356**	**40863**	GAL
	316	ASPH (AC-20XP, AC-10-2TR, OR AC-20-5TR)	0.42 GAL/SY	0	SY	**0**	106055	SY	**44543**	**44543**	GAL
	316	AGGR (TY-PD GR-3 OR TY-PL GR-3)	1 CY/115 SY	0	SY	**0**	106055	SY	**922**	**922**	CY
	316	AGGR (TY-PD GR-4 OR TY-PL GR-4)(SAC-B)	1 CY/130 SY	6964	SY	**54**	106544	SY	**820**	**874**	CY
	316	AGGR (TY-PD GR-5 OR TY-PL GR-5)	1 CY/130 SY	0	SY	**0**	106055	SY	**816**	**816**	CY
	500	MOBILIZATION				**0.33**			**0.67**	**1**	LS
	502	BARRICADES, SIGNS AND TRAFFIC HANDLING				**4**			**6**	**10**	MO
	3077	SP MIXES SP-C PG70-22 (BASE) (8")	880 LB/SY	6964	SY	**3064**	0	SY	**0**	**3064**	TON
[2]	3077	TACK COAT	0.1 GAL/SY	6964	SY	**1393**	0	SY	**0**	**1393**	GAL

[1]FOR INFORMATION ONLY
[2]TOTAL PAY QUANTITY IS FOR 2 APPLICATIONS

GRADING SUMMARY

CSJ	110 EXCAVATION (ROADWAY)	132 EMBANKMENT (FINAL) (ORD COMP) (TY C)	132 EMBANKMENT (VEHICLE) (ORD COMP) (TY C)	150 BLADING	REMARKS
	CY	CY	CY	STA	
CSJ: 2653-01-016					
FROM EARTHWORK QUANTITIES REPORT	4832	5173			
CSJ: TOTAL	**4832**	**5173**	**0**	**0**	
CSJ: 2653-01-017					
STA 83+11 TO STA 175+06				91.95	
STA 175+06 TO STA 202+06	LIMITS OF CEMENT STABILIZED RIPRAP				
STA 202+06 TO STA 241+16				39.10	
STA 247+36 TO STA 291+12				43.76	
STA 296+03 TO STA 327+30				31.27	
AS DIRECTED			25		
CSJ: TOTAL	**0**	**0**	**25**	**206.08**	
PROJECT TOTALS	**4832**	**5173**	**25**	**206.08**	

PORTABLE CHANGEABLE MESSAGE SIGN

SIGN	LOCATION	6001 PORTABLE CHANGEABLE MESSAGE SIGN
		DAY
CSJ: 2653-01-016		
LOCATION #1	AS DIRECTED	120
LOCATION #2	AS DIRECTED	120
CSJ: TOTAL		**240**
CSJ: 2653-01-017		
LOCATION #1	AS DIRECTED	185
LOCATION #2	AS DIRECTED	150
LOCATION #3	AS DIRECTED	150
LOCATION #4	AS DIRECTED	185
CSJ: TOTAL		**670**
PROJECT TOTALS		**910**

NOTE: TO BE PLACED 7 DAYS PRIOR TO START DATE

TRUCK MOUNTED ATTENUATORS

NUMBER OF TRUCKS	6185 [1] TMA (STATIONARY)	6185 [2] TMA (MOBILE OPERATION)
	DAY	DAY
CSJ: 2653-01-016		
1	4	1
CSJ: TOTAL	**4**	**1**
CSJ: 2653-01-017		
1	16	3
CSJ: TOTAL	**16**	**3**
PROJECT TOTALS	**20**	**4**

[1] FOR ROADWAY OPERATIONS
[2] FOR MOBILE OPERATIONS

QUANTITY SUMMARY

SHEET 1 OF 6

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	See Title Sheet	10

STATE	DIST.	COUNTY
TEXAS	TYL	RUSK

CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

FILE: FM2658*AF01.dgn
DATE: 5/26/2023 TIME: 3:19:37 PM
DIRECTORY: I:\TYL\PRJ\000020656\3*Design\Proj3-FM 2658\DGN\PSE\01 GENVFM2658*AF01.dgn

TABULATION OF SURFACE AREAS

STATION FROM	STATION TO	LENGTH	316 [1] PRIME COAT (RC 250 - GR 5)		316 [1] SURFACE TREATMENT (1ST COURSE - GR 3)		316 [1] SURFACE TREATMENT (2ND COURSE - GR 4)		428 PENETRATING CONCRETE SURFACE TREATMENT		3077 [1] SP MIXES SP-C PG70-22 (8") (BASE)		3077 [1] TACK COAT	
FROM	TO	FT	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)
CSJ: 2653-01-016														
25+50.00	26+60.00	110					39 Avg	477			39 Avg	477	39 Avg	477
26+60.00	33+30.00	670					40	2978			40	2978	40	2978
34+60.00	41+50.00	690					40	3067			40	3067	40	3067
41+50.00	42+52.00	102					39 Avg	442			39 Avg	442	39 Avg	442
BRIDGES (INCLUDING BAS)														
33+30.00	34+60.00	130							40	578				
CSJ: TOTAL		**1702**		**0**		**0**		**6964**		**578**		**6964**		**6964**
CSJ: 2653-01-017														
83+11.00	88+50.00	539	40	2396	40	2396	40	2396						
88+50.00	170+50.00	8200	40	36444	40	36444	40	36444						
170+50.00	175+06.00	456	40	2027	40	2027	40	2027						
175+06.00	183+75.00	869	40	3862	40	3862	40	3862						
183+75.00	186+06.00	231	37 Avg	950	37 Avg	950	37 Avg	950						
188+46.00	190+78.00	232	37 Avg	954	37 Avg	954	37 Avg	954						
190+78.00	202+06.00	1128	40	5013	40	5013	40	5013						
202+06.00	244+04.00	4198	40	18658	40	18658	40	18658						
245+45.00	292+97.00	4752	40	21120	40	21120	40	21120						
294+38.00	327+30.00	3292	40	14631	40	14631	40	14631						
BRIDGES (INCLUDING BAS)														
186+06.00	188+46.00	240							36	960				
244+04.00	245+45.00	141							40	627				
292+97.00	294+38.00	141							40	627				
4' AT DRIVEWAYS (22 TOTAL)								489						
CSJ: TOTAL		**24419**		**106055**		**106055**		**106544**		**2214**		**0**		**0**
PROJECT TOTALS		**26121**		**106055**		**106055**		**113508**		**2792**		**6964**		**6964**

[1] QUANTITY INCLUDED IN BASIS OF ESTIMATE

ROADWAY SUMMARY

STATION FROM	STATION TO	LENGTH	105 REMOVING STAB BASE AND ASPH PAV(8")		247 FLEX BASE (CMP IN PLC) (TY A GR 1-2) (8")		251 REWORK BS MTL (TY B) (8") (ORD COMP)		251 REWORK BS MTL (TY B) (12")(ORD COMP)		275 [1] CEMENT		275 CEMENT TREAT (NEW BASE) (8")		275 CEMENT TREAT (EXIST MATL)(8")		275 CEMENT TREAT (SUBGRADE)(10")	
FROM	TO	FT	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)
CSJ: 2653-01-016																		
25+50.00	26+60.00	110							39 Avg	477	41 Avg	501			41 Avg	501		
26+60.00	33+30.00	670							40	2978	42	3127			42	3127		
34+60.00	41+50.00	690							40	3067	42	3220			42	3220		
41+50.00	42+52.00	102							39 Avg	442	41 Avg	465			41 Avg	465		
BRIDGES (INCLUDING BAS)																		
33+30.00	34+60.00	130																
CSJ: TOTAL		**1702**		**0**		**0**		**0**		**6964**		**7313**		**0**		**7313**		**0**
CSJ: 2653-01-017																		
83+11.00	88+50.00	539	41	2455	41	2455					42 & 41	4970	41	2455			42	2515
88+50.00	170+50.00	8200					41	37356			42 & 41	75623			41	37356	42	38267
170+50.00	175+06.00	456	41	2077	41	2077					42 & 41	4205	41	2077			42	2128
175+06.00	183+75.00	869					41	3959			30 & 41	6856			41	3959	30	2897
183+75.00	186+06.00	231					38 Avg	975			27 & 38 Av	1668			38 Avg	975	27 Avg	693
188+46.00	190+78.00	232					38 Avg	980			27 & 38 Av	1676			38 Avg	980	27 Avg	696
190+78.00	202+06.00	1128					41	5139			30 & 41	8899			41	5139	30	3760
202+06.00	244+04.00	4198					41	19124			42 & 41	38715			41	19124	42	19591
245+45.00	292+97.00	4752					41	21648			42 & 41	43824			41	21648	42	22176
294+38.00	327+30.00	3292					41	14997			42 & 41	30360			41	14997	42	15363
BRIDGES (INCLUDING BAS)																		
186+06.00	188+46.00	240																
244+04.00	245+45.00	141																
292+97.00	294+38.00	141																
CSJ: TOTAL		**24419**		**4532**		**4532**		**104178**		**0**		**216796**		**4532**		**104178**		**108086**
PROJECT TOTALS		**26121**		**4532**		**4532**		**104178**		**6964**		**224109**		**4532**		**111491**		**108086**

[1] QUANTITY INCLUDED IN BASIS OF ESTIMATE

QUANTITY SUMMARY

SHEET 2 OF 6

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		11
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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VEGETATION SUMMARY							
	160	164	164	164	164	168	314
			[1]	[1]	[1]	[2]	[2]
LOCATION	FURNISHING AND PLACING TOPSOIL (4")	BOND FBR MTRX SEED (PERM) (RURAL) (SAND)	BONDED FBR MTRX SEED (TEMP) (WARM)	BONDED FBR MTRX SEED (TEMP) (COOL)	BROADCAST SEED (PERM) (RURAL) (SANDY)	VEGETATIVE WATERING	EMULS ASPH (EROSN CONT) (CSS-1)
	SY	SY	SY	SY	SY	MG	SY
CSJ: 2653-01-016							
STA 25+50 TO STA 42+52	3260	3260	1630	1630	1630	8150	592
CSJ: TOTAL	**3260**	**3260**	**1630**	**1630**	**1630**	**8150**	**592**
CSJ: 2653-01-017							
STA 83+11 TO STA 175+06		20434	10217	10217	10217	51085	7294
STA 175+06 TO STA 202+06			LIMITS OF CEMENT STABILIZED RIPRAP				
STA 202+06 TO STA 327+30		25074	12537	12537	12537	62685	10030
CSJ: TOTAL	**0**	**45508**	**22754**	**22754**	**22754**	**113770**	**17324**
PROJECT TOTALS	**3260**	**48768**	**24384**	**24384**	**24384**	**121920**	**17916**

[1] MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE VEGETATION IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT
[2] QUANTITY INCLUDED IN BASIS OF ESTIMATE

PREP ROW		
		100
LOCATION	DESCRIPTION	PREPARING ROW
		STA
CSJ: 2653-01-016		
STA 25+50 TO 42+52	TREE TRIMMING / REMOVAL, CLEAR & GRUB, REMOVING OLD MBGF POSTS FROM CEM STAB RIPRAP	17.02
CSJ: TOTAL		**17.02**
CSJ: 2653-01-017		
STA 87+50 TO STA 88+50	TREE TRIMMING / REMOVAL / C&G	1.00
STA 102+00 TO STA 103+50	TREE TRIMMING / REMOVAL / C&G	1.50
STA 137+00 TO STA 150+50	TREE TRIMMING / REMOVAL / C&G	13.50
STA 157+75 TO STA 158+75	TREE TRIMMING / REMOVAL / C&G	1.00
STA 167+50 TO STA 169+00	TREE TRIMMING / REMOVAL / C&G	1.50
STA 201+30 TO STA 203+80	TREE TRIMMING / REMOVAL / C&G	2.50
STA 225+00 TO STA 228+00	TREE TRIMMING / REMOVAL / C&G	3.00
STA 236+00 TO STA 246+00	TREE TRIMMING / REMOVAL / C&G	10.00
STA 280+00 TO STA 282+00	TREE TRIMMING / REMOVAL / C&G	2.00
STA 290+50 TO STA 294+50	TREE TRIMMING / REMOVAL / C&G	4.00
CSJ: TOTAL		**40.00**
PROJECT TOTALS		**57.02**

SUMMARY OF EROSION CONTROL ITEMS								
	506	506	506	506	506	506	506	506
STATION	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	EARTHWORK (EROSN & SEDMT CONT, IN VEH)	BACKHOE WORK (EROSION & SEDMT CONT)	TRACKHOE WORK (EROSION & SEDMT CONT)
	LF	LF	LF	LF	LF	CY	HR	HR
CSJ: 2653-01-016								
STA 25+50 TO STA 42+52	2920	2920	45		45			
AS DIRECTED	500	500	15		15	80	15	10
CSJ: TOTAL	**3420**	**3420**	**60**	**0**	**60**	**80**	**15**	**10**
CSJ: 2653-01-017								
STA 83+11 TO STA 104+00	350	350	165		165			
STA 104+00 TO STA 129+00	2350	2350	105		105			
STA 129+00 TO STA 153+00	3100	3100	90		90			
STA 153+00 TO STA 177+00	1100	1100	165		165			
STA 177+00 TO STA 201+00	4300	4300						
STA 201+00 TO STA 225+00	2450	2450	45		45			
STA 225+00 TO STA 249+00	1700	1700	135		135			
STA 249+00 TO STA 273+00	1650	1650	90		90			
STA 273+00 TO STA 297+00	1500	1500	120		120			
STA 297+00 TO STA 323+00	1600	1600	105		105			
STA 323+00 TO STA 327+30	200	200	60		60			
AS DIRECTED	2000	2000	90	60	150	120	30	20
CSJ: TOTAL	**22300**	**22300**	**1170**	**60**	**1230**	**120**	**30**	**20**
PROJECT TOTALS	**25720**	**25720**	**1230**	**60**	**1290**	**200**	**45**	**30**

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE VEGETATION IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT

QUANTITY SUMMARY

SHEET 3 OF 6

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		12
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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BRIDGE SUMMARY														
	400	401	416	420	422	422	425	429	432 [1] [2]	438	450	451	454	496 [2]
LOCATION	CEM STABIL BKFL	FLOWABLE BACKFILL	DRILL SHAFT (36 IN)	CL C CONC (ABUT)	REINF CONC SLAB	APPROACH SLAB	PRESTR CONC GIRDER (TX40)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (STONE PROTECTION) (24 IN)	CLEANING AND SEALING EXIST JOINTS(CL7)	RAIL (TY T551)	RETROFIT RAIL (TY T631)	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	REMOV STR (BOX CULVERT)
STA	CY	CY	LF	CY	SF	CY	LF	SF	CY	LF	LF	LF	LF	EA
CSJ: 2653-01-016														
PANTHER CREEK BRIDGE 10-201-0-2653-01-021 STA 33+50 TO STA 34+40	120		300	51.4	3780	64.2	447.5		1468		220		82	1
CSJ: TOTAL	120	0	300	51.4	3780	64.2	447.5	0	1468	0	220	0	82	1
CSJ: 2653-01-017														
DRY CREEK BRIDGE 10-201-0-2653-01-004 STA 186+06 TO STA 188+46		1						5		252		506		
MARTIN CREEK TRIBUTARY BRIDGE 10-201-0-2653-01-006 STA 244+34 TO STA 245+14										94				
MARTIN CREEK BRANCH BRIDGE 10-201-0-2653-01-007 STA 293+28 TO STA 294+08										94				
CSJ: TOTAL	0	1	0	0	0	0	0	5	0	440	0	506	0	0
PROJECT TOTALS	120	1	300	51.4	3780	64.2	447.5	5	1468	440	220	506	82	1

[1] QUANTITY INCLUDED IN PERTINENT SUMMARY
[2] DEWATERING WILL BE REQUIRED FOR THE REMOVAL OF THE EXISTING BOX CULVERT AND FOR PLACEMENT OF STONE PROTECTION RIPRAP. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE APPLICABLE ITEMS.

RIPRAP SUMMARY					
	104	104	432	432	432
LOCATION	REMOVING CONC (RIPRAP)	REMOVING CONCRETE (MOW STRIP)	RIPRAP (CONC) (4 IN)	RIPRAP (STONE PROTECTION) (24 IN)	RIPRAP (MOW STRIP) (4 IN)
STA	SY	LF	CY	CY	CY
CSJ: 2653-01-016					
STA 33+30 TO STA 34+60 (LT)	346				
STA 32+50 TO STA 33+40 (LT)				383	
STA 32+50 TO STA 33+40 (RT)				383	
STA 34+50 TO STA 35+40 (LT)				388	
STA 34+50 TO STA 35+40 (RT)				388	
FROM BRIDGE SUMMARY				1468	
FROM MBGF SUMMARY		0	70.1		83.7
CSJ: TOTAL	346	0	70.1	3010	83.7
CSJ: 2653-01-017					
FROM MBGF SUMMARY		2181			89.3
CSJ: TOTAL	0	2181	0	0	89.3
PROJECT TOTALS	346	2181	70.1	3010	173.0

DELINEATOR SUMMARY		
	658	658
LOCATION	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)
STA	EA	EA
CSJ: 2653-01-016		
AT PANTHER CREEK BRIDGE		4
FROM MBGF SUMMARY	24	
CSJ: TOTAL	24	4
CSJ: 2653-01-017		
FROM MBGF SUMMARY	82	
CSJ: TOTAL	82	0
PROJECT TOTALS	106	4

QUANTITY SUMMARY

SHEET 4 OF 6

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		13
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

MBGF SUMMARY

* STATION		LOC	104	104 [2]	104 [1]	432 [1]	432 [1]	540	540	542	544	544	545	658 [1]	REMARKS
			REMOVING CONC (CTB)	REMOVING CONC (MISC)	REMOVING CONCRETE (MOW STRIP)	RIPRAP (CONC) (4 IN)	RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	CRASH CUSH ATTEN (REMOVE)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 (BI)	
FROM	TO	LT / RT	LF	SY	LF	CY	CY	LF	EA	LF	EA	EA	EA	EA	
CSJ: 2653-01-016															
28+47.74	33+40.00	LT	1103	11.3		31.0	24.7	475	1		1		1	7	
33+40.00	34+50.00	LT													
34+50.00	38+92.48	LT		11.3		39.1	21.5	425	1		1		1	6	
29+21.23	33+40.00	RT	659	11.3			22.5	400	1		1		1	6	
33+40.00	34+50.00	RT													
34+50.00	37+18.20	RT		11.3			15.0	250	1		1		1	5	
CSJ: TOTAL			1762	45.2	0	70.1	83.7	1550	4	0	4	0	4	24	
CSJ: 2653-01-017															
137+42.00	143+32.00	RT			805		32.8	600		600	2	2		9	
138+43.00	150+02.00	LT			1376		56.5	1150		1150	2	2		15	
175+23.50	185+99.50	RT						1075		1075	1	1		13	
175+25.86	185+99.50	LT						1075		1075	1	1		13	
DRY CREEK BRIDGE															
188+52.50	201+70.01	LT						1325		1325	1	1		16	
188+52.50	201+85.26	RT						1325		1325	1	1		16	
CSJ: TOTAL			0	0	2181	0	89.3	6550	0	6550	8	8	0	82	
PROJECT TOTALS			1762	45.2	2181	70.1	173	8100	4	6550	12	8	4	106	

[1] QUANTITY INCLUDED IN PERTINENT SUMMARY
[2] CONCRETE PAD (22.5' X 4.5') UNDER EXISTING CRASH CUSHIONS
* STATION LIMITS ARE EITHER WHERE THE MBGF TIES TO THE SGT OR AT THE END OF THE CONCRETE WINGWALL FOR THRIE BEAM CONNECTIONS

SUMMARY OF WORK ZONE PAVEMENT MARKINGS

LOCATION	TYPE	RATE	662 WK ZN PAV MRK NON-REMOV (W)6" (SLD)	662 WK ZN PAV MRK NON-REMOV (Y)6" (SLD)	662 WK ZN PAV MRK NON-REMOV (Y)6" (BRK)	RATE	662 WK ZN PAV MRK SHT TERM (TAB)TY Y-2
			LF	LF	LF		EA
CSJ: 2653-01-016							
	EDGE LINE	SOLID	3404				
	BARRIER LINE	SOLID		3404		1/20 FT	170
	BARRIER LINE	10 FT/40 FT				3/40 FT	
CSJ: TOTAL			3404	3404	0		170
CSJ: 2653-01-017							
	EDGE LINE	SOLID	48557				
	BARRIER LINE	SOLID		41353		1/20 FT	4136
	BARRIER LINE	10 FT/40 FT			1520	3/40 FT	912
CSJ: TOTAL			48557	41353	1520		5048
PROJECT TOTALS			51961	44757	1520		5218

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE STRIPING

SMALL SIGN TABULATION

LOCATION	644 IN SM RD SN SUP&AM TY10BWG(1)SA(P)	644 REMOVE SM RD SN SUP&AM
	EA	EA
CSJ: 2653-01-016		
STA 25+50 TO STA 42+52	4	4
CSJ: TOTAL	4	4
CSJ: 2653-01-017		
STA 83+11 TO STA 327+30	0	0
CSJ: TOTAL	0	0
PROJECT TOTALS	4	4

NOTE: MULTIPLE MOVE-INS MAY BE REQUIRED FOR PLACEMENT OF PERMANENT SIGNS

QUANTITY SUMMARY

SHEET 5 OF 6

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		14
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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SUMMARY OF PERMANENT PAVEMENT MARKINGS

LOCATION	STATION		666	666	666	666	666	666	666	6056	677	678	672
			PAVEMENT SEALER 6"	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL)	REF PROF PAV MRK TY I(W)6"(SLD) (100MIL)	REF PROF PAV MRK TY I(Y)6"(BRK) (100MIL)	REF PROF PAV MRK TY I(Y)6"(SLD) (100MIL)	PREFORMED CENTERLINE RUMBLE STRIP	ELIM EXT PAV MRK & MRKS (4")	PAV SURF PREP FOR MRK (6")	REFL PAV MRKR TY II-A-A
	FROM	TO	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA
CSJ: 2653-01-016													
SHEET 1 OF 12			520	580		580	2824		2824			520	43
CSJ: TOTAL			**520**	**580**	**0**	**580**	**2824**	**0**	**2824**	**0**	**0**	**520**	**43**
CSJ: 2653-01-017													
SHEET 2 OF 12	80+00.00	104+00.00		300		300	3816	280	2413	20			49
SHEET 3 OF 12	104+00.00	129+00.00					4800	410	2688	75			52
SHEET 4 OF 12	129+00.00	153+00.00					4800		4800				60
SHEET 5 OF 12	153+00.00	177+00.00		459		518	4282		4282				59
SHEET 6 OF 12	177+00.00	201+00.00	960	880		880	3920		3920		960	960	60
SHEET 7 OF 12	201+00.00	225+00.00					4800		4800				60
SHEET 8 OF 12	225+00.00	249+00.00	463	682	90	340	4118	300	2917		463	463	60
SHEET 9 OF 12	249+00.00	273+00.00					4800	440	2595	50			60
SHEET 10 OF 12	273+00.00	297+00.00	564	682		682	4118		4118		564	564	60
SHEET 11 OF 12	297+00.00	323+00.00					5200		5200				62
SHEET 12 OF 12	323+00.00	327+30.00					900		900				11
CSJ: TOTAL			**1987**	**3003**	**90**	**2720**	**45554**	**1430**	**38633**	**145**	**1987**	**1987**	**593**
PROJECT TOTALS			**2507**	**3583**	**90**	**3300**	**48378**	**1430**	**41457**	**145**	**1987**	**2507**	**636**

NOTE: MULTIPLE MOVE-INS WILL BE REQUIRED TO MAINTAIN ADEQUATE STRIPING.

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QUANTITY SUMMARY

SHEET 6 OF 6

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		15
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

SUMMARY OF SMALL SIGNS

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

STATION	OFFSET	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
31+14	LT	1	R8-4	EMERGENCY PARKING ONLY	30 x 24	x		10BWG	1	SA	P		
32+60	RT	2	R8-4	EMERGENCY PARKING ONLY	30 x 24	x		10BWG	1	SA	P		
38+62	RT	3	W12-2	XX'X"	36 x 36	x		10BWG	1	SA	P		
39+61	LT	4	R8-4	EMERGENCY PARKING ONLY	30 x 24	x		10BWG	1	SA	P		

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 1 OF 1

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
4-16 8-16	DIST	COUNTY		SHEET NO.
	TYL	RUSK		16

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End Area Volume Report

Report Created: Monday, May 8, 2023
Time: 10:44:48 AM

Cross Section Set Name: FM2658-BL
Alignment Name: FM2658-BL
Input Grid Factor: **Note:** All units in this report are in feet, square feet and cubic yards unless specified otherwise.

Baseline Station	Station Quantities - Cut - Factor	Cut - Area	Cut - Volume	Cut - Adjusted	Fill - Factor	Fill - Area	Fill - Volume	Fill - Adjusted	Mass Ordinate
25+50.00 R1									0.00
26+00.00 R1	1.0000		45.18	45.18	1.0000		10.59	10.59	34.59
27+00.00 R1	1.0000		102.32	102.32	1.0000		33.12	33.12	103.78
28+00.00 R1	1.0000		98.16	98.16	1.0000		40.86	40.86	161.08
29+00.00 R1	1.0000		62.79	62.79	1.0000		31.76	31.76	192.11
30+00.00 R1	1.0000		15.58	15.58	1.0000		63.79	63.79	143.90
31+00.00 R1	1.0000		1.11	1.11	1.0000		252.64	252.64	-107.63
32+00.00 R1	1.0000		1.01	1.01	1.0000		584.13	584.13	-690.75
33+00.00 R1	1.0000		130.25	130.25	1.0000		958.31	958.31	-1518.81
34+00.00 R1	1.0000		1609.60	1609.60	1.0000		527.21	527.21	-436.42
35+00.00 R1	1.0000		1984.39	1984.39	1.0000		682.18	682.18	865.79
36+00.00 R1	1.0000		176.26	176.26	1.0000		1008.29	1008.29	33.76
37+00.00 R1	1.0000		1.05	1.05	1.0000		687.19	687.19	-652.38
38+00.00 R1	1.0000		6.19	6.19	1.0000		232.18	232.18	-878.37
39+00.00 R1	1.0000		103.78	103.78	1.0000		36.78	36.78	-811.38
40+00.00 R1	1.0000		159.86	159.86	1.0000		6.54	6.54	-658.05
41+00.00 R1	1.0000		153.76	153.76	1.0000		4.22	4.22	-508.51
42+00.00 R1	1.0000		128.81	128.81	1.0000		9.73	9.73	-389.42
42+52.00 R1	1.0000		51.51	51.51	1.0000		3.70	3.70	-341.61
Grand Total:			4831.61	4831.61			5173.23	5173.23	

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EARTHWORK
QUANTITIES
REPORT
CSJ 2653-01-016

SHEET 1 OF 1

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		17
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

CONSTRUCTION SEQUENCE

PHASE 1 - BRIDGE REPLACEMENT AT PANTHER CREEK (CSJ 2653-01-016)

* MILESTONE 1 BEGINS ON NOVEMBER 1, 2023
* SUBSTANTIALLY COMPLETE MILESTONE 1 IN 120 WORKING DAYS

1. INSTALL PROJECT SIGNS AND MESSAGE BOARDS ANNOUNCING FM 2658 ROAD WORK.
2. CLOSE FM 2658 AND DETOUR THRU TRAFFIC AS SHOWN ON "DETOUR LAYOUT" AND WZ(RCD)-13.
3. INSTALL EROSION CONTROL MEASURES AS SHOWN IN THE PLANS AND AS DIRECTED.
4. CONSTRUCT PROPOSED BRIDGE AS SHOWN IN THE PLANS. DEWATERING WILL BE REQUIRED FOR THE REMOVAL OF THE EXISTING CULVERT AND FOR PLACEMENT OF STONE PROTECTION. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE APPLICABLE ITEMS.
5. CONSTRUCT APPROACH ROADWAY TO LIMITS AS SHOWN IN THE PLANS. CEMENT TREAT SALVAGED BASE MATERIAL TO A DEPTH OF 8 INCHES. PLACE SUPERPAVE TY C BASE (8"). INSTALL MBGF, MOW STRIP, AND RIPRAP (CONCRETE AND ROCK). PLACE TOPSOIL, SEED & EMULSION. PLACE WZ NON-REMOVABLE STRIPING.

   SUBSTANTIALLY COMPLETE WILL BE DEFINED AS WHEN ALL BRIDGE WORK (INCLUDING APPROACH SLABS, BRIDGE RAIL AND STONE PROTECTION) ARE COMPLETE AND IN FINAL PLACE, AND ROADWAY WORK IS COMPLETE THROUGH STEP (5).

6. ONCE FM 2658 HAS BEEN SUBSTANTIALLY COMPLETE, OPEN THE ROAD TO THRU TRAFFIC AND REMOVE DETOUR SIGNS. INSTALL APPROPRIATE WORK ZONE SIGNAGE FOR REMAINDER OF PHASE 1.
7. PLACE SECOND COURSE SURFACE TREATMENT (GR 4 AGGR.) WITH TEMPORARY TABS.
8. PLACE PERMANENT PAVEMENT MARKINGS AND REFLECTORS. COMPLETE STRIPING WITHIN 11 DAYS OF EXPIRATION OF THE THREE DAY CURING PERIOD.

PHASE 2 - ROADWAY RESTORATION (CSJ 2653-01-017)

1. CLOSE FM 2658 AND DETOUR THRU TRAFFIC AS SHOWN ON "DETOUR LAYOUT" AND WZ(RCD)-13.
2. INSTALL EROSION CONTROL MEASURES AS SHOWN IN THE PLANS AND AS DIRECTED.
3. BEGIN MBGF, BRIDGE REPAIR, RAIL RETROFIT AND PREP ROW WORK AS APPROVED.
4. ON A ONE MILE SEGMENT, OR LENGTH APPROVED BY THE ENGINEER, BEGIN RESTORATION OPERATIONS ON HALF OF THE ROADWAY WIDTH AT A TIME (ALLOWING LOCAL TRAFFIC ACCESS):
   * SCARIFY AND SALVAGE (WINDROW) 8 INCHES OF EXISTING BASE MATERIAL (COMPACT WINDROWED MATERIAL ON OPPOSITE LANE TO MAKE IT TRAVERSABLE FOR LOCAL TRAFFIC).
   * CEMENT TREAT SUBGRADE MATERIAL (BASE AND TREATED MATERIAL) WITH 5% CEMENT TO A DEPTH OF 10 INCHES. PLACE SALVAGED MATERIAL BACK ON ROADWAY BY THE END OF THE DAY.
   * CEMENT TREAT RELAID SALVAGED MATERIAL WITH 5% CEMENT TO A DEPTH OF 8 INCHES.
   * PERFORM IRI - MAKE NECESSARY CORRECTIONS IN ACCORDANCE WITH THE SPECIFICATIONS. CORRECTIVE WORK WILL NOT BE PAID FOR, BUT WILL BE SUBSIDIARY TO PERTINENT ITEMS.
   * PLACE COVERED PRIME COURSE (RC 250 AND GR 5 AGGR).
   * PLACE VERTICAL PANELS FOR ROADWAY DELINEATION IN ACCORDANCE WITH BC(9).
   * REPEAT ON NEXT ONE MILE SEGMENT UNTIL ALL OF FM 2658 HAS BEEN RESTORED.
   * COMPLETE MBGF, BRIDGE REPAIR, RAIL RETROFIT AND PREP ROW.
   * PLACE FIRST COURSE SURFACE TREATMENT WITH GR 3 AGGR. (USE SHORT TERM TABS).
   * PLACE TEMPORARY STRIPING - COMPLETE WZ NON-REMOVABLE STRIPING ON THE CENTERLINE AND EDGELINE WITHIN 11 DAYS OF EXPIRATION OF THE THREE DAY CURING PERIOD.
   * OPEN FM 2658 TO THRU TRAFFIC AND REMOVE DETOUR SIGNS (INSTALL APPROPRIATE WZ SIGNAGE).
5. APPLY PENETRATING CONCRETE SURFACE TREATMENT AND CLEAN & SEAL BRIDGE JOINTS.
6. PLACE BONDED FIBER MATRIX SEED AND EMULSION.
7. PLACE SECOND COURSE SURFACE TREATMENT WITH GR 4 AGGR. (USE SHORT TERM TABS).
8. PLACE PERMANENT PAVEMENT MARKINGS AND REFLECTORS. COMPLETE STRIPING WITHIN 11 DAYS OF EXPIRATION OF THE THREE DAY CURING PERIOD.
9. ONCE ALL WORK HAS BEEN COMPLETED AND VEGETATION ESTABLISHED FOR BOTH PHASES, PERFORM FINAL CLEAN-UP AND REMOVE PROJECT SIGNS.

NOTES:

1. THE SEASONAL WINDOW FOR ALLOWING ROADWAY REHABILITATION OPERATIONS IS FROM APRIL 1 TO AUGUST 31. AT THE END OF EACH SEASON THE ENGINEER WILL MAKE A DETERMINATION AS TO WHETHER ROADWAY REHAB OPERATIONS WILL BE ALLOWED TO CONTINUE BEYOND AUGUST 31, FOR HOW LONG, AND AT WHAT POINT OPERATIONS AND TIME CHARGES WILL BE SUSPENDED UNTIL THE FOLLOWING SEASON.
2. IMMEDIATELY AFTER CENTERLINE PAVEMENT MARKINGS ARE OBLITERATED DUE TO REWORKING BASE, PLACE APPROVED CHANNELIZING DEVICES AT 100 FT SPACING ON BOTH SIDES OF THE ROADWAY UNTIL THE CENTERLINE PAVEMENT MARKINGS ARE IN PLACE.
3. SALVAGED (WINDROWED) MATERIAL MAY BE MOVED MULTIPLE TIMES BUT ONLY PAID ONCE IN ITS FINAL POSITION.

* BEGIN PHASE 2 ONCE MILESTONE 1 HAS BEEN SUBSTANTIALLY COMPLETE AND FM 2658 HAS REOPENED TO THRU TRAFFIC.

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

CONSTRUCTION SEQUENCE

SHEET 1 OF 1

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		18
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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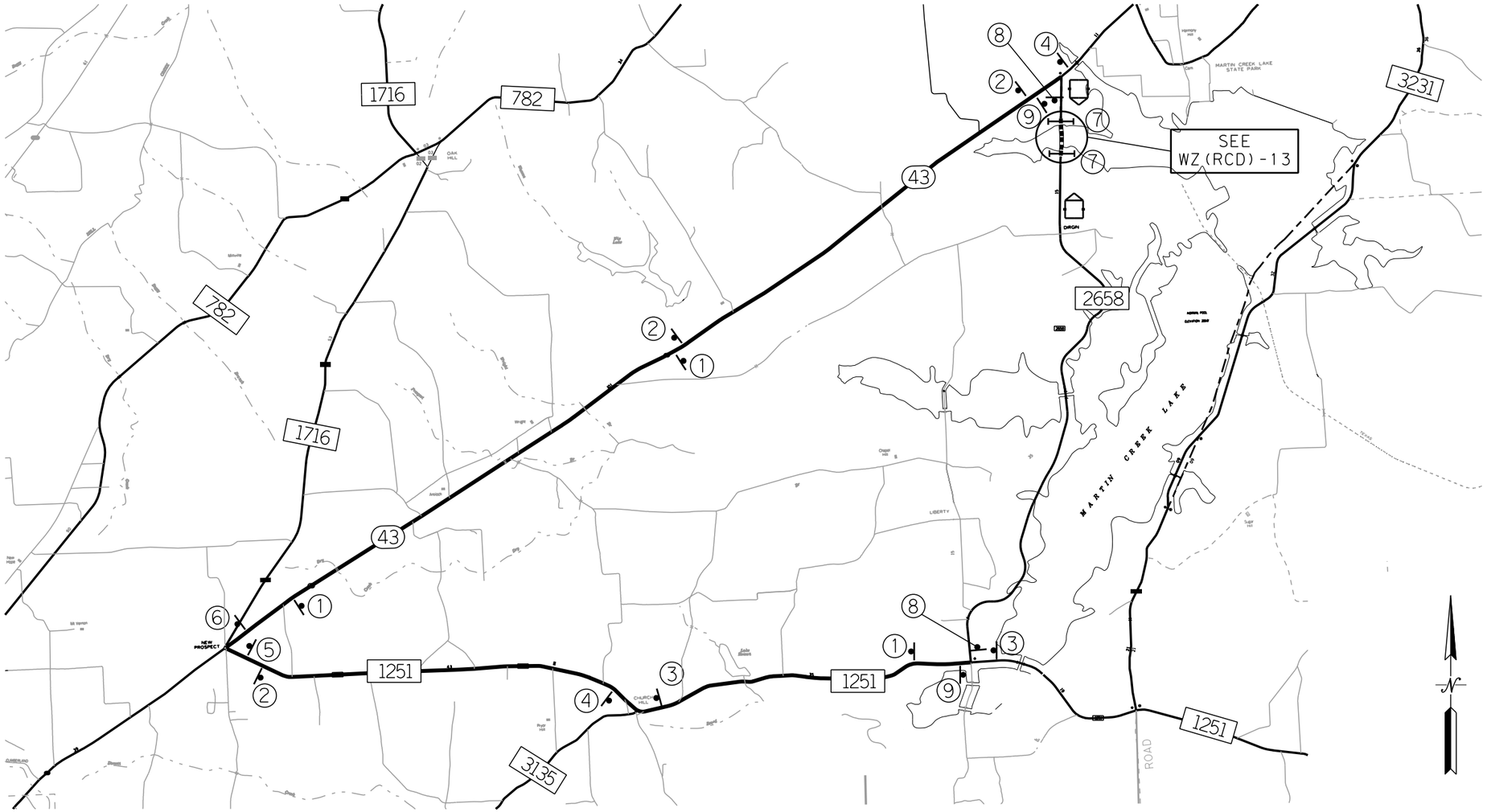

LEGEND

- PHASE 1 WORK LIMITS
- CONSTRUCTION SIGN
- TYPE 3 BARRICADE
- PCMS

NOTES:

1. THIS DETOUR IS FOR CLOSING FM 2658 DURING BRIDGE AND ROADWAY CONSTRUCTION AT PANTHER CREEK. INSTALLATION AND REMOVAL SHALL BE AS PER THE ENGINEER'S DISCRETION.
2. LOCATIONS OF ROAD CLOSURE MUST BE APPROVED. ACCESS MUST BE PROVIDED TO ALL PROPERTIES LOCATED WITHIN THE ROAD CLOSURE UNLESS OTHERWISE DIRECTED. TEMPORARY CONSTRUCTION NEEDED FOR THESE ACCESSES MUST BE APPROVED. COST FOR ANY OF THESE TEMPORARY ACCESSES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
3. SIGN LOCATIONS AND SPACINGS SHALL BE PER TXDOT'S BC STANDARDS, TMUTCD, OR AS DIRECTED.
4. EXISTING SIGNS AT INTERSECTIONS AND OTHER SIGNS IN CONFLICT WITH THESE SIGNS SHALL BE COVERED AS DIRECTED.
5. TEMPORARY SIGNS SHALL BE GROUND MOUNTED (NOT ON SKIDS).

① DETOUR M4-8 / NORTH M3-1 / 2658 TEXAS M1-6T

② DETOUR M4-8 / SOUTH M3-3 / 2658 TEXAS M1-6T

③ DETOUR M4-9S / NORTH M3-1 / 2658 TEXAS M1-6T

④ DETOUR M4-9S / SOUTH M3-3 / 2658 TEXAS M1-6T

⑤ DETOUR M4-9R / NORTH M3-1 / 2658 TEXAS M1-6T

⑥ DETOUR M4-9L / SOUTH M3-3 / 2658 TEXAS M1-6T

⑦ ROAD CLOSED R11-2

⑧ ROAD CLOSED AHEAD CW20-3D

⑨ END DETOUR M4-8A

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

TRAFFIC CONTROL PLAN DETOUR LAYOUT

PHASE 1 (CSJ: 2653-01-016)

SHEET 1 OF 2

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LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		19
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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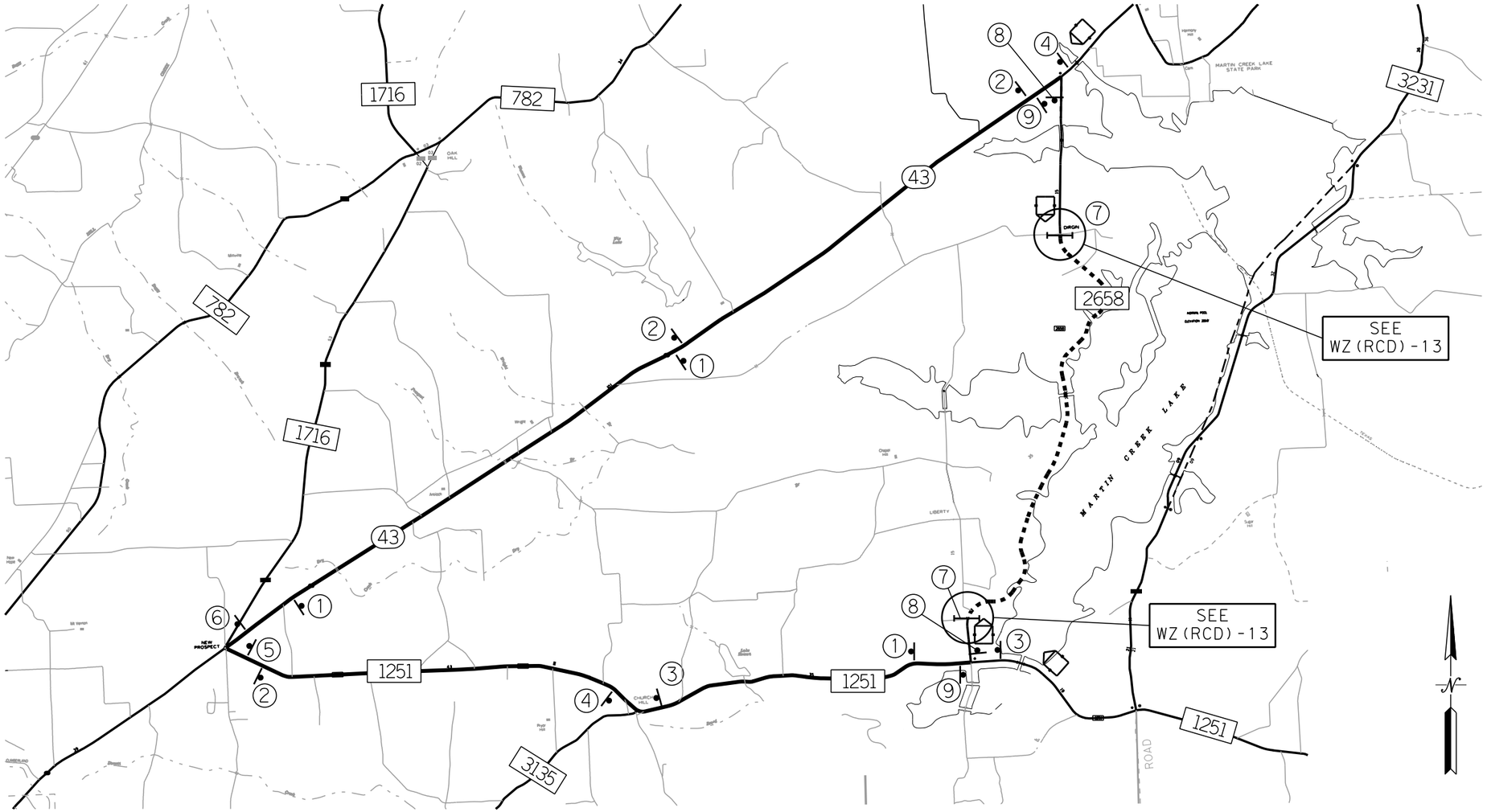

LEGEND

- PHASE 2 WORK LIMITS
- CONSTRUCTION SIGN
- TYPE 3 BARRICADE
- PCMS

NOTES:

1. THIS DETOUR IS FOR CLOSING FM 2658 DURING ROADWAY RESTORATION WORK FROM CR 2144 TO CR 399D. INSTALLATION AND REMOVAL SHALL BE AS PER THE ENGINEER'S DISCRETION.
2. LOCATIONS OF ROAD CLOSURE MUST BE APPROVED. ACCESS MUST BE PROVIDED TO ALL PROPERTIES LOCATED WITHIN THE ROAD CLOSURE UNLESS OTHERWISE DIRECTED. TEMPORARY CONSTRUCTION NEEDED FOR THESE ACCESSES MUST BE APPROVED. COST FOR ANY OF THESE TEMPORARY ACCESSES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
3. SIGN LOCATIONS AND SPACINGS SHALL BE PER TXDOT'S BC STANDARDS, TMUTCD, OR AS DIRECTED.
4. EXISTING SIGNS AT INTERSECTIONS AND OTHER SIGNS IN CONFLICT WITH THESE SIGNS SHALL BE COVERED AS DIRECTED.
5. TEMPORARY SIGNS SHALL BE GROUND MOUNTED (NOT ON SKIDS).

① DETOUR M4-8 / NORTH M3-1 / 2658 TEXAS M1-6T

② DETOUR M4-8 / SOUTH M3-3 / 2658 TEXAS M1-6T

③ DETOUR M4-9S / NORTH M3-1 / 2658 TEXAS M1-6T

④ DETOUR M4-9S / SOUTH M3-3 / 2658 TEXAS M1-6T

⑤ DETOUR M4-9R / NORTH M3-1 / 2658 TEXAS M1-6T

⑥ DETOUR M4-9L / SOUTH M3-3 / 2658 TEXAS M1-6T

⑦ ROAD CLOSED R11-2

⑧ ROAD CLOSED AHEAD CW20-3D

⑨ END DETOUR M4-8A

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

TRAFFIC CONTROL PLAN DETOUR LAYOUT

PHASE 2 (CSJ: 2653-01-017)

SHEET 2 OF 2

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		20
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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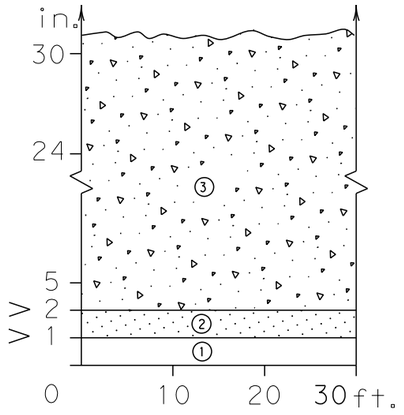
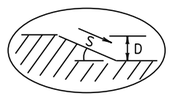
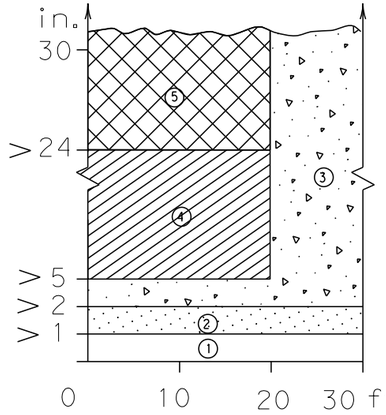
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

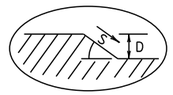


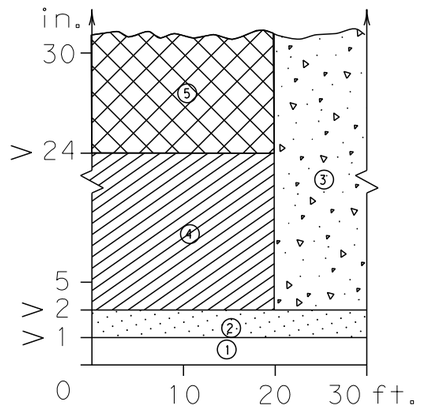
Edge Condition I
S = (3:1) (or flatter)



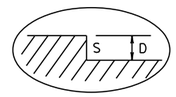


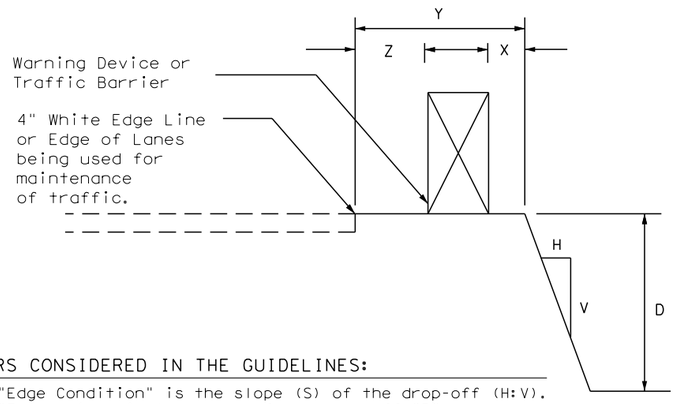
Edge Condition II
S = ((2.99):1) to (1:1)





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	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive 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:

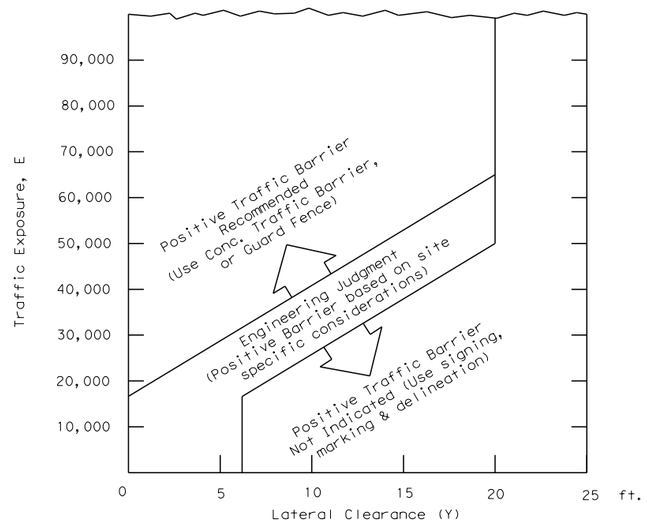
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 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 the clear zone.

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
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Date 05/17/2023

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

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© TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
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03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	TYL	RUSK		21

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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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		22

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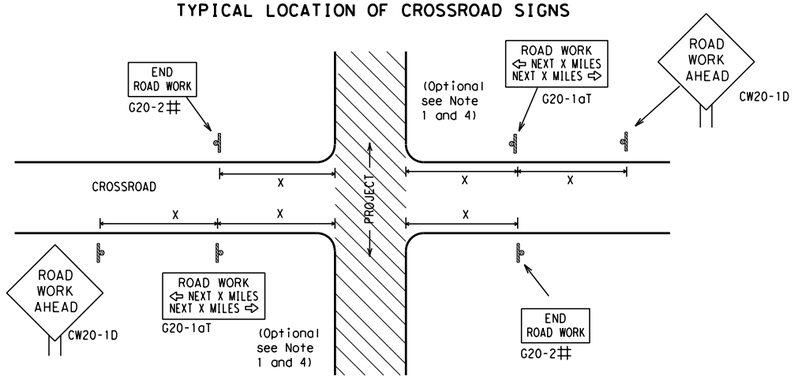
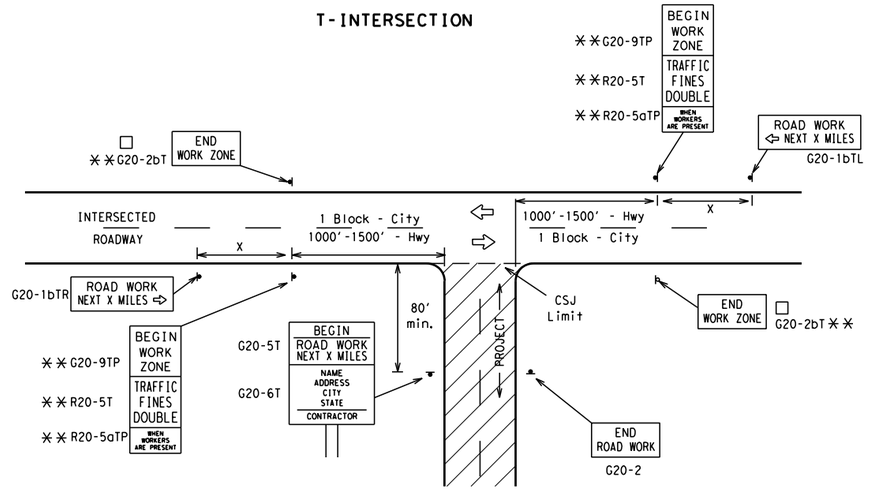
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

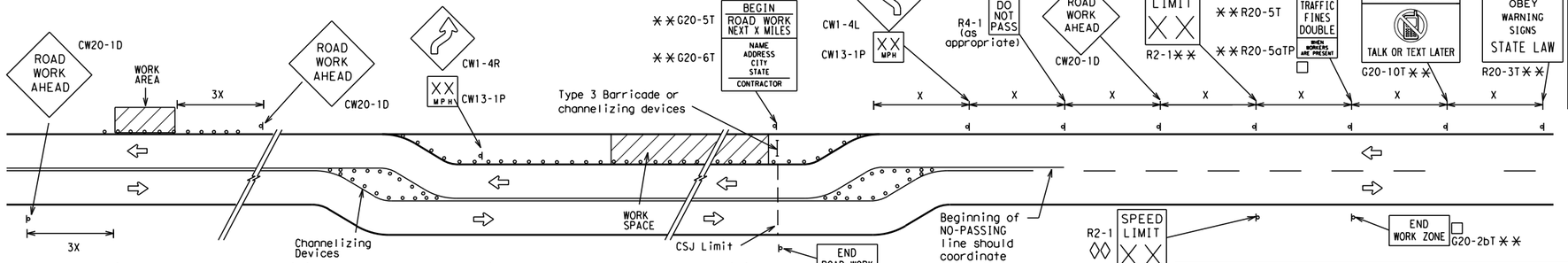
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

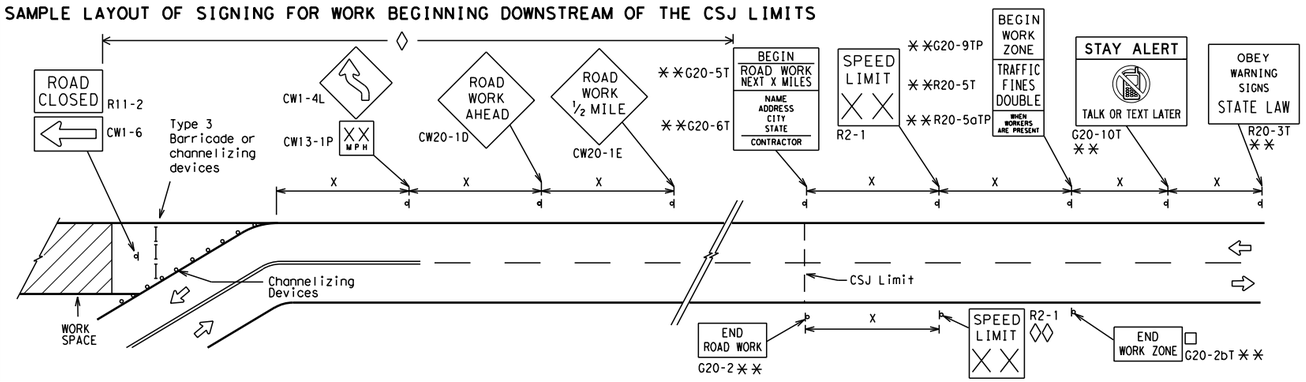
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

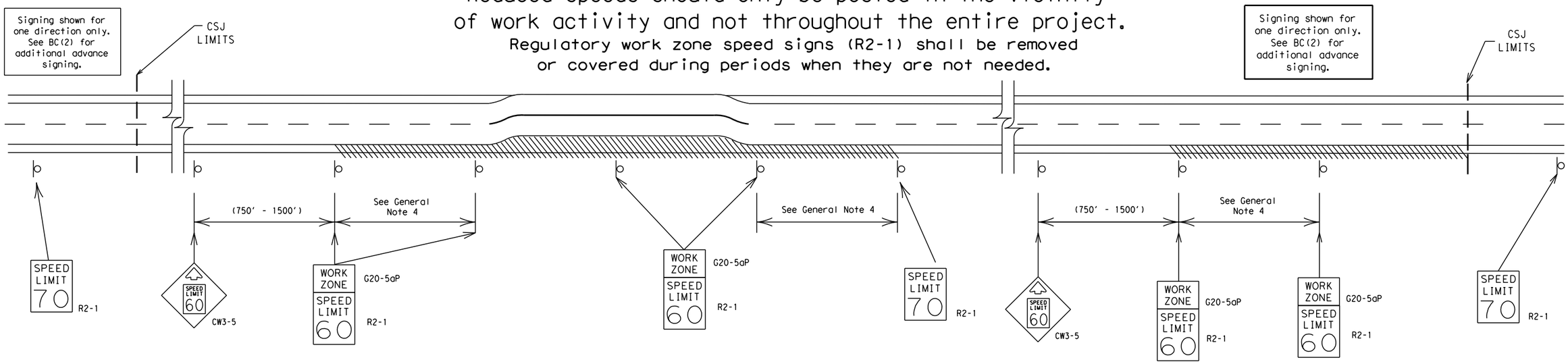
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	RUSK		23

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
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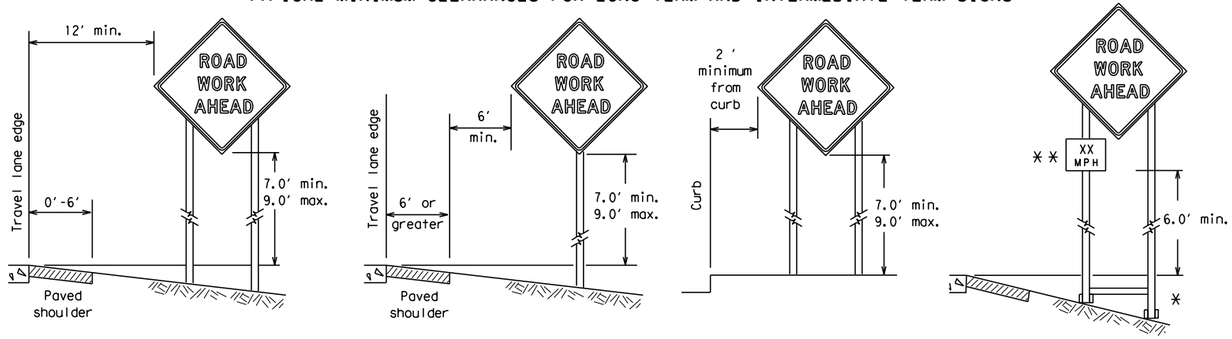
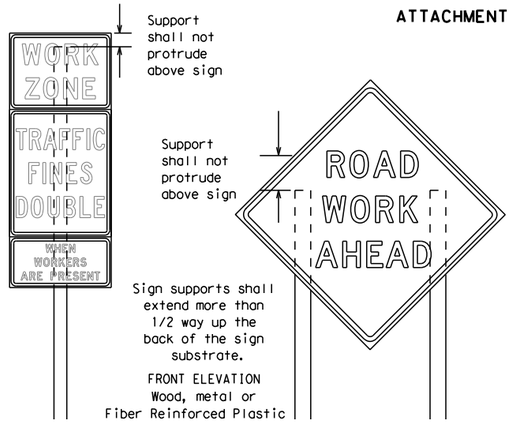
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

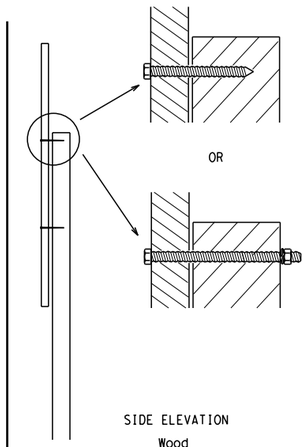


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





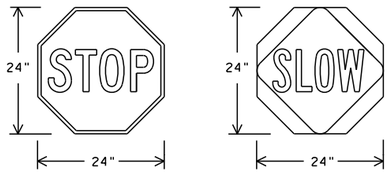
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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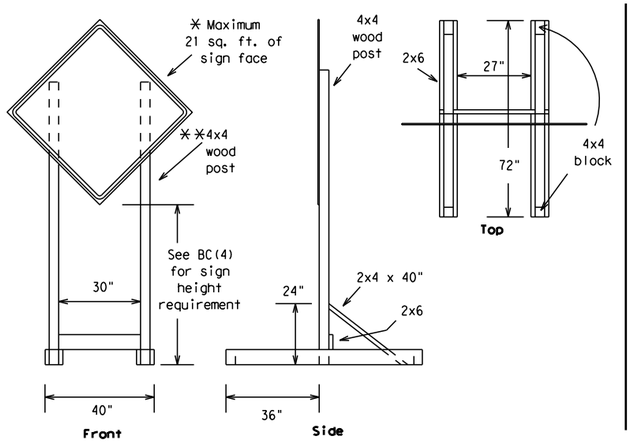
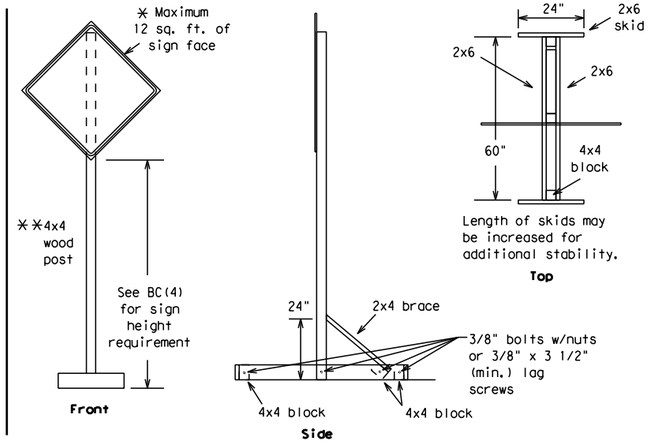
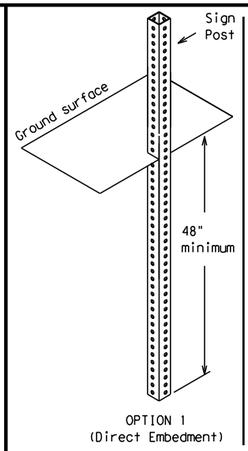
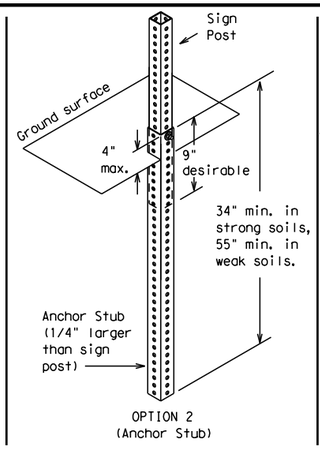


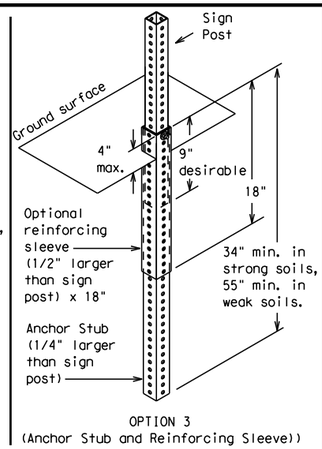


SKID MOUNTED WOOD SIGN SUPPORTS

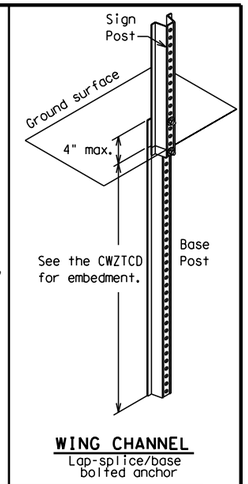
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







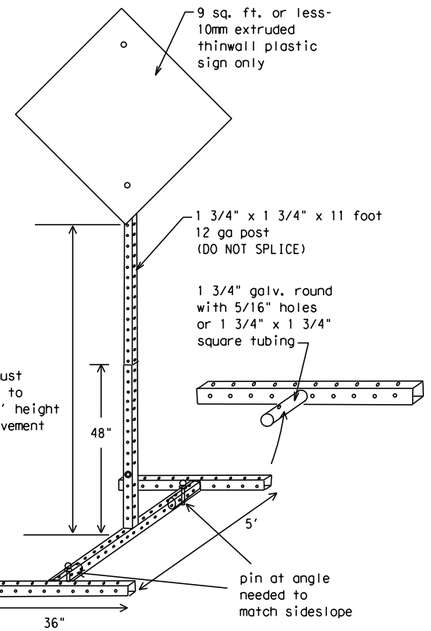
PERFORATED SQUARE METAL TUBING

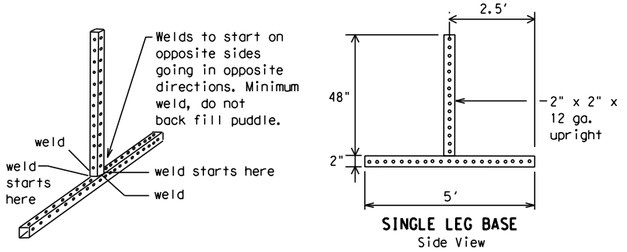


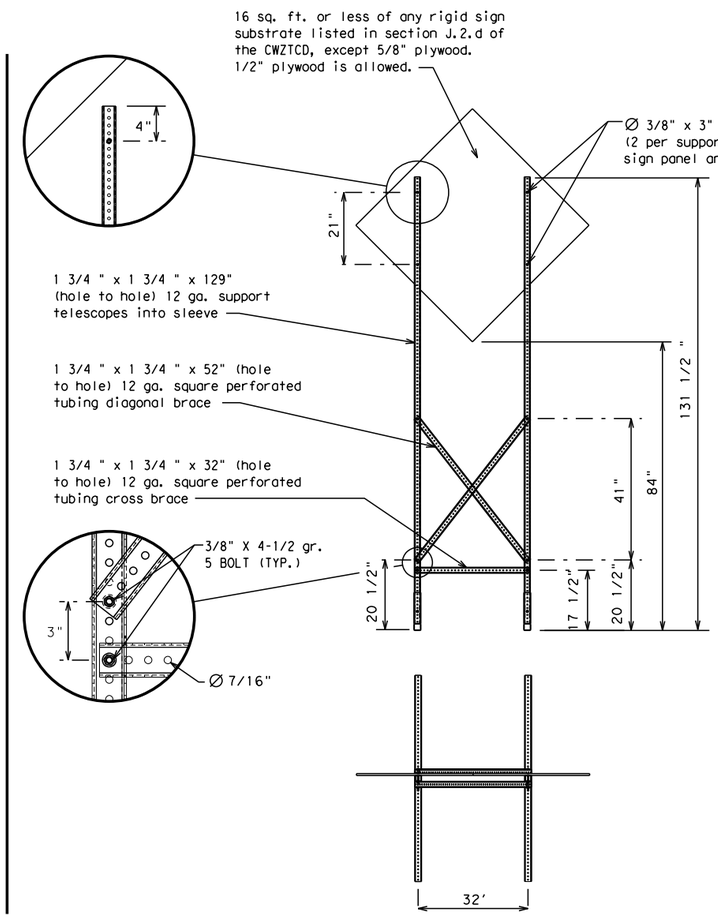
WING CHANNEL
Lap-splice/base bolted anchor

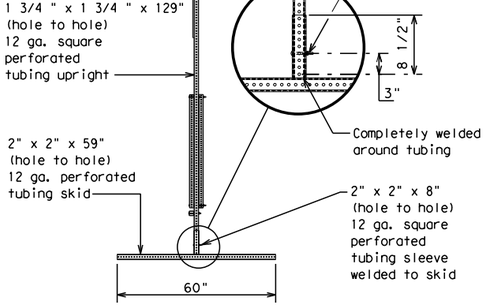
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	RUSK		26

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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

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

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

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

Warning List

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

** Advance Notice List

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

* 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	2653	01	016,ETC	FM 2658
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	RUSK		27

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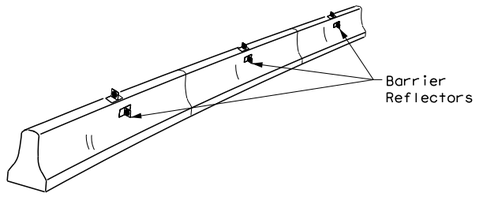
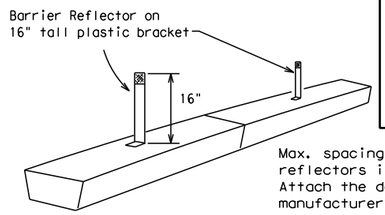
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



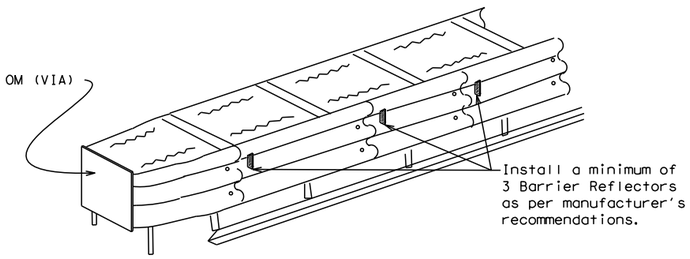
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

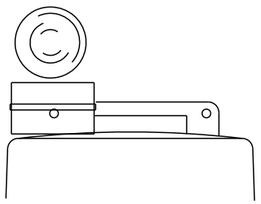
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

END TREATMENTS FOR CTB'S USED IN WORK ZONES

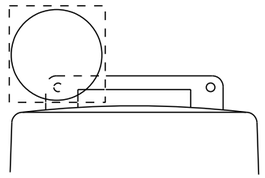
End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS



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



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

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

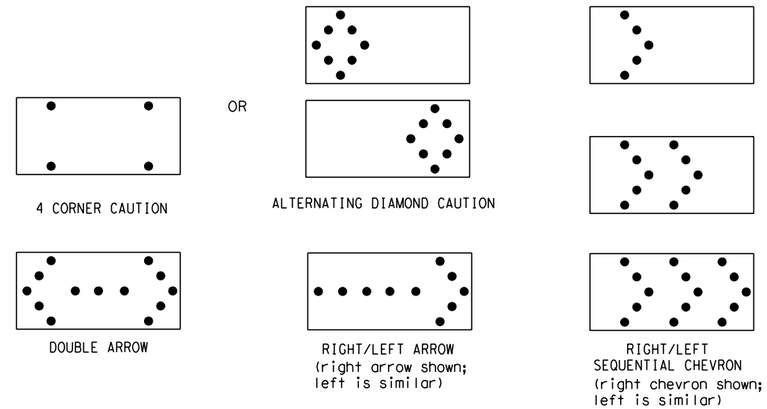
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 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 an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	RUSK		28

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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:

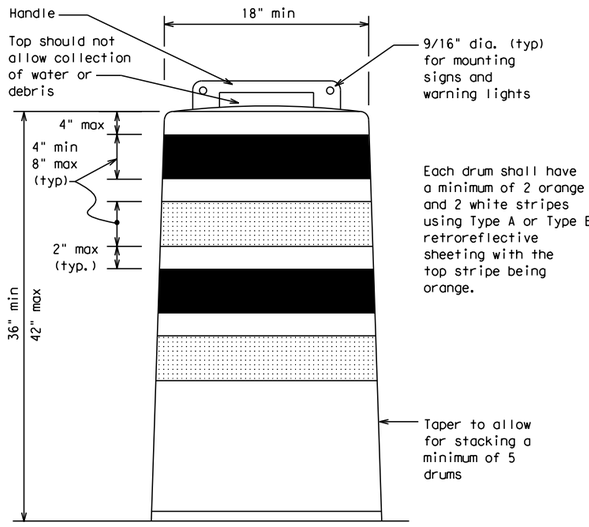
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

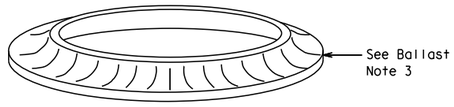
RETROREFLECTIVE SHEETING

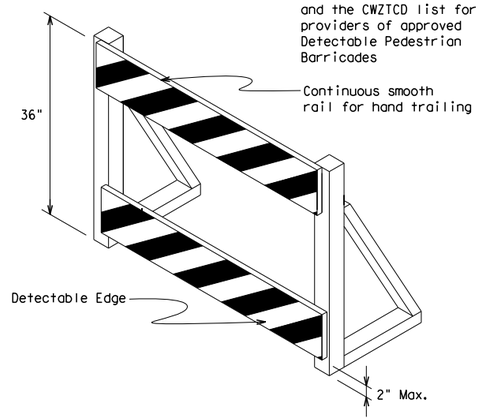
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

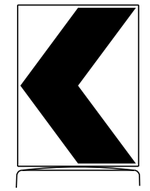




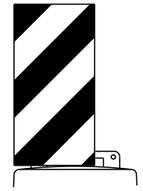


DETECTABLE PEDESTRIAN BARRICADES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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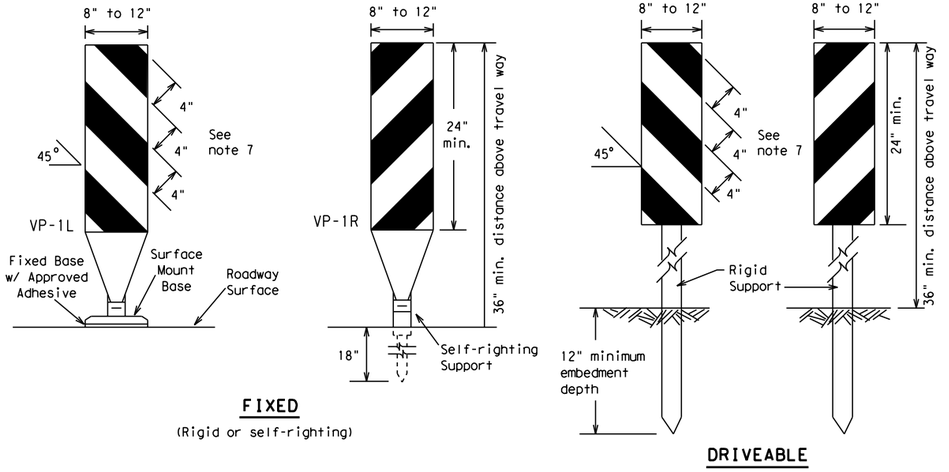
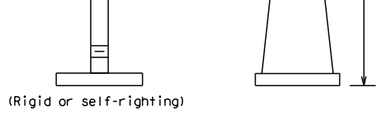


FIXED
(Rigid or self-righting)

DRIVEABLE

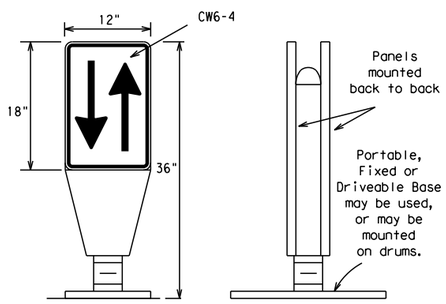


(Rigid or self-righting)

PORTABLE

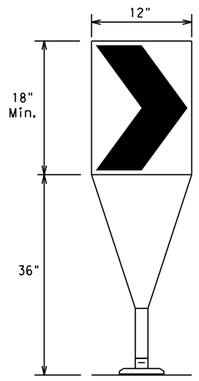
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



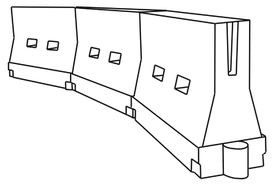
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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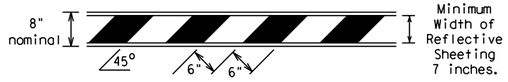
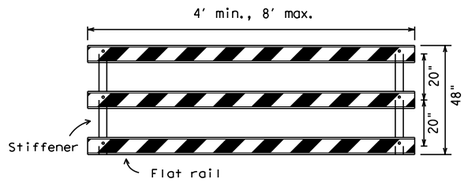
TYPE 3 BARRICADES

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.



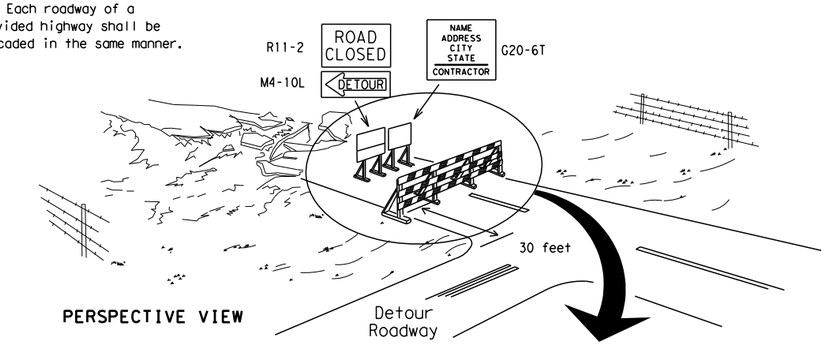
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

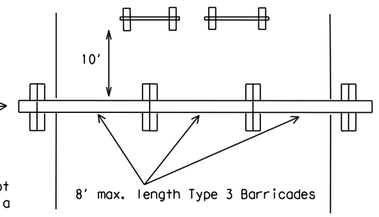
Each roadway of a divided highway shall be barricaded in the same manner.



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.

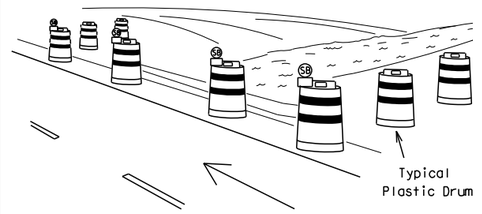
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

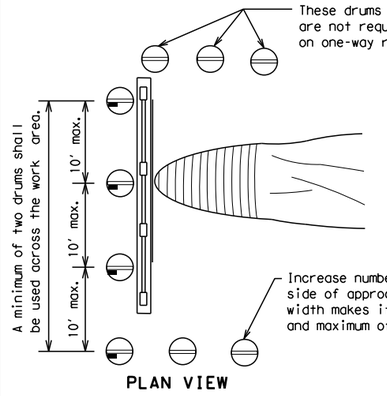
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

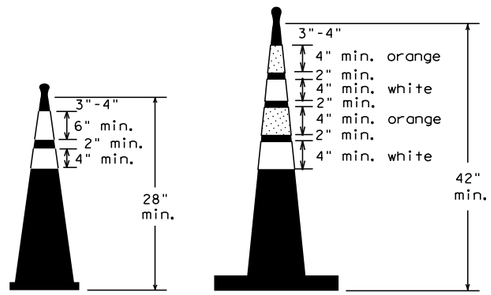
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



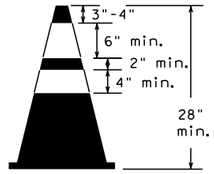
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

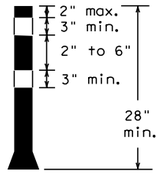
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

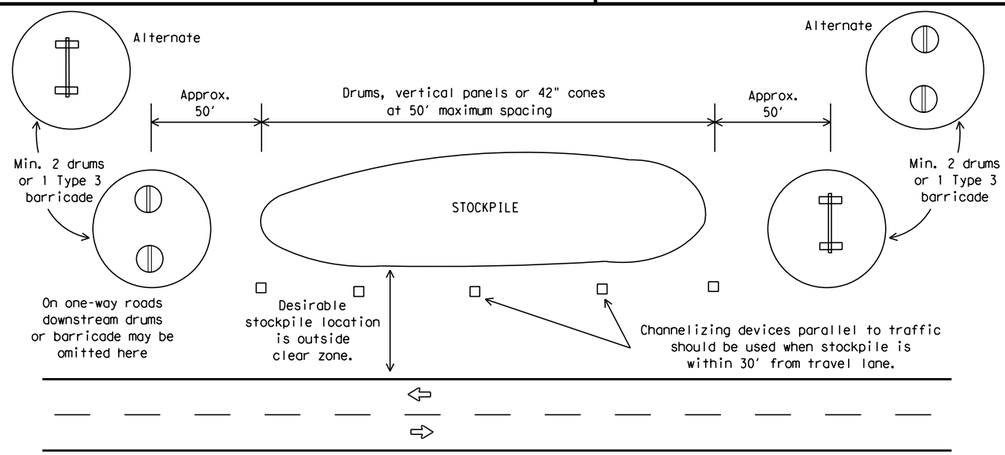


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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.

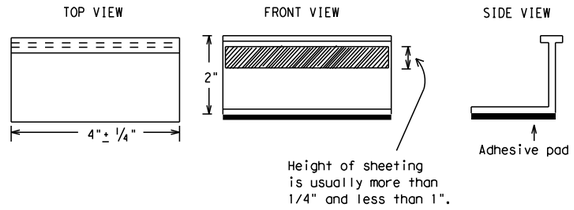
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		32

DATE: 5/16/2023 4:26:29 PM
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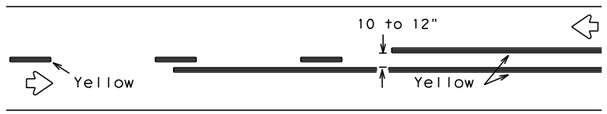
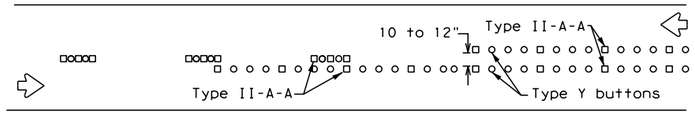
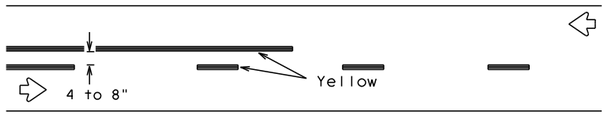
PAVEMENT MARKING PATTERNS



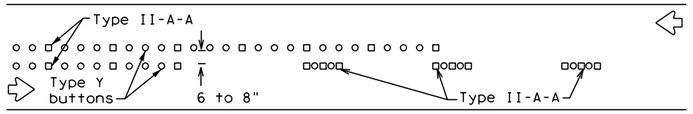
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



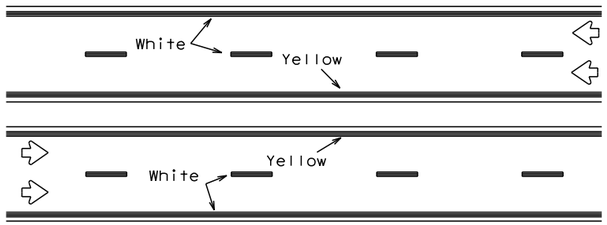
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



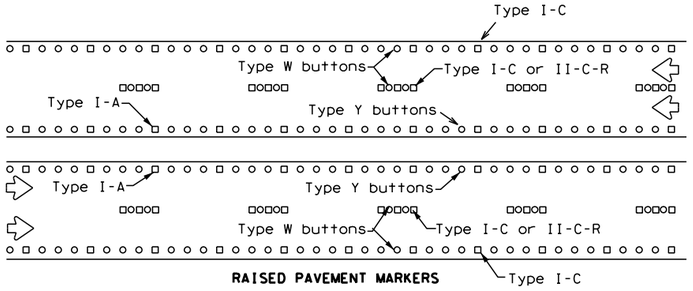
RAISED PAVEMENT MARKERS - PATTERN B

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

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



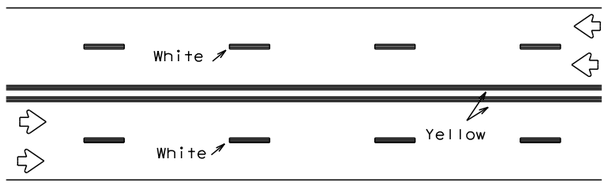
REFLECTORIZED PAVEMENT MARKINGS



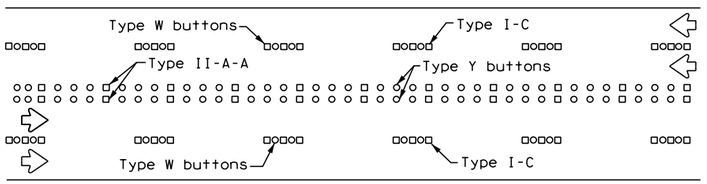
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



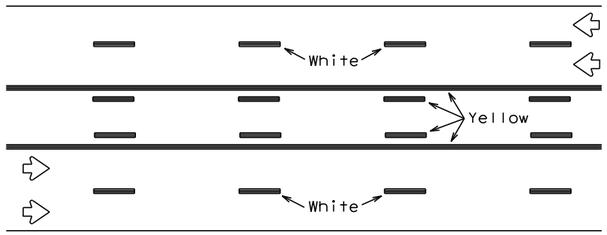
REFLECTORIZED PAVEMENT MARKINGS



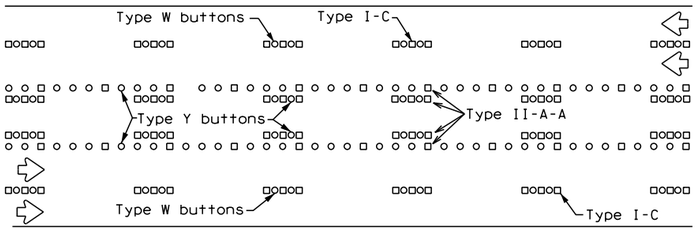
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



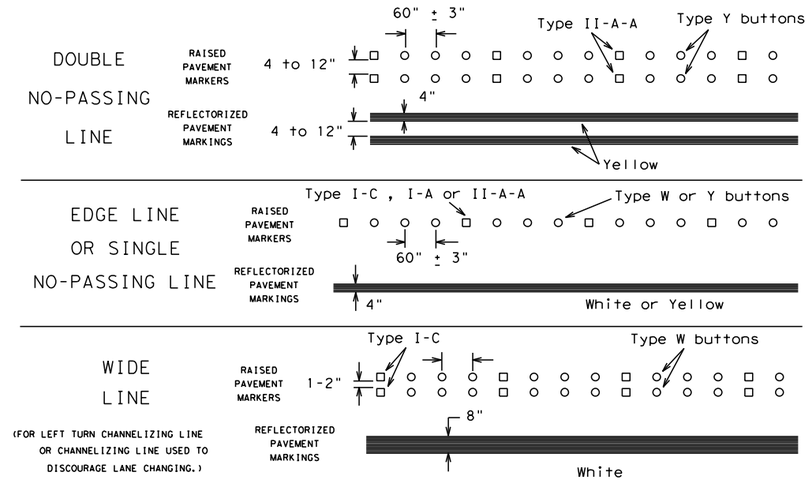
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

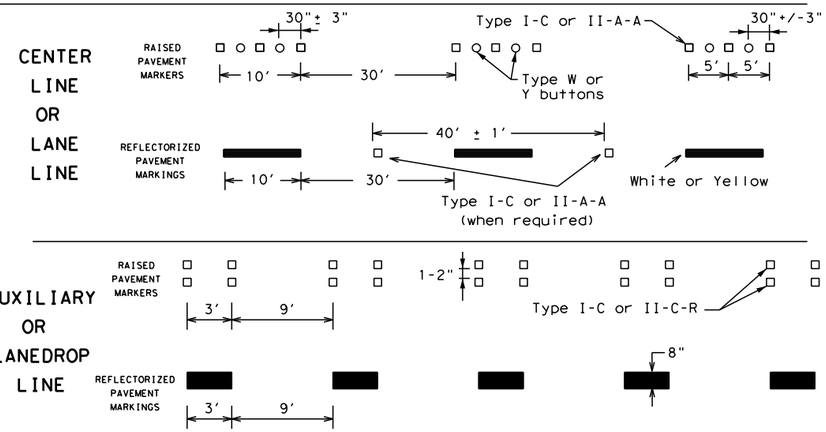
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

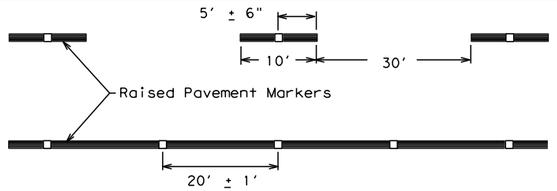


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



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	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
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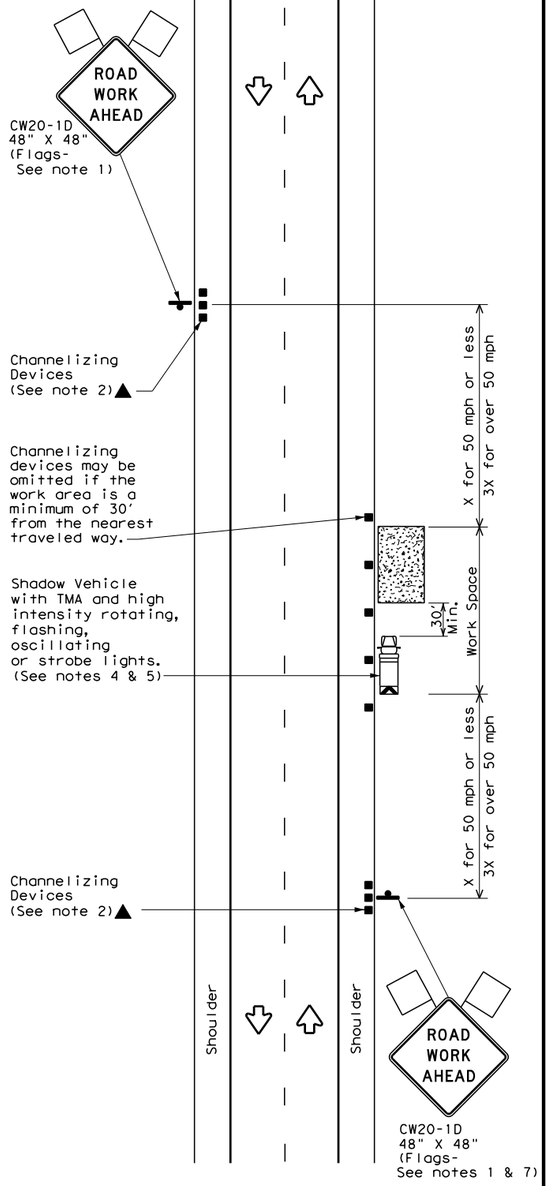
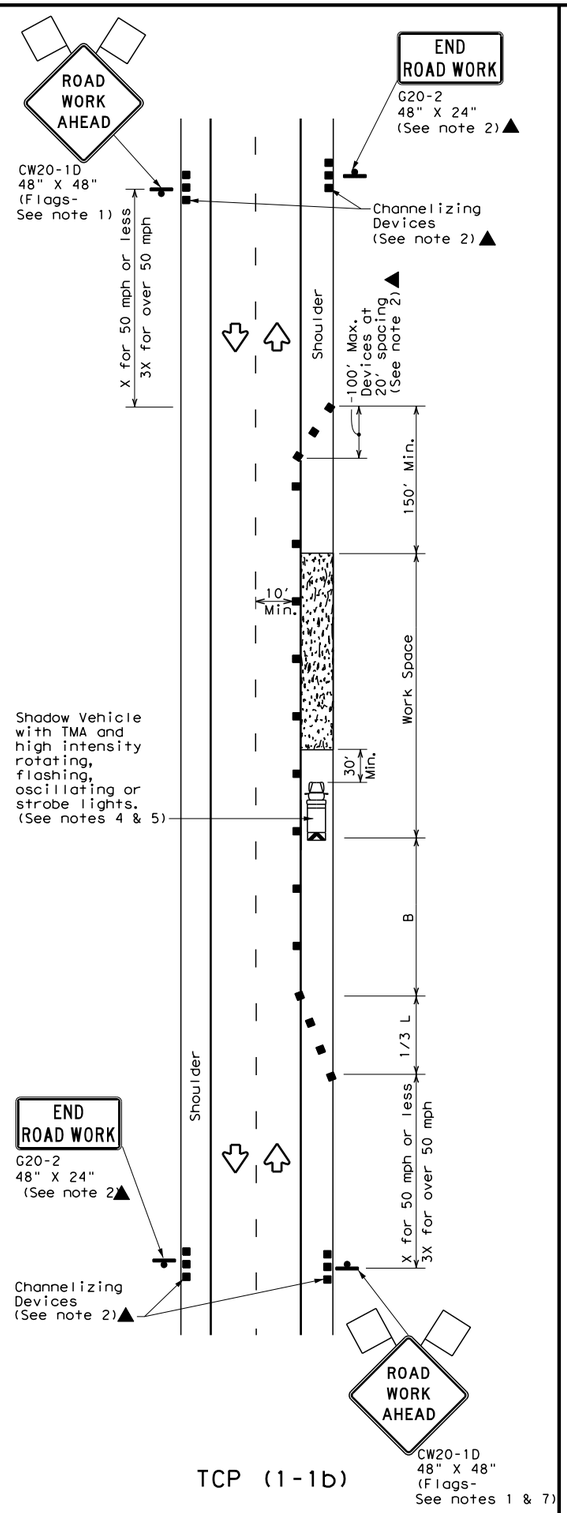


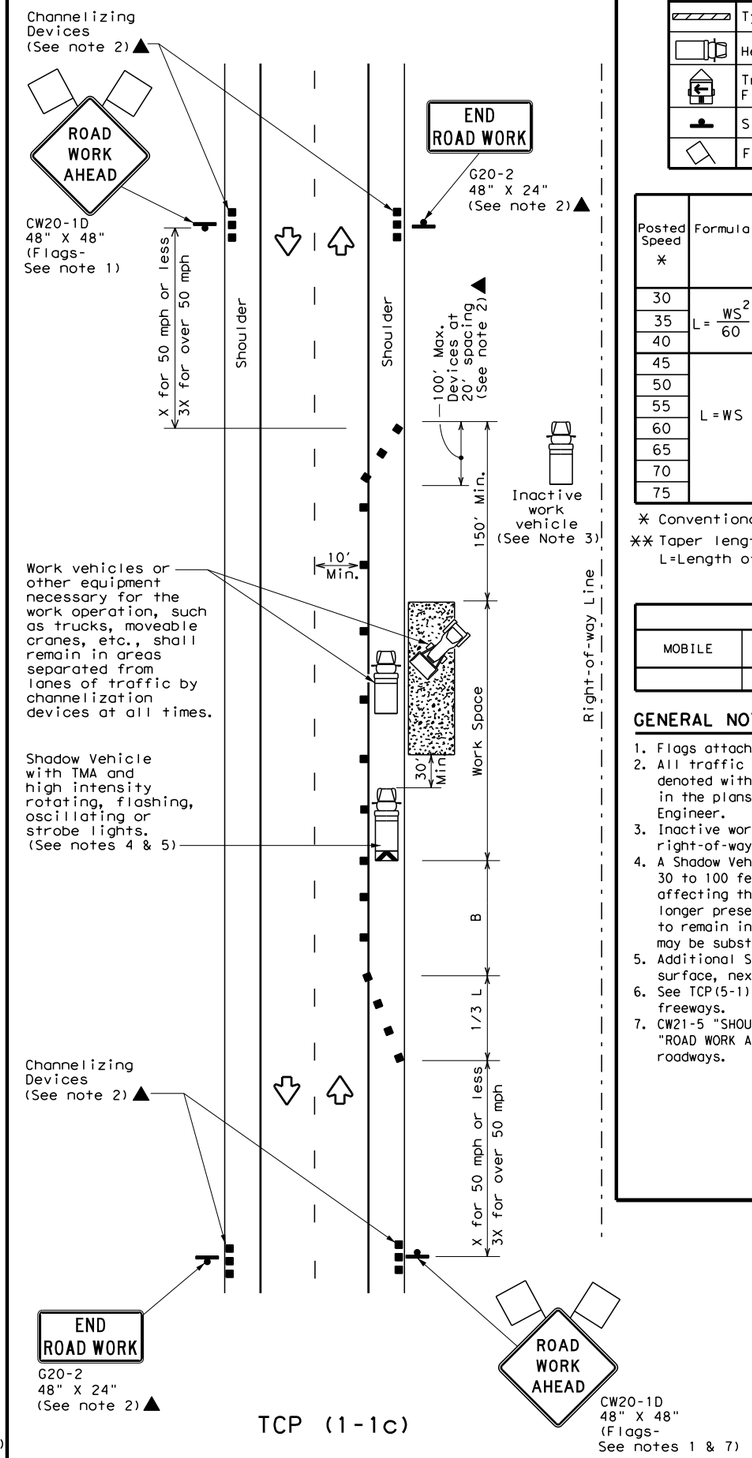
TCP (1-1a)

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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	RUSK		34
1-97 2-18				

151

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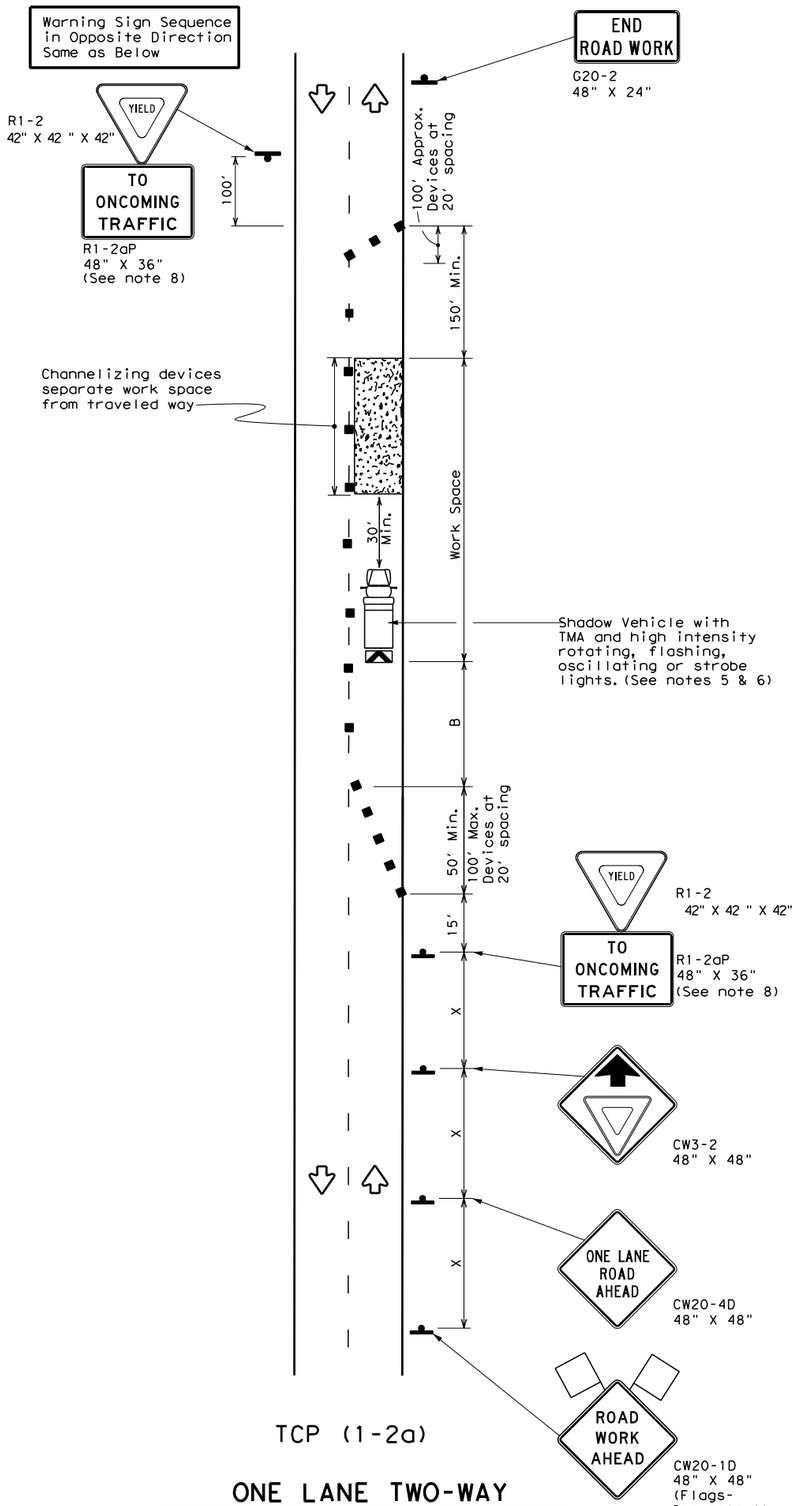
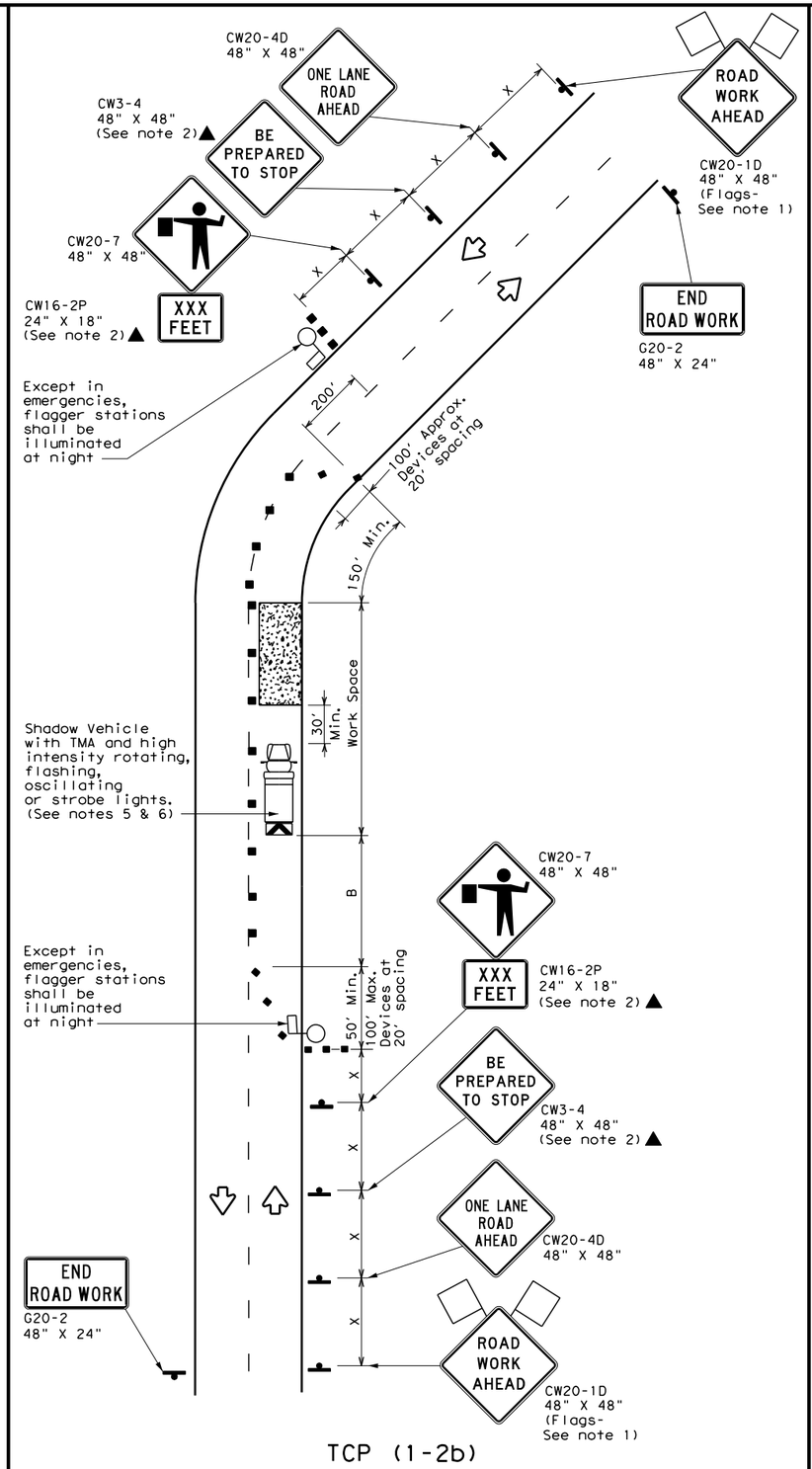


TCP (1-2a)

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
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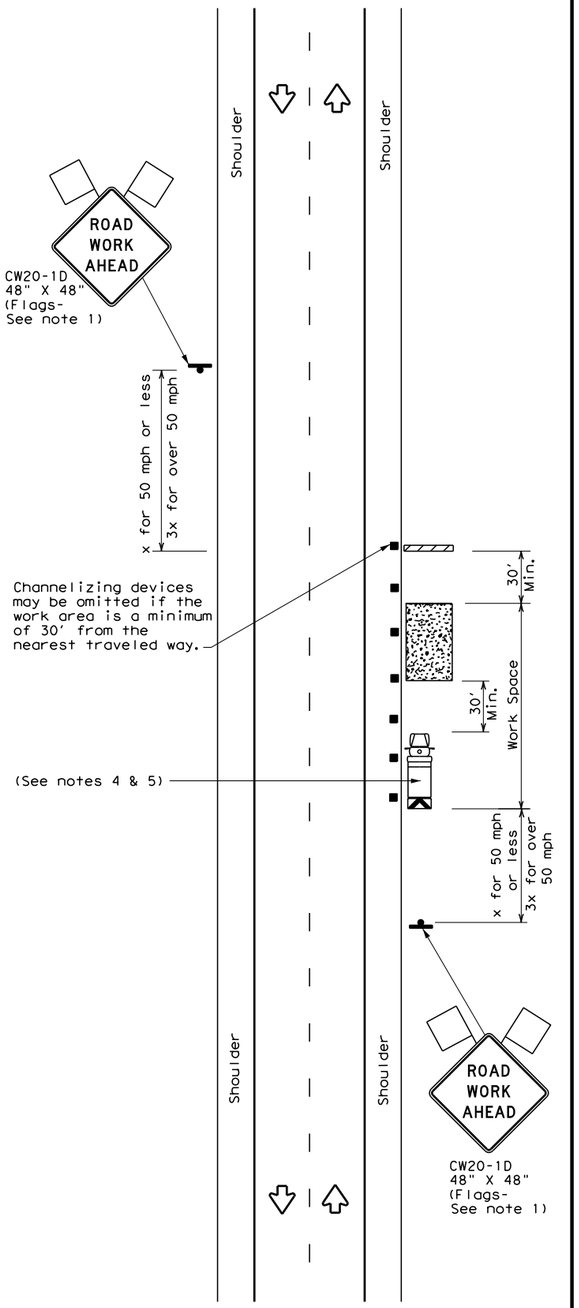
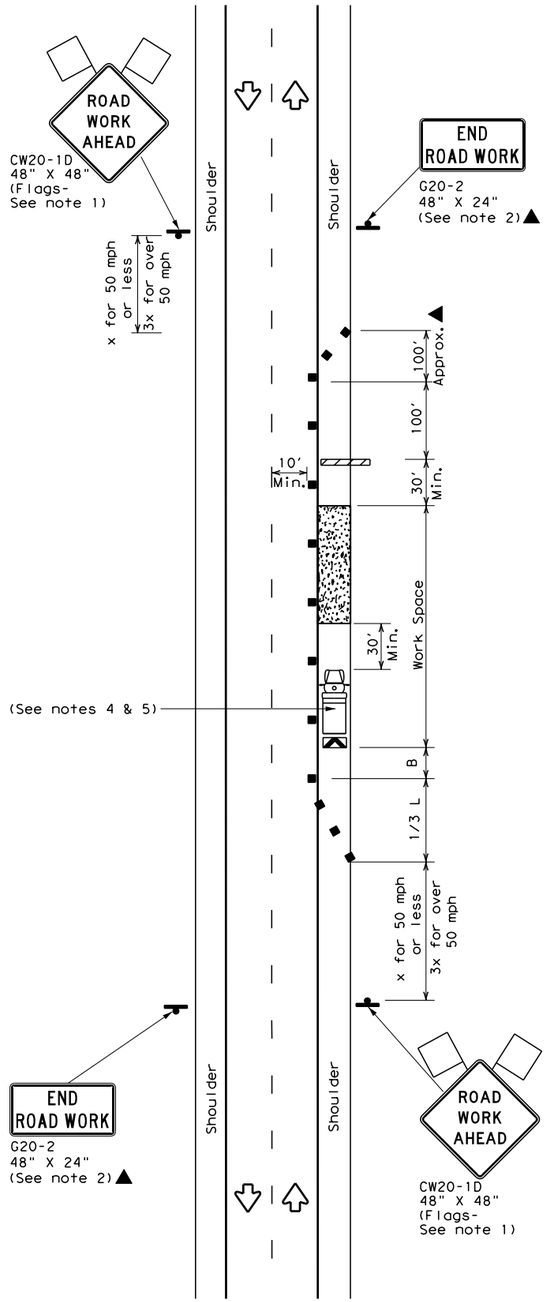


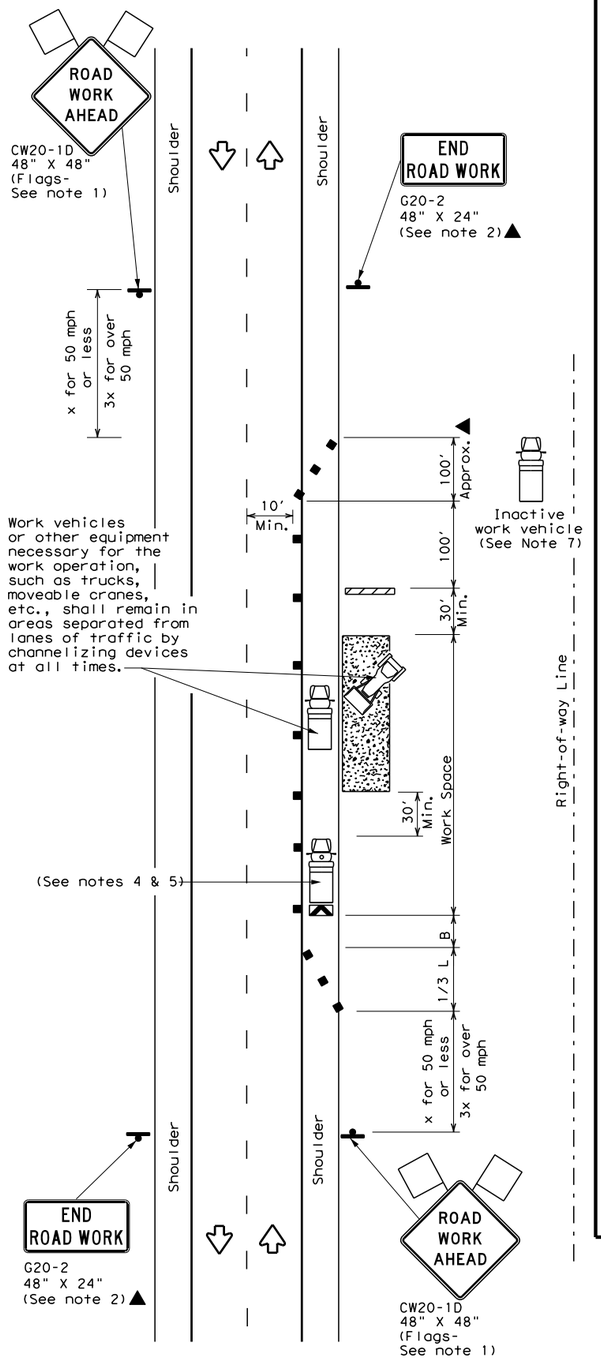
TCP (2-1a)

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
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	RUSK		36
1-97 2-18				

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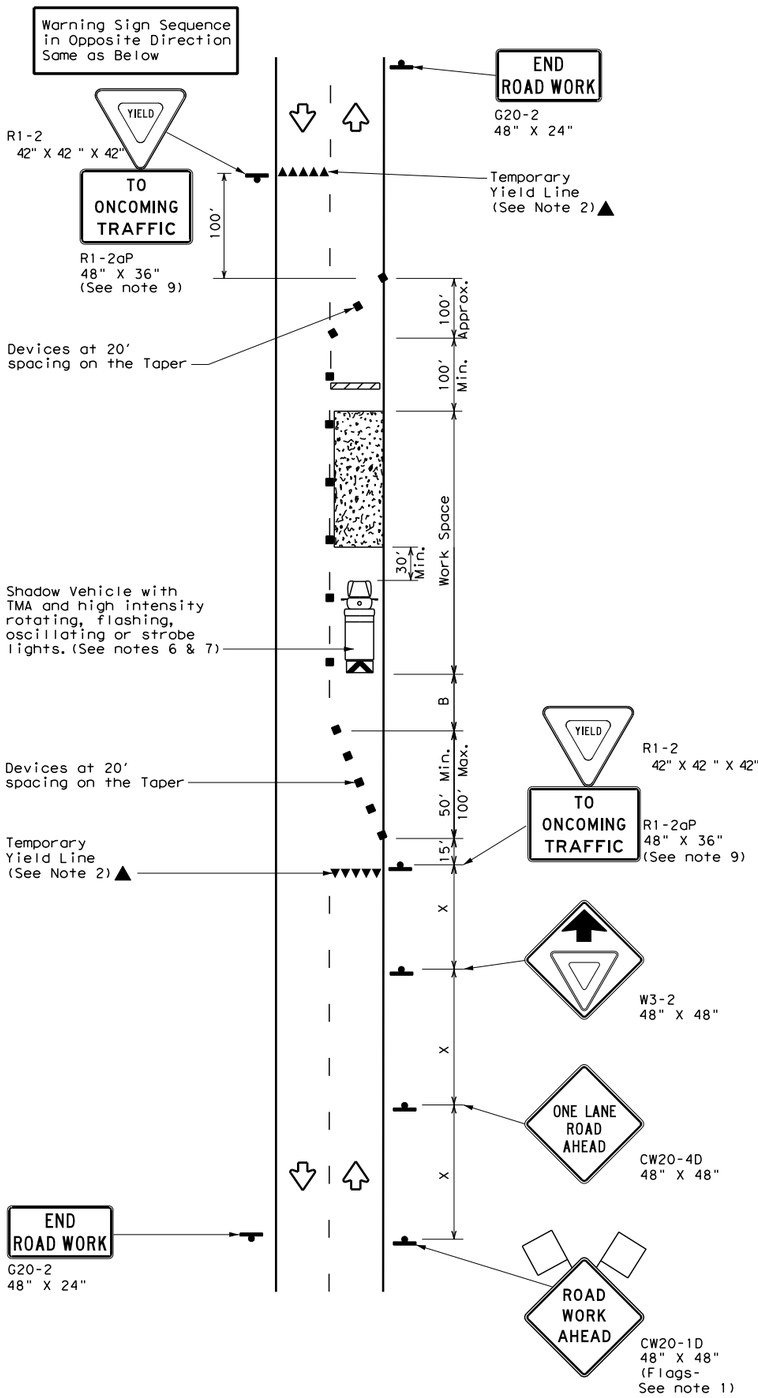
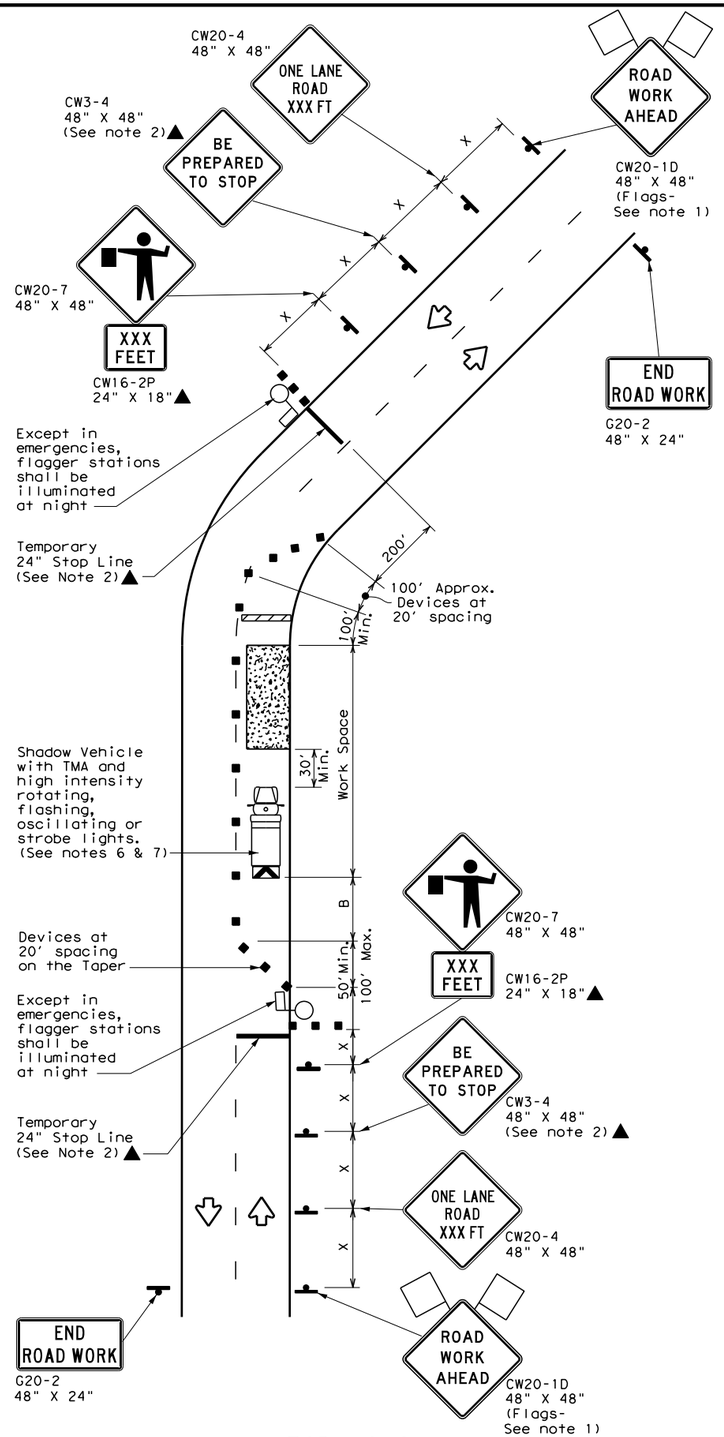


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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 situtations.

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
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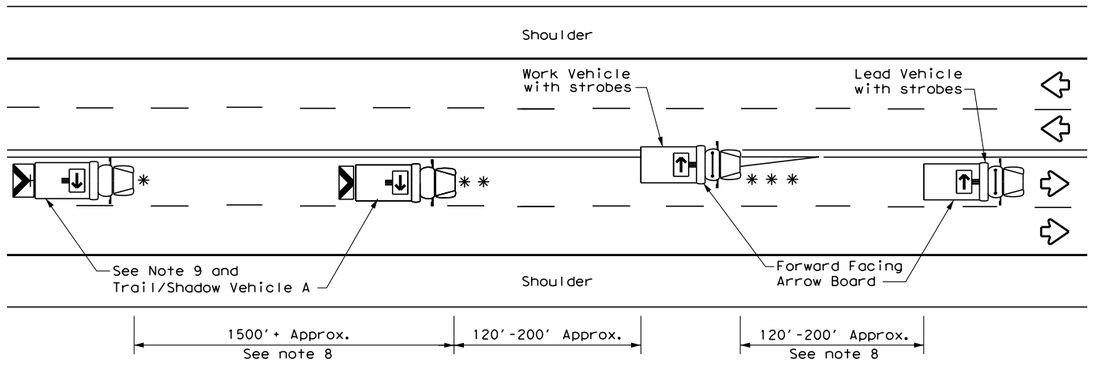
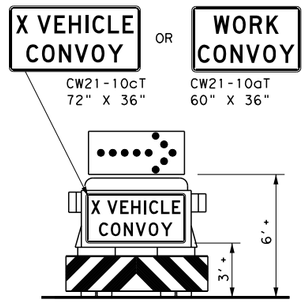


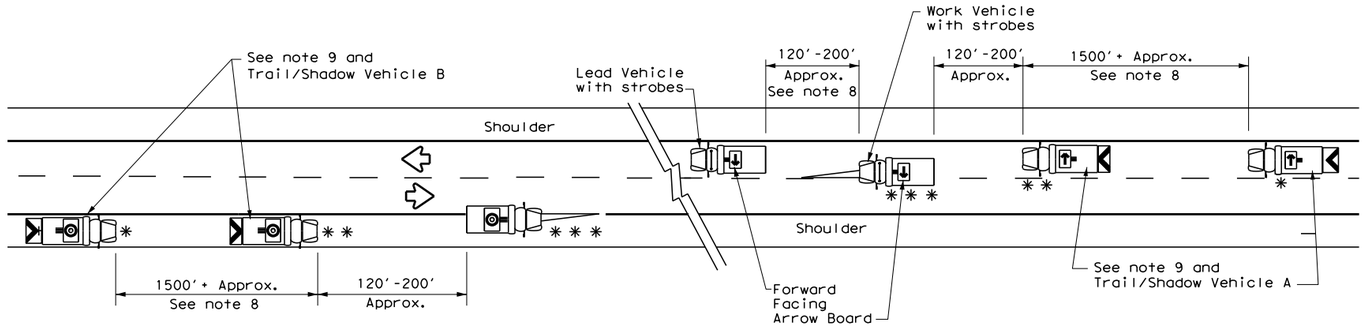
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

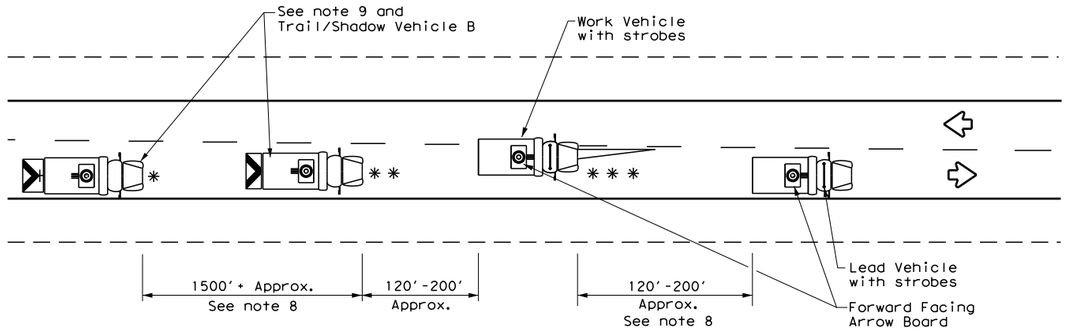


WORK ON SHOULDER

WORK ON TRAVEL LANE

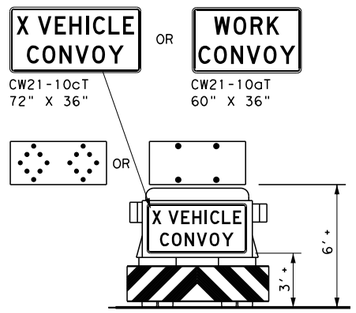
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

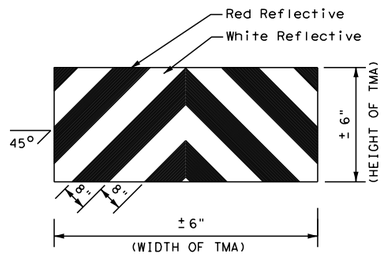
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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8-95 7-13	TYL	RUSK		38
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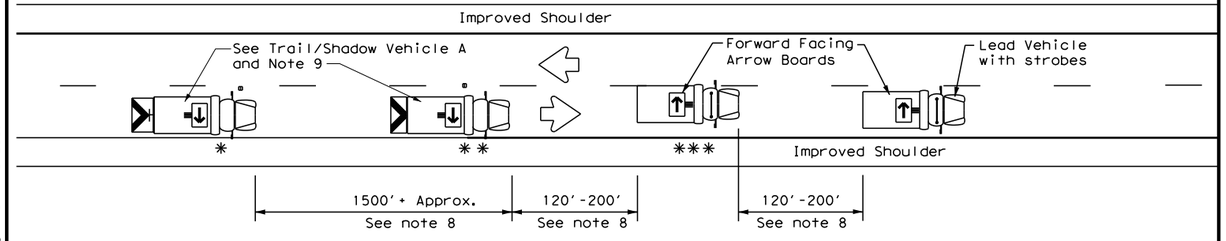
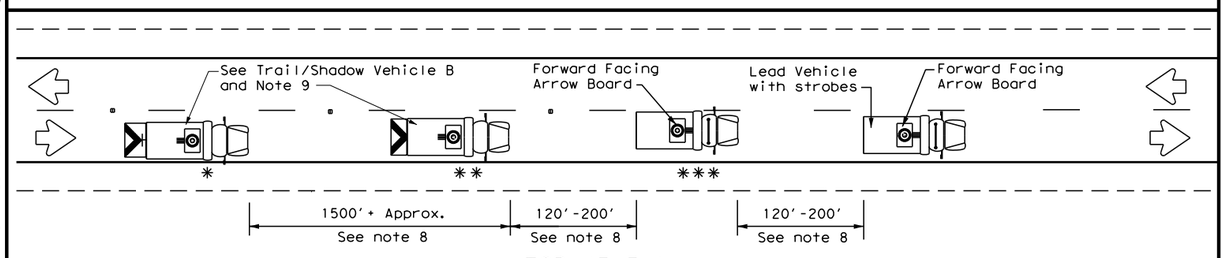


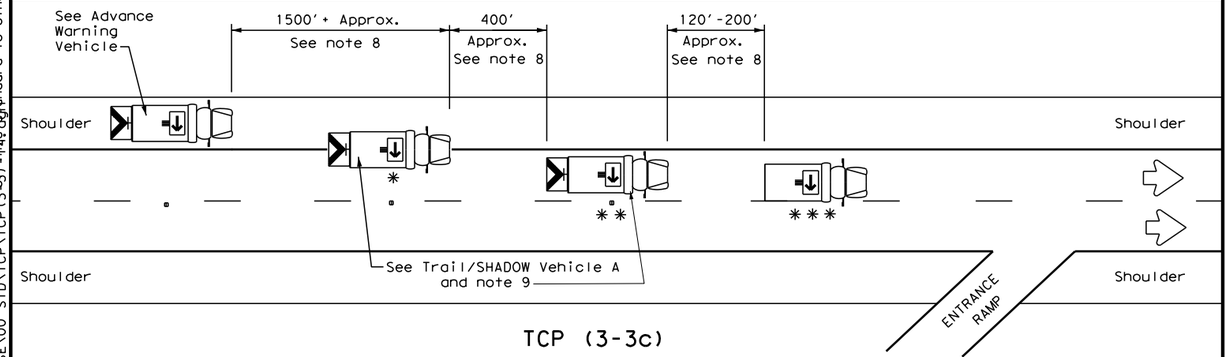
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



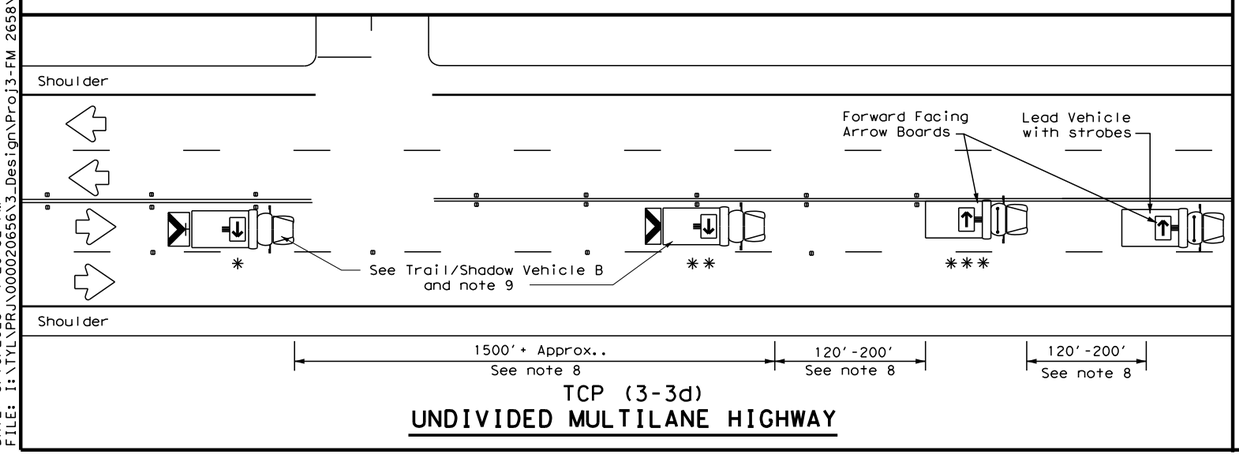
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



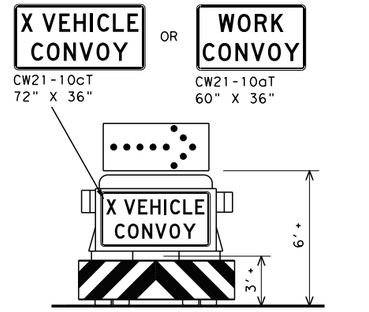
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



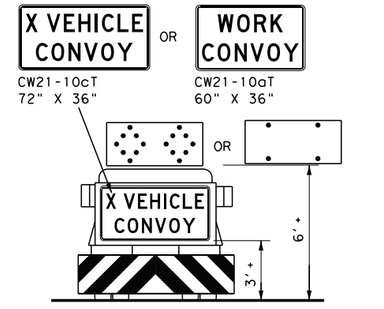
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



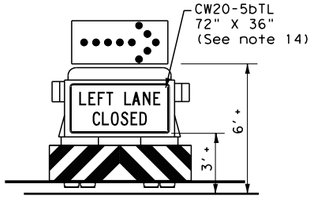
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

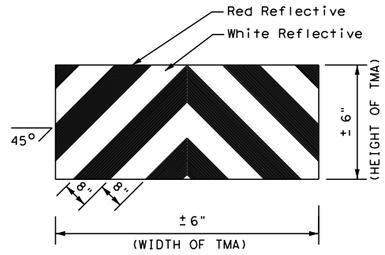


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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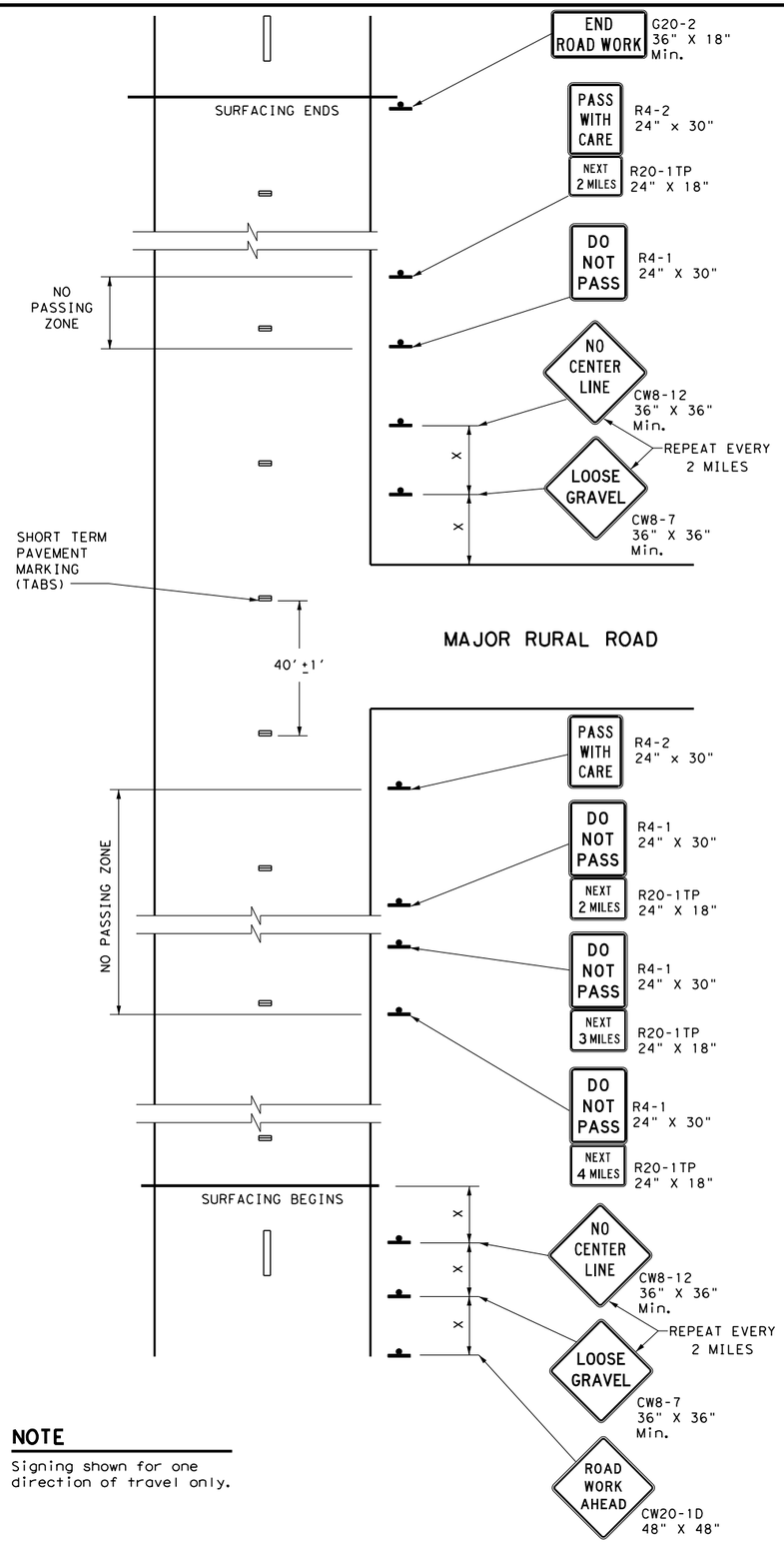
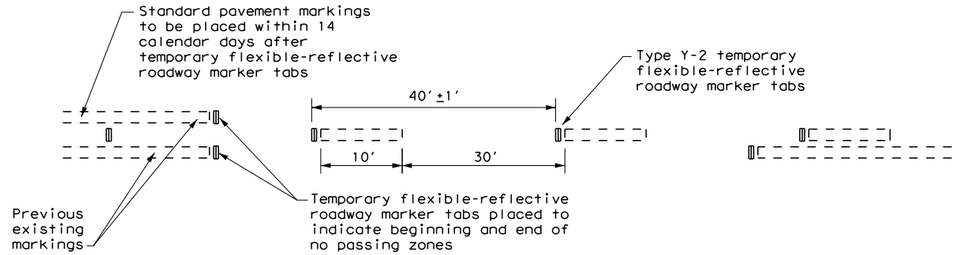


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	TYL	RUSK		40

210

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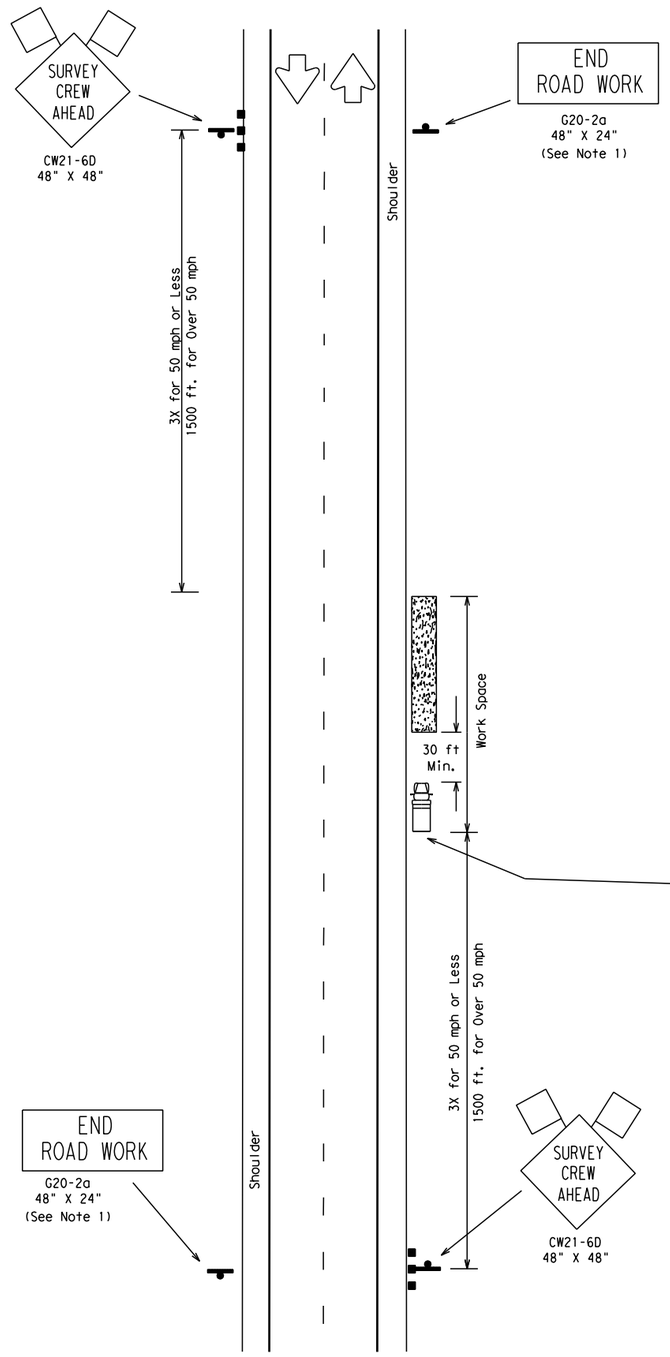
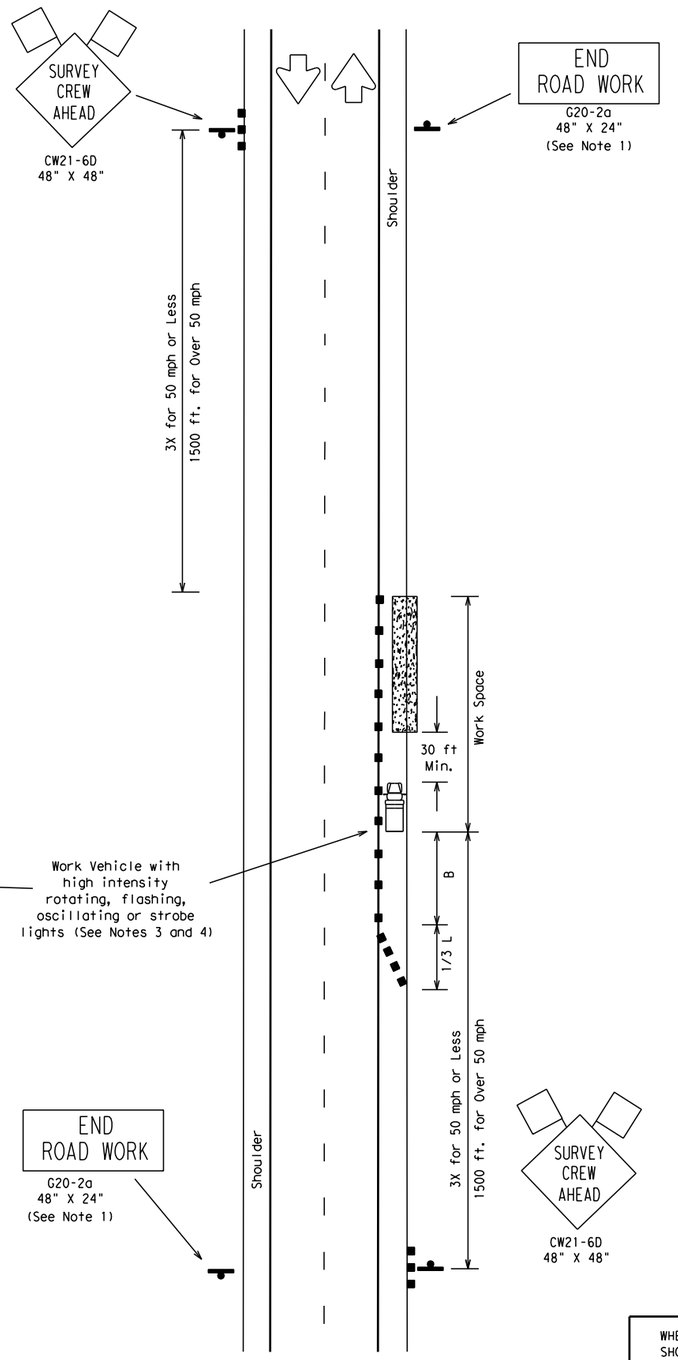


TCP (S-1a)
WORK OFF SHOULDER OR PAVED SURFACE



TCP (S-1b)
WORK ON SHOULDER

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel (M) Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′-75′	120′	90′
35		205′	225′	245′	35′	70′-90′	160′	120′
40		265′	295′	320′	40′	80′-100′	240′	155′
45	L=WS	450′	495′	540′	45′	90′-110′	320′	195′
50		500′	550′	600′	50′	100′-125′	400′	240′
55		550′	605′	660′	55′	110′-140′	500′	295′
60		600′	660′	720′	60′	120′-150′	600′	350′
65		650′	715′	780′	65′	130′-165′	700′	410′
70		700′	770′	840′	70′	140′-175′	800′	475′
75		750′	825′	900′	75′	150′-185′	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Channelizing devices on the shoulder taper and tangent section may be omitted for short duration (less than 1 hour) work.
3. If line-of-sight requirements for surveying operations will preclude the placement of the Work Vehicle to protect workers, the channelizing devices mentioned in Note 2 are required.
4. ⚠ A Shadow Vehicle with a Truck Mounted Attenuator and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
5. The CW20-1D "ROAD WORK AHEAD" sign may be substituted for the CW21-6D "SURVEY CREW AHEAD" sign.
6. This plan may also be used for shoulder work or off shoulder work for multilane undivided roadways.
7. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-1a)

8. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
⚠ Corrected misspelling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-1)-08A

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

REVISIONS
8-08

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.
TYL	RUSK		41

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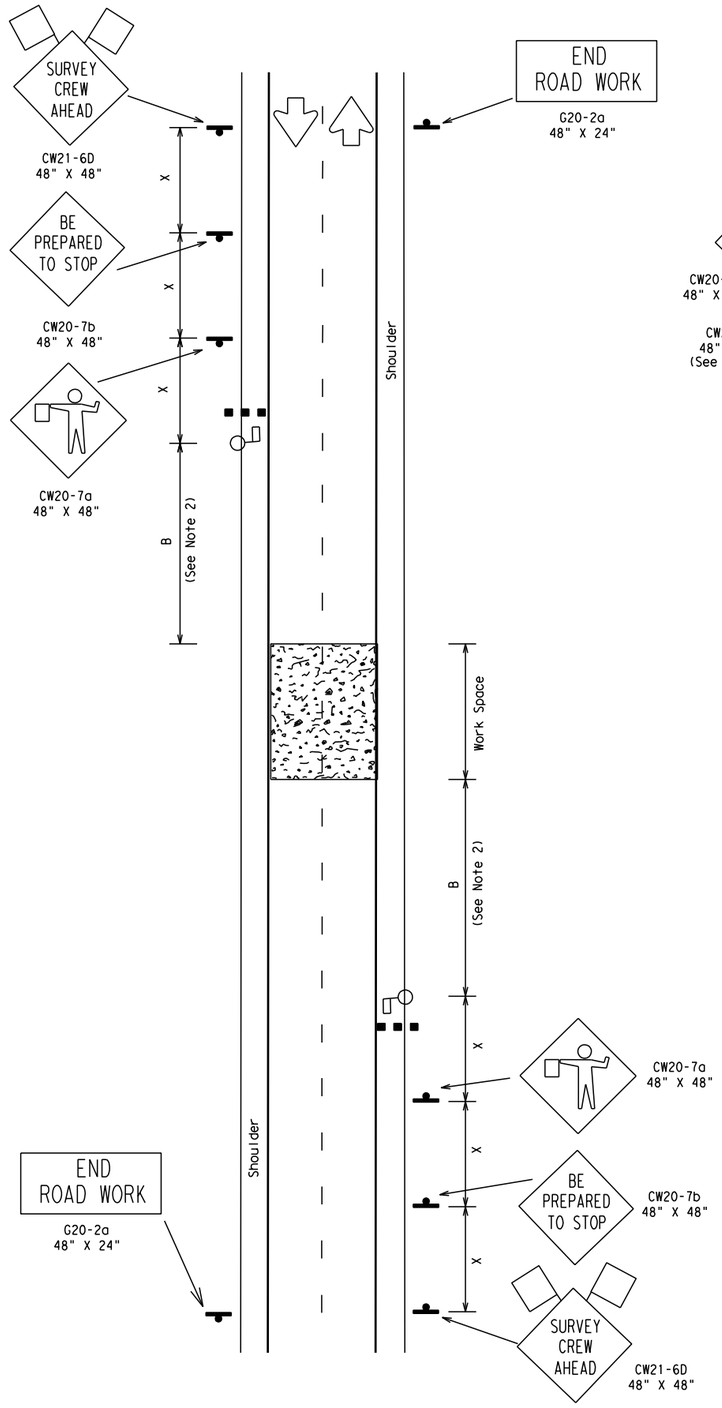
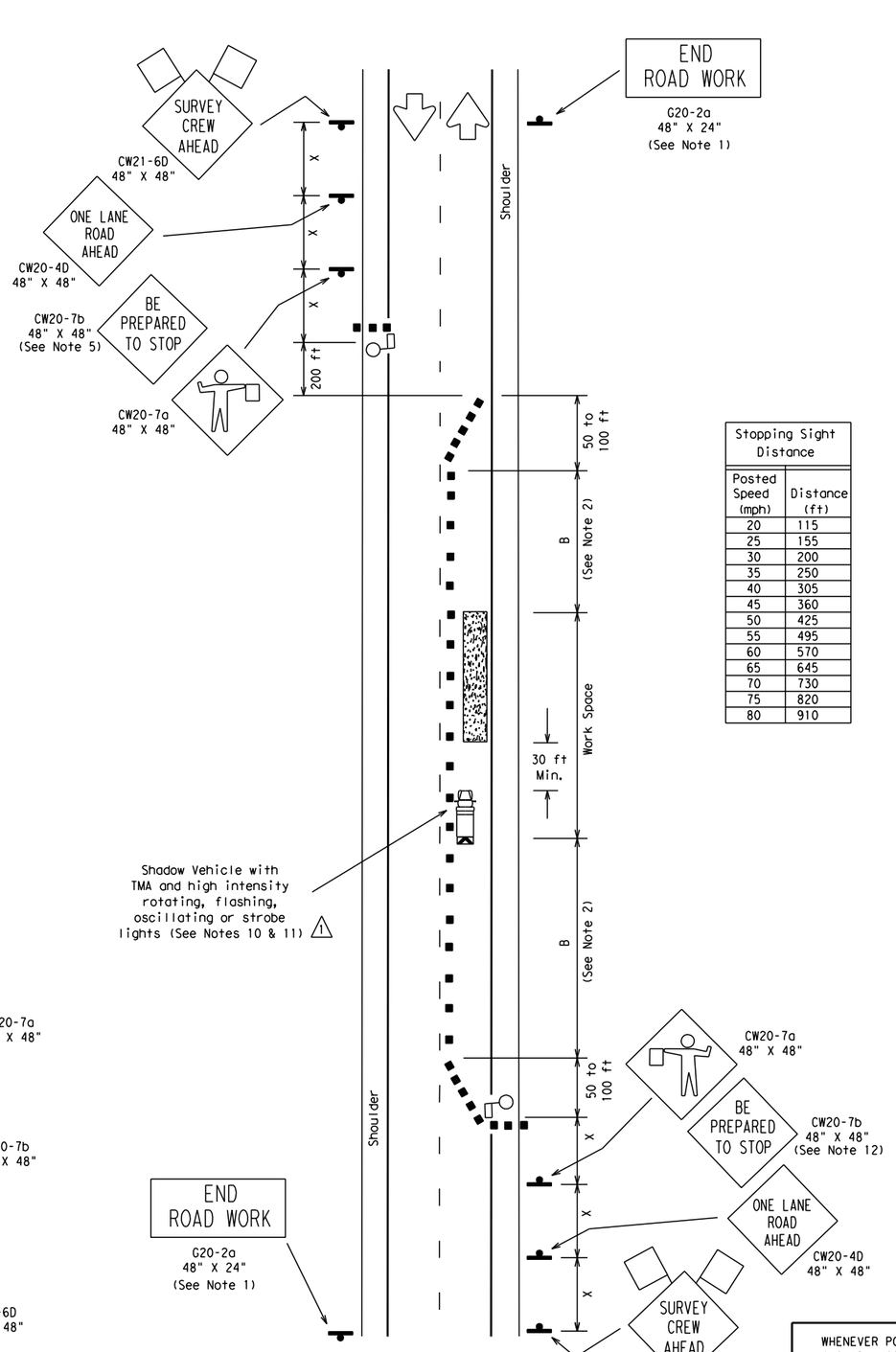


TCP (S-2a)
ROAD CLOSED FOR LESS THAN 20 MINUTES -
OFF PEAK TRAFFIC HOURS
WITH OR WITHOUT SHOULDERS



TCP (S-2b)
WORK IN ROADWAY
OFF PEAK TRAFFIC HOURS
WITH OR WITHOUT SHOULDERS

Stopping Sight Distance	
Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel (M) Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:
1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Adequate Stopping Sight Distance (see Stopping Sight Distance table) should be maintained from approaching traffic to the flagger or a queue of stopped vehicles. The Buffer Space "B" should be extended around curves or other obstacles, when necessary, to have adequate Stopping Sight Distance to the flagger station.
3. Flaggers should use two-way radios or other means of communication while flagging.
4. The length of the work space should be based on the ability of the flaggers to communicate.
5. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
6. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-2a)

7. Road closures shall be less than 20 minutes. Closures less than 5 minutes are desirable.
8. Sign spacing should be increased if traffic repeatedly queues past the CW20-7b "BE PREPARED TO STOP" sign.
9. The surveying instrument should not be located on the paved surface.

TCP (S-2B)

10. For short duration work the Shadow Vehicle with a TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
11. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
12. The CW20-7b "BE PREPARED TO STOP" sign is optional. When used, it should be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
1 Corrected referrence to notes.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-2)-08A

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

REVISIONS
8-08

CONT	SECT	JOB	HIGHWAY
2653	01	016, ETC	FM 2658

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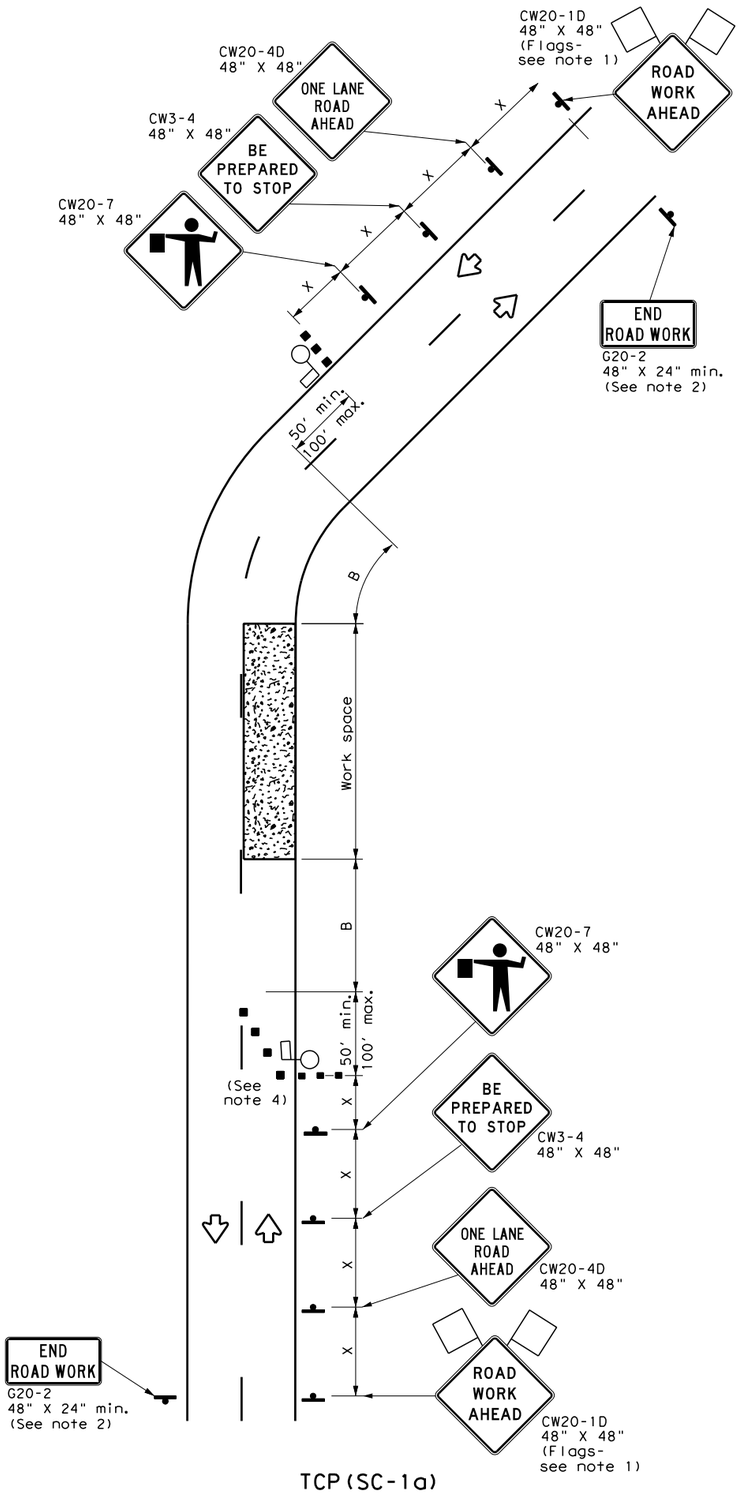
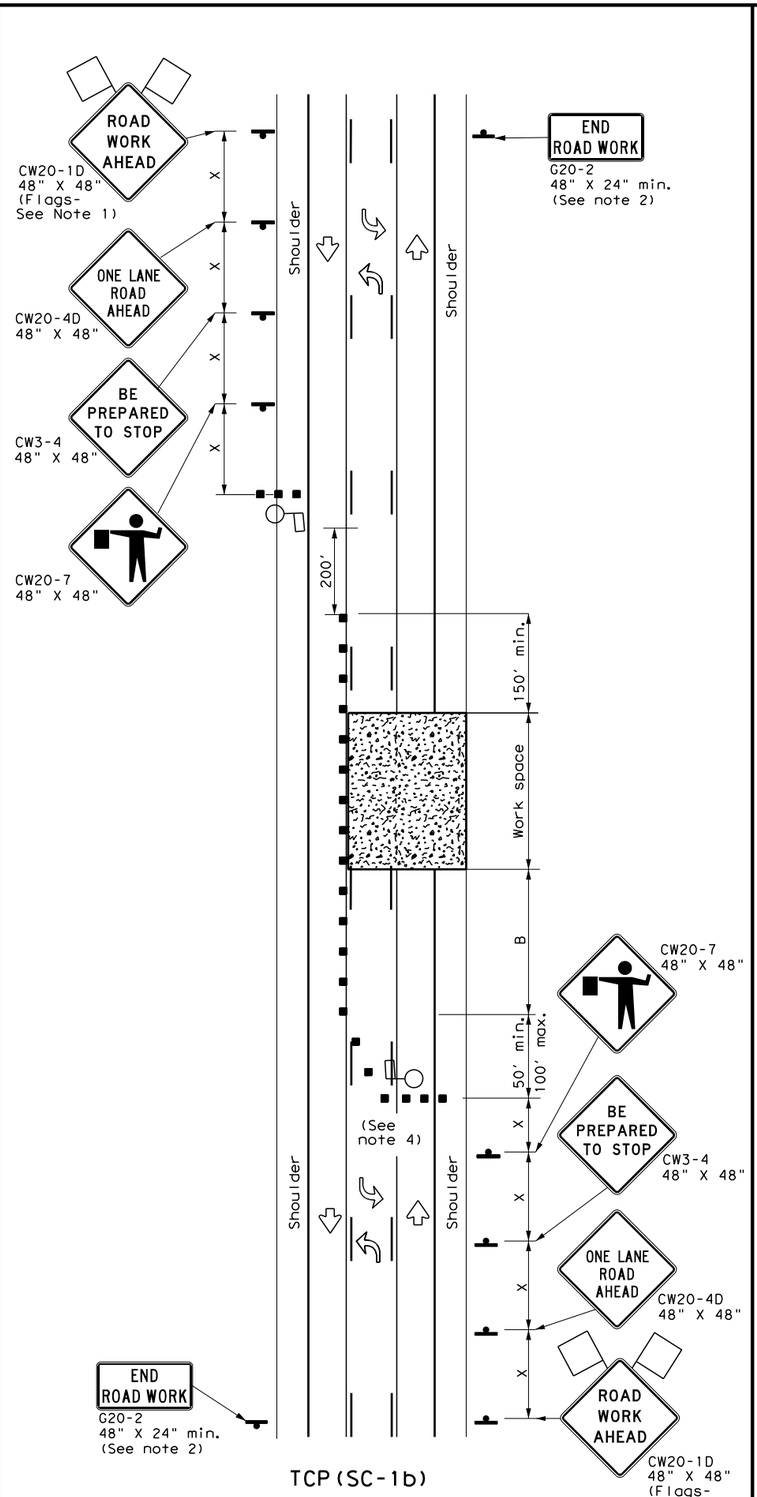


TCP(SC-1a)

ONE LANE TWO-WAY (TWO LANES) CONTROL WITH PILOT VEHICLE



TCP(SC-1b)

ONE LANE TWO-WAY (THREE LANES) CONTROL WITH PILOT VEHICLE AND CHANNELIZING DEVICES

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 Distance "X"	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: if project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.
3. Sign spacing may be increased or an additional ROAD WORK AHEAD (CW20-1D) sign may be used if advance warning ahead of the flagger sign is less than 1500 feet.
4. Flaggers should use two-way radios or other methods of communication at all times for traffic control coordination.
5. Flaggers should use 24" STOP (CW20-8) / SLOW (CW20-8aT) paddles to control traffic. Flags should be limited to emergency situations.
6. 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).
7. If the seal coat operation crosses intersections, traffic in these areas must be controlled. Care must be taken to prevent vehicles from crossing the asphalt before the aggregate is placed. This may require positioning additional traffic control personnel (flaggers) at the intersection.
8. Temporary rumble strips are not required on seal coat operations.
9. The pilot car is used to guide vehicles through traffic control zone. The pilot car shall have an identification name displayed and PILOT CAR, FOLLOW ME (G20-4) sign or message board mounted in a conspicuous position on rear.

TCP (SC-1a)

1. Channelizing devices on the centerline are not required when a pilot car is leading traffic, unless directed by the Engineer.

Texas Department of Transportation — Traffic Safety Division Standard

TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS ONE-LANE TWO-WAY

TCP(SC-1)-22

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© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-21 10-22	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		43

217

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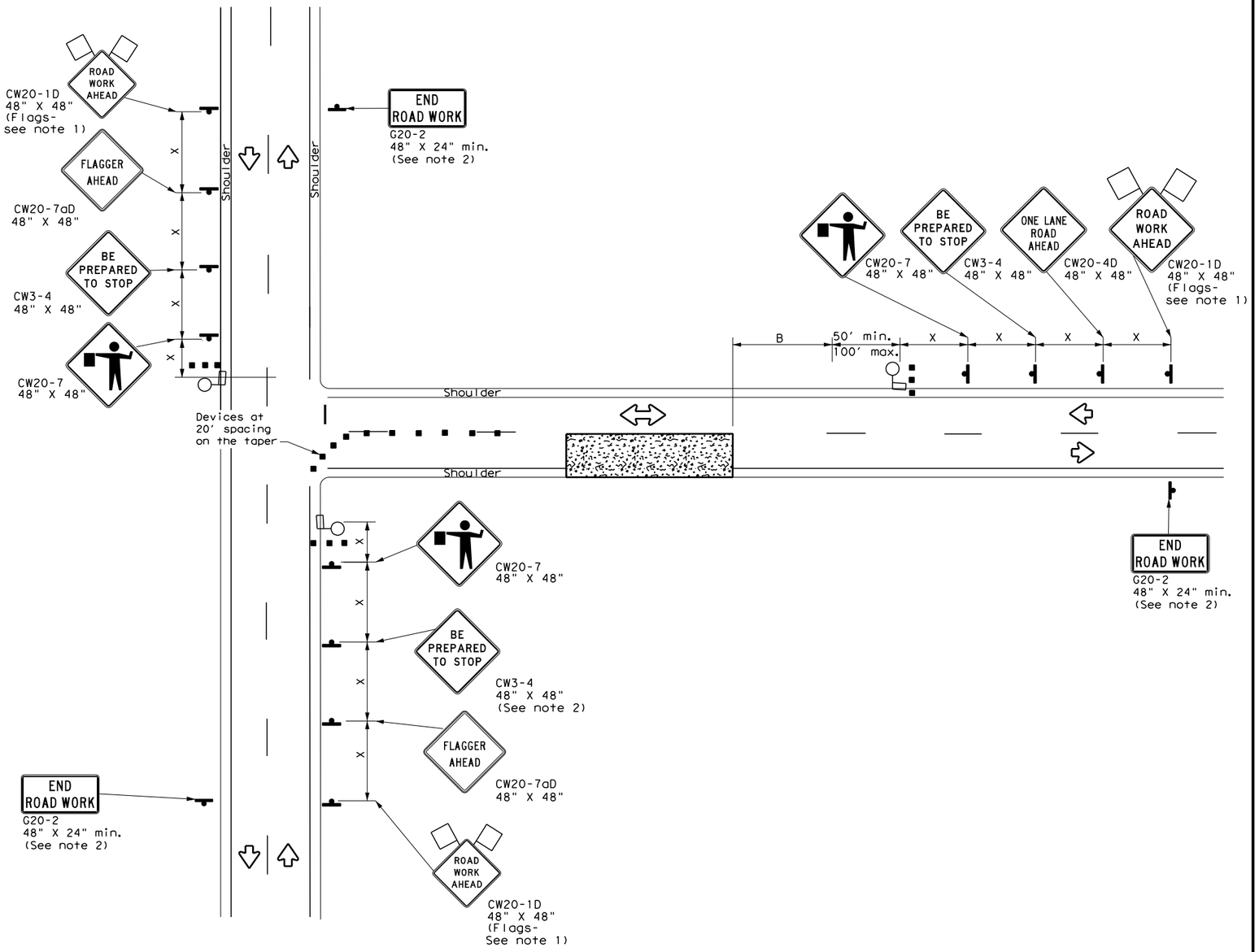

ONE LANE TWO-WAY (T-INTERSECTION) CONTROL WITH PILOT VEHICLE

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 Distance "X"	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: if project signing is present, END ROAD WORK (G20-2) sign is optional with approval by the Engineer.
3. Flaggers should use two-way radios or other methods of communication at all times for traffic control coordination.
4. Flaggers should use 24" STOP (CW20-8) / SLOW (CW20-8aT) paddles to control traffic. Flags should be limited to emergency situations.
5. 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).
6. Temporary rumble strips are not required on seal coat operations.
7. The pilot car is used to guide vehicles through traffic control zone. The pilot car shall have an identification name displayed and PILOT CAR, FOLLOW ME (G20-4) sign or message board mounted in a conspicuous position on rear.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS NEAR INTERSECTION

TCP(SC-4)-22

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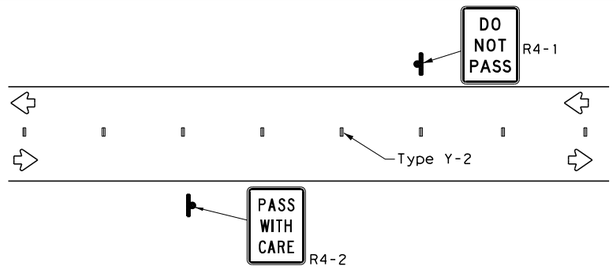
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		44

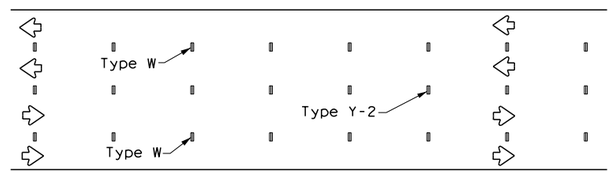
220

DATE: 5/16/2023
FILE: I:\TYL\PRJ\0000206563_Design\Proj3-FM 2658\DGN\PSE\00 STD\TCP\TCP(SC-7)22.dgn

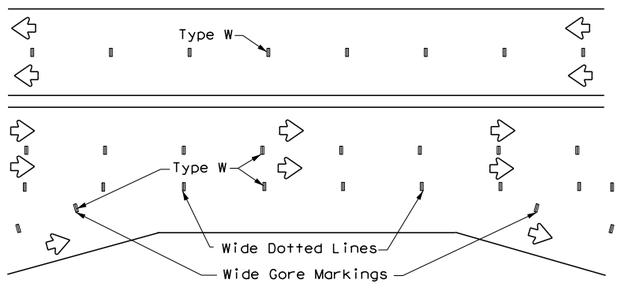
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS (TABS)



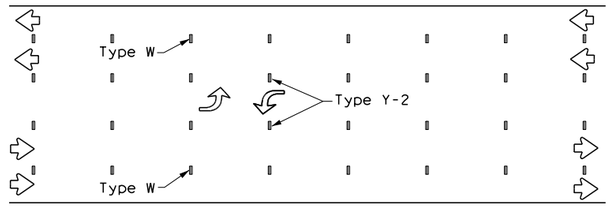
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

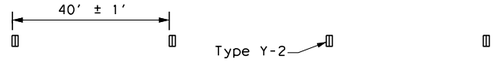
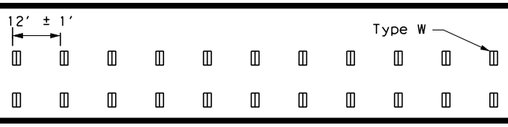


LANE LINES FOR DIVIDED HIGHWAY

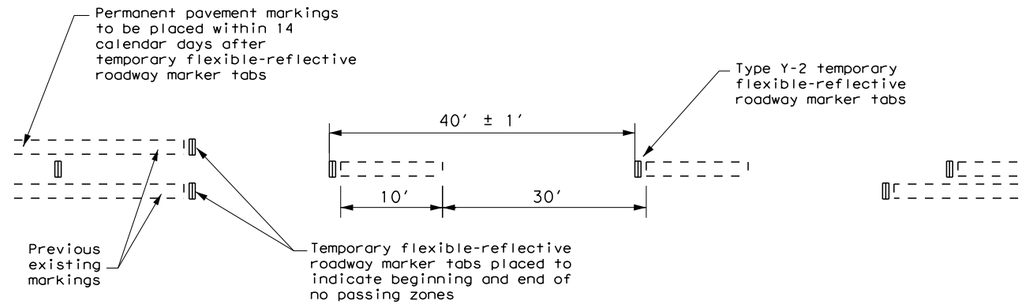


TWO-WAY LEFT TURN LANE

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS (TABS)

SOLID LINES	DOUBLE NO-PASSING LINE	
	SINGLE NO-PASSING LINE or CHANNELIZATION LINE	
	8" WIDE SOLID LINE	
BROKEN LINES (FOR CENTER LINE OR LANE LINE)		
WIDE DOTTED LINES (FOR LANE DROP LINES)		
WIDE GORE MARKINGS		

TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS



TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS

1. Temporary markings for surfacing projects shall be Temporary Flexible-Reflective Roadway Marker Tabs with protective cover unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two days before the surfacing is applied. After the surfacing is rolled and swept, the protective cover over the reflective strip shall be removed.
2. Temporary Flexible-Reflective Roadway Marker Tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with a yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
3. Temporary Flexible-Reflective Roadway Marker Tabs will require normal maintenance replacement when used on roadways with an Average Daily Traffic (ADT) per lane of up to 7500 vehicles with no more than 10% truck mix. When roadway volumes exceed these values, additional maintenance replacement of these devices should be planned for.
4. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low- beam head light at night, unless sight distance is restricted by roadway geometrics.
5. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 4.
6. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
7. Tabs shall NOT be used to simulate edge lines.

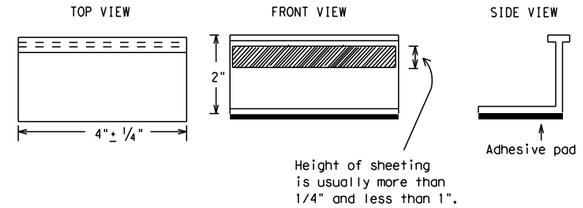
NOTES:

1. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
2. For exit gores where a lane is being dropped, place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are NOT acceptable.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as ¼ inch, unless otherwise noted.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above may be found along with embedded links to their respective MPLs at the following website: http://www.txdot.gov

TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS



Texas Department of Transportation

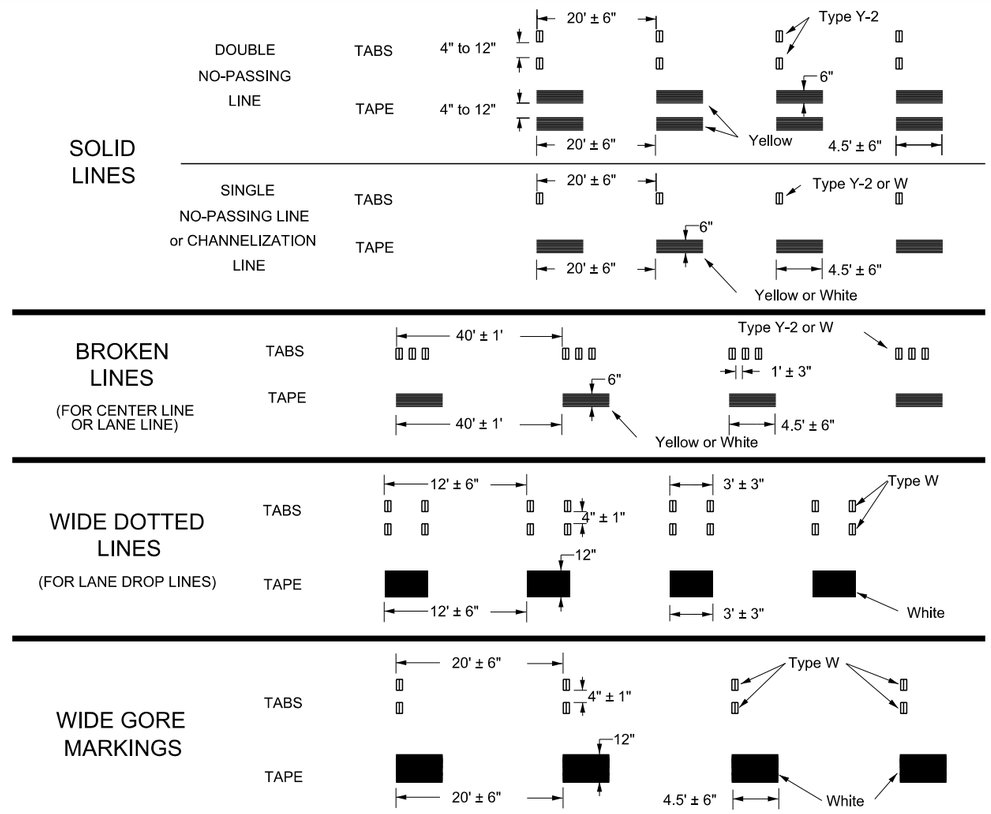
Traffic Safety Division Standard

TEMPORARY PAVEMENT MARKINGS FOR SEAL COAT OPERATIONS

TCP(SC-7)-22

FILE:	tcpsc-7-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS		2653	01	016,ETC	FM 2658
4-21		DIST	COUNTY		SHEET NO.
10-22		TYL	RUSK		45

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



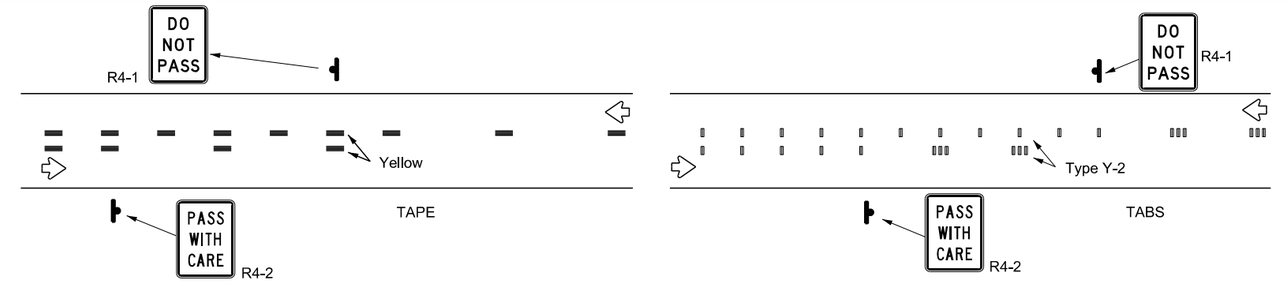
NOTES:

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

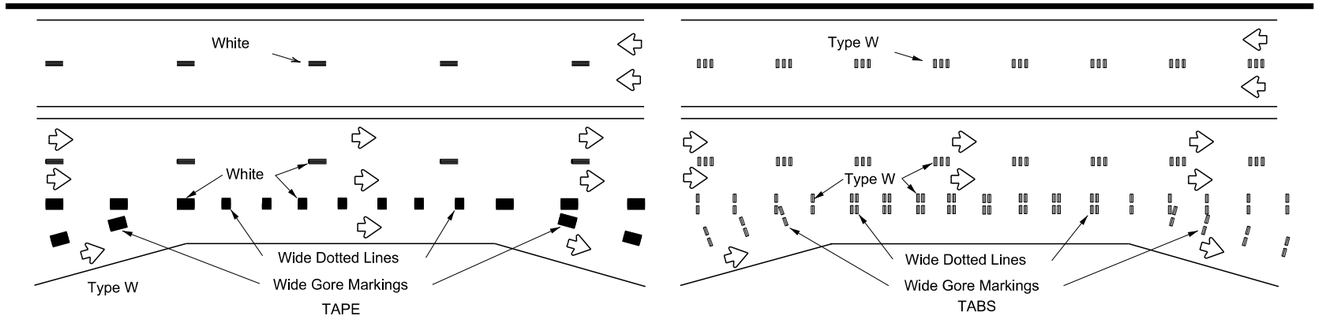
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

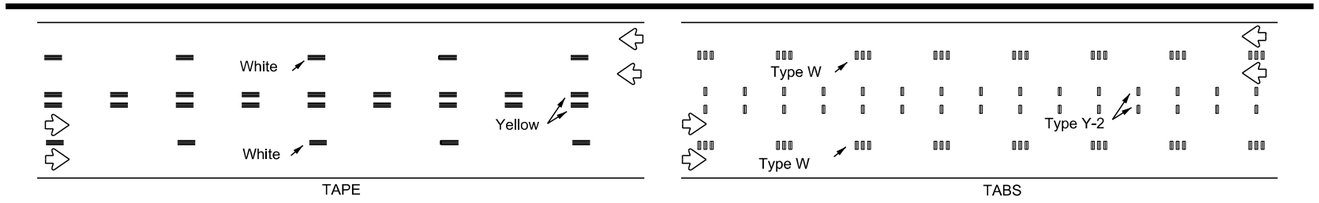
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



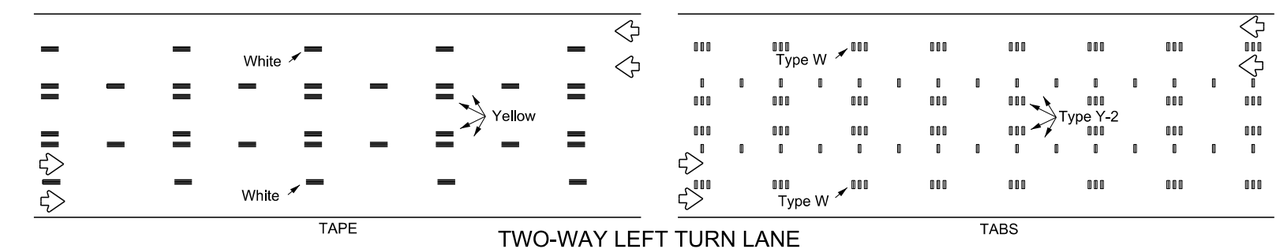
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



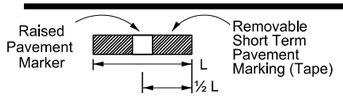
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016, ETC	FM 2658
4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	TYL	RUSK		46

111

DATE: 5/16/2023 4:26:36 PM
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DATE: 5/16/2023 4:26:36 PM
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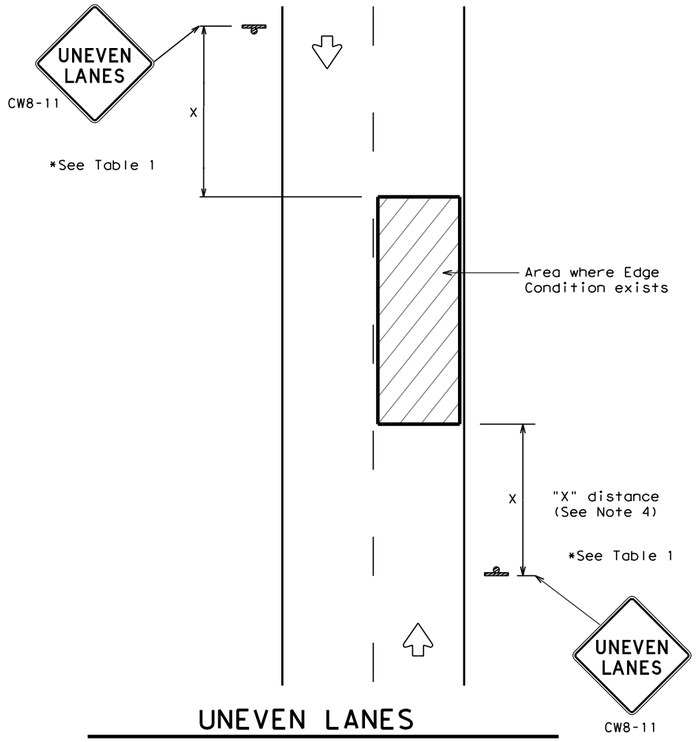
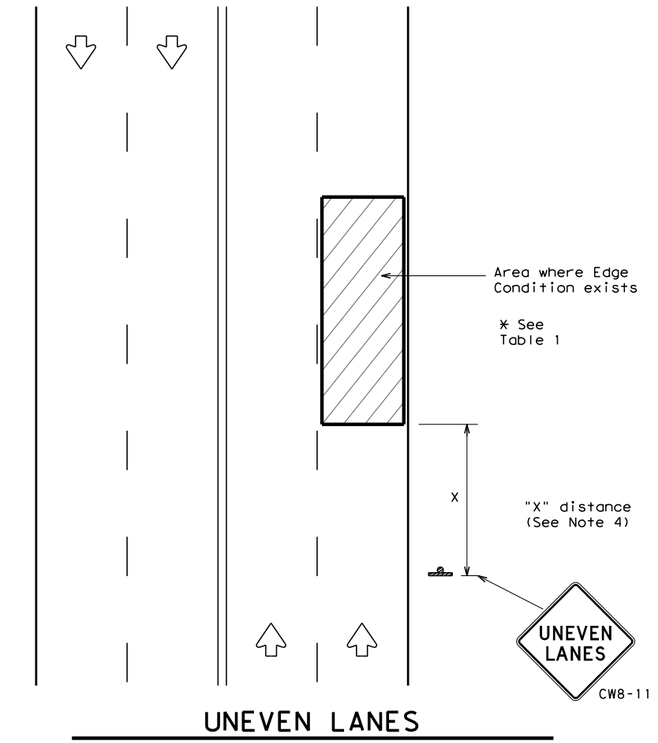
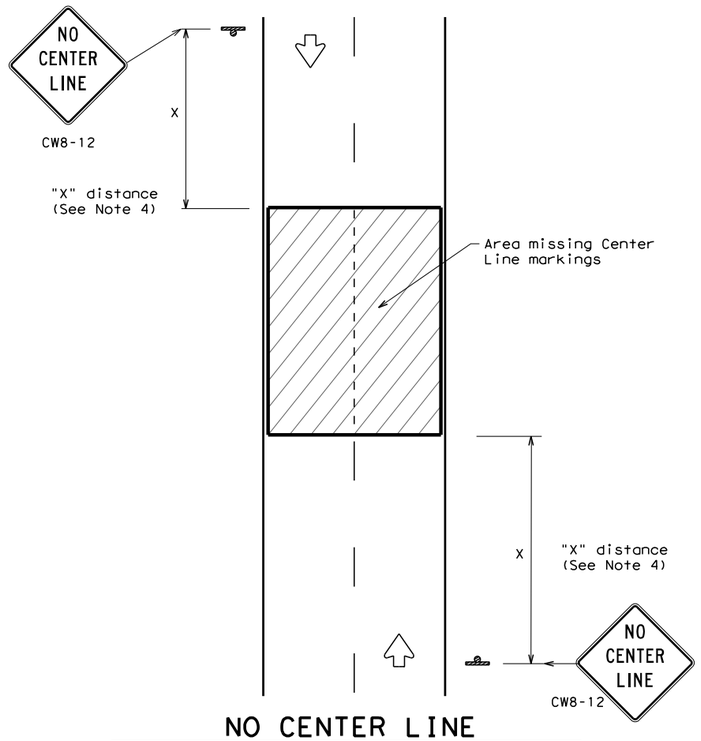


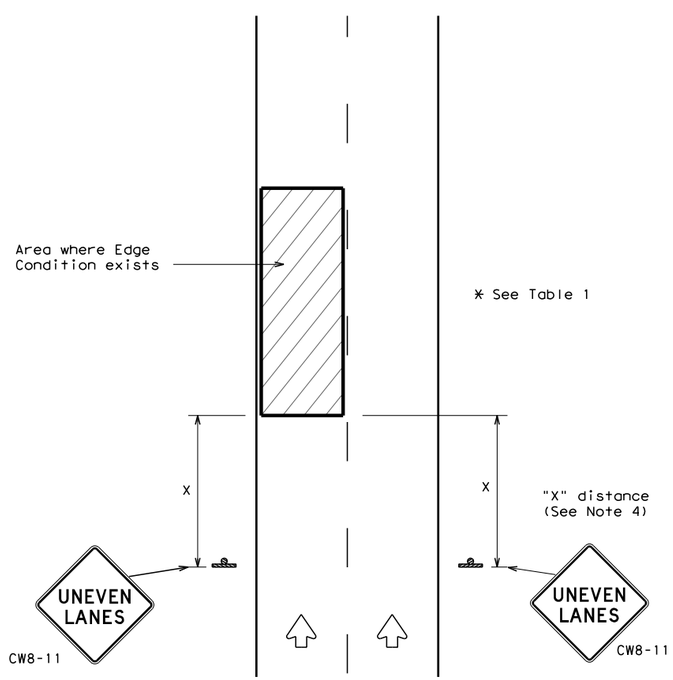
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

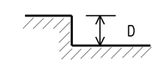
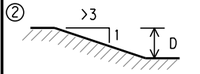
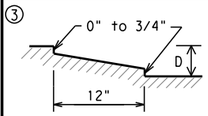
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	TYL	RUSK		47

DATE: 5/16/2023 4:26:37 PM
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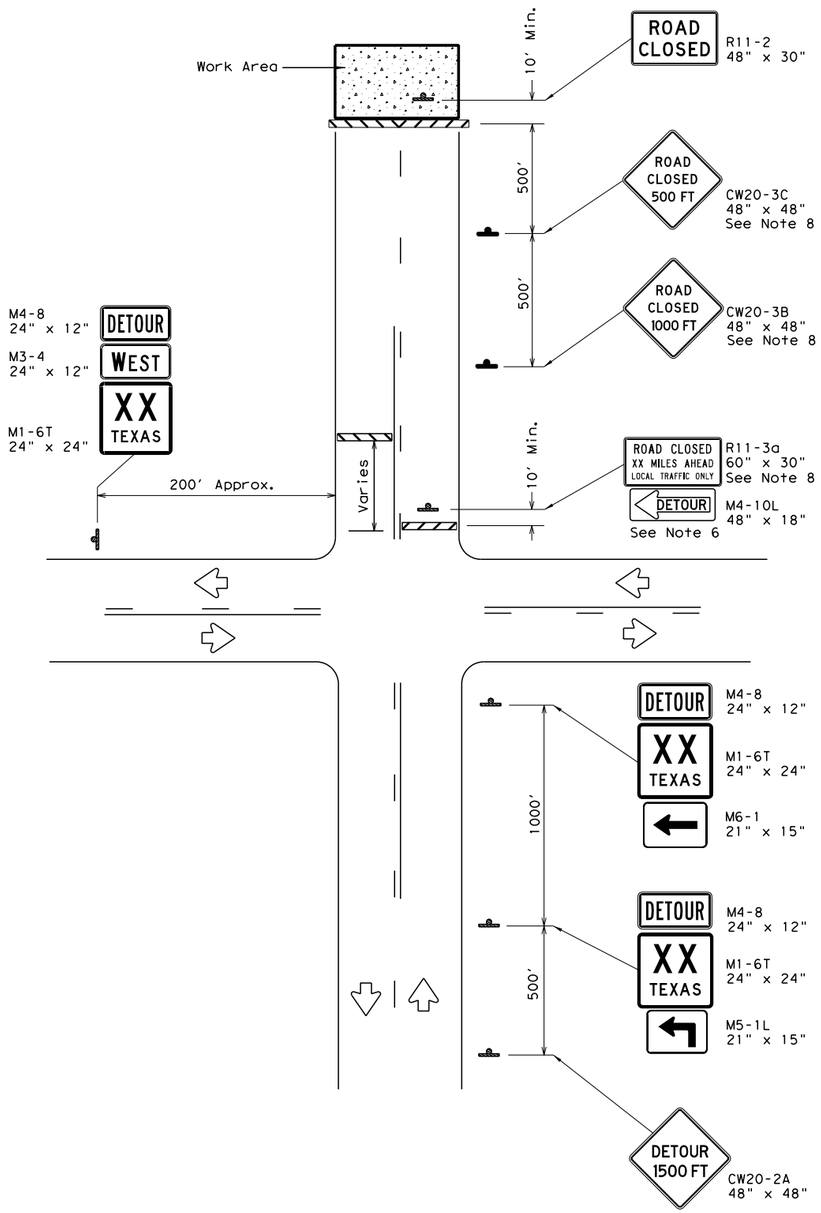
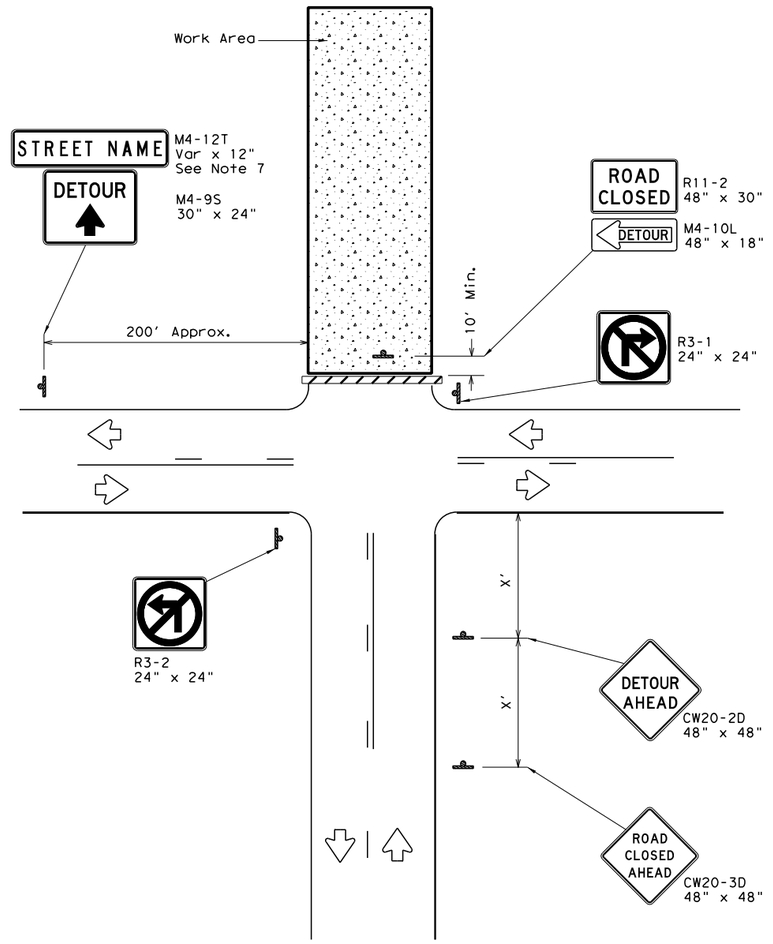


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	TYL	RUSK		48

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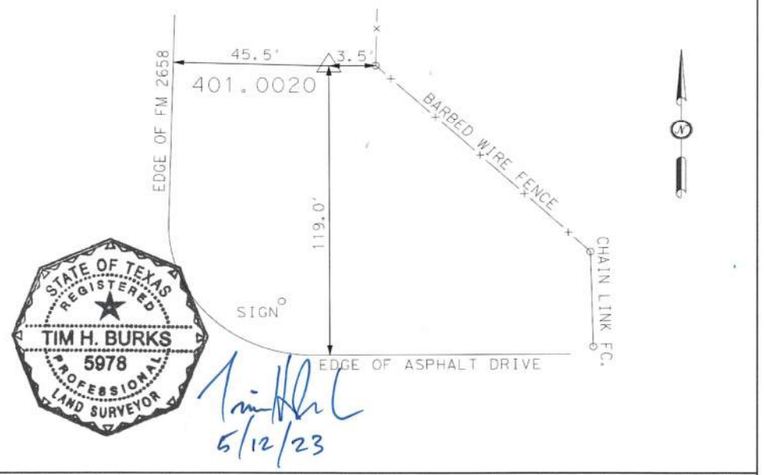
Texas Department of Transportation

Highway / Location		FM 2658 @ Panther Creek		**Station Name**	
TxDOT Project No.		CSJ: 2653-01-016		401.0020	
County	Rusk	**State**	Texas	**Established By**	HW Lochner, Inc.
TxDOT Survey Level	2			**Date Established**	11/25/2022
Intervisible Stations	N/A			**Survey Method Hz.**	GPS Static
Unit of Measure	USFT			**Survey Method Vt.**	GPS Static
Hz. Datum	NAD 83			**Vt. Datum**	NAVD88
Hz. Adjustment	2011 (Epoch: 2010:0000)			**Vt. Adjustment**	1988
Projection Zone	TXNC (4202)			**Geoid Model**	18
Monument(s) Held Hz.	TXNC, TXTY, SHRV, TXC1				
Monument(s) Held Vt.	TXNC, TXTY, SHRV, TXC1				

Geodetic Position		**Grid Coordinates**		**Ground (Surface) Coordinates**	
Lat.	32°15'52.27001" N	**Northing**	6801683.916	**Northing**	6801520.676
Long.	94°35'18.52381" W	**Easting**	3177320.637	**Easting**	3177244.381
Elevation in US Survey Feet		351.63			
TxDOT Surface Adjustment Factor		0.999976			
Mapping Angle	02°08'00.0"	Scale Factor	0.99996625	Combined Factor	0.99995356
Mark Logo	TxDOT Control Mark		**Stamping**	401.0020	
Type of Marker	TxDOT aluminum triangulation disk on 5/8" iron rod set in concrete				

Station Sketch



Point Information Disclaimer: This data has been supplied by state statute. No expressed or implied warranties are made by TxDOT for the accuracy, completeness, reliability, usability or suitability of the point data. The department assumes no responsibility for incorrect results or damages resulting from the use of data.

Page 1

Texas Department of Transportation

Highway / Location	FM 2658 @ Panther Creek	**Station Name**
TxDOT Project No.	CSJ: 2653-01-016	401.0020

Vicinity Map

To Reach the Point: From the intersection of SH 43 and FM 2658, go south on FM 2658 for approx. 1.0 miles to the point on the left.

Station Detail	**Station Area**
	

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Page 2

SURVEY CONTROL DATA SHEETS

SHEET 1 OF 2

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		49
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

FILE: FM2658+CA01.dgn
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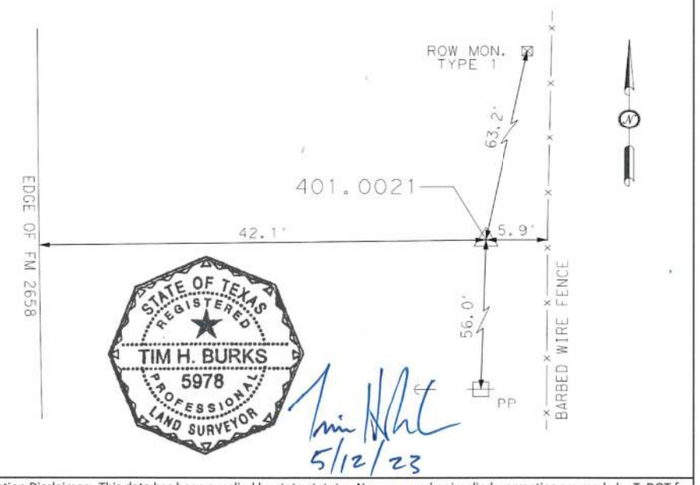
Texas Department of Transportation

Highway / Location		FM 2658 @ Panther Creek		**Station Name**	
TxDOT Project No.		CSJ: 2653-01-016		401.0021	
County	Rusk	**State**	Texas	**Established By**	HW Lochner, Inc.
TxDOT Survey Level	2			**Date Established**	11/25/2022
Intervisible Stations	N/A			**Survey Method Hz.**	GPS Static
Unit of Measure	USFT			**Survey Method Vt.**	RTK
Hz. Datum	NAD 83			**Vt. Datum**	NAVD88
Hz. Adjustment	2011 (Epoch: 2010:0000)			**Vt. Adjustment**	1988
Projection Zone	TXNC (4202)			**Geoid Model**	18
Monument(s) Held Hz.	TXMA, SHRV, TXC1, TXNC, TXTY				
Monument(s) Held Vt.	401.0020				

Geodetic Position		**Grid Coordinates**		**Ground (Surface) Coordinates**	
Lat.	32°16'25.08111" N	**Northing**	6805004.584	**Northing**	6804841.264
Long.	94°35'16.27579" W	**Easting**	3177390.079	**Easting**	3177313.822

Elevation in US Survey Feet			328.59		
TxDOT Surface Adjustment Factor			0.999976		
Mapping Angle	02°08'01.2"	Scale Factor	0.99996410	Combined Factor	0.99995252
Mark Logo	TxDOT Control Mark		**Stamping**	401.0021	
Type of Marker	TxDOT aluminum triangulation disk on 5/8" iron rod set in concrete				

Station Sketch



Point Information Disclaimer: This data has been supplied by state statute. No expressed or implied warranties are made by TxDOT for the accuracy, completeness, reliability, usability or suitability of the point data. The department assumes no responsibility for incorrect results or damages resulting from the use of data.

Texas Department of Transportation

Highway / Location	FM 2658 @ Panther Creek	**Station Name**
TxDOT Project No.	CSJ: 2653-01-016	401.0021

Vicinity Map

To Reach the Point: From the intersection of SH 43 and FM 2658, go south on FM 2568 approx. 0.3 miles to the point on the left.

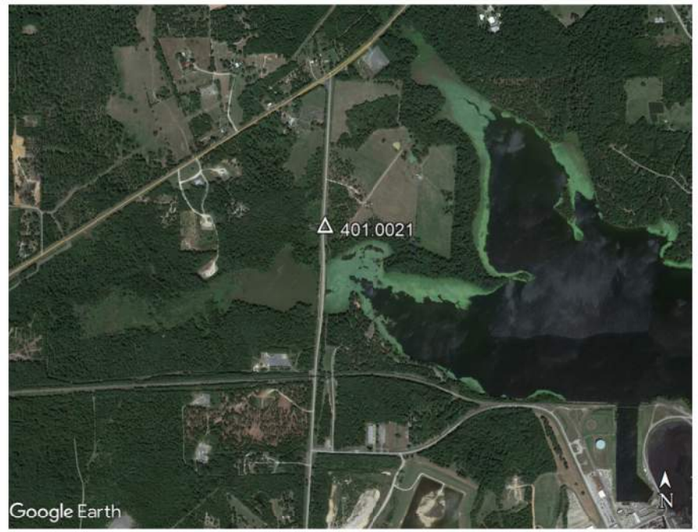


Photo 1 - Station Detail	**Photo 1 - Station Area**
	

Point Information Disclaimer: This data has been supplied by state statute. No expressed or implied warranties are made by TxDOT for the accuracy, completeness, reliability, usability or suitability of the point data. The department assumes no responsibility for incorrect results or damages resulting from the use of data.

SURVEY CONTROL DATA SHEETS

SHEET 2 OF 2

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		50
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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PROPOSED FM 2658 CL (AT PANTHER CREEK)

Beginning chain FM2658-BL description

Course from PT FM2658-EXCL01 to PC 1502 S 3° 24′ 17.76" E Dist 91.16

				Curve 1502		Curve Data	
P.I.	Station	28+62.27	X	3,177,284.23	Y		6,804,286.52
	Delta	=	4° 45′ 49.00" (RT)				
	Degree	=	1° 00′ 00.00"				
	Tangent	=	238.32				
	Length	=	476.36				
	Radius	=	5,729.58				
	External	=	4.95				
	Long Chord	=	476.22				
	Mid. Ord.	=	4.95				
P.C.	Station	26+23.95	X	3,177,270.07	Y		6,804,524.42
P.T.	Station	31+00.31	X	3,177,278.58	Y		6,804,048.27
C.C.			X	3,171,550.61	Y		6,804,184.12
	Back	= S	3° 24′ 17.76" E				
	Ahead	= S	1° 21′ 31.24" W				
	Chord Bear	= S	1° 01′ 23.26" E				

Course from PT 1502 to PC 1503 S 1° 21′ 31.24" W Dist 601.24

				Curve 1503		Curve Data	
P.I.	Station	39+39.87	X	3,177,258.67	Y		6,803,208.95
	Delta	=	4° 45′ 49.00" (RT)				
	Degree	=	1° 00′ 00.00"				
	Tangent	=	238.32				
	Length	=	476.36				
	Radius	=	5,729.58				
	External	=	4.95				
	Long Chord	=	476.22				
	Mid. Ord.	=	4.95				
P.C.	Station	37+01.55	X	3,177,264.32	Y		6,803,447.20
P.T.	Station	41+77.91	X	3,177,233.25	Y		6,802,971.99
C.C.			X	3,171,536.35	Y		6,803,583.05
	Back	= S	1° 21′ 31.24" W				
	Ahead	= S	6° 07′ 20.24" W				
	Chord Bear	= S	3° 44′ 25.74" W				

Course from PT 1503 to PC 2604 S 6° 07′ 20.24" W Dist 47.38

EXISTING FM 2658 CL (SH 43 TO FM 1251)

Beginning chain FM2658-EXCL description

Point EXFM265801 X 3,177,311.52 Y 6,807,147.44 Sta 0+00.00

Course from EXFM265801 to PC FM2658-EXCL01 S 1° 21′ 31.24" W Dist 2,215.21

				Curve FM2658-EXCL01		Curve Data	
P.I.	Station	23+74.09	X	3,177,255.22	Y		6,804,774.02
	Delta	=	4° 45′ 49.00" (LT)				
	Degree	=	1° 29′ 59.84"				
	Tangent	=	158.88				
	Length	=	317.58				
	Radius	=	3,819.83				
	External	=	3.30				
	Long Chord	=	317.49				
	Mid. Ord.	=	3.30				
P.C.	Station	22+15.21	X	3,177,258.99	Y		6,804,932.86
P.T.	Station	25+32.79	X	3,177,264.66	Y		6,804,615.41
C.C.			X	3,181,077.75	Y		6,804,842.28
	Back	= S	1° 21′ 31.24" W				
	Ahead	= S	3° 24′ 17.76" E				
	Chord Bear	= S	1° 01′ 23.26" E				

Course from PT FM2658-EXCL01 to PC FM2658-EXCL02 S 3° 24′ 17.76" E Dist 351.22

				Curve FM2658-EXCL02		Curve Data	
P.I.	Station	30+42.90	X	3,177,294.96	Y		6,804,106.21
	Delta	=	4° 45′ 49.00" (RT)				
	Degree	=	1° 29′ 59.84"				
	Tangent	=	158.88				
	Length	=	317.58				
	Radius	=	3,819.83				
	External	=	3.30				
	Long Chord	=	317.49				
	Mid. Ord.	=	3.30				
P.C.	Station	28+84.01	X	3,177,285.52	Y		6,804,264.82
P.T.	Station	32+01.60	X	3,177,291.19	Y		6,803,947.37
C.C.			X	3,173,472.43	Y		6,804,037.95
	Back	= S	3° 24′ 17.76" E				
	Ahead	= S	1° 21′ 31.24" W				
	Chord Bear	= S	1° 01′ 23.26" E				

Course from PT FM2658-EXCL02 to PC FM2658-EXCL03 S 1° 21′ 31.24" W Dist 400.10

				Curve FM2658-EXCL03		Curve Data	
P.I.	Station	37+60.58	X	3,177,277.93	Y		6,803,388.54
	Delta	=	4° 45′ 49.00" (RT)				
	Degree	=	1° 29′ 59.84"				
	Tangent	=	158.88				
	Length	=	317.58				
	Radius	=	3,819.83				
	External	=	3.30				
	Long Chord	=	317.49				
	Mid. Ord.	=	3.30				
P.C.	Station	36+01.70	X	3,177,281.70	Y		6,803,547.38
P.T.	Station	39+19.28	X	3,177,260.99	Y		6,803,230.57
C.C.			X	3,173,462.94	Y		6,803,637.95
	Back	= S	1° 21′ 31.24" W				
	Ahead	= S	6° 07′ 20.24" W				
	Chord Bear	= S	3° 44′ 25.74" W				

Course from PT FM2658-EXCL03 to PC FM2658-EXCL04 S 6° 07′ 20.24" W Dist 307.44

				Curve FM2658-EXCL04		Curve Data	
P.I.	Station	43+85.61	X	3,177,211.25	Y		6,802,766.90
	Delta	=	4° 45′ 49.00" (LT)				
	Degree	=	1° 29′ 59.84"				
	Tangent	=	158.88				
	Length	=	317.58				
	Radius	=	3,819.83				
	External	=	3.30				
	Long Chord	=	317.49				
	Mid. Ord.	=	3.30				
P.C.	Station	42+26.72	X	3,177,228.20	Y		6,802,924.88
P.T.	Station	45+44.31	X	3,177,207.49	Y		6,802,608.06
C.C.			X	3,181,026.24	Y		6,802,517.49
	Back	= S	6° 07′ 20.24" W				
	Ahead	= S	1° 21′ 31.24" W				
	Chord Bear	= S	3° 44′ 25.74" W				

Course from PT FM2658-EXCL04 to PC FM2658-EXCL05 S 1° 21′ 31.24" W Dist 101.56

				Curve FM2658-EXCL05		Curve Data	
P.I.	Station	46+52.02	X	3,177,204.93	Y		6,802,500.38
	Delta	=	0° 07′ 22.92" (LT)				
	Degree	=	1° 00′ 00.00"				
	Tangent	=	6.15				
	Length	=	12.30				
	Radius	=	5,729.58				
	External	=	0.00				
	Long Chord	=	12.30				
	Mid. Ord.	=	0.00				
P.C.	Station	46+45.87	X	3,177,205.08	Y		6,802,506.53
P.T.	Station	46+58.17	X	3,177,204.80	Y		6,802,494.23
C.C.			X	3,182,933.05	Y		6,802,370.68
	Back	= S	1° 21′ 31.24" W				
	Ahead	= S	1° 14′ 08.32" W				
	Chord Bear	= S	1° 17′ 49.78" W				

Course from PT FM2658-EXCL05 to PC FM2658-EXCL06 S 1° 14′ 08.32" W Dist 2,941.23

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658 HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 3

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LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	See Title Sheet	51

STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

FILE: FM2658*CC01.dgn
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EXISTING FM 2658 CL (SH 43 TO FM 1251)

Curve Data

Curve FM2658-EXCL06

P.I.	Station	77+66.56	X	3,177,137.77	Y 6,799,386.56
	Delta	= 3° 03′ 50.75" (LT)			
	Degree	= 0° 55′ 00.24"			
	Tangent	= 167.16			
	Length	= 334.24			
	Radius	= 6,250.00			
	External	= 2.24			
	Long Chord	= 334.20			
	Mid. Ord.	= 2.23			
P.C.	Station	75+99.40	X	3,177,141.38	Y 6,799,553.68
P.T.	Station	79+33.64	X	3,177,143.10	Y 6,799,219.49
C.C.			X	3,183,389.92	Y 6,799,418.91
		Back	= S 1° 14′ 08.32" W		
		Ahead	= S 1° 49′ 42.43" E		
		Chord Bear	= S 0° 17′ 47.06" E		

Course from PT FM2658-EXCL06 to PC FM2658-EXCL07 S 1° 49′ 42.43" E Dist 634.00

Curve Data

Curve FM2658-EXCL07

P.I.	Station	90+39.98	X	3,177,178.40	Y 6,798,113.72
	Delta	= 46° 28′ 37.31" (LT)			
	Degree	= 5° 12′ 31.35"			
	Tangent	= 472.34			
	Length	= 892.29			
	Radius	= 1,100.00			
	External	= 97.12			
	Long Chord	= 868.03			
	Mid. Ord.	= 89.24			
P.C.	Station	85+67.64	X	3,177,163.33	Y 6,798,585.81
P.T.	Station	94+59.94	X	3,177,531.10	Y 6,797,799.54
C.C.			X	3,178,262.77	Y 6,798,620.91
		Back	= S 1° 49′ 42.43" E		
		Ahead	= S 48° 18′ 19.74" E		
		Chord Bear	= S 25° 04′ 01.09" E		

Course from PT FM2658-EXCL07 to PC FM2658-EXCL08 S 48° 18′ 19.74" E Dist 2,222.74

Curve Data

Curve FM2658-EXCL08

P.I.	Station	131+68.86	X	3,180,300.56	Y 6,795,332.51
	Delta	= 106° 59′ 09.90" (RT)			
	Degree	= 5° 12′ 31.35"			
	Tangent	= 1,486.19			
	Length	= 2,053.99			
	Radius	= 1,100.00			
	External	= 748.99			
	Long Chord	= 1,768.33			
	Mid. Ord.	= 445.59			
P.C.	Station	116+82.67	X	3,179,190.82	Y 6,796,321.06
P.T.	Station	137+36.66	X	3,179,030.93	Y 6,794,559.98
C.C.			X	3,178,459.14	Y 6,795,499.69
		Back	= S 48° 18′ 19.74" E		
		Ahead	= S 58° 40′ 50.16" W		
		Chord Bear	= S 5° 11′ 15.21" W		

Curve Data

Curve FM2658-EXCL09

P.I.	Station	142+31.96	X	3,178,607.81	Y 6,794,302.52
	Delta	= 48° 28′ 53.20" (LT)			
	Degree	= 5° 12′ 31.35"			
	Tangent	= 495.30			
	Length	= 930.78			
	Radius	= 1,100.00			
	External	= 106.37			
	Long Chord	= 903.26			
	Mid. Ord.	= 96.99			
P.C.	Station	137+36.66	X	3,179,030.93	Y 6,794,559.98
P.T.	Station	146+67.44	X	3,178,520.11	Y 6,793,815.05
C.C.			X	3,179,602.72	Y 6,793,620.27
		Back	= S 58° 40′ 50.16" W		
		Ahead	= S 10° 11′ 56.95" W		
		Chord Bear	= S 34° 26′ 23.55" W		

Curve Data

Curve FM2658-EXCL10

P.I.	Station	150+26.03	X	3,178,456.61	Y 6,793,462.12
	Delta	= 36° 06′ 39.51" (RT)			
	Degree	= 5° 12′ 31.35"			
	Tangent	= 358.59			
	Length	= 693.28			
	Radius	= 1,100.00			
	External	= 56.97			
	Long Chord	= 681.86			
	Mid. Ord.	= 54.17			
P.C.	Station	146+67.44	X	3,178,520.11	Y 6,793,815.05
P.T.	Station	153+60.72	X	3,178,197.32	Y 6,793,214.43
C.C.			X	3,177,437.49	Y 6,794,009.82
		Back	= S 10° 11′ 56.95" W		
		Ahead	= S 46° 18′ 36.46" W		
		Chord Bear	= S 28° 15′ 16.71" W		

Course from PT FM2658-EXCL10 to PC FM2658-EXCL11 S 46° 18′ 36.46" W Dist 991.81

EXISTING FM 2658 CL (SH 43 TO FM 1251)

Curve Data

Curve FM2658-EXCL11

P.I.	Station	169+00.97	X	3,177,083.58	Y 6,792,150.49
	Delta	= 52° 59′ 59.98" (LT)			
	Degree	= 5° 12′ 31.35"			
	Tangent	= 548.44			
	Length	= 1,017.53			
	Radius	= 1,100.00			
	External	= 129.14			
	Long Chord	= 981.64			
	Mid. Ord.	= 115.57			
P.C.	Station	163+52.53	X	3,177,480.15	Y 6,792,529.33
P.T.	Station	173+70.05	X	3,177,147.47	Y 6,791,605.78
C.C.			X	3,178,239.98	Y 6,791,733.93
		Back	= S 46° 18′ 36.46" W		
		Ahead	= S 6° 41′ 23.52" E		
		Chord Bear	= S 19° 48′ 36.47" W		

Course from PT FM2658-EXCL11 to PC FM2658-EXCL12 S 6° 41′ 23.52" E Dist 11.34

Curve Data

Curve FM2658-EXCL12

P.I.	Station	175+13.83	X	3,177,164.22	Y 6,791,462.99
	Delta	= 3° 58′ 16.23" (LT)			
	Degree	= 1° 29′ 59.84"			
	Tangent	= 132.43			
	Length	= 264.75			
	Radius	= 3,819.83			
	External	= 2.29			
	Long Chord	= 264.70			
	Mid. Ord.	= 2.29			
P.C.	Station	173+81.40	X	3,177,148.79	Y 6,791,594.52
P.T.	Station	176+46.15	X	3,177,188.72	Y 6,791,332.85
C.C.			X	3,180,942.61	Y 6,792,039.51
		Back	= S 6° 41′ 23.52" E		
		Ahead	= S 10° 39′ 39.74" E		
		Chord Bear	= S 8° 40′ 31.63" E		

Course from PT FM2658-EXCL12 to PC FM2658-EXCL13 S 10° 39′ 39.74" E Dist 518.50

Curve Data

Curve FM2658-EXCL13

P.I.	Station	183+41.87	X	3,177,317.42	Y 6,790,649.14
	Delta	= 5° 18′ 44.92" (RT)			
	Degree	= 1° 29′ 59.84"			
	Tangent	= 177.21			
	Length	= 354.18			
	Radius	= 3,819.83			
	External	= 4.11			
	Long Chord	= 354.05			
	Mid. Ord.	= 4.10			
P.C.	Station	181+64.65	X	3,177,284.64	Y 6,790,823.30
P.T.	Station	185+18.83	X	3,177,333.94	Y 6,790,472.70
C.C.			X	3,173,530.74	Y 6,790,116.63
		Back	= S 10° 39′ 39.74" E		
		Ahead	= S 5° 20′ 54.82" E		
		Chord Bear	= S 8° 00′ 17.28" E		

Course from PT FM2658-EXCL13 to PC FM2658-EXCL14 S 5° 20′ 54.82" E Dist 990.35

Curve Data

Curve FM2658-EXCL14

P.I.	Station	198+24.96	X	3,177,455.69	Y 6,789,172.25
	Delta	= 21° 49′ 59.02" (RT)			
	Degree	= 3° 29′ 58.02"			
	Tangent	= 315.78			
	Length	= 623.90			
	Radius	= 1,637.28			
	External	= 30.17			
	Long Chord	= 620.13			
	Mid. Ord.	= 29.63			
P.C.	Station	195+09.18	X	3,177,426.26	Y 6,789,486.66
P.T.	Station	201+33.08	X	3,177,366.09	Y 6,788,869.45
C.C.			X	3,175,796.11	Y 6,789,334.04
		Back	= S 5° 20′ 54.82" E		
		Ahead	= S 16° 29′ 04.20" W		
		Chord Bear	= S 5° 34′ 04.69" W		

Course from PT FM2658-EXCL14 to PC FM2658-EXCL15 S 16° 29′ 04.20" W Dist 1,581.82

Curve Data

Curve FM2658-EXCL15

P.I.	Station	222+62.88	X	3,176,761.74	Y 6,786,827.20
	Delta	= 15° 36′ 04.45" (RT)			
	Degree	= 1° 25′ 56.62"			
	Tangent	= 547.98			
	Length	= 1,089.17			
	Radius	= 4,000.00			
	External	= 37.36			
	Long Chord	= 1,085.81			
	Mid. Ord.	= 37.01			
P.C.	Station	217+14.90	X	3,176,917.24	Y 6,787,352.65
P.T.	Station	228+04.07	X	3,176,470.67	Y 6,786,362.92
C.C.			X	3,173,081.65	Y 6,788,487.67
		Back	= S 16° 29′ 04.20" W		
		Ahead	= S 32° 05′ 08.65" W		
		Chord Bear	= S 24° 17′ 06.43" W		

Course from PT FM2658-EXCL15 to PC FM2658-EXCL16 S 32° 05′ 08.65" W Dist 218.83

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 3

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FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		52
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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EXISTING FM 2658 CL (SH 43 TO FM 1251)

Curve Data

Curve FM2658-EXCL16

P.I.	Station	233+58.36	X	3,176,176.24	Y	6,785,893.30
	Delta	=	6° 22′ 06.03" (LT)			
	Degree	=	0° 57′ 00.64"			
	Tangent	=	335.46			
	Length	=	670.23			
	Radius	=	6,030.00			
	External	=	9.32			
	Long Chord	=	669.88			
	Mid. Ord.	=	9.31			
P.C.	Station	230+22.90	X	3,176,354.43	Y	6,786,177.52
P.T.	Station	236+93.13	X	3,176,030.67	Y	6,785,591.07
C.C.			X	3,181,463.37	Y	6,782,974.45
	Back	= S	32° 05′ 08.65" W			
	Ahead	= S	25° 43′ 02.63" W			
	Chord Bear	= S	28° 54′ 05.64" W			

Course from PT FM2658-EXCL16 to PC FM2658-EXCL17 S 25° 43′ 02.63" W Dist 1,025.90

Curve Data

Curve FM2658-EXCL17

P.I.	Station	251+53.55	X	3,175,396.95	Y	6,784,275.31
	Delta	=	8° 14′ 35.03" (LT)			
	Degree	=	0° 57′ 00.64"			
	Tangent	=	434.51			
	Length	=	867.53			
	Radius	=	6,030.00			
	External	=	15.63			
	Long Chord	=	866.78			
	Mid. Ord.	=	15.59			
P.C.	Station	247+19.03	X	3,175,585.50	Y	6,784,666.78
P.T.	Station	255+86.56	X	3,175,266.47	Y	6,783,860.85
C.C.			X	3,181,018.20	Y	6,782,050.17
	Back	= S	25° 43′ 02.63" W			
	Ahead	= S	17° 28′ 27.60" W			
	Chord Bear	= S	21° 35′ 45.11" W			

Course from PT FM2658-EXCL17 to PC FM2658-EXCL18 S 17° 28′ 27.60" W Dist 1,123.80

Curve Data

Curve FM2658-EXCL18

P.I.	Station	270+94.11	X	3,174,813.79	Y	6,782,422.87
	Delta	=	35° 28′ 04.56" (LT)			
	Degree	=	4° 46′ 28.73"			
	Tangent	=	383.75			
	Length	=	742.84			
	Radius	=	1,200.00			
	External	=	59.87			
	Long Chord	=	731.03			
	Mid. Ord.	=	57.02			
P.C.	Station	267+10.36	X	3,174,929.02	Y	6,782,788.91
P.T.	Station	274+53.20	X	3,174,932.33	Y	6,782,057.88
C.C.			X	3,176,073.64	Y	6,782,428.58
	Back	= S	17° 28′ 27.60" W			
	Ahead	= S	17° 59′ 36.96" E			
	Chord Bear	= S	0° 15′ 34.68" E			

Course from PT FM2658-EXCL18 to PC FM2658-EXCL19 S 17° 59′ 36.96" E Dist 395.76

Curve Data

Curve FM2658-EXCL19

P.I.	Station	284+61.93	X	3,175,243.94	Y	6,781,098.49
	Delta	=	54° 07′ 00.69" (RT)			
	Degree	=	4° 46′ 28.73"			
	Tangent	=	612.97			
	Length	=	1,133.42			
	Radius	=	1,200.00			
	External	=	147.49			
	Long Chord	=	1,091.76			
	Mid. Ord.	=	131.35			
P.C.	Station	278+48.96	X	3,175,054.59	Y	6,781,681.48
P.T.	Station	289+82.38	X	3,174,882.58	Y	6,780,603.36
C.C.			X	3,173,913.28	Y	6,781,310.79
	Back	= S	17° 59′ 36.96" E			
	Ahead	= S	36° 07′ 23.73" W			
	Chord Bear	= S	9° 03′ 53.39" W			

Course from PT FM2658-EXCL19 to PC FM2658-EXCL20 S 36° 07′ 23.73" W Dist 783.09

Curve Data

Curve FM2658-EXCL20

P.I.	Station	303+95.43	X	3,174,049.55	Y	6,779,461.97
	Delta	=	55° 23′ 44.98" (RT)			
	Degree	=	4° 46′ 28.73"			
	Tangent	=	629.96			
	Length	=	1,160.21			
	Radius	=	1,200.00			
	External	=	155.30			
	Long Chord	=	1,115.54			
	Mid. Ord.	=	137.51			
P.C.	Station	297+65.47	X	3,174,420.93	Y	6,779,970.82
P.T.	Station	309+25.68	X	3,173,419.81	Y	6,779,478.67
C.C.			X	3,173,451.62	Y	6,780,678.25
	Back	= S	36° 07′ 23.73" W			
	Ahead	= N	88° 28′ 51.28" W			
	Chord Bear	= S	63° 49′ 16.22" W			

Course from PT FM2658-EXCL20 to PC FM2658-EXCL21 N 88° 28′ 51.28" W Dist 170.02

EXISTING FM 2658 CL (SH 43 TO FM 1251)

Curve Data

Curve FM2658-EXCL21

P.I.	Station	324+39.13	X	3,171,906.90	Y	6,779,518.79
	Delta	=	96° 27′ 18.96" (LT)			
	Degree	=	4° 46′ 28.73"			
	Tangent	=	1,343.43			
	Length	=	2,020.15			
	Radius	=	1,200.00			
	External	=	601.33			
	Long Chord	=	1,789.91			
	Mid. Ord.	=	400.59			
P.C.	Station	310+95.70	X	3,173,249.86	Y	6,779,483.17
P.T.	Station	331+15.85	X	3,172,022.49	Y	6,778,180.34
C.C.			X	3,173,218.04	Y	6,778,283.60
	Back	= N	88° 28′ 51.28" W			
	Ahead	= S	4° 56′ 10.25" E			
	Chord Bear	= S	43° 17′ 29.23" W			

Course from PT FM2658-EXCL21 to EXFM265802 S 4° 56′ 10.25" E Dist 1,981.13

Point EXFM265802 X 3,172,192.96 Y 6,776,206.56 Sta 350+96.98

==========

Ending chain FM2658-EXCL description

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
HORIZONTAL
ALIGNMENT DATA

SHEET 3 OF 3

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		53
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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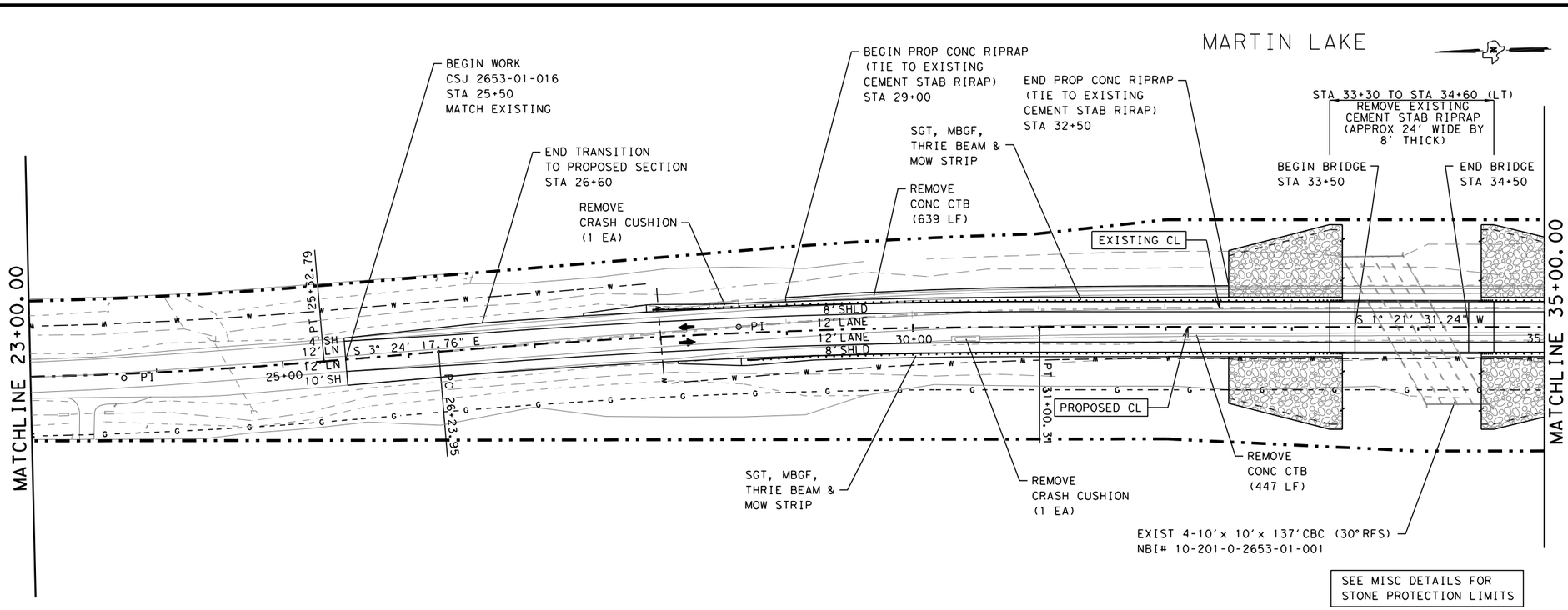


LEGEND

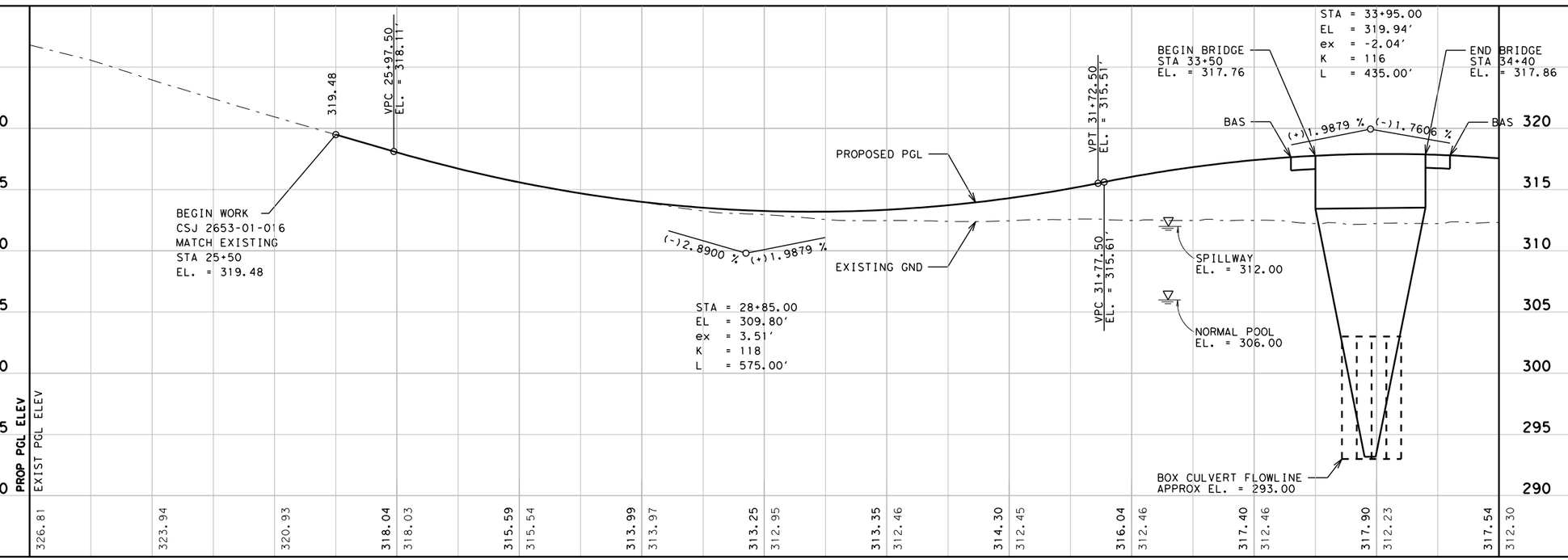
- TRAFFIC FLOW ARROW
- EXISTING ROW (APPROXIMATE)
- EXISTING WATER LINE (APPROXIMATE)
- EXISTING GAS LINE (APPROXIMATE)

SUPERELEVATION: FM 2658

STATION	LT. LANES	RT. LANES	POINT TYPE
25+50.00	-2.16%	0.88%	BEGIN SUPER TRANSITION
26+60.00	2.40%	-2.40%	FULL SUPER
30+69.00	2.40%	-2.40%	BEGIN SUPER TRANSITION
31+75.00	-2.00%	-2.00%	NORMAL CROWN

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" FOR MORE INFORMATION.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. ALL CRASH CUSHION ATTENUATORS SHALL BECOME PROPERTY OF THE STATE.
4. UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THEIR LOCATIONS IN THE FIELD PRIOR TO BEGINNING WORK.



05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

PLAN & PROFILE (AT PANTHER CREEK)

STA 23+00.00 to STA 35+00.00

HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

SHEET 1 OF 2

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	See Title Sheet	54
STATE	DIST.	COUNTY
TEXAS	TYL	RUSK
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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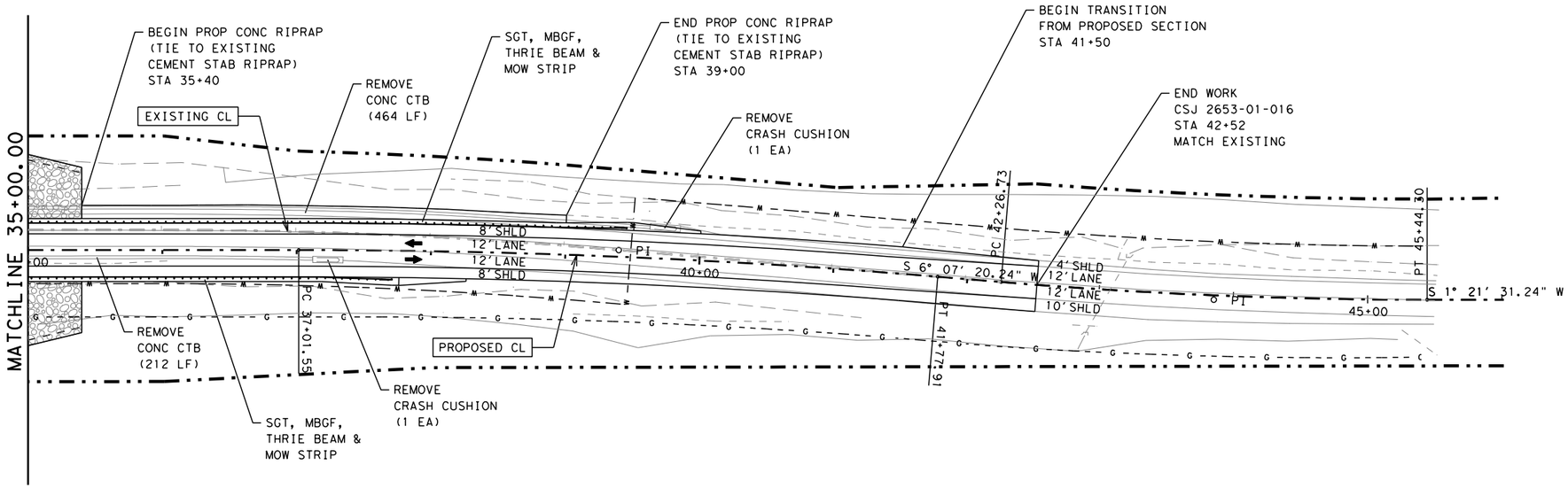
MARTIN LAKE



SEE MISC DETAILS FOR STONE PROTECTION LIMITS

SUPERELEVATION: FM 2658

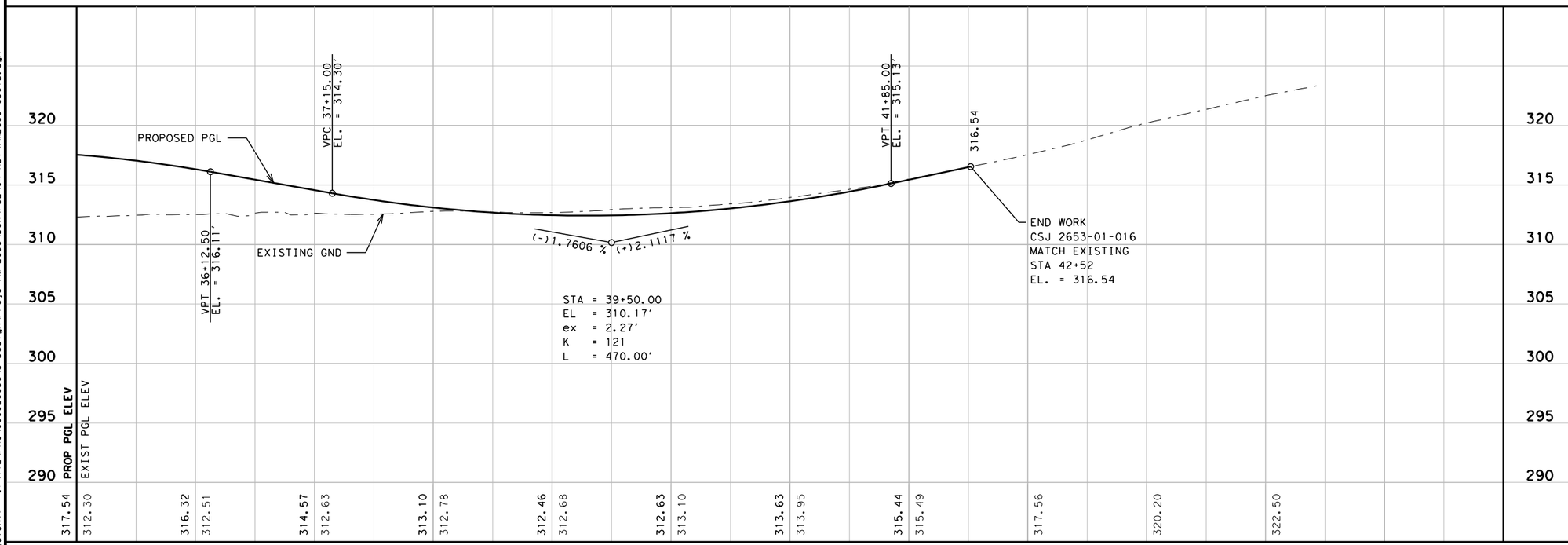
STATION	LT. LANES	RT. LANES	POINT TYPE
36+27.00	-2.00%	-2.00%	BEGIN SUPER TRANSITION
37+33.00	2.40%	-2.40%	FULL SUPER
41+50.00	2.40%	-2.40%	BEGIN SUPER TRANSITION
42+52.00	-1.72%	0.38%	TIE TO EXISTING

LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW (APPROXIMATE)
- W EXISTING WATER LINE (APPROXIMATE)
- G EXISTING GAS LINE (APPROXIMATE)

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" FOR MORE INFORMATION.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. ALL CRASH CUSHION ATTENUATORS SHALL BECOME PROPERTY OF THE STATE.
4. UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY THEIR LOCATIONS IN THE FIELD PRIOR TO BEGINNING WORK.



05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

PLAN & PROFILE (AT PANTHER CREEK)

STA 35+00.00 to STA 46+00.00

HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

SHEET 2 OF 2

Texas Department of Transportation
© 2023

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		55
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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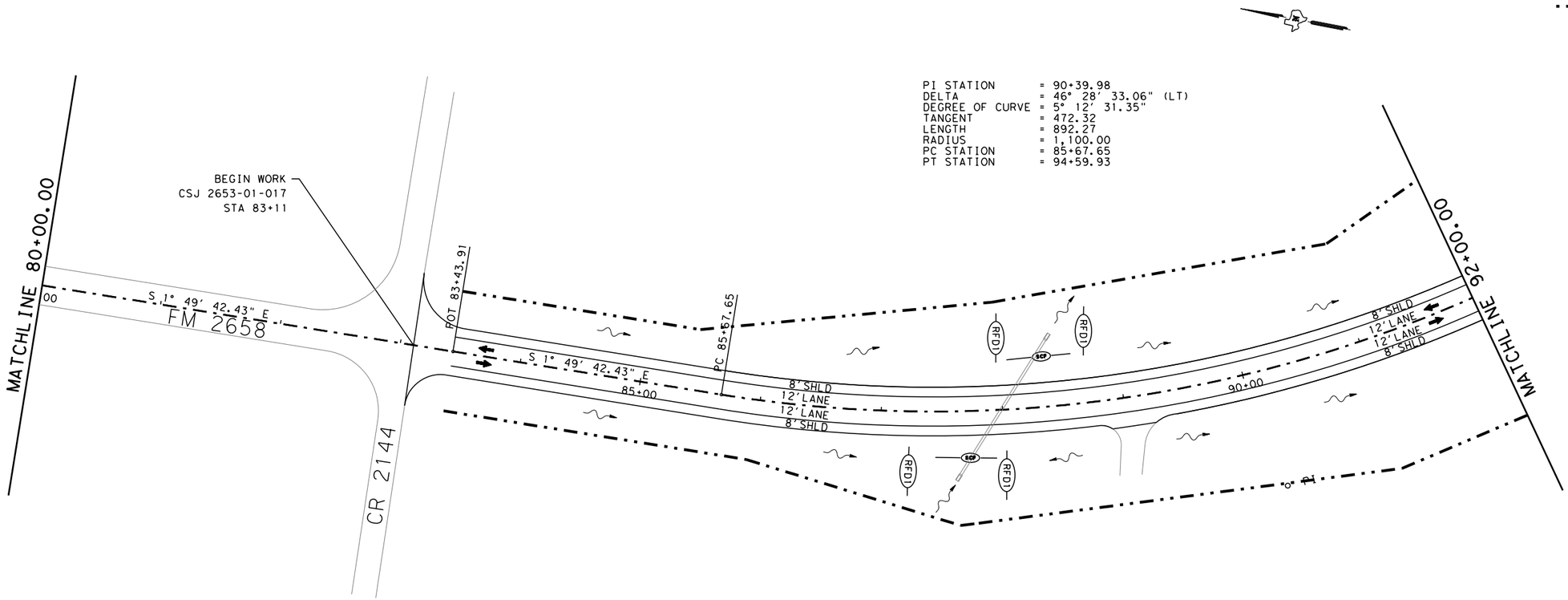
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

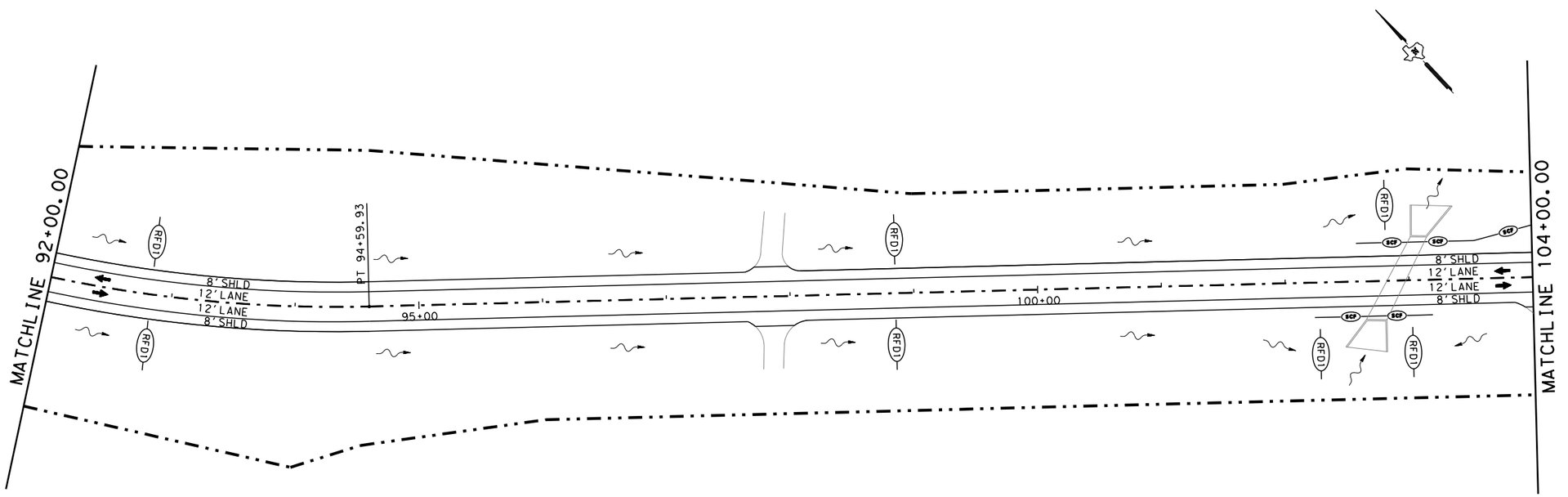
EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.



PI STATION = 90+39.98
DELTA = 46° 28' 33.06" (LT)
DEGREE OF CURVE = 5° 12' 31.35"
TANGENT = 472.32
LENGTH = 892.27
RADIUS = 1,100.00
PC STATION = 85+67.65
PT STATION = 94+59.93

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 80+00.00 to STA 104+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 1 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		56
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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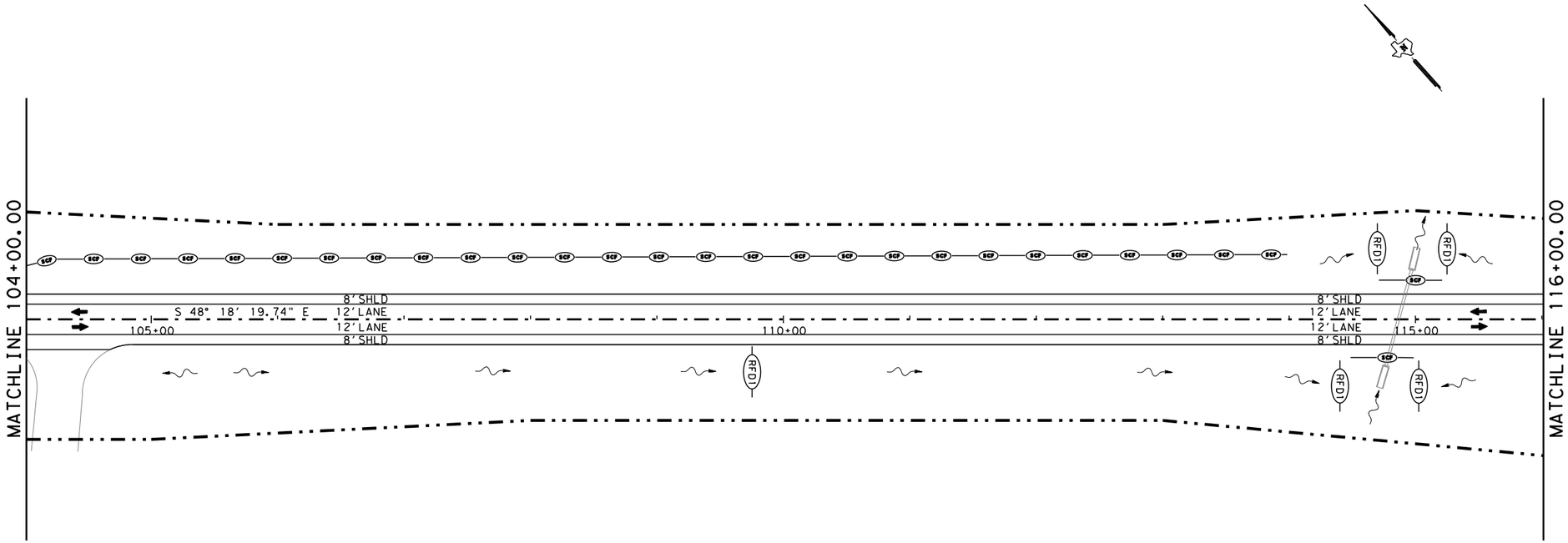


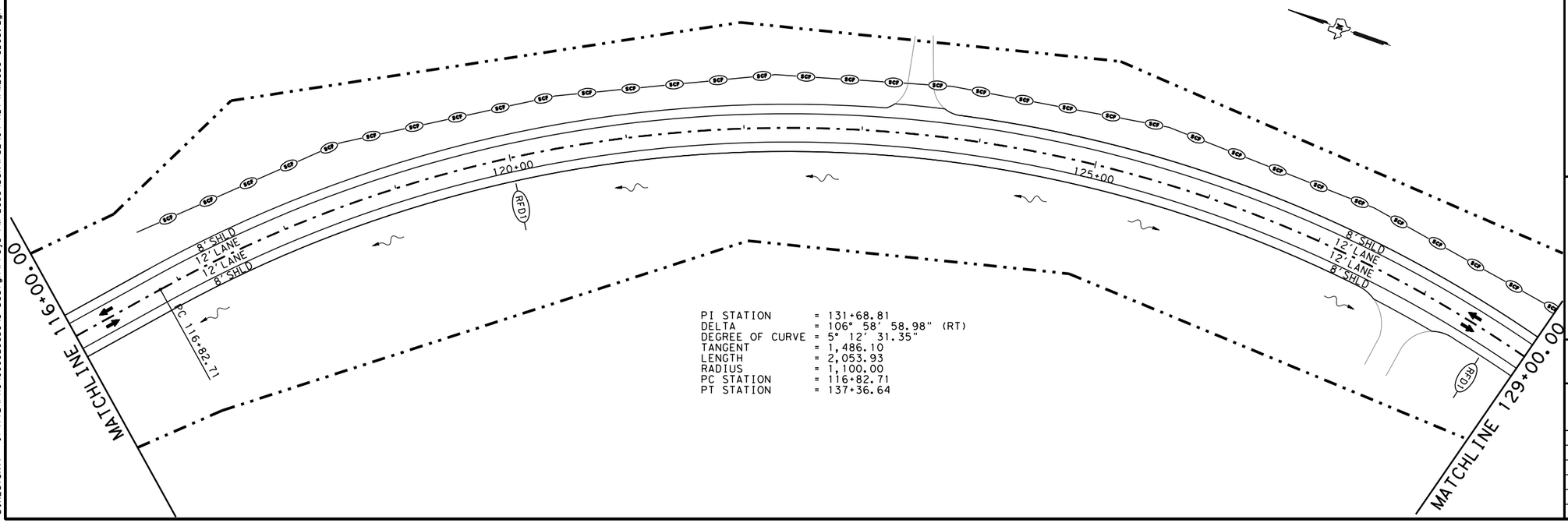
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



PI STATION = 131+68.81
DELTA = 106° 58' 58.98" (RT)
DEGREE OF CURVE = 5° 12' 31.35"
TANGENT = 1,486.10
LENGTH = 2,053.93
RADIUS = 1,100.00
PC STATION = 116+82.71
PT STATION = 137+36.64

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 104+00.00 to STA 129+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 2 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		57
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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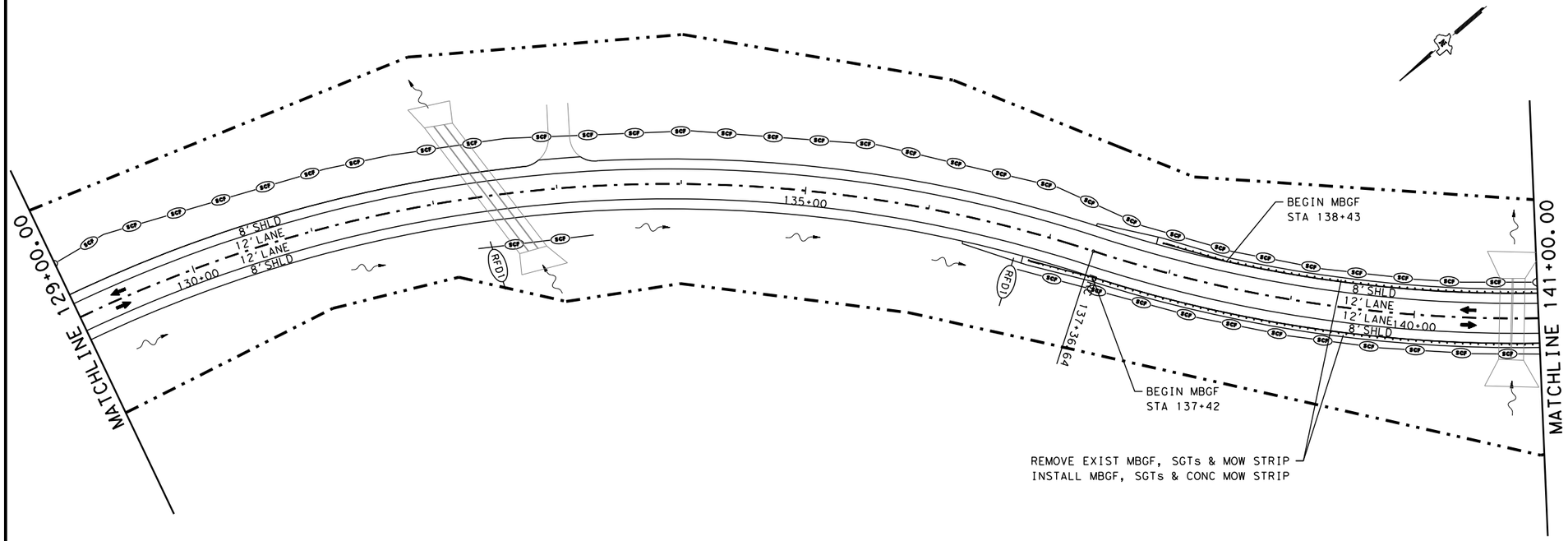


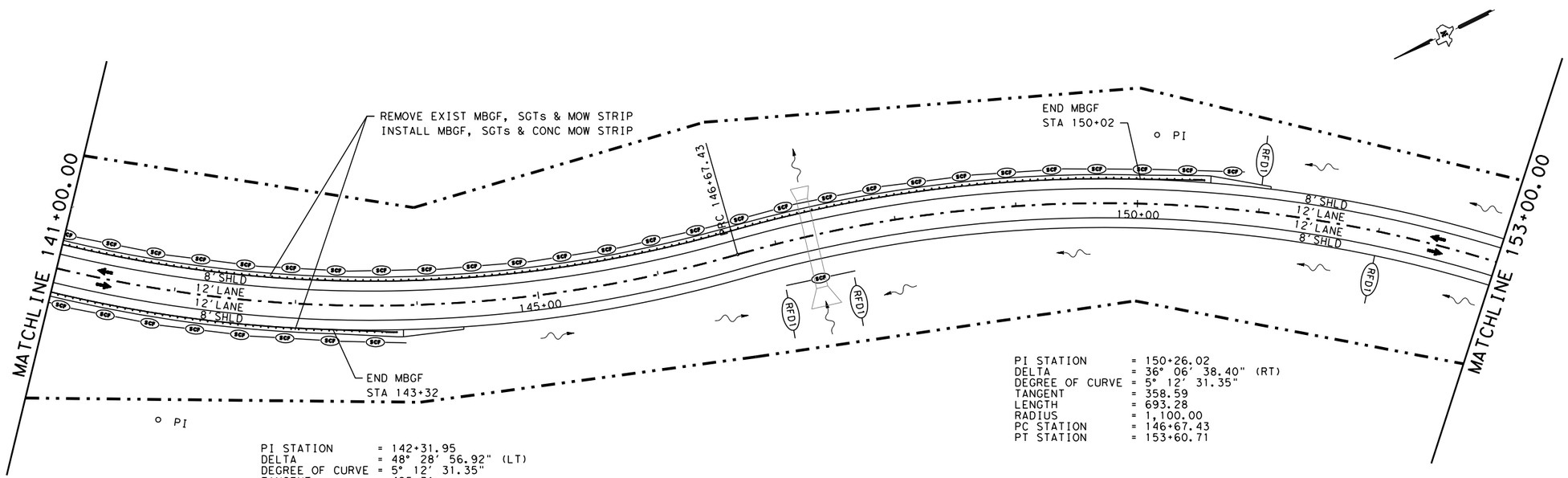
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



PI STATION = 142+31.95
DELTA = 48° 28' 56.92" (LT)
DEGREE OF CURVE = 5° 12' 31.35"
TANGENT = 495.31
LENGTH = 930.80
RADIUS = 1,100.00
PC STATION = 137+36.64
PT STATION = 146+67.43

PI STATION = 150+26.02
DELTA = 36° 06' 38.40" (RT)
DEGREE OF CURVE = 5° 12' 31.35"
TANGENT = 358.59
LENGTH = 693.28
RADIUS = 1,100.00
PC STATION = 146+67.43
PT STATION = 153+60.71

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 129+00.00 to STA 153+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 3 OF 11

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		58
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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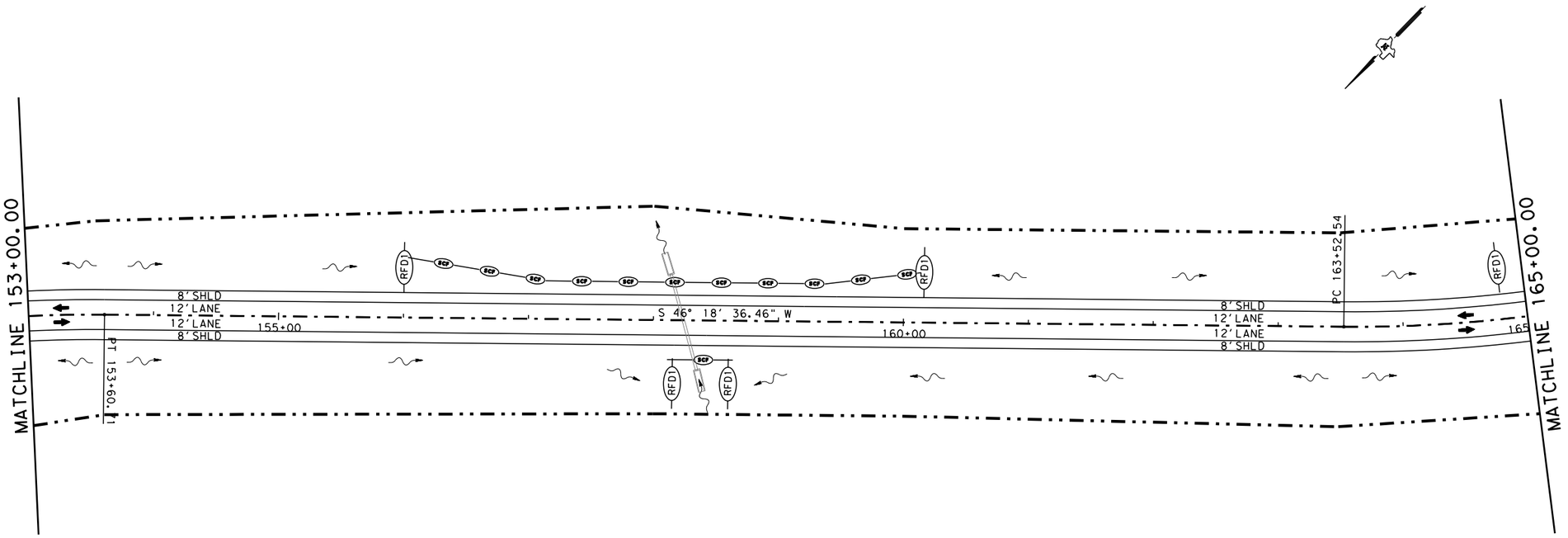


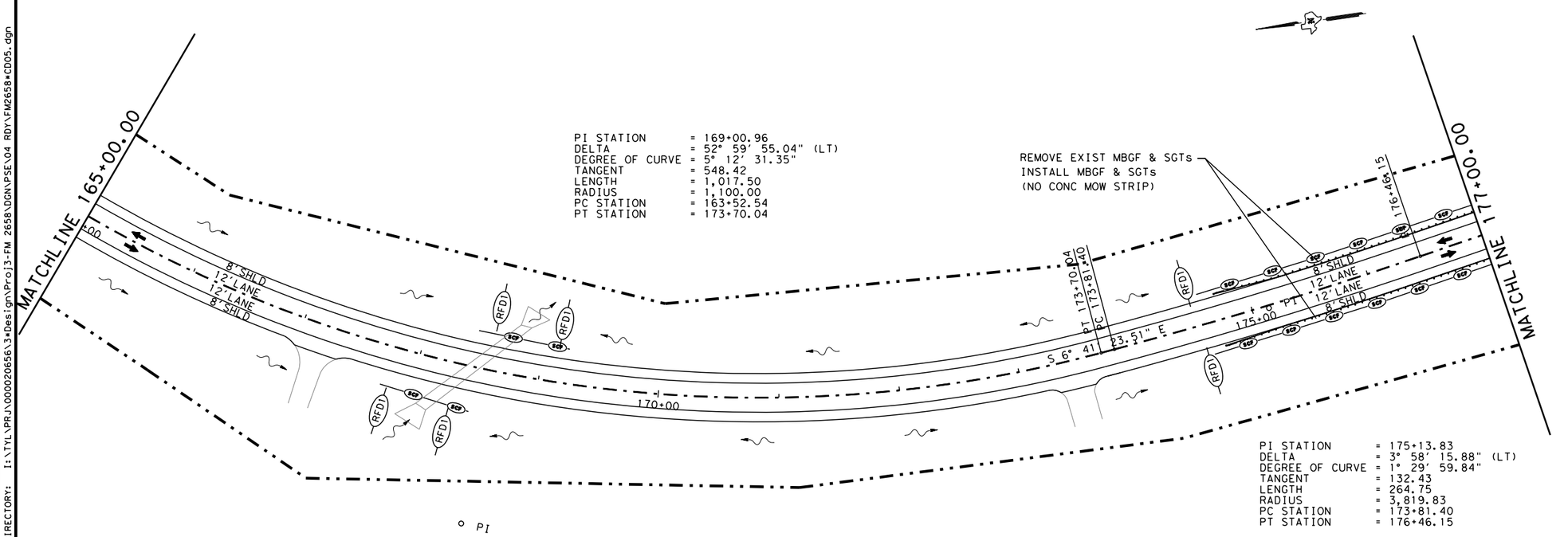
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- RFD1 — ROCK FILTER DAM TY 1 (15' TYP)
- RFD2 — ROCK FILTER DAM TY 2 (15' TYP)
- SCF — SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



PI STATION = 169+00.96
DELTA = 52° 59' 55.04" (LT)
DEGREE OF CURVE = 5° 12' 31.35"
TANGENT = 548.42
LENGTH = 1,017.50
RADIUS = 1,100.00
PC STATION = 163+52.54
PT STATION = 173+70.04

PI STATION = 175+13.83
DELTA = 3° 58' 15.88" (LT)
DEGREE OF CURVE = 1° 29' 59.84"
TANGENT = 132.43
LENGTH = 264.75
RADIUS = 3,819.83
PC STATION = 173+81.40
PT STATION = 176+46.15

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 153+00.00 to STA 177+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 4 OF 11

Texas Department of Transportation
© 2023

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		59
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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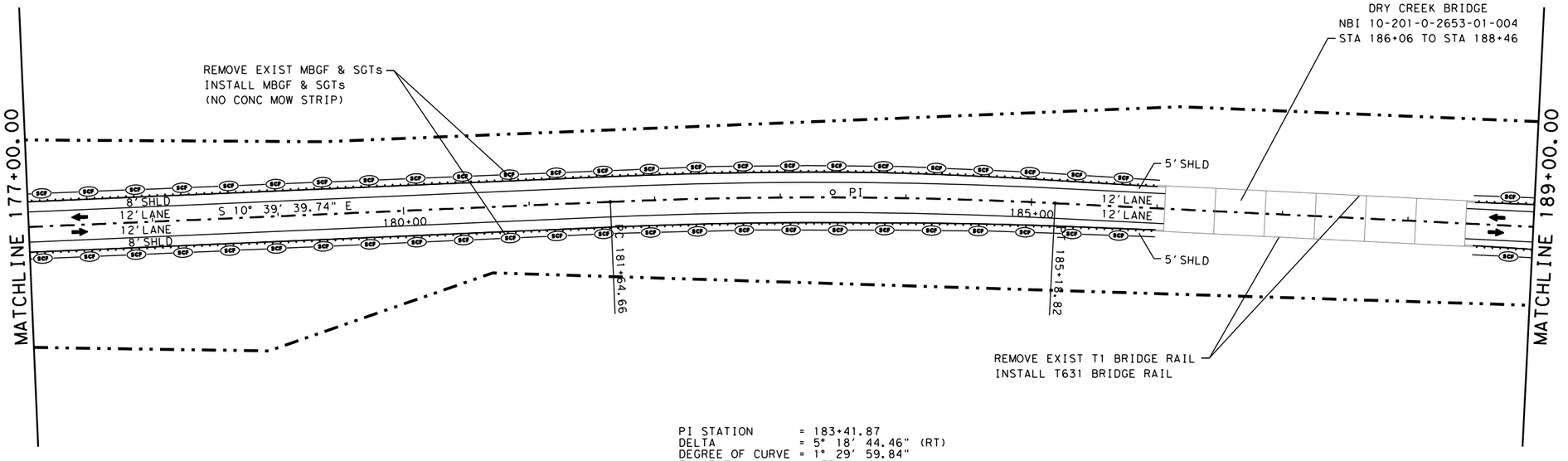


PI STATION = 183+41.87
DELTA = 5° 18' 44.46" (RT)
DEGREE OF CURVE = 1° 29' 59.84"
TANGENT = 177.21
LENGTH = 354.17
RADIUS = 3,819.83
PC STATION = 181+64.66
PT STATION = 185+18.82

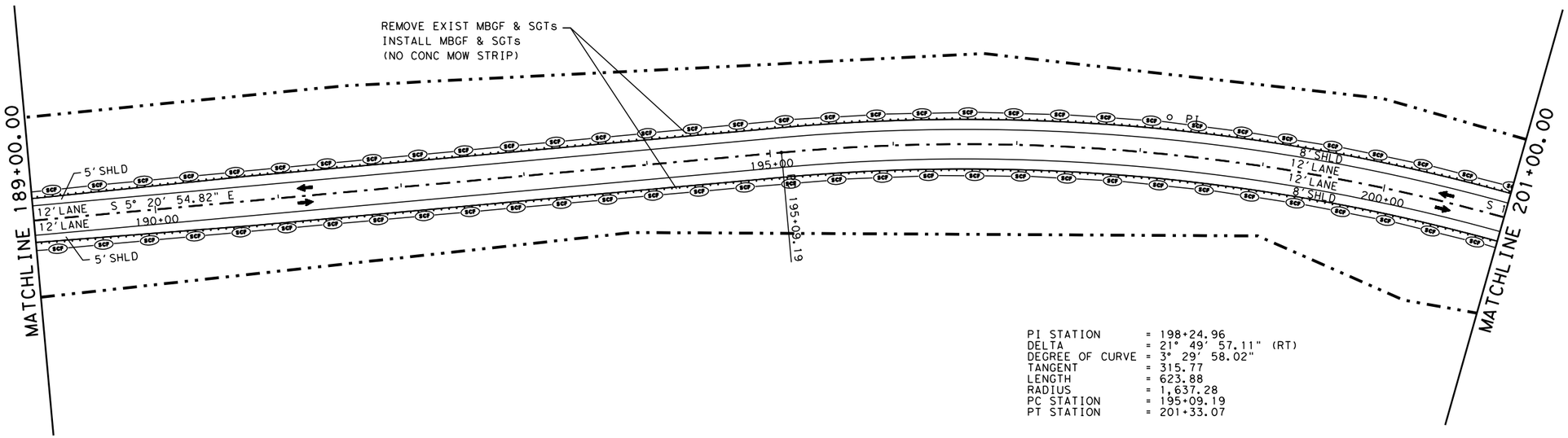
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



PI STATION = 198+24.96
DELTA = 21° 49' 57.11" (RT)
DEGREE OF CURVE = 3° 29' 58.02"
TANGENT = 315.77
LENGTH = 623.88
RADIUS = 1,637.28
PC STATION = 195+09.19
PT STATION = 201+33.07

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 177+00.00 to STA 201+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 5 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		60
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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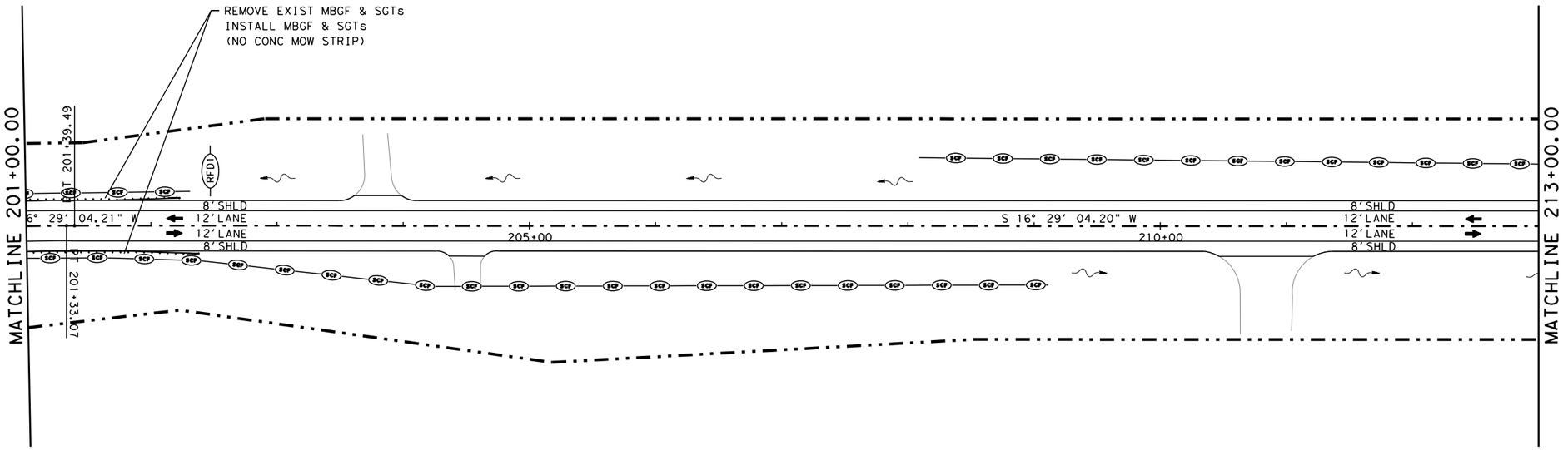


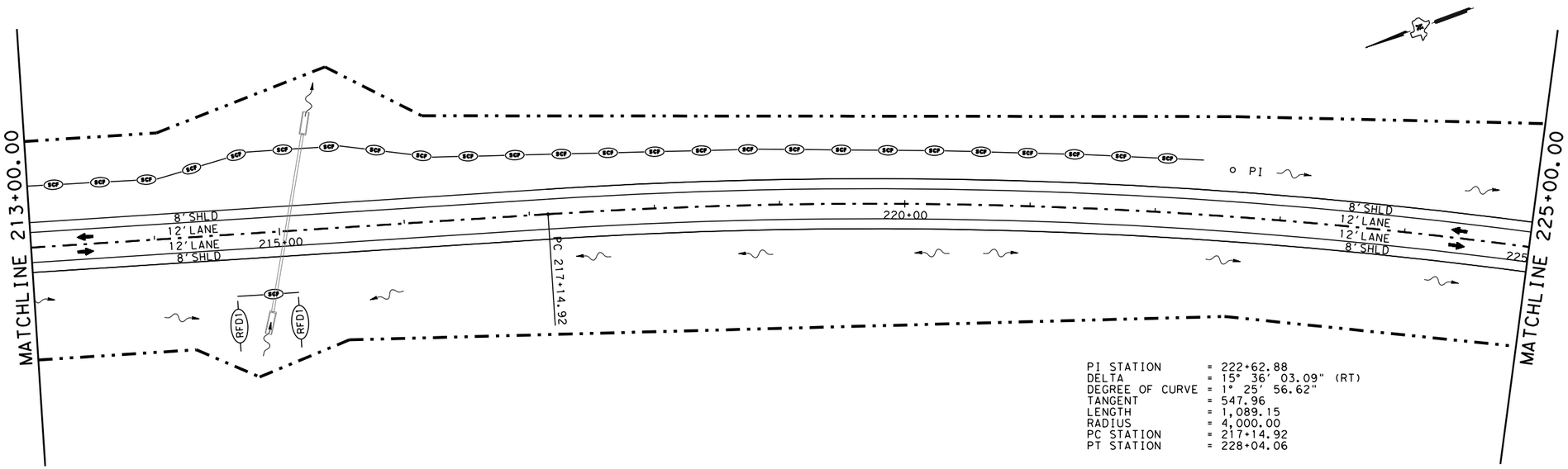
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



PI STATION = 222+62.88
DELTA = 15° 36' 03.09" (RT)
DEGREE OF CURVE = 1° 25' 56.62"
TANGENT = 547.96
LENGTH = 1,089.15
RADIUS = 4,000.00
PC STATION = 217+14.92
PT STATION = 228+04.06

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 201+00.00 to STA 225+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 6 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		61
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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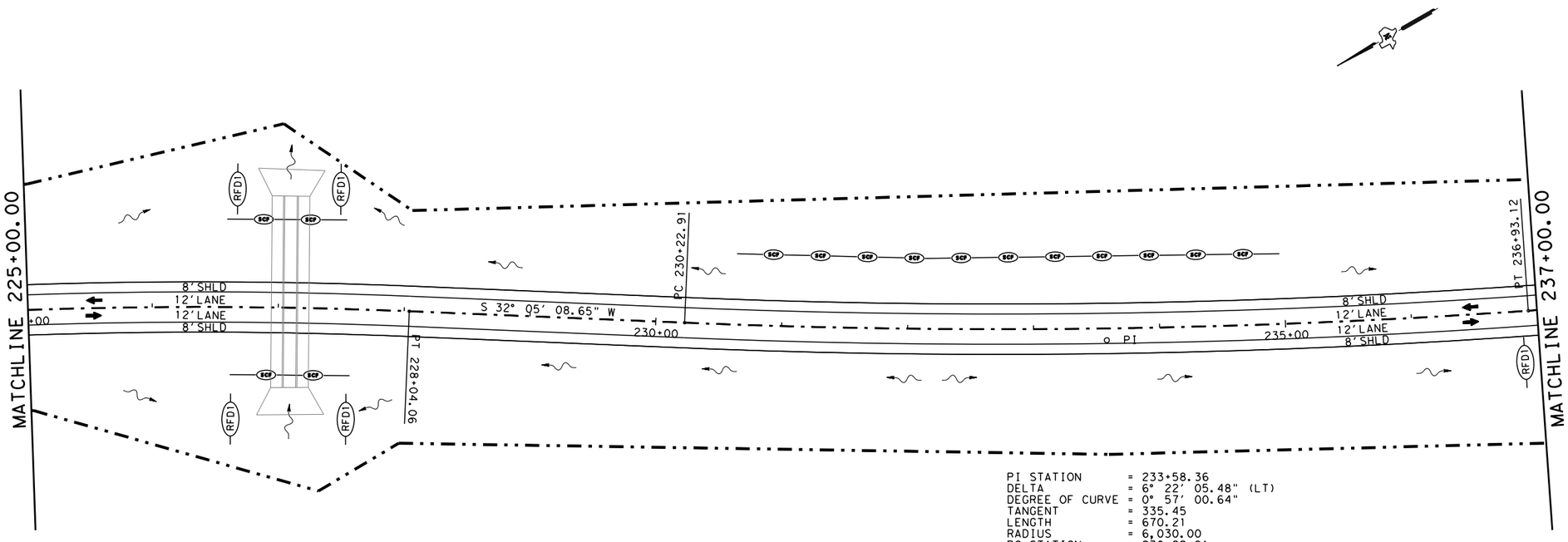


PI STATION = 233+58.36
DELTA = 6° 22' 05.48" (LT)
DEGREE OF CURVE = 0° 57' 00.64"
TANGENT = 335.45
LENGTH = 670.21
RADIUS = 6,030.00
PC STATION = 230+22.91
PT STATION = 236+93.12

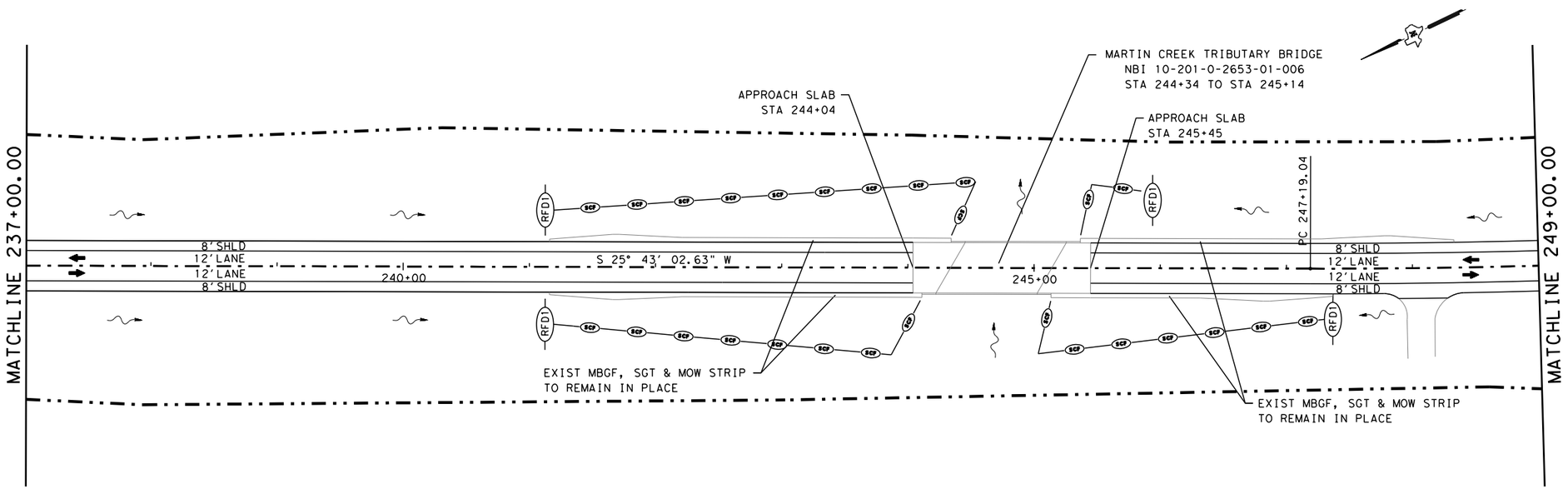
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- RFD1 — ROCK FILTER DAM TY 1 (15' TYP)
- RFD2 — ROCK FILTER DAM TY 2 (15' TYP)
- SCF — SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 225+00.00 to STA 249+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 7 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		62
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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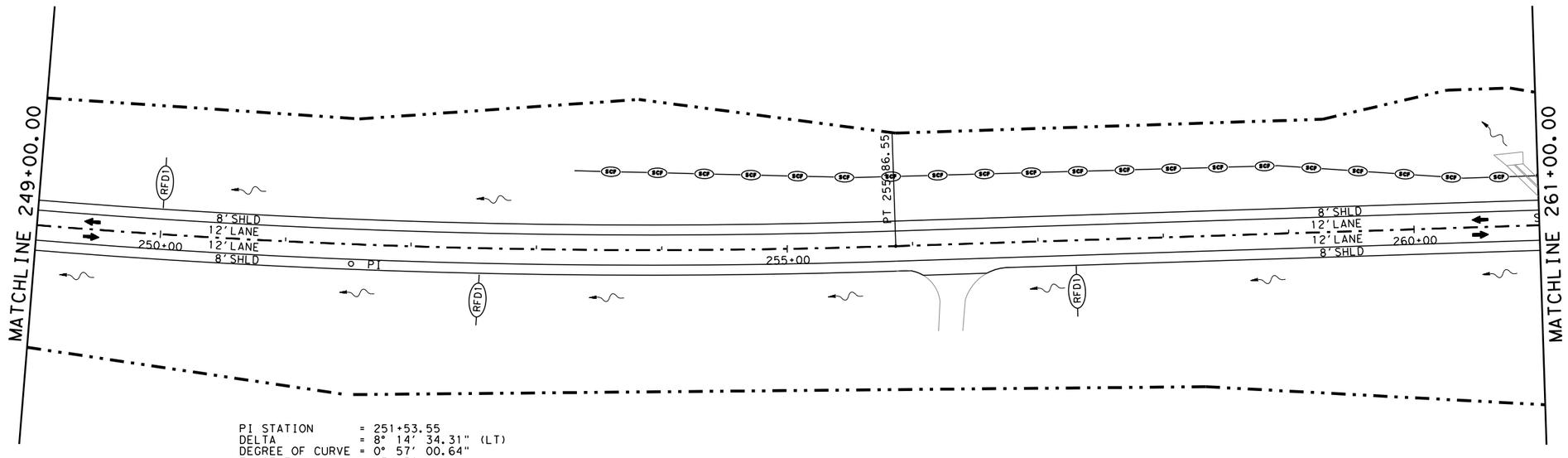

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TANGENT = 434.50
LENGTH = 867.51
RADIUS = 6,030.00
PC STATION = 247+19.04
PT STATION = 255+86.55

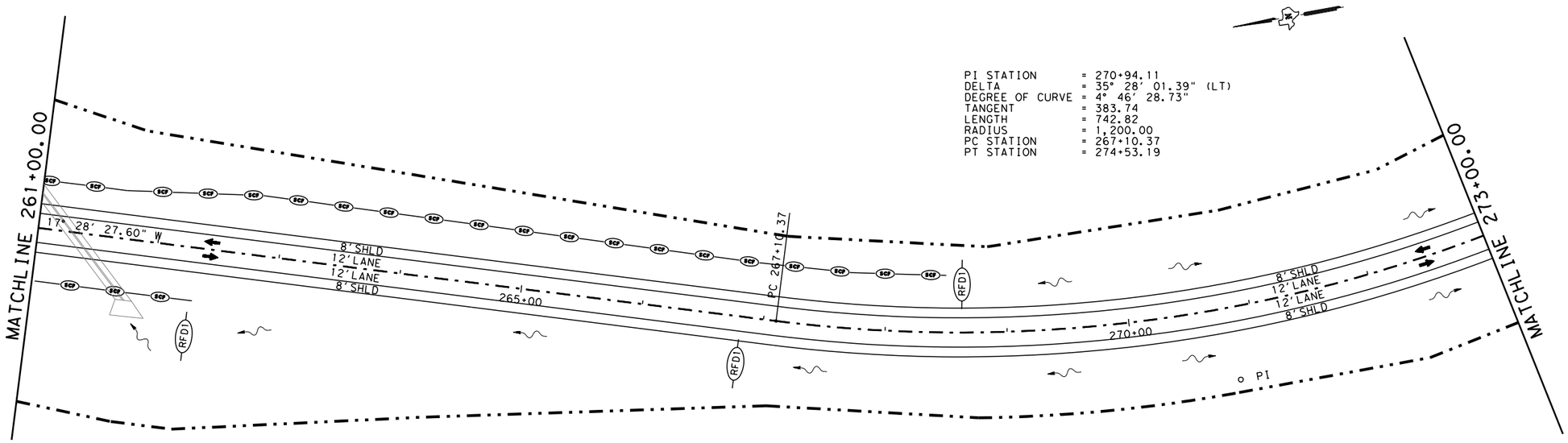
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- RFD1 — ROCK FILTER DAM TY 1 (15' TYP)
- RFD2 — ROCK FILTER DAM TY 2 (15' TYP)
- SCF — SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



PI STATION = 270+94.11
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TANGENT = 383.74
LENGTH = 742.82
RADIUS = 1,200.00
PC STATION = 267+10.37
PT STATION = 274+53.19

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 249+00.00 to STA 273+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 8 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		63
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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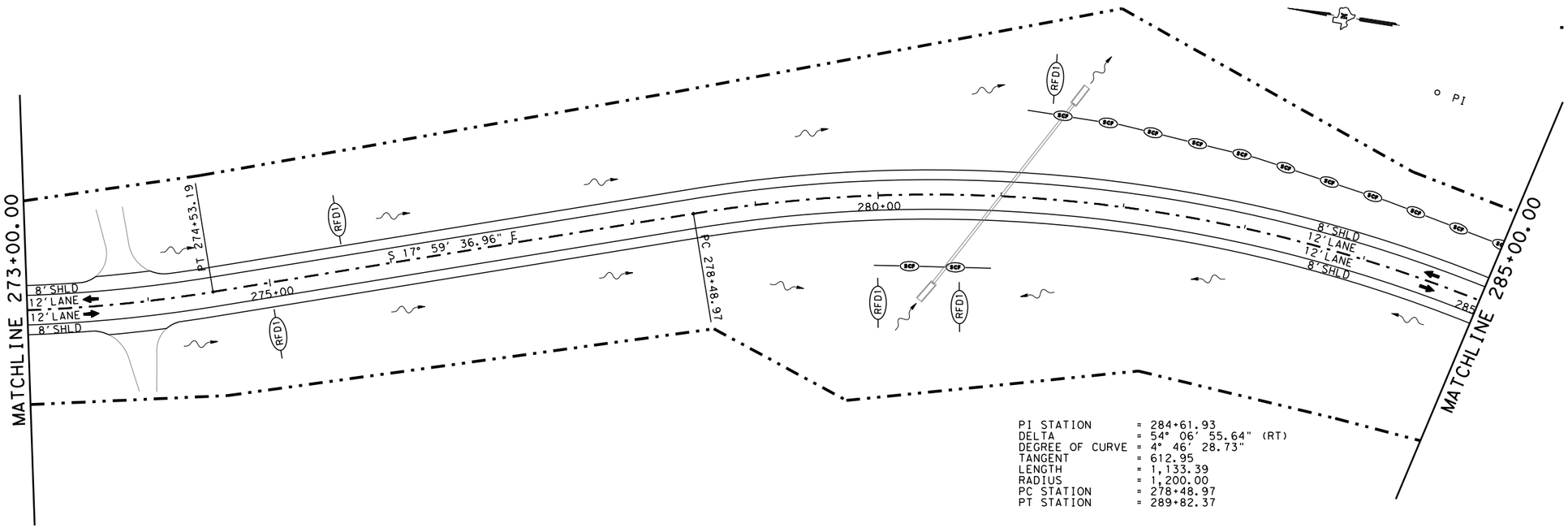


PI STATION = 284+61.93
DELTA = 54° 06' 55.64" (RT)
DEGREE OF CURVE = 4° 46' 28.73"
TANGENT = 612.95
LENGTH = 1,133.39
RADIUS = 1,200.00
PC STATION = 278+48.97
PT STATION = 289+82.37

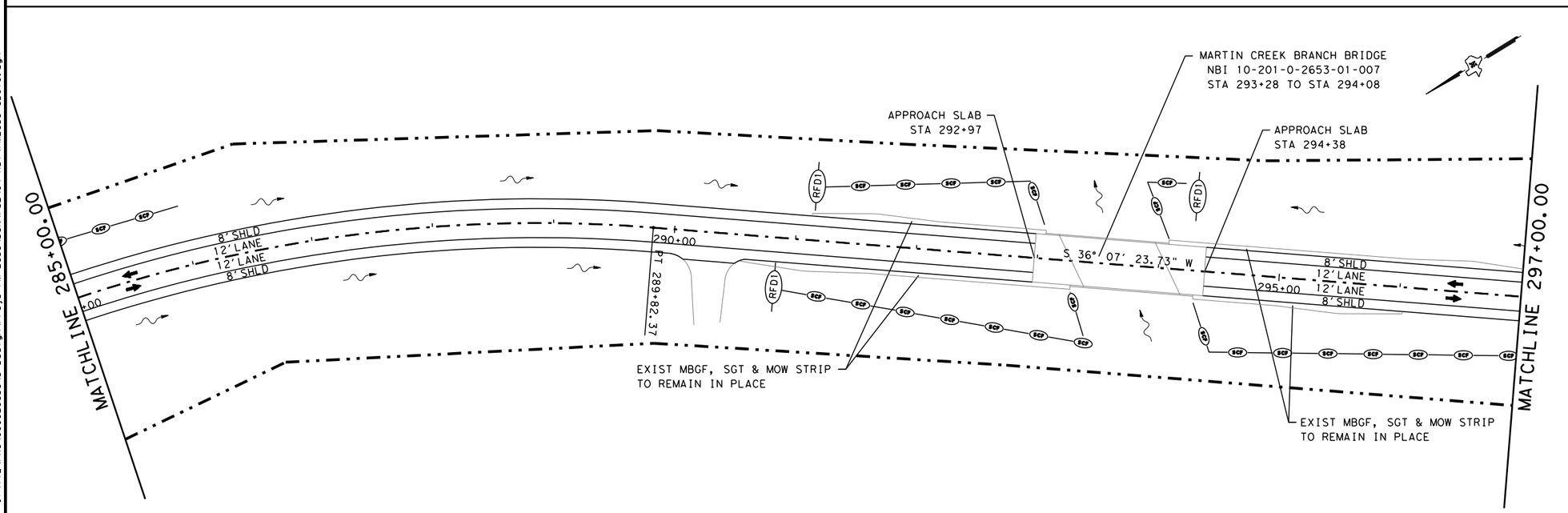
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
2. ALL APPROACH TAPERS TO PROPOSED GUARDRAIL END TREATMENTS SHALL BE GRADED (NOT MOW STRIP).
3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.



05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 273+00.00 to STA 297+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 9 OF 11

Texas Department of Transportation
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LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		64
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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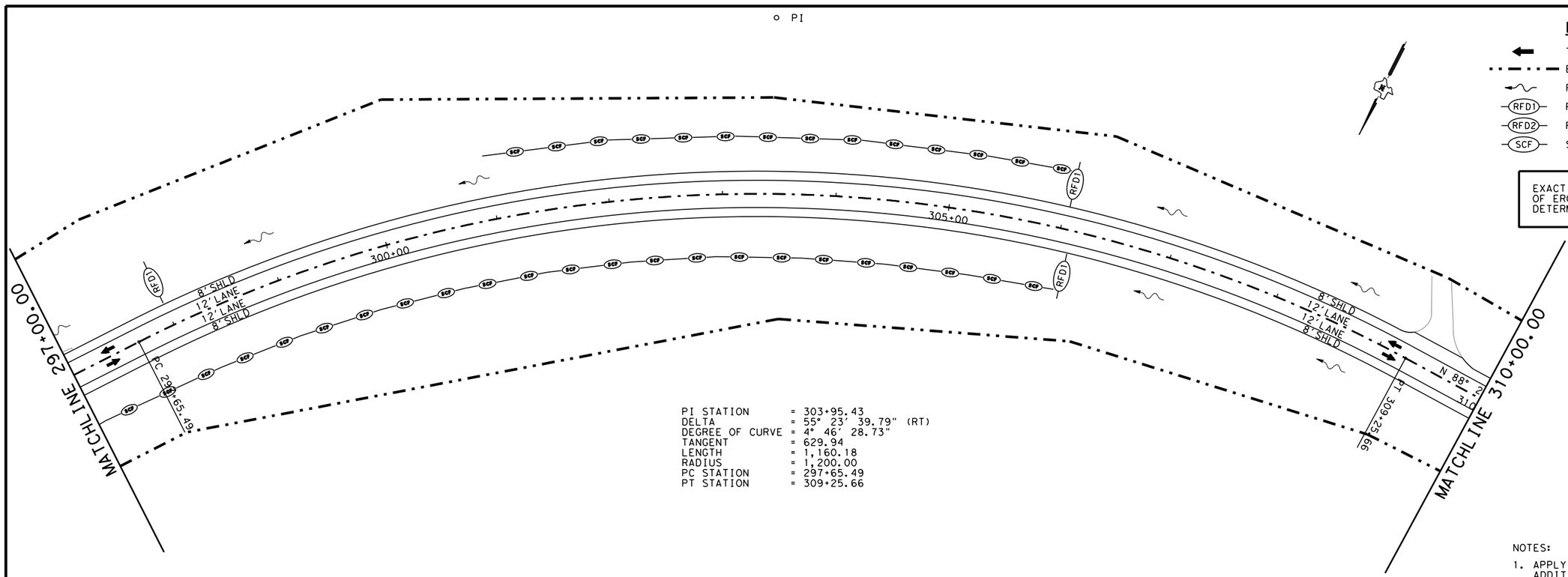

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DEGREE OF CURVE = 4° 46' 28.73"
TANGENT = 629.94
LENGTH = 1,160.18
RADIUS = 1,200.00
PC STATION = 297+65.49
PT STATION = 309+25.66

LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- RFD1 — ROCK FILTER DAM TY 1 (15' TYP)
- RFD2 — ROCK FILTER DAM TY 2 (15' TYP)
- SCF — SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
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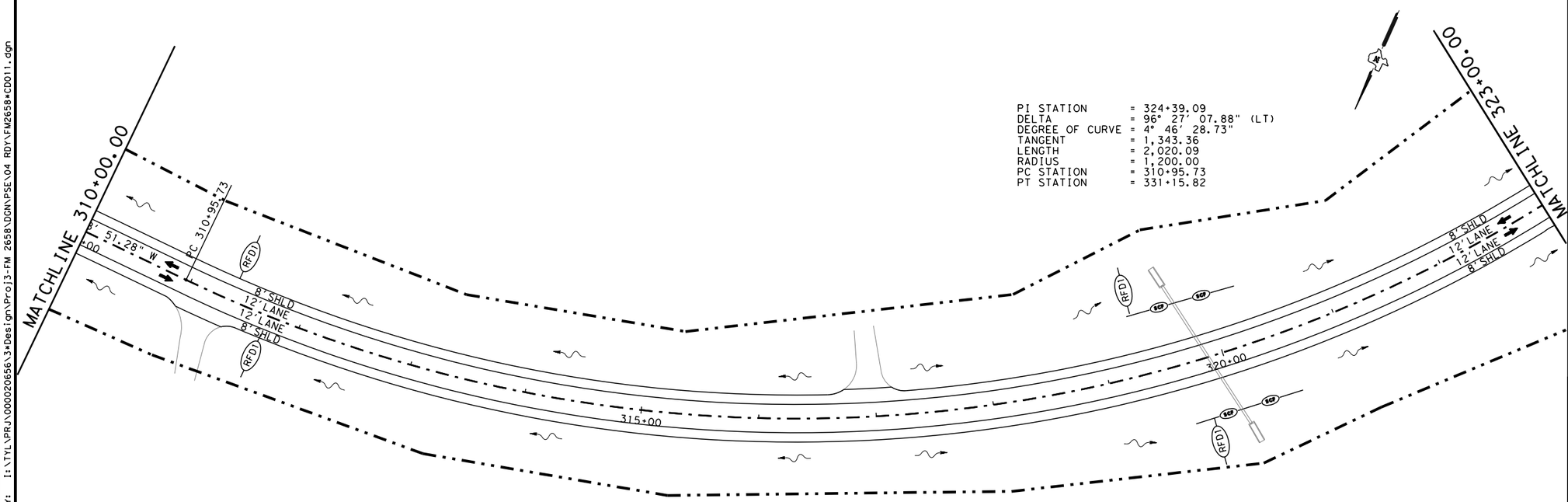

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TANGENT = 1,343.36
LENGTH = 2,020.09
RADIUS = 1,200.00
PC STATION = 310+95.73
PT STATION = 331+15.82

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 297+00.00 to STA 323+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 10 OF 11

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		65
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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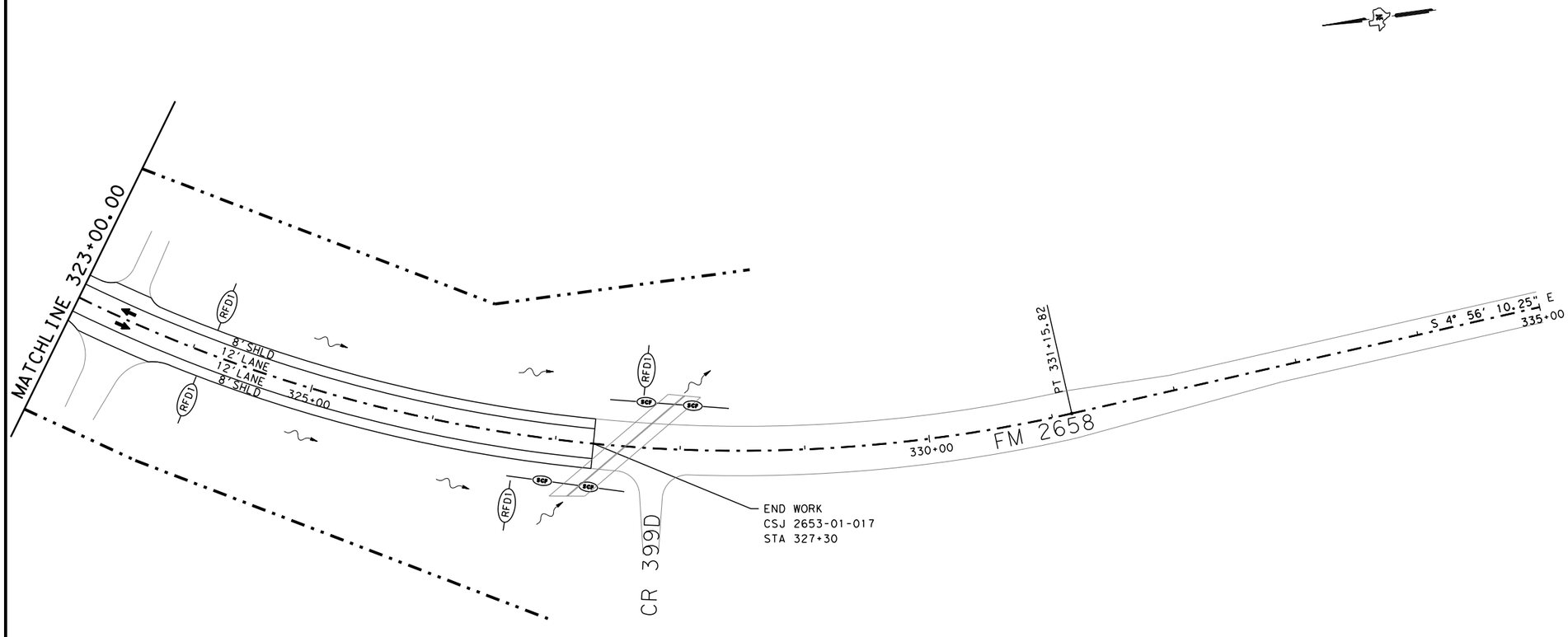

LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW
- FLOW DIRECTION
- (RFD1) ROCK FILTER DAM TY 1 (15' TYP)
- (RFD2) ROCK FILTER DAM TY 2 (15' TYP)
- (SCF) SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

NOTES:

1. APPLY 2ND COURSE (GR 4) OF TCST AN ADDITIONAL 4' WIDTH AT DRIVEWAYS.
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3. EXISTING CEMENT STAB RIPRAP LAYERS WILL BE ENCOUNTERED DURING SOME MBGF REMOVAL / INSTALLATION.

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
PLAN LAYOUT

STA 323+00.00 to STA 347+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 11 OF 11

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		66
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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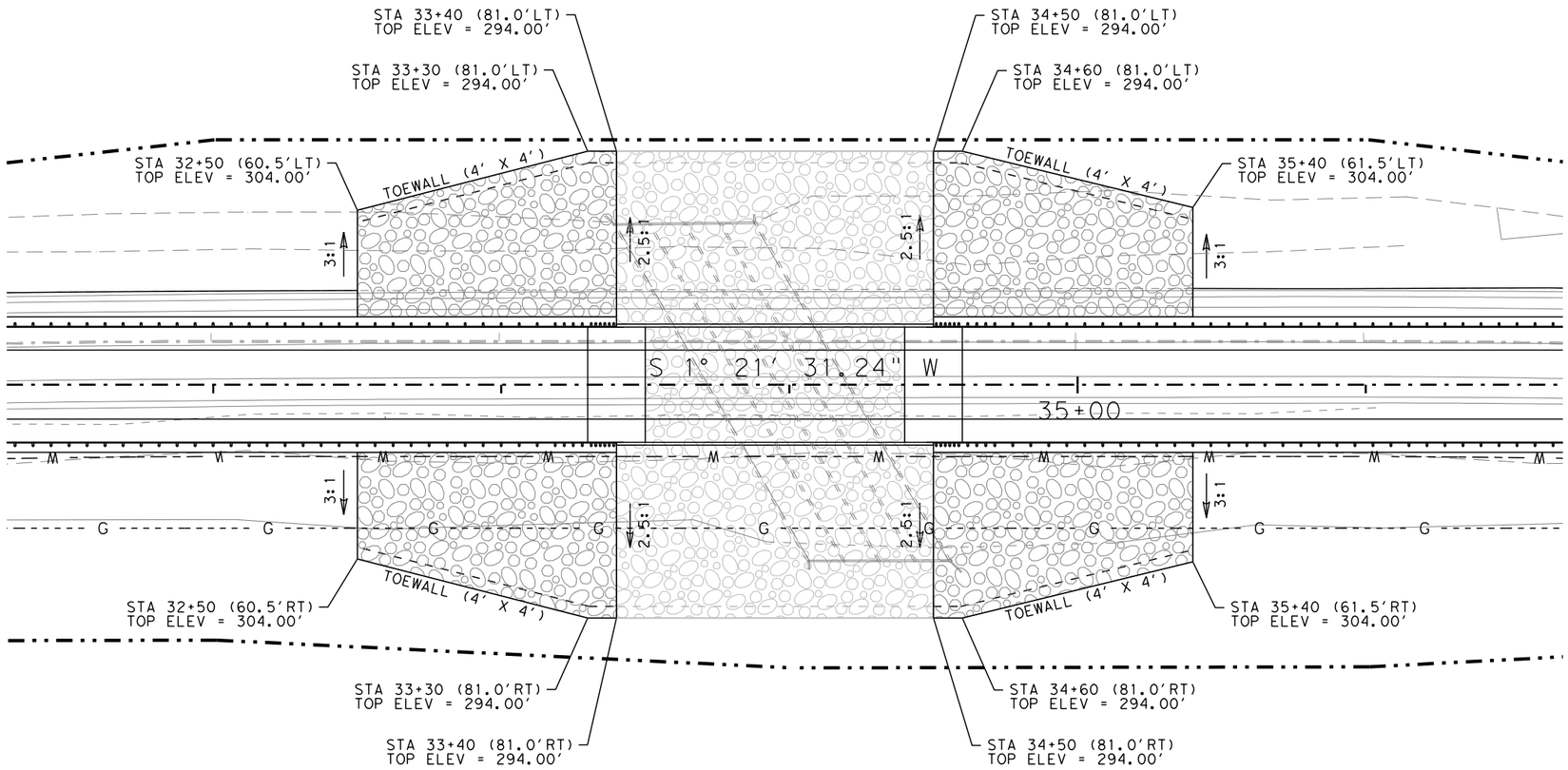
LEGEND

- TRAFFIC FLOW ARROW
- EXISTING ROW (APPROXIMATE)
- M EXISTING WATER LINE (APPROXIMATE)
- G EXISTING GAS LINE (APPROXIMATE)
- STONE PROTECTION (15") (THICKNESS = 24")



STONE PROTECTION LIMITS (ROADWAY)

SEE BRIDGE DRAWINGS FOR RIPRAP GEOMETRY AND GRADING BETWEEN STA 33+40 AND STA 34+50

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
MISC DETAILS

SHEET 1 OF 2

LOCHNER
TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		67
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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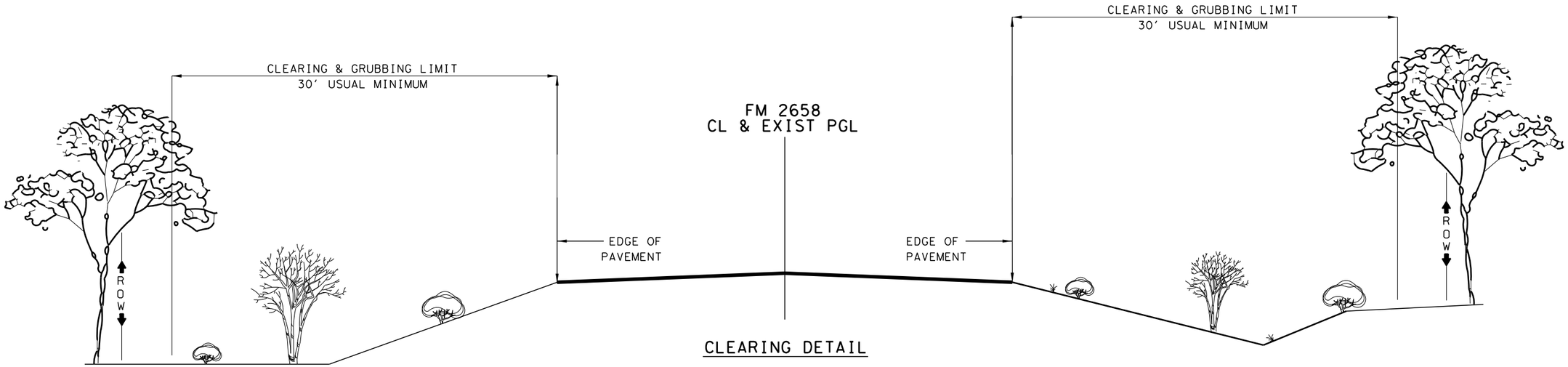


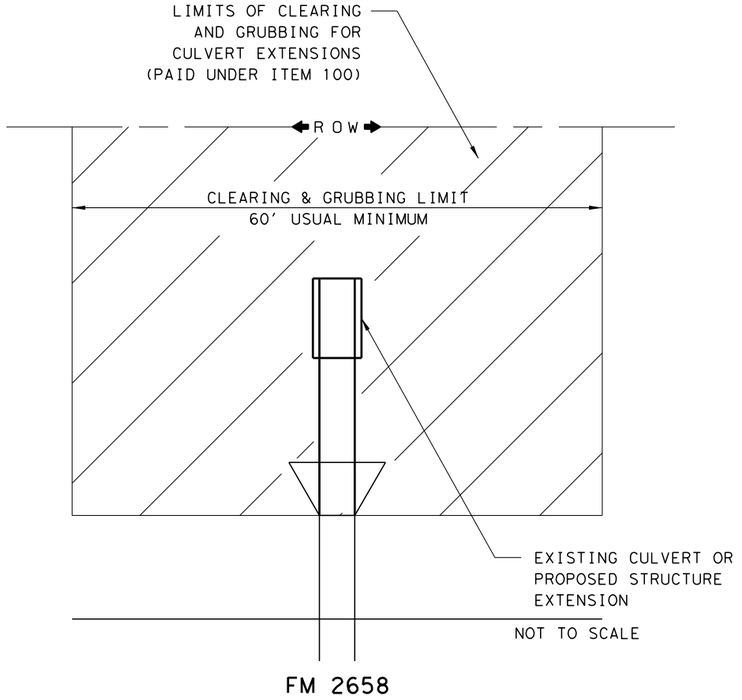
CLEARING DETAIL

ALL TRIMMING APPLIES
TO BOTH SIDES OF ROADWAY

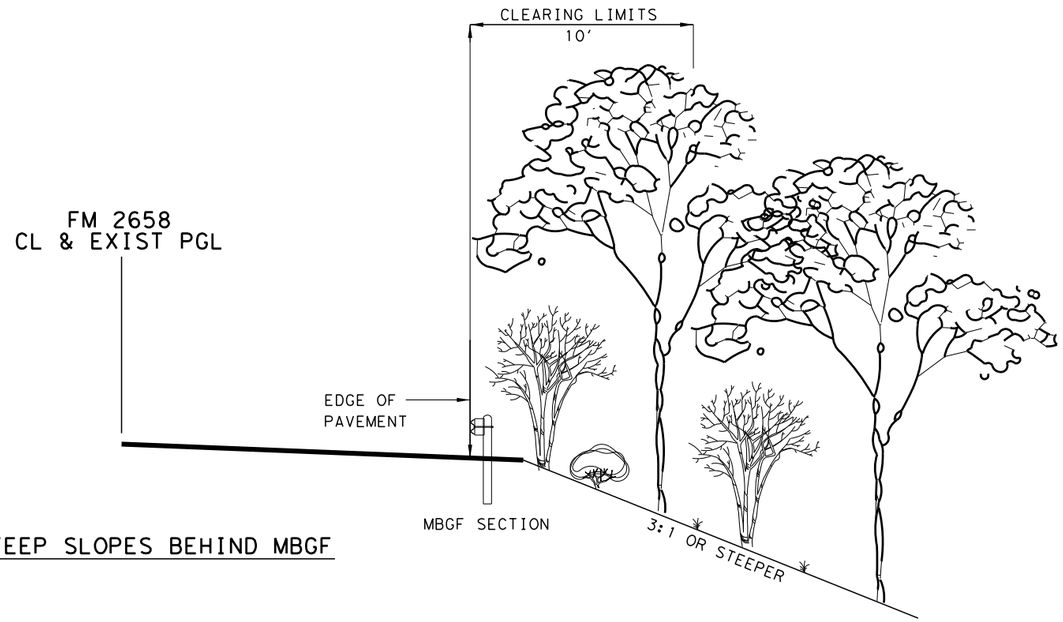
PREPARING ROW DETAILS

NOTES:

1) ALL TREE LIMBS EXTENDING INTO THE CLEARING LIMITS SHALL BE REMOVED, UNLESS OTHERWISE SHOWN ON PLANS. VERTICAL CLEARING LIMITS ARE FROM NATURAL GROUND THROUGH TOP OF TREE OR AS DIRECTED.
2) CLEARING OPERATIONS SHALL BE PERFORMED IN ACCORDANCE TO ITEM 100, "PREPARING RIGHT OF WAY", EXCEPT THOSE SHOWN BY THESE DETAILS.
3) PAYMENT WILL BE MADE AT THE UNIT PRICE BID FOR PREPARING RIGHT OF WAY BY THE STATION. STATION LIMITS WILL BE SHOWN ELSEWHERE IN THE PLANS.
4) WHERE STEEP SLOPES MAKE GRINDING OPERATIONS IMPRACTICAL, AND THE ENGINEER APPROVES IN WRITING, THE CONTRACTOR MAY CUT STUMPS OFF EVEN WITH THE GROUND.



CLEARING AND GRUBBING DETAIL



FOR STEEP SLOPES BEHIND MBGF

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

FM 2658
MISC DETAILS

SHEET 2 OF 2

Texas Department of Transportation
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LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		68
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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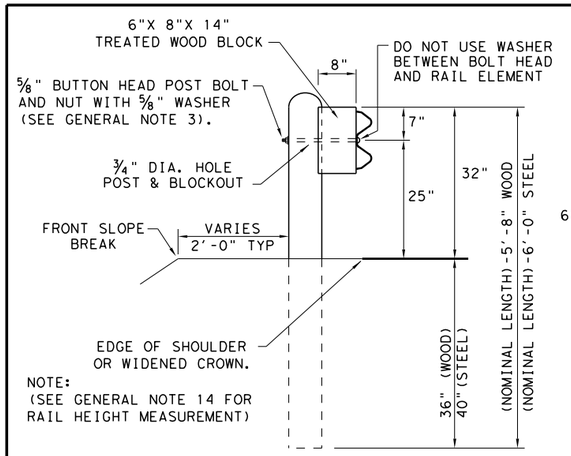
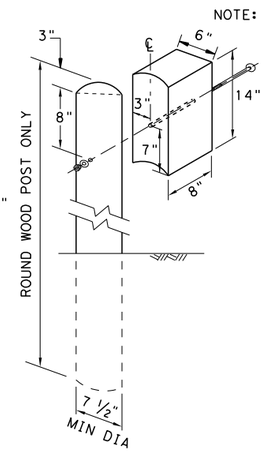
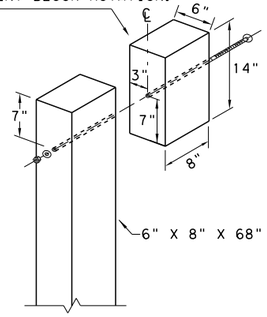


TYPICAL POST PLACEMENT

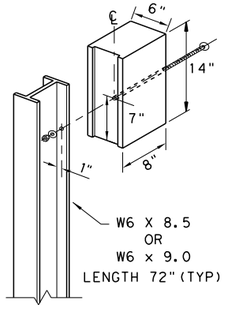


WOOD BLOCK TO ROUND WOOD POST

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

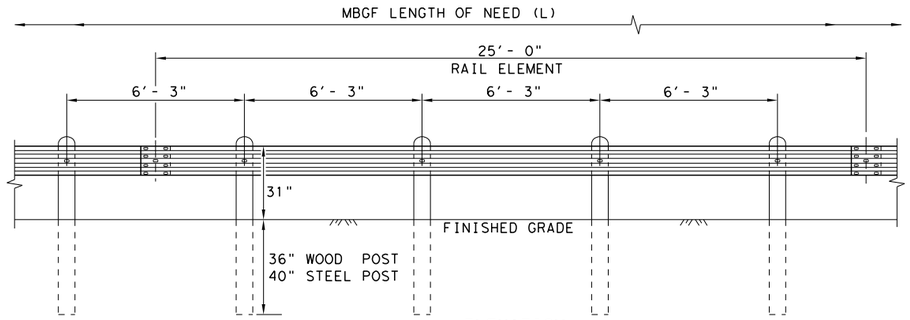


WOOD BLOCK TO RECTANGULAR WOOD POST



ROUTED WOOD BLOCK TO I-BEAM STEEL POST

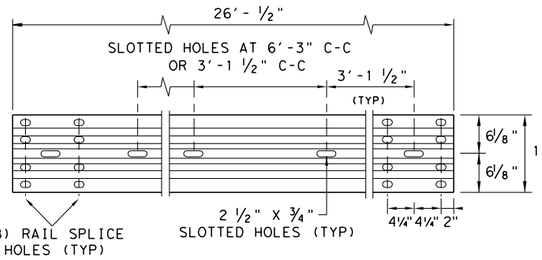
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION
MID-SPAN RAIL SPLICE

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

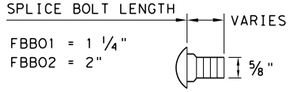
DIRECTION OF TRAFFIC



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

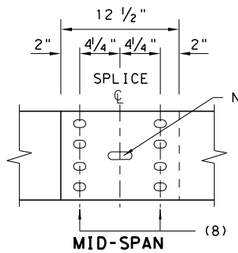
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



BUTTON HEAD BOLT

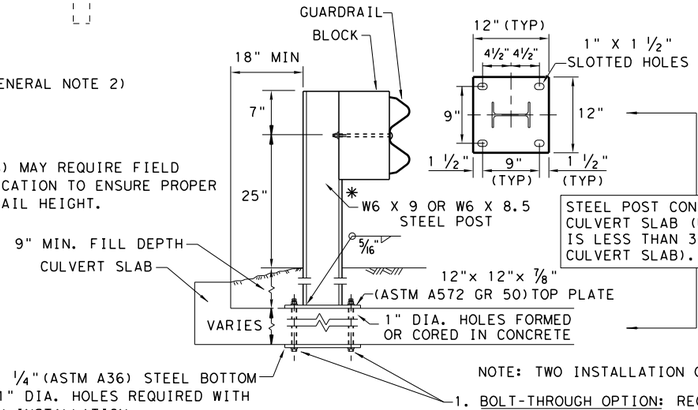
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



DIRECTION OF TRAFFIC

MID-SPAN RAIL SPLICE DETAIL

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



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

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

12" X 12" X ¼"(ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

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

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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

Texas Department of Transportation | Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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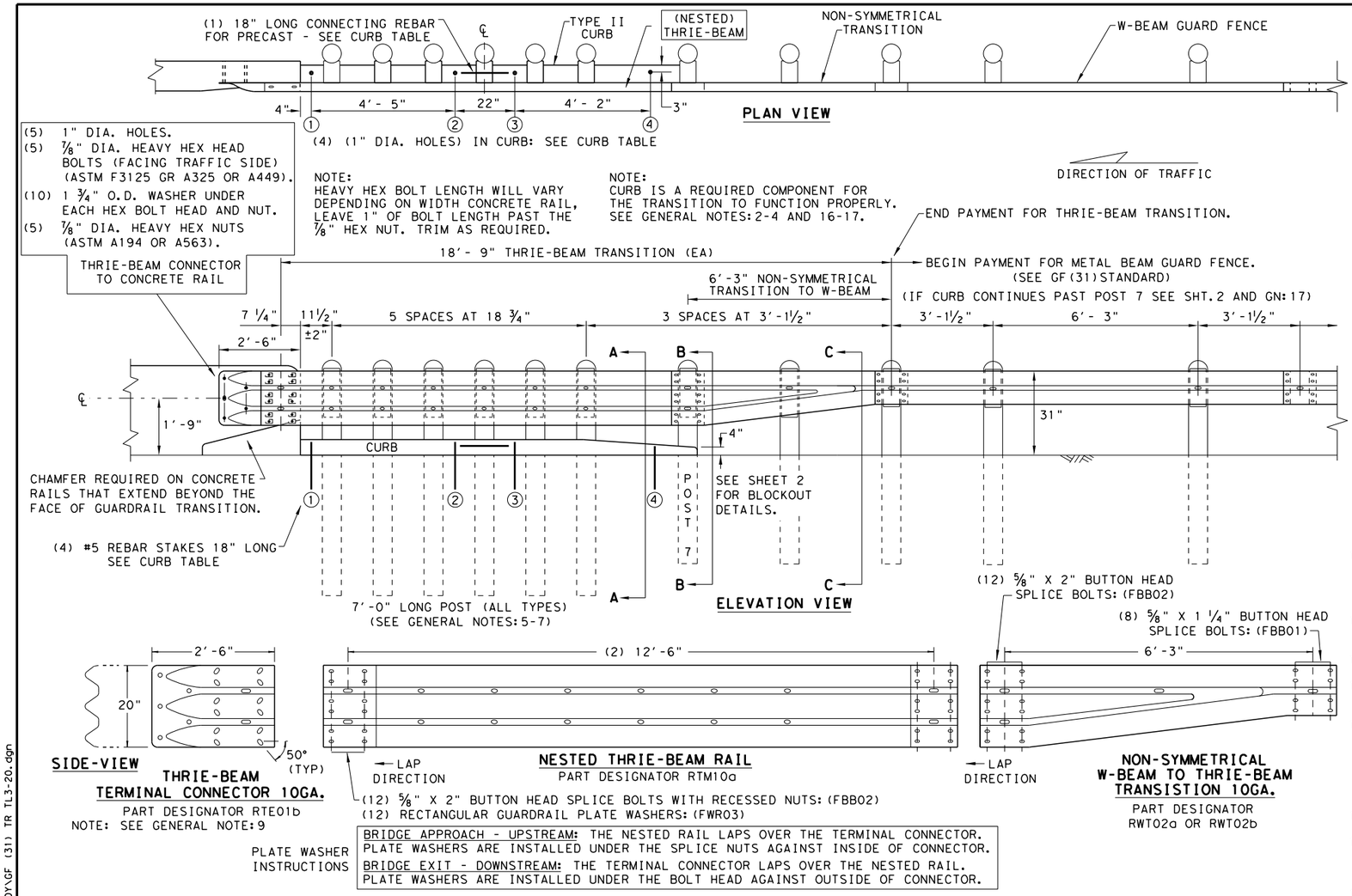
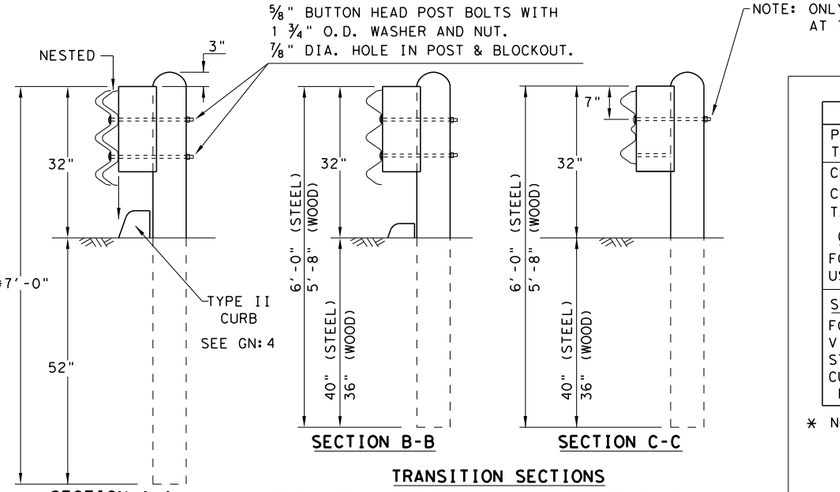
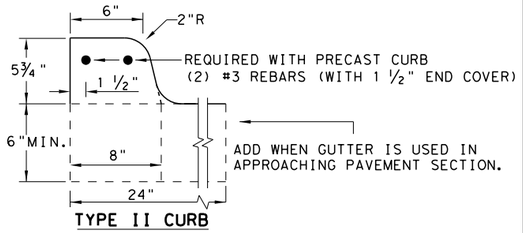




THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB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



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

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

TYPE II CURB DETAILS

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

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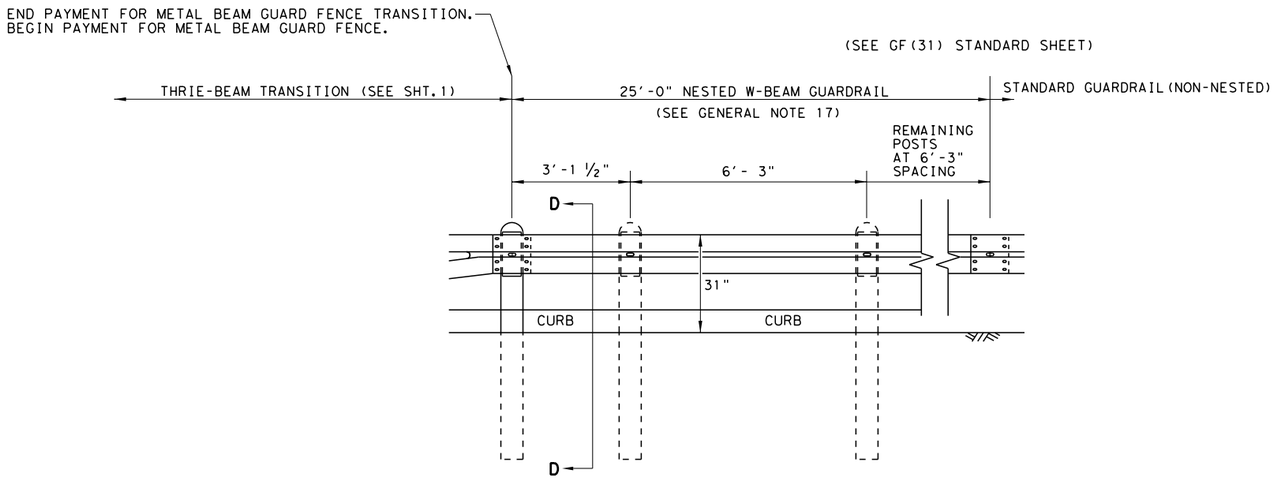
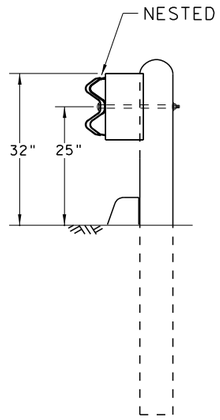
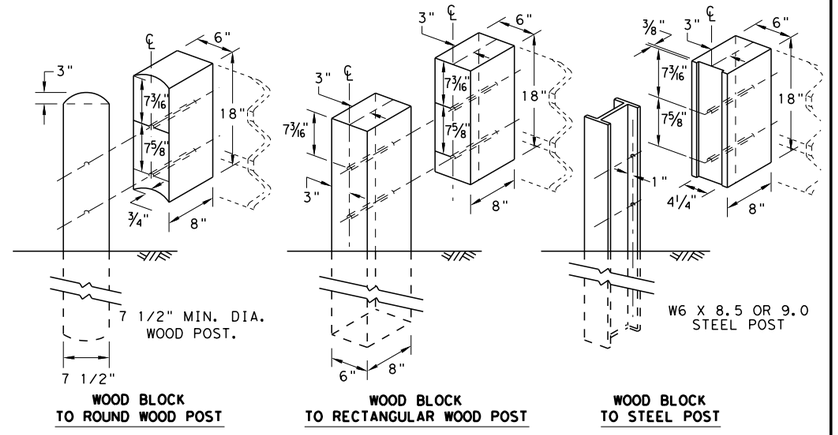
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

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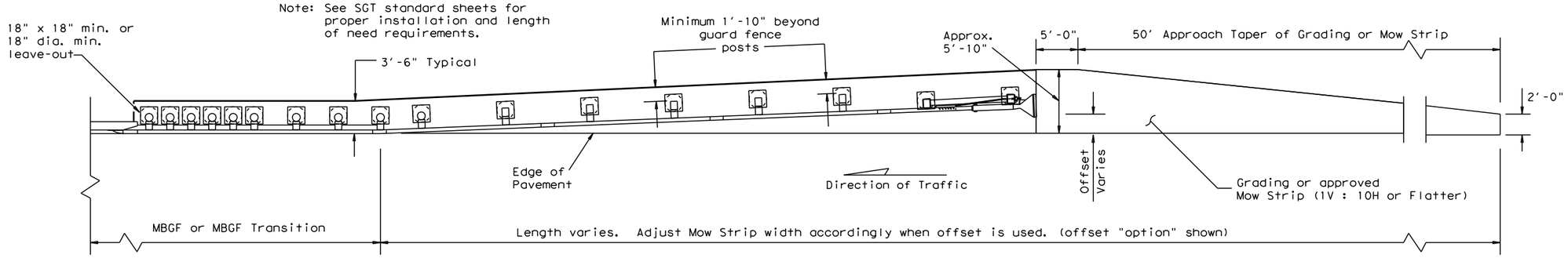
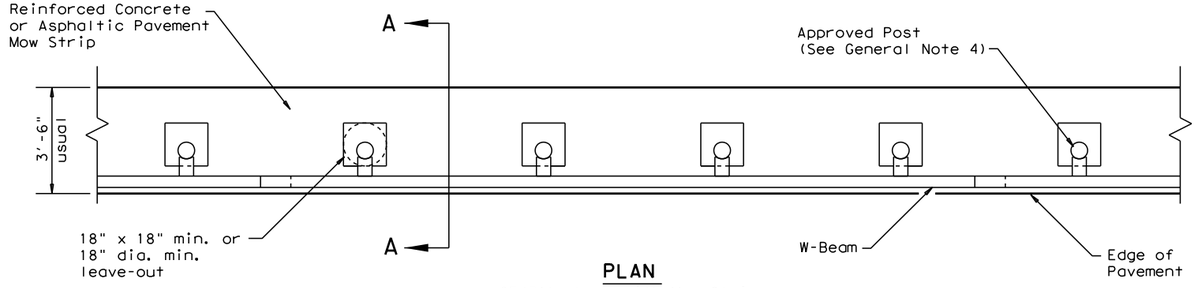
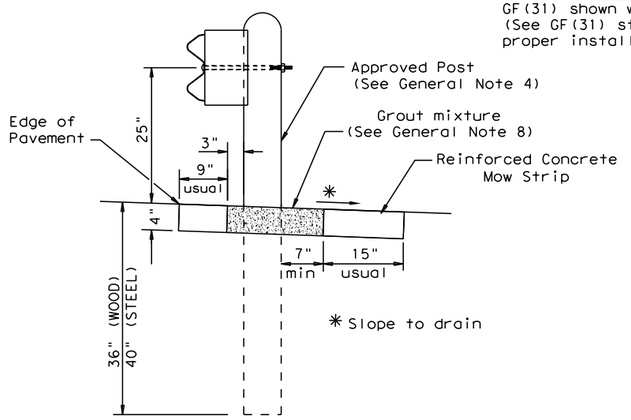


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



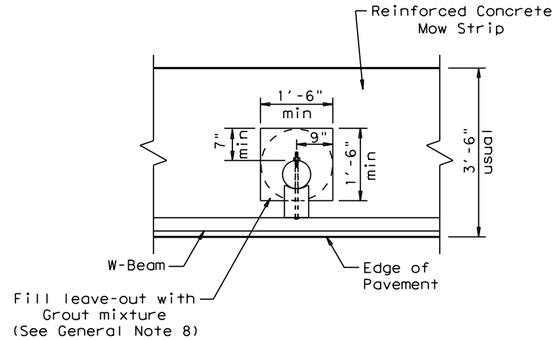
PLAN

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



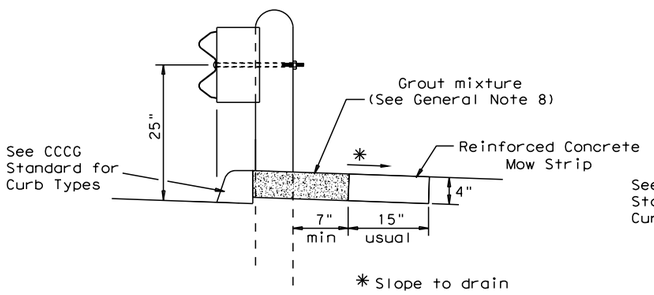
SECTION A-A

Typical



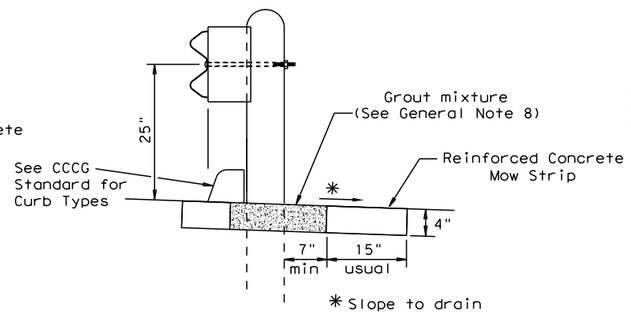
MOW STRIP DETAIL

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



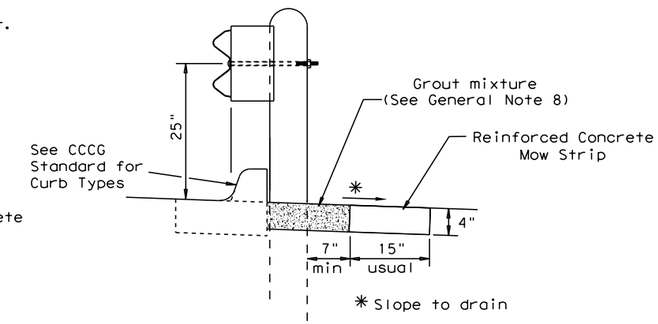
CURB OPTION (1)

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

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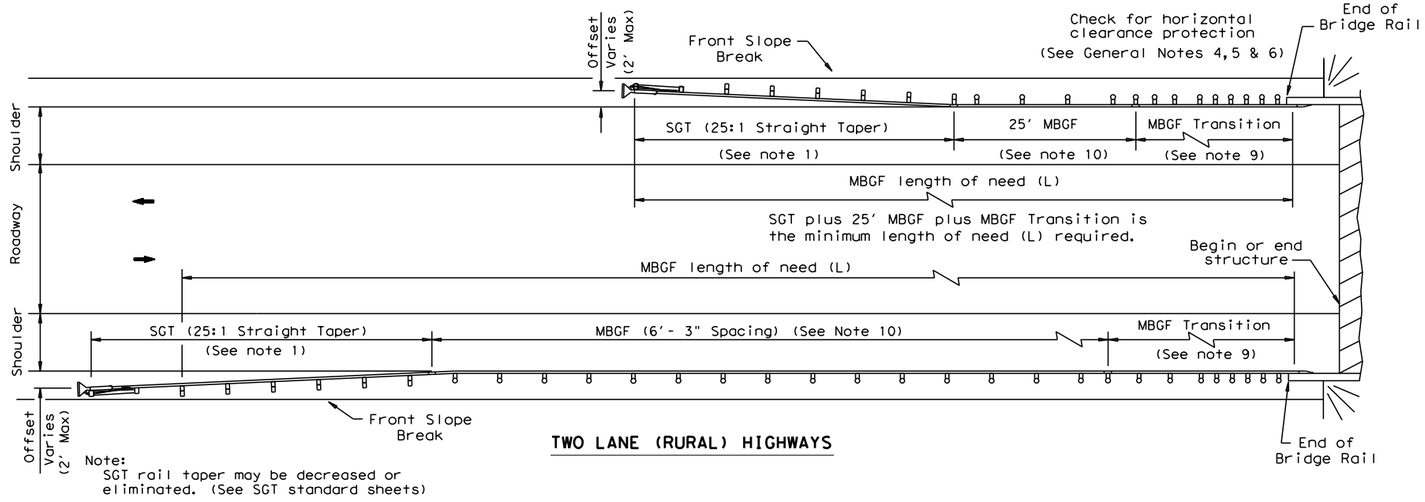
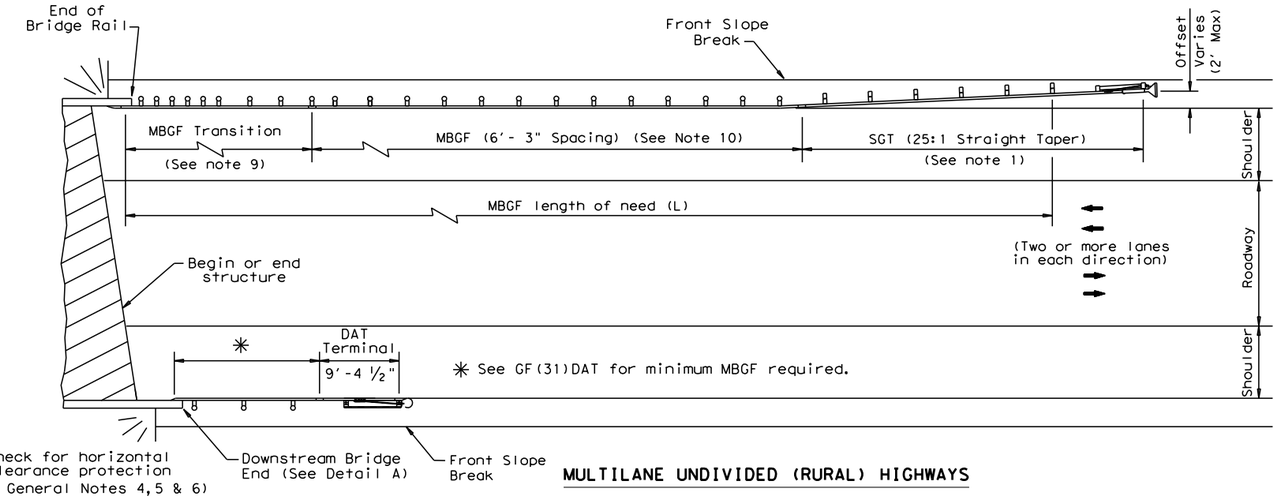
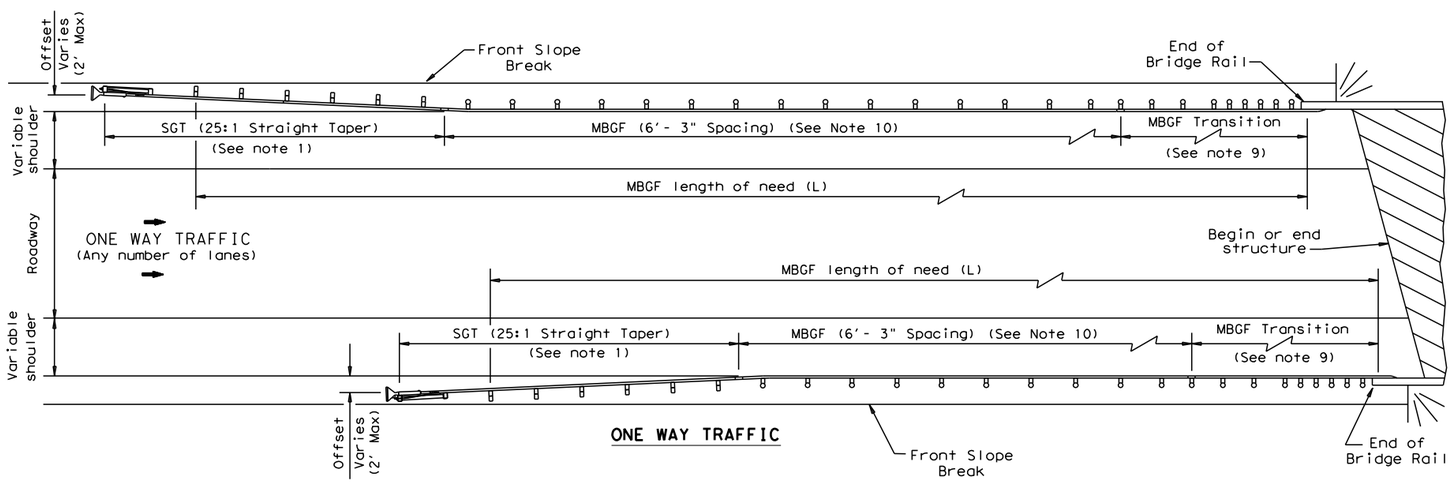


TWO LANE (RURAL) HIGHWAYS

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



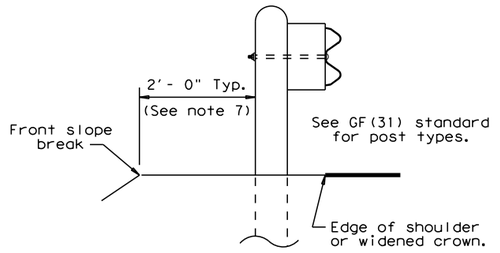
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



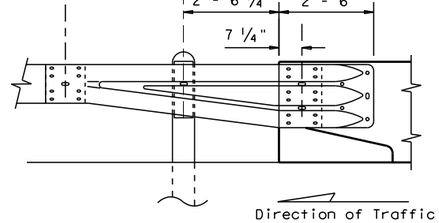
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	2653	01	016, ETC	FM 2658
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DATE: 5/17/2023
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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

BEGIN LENGTH OF NEED

PLAN VIEW

TRAFFIC FLOW

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

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)½" 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: C

SEE NOTE: A

POST 32" HEIGHT

31"

RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

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

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

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

SEE DETAIL 3

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

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"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

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

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)

(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

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"

FINISHED GRADE

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

SECTION VIEW B-B

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

POST(2)

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 17"- ½" HEIGHT

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"

STANDARD MBGF

5'-0"

50' APPROACH GRADING

2'-0"

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

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

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: 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

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
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	DIST	COUNTY		SHEET NO.
	TYL	RUSK		74

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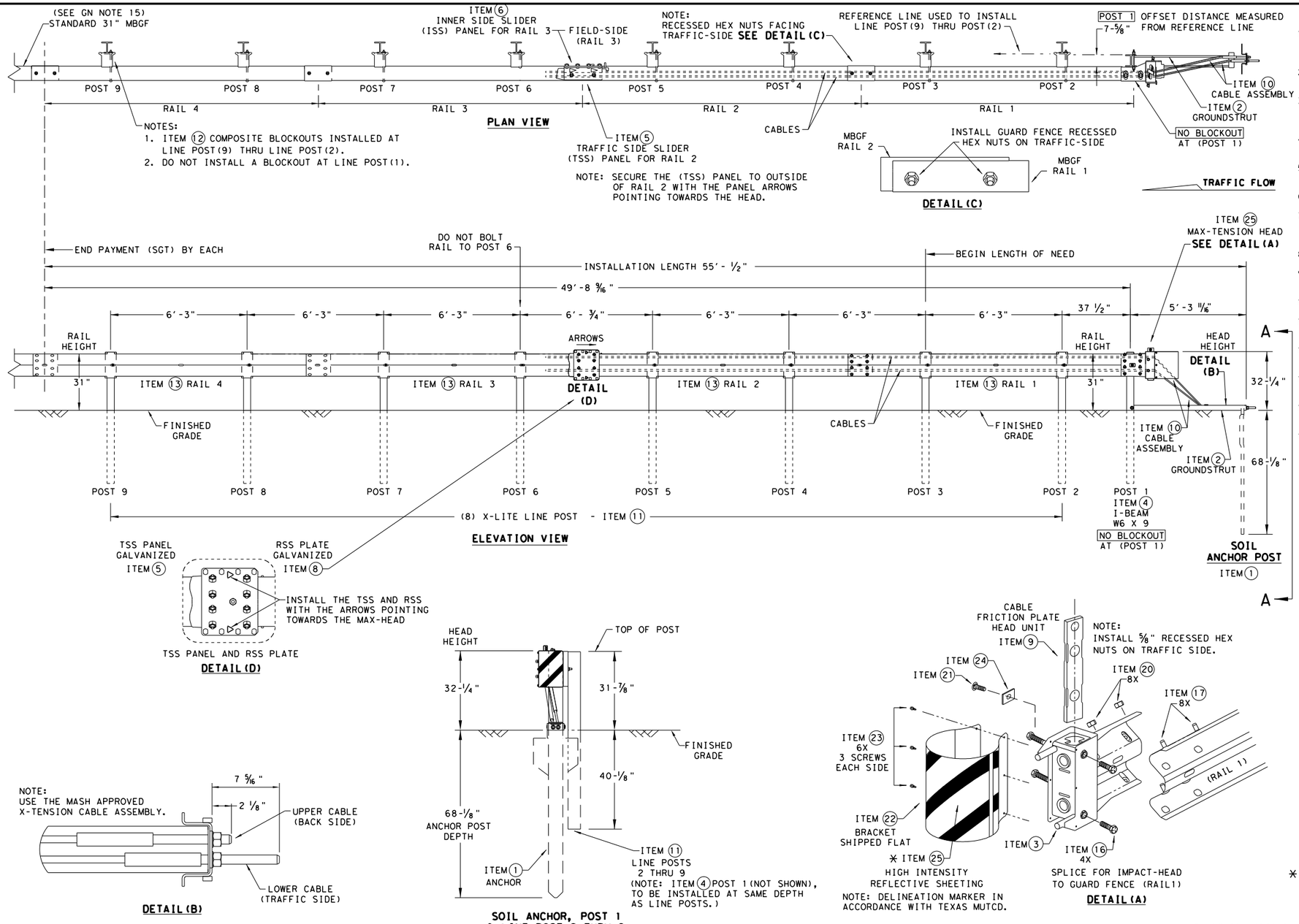

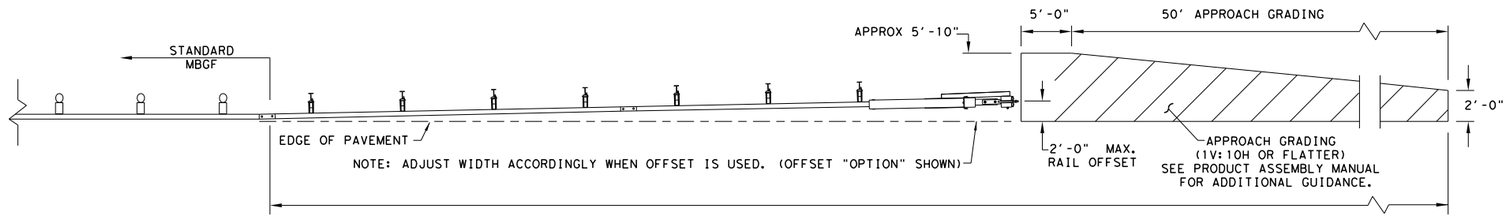

GENERAL NOTES

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 MANUFACTURE'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
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	DIST	COUNTY		SHEET NO.
	TYL	RUSK		75

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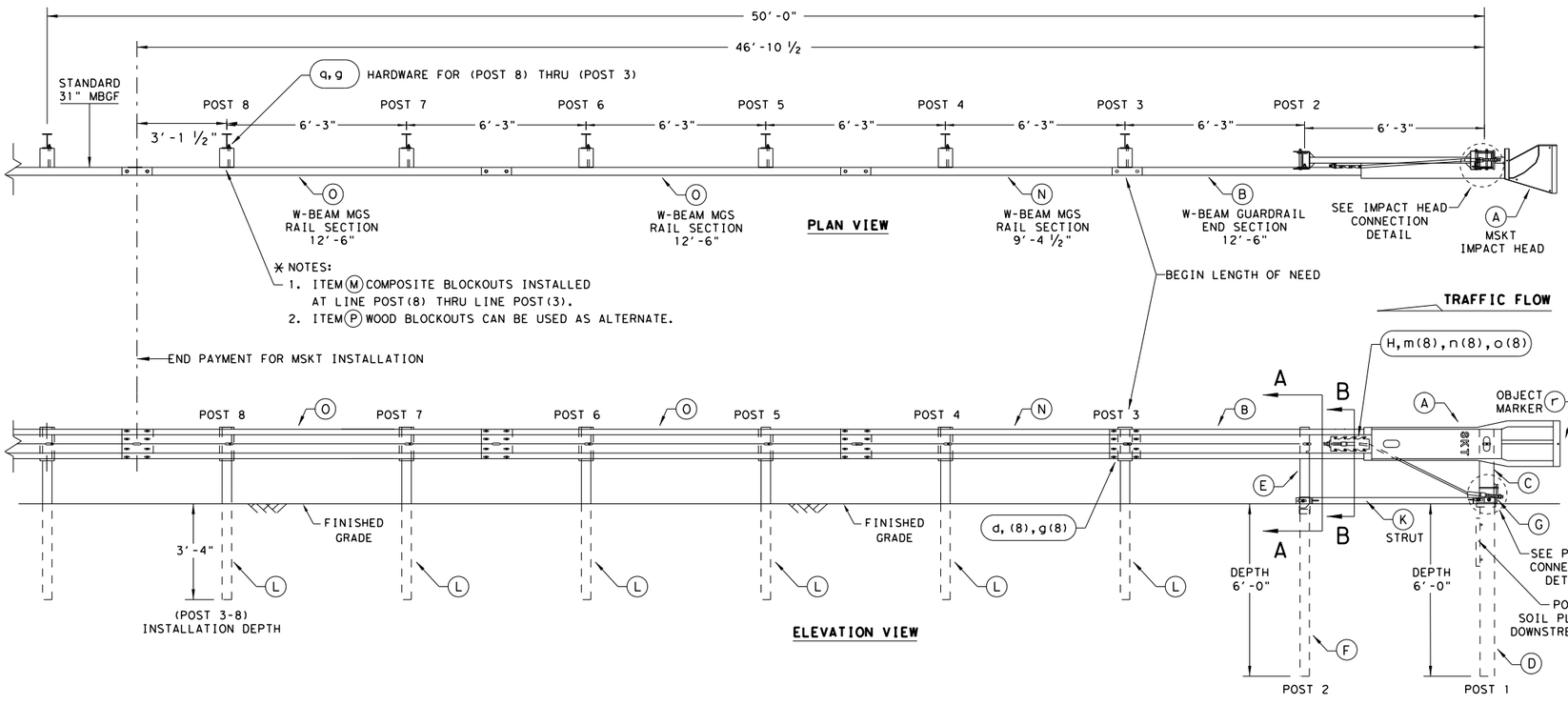


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

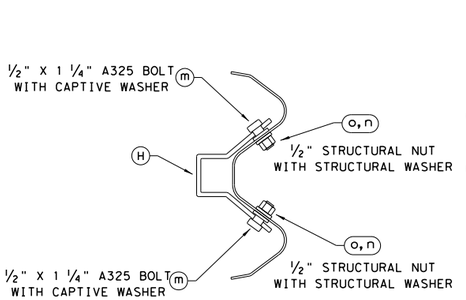
GENERAL NOTES

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.

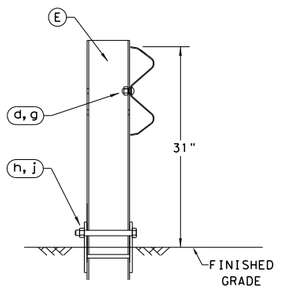
SEE NOTES: ✳

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 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

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



SECTION B-B
ANCHOR BRACKET



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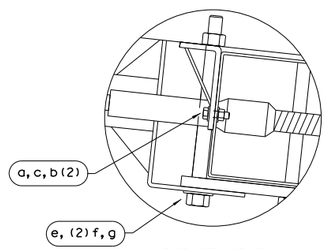
SECTION A-A



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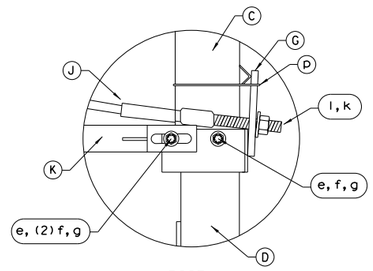
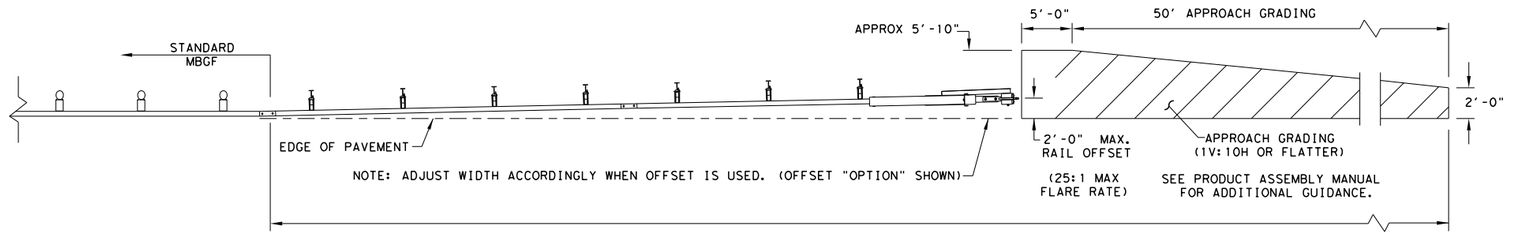


POST 1
CONNECTION DETAIL



TRAFFIC FLOW

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

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© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
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	TYL	RUSK		76

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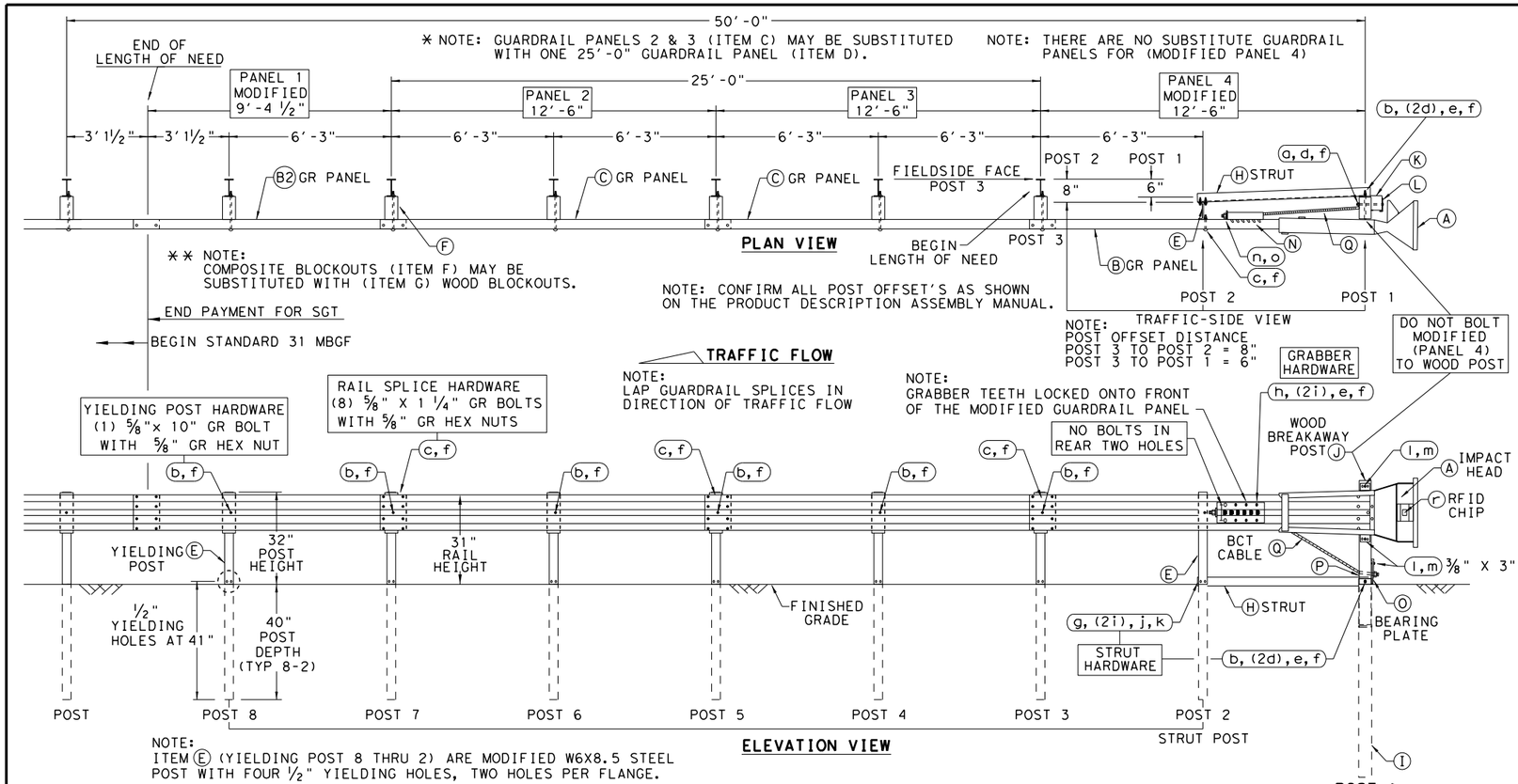
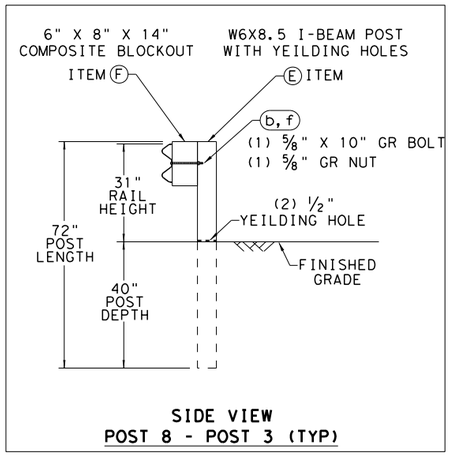


GENERAL NOTES

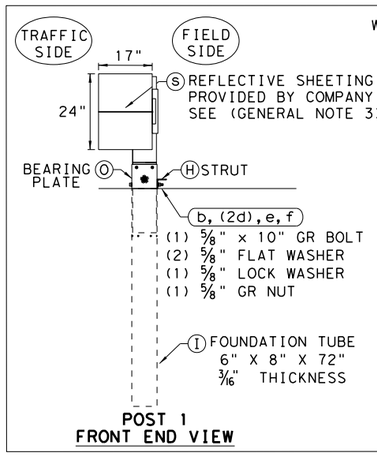
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

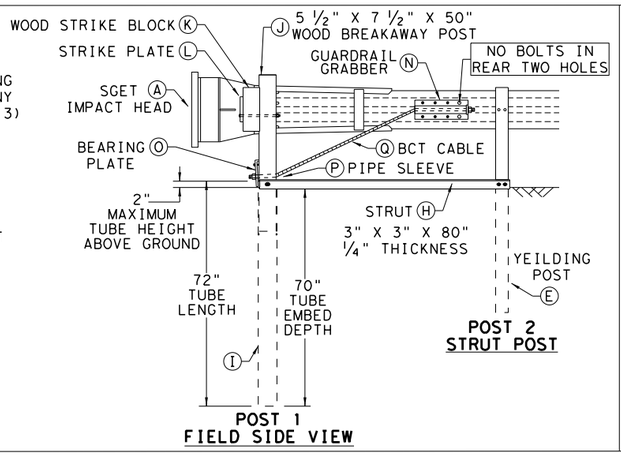
ALTERNATIVE ITEMS
* D
** G
NOTE: SEE PLAN VIEW



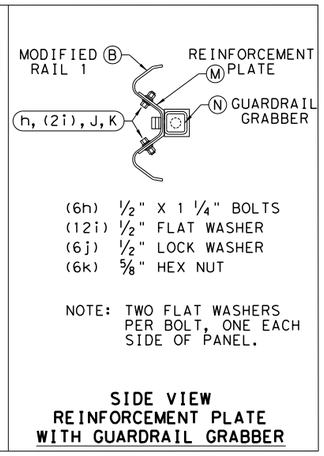
SIDE VIEW
POST 8 - POST 3 (TYP)



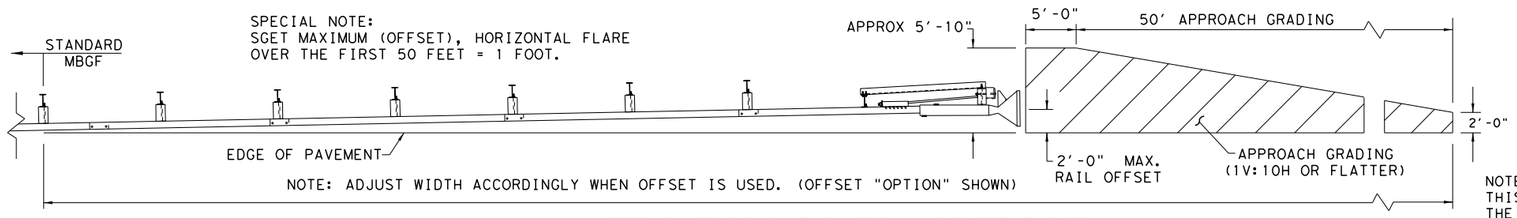
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW
POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation
Design Division Standard

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

FILE: sgt15312o.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
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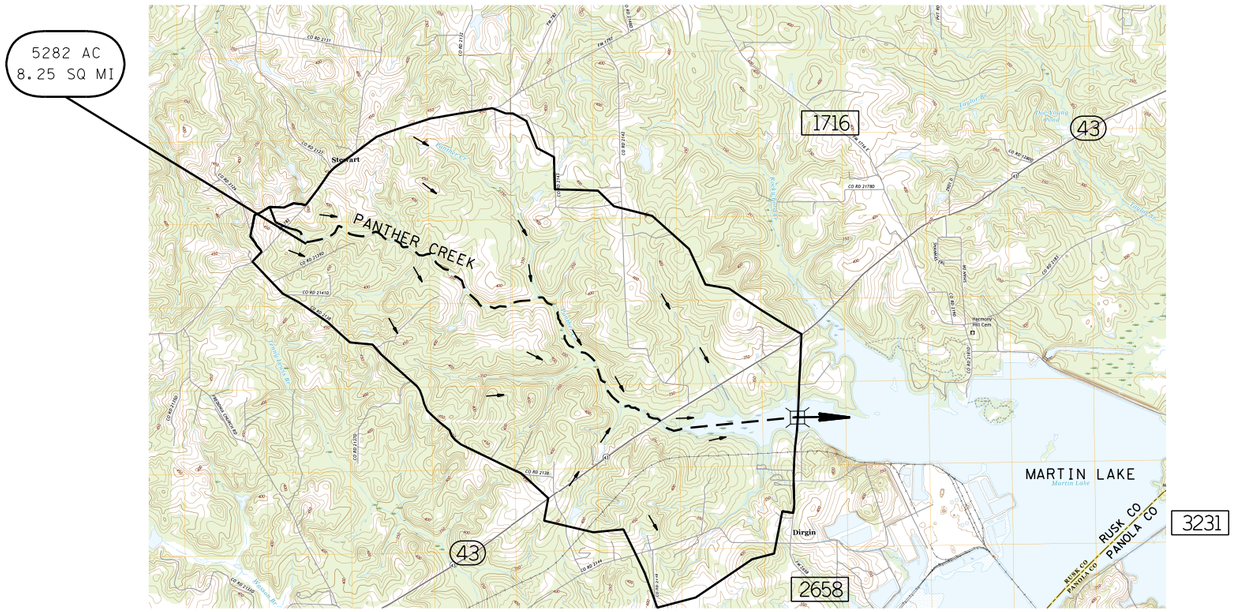
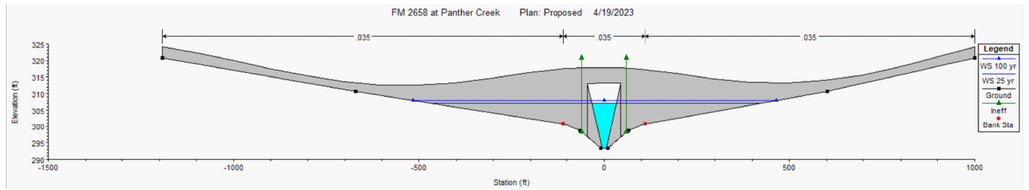
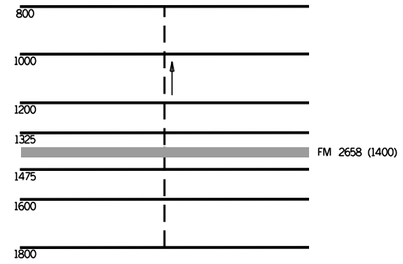
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		77







CROSS SECTION LOCATIONS

LEGEND:

XX
XX — DA SIZE

WATERSHED BOUNDARY

FLOW PATH FOR Tc

STRUCTURE AND FLOW DIRECTION

FLOW DIRECTION IN WATERSHED

0 250 500 1000 FT

Existing Panther Creek Culvert Lagoon Storage-Discharge Above Normal Pool		
Elev	Storage (Acre-FT)	Discharge (cfs)
306	0	0
307	76	1308
308	175	2616
309	297	3285
310	443	3742
311	612	4105
312	804	4482
312.23	852	4603
313.23	1073	5427

Proposed Panther Creek Bridge Lagoon Storage-Discharge Above Normal Pool		
Elev	Storage (Acre-FT)	Discharge (cfs)
306	0	0
307	76	2225
308	175	4091
309	297	5243
310	443	6410
311	612	7563
312	804	8681

HEC-HMS Data											
Drainage Structure	Station	Area		Curve Number	Tc	Lag Time	10% AEP (10-year) Q (cfs)	4% AEP (25-year) Q (cfs)	2% AEP (50-year) Q (cfs)	1% AEP (100-year) Q (cfs)	0.5% AEP (200-year) Q (cfs)
		(Acre)	(Square Mile)		(min)	(min)					
Panther Creek Lagoon	34+00	5282	8.25	64	143.41	86.05	3,808	5,420	6,766	8,264	9,925
Bridge Site	Qs Adjusted for Lagoon Storage (Existing Conditions)						2,825	3,504	3,932	4,361	5,095
Bridge Site	Qs Adjusted for Lagoon Storage (Proposed Conditions)						3,338	4,483	5,348	6,282	7,260

Resevoir Rock Riprap Protection							
Specific Unit Weight of Stone	H (Design Wave Height) (ft)	K (Riprap Stability Coefficient)	Slope Angle (Degrees)	G (Specific Gravity of Stone)	Calculated W50 (lb)	Design Stone Size (in)	Design Thickness (in)
165	2.5	4.37	21.8	2.52	67.20	12	24

Bridge Scour Protection								
Design Year	Specific Gravity	K (Turbulence)	G (Acceleration due to Gravity) (ft/sec*sec)	Velocity (ft/s)	Calculated D50 (ft)*	Calculated D50 (in)*	Design Stone Size (in)	Design Thickness (in)
50	2.65	1	32.2	9.72	0.62	7.38	12	24
100	2.65	1	32.2	11.03	0.79	9.51	15	24

*D50 Calculated using Equation 5.1 in HEC-23
SIRCOS Contraction scour design depth based on native material is 7.2 ft for 50 YR and 8.5 ft for 100 YR flood routing.
HEC-18 Contraction scour design depth based on 12" design stone rip rap is 0 ft for both the 50 YR and 100 YR flood frequency.

	Prop Bridge Hydraulic Data			Exist Culvert Hydraulic Data		
Design Year	Tailwater (ft)*	Velocity (ft/s)	Headwater (ft)**	Tailwater (ft)*	Velocity (ft/s)	Headwater (ft)**
10	307.12	6.58	307.50	307.25	7.06	308.16
25	307.61	8.65	308.26	307.99	8.76	309.40
50	308.30	9.72	309.10	308.68	9.83	310.48
100	308.87	11.03	309.89	309.54	10.90	311.77
200	309.49	12.29	310.74	310.28	12.40	313.17

*Tailwater at HECRAS RS 1200
**Headwater at HECRAS RS 1600
Headwater based on Martin Lake WSEL

NOTES:

1. Rainfall Depths were obtained from the NOAA Atlas 14 Precipitation Frequency Data Server for the project location (Tatum, TX).
2. Kerby-Kirpich Method used for estimating time of concentration.
3. The average Hydrologic Soil Group rating is between soil type B and C. Soils data was obtained from the NRCS Web Soil Survery Utility.
4. All Cross Sections are normal to stream flow.
5. Panther Creek is identified on FEMA Firm Panel 0150C, Dated September 29,2010. FM 2658 Crosses a special Flood Hazard Area with a Zone "A" Designation.
6. Coordination with the Rusk County Floodplain administration conducted on MAY 15, 2023.
7. HEC-RAS VERSION 6.3.1 used for analysis.
8. Runoff computations and flood routing performed with HEC-HMS 4.9.

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

PANTHER CREEK DRAINAGE AREA MAP AND HYDRAULIC COMPUTATIONS

SHEET 1 OF 1

Texas Department of Transportation © 2023

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		78
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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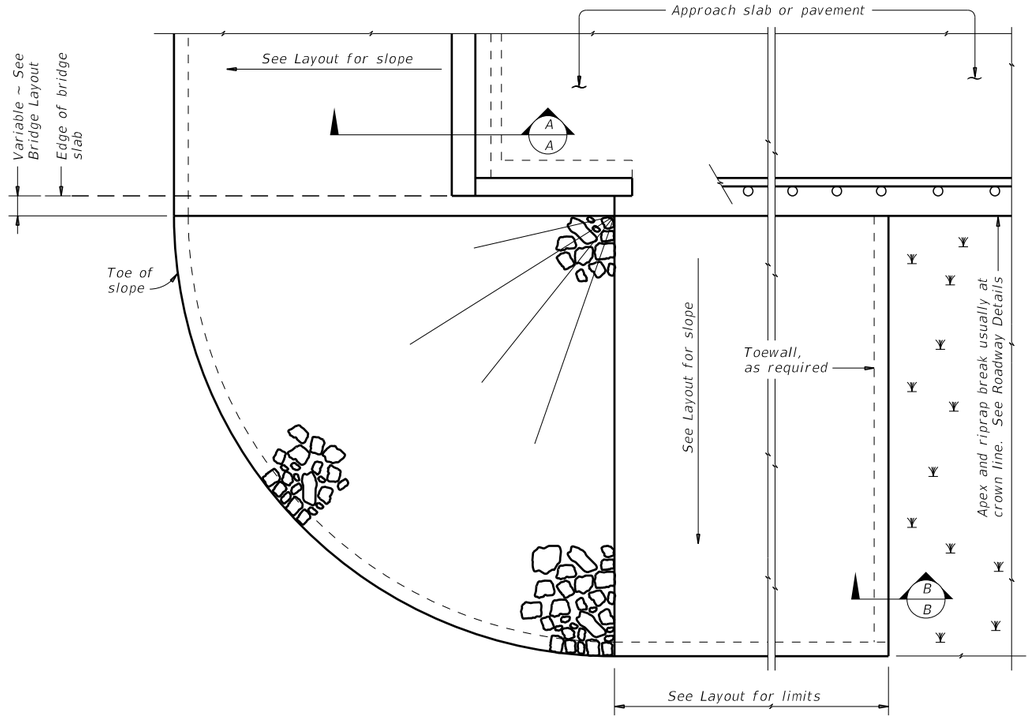
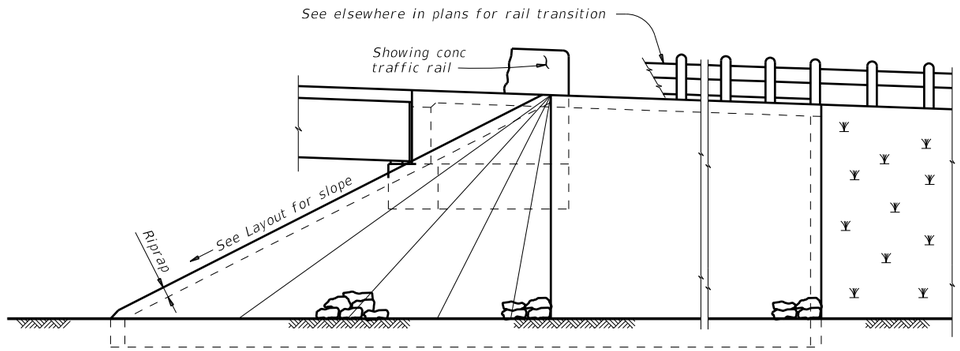
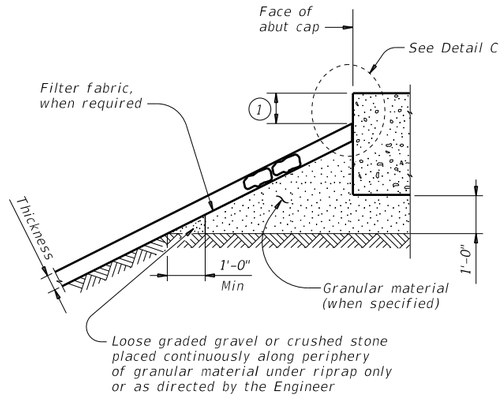


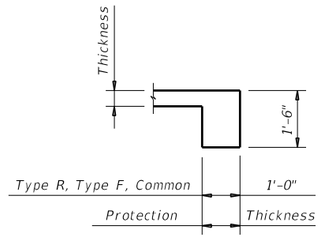
PLAN



ELEVATION

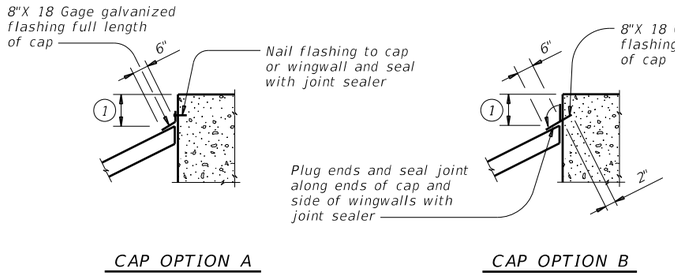


SECTION A-A AT CAP



SECTION B-B

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



CAP OPTION A

CAP OPTION B

DETAIL C

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

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

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		
REVISIONS	2653	01	016, ETC		FM 2658		
	DIST	COUNTY				SHEET NO.	
	TYL	RUSK				79	

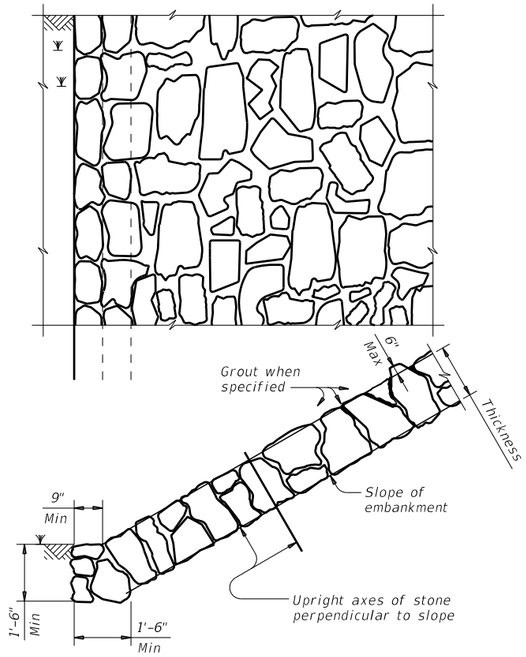


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

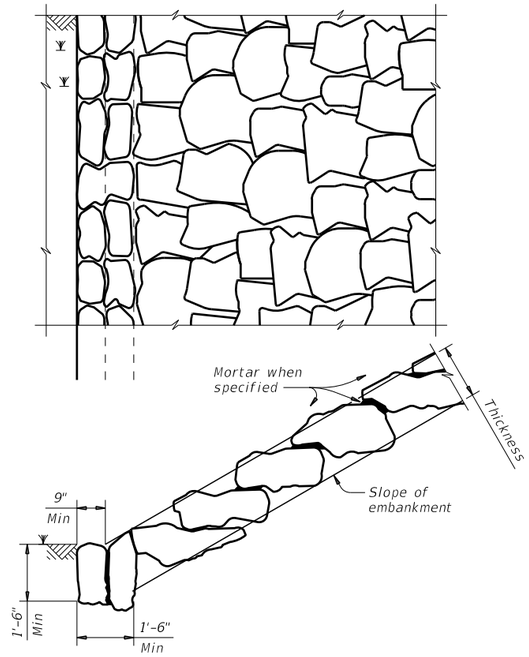


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

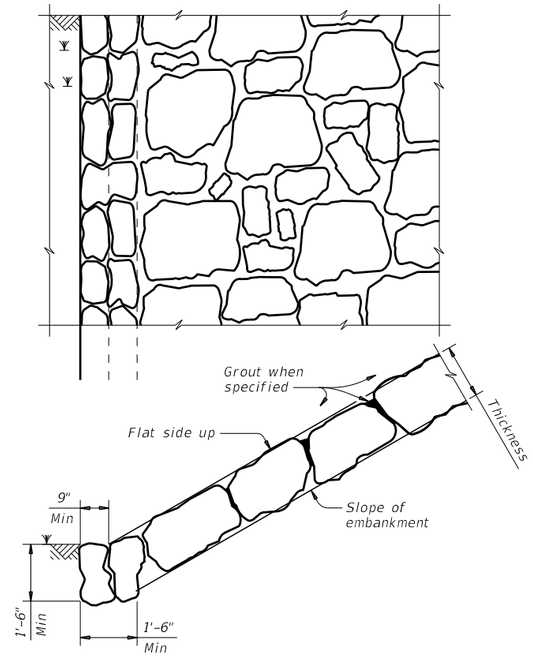


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

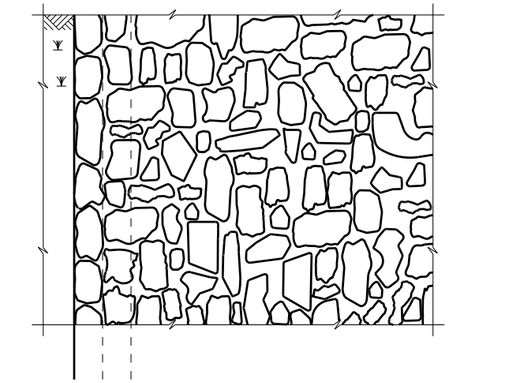


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

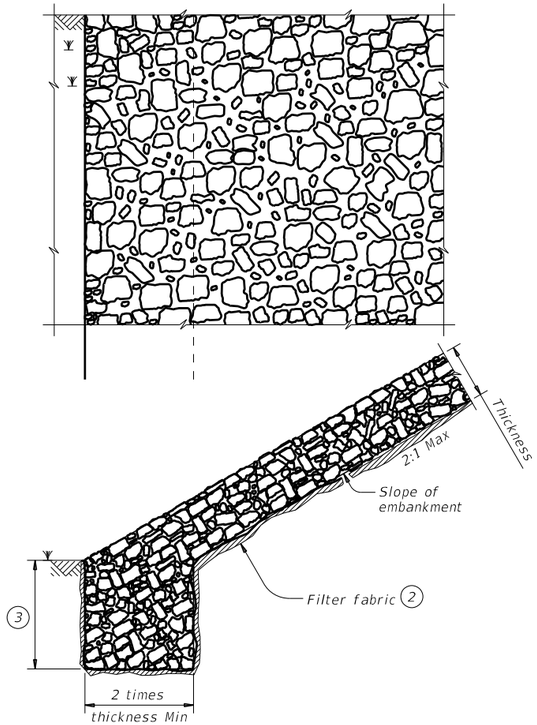


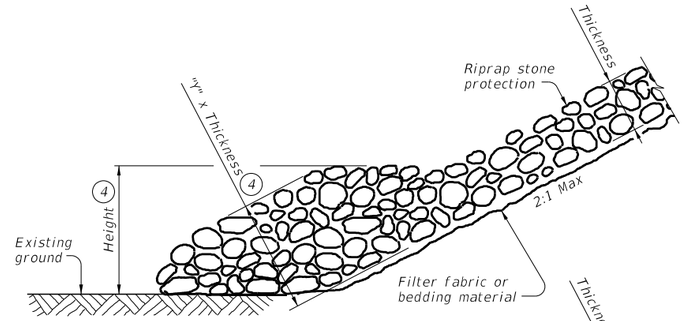
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

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

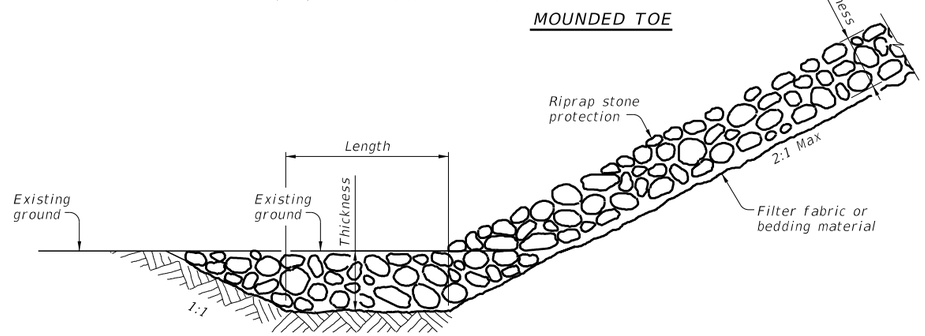
(3) *Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.*

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

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



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

SHEET 2 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
REVISIONS	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		80

DATE: 5/17/2023 6:49:49 AM
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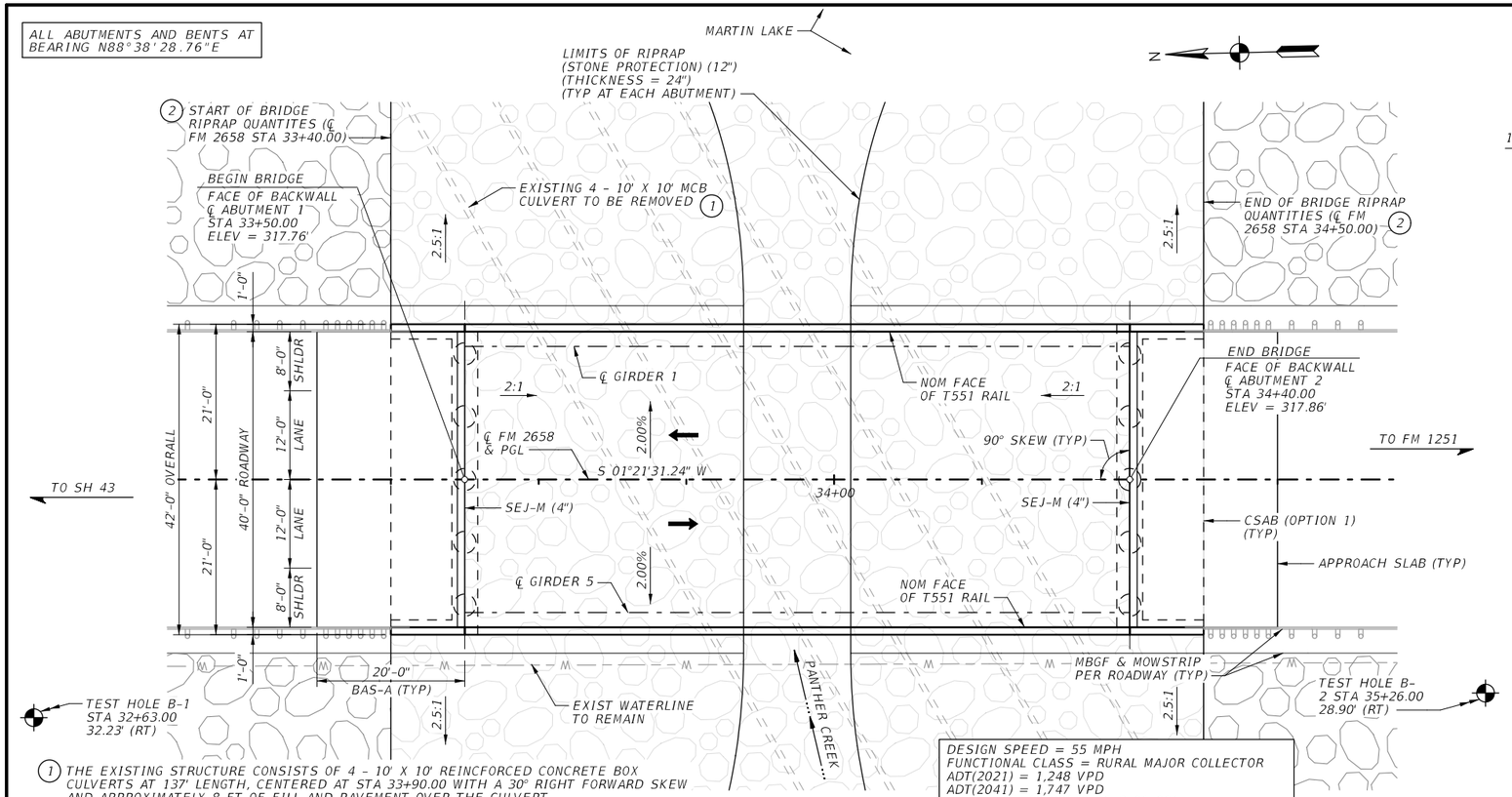
ALL ABUTMENTS AND BENTS AT BEARING N88°38'28.76"E

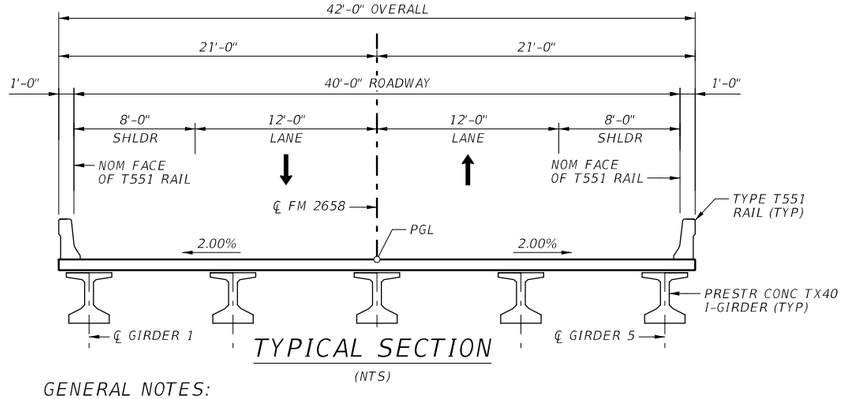


PLAN

DESIGN SPEED = 55 MPH
FUNCTIONAL CLASS = RURAL MAJOR COLLECTOR
ADT(2021) = 1,248 VPD
ADT(2041) = 1,747 VPD
EXIST NBI: 10-201-0-2653-01-001
NEW NBI NO: 10-201-0-2653-01-021

1 THE EXISTING STRUCTURE CONSISTS OF 4 - 10' X 10' REINCFORCED CONCRETE BOX CULVERTS AT 137' LENGTH, CENTERED AT STA 33+90.00 WITH A 30° RIGHT FORWARD SKEW AND APPROXIMATELY 8 FT OF FILL AND PAVEMENT OVER THE CULVERT.

2 SEE ROADWAY DRAWINGS FOR RIPRAP GEOMETRY, QUANTITIES AND GRADING BEFORE ℄ FM 2658 STA 33+40.00 AND AFTER ℄ FM 2658 STA 34+50.00



TYPICAL SECTION
(NTS)

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIM REVISIONS.
2. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK.
3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN, AND/OR SUPERELEVATION.
4. "D" DENOTES ABUTMENTS WITH DOWELS "D" AND SLOTTED HOLES AT ENDS OF EXTERIOR GIRDERS ONLY.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION AND/OR DRILLING.
6. SEE "RIPRAP LAYOUT & SOIL BORING LOGS" FOR BORING TEST HOLE PROFILES.
7. SEE "RIPRAP LAYOUT & SOIL BORING LOGS" FOR RIPRAP DIMENSIONS, SLOPES, AND ADDITIONAL INFORMATION.
8. SEE STANDARD DRAWINGS FOR FOUNDATION, ABUTMENT, SLAB BEAM DETAILS.
9. SEE CSAB STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
10. SEE IGSK STANDARD FOR ABUTMENT SHEAR KEY DETAILS.
11. ⌖ DENOTES BORING TEST HOLE LOCATION.

HL93 LOADING: SUPERSTRUCTURE INV/OPR RATING = 1.52/1.85
SUBSTRUCTURE INV/OPR RATING = SUBSTRUCTURE NOT RATED

ELEVATION

HYDRAULIC DATA
NORMAL POOL ELEVATION = 306.00'

Q_{25} = 4,483 CFS	Q_{100} = 6,282 CFS
TW_{25} = 307.61'	TW_{100} = 308.87'
HW_{25} = 308.26'	HW_{100} = 309.89'
V_{25} = 8.65 FPS	V_{100} = 11.03 FPS

STATE OF TEXAS
TIMOTHY J. ROSS
98465
LICENSED
PROFESSIONAL ENGINEER
5/17/23

BRIDGE LAYOUT FM 2658 OVER PANTHER CREEK

0 5 10 15 20
SCALE: 1" = 20'

SHEET 1 OF 1

Texas Department of Transportation
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H&H PESC
P.E. Structural Consultants
a Hardesty & Hanover Company
8436 Spicewood Springs Road
Austin, Texas 78759
(512) 250-0200
www.HardestyHanover.com
TBPELS Firm No. F-5379

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	See Title Sheet	81

STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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SUMMARY OF ESTIMATED BRIDGE QUANTITIES

BID ITEM	400 6005	416 6004	420 6013	422 6001	422 6015	425 6037	432 6035 (1)	450 6014	454 6018	496 6001
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (36 IN)	CL C CONC (ABUT)	REINF CONC SLAB	APPROACH SLAB	PRESTR CONC GIRDER (TX40)	RIPRAP (STONE PROTECTION) (24 IN)	RAIL (TY T551)	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	REMOV STR (BOX CULVERT)
	CY	LF	CY	SF	CY	LF	CY	LF	LF	EA
2 ~ ABUTMENTS	120	300	51.4		64.2		1,468			
1 ~ 90.00' PRESTR CONC I-GIRDER UNIT				3,780		447.50		220.0	82	1
TOTALS	120	300	51.4	3,780	64.2	447.50	1,468	220.0	82	1

(1) RIPRAP QUANTITY SHOWN IS FOR RIPRAP LOCATED BETWEEN THE ENDS OF THE WINGWALLS (℄ FM 2658 STA 33+40.00 TO 34+50.00) AS DIMENSIONED ON THE RIPRAP LAYOUT SHEET. SEE RDWY FOR ADDITIONAL QUANTITIES, LIMITS AND GRADING INFORMATION.

BEARING SEAT ELEVATION

	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5
BENT 1 (FWD)	312.843	313.023	313.203	313.023	312.843

	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5
BENT 2 (BK)	312.945	313.125	313.305	313.125	312.945

STATE OF TEXAS
TIMOTHY J. ROSS
98465
LICENSED
PROFESSIONAL ENGINEER
5/17/23

ESTIMATED QUANTITIES FM 2658 OVER PANTHER CREEK

SHEET 1 OF 1

Texas Department of Transportation

H&H PESC
P.E. Structural Consultants
a Hardesty & Hanover Company
8436 Spicewood Springs Road
Austin, Texas 78759
(512) 2954200
www.HardestyHanover.com
TBPELS Firm No. F-3379

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	See Title Sheet	82

STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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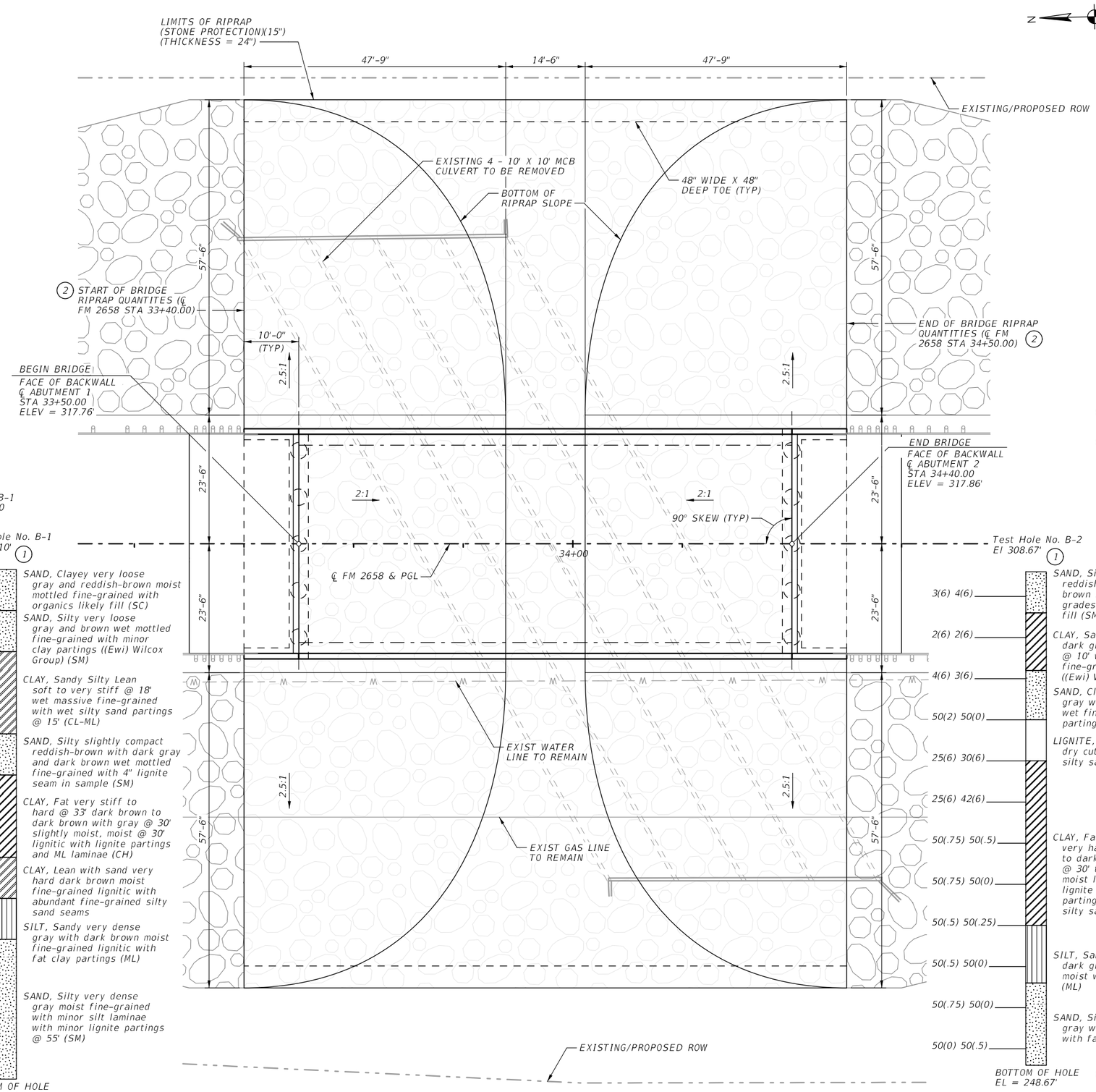

TEST HOLE B-1
STA 32+63.00
32.23' (RT)

Test Hole No. B-1
El 308.10' 1

3(6) 3(6)	SAND, Clayey very loose gray and reddish-brown moist mottled fine-grained with organics likely fill (SC)
1(6) 2(6)	SAND, Silty very loose gray and brown wet mottled fine-grained with minor clay partings ((Ewi) Wilcox Group) (SM)
4(6) 7(6)	CLAY, Sandy Silty Lean soft to very stiff @ 18' wet massive fine-grained with wet silty sand partings @ 15' (CL-ML)
18(6) 33(6)	SAND, Silty slightly compact reddish-brown with dark gray and dark brown wet mottled fine-grained with 4" lignite seam in sample (SM)
11(6) 12(6)	CLAY, Fat very stiff to hard @ 33' dark brown to dark brown with gray @ 30' slightly moist, moist @ 30' lignitic with lignite partings and ML laminae (CH)
27(6) 36(6)	CLAY, Lean with sand very hard dark brown moist fine-grained lignitic with abundant fine-grained silty sand seams
50(3) 50(2)	SILT, Sandy very dense gray with dark brown moist fine-grained lignitic with fat clay partings (ML)
50(.5) 50(.5)	SAND, Silty very dense gray moist fine-grained with minor silt laminae with minor lignite partings @ 55' (SM)
50(.75) 50(.25)	
50(.75) 50(.5)	
50(.25) 50(0)	
50(.5) 50(.5)	

BOTTOM OF HOLE
EL = 246.10'

The groundwater elevation was not determined during the course of this boring.

Test Hole No. B-2
El 308.67' 1

3(6) 4(6)	SAND, Silty very loose reddish-brown with light brown moist mottled fine-grained grades to sandy clay likely fill (SM)
2(6) 2(6)	CLAY, Sandy Fat very soft dark gray and brown to gray @ 10' wet mottled with fine-grained silty sand partings ((Ewi) Wilcox Group) (CH)
4(6) 3(6)	SAND, Clayey very loose gray with reddish-brown wet fine-grained with iron-oxide partings (SC)
50(2) 50(0)	LIGNITE, Hard dark gray dry cuttings include wet silty sand
25(6) 30(6)	
25(6) 42(6)	CLAY, Fat very stiff to very hard @ 33' dark gray to dark brown with dark gray @ 30' to dark brown @ 35' moist lignitic with discrete lignite partings @ 30', silt partings @ 35', and minor silty sand partings @ 40' (CH)
50(.75) 50(.5)	
50(.75) 50(0)	
50(.5) 50(.25)	
50(.5) 50(0)	SILT, Sandy very dense dark gray and dark brown moist with fat clay partings (ML)
50(.75) 50(0)	
50(0) 50(.5)	SAND, Silty very dense gray with dark brown moist with fat clay partings (SM)

TEST HOLE B-2
STA 35+26.00
28.90' (RT)

BOTTOM OF HOLE
EL = 248.67'

1 TEST HOLES NOT PLOTTED AT ACTUAL LOCATIONS FOR CLARITY.

The groundwater elevation was not determined during the course of this boring.

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIM REVISIONS.
2. ALL DIMENSIONS ARE HORIZONTAL AND MUST BE CORRECTED FOR SLOPE.
3. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION AND/OR DRILLING.
4. SEE BRIDGE LAYOUT FOR ADDITIONAL INFORMATION.
5. SEE SRR STANDARD FOR DETAILS.
6. ⊕ DENOTES BORING TEST HOLE LOCATION.

1 TEST HOLES NOT PLOTTED AT ACTUAL LOCATIONS FOR CLARITY.

2 SEE ROADWAY DRAWINGS FOR RIPRAP GEOMETRY, QUANTITIES AND GRADING BEFORE ℄ FM 2658 STA 33+40.00 AND AFTER ℄ FM 2658 STA 34+50.00

STATE OF TEXAS
TIMOTHY J. ROSS
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5/17/23

RIPRAP LAYOUT & SOIL BORING LOGS FM 2658 OVER PANTHER CREEK

0 5 10 15 20
SCALE: 1" = 20'

SHEET 1 OF 1

Texas Department of Transportation
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www.HardestyHanover.com
TBPELS Firm No. F-3379

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		83
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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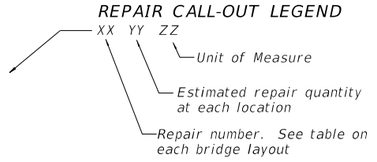
GENERAL NOTES

1) Layout, stations, and elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.

2) Repair locations and quantities are based on Condition Survey dated (03/2023). Current conditions may vary. Field varify locations and extent of repairs in the prescence of the Engineer prior to ordering materials.

3) Existing Load Rating:
HS 20 (INV)
HS 33.4 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D#	Deck, joints, overhangs approach slabs
R#	Rails, approach MBGF
SP#	Superstructure elements, bearings
SB#	Substructure elements
M#	Micellaneous (Riprap, shoulder drains, etc.)

MATERIAL NOTES

Provide class C concrete (f'c=3600 psi) for full-depth deck repairs and concrete bridge railing. Provide type C concrete repair material conforming to DMS 4655, "Concrete Repair Materials", capable of achieving a minimum average 28-day compressive strength of 3600 psi for all vertical and overhead concrete repairs. Provide type X epoxy coating conforming to DMS 6100, "Epoxies and Adhesives", for all deck soffit spall repairs.

CONSTRUCTION NOTES

Submit a detailed concrete repair procedure for approval prior to commencing work. All concrete repairs shall be performed in accordance with Item 429 and Chapter 3, Sections 1-3 of TxDOT's Concrete Repair Manual. A copy of the Concrete Repair Manual must be available on site during all repair operations. Repair all damaged or loose concrete without damaging surrounding sound concrete that is to remain in place. Only use hand tools or power-driven chipping hammers (15 lb. max) to remove concrete, unless otherwise approved by the Engineer. Clean all reinforcing steel that is already exposed or that is exposed during chipping operations. Additional damage caused to the stucture during repair operations must be repaired at the Contractor's expense.

05/17/2023

STATE OF TEXAS
MARK A. STURROCK
72267
REGISTERED PROFESSIONAL ENGINEER

Mark Sturrock

BRIDGE REPAIR GENERAL NOTES

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TBPE Firm Reg. No. 10488

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		84
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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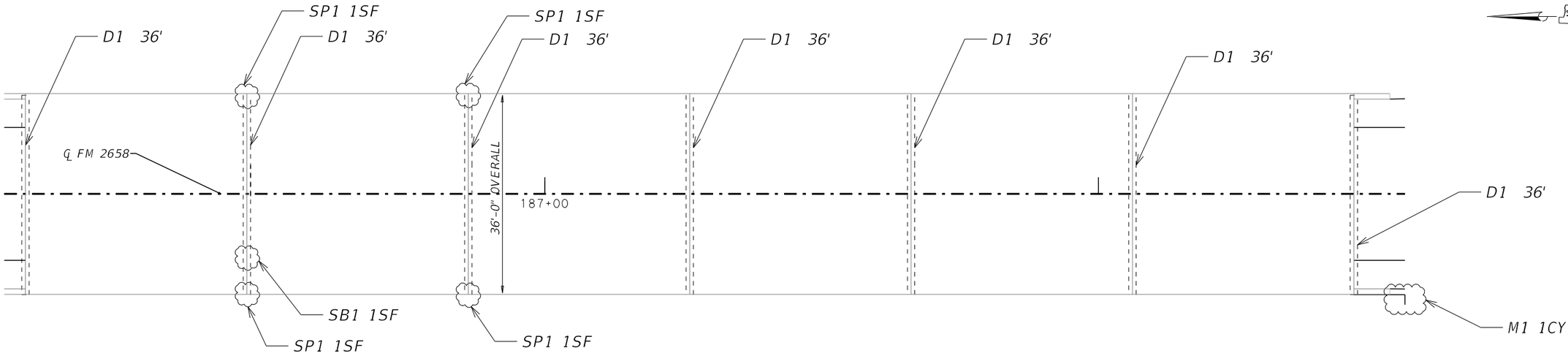

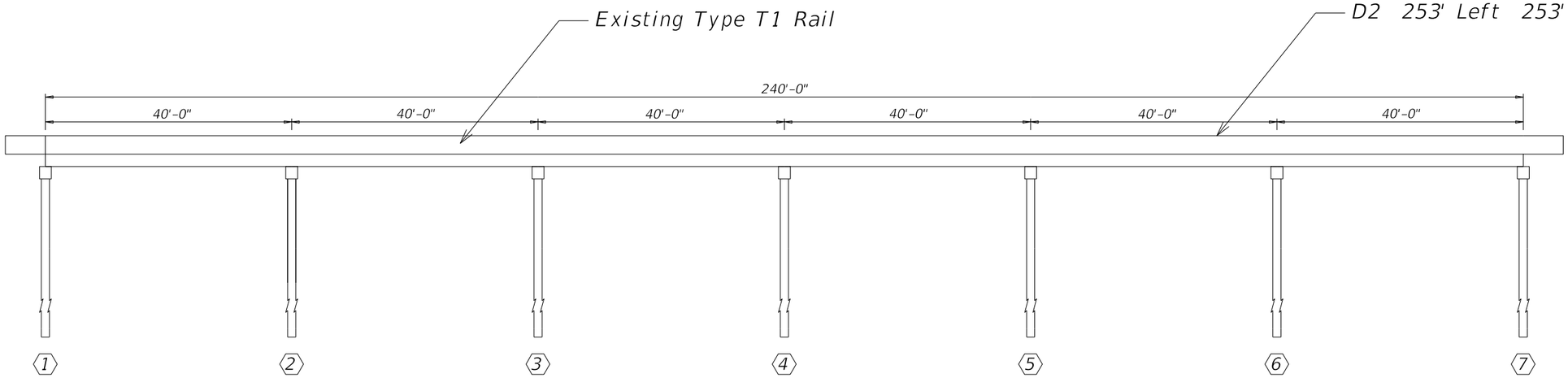

	REPAIR NUMBER	ITEM DESC CODE	DESCRIPTION	UNIT	QUANTITY
(1)	M1	401-6001	FLOWABLE BACKFILL	CY	1
	SP1	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	4
	SB1	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	1
	D1	438-6004	CLEANING AND SEALING EXISTING JOINTS (CL 7)	LF	252
	D2	451-6019	RETROFIT RAIL (TY T631)	LF	506

(1) FLOWABLE BACKFILL WILL REQUIRE PUMPING AT THESE LOCATIONS.

See BRIDGE REPAIR GENERAL NOTES sheet for General Notes, Material Notes and, Construction Notes.

05/17/2023

STATE OF TEXAS
MARK A. STURROCK
72267
REGISTERED PROFESSIONAL ENGINEER

Mark Sturrock

BRIDGE LAYOUT FM 2658 OVER DRY CREEK

(NBI: 10-201-0-2653-01-004)

Texas Department of Transportation

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FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		85
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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GENERAL NOTES

Perform all work in accordance with Item 429, "Concrete Structure Repair", and the TxDOT Concrete Repair Manual, Chapter 3 sections 2-3.

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.

Southwest Wingwall
① M1 1 CY

Typical Superstructure spall at both ends of Bents 2 and 3 from North
SP1 1 SF Each at 4 locations

Spall on West pile of Bent 2 from North
SB1 1 SF

① REPAIR M1, FLOWABLE BACKFILL WILL REQUIRE PUMPING AT THESE LOCATIONS.

05/17/2023

STATE OF TEXAS
MARK A. STURROCK
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REGISTERED PROFESSIONAL ENGINEER

Mark Sturrock

REPAIR LOCATION PHOTOS FM 2658 OVER DRY CREEK

(NBI: 10-201-0-2653-01-004)

Texas Department of Transportation

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FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		86
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
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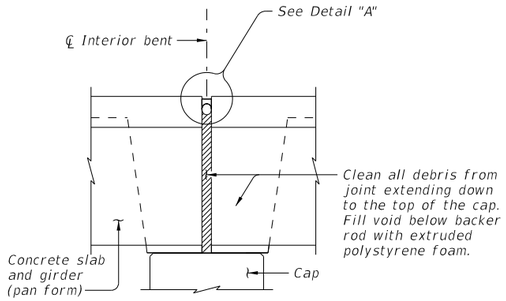
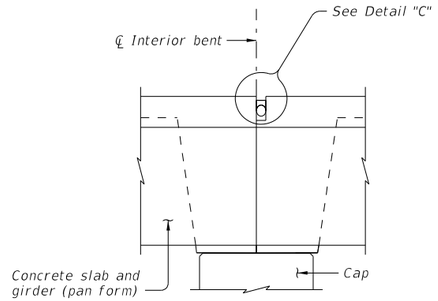
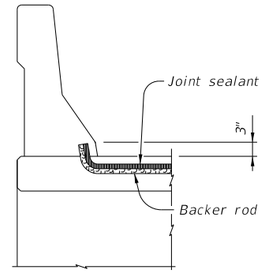


JOINT WITH SILICONE SEAL

(Used without ACP overlay)

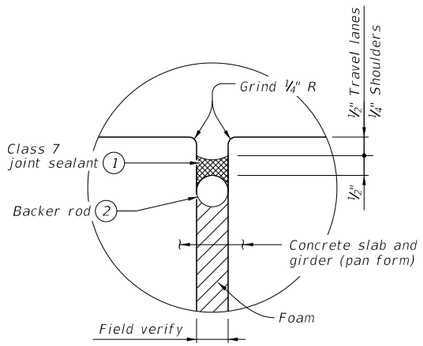


FIXED JOINT

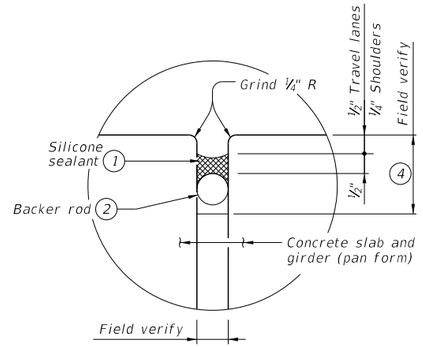


SHOWN AT BARRIER RAIL

JOINT SEALANT TERMINATION DETAILS



DETAIL "A"



DETAIL "C"

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

1) Clean joint opening of all existing 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) Fill void with extruded polystyrene foam.

4) Place backer rod into joint opening 1" below the top of concrete.

5) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of concrete in travel lanes and ¼" below top of concrete in shoulders.

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 if opening width allows.

5) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of concrete in travel lanes and ¼" below top of concrete in shoulders.

(1) Use Class 7 joint sealant. Prepare joint and seal in accordance with Item 438, "Cleaning and Sealing Joints."

(2) Provide backer rod 25% larger than joint opening and 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 joint sealant. 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".

(5) Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

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 to clean and seal the joint.

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

Provide Class 7 joint 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 joint sealant cannot be effectively placed in the vertical position, a Class 4 joint sealant compatible with the Class 7 joint 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.

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

DATE:
FILE:

Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

(PAN GIRDER BRIDGES)

(MOD)

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©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		87

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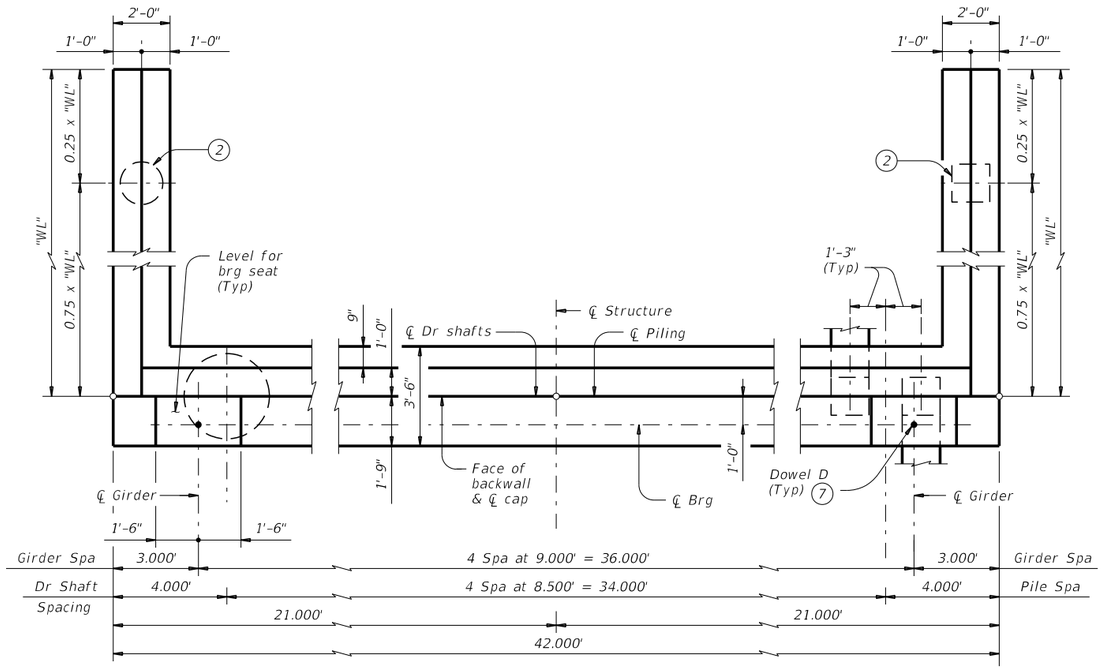
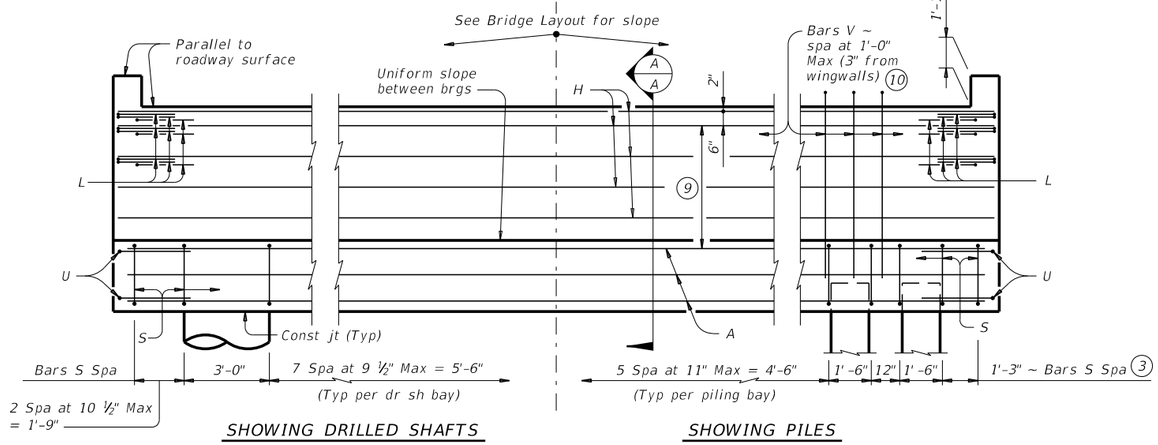
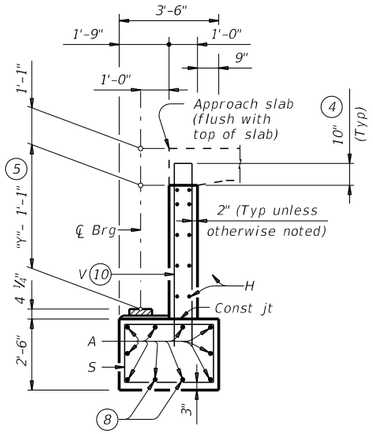


PLAN (1)



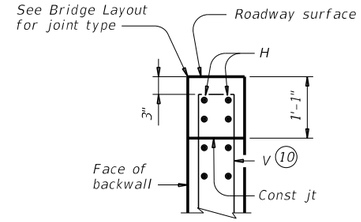
ELEVATION

TABLE A			
Header Slope	Girder Type	Wingwall Type	Wingwall Lgth "WL"
2:1	Tx28	Cantilevered	8.000'
	Tx34	Cantilevered	9.000'
	Tx40	Cantilevered	10.000'
	Tx46	Cantilevered	11.000'
	Tx54	Cantilevered	12.000'
3:1	Tx28	Cantilevered	12.000'
	Tx34	Founded	13.000'
	Tx40	Founded	15.000'
	Tx46	Founded	16.000'
	Tx54	Founded	18.000'



SECTION A-A

(With approach slab) (6)



BACKWALL DETAIL

(Without approach slab) (6)

1. See Table A for variable dimensions based on header slope and girder type.
2. See Table A to determine if wingwall foundations are required.
3. For piling larger than 16" adjust Bars S spacing as required to avoid piling.
4. Increase as required to maintain 3" from finished grade.
5. See Span details for "Y" value.
6. See Bridge Layout to determine if approach slab is present.
7. Omit Dowels D at end of multi-span unit. Adjust reinforcing steel total accordingly.
8. With pile foundations, move Bars A shown to clear piles.
9. Spacing based on girder type:
   Tx28 ~ 3 spaces at 1'-0" Max
   Tx34 ~ 3 spaces at 1'-0" Max
   Tx40 ~ 4 spaces at 1'-0" Max
   Tx46 ~ 4 spaces at 1'-0" Max
   Tx54 ~ 5 spaces at 1'-0" Max
10. Field bend as needed to clear piles.

TABLE OF FOUNDATION LOADS		
Span Length	All Girder Types	
Ft	Tons/Shaft	Tons/Pile
40	51	47
45	55	48
50	58	50
55	62	52
60	65	53
65	68	55
70	71	57
75	74	58
80	77	60
85	81	62
90	84	63
95	87	65
100	90	66
105	93	68
110	96	69
115	99	71
120	102	73

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

See Bridge Layout for header slope and foundation type, size and length.

See Common Foundation Details (FD) standard sheet for all foundation details and notes.

See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.

See applicable rail details for rail anchorage in wingwalls.

These abutment details may be used with standard SIG-40 only.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

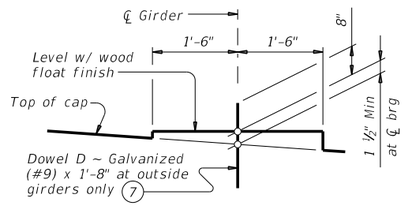
MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).

Provide Class C (HPC) concrete if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

Galvanize dowel bars D.



BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)

HL93 LOADING

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS
TYPE TX28 THRU TX54
PRESTR CONC I-GIRDERS
40' ROADWAY

AIG-40

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	TYL	RUSK		88

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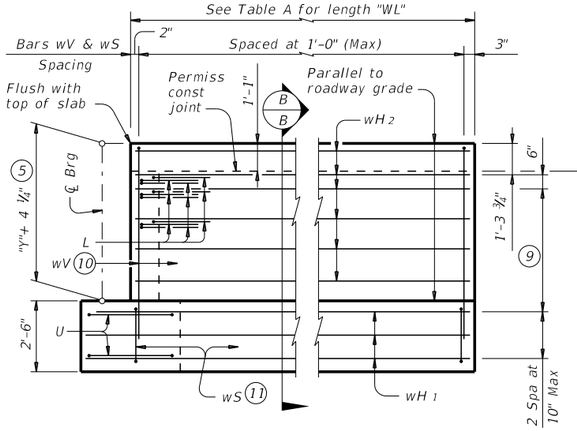
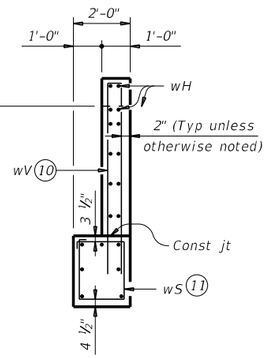
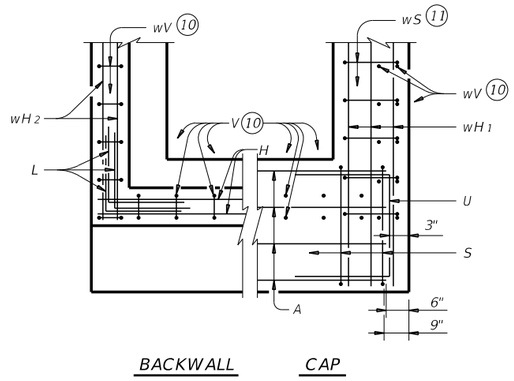


WINGWALL ELEVATION

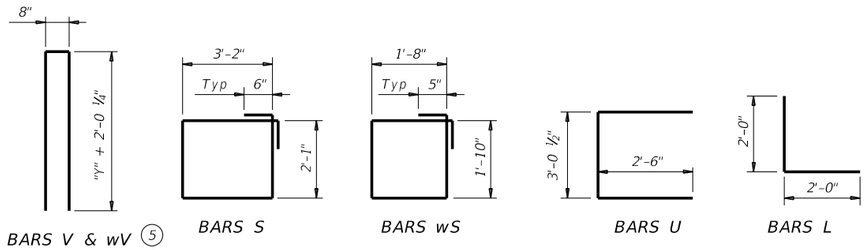


SECTION B-B



BACKWALL CAP

CORNER DETAILS



BARS V & wV (5) BARS S BARS wS BARS U BARS L

(5) See Span details for "Y" value.

(9) Spacing based on girder type:
Tx28 ~ 3 spaces at 1'-0" Max
Tx34 ~ 3 spaces at 1'-0" Max
Tx40 ~ 4 spaces at 1'-0" Max
Tx46 ~ 4 spaces at 1'-0" Max
Tx54 ~ 5 spaces at 1'-0" Max

(10) Field bend as needed to clear piles.

(11) Adjust as required to avoid piling.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS
TYPE TX28 THRU TX54
PRESTR CONC I-GIRDERS
40' ROADWAY

AIG-40

FILE: aig45sts-17.dgn	DN: TAR	CK: KCM	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		89

DATE: 5/17/2023 6:56:12 AM
FILE: I:\TYL\PRJ\0000206563_Design\Proj3-FM 2658\DGN\PSE\00 STD\BRG\AIG-40.dgn

TABLES OF ESTIMATED QUANTITIES WITH 2:1 HEADER SLOPE (12)

TYPE Tx28 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	8	#6	41'-8"	501
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	11'-4"	485
wH1	14	#6	9'-5"	198
wH2	20	#6	7'-8"	230
wS	18	#4	7'-10"	94
wV	18	#5	11'-4"	213

Reinforcing Steel	Lb	4,523
Class "C" Concrete	CY	21.9

TYPE Tx34 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	8	#6	41'-8"	501
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	12'-4"	527
wH1	14	#6	10'-5"	219
wH2	20	#6	8'-8"	260
wS	20	#4	7'-10"	105
wV	20	#5	12'-4"	257

Reinforcing Steel	Lb	4,671
Class "C" Concrete	CY	23.6

TYPE Tx40 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	10	#6	41'-8"	626
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	13'-4"	570
wH1	14	#6	11'-5"	240
wH2	24	#6	9'-8"	348
wS	22	#4	7'-10"	115
wV	22	#5	13'-4"	306

Reinforcing Steel	Lb	5,007
Class "C" Concrete	CY	25.4

TYPE Tx46 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	10	#6	41'-8"	626
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	14'-4"	613
wH1	14	#6	12'-5"	261
wH2	24	#6	10'-8"	385
wS	24	#4	7'-10"	126
wV	24	#5	14'-4"	359

Reinforcing Steel	Lb	5,172
Class "C" Concrete	CY	27.3

TYPE Tx54 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	12	#6	41'-8"	751
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	15'-8"	670
wH1	14	#6	13'-5"	282
wH2	28	#6	11'-8"	491
wS	26	#4	7'-10"	136
wV	26	#5	15'-8"	425

Reinforcing Steel	Lb	5,557
Class "C" Concrete	CY	29.6

TABLES OF ESTIMATED QUANTITIES WITH 3:1 HEADER SLOPE (12)

TYPE Tx28 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	8	#6	41'-8"	501
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	11'-4"	485
wH1	14	#6	13'-5"	282
wH2	20	#6	11'-8"	350
wS	26	#4	7'-10"	136
wV	26	#5	11'-4"	307

Reinforcing Steel	Lb	4,863
Class "C" Concrete	CY	24.6

TYPE Tx34 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	8	#6	41'-8"	501
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	12'-4"	527
wH1	14	#6	14'-5"	303
wH2	20	#6	12'-8"	381
wS	28	#4	7'-10"	147
wV	28	#5	12'-4"	360

Reinforcing Steel	Lb	5,021
Class "C" Concrete	CY	26.4

TYPE Tx40 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	10	#6	41'-8"	626
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	13'-4"	570
wH1	14	#6	16'-5"	345
wH2	24	#6	14'-8"	529
wS	32	#4	7'-10"	167
wV	32	#5	13'-4"	445

Reinforcing Steel	Lb	5,484
Class "C" Concrete	CY	29.0

TYPE Tx46 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	10	#6	41'-8"	626
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	14'-4"	613
wH1	14	#6	17'-5"	366
wH2	24	#6	15'-8"	565
wS	34	#4	7'-10"	178
wV	34	#5	14'-4"	508

Reinforcing Steel	Lb	5,658
Class "C" Concrete	CY	31.1

TYPE Tx54 Girders

Bar	No.	Size	Length	Weight
A	10	#11	41'-0"	2,178
D (7)	2	#9	1'-8"	11
H	12	#6	41'-8"	751
L	18	#6	4'-0"	108
S	38	#5	11'-6"	456
U	4	#6	8'-1"	49
V	41	#5	15'-8"	670
wH1	14	#6	19'-5"	408
wH2	28	#6	17'-8"	743
wS	38	#4	7'-10"	199
wV	38	#5	15'-8"	621

Reinforcing Steel	Lb	6,194
Class "C" Concrete	CY	34.4

(7) Omit Dowels D at end of multi-span unit. Adjust reinforcing steel total accordingly.

(12) Quantities shown are for one abutment only (with approach slab). With no approach slab, add 1.6 CY Class "C" concrete and 250 lbs reinforcing steel for 4 additional Bars H.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS
TYPE TX28 THRU TX54
PRESTR CONC I-GIRDERS
40' ROADWAY

AIG-40

FILE: aig45sts-17.dgn	DN: TAR	CK: KCM	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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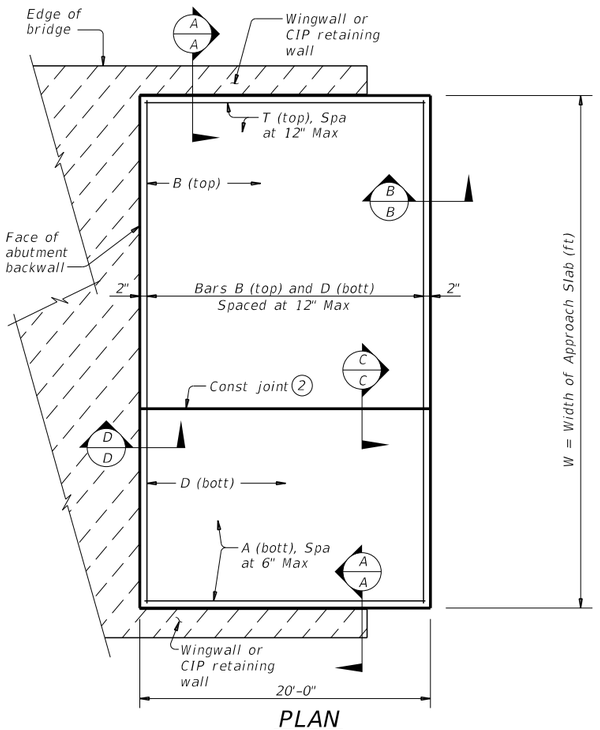
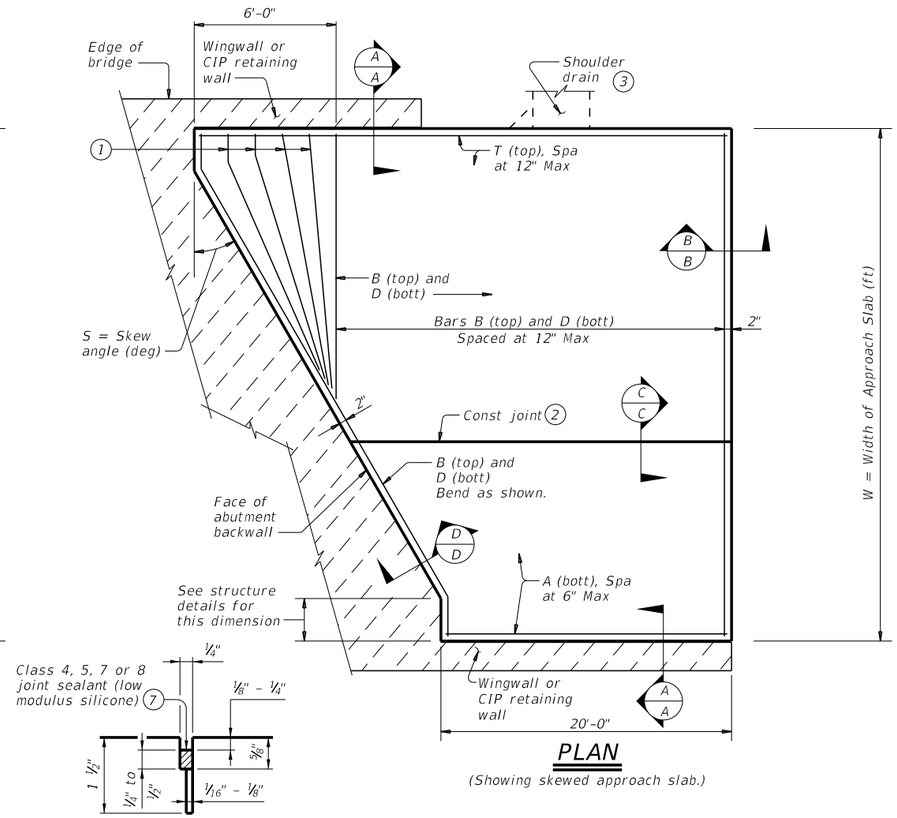


PLAN

(Showing non-skewed approach slab.)



PLAN

(Showing skewed approach slab.)

BAR TABLE

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

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = $0.802W + 0.02W^2 \tan S$

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab.

(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(6) See details elsewhere in plans for required cross-slope.

(7) Place in accordance with Item 438.

(8) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(9) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310, "Joint Sealants and Fillers."

Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

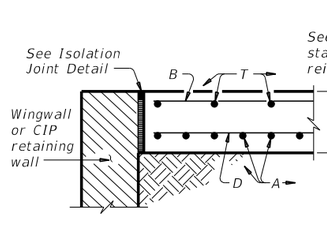
Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

Cure for 4 days using water or membrane curing per Item 422.

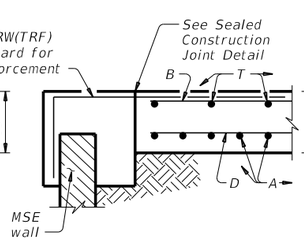
All details shown herein are subsidiary to bridge approach slab.

Cover dimensions are clear dimensions, unless noted otherwise.

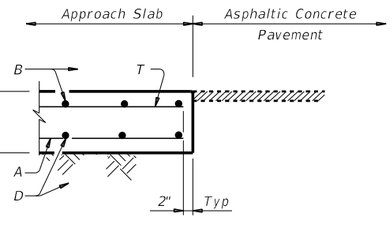
LONGITUDINAL SAW CUT JOINT DETAIL

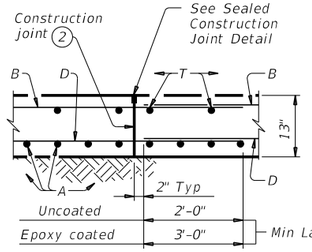


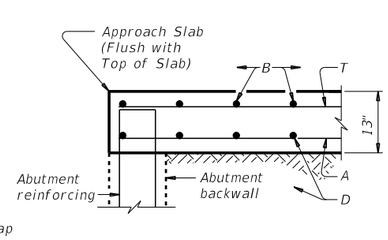
SHOWING WINGWALL OR CIP RETAINING WALL



SHOWING MSE WALL





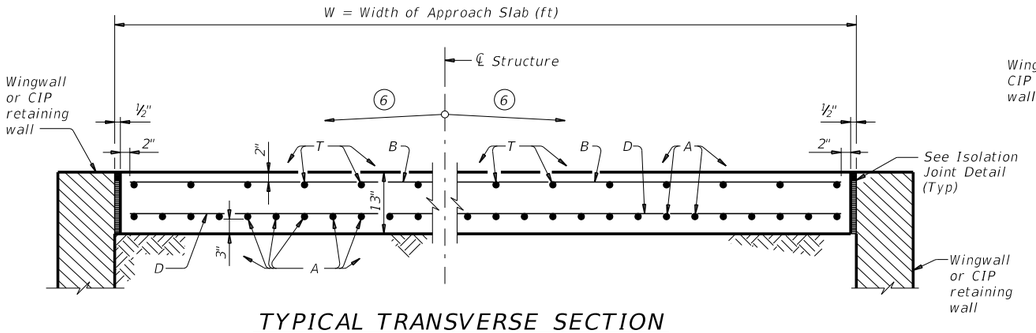


SECTION A-A

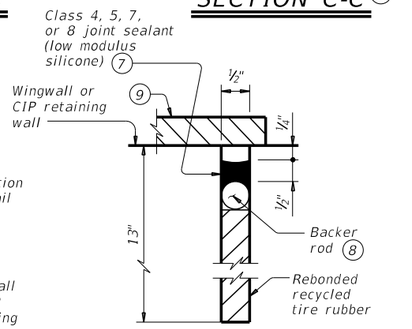
SECTION B-B

SECTION C-C (5)

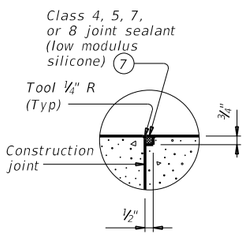
SECTION D-D



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

Bridge Division Standard

BRIDGE APPROACH SLAB

ASPHALTIC CONCRETE PAVEMENT

BAS-A

FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Removed stress relieving pad.	DIST	COUNTY		SHEET NO.
	TYL	RUSK		91

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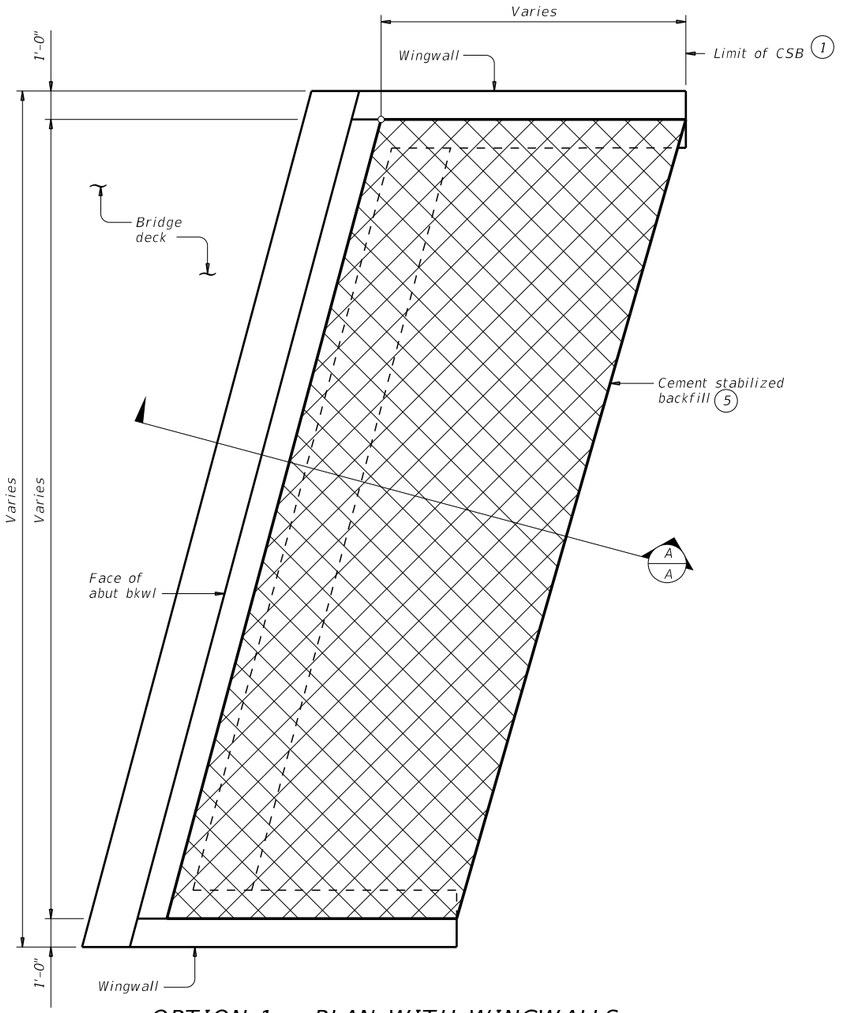
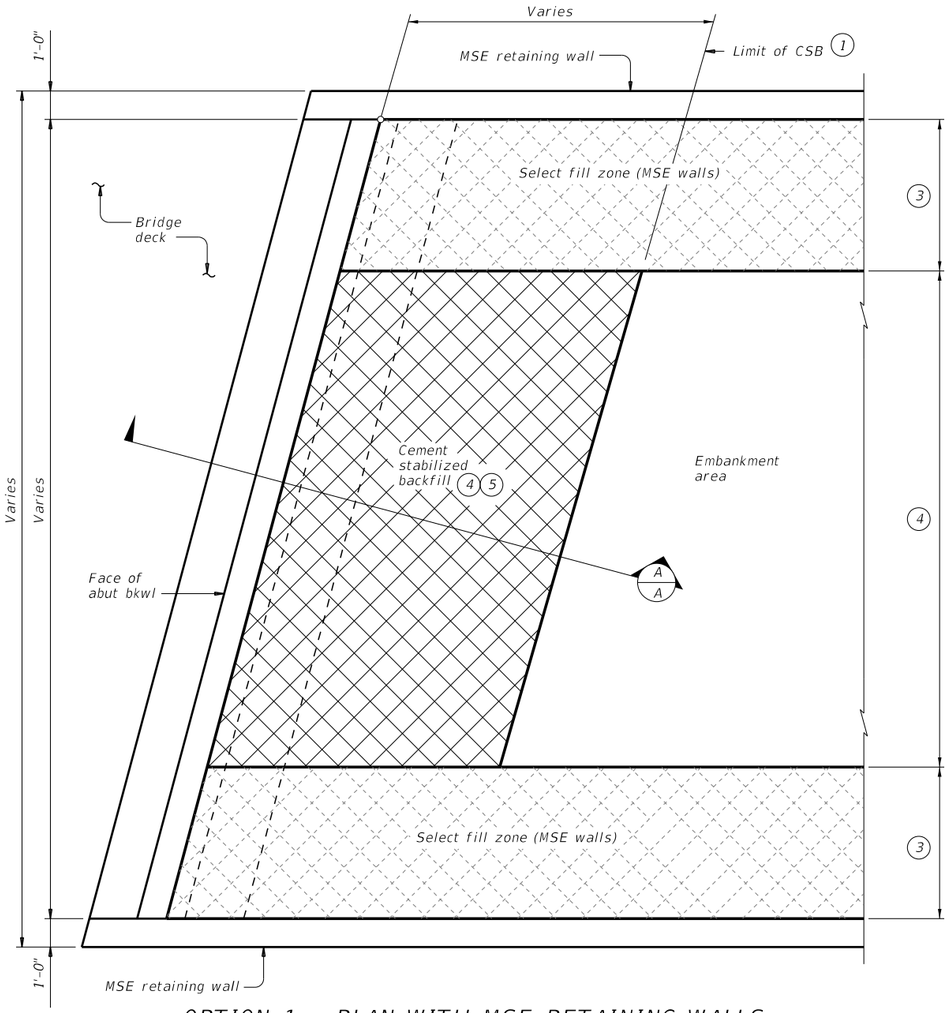
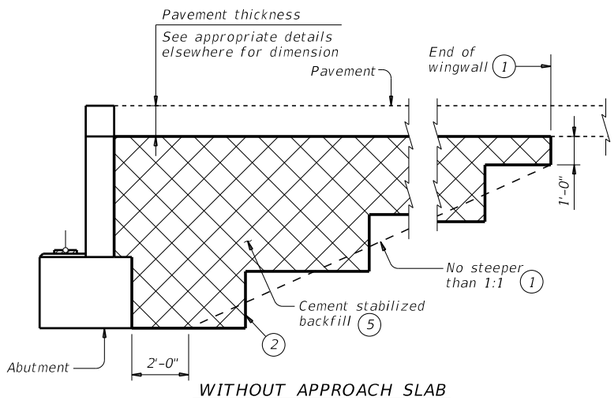


OPTION 1 ~ PLAN WITH WINGWALLS

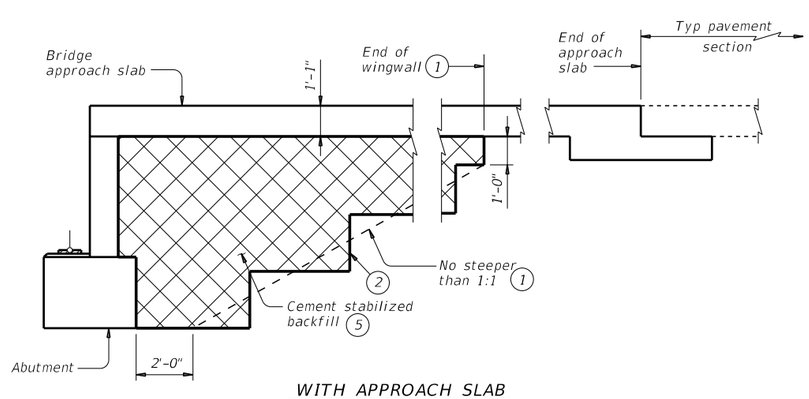
Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

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

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

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

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

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

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

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
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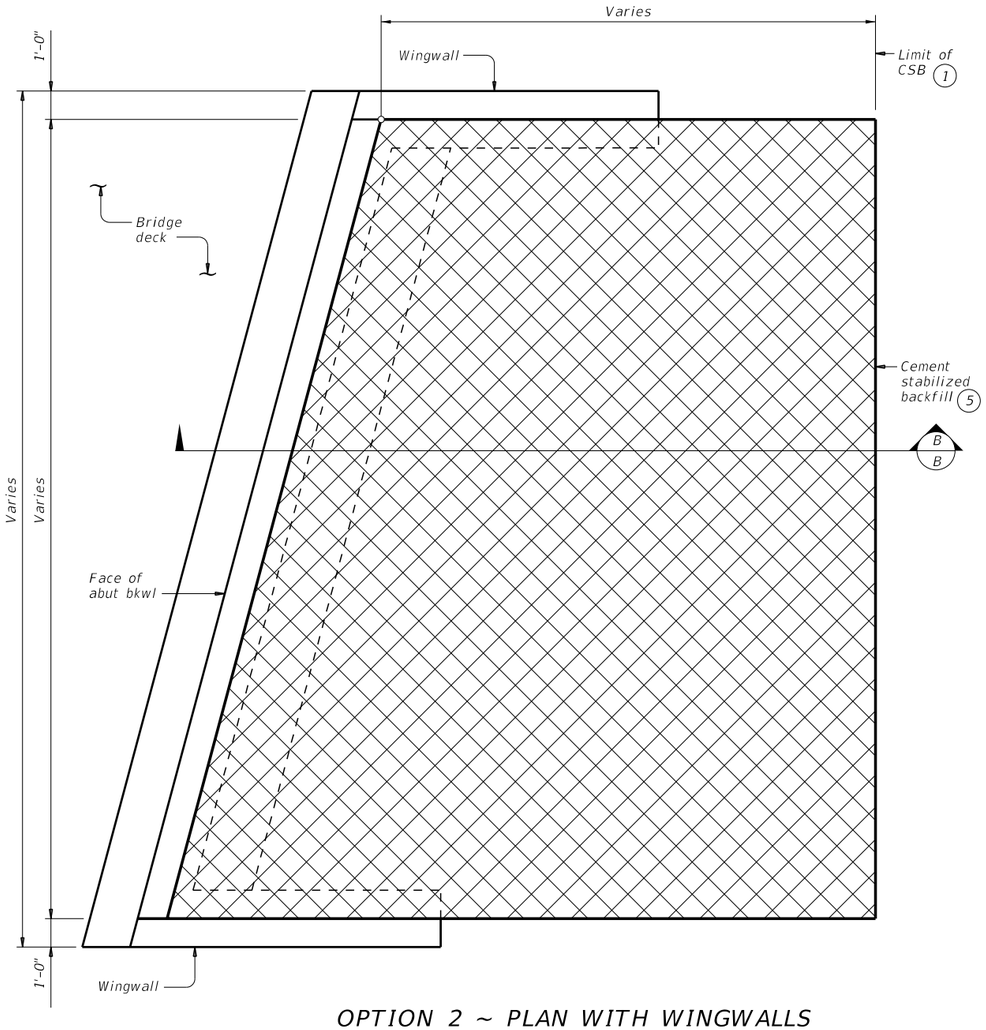
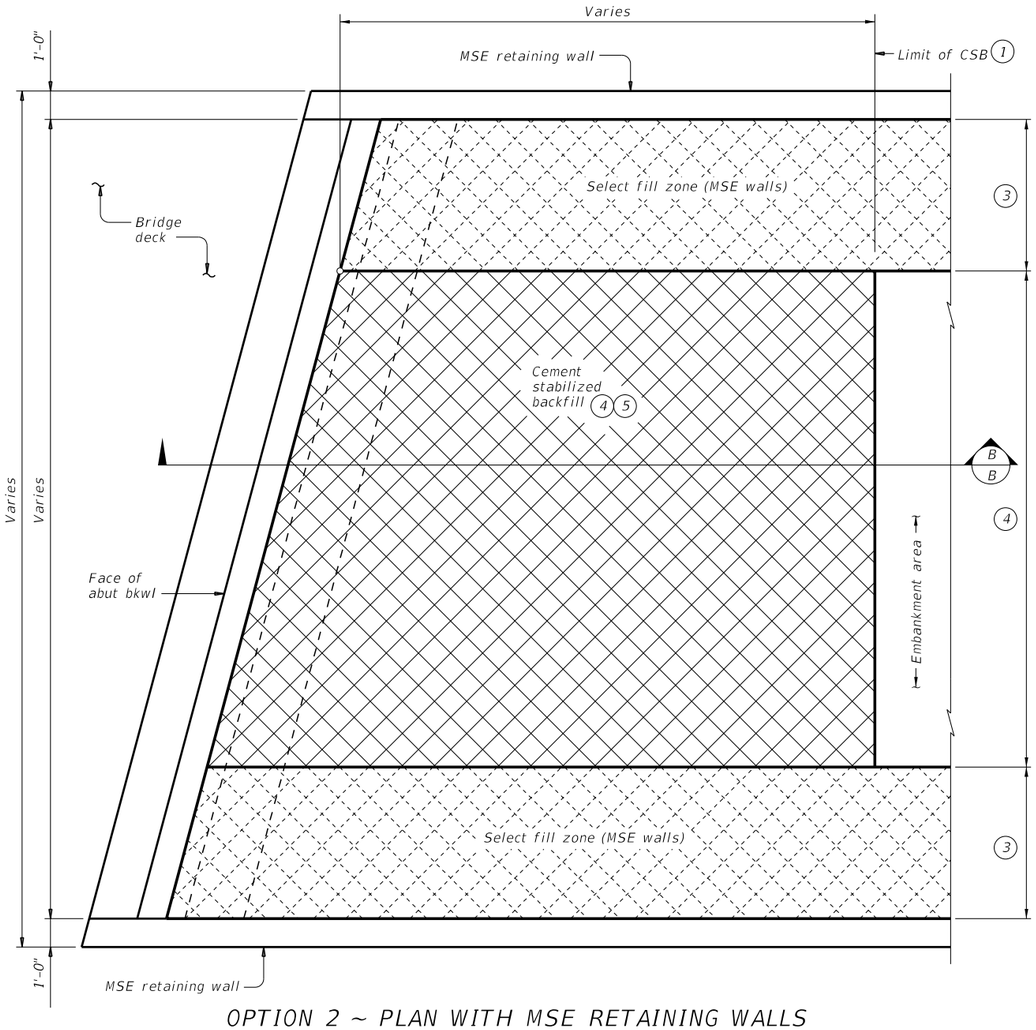


OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

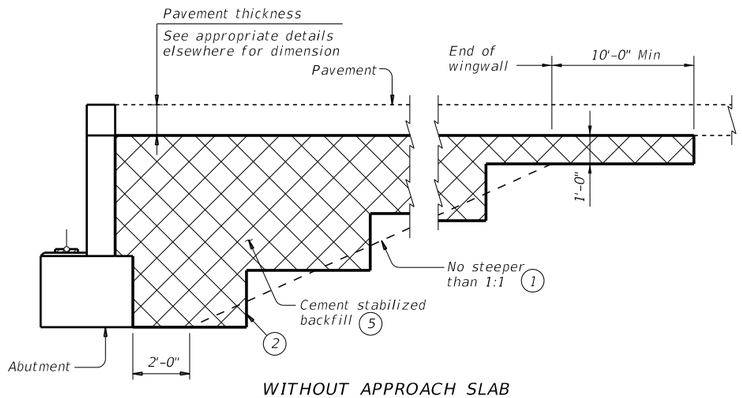
(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

(6) 1'-0" for BAS-A
1'-10" for BAS-C



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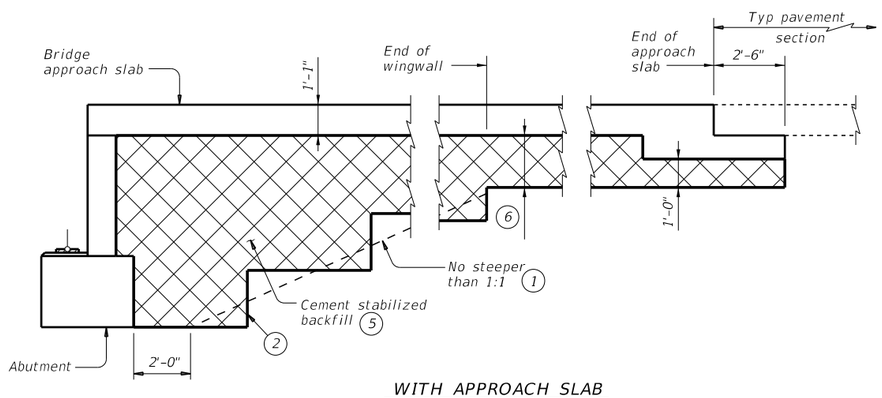

WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
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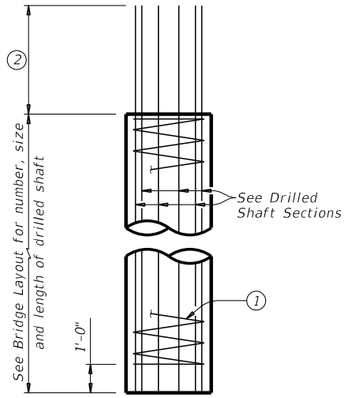
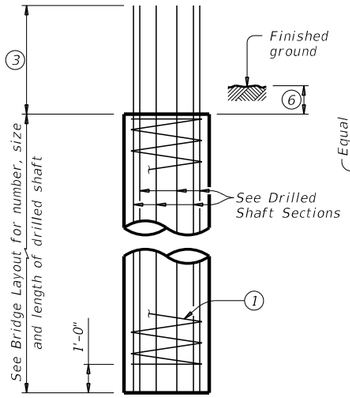
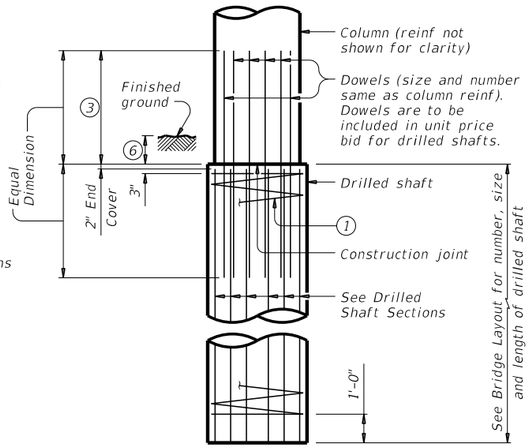


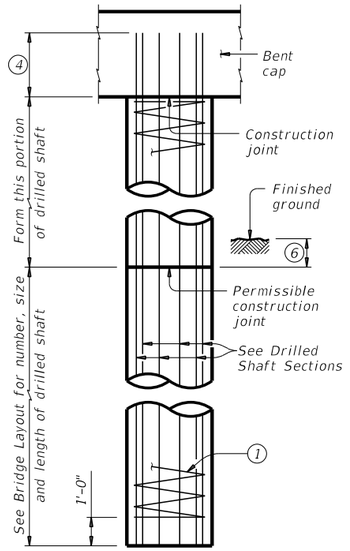
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



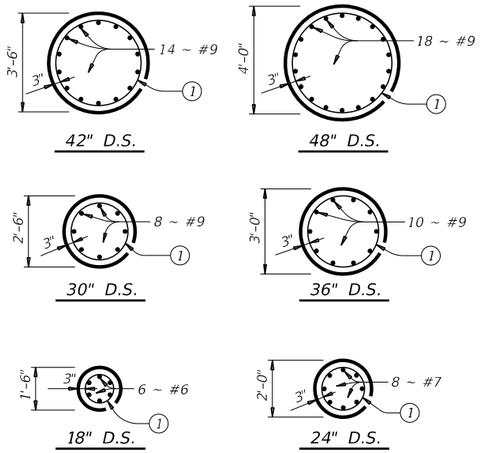
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

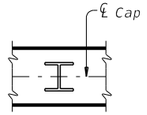


DRILLED SHAFT SECTIONS

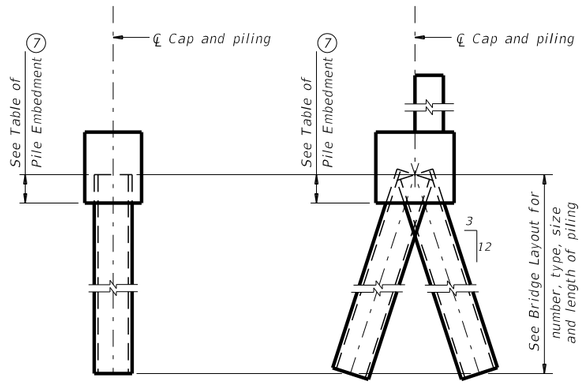
DRILLED SHAFT DETAILS

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

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

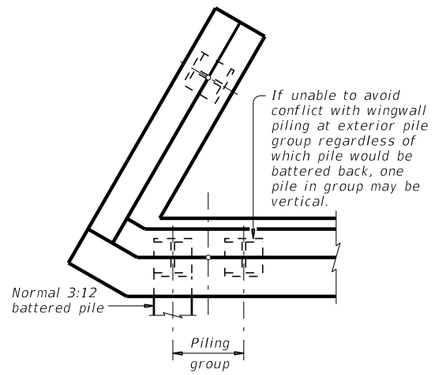


ORIENTATION OF STEEL H-PILING

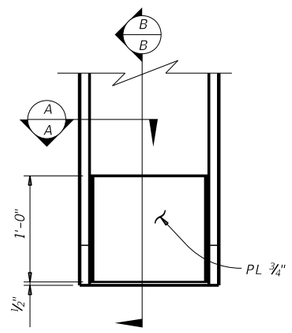


VERTICAL PILE BATTERED PILE

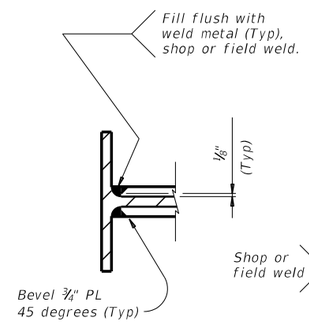
PILING DETAILS
(Concrete or steel H)



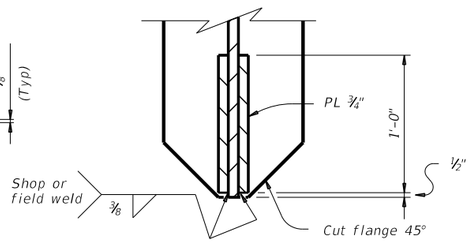
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION



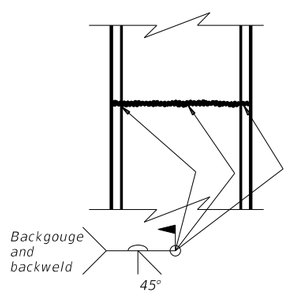
SECTION A-A

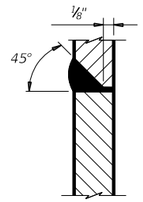


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

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





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	RUSK		94

DATE: 5/17/2023 6:56:15 AM
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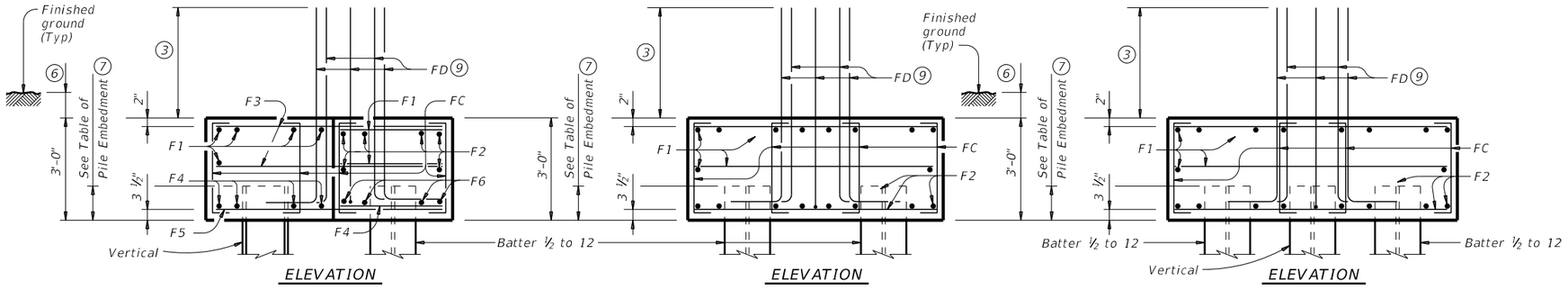
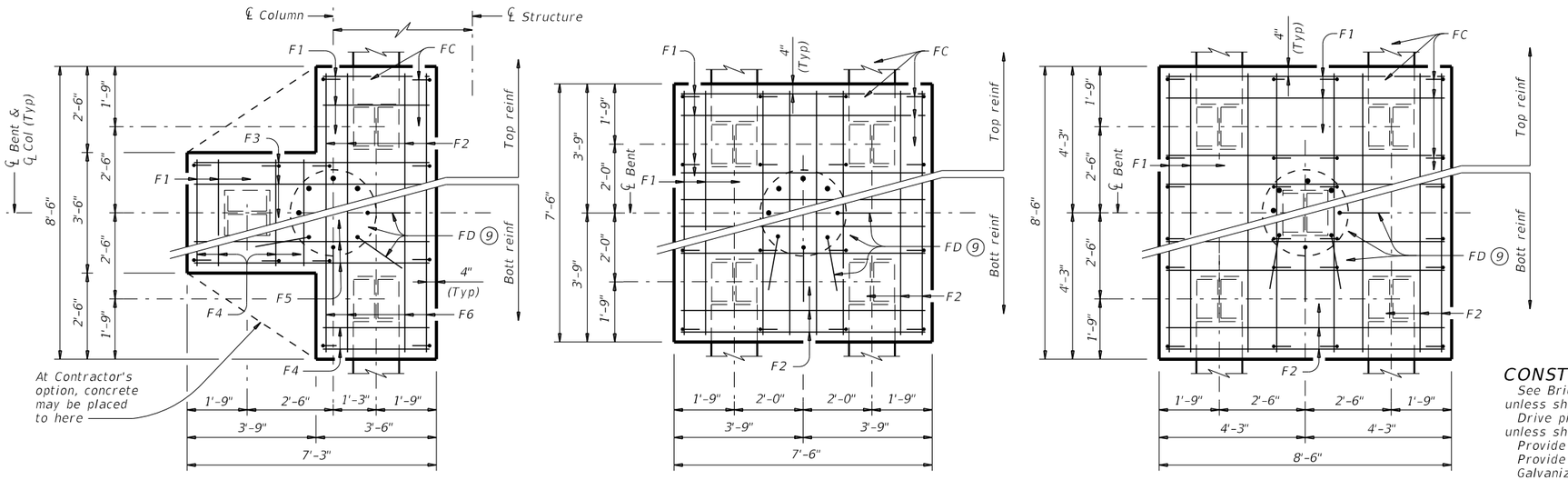




THREE PILE FOOTING (8)

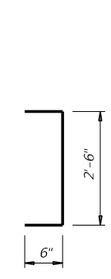
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

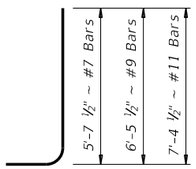
For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



BARS FC



BARS FD (9)

(3) Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

(8) See Bridge Layout for type, size and length of piling.

(9) Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) Adjust FD quantity, size and weight as needed to match column reinforcing.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

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

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

DESIGNER NOTES:

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

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	RUSK		95

DATE: 5/17/2023 6:56:15 AM
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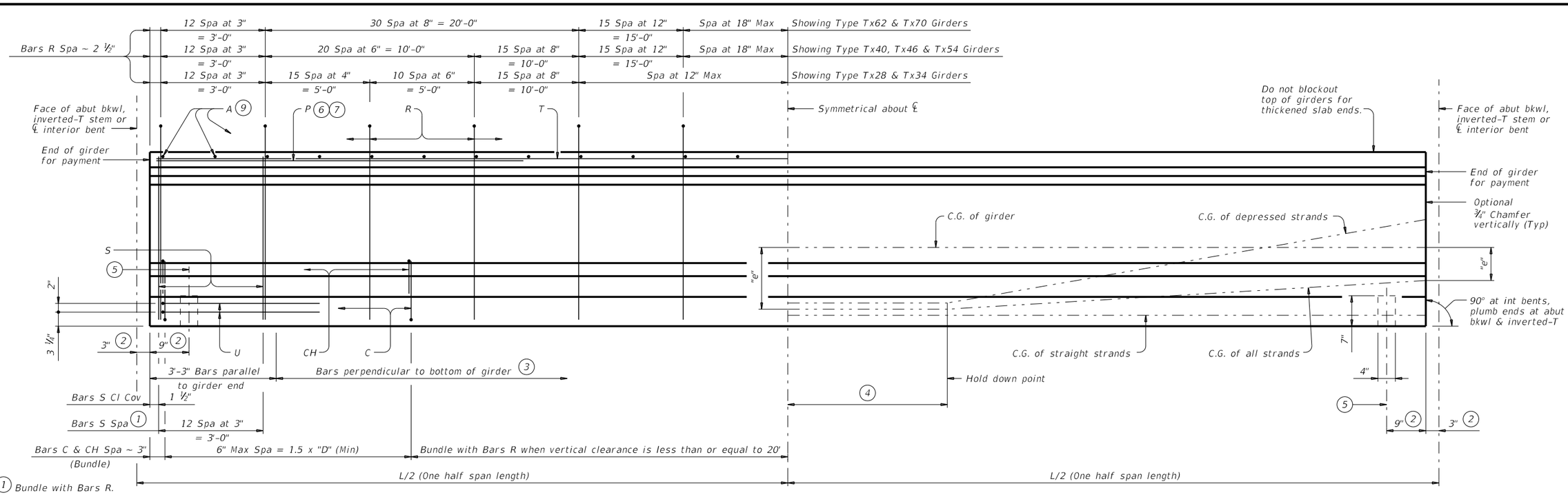


(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅝") at base. If holes are formed with sheet metal, forms may be left in place.

GIRDER ELEVATION

(6) Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

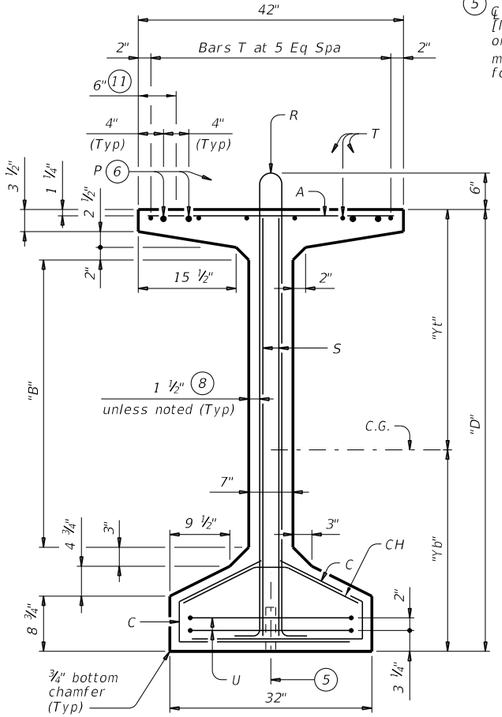
(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

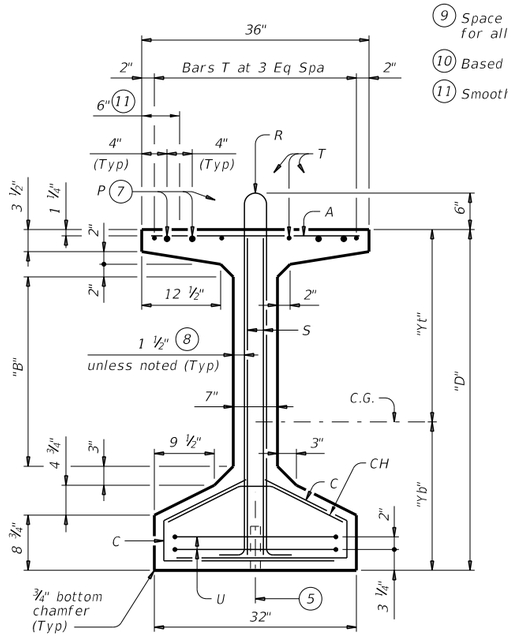
(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

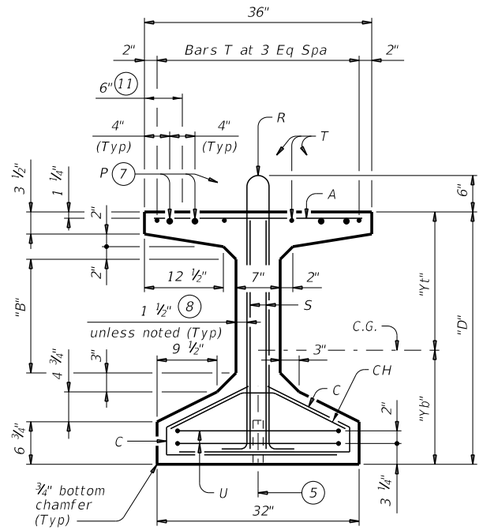
(11) Smooth trowel finish on the slab overhang side of exterior girder.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.
When vertical clearance of the span is less than or equal to 20', provide additional Bars C and CH in every girder of that span.

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

HL93 LOADING

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Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		96

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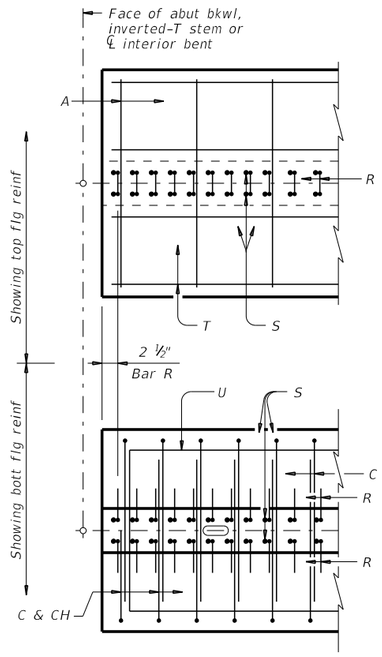
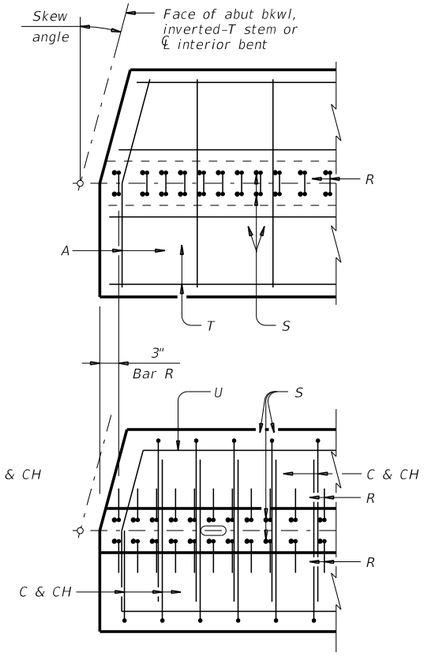
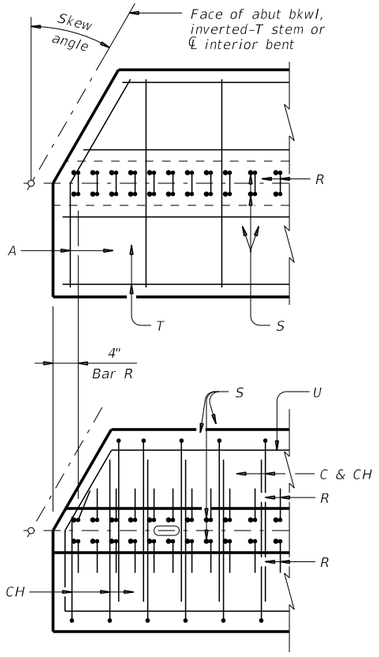
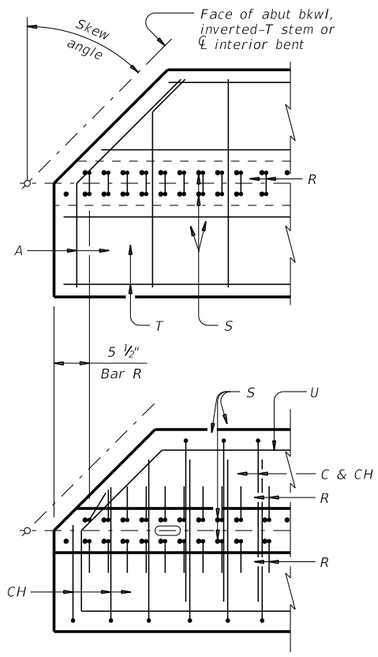
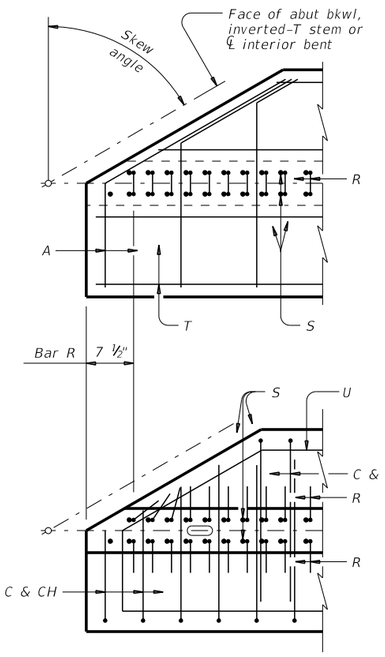




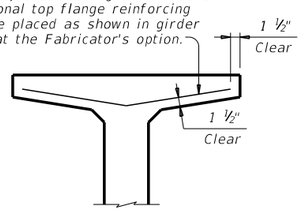




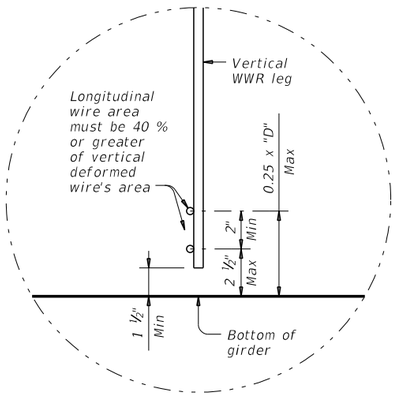


PLAN OF GIRDER ENDS (12)

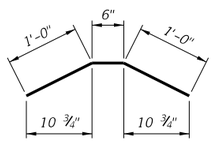
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



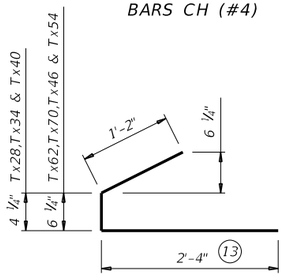
OPTIONAL TOP FLANGE REINFORCING DETAIL



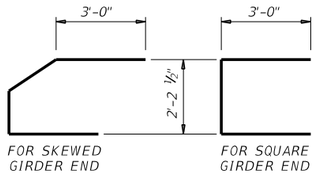
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



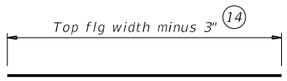
BARS CH (#4)



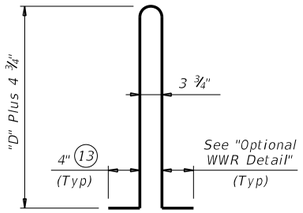
BARS C (#4)



BARS U (#5)

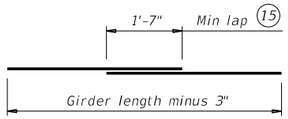


BARS A (#3)



BARS R (#4) (16)

BARS S (#6)



BARS T (#4)

(12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(13) Bars may be cut or bent at skewed end as required.

(14) Increase as necessary for bars at skewed end.

(15) No portion of bar less than 10 ft.

(16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	2653	01	016,ETC	FM 2658
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	TYL	RUSK		97

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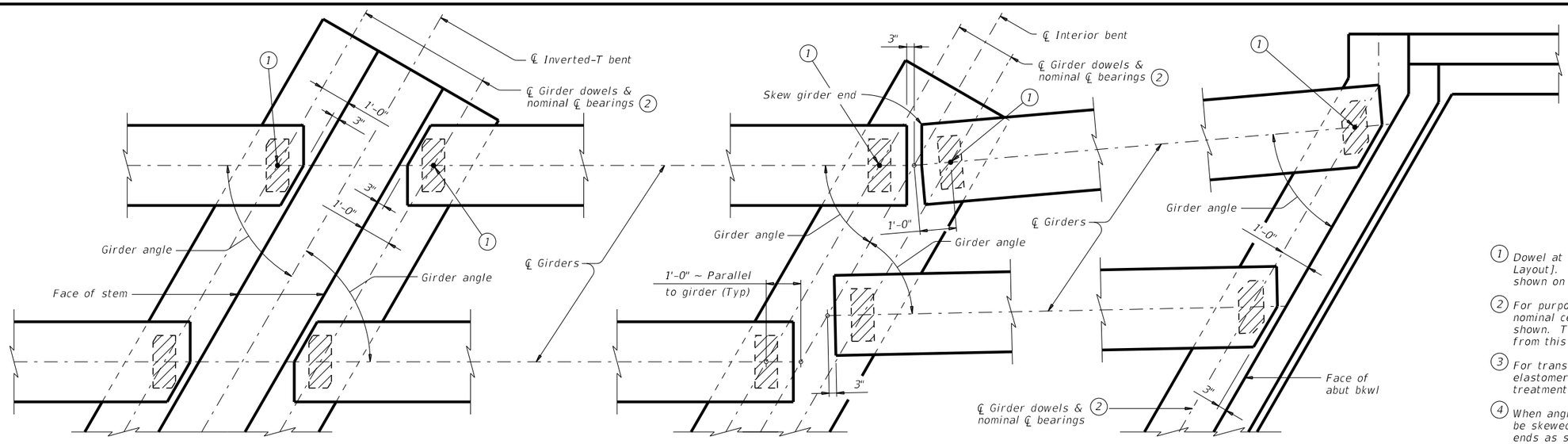


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

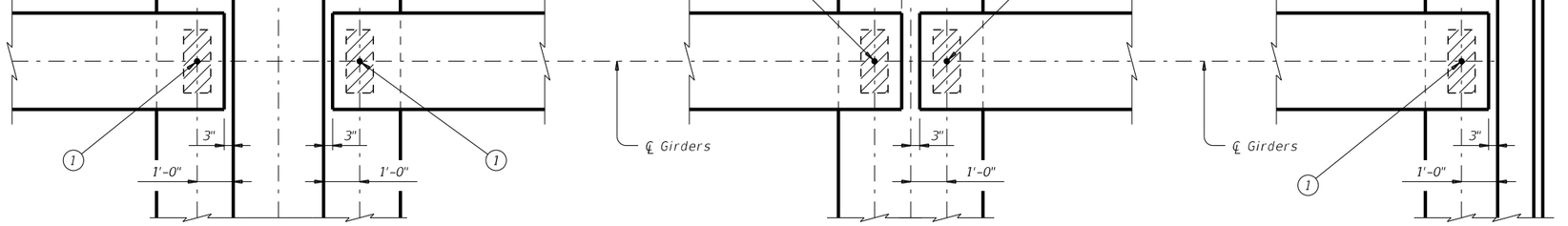
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(3) For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.

(4) When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.

(5) See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.

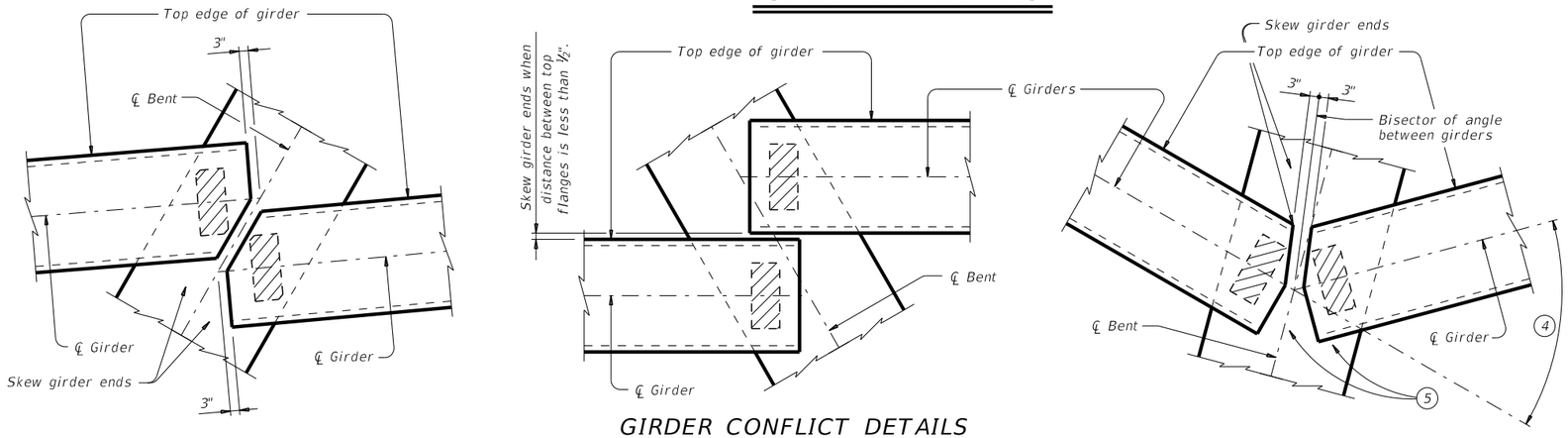


AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT (3)

GIRDER END DETAILS



GIRDER CONFLICT DETAILS

GENERAL NOTES:
These details accommodate skew angles up to 60°.
Shop drawings for approval are required.
A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

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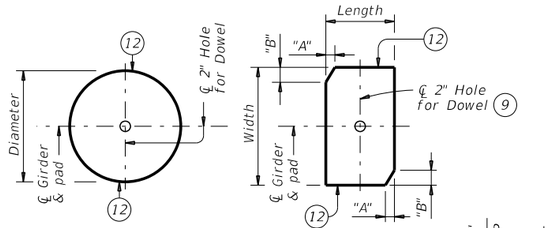
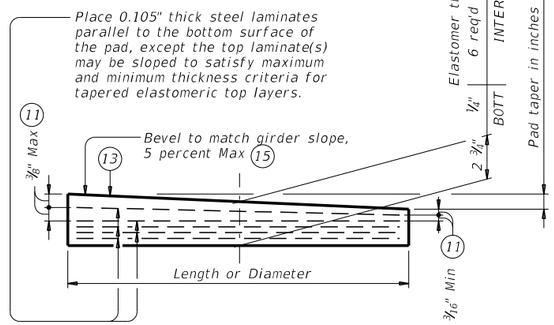


PLANS (10)



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

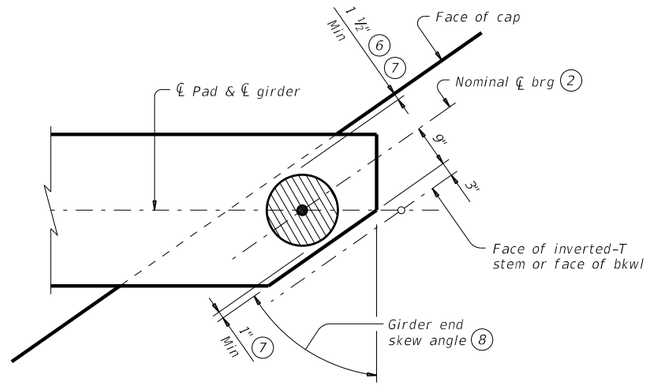
(50 DUROMETER)

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

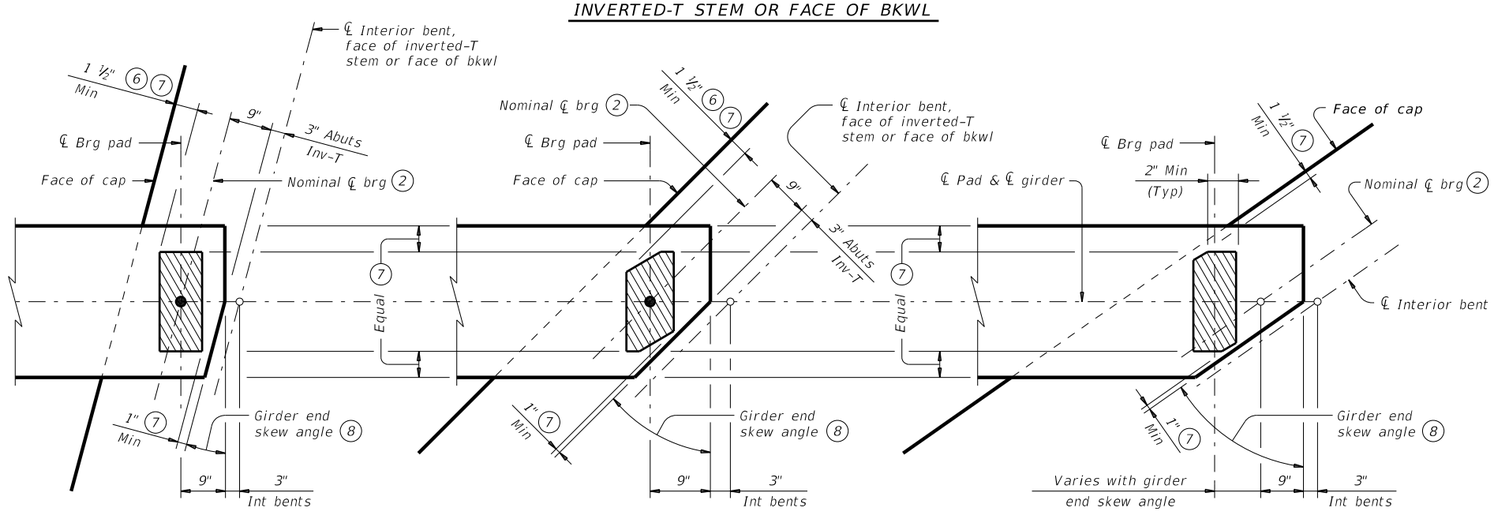
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Width	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"



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



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

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (16)

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

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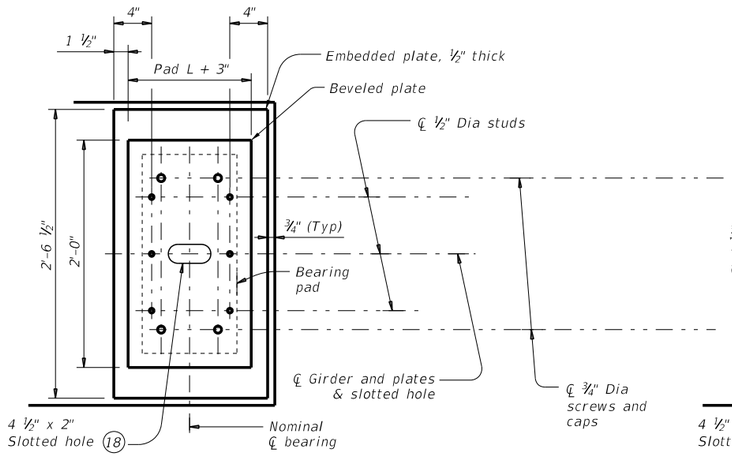
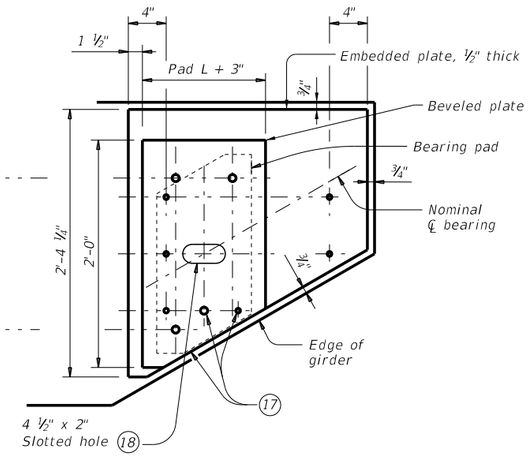
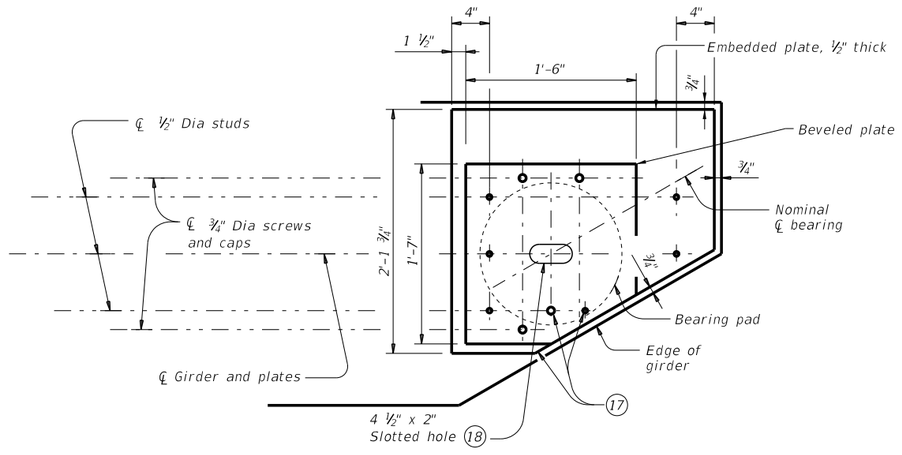


NORMAL GIRDER END
RECTANGULAR BEARING PAD

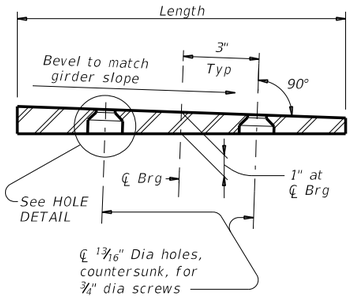


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

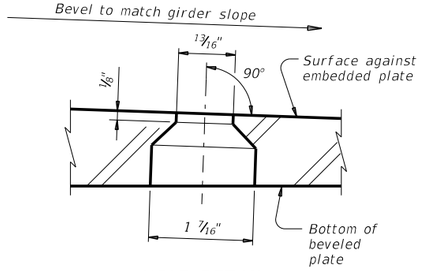


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



SECTION



HOLE DETAIL

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

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

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

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

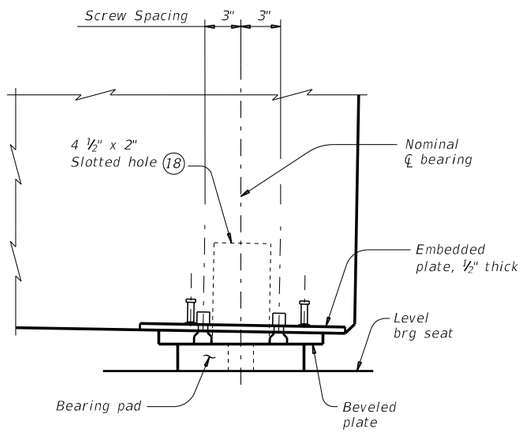
When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

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

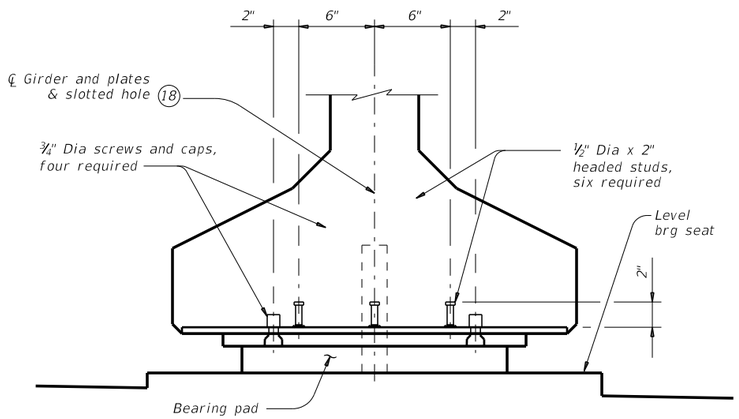
¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

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

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

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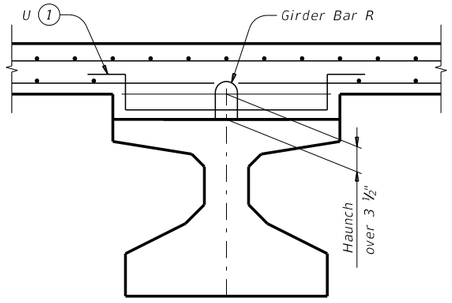
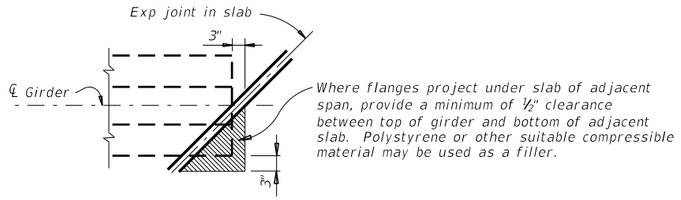
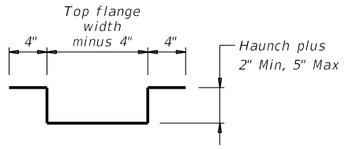


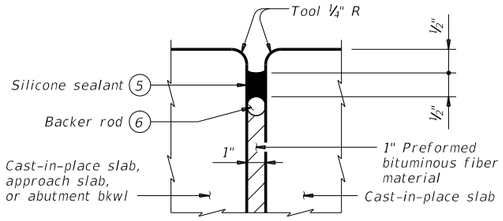
HAUNCH REINFORCING DETAIL



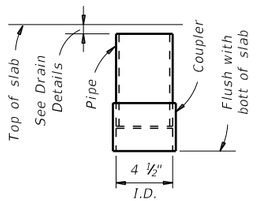
TREATMENT AT GIRDER END FOR SKEWED SPANS



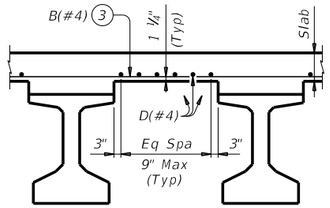
BARS U (#4)



TYPE A JOINT DETAIL (7)

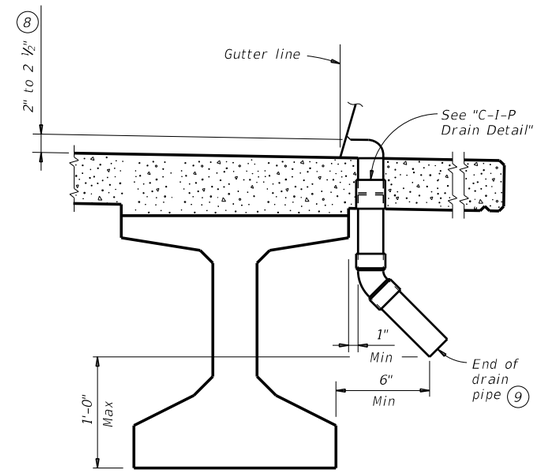


C-I-P DRAIN DETAIL (2)



TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



DRAIN DETAIL (10)

(1) Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".

(2) Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.

(3) Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.

(4) Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

(5) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(6) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(7) The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.

(8) Drain entrance formed in rail or sidewalk.

(9) Water may not be discharged onto girders.

(10) All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."

All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:

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

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

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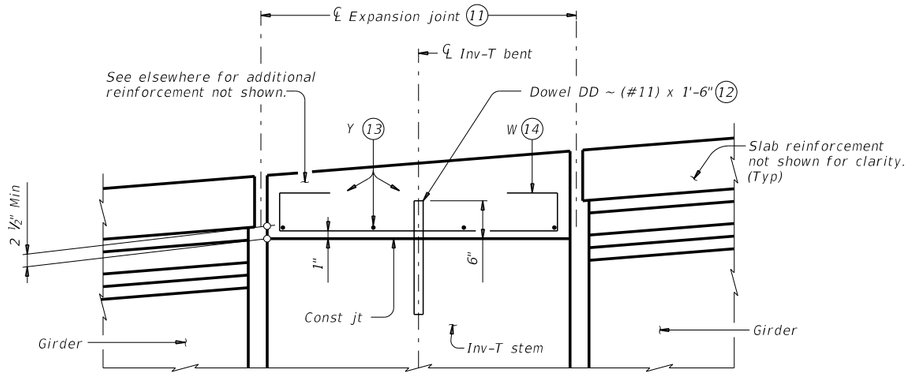
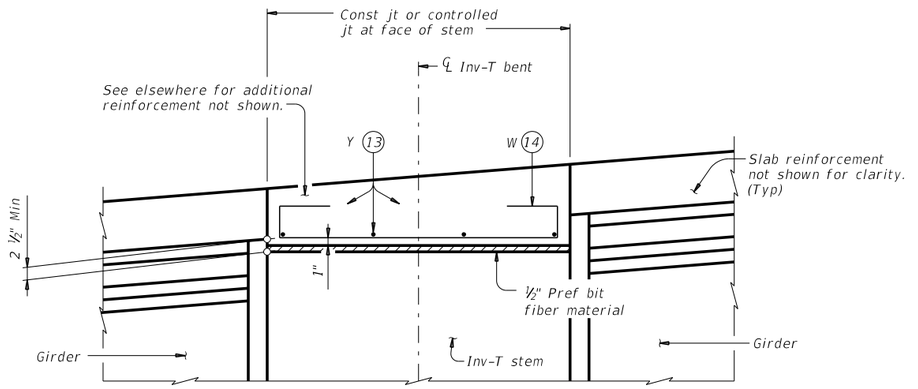
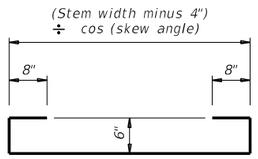


SHOWING EXPANSION JOINTS

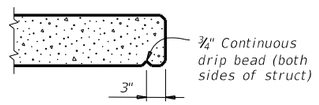


SHOWING CONST JTS OR CONTROLLED JTS

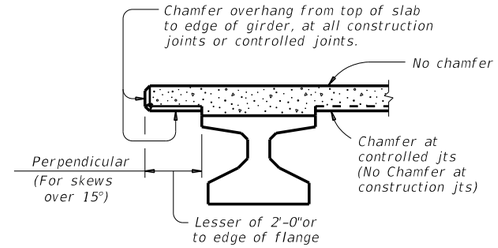
REINFORCEMENT OVER INV-T BENTS



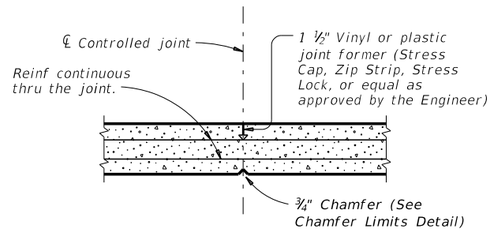
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) See Layout for joint type.

(12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

(13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(15) See Span details for type of joint and joint locations.

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SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

MISCELLANEOUS SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

IGMS

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STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						NO.	TO END	RELEASE STRGTH (1) f'ci	MINIMUM 28 DAY COMP STRGTH f'c	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH	"e" ℄	"e" END													
						(in)	fpu (ksi)	(in)	(in)		(in)	(ksi)	(ksi)	fct(ksi)	fcb(ksi)	(kip-ft)	Moment	Shear	Inv	Opr	Inv
Type Tx28 Girders 40' Roadway 8.5" Slab	40	ALL	Tx28		12	0.6	270	10.48	10.48			4.700	5.000	1.171	-1.656	1590	0.830	1.040	1.54	2.00	1.85
	45	ALL	Tx28		14	0.6	270	10.48	9.34	2	10.5	4.000	5.200	1.483	-2.021	1684	0.800	1.050	1.53	1.98	1.63
	50	ALL	Tx28		16	0.6	270	10.23	9.23	4	8.5	4.000	5.600	1.807	-2.427	1973	0.780	1.050	1.44	1.87	1.38
	55	ALL	Tx28		18	0.6	270	10.04	7.81	4	14.5	4.000	6.200	2.190	-2.882	2297	0.760	1.060	1.37	1.77	1.15
	60	ALL	Tx28		22	0.6	270	9.75	6.48	4	22.5	4.400	6.800	2.597	-3.355	2625	0.740	1.060	1.35	1.90	1.13
	65	ALL	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.200	7.200	3.049	-3.865	2965	0.720	1.070	1.20	1.77	1.09
Type Tx34 Girders 40' Roadway 8.5" Slab	40	ALL	Tx34		12	0.6	270	13.01	13.01			4.000	5.000	0.920	-1.270	1937	0.860	1.020	1.82	2.36	2.43
	45	ALL	Tx34		14	0.6	270	13.01	12.15	2	8.5	4.000	5.000	1.161	-1.547	2121	0.830	1.030	1.81	2.35	2.20
	50	ALL	Tx34		14	0.6	270	13.01	12.44	2	6.5	4.000	5.000	1.425	-1.865	2073	0.810	1.030	1.46	1.89	1.64
	55	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.000	1.724	-2.213	2383	0.790	1.040	1.42	1.84	1.41
	60	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.500	5.800	2.033	-2.567	2721	0.770	1.040	1.38	1.79	1.24
	65	ALL	Tx34		20	0.6	270	12.41	9.61	4	18.5	4.000	5.800	2.373	-2.945	3069	0.750	1.050	1.17	1.74	1.08
	70	ALL	Tx34		24	0.6	270	12.18	8.18	4	28.5	4.400	6.200	2.747	-3.350	3430	0.730	1.050	1.45	1.90	1.09
	75	ALL	Tx34		28	0.6	270	12.01	8.58	4	28.5	5.200	6.500	3.138	-3.781	3824	0.720	1.050	1.49	1.99	1.11
	80	ALL	Tx34		32	0.6	270	11.64	8.26	6	24.5	5.800	7.000	3.567	-4.245	4236	0.710	1.060	1.22	1.79	1.05
Type Tx40 Girders 40' Roadway 8.5" Slab	40	ALL	Tx40		12	0.6	270	15.60	15.60			4.000	5.000	0.757	-1.027	1998	0.890	1.010	2.08	2.70	2.97
	45	ALL	Tx40		14	0.6	270	15.60	15.60			4.700	5.000	0.953	-1.249	2363	0.860	1.010	2.08	2.69	2.72
	50	ALL	Tx40		14	0.6	270	15.60	15.60			4.500	5.000	1.175	-1.505	2555	0.830	1.020	1.70	2.21	2.12
	55	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.408	-1.776	2685	0.810	1.020	1.66	2.15	1.89
	60	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.672	-2.070	2798	0.790	1.030	1.39	1.81	1.46
	65	ALL	Tx40		18	0.6	270	15.16	13.82	4	10.5	4.000	5.000	1.942	-2.368	3153	0.770	1.030	1.38	1.79	1.31
	70	ALL	Tx40		20	0.6	270	15.00	13.40	4	12.5	4.000	5.000	2.249	-2.705	3554	0.760	1.030	1.35	1.75	1.14
	75	ALL	Tx40		24	0.6	270	14.77	9.77	4	34.5	4.100	5.600	2.574	-3.046	3937	0.740	1.040	1.12	1.73	1.02
	80	ALL	Tx40		26	0.6	270	14.68	9.76	4	36.5	4.400	5.800	2.900	-3.399	4348	0.730	1.040	1.20	1.88	1.05
	85	ALL	Tx40		30	0.6	270	14.40	10.00	6	28.5	5.100	6.100	3.268	-3.787	4786	0.720	1.040	1.26	1.99	1.04
	90	ALL	Tx40		34	0.6	270	14.07	9.48	6	32.5	5.600	6.300	3.628	-4.168	5218	0.710	1.040	1.52	1.85	1.16
Type Tx46 Girders 40' Roadway 8.5" Slab	40	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.663	-0.816	2075	0.920	0.990	2.31	3.00	3.55
	45	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.832	-0.994	2458	0.890	1.000	1.92	2.49	2.84
	50	ALL	Tx46		14	0.6	270	17.60	17.60			4.200	5.000	1.026	-1.204	2931	0.870	1.000	1.88	2.44	2.56
	55	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.236	-1.421	3272	0.840	1.010	1.86	2.41	2.33
	60	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.466	-1.657	3218	0.820	1.010	1.56	2.03	1.85
	65	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.500	5.500	1.702	-1.897	3301	0.800	1.010	1.56	2.02	1.69
	70	ALL	Tx46		18	0.6	270	17.16	15.83	4	10.5	4.000	5.000	1.969	-2.168	3722	0.790	1.020	1.32	1.71	1.31
	75	ALL	Tx46		20	0.6	270	17.00	15.40	4	12.5	4.000	5.000	2.251	-2.442	4127	0.770	1.020	1.06	1.46	1.00
	80	ALL	Tx46		22	0.6	270	16.88	15.06	4	14.5	4.000	5.000	2.537	-2.727	4561	0.760	1.020	1.19	1.69	1.05
	85	ALL	Tx46		26	0.6	270	16.68	12.07	4	34.5	4.000	5.300	2.856	-3.039	5023	0.750	1.020	1.31	1.86	1.07
	90	ALL	Tx46		30	0.6	270	16.40	9.20	6	42.5	4.100	5.500	3.190	-3.351	5458	0.730	1.030	1.38	2.02	1.06
	95	ALL	Tx46		34	0.6	270	16.07	9.72	6	42.5	4.700	5.700	3.520	-3.670	5924	0.720	1.030	1.47	2.12	1.09
	100	ALL	Tx46		38	0.6	270	15.81	10.45	6	40.5	5.400	6.100	3.862	-4.000	6400	0.710	1.030	1.48	2.19	1.10
	105	ALL	Tx46		42	0.6	270	15.60	10.46	6	42.5	5.900	6.800	4.249	-4.363	6911	0.700	1.030	1.50	1.75	1.08

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

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

Compression = 0.65 f'ci

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

Optional designs must likewise conform.

(2) Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

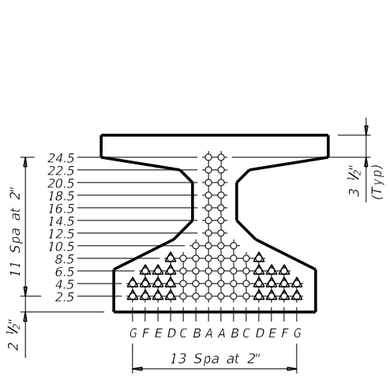
Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked Δ. Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

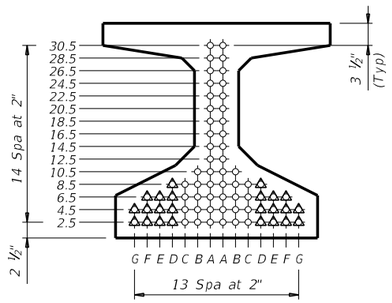
Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

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



TYPE Tx28



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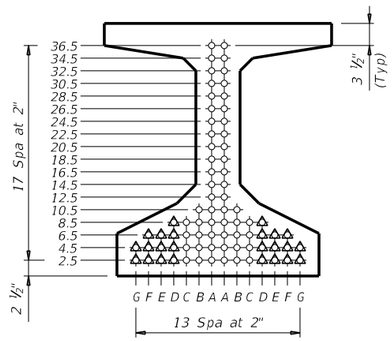

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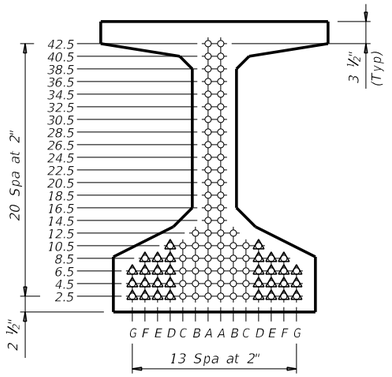

TYPE Tx46

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS

40' ROADWAY

IGSD-40

FILE: ig07stds-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Redesigned girders. 1-21: Added load rating.	2653	01	016, ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		103

DATE: 5/17/2023 6:56:19 AM
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STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS		
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						NO.	TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)								Moment	Shear	Inv	Opr	Inv
Type Tx54 Girders 40' Roadway 8.5" Slab	40	ALL	Tx54		10	0.6	270	21.01	21.01			4.000	5.000	0.554	-0.670	2161	0.960	0.980	2.11	2.74	3.61
	45	ALL	Tx54		12	0.6	270	21.01	21.01			4.000	5.000	0.688	-0.808	2537	0.920	0.990	2.21	2.86	3.46
	50	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	0.847	-0.978	3027	0.900	0.990	2.17	2.81	3.14
	55	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	1.018	-1.154	3506	0.870	0.990	1.82	2.36	2.56
	60	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.206	-1.346	3925	0.850	1.000	1.82	2.36	2.36
	65	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.408	-1.548	3872	0.830	1.000	1.55	2.01	1.92
	70	ALL	Tx54		18	0.6	270	20.56	19.23	4	10.5	4.000	5.000	1.614	-1.751	4103	0.810	1.000	1.57	2.04	1.79
	75	ALL	Tx54		18	0.6	270	20.56	19.67	4	8.5	4.000	5.000	1.847	-1.981	4272	0.800	1.000	1.34	1.74	1.43
	80	ALL	Tx54		20	0.6	270	20.41	18.81	4	12.5	4.000	5.000	2.091	-2.214	4703	0.780	1.010	1.36	1.76	1.32
	85	ALL	Tx54		20	0.6	270	20.41	18.81	4	12.5	4.000	5.000	2.353	-2.466	5180	0.770	1.010	1.17	1.52	1.02
	90	ALL	Tx54		24	0.6	270	20.17	17.84	4	18.5	4.000	5.000	2.612	-2.717	5655	0.760	1.010	1.35	1.76	1.09
	95	ALL	Tx54		28	0.6	270	20.01	14.29	4	44.5	4.000	5.000	2.902	-2.991	6161	0.750	1.010	1.50	1.94	1.11
	100	ALL	Tx54		32	0.6	270	19.63	11.38	6	50.5	4.100	5.000	3.184	-3.260	6658	0.740	1.020	1.55	2.08	1.12
	105	ALL	Tx54		34	0.6	270	19.48	13.48	6	40.5	4.700	5.400	3.500	-3.555	7191	0.730	1.020	1.46	2.03	1.01
	110	ALL	Tx54		38	0.6	270	19.22	12.27	6	50.5	5.000	5.700	3.831	-3.862	7738	0.720	1.020	1.53	2.13	1.05
	115	ALL	Tx54		42	0.6	270	19.01	12.72	6	50.5	5.600	6.400	4.147	-4.157	8268	0.710	1.020	1.39	1.87	1.08
	120	ALL	Tx54		46	0.6	270	18.66	11.36	8	50.5	5.800	6.800	4.504	-4.484	8840	0.700	1.020	1.34	1.76	1.03
Type Tx62 Girders 40' Roadway 8.5" Slab	60	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	0.948	-1.129	4196	0.880	0.990	2.04	2.65	2.83
	65	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	1.106	-1.298	4607	0.860	0.990	1.75	2.27	2.35
	70	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.274	-1.476	4887	0.840	0.990	1.77	2.29	2.21
	75	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.443	-1.653	4843	0.820	0.990	1.55	2.00	1.85
	80	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	1.634	-1.854	5110	0.810	1.000	1.55	2.01	1.72
	85	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	1.834	-2.057	5382	0.790	1.000	1.36	1.77	1.41
	90	ALL	Tx62		22	0.6	270	25.05	23.60	4	12.5	4.000	5.000	2.048	-2.277	5897	0.780	1.000	1.37	1.78	1.31
	95	ALL	Tx62		24	0.6	270	24.94	23.94	4	10.5	4.900	5.000	2.273	-2.506	6428	0.770	1.000	1.19	1.55	1.03
	100	ALL	Tx62		28	0.6	270	24.78	22.49	4	20.5	4.500	5.100	2.491	-2.730	6948	0.760	1.000	1.38	1.78	1.12
	105	ALL	Tx62		32	0.6	270	24.40	15.40	6	54.5	4.000	5.000	2.736	-2.977	7508	0.750	1.010	1.20	1.77	1.01
	110	ALL	Tx62		34	0.6	270	24.25	15.42	6	56.5	4.200	5.000	2.970	-3.214	8051	0.740	1.010	1.65	2.18	1.31
	115	ALL	Tx62		36	0.6	270	24.11	15.78	6	56.5	4.500	5.200	3.236	-3.479	8638	0.730	1.010	1.58	2.12	1.22
	120	ALL	Tx62		38	0.6	270	23.99	17.67	6	46.5	5.000	5.900	3.513	-3.752	9241	0.720	1.010	1.55	2.07	1.12
	125	ALL	Tx62		42	0.6	270	23.78	16.35	6	58.5	5.300	6.200	3.770	-4.009	9815	0.710	1.010	1.58	2.13	1.35
	130	ALL	Tx62		46	0.6	270	23.43	15.78	8	52.5	5.700	6.600	4.073	-4.315	10512	0.710	1.010	1.51	1.88	1.21

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

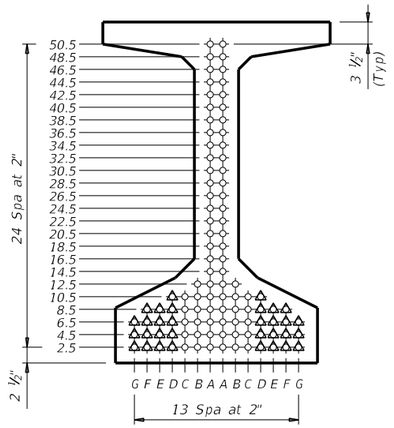
(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

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

Optional designs must likewise conform.

(2) Portion of full HL93.



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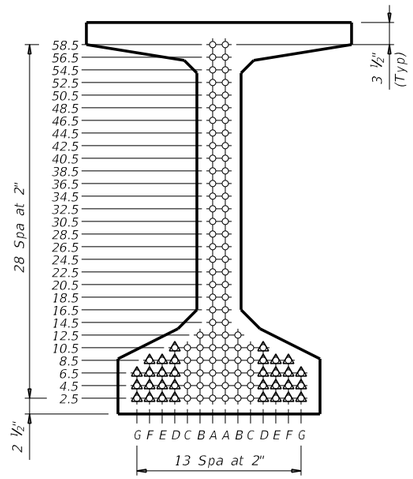

TYPE Tx62

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS

40' ROADWAY

IGSD-40

FILE: ig07stds-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Redesigned girders. 1-21: Added load rating.	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		104

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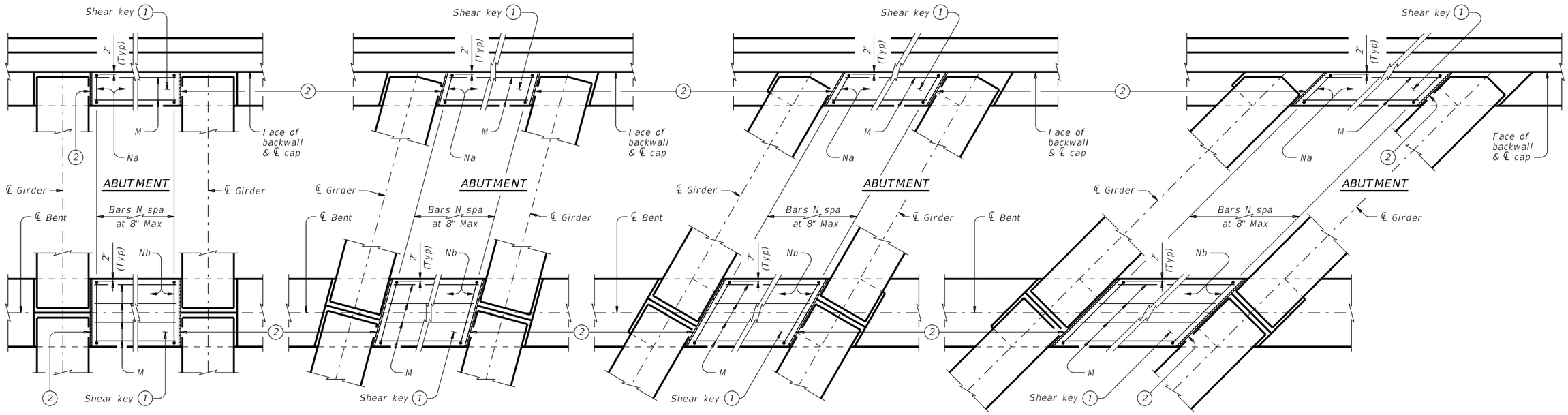


PARTIAL PLANS WITH NO SKEW

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

PARTIAL PLANS WITH 15° SKEW

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

PARTIAL PLANS WITH 30° SKEW

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

PARTIAL PLANS WITH 45° SKEW

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

(1) Place shear keys on the upstream side of structure between outside girder and next adjacent girder, unless shown otherwise on plans.

(2) UHMW polyethylene wear pad. (Typ)

(3) Leave a ¼" gap plus or minus between girder and face of wear pad. Cast wear pad with shear key, smooth side facing girder. Care must be taken to keep concrete from flowing under girder. Slope top of shear keys in accordance with Item 420.4.9, "Treatment and Finishing of Horizontal Surfaces."

(4) Measure at higher bearing seat elevation forward or back. Dimension based on typical bearing pad and bearing seat. Increase as necessary to maintain 5" overlap.

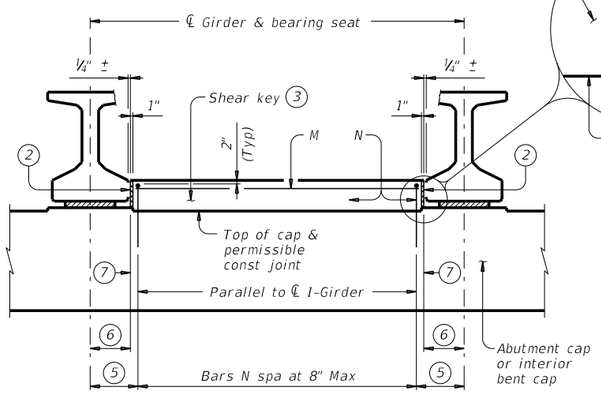
(5) With No Skew = 1'-8 ¼", measured along ℄ cap.
With Skew = 1'-8 ¼" ÷ Cos Skew, measured along ℄ cap.

(6) With No Skew = 1'-4 ¼", measured along ℄ cap.
With Skew = 1'-4 ¼" ÷ Cos Skew, measured along ℄ cap.

(7) Face of UHMW polyethylene wear pad. Smooth side of pad facing girder.

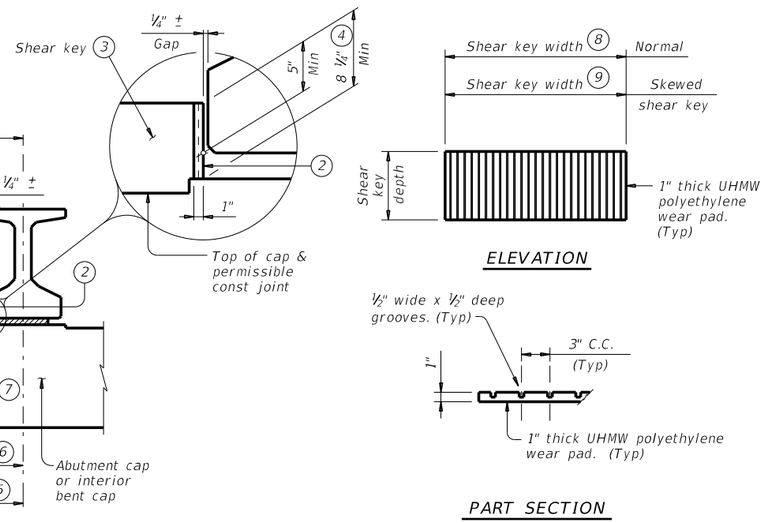
(8) Abutments = ½ Cap width.
Interior bents = Cap width.

(9) Abutments = ½ Cap width ÷ Cos Skew.
Interior bents = Cap width ÷ Cos Skew.

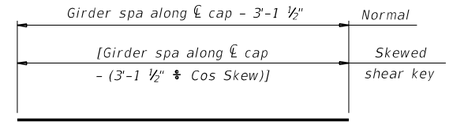


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP (1)

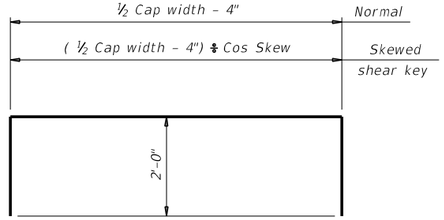
Showing shear key with girder Type Tx46.
Other I-Girder types similar.



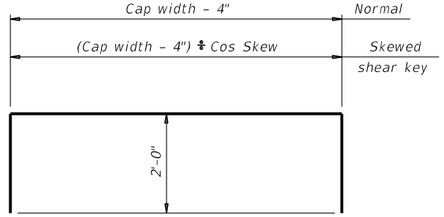
ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



BARS M (#5)



BARS Na (#5)
(For abutments)



BARS Nb (#5)
(For interior bents)

CONSTRUCTION NOTES:

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

GENERAL NOTES:

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

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

Texas Department of Transportation

Bridge Division Standard

SHEAR KEY DETAILS
PRESTR CONCRETE I-GIRDERS

IGSK

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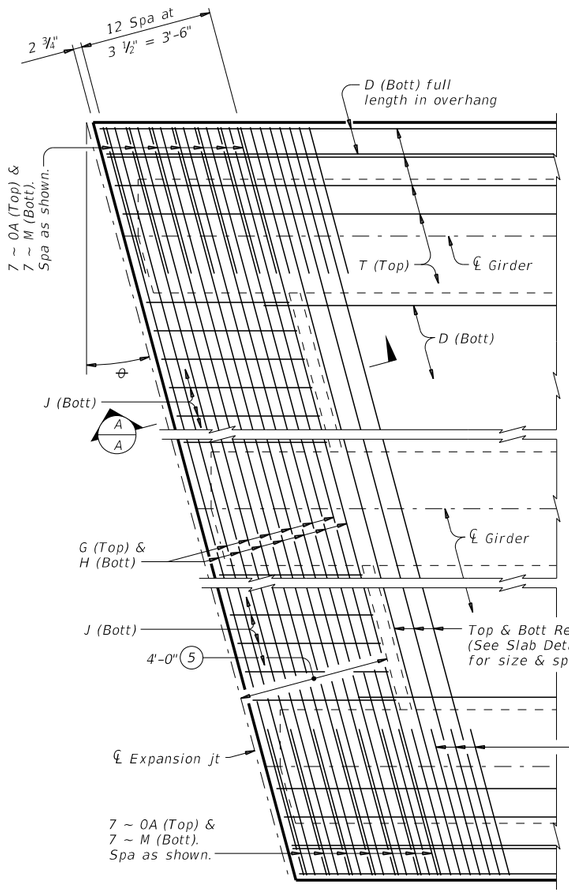
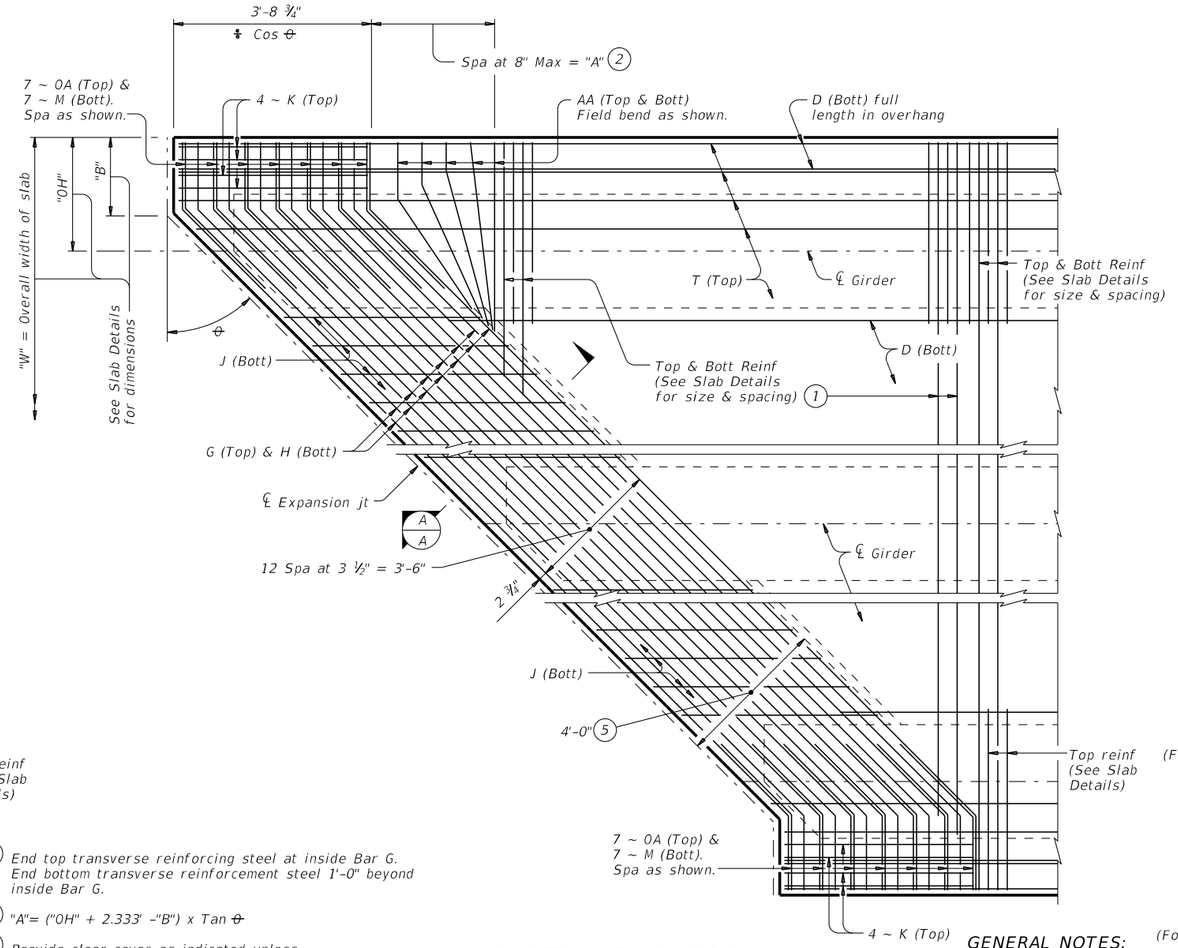


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

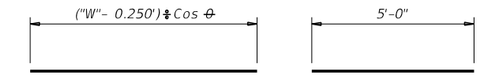
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("0H" + 2.333' -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

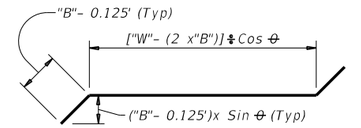
(4) Only required on slabs with breakbacks.

(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

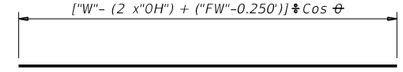


BARS G (#4) (For slabs without breakbacks)

BARS K (#4) (4)



BARS G (#4) (For slabs with breakbacks)

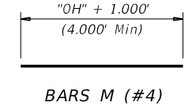


"FW" = girder's top flange width (ft)

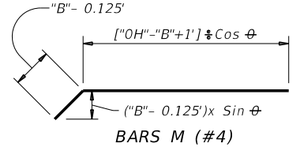
BARS H (#4)

BARS AA (#5) (4)

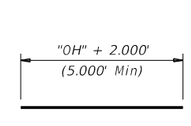
BARS J (#4)



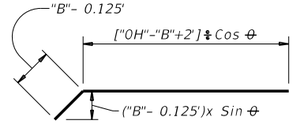
BARS M (#4) (For slabs without breakbacks)



BARS M (#4) (For slabs with breakbacks)



BARS OA (#5) (For slabs without breakbacks)



BARS OA (#5) (For slabs with breakbacks)

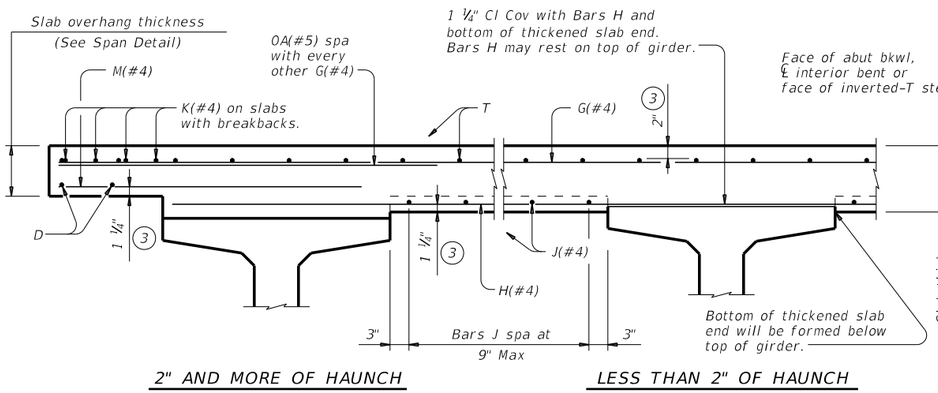
GENERAL NOTES:

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

MATERIAL NOTES:

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

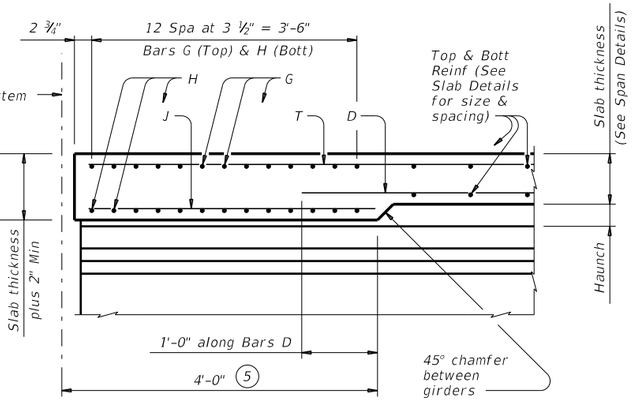
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



2" AND MORE OF HAUNCH — LESS THAN 2" OF HAUNCH

TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ℄ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

THICKENED SLAB END DETAILS
PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS

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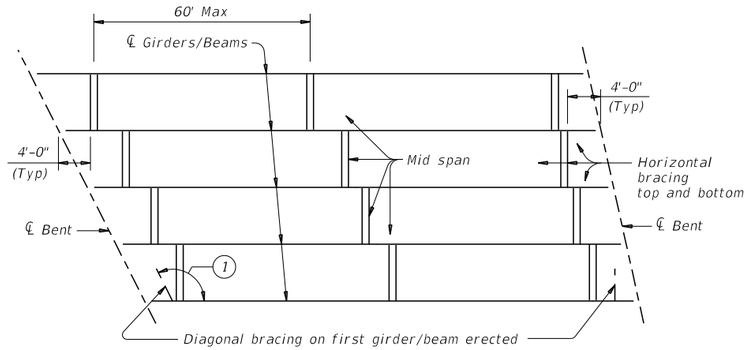
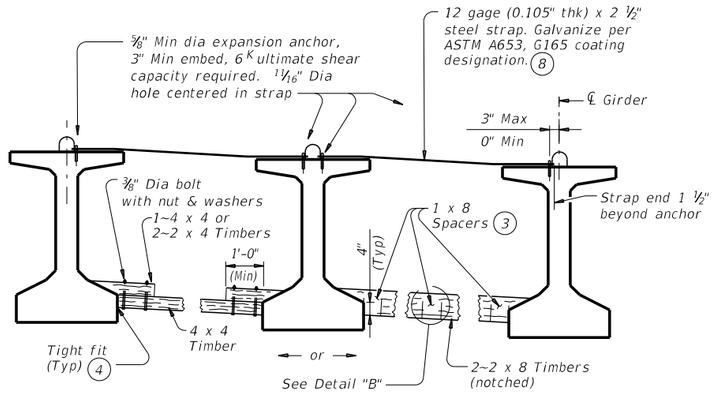
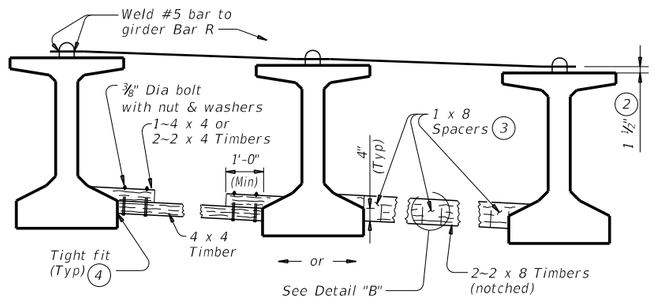


ERECTION BRACING



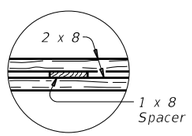
FOR ERECTION BRACING, OPTION 1

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



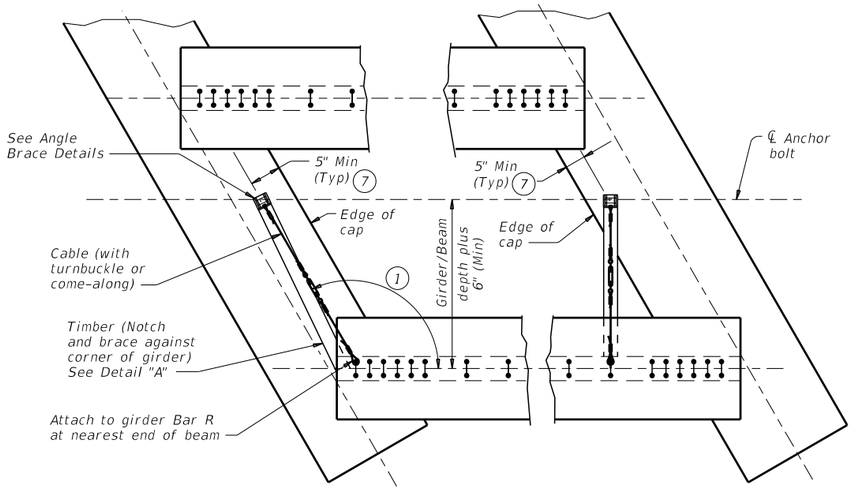
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS (5)

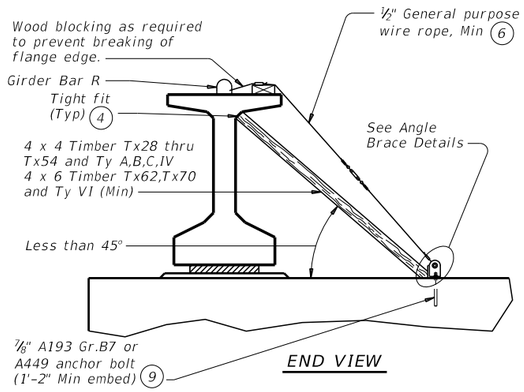


PLAN

DETAIL "B"



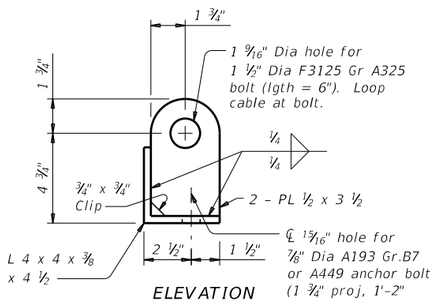
PLAN



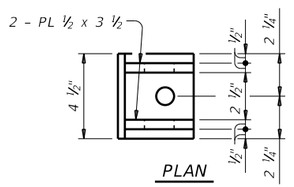
END VIEW

DIAGONAL BRACING DETAILS (5)

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



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

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

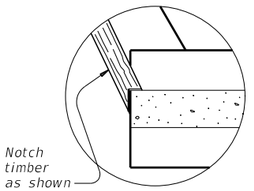
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

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



DETAIL "A"

(1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(6) All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.

(7) It is acceptable to tie anchor bolts to cap reinforcement.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS
PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

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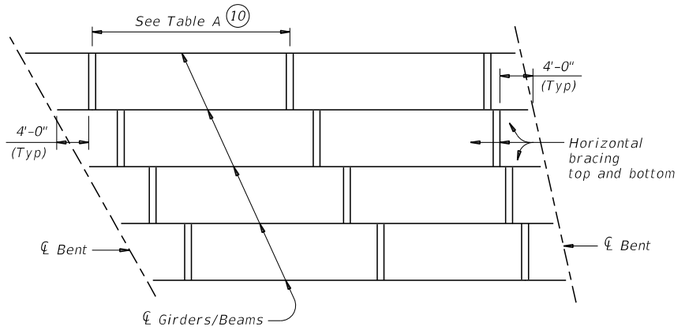


SLAB PLACEMENT BRACING

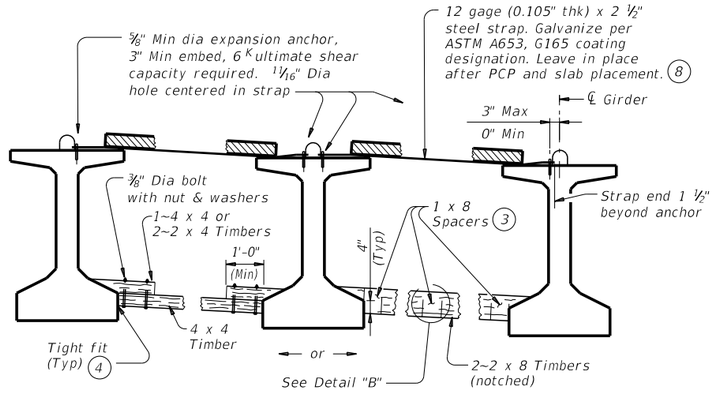
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	¼ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

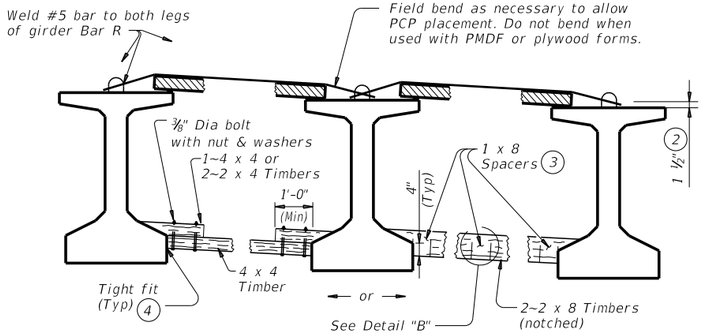
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



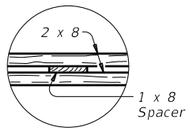
FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

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



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)



PLAN

DETAIL "B"

HORIZONTAL BRACING DETAILS (5)

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between first and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

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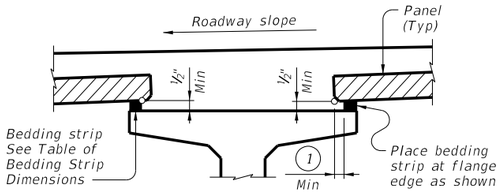
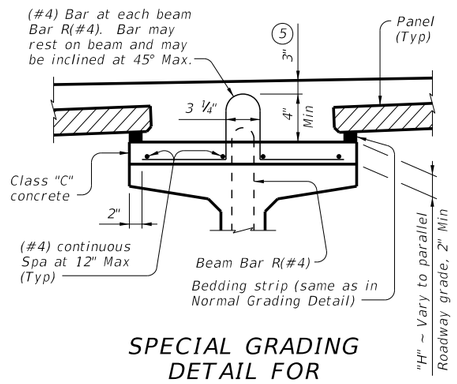


NORMAL GRADING DETAIL (3)

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



SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

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

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (4)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2"	½"	4"
2 ¼"	½"	4 ½" (2)
2 ½"	½"	5" (2)
2 ¾"	½"	5 ½" (2)
3" (Max)	½"	6" (2)

(1) 2" Min for I-girders, 1 ½" Min for all other beam types.

(2) Allowed for prestressed concrete I-girders, not allowed on other beam types.

(3) To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ¼". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.

(4) Height must not exceed twice the width.

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(7) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 ½" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.

(8) Do not locate construction joints on top of a panel.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

Placing panels to minimize joint openings is recommended.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:

Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

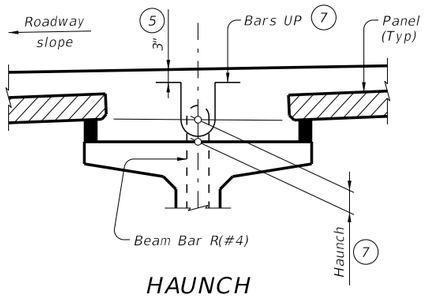
These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings.

When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

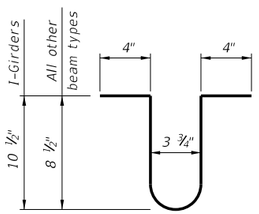
Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

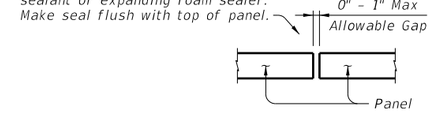


HAUNCH REINFORCING DETAIL

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

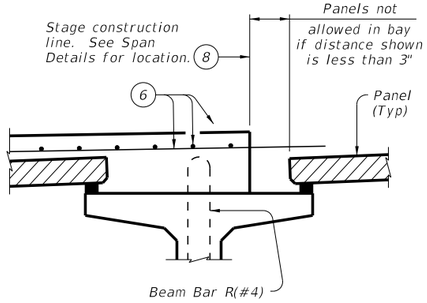


BARS UP (#4) (7)

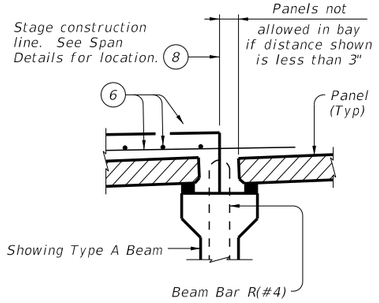


PANEL JOINTS

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



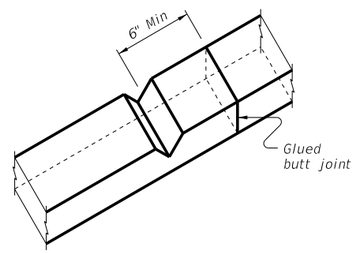
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)



BEDDING STRIP DETAIL (9)

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

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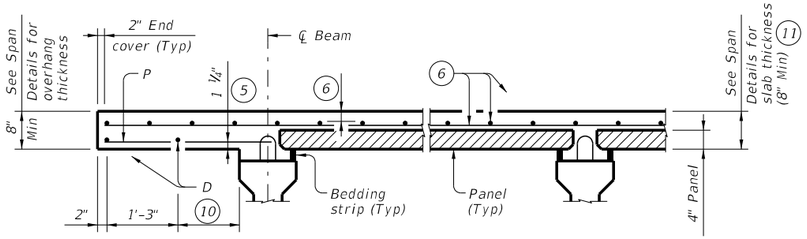
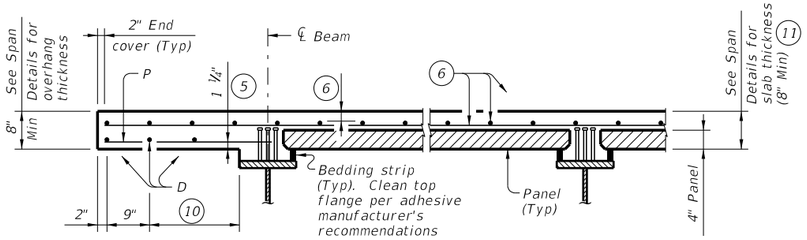
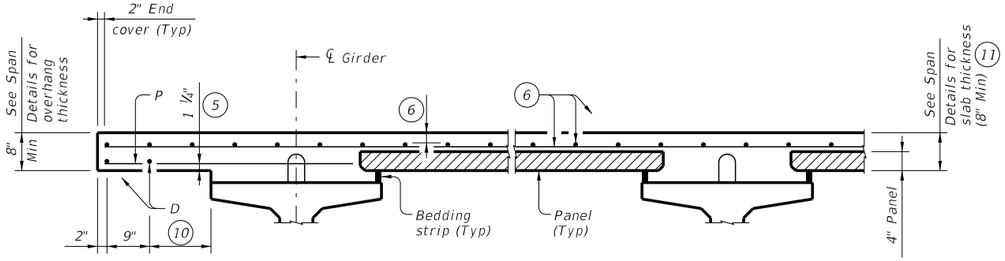


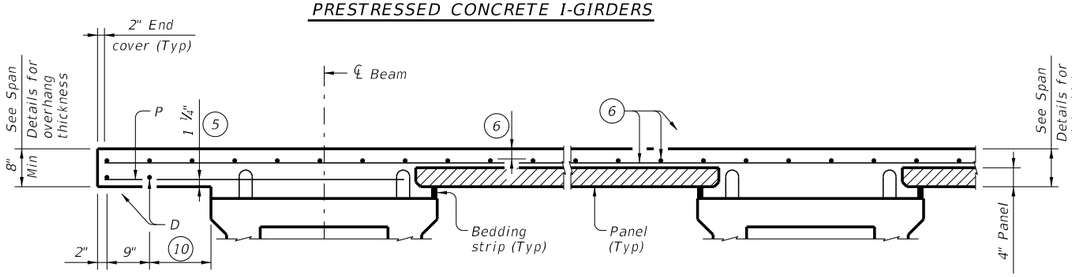
PRESTRESSED CONCRETE I-BEAMS



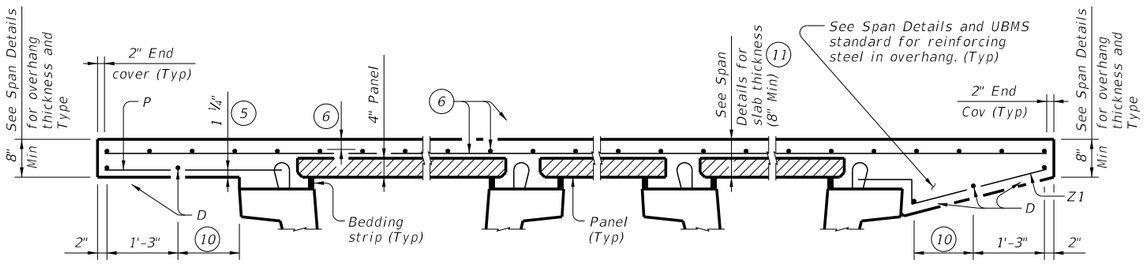
STEEL BEAMS (13)



PRESTRESSED CONCRETE I-GIRDERS



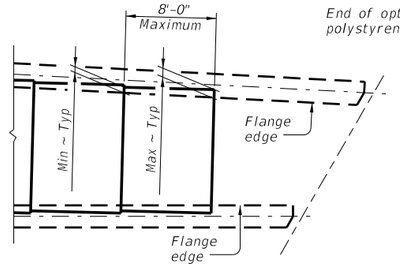
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

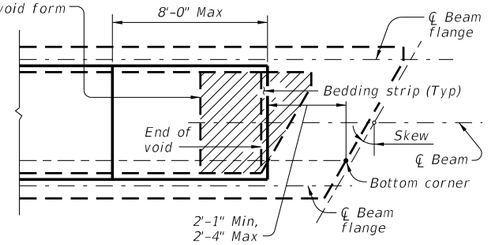
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS



AT FLARED BEAMS OR GIRDERS

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



OVER CONC U-BEAMS

PART PLANS OF PANEL PLACEMENT

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

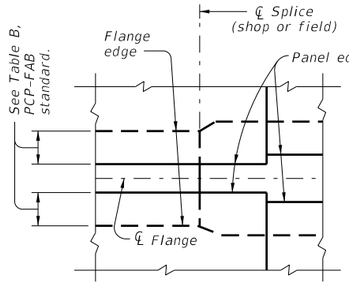
(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(10) Equally space additional bar if more than 1'-3" Max.

(11) The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.

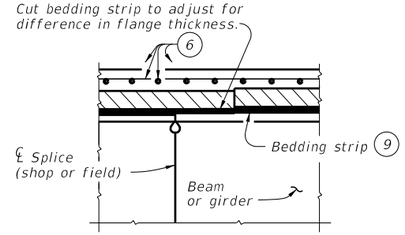
(12) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.

(13) Panels are allowed over top tension flanges, as approved by the Engineer. See Span Details for additional top mat reinforcement required in tension zones. Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



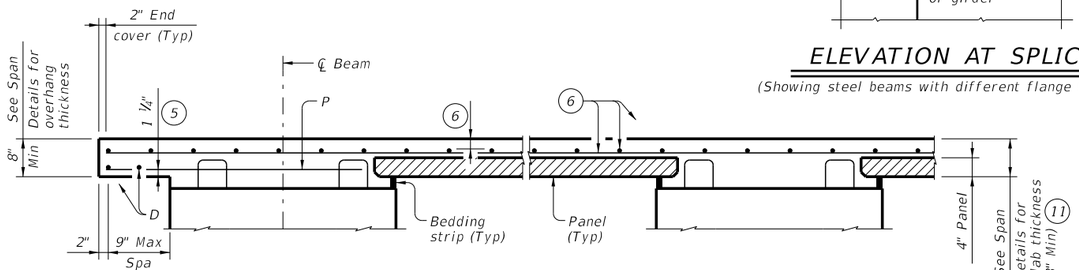
PLAN AT SPLICE

(Showing steel beams with flange width transition)



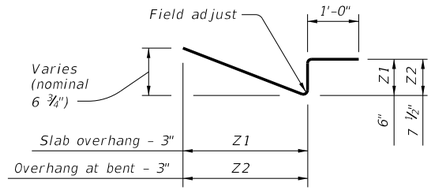
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

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



BARS Z (#4) (12)

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PRESTRESSED CONCRETE PANELS
DECK DETAILS

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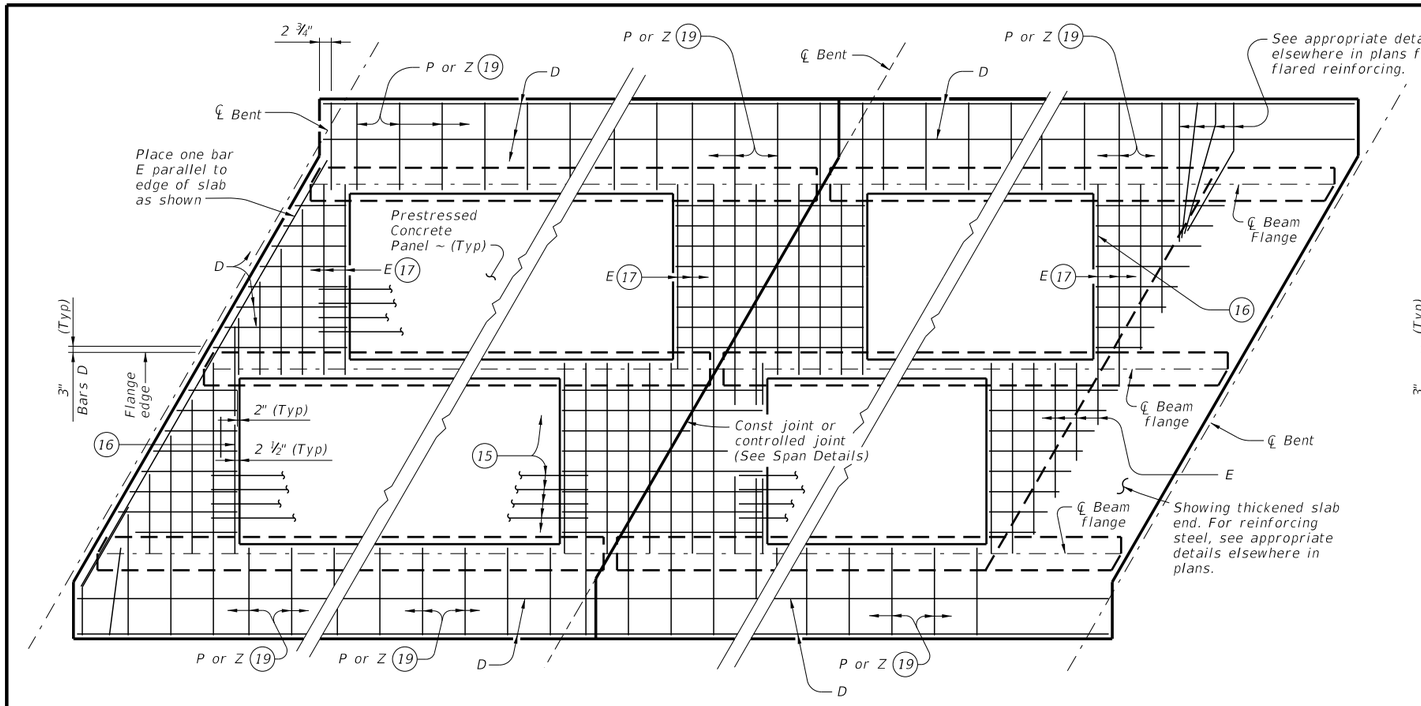
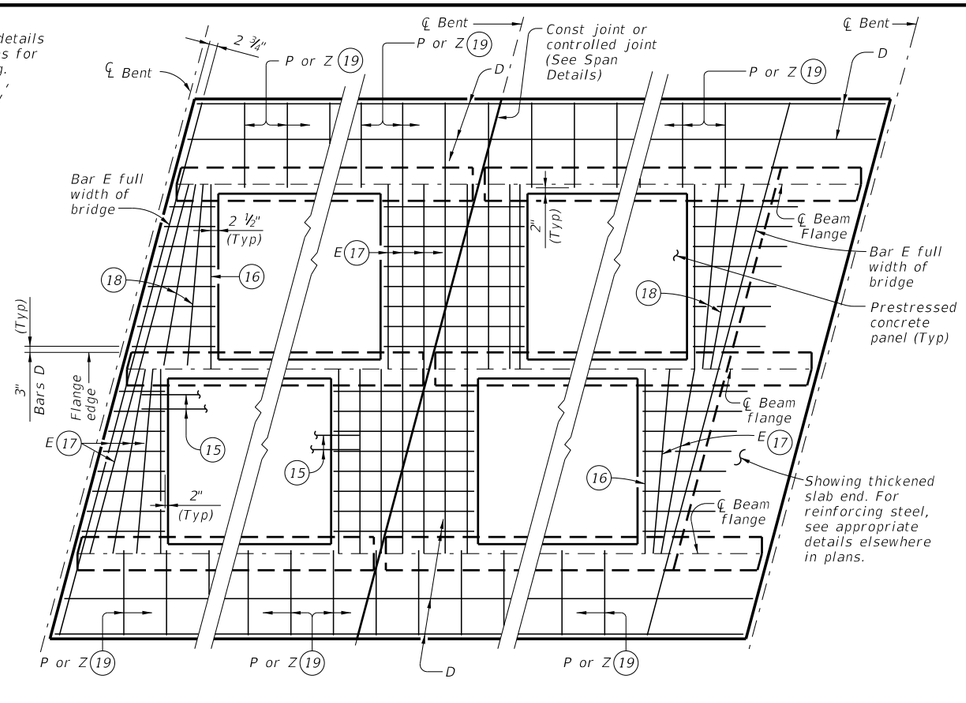


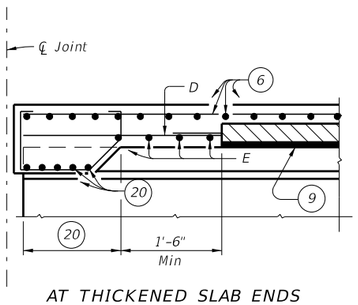
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

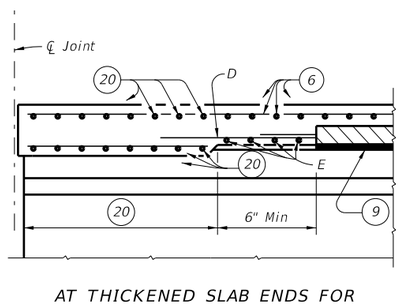


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

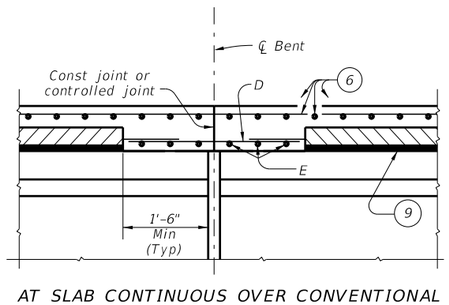
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



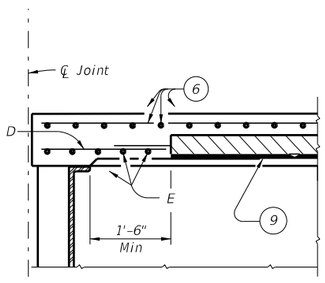
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



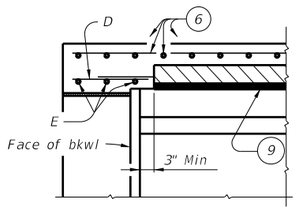
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



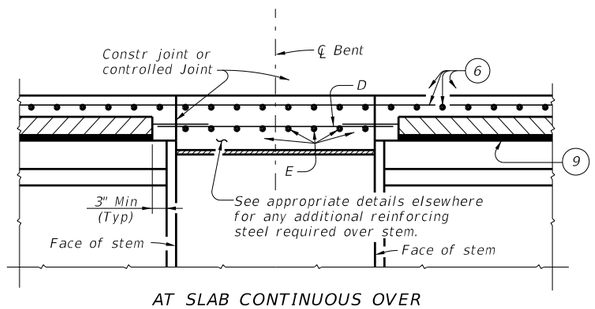
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.

(14) Max Spacing as listed unless otherwise shown.

(15) At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.

(16) Maintain one Bar E(#4) parallel to panel ends (Typ).

(17) Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.

(18) Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.

(19) Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.

(20) See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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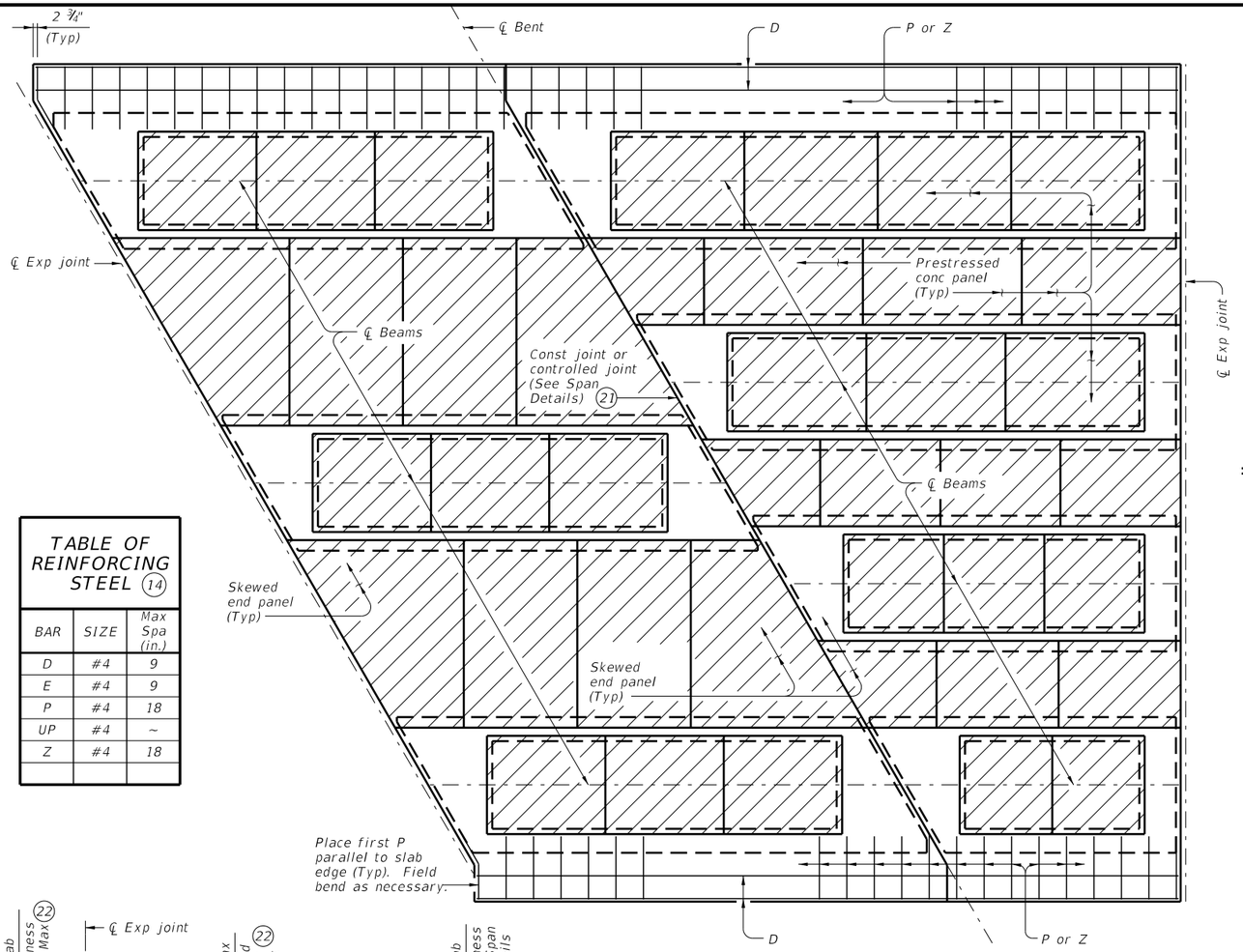
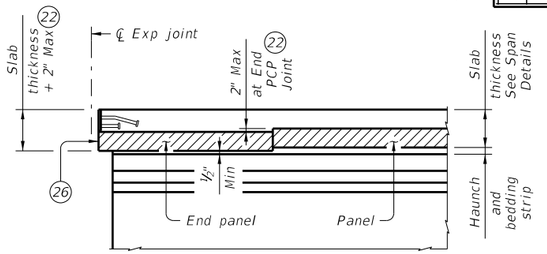


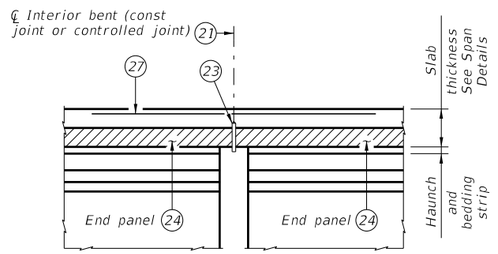
OPTION 2 ~ PLAN OF SLAB

(Showing U-Beams; other beams similar)



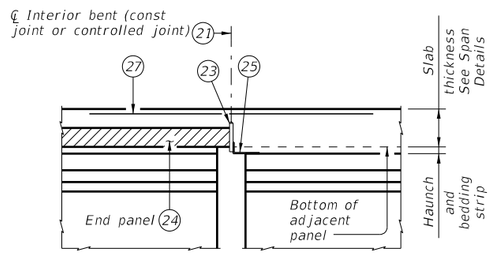
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

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



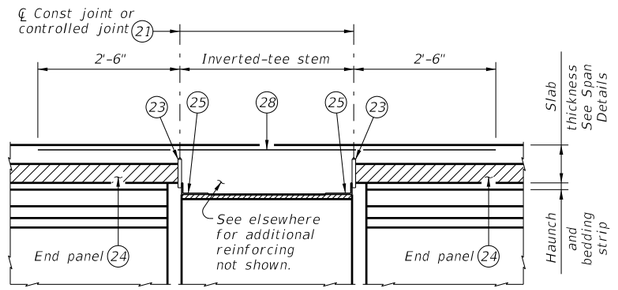
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

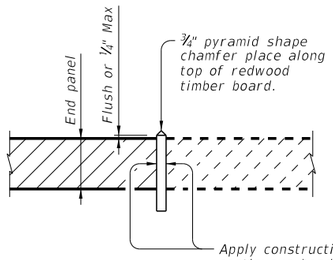
Panel against beam/girder end in adjacent span.



INVERTED-T BENT

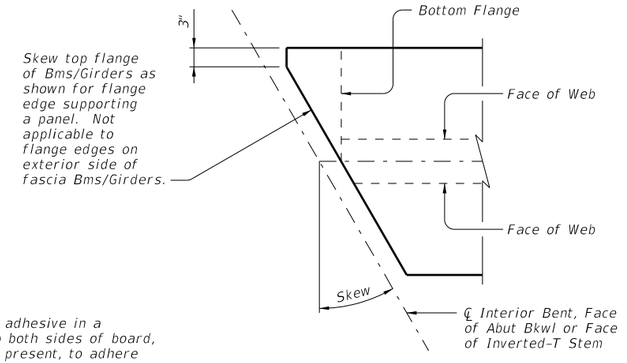
Panels against inverted-tee stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)



ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".



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

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

TABLE OF REINFORCING STEEL (14)

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

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(14) Max Spacing as listed unless otherwise shown.

(21) 1 ½" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

(22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.

(23) ¾" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within ¼" Max above panel. Place ¾" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within ¼" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.

(24) Place panel within ½" of ¾" thick board.

(25) Permanent galvanized steel sheet form. Removable formwork is acceptable.

(26) Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.

(27) Place additional (#4) bar 5'-0" in length between every slab Bars T. Center (#4) bar on Joint.

(28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on standards AJ, SEJ-B, SEJ-M, and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G, K and 0A from standard IGTS in the slab.

HL93 LOADING SHEET 4 OF 4

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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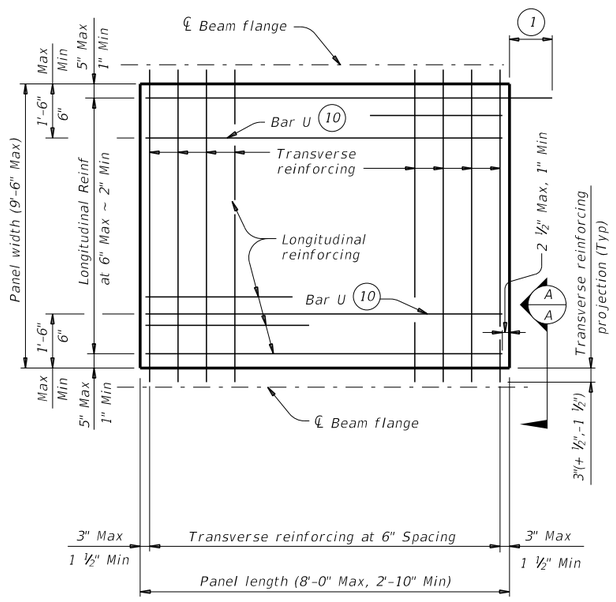
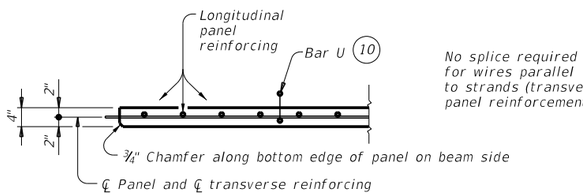
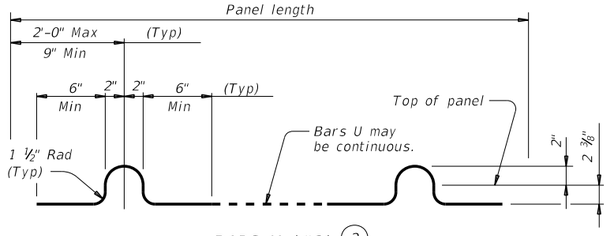


TYPICAL NON-SKEWED PANEL PLAN

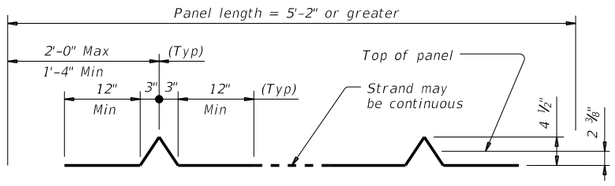


SECTION A-A

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

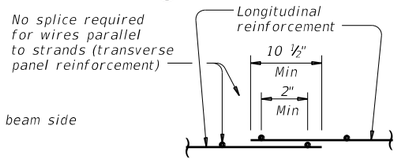


BARS U (#3) (2)



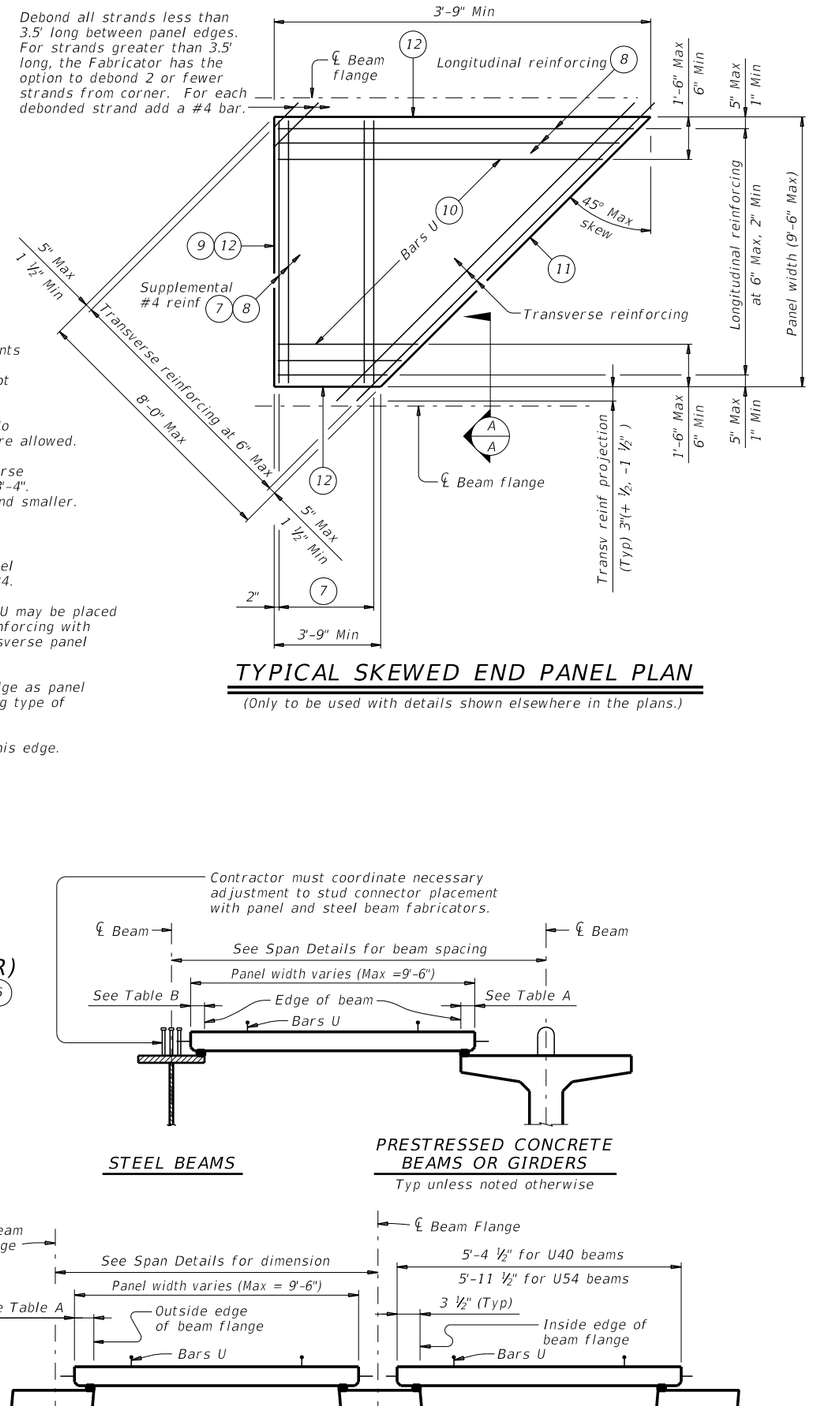
OPTIONAL STRAND FOR BARS U (3)

1. At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
2. Four loops required per panel.
3. Four loops required per panel. ⅜" or ½" strands may be used.
4. Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
5. See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
6. One Splice allowed per panel. No more than two sheets of WWR are allowed.
7. Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
8. End Cover 2 ½" Max, 1" Min.
9. Recess strands on indicated panel edge in accordance with Item 424.
10. At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
11. Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
12. Timber form work permissible this edge.



WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)

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



TYPICAL SKEWED END PANEL PLAN

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

TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½"	8 ½
U40 – 54	5 ½	5 ½	7
Tx28-70	6	5	7 ½
XB20 – 40	4	3	4 ½
XSB12 – 15	4	3	4 ½

TABLE B (4) (5)			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼

STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

Typ unless noted otherwise

PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3,500 psi. Minimum 28 day strength f'c=5,000 psi.

Provide ¾" chamfer along bottom edge of panel on beam side.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

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

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).

Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

No combination of longitudinal reinforcement options in a panel is allowed.

Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

PCP-FAB

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©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	TYL	RUSK		113

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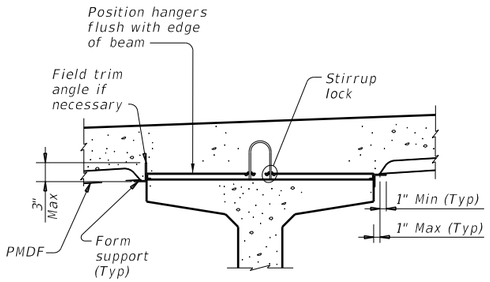
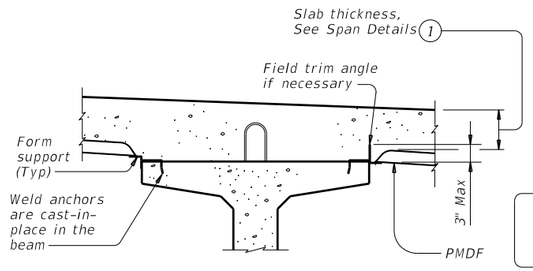
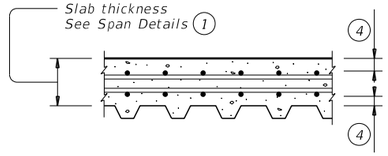


PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



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



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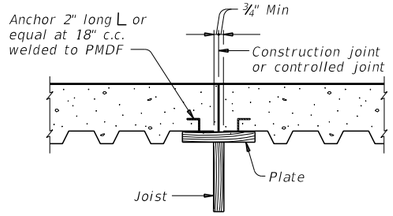
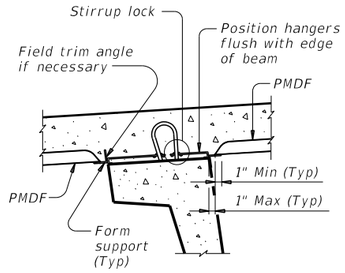
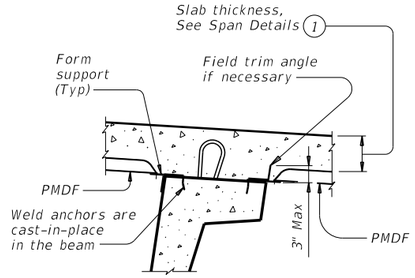


Note: In spans where PMD forms are used, timber forms must be used at construction joints.
Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

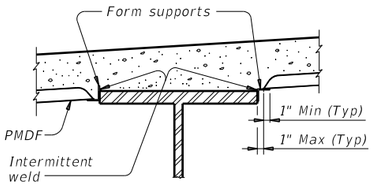
SECTION THRU CONSTRUCTION JOINT



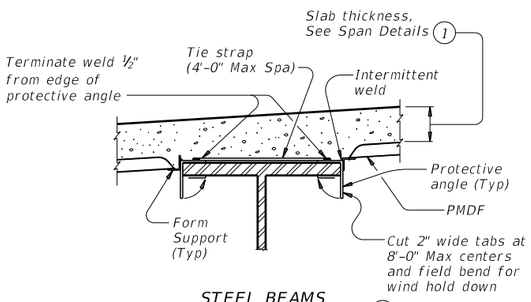
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

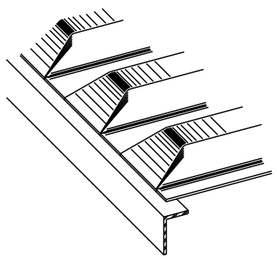


STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES (2)

TYPICAL TRANSVERSE SECTIONS



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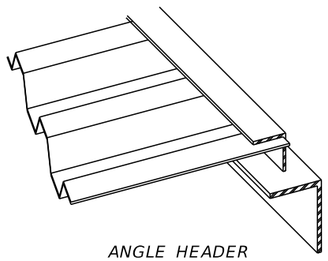
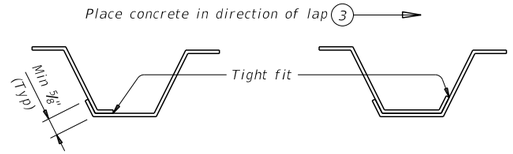


ANGLE HEADER

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

TYPES OF END CLOSURES



SIDE LAP DETAILS

(1) Slab thickness minus ⅝" if corrugations match reinforcing bars.

(2) Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.

(3) The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.

(4) See Span details for cover requirements.

FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422 "Concrete Superstructures."

FOR PRESTR CONC TX-GIRDER BRIDGES:
See Miscellaneous Slab Details, Prestr Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:

As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.

Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

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

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

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

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

CONSTRUCTION NOTES:

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

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

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

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

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

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

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

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST	COUNTY		SHEET NO.
12-21: Updated max deflection for RR.	TYL	RUSK		114

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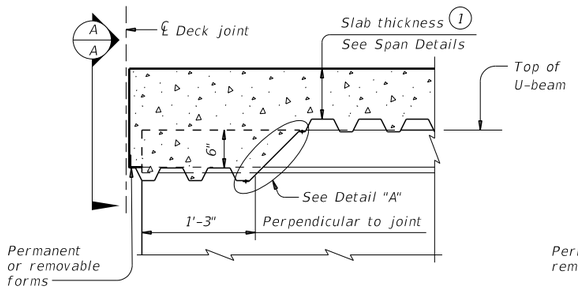
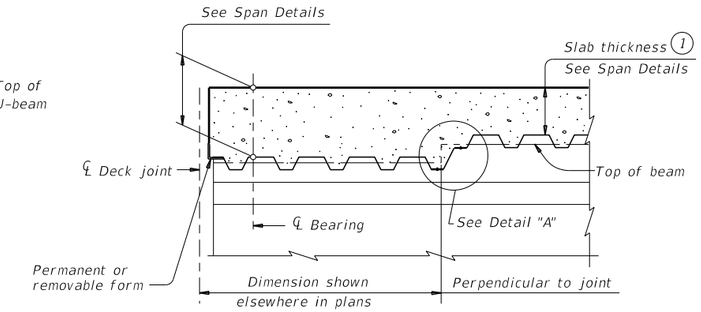
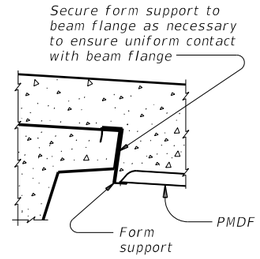


AT THICKENED SLAB END FOR U-BEAMS

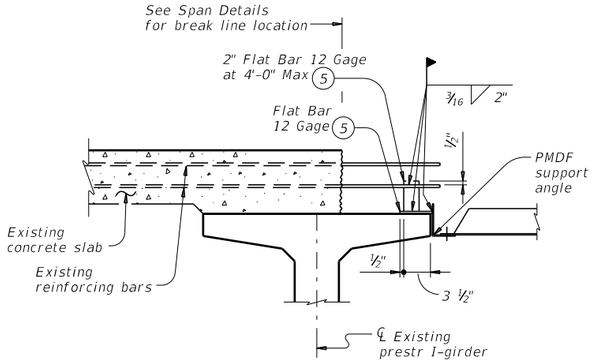


AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

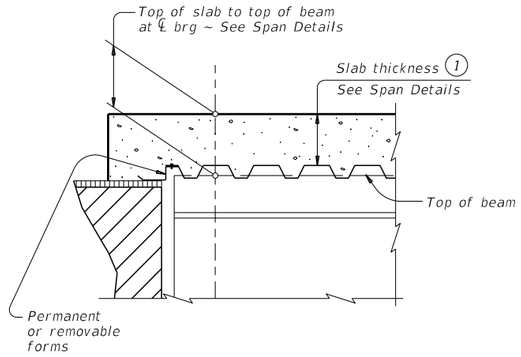
Showing I-beam block-out. No block-out for I-girders or steel beams.



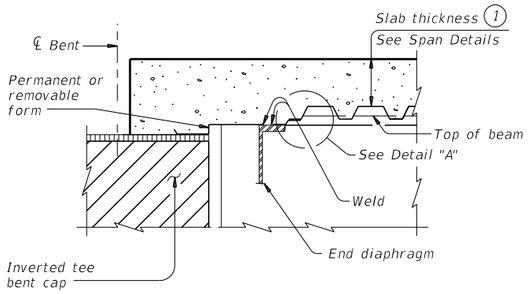
SECTION A-A



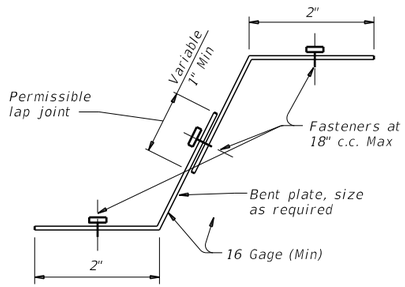
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



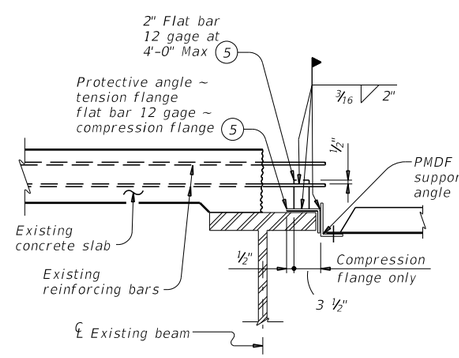
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



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

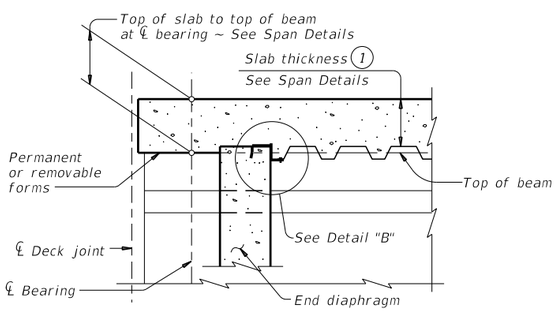


DETAIL "A"

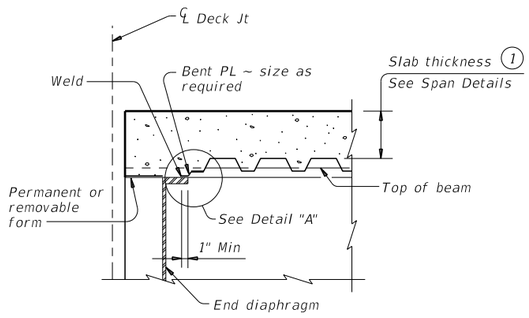


SHOWING STEEL BEAMS

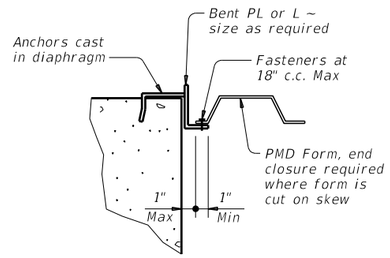
WIDENING DETAILS



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



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

(1) Slab thickness minus ⅝" if corrugations match reinforcing bars

(5) Minimum yield stress of 12 gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

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12-21: Updated max deflection for RR.	TYL	RUSK		115

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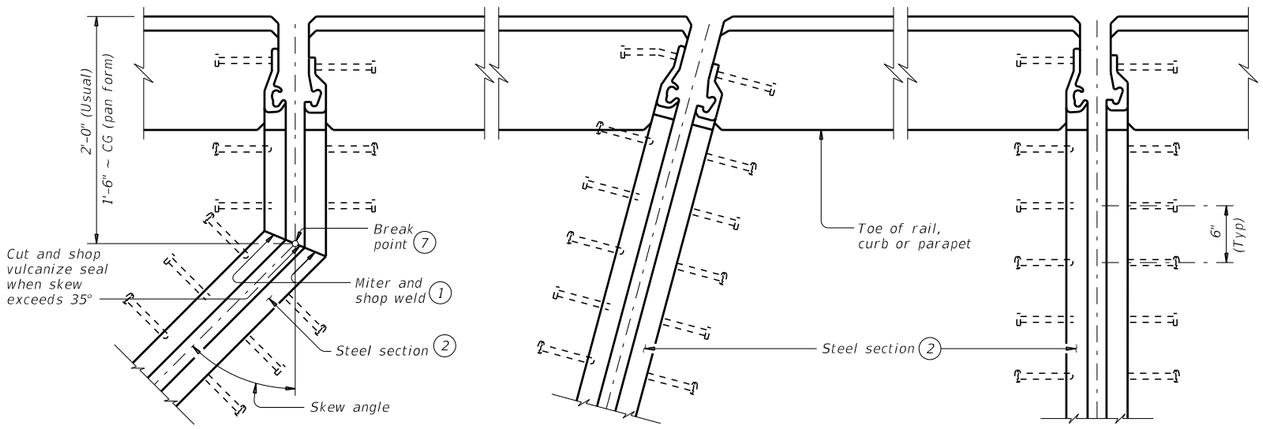
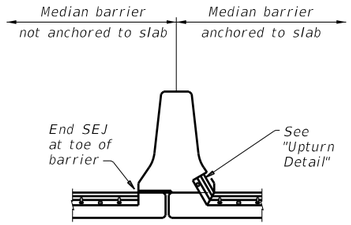


SHOWING SKEWS WITH SLAB BREAKBACKS

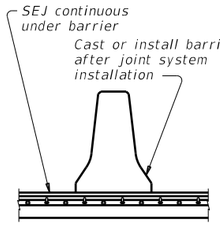
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

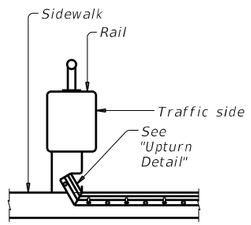
PLANS OF END CONDITIONS



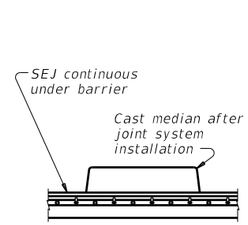
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



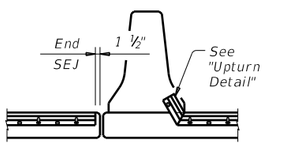
AT MEDIAN BARRIER



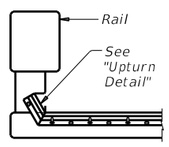
AT SIDEWALK BEHIND BRIDGE RAIL



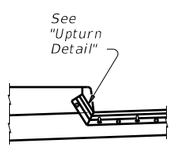
AT RAISED MEDIAN



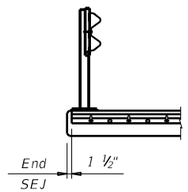
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

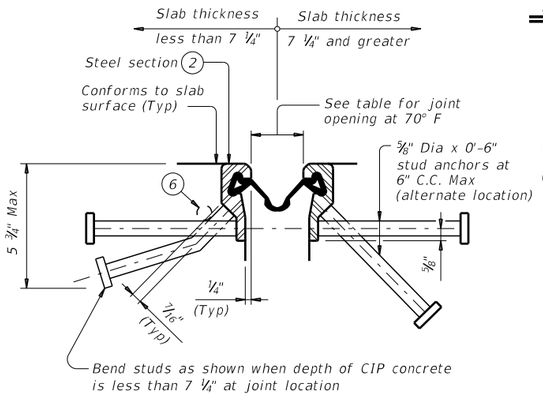


AT SIDEWALK

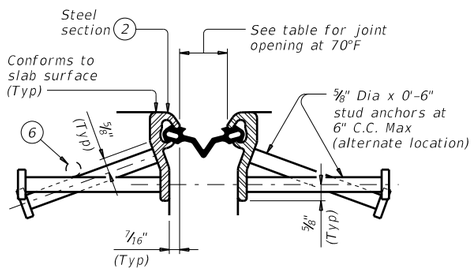


AT STEEL POST BRIDGE RAIL

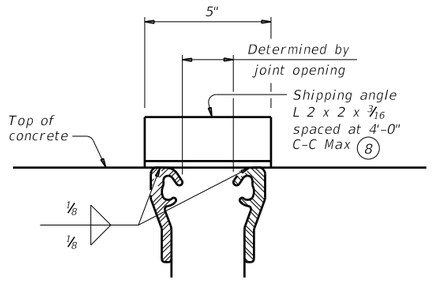
TYPICAL SECTIONS (5)



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



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



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

SHIPPING ANGLE

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

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

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

DESIGN NOTES:

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

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

(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.

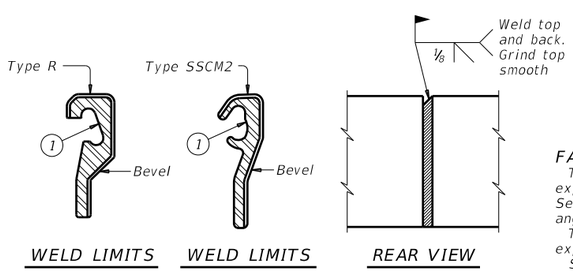
(4) Reduce for sidewalk or parapet heights less than 6".

(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.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS WELD LIMITS REAR VIEW

FIELD SPLICE DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

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

Weld studs in accordance with AWS D1.1.

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

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Field Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

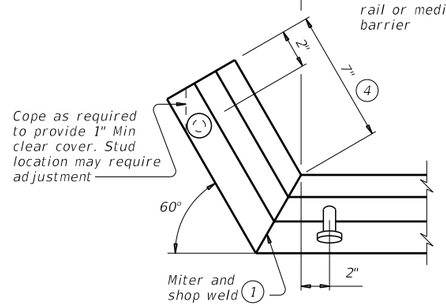
Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

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

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

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



UPTURN DETAIL

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 ½".

Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY

SEJ-M

FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		116

DATE: 5/17/2023 6:56:27 AM
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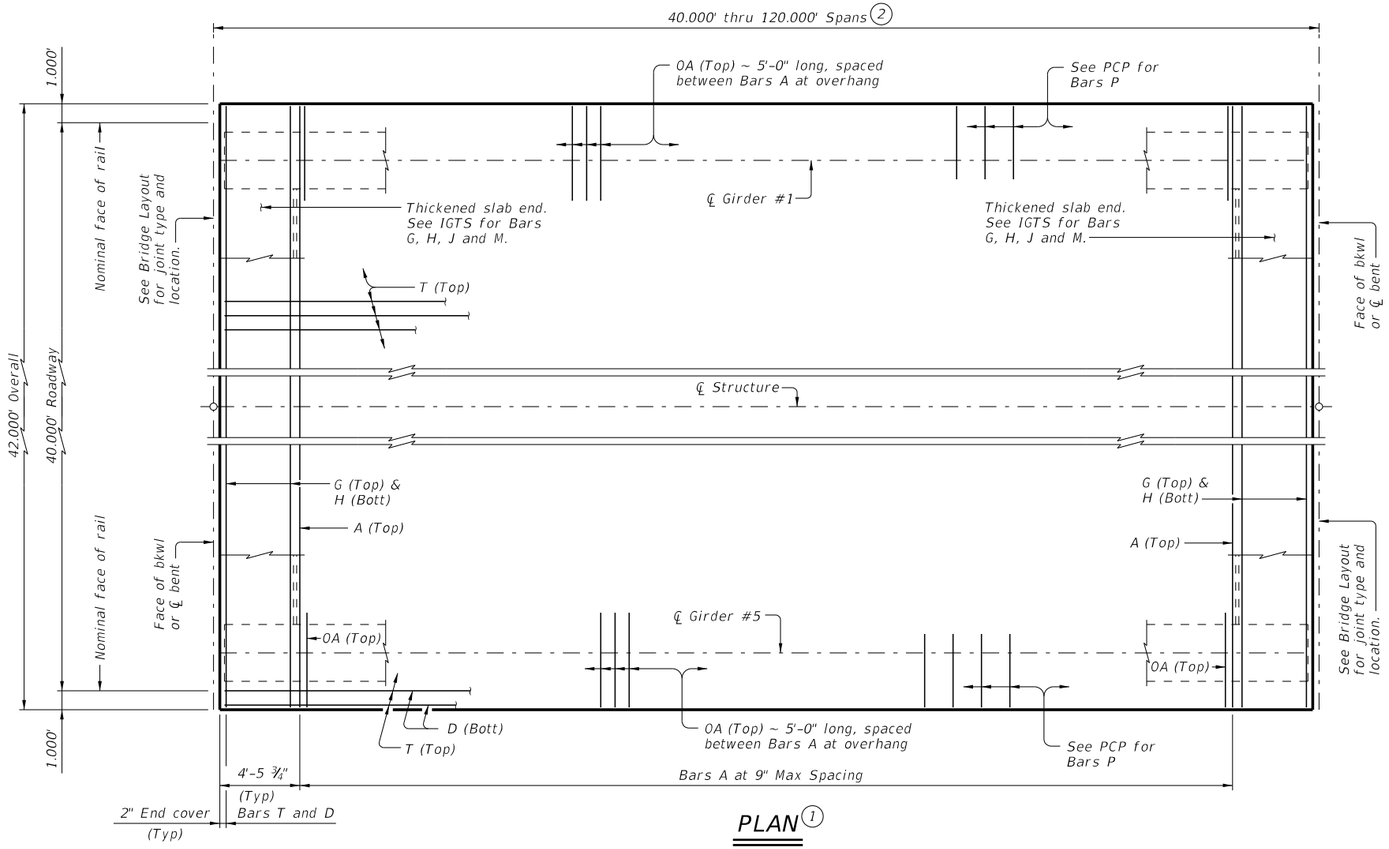


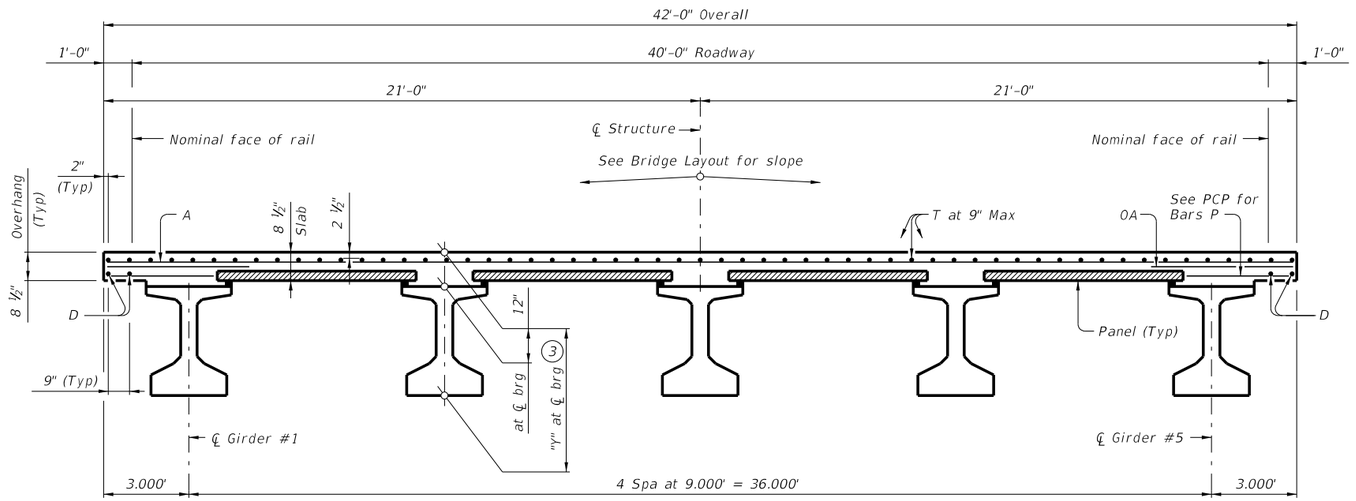
PLAN (1)

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
0A	#5
P	#4
T	#4

(1) If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities.

(2) Span lengths for prestressed concrete I-Girder type:
Type Tx28 for spans lengths 40.000' thru 65.000'.
Type Tx34 for spans lengths 40.000' thru 80.000'.
Type Tx40 for spans lengths 40.000' thru 90.000'.
Type Tx46 for spans lengths 40.000' thru 105.000'.
Type Tx54 for spans lengths 40.000' thru 120.000'.

(3) "Y" value shown is based on theoretical girder camber, dead load deflection from an 8 ½" concrete slab, a constant roadway grade, and using precast panels (PCP). The Contractor will adjust this value as necessary for any roadway vertical curve.



TYPICAL TRANSVERSE SECTION
(Showing girder type Tx46)

TABLE OF SECTION DEPTHS	
GIRDER TYPE	"Y" AT ℄ BRG (3)
	Ft/In
Tx28	3'-4"
Tx34	3'-10"
Tx40	4'-4"
Tx46	4'-10"
Tx54	5'-6"

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54)

40' ROADWAY

SIG-40

FILE: IG-SIG4000-23.dgn	DN: JMH	CK: ASB	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
10-19: Increased "X" and "Y" Values. 01-23: Removed PCP(0) reference.	DIST	COUNTY		SHEET NO.
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DATE: 5/17/2023 6:56:27 AM
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TABLE OF DEAD LOAD DEFLECTIONS

TYPE Tx28 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.010	0.014
45	0.016	0.023
50	0.026	0.036
55	0.038	0.054
60	0.055	0.077
65	0.076	0.107

TYPE Tx34 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.006	0.008
45	0.010	0.014
50	0.016	0.022
55	0.023	0.032
60	0.033	0.046
65	0.046	0.064
70	0.062	0.087
75	0.082	0.115
80	0.107	0.150

TYPE Tx40 GIRDERS

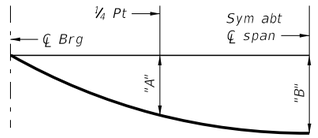
SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.004	0.006
45	0.006	0.009
50	0.010	0.014
55	0.015	0.021
60	0.021	0.030
65	0.030	0.042
70	0.041	0.057
75	0.053	0.075
80	0.070	0.098
85	0.090	0.126
90	0.113	0.159

TYPE Tx46 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.003	0.004
45	0.004	0.006
50	0.007	0.010
55	0.010	0.014
60	0.014	0.020
65	0.021	0.029
70	0.028	0.039
75	0.036	0.051
80	0.048	0.067
85	0.061	0.086
90	0.078	0.109
95	0.096	0.135
100	0.119	0.167
105	0.145	0.204

TYPE Tx54 GIRDERS

SPAN LENGTH	"A"	"B"
Ft	Ft	Ft
40	0.001	0.002
45	0.003	0.004
50	0.004	0.006
55	0.006	0.009
60	0.010	0.014
65	0.014	0.019
70	0.019	0.026
75	0.024	0.034
80	0.031	0.044
85	0.041	0.057
90	0.051	0.072
95	0.063	0.089
100	0.078	0.110
105	0.096	0.135
110	0.116	0.163
115	0.139	0.195
120	0.165	0.232



DEAD LOAD DEFLECTION DIAGRAM

Calculated deflections shown are due to the concrete slab on interior girders only (Ec = 5000 ksi). Adjust values as required for exterior girders and if optional slab forming is used. These values may require field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB	Prestressed Concrete Girders			TOTAL REINF STEEL (5)
		ABUT TO (4) INT BT	INT BT TO (4) INT BT	ABUT TO (4) ABUT	
Ft	SF	LF	LF	LF	Lb
40	1,680	197.50	197.50	197.50	3,864
45	1,890	222.50	222.50	222.50	4,347
50	2,100	247.50	247.50	247.50	4,830
55	2,310	272.50	272.50	272.50	5,313
60	2,520	297.50	297.50	297.50	5,796
65	2,730	322.50	322.50	322.50	6,279
70	2,940	347.50	347.50	347.50	6,762
75	3,150	372.50	372.50	372.50	7,245
80	3,360	397.50	397.50	397.50	7,728
85	3,570	422.50	422.50	422.50	8,211
90	3,780	447.50	447.50	447.50	8,694
95	3,990	472.50	472.50	472.50	9,177
100	4,200	497.50	497.50	497.50	9,660
105	4,410	522.50	522.50	522.50	10,143
110	4,620	547.50	547.50	547.50	10,626
115	4,830	572.50	572.50	572.50	11,109
120	5,040	597.50	597.50	597.50	11,592

(4) Fabricator will adjust lengths for girder slopes as required.

(5) Reinforcing steel weight is calculated using an approximate factor of 2.3 lbs/SF.

MATERIAL NOTES:

Provide Class S concrete (f'c = 4,000 psi).
Provide Class S (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"
Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A, D, 0A, P or T unless noted otherwise.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Multi-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet and the I-Girder Continuous Slab Detail (IGCS) standard.
See I-Girder Thickened Slab End Details (IGTS) standard for details and quantity adjustments.
See Prestressed Concrete Panels (PCP) standard and Prestressed Concrete Panel Fabrication Details (PCP-FAB) standard for panel details not shown.
See I-Girder Miscellaneous Slab Details (IGMS) standard for miscellaneous details.
See applicable rail details for rail anchorage in slab.
See Permanent Metal Deck Forms (PMDF) standard for details and quantity adjustments if this option is used.
This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54)

40' ROADWAY

SIG-40

FILE: IG-SIG4000-23.dgn	DN: JMH	CK: ASB	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
10-19: Increased "X" and "Y" Values. 01-23: Removed PCP(0) reference.	DIST	COUNTY		SHEET NO.
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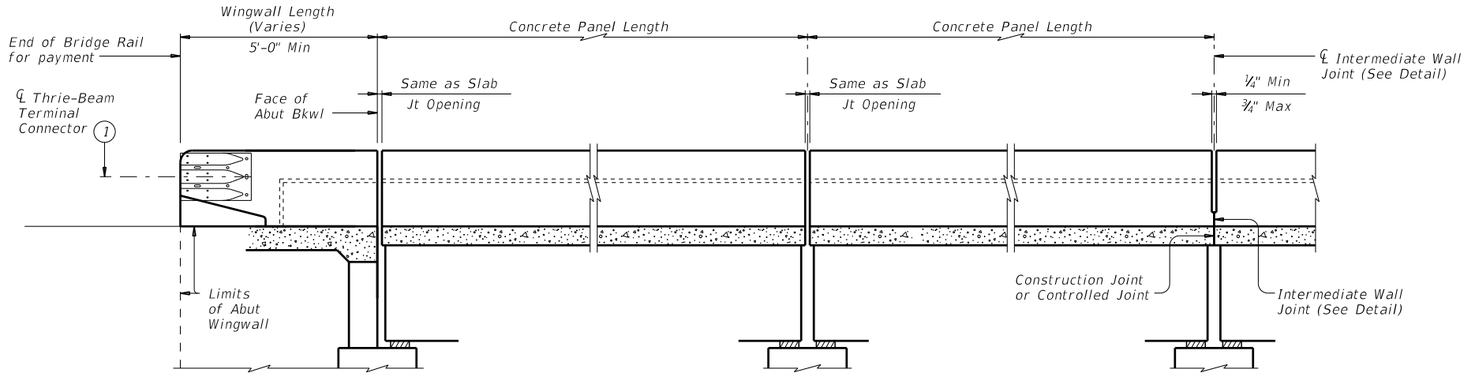
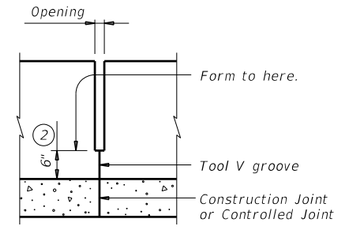


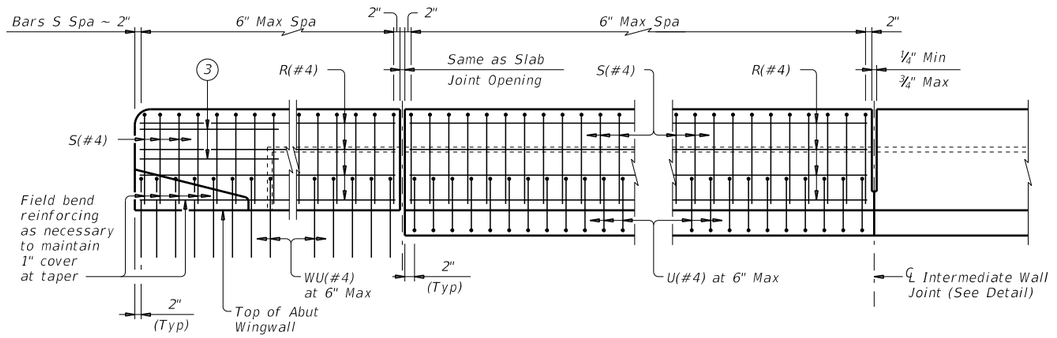
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

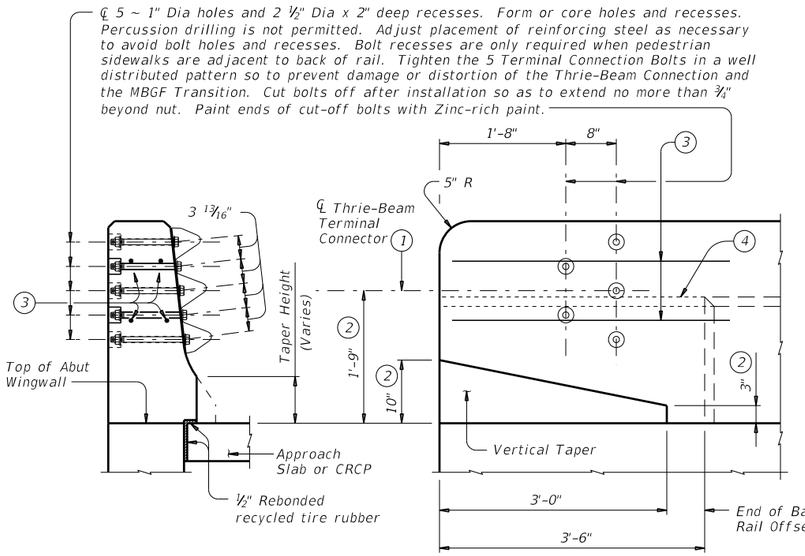


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

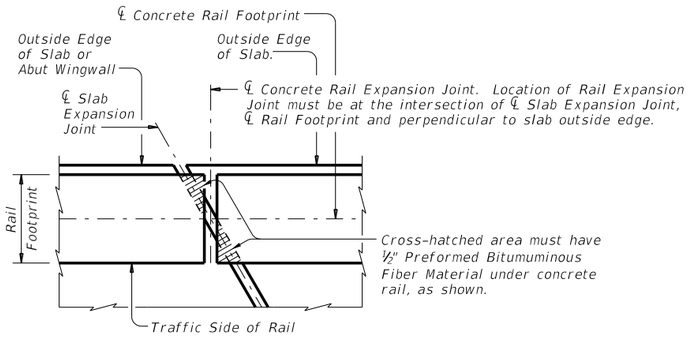


ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with overlay.
3. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.
4. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL

TYPE T551

FILE: rlstd009-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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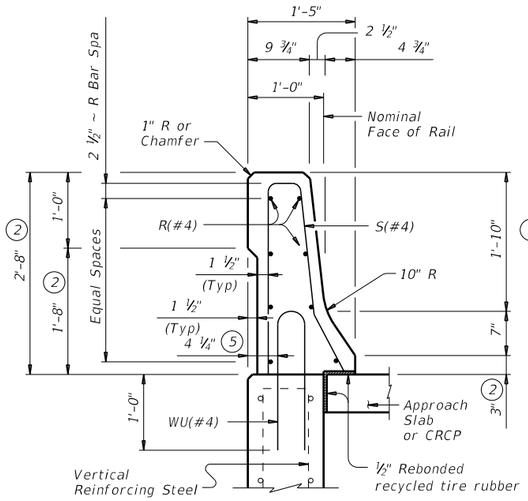
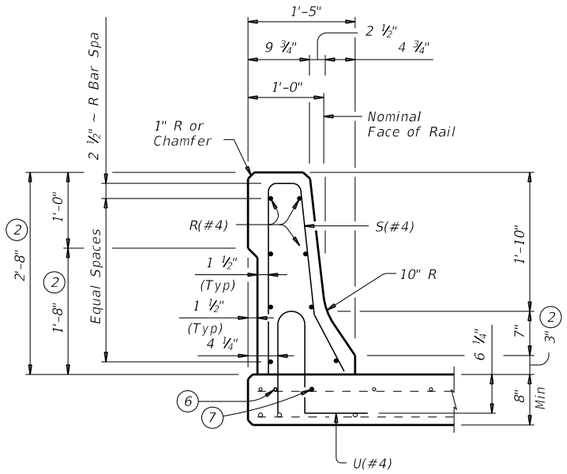


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with overlay.

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

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

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

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

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

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

CONSTRUCTION NOTES:

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

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

The back of railing must be vertical unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

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

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"

Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

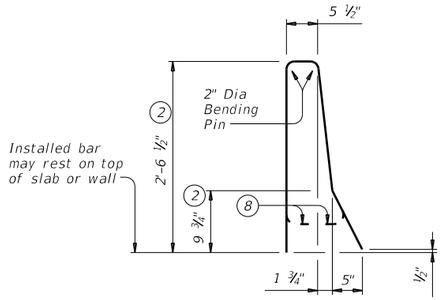
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

Average weight of railing with no overlay is 382 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

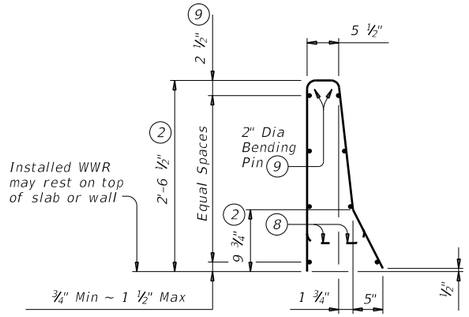
Reinforcing bar dimensions shown are out-to-out of bar.



BARS S (#4)

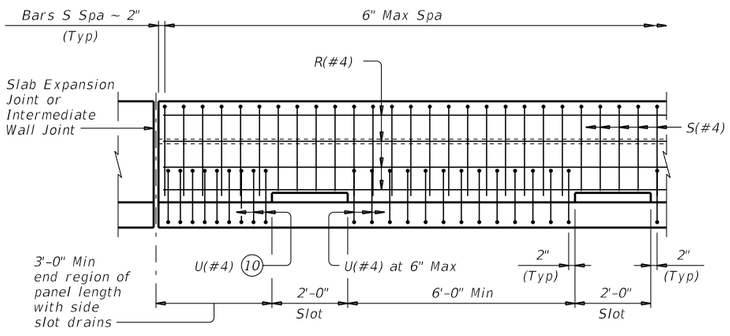
BARS U (#4)

BARS WU (#4)



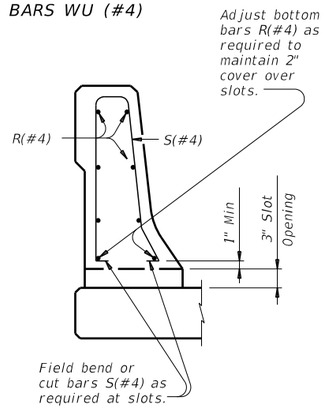
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. If continuous slots at 8 ft c-c are required, then details as on standard Type T552 should apply. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T551

FILE: rlstd009-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		120

DATE: 5/17/2023 6:56:29 AM
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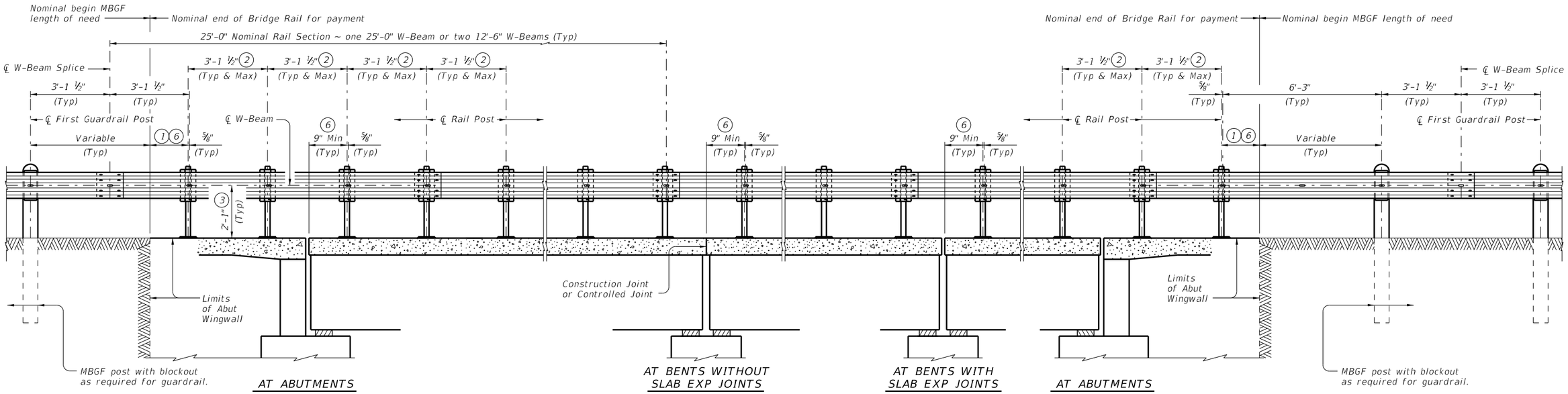
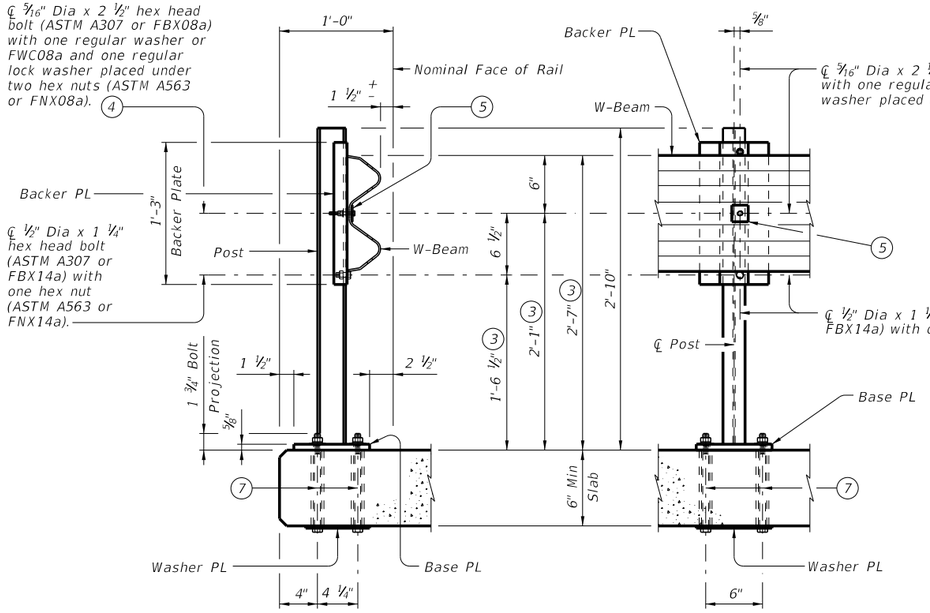


ROADWAY ELEVATION OF RAIL

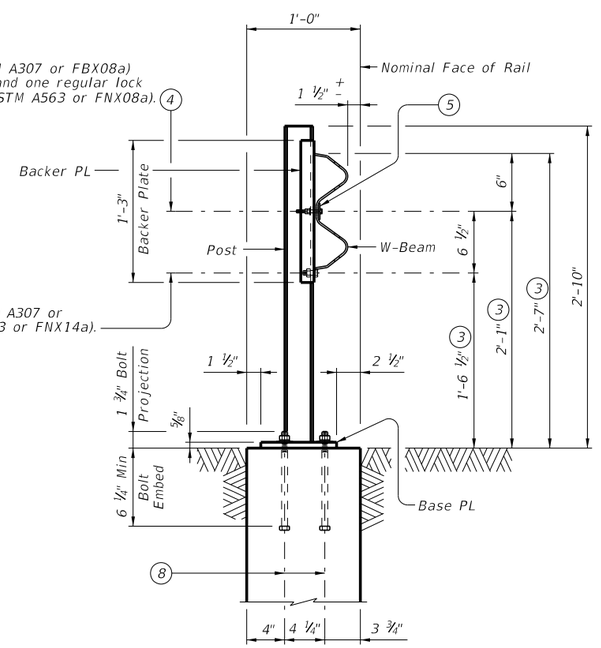
Showing without overlay.



RAIL SECTION — TRAFFIC SIDE RAIL VIEW

RAIL DETAILS ON BRIDGE SLAB

Showing without overlay.



RAIL SECTION ON ABUTMENT WINGWALL

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 1¾ 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) ℄ ⅝" 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 welded 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 welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE: RL-T631-23.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016, ETC	FM 2658
07/2020: Allowing 9'-4 ½" or 6'-3" W-Beam sections. 03/2023: MBGF Notes.	DIST	COUNTY		SHEET NO.
	TYL	RUSK		121

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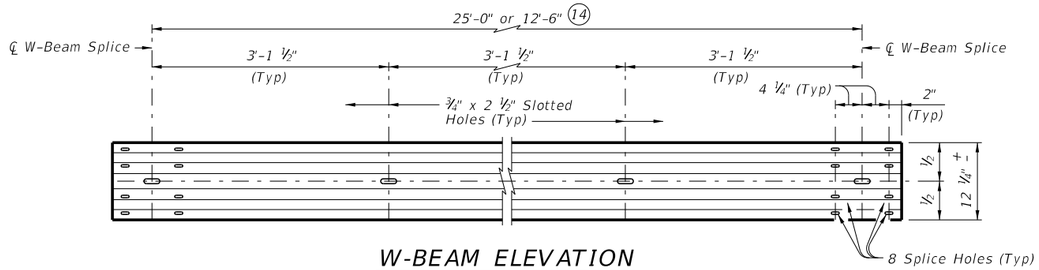
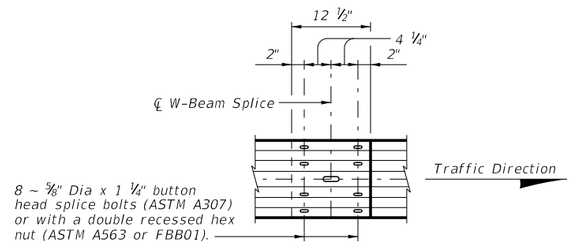
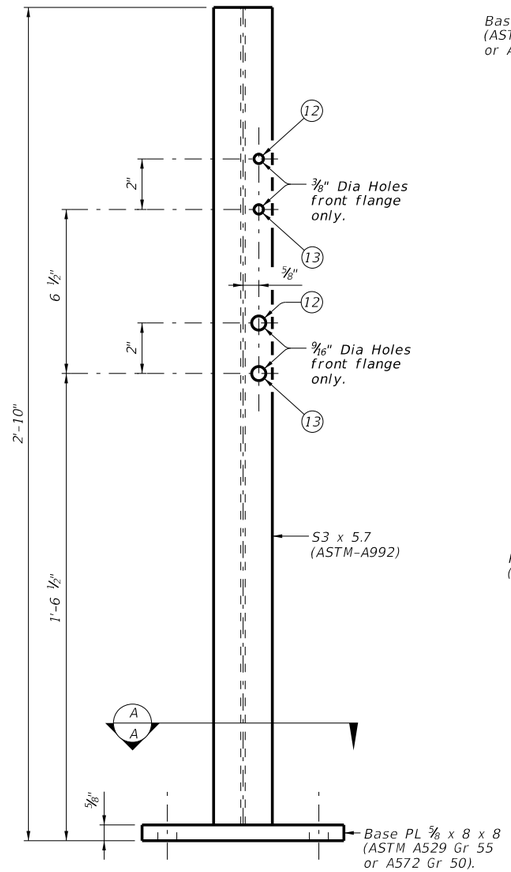


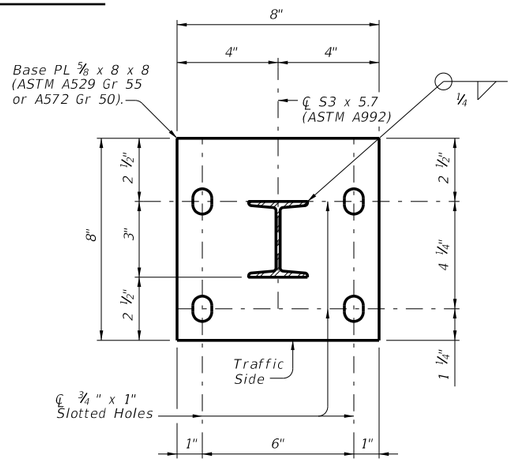
W-BEAM ELEVATION



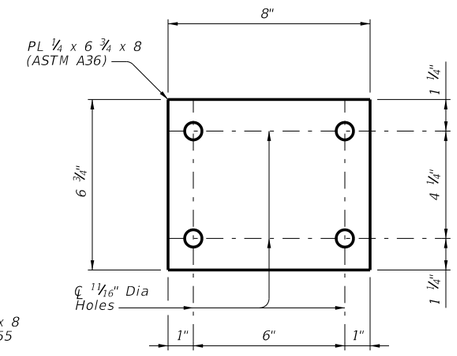
W-BEAM SPLICE ELEVATION



POST ELEVATION

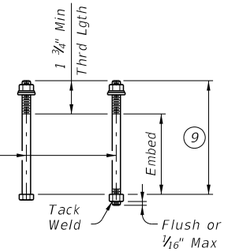


SECTION A-A



WASHER PLATE DETAIL

℄ 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 welded for each threaded rod.



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

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

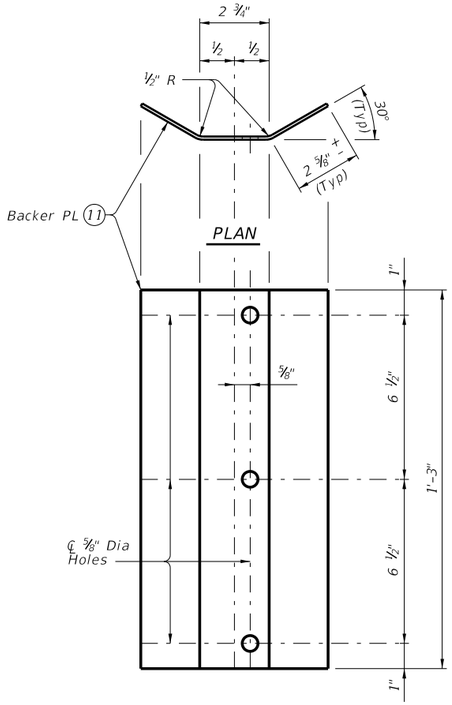
(10) See "Material Notes" for anchor bolt information.

(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.



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 installed tangent to the primary roadway.

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.

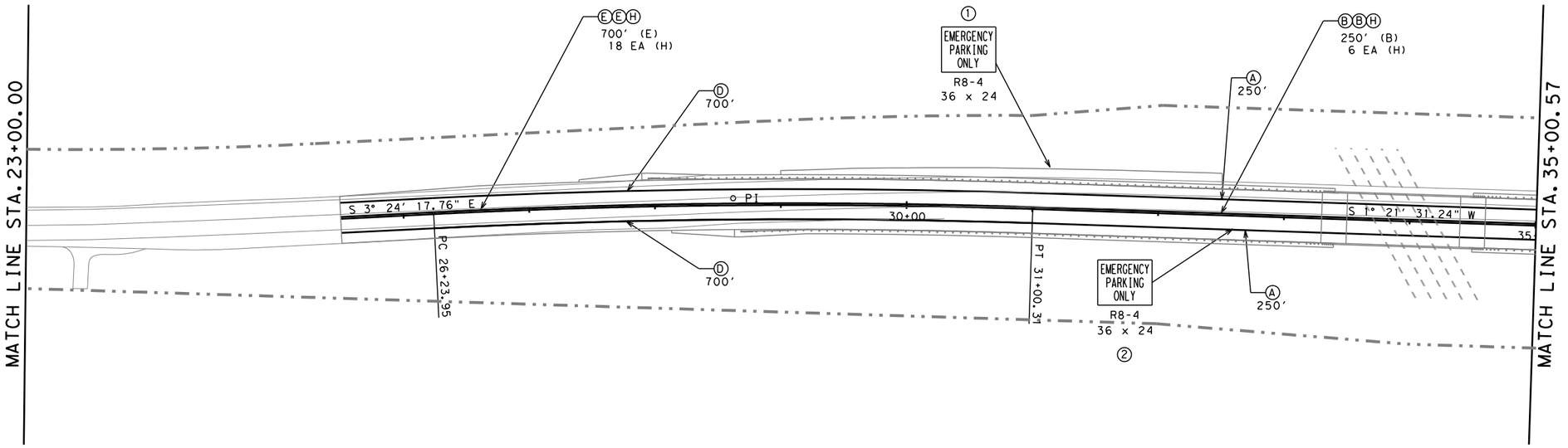
Texas Department of Transportation

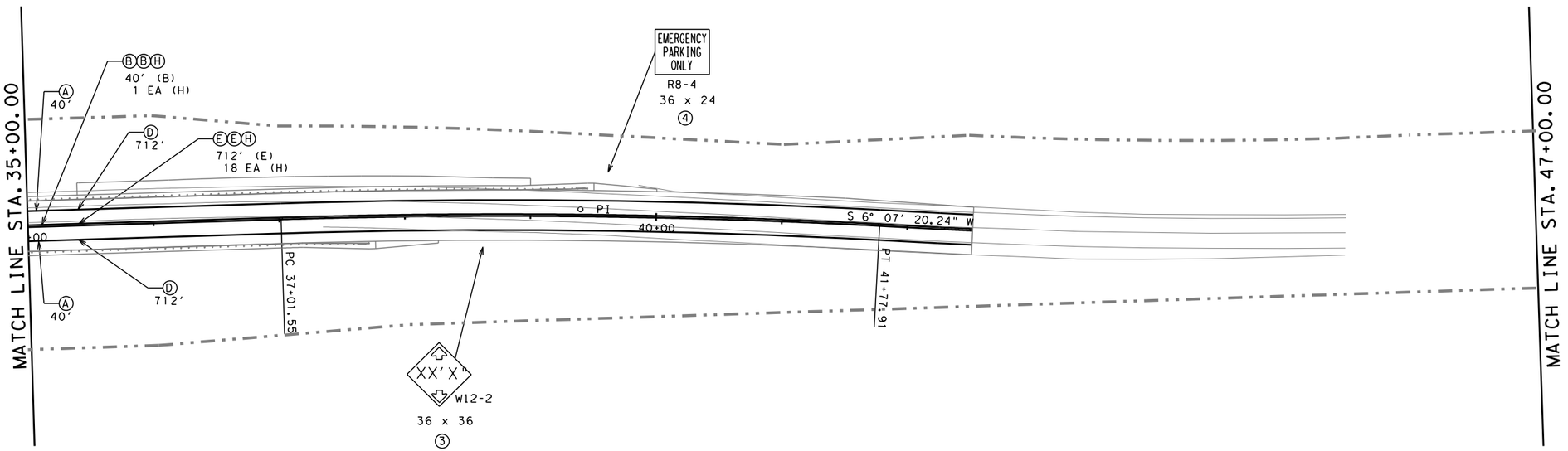
Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE: RL-T631-23.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
07/2020: Allowing 9'-4 ½" or 6'-3" W-Beam sections. 03/2023: MBGF Notes.	DIST	COUNTY		SHEET NO.
	TYL	RUSK		122





0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 23+00.00 to STA 47+00.00

SHEET 1 OF 12

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FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
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STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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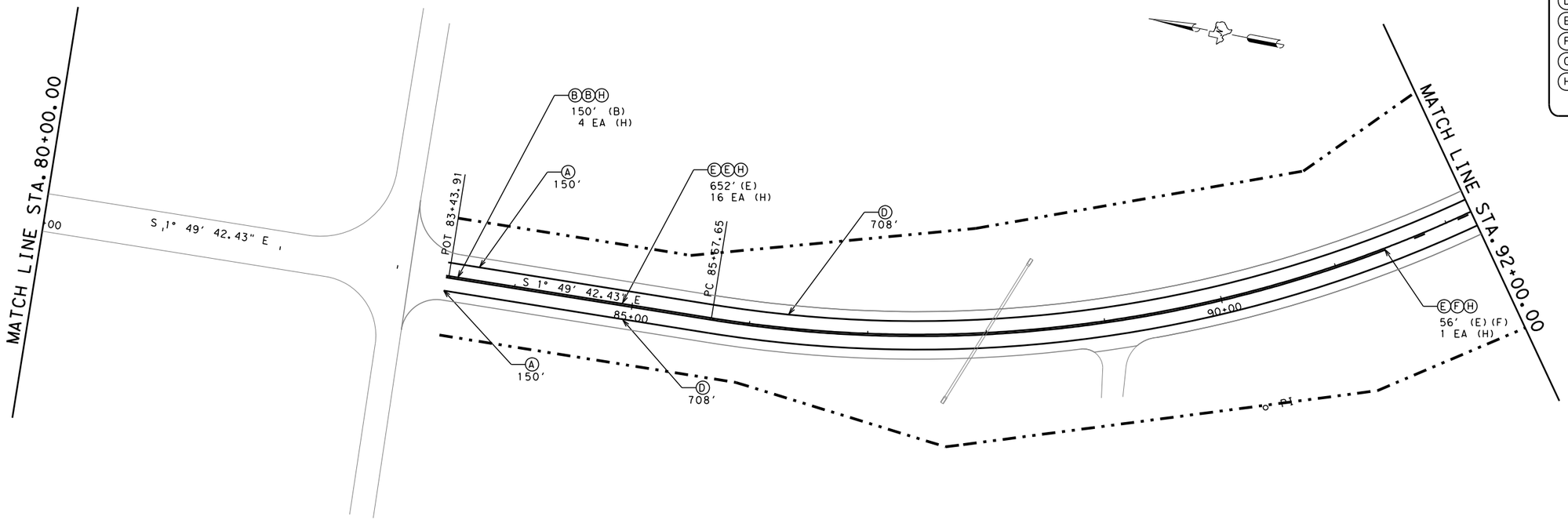

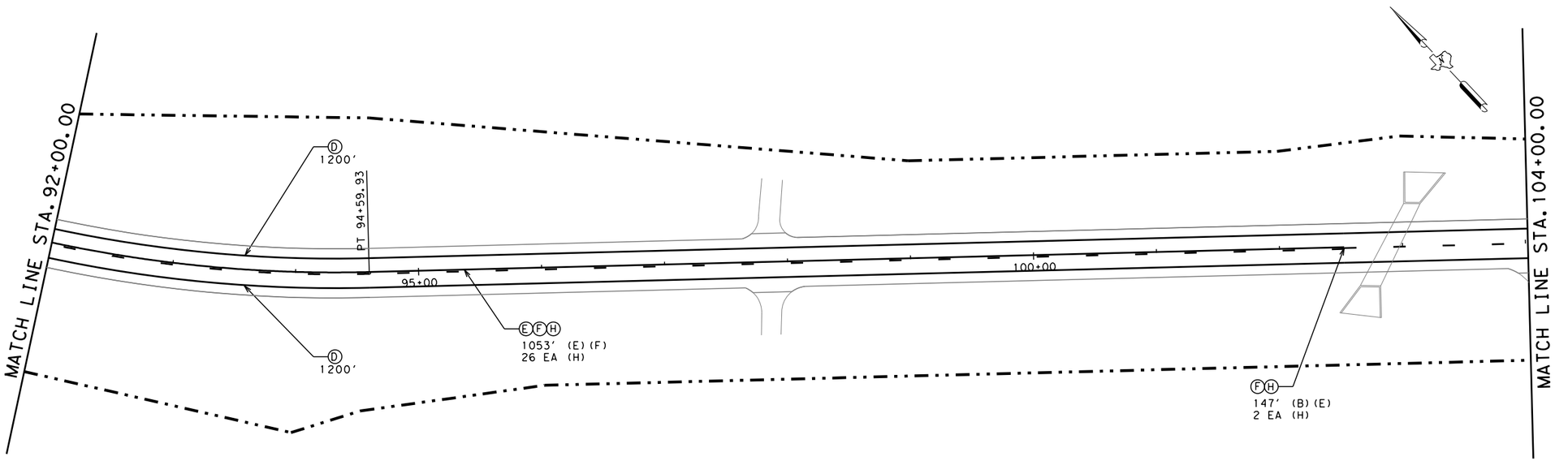

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- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
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- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
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LICENSED PROFESSIONAL ENGINEER

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SHEET 2 OF 12

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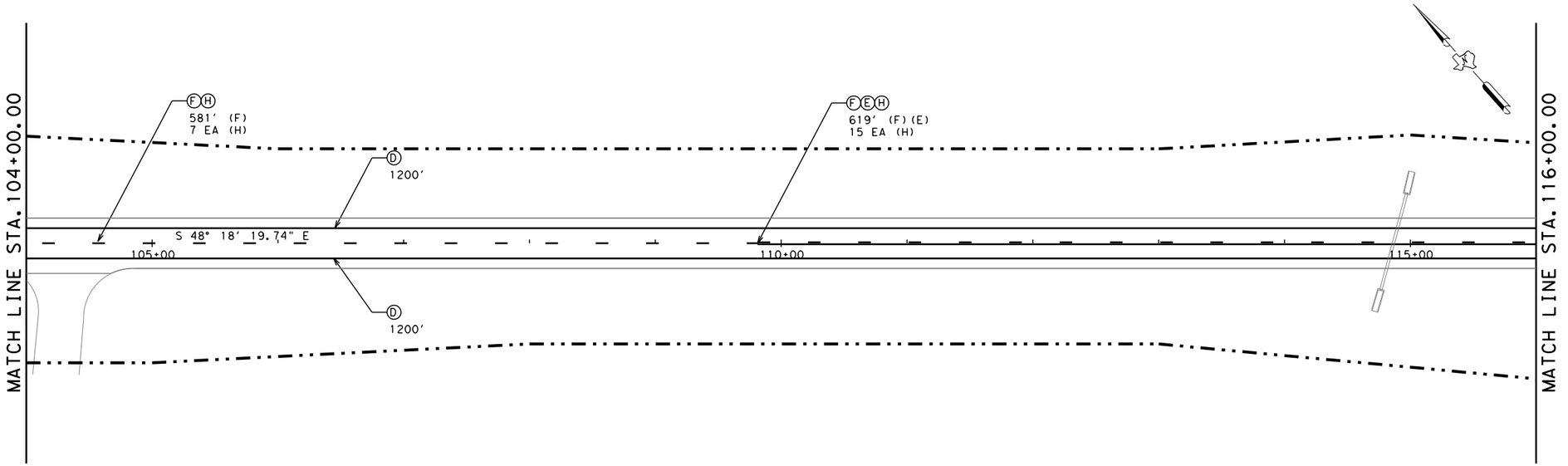

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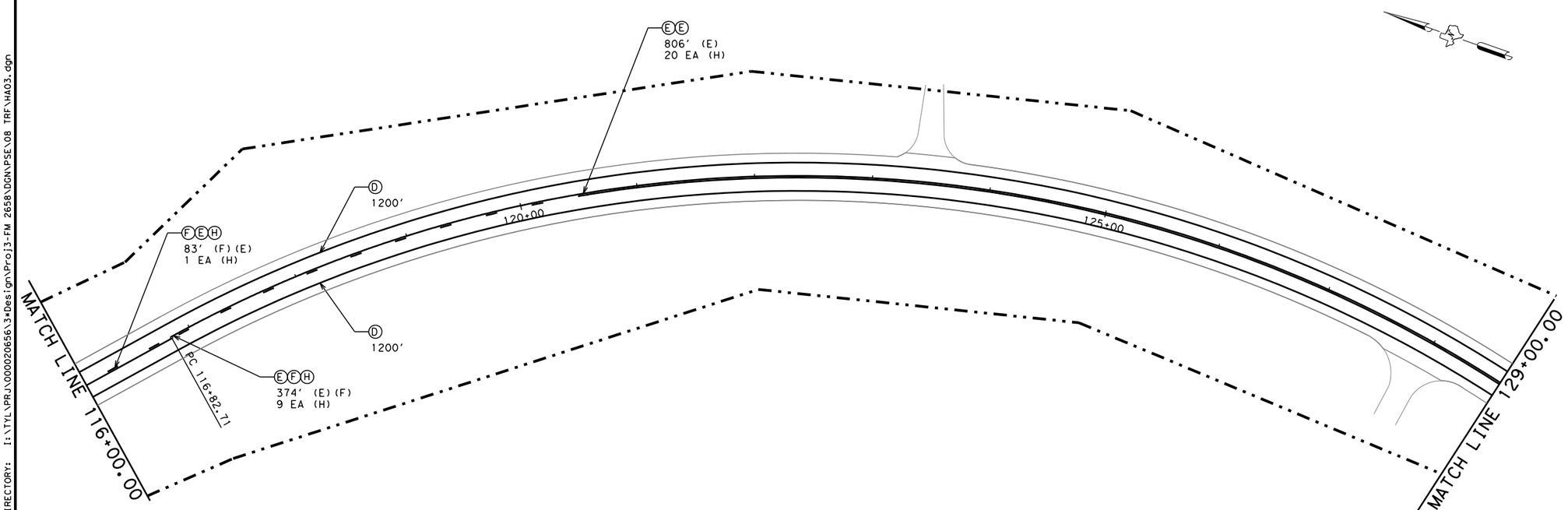
HORIZONTAL SCALE



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SHEET 3 OF 12

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FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
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STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
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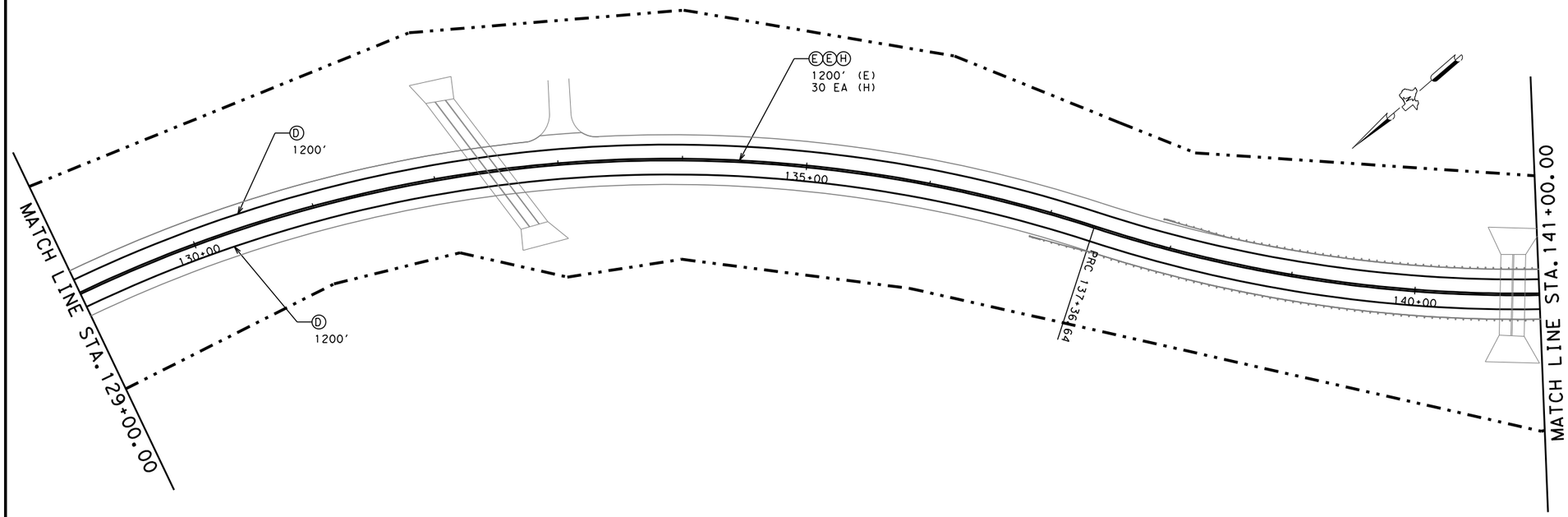

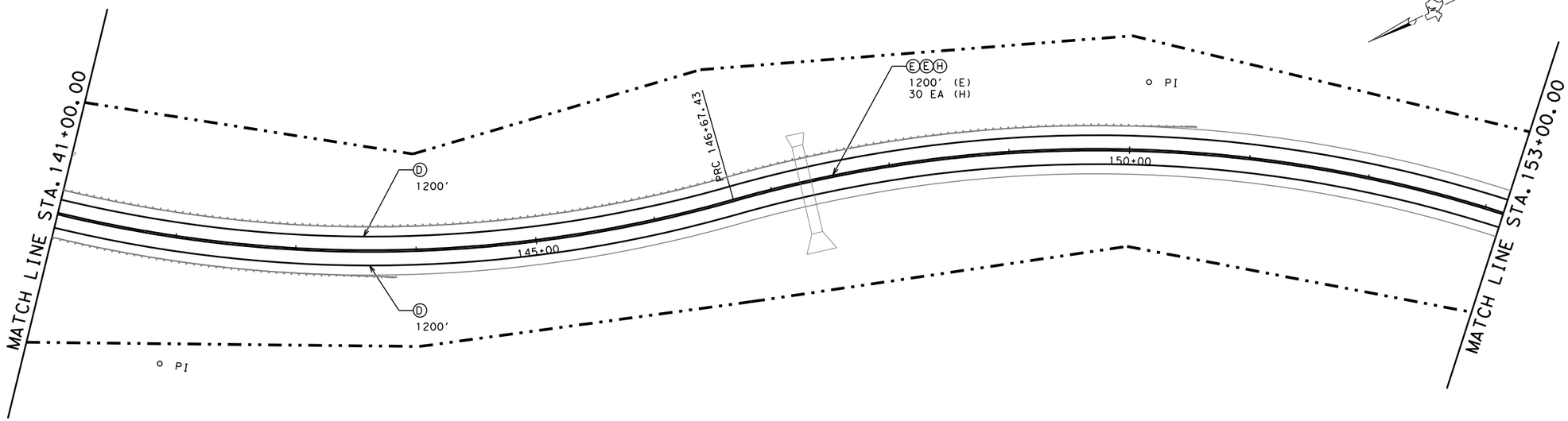

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- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

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SHEET 4 OF 12

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FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
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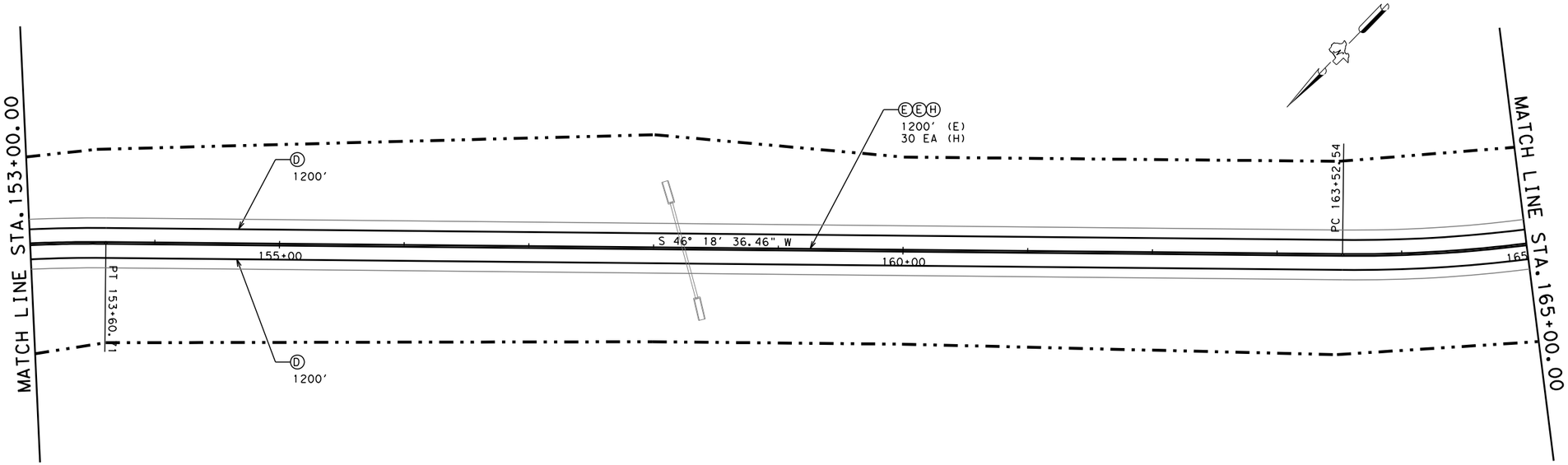

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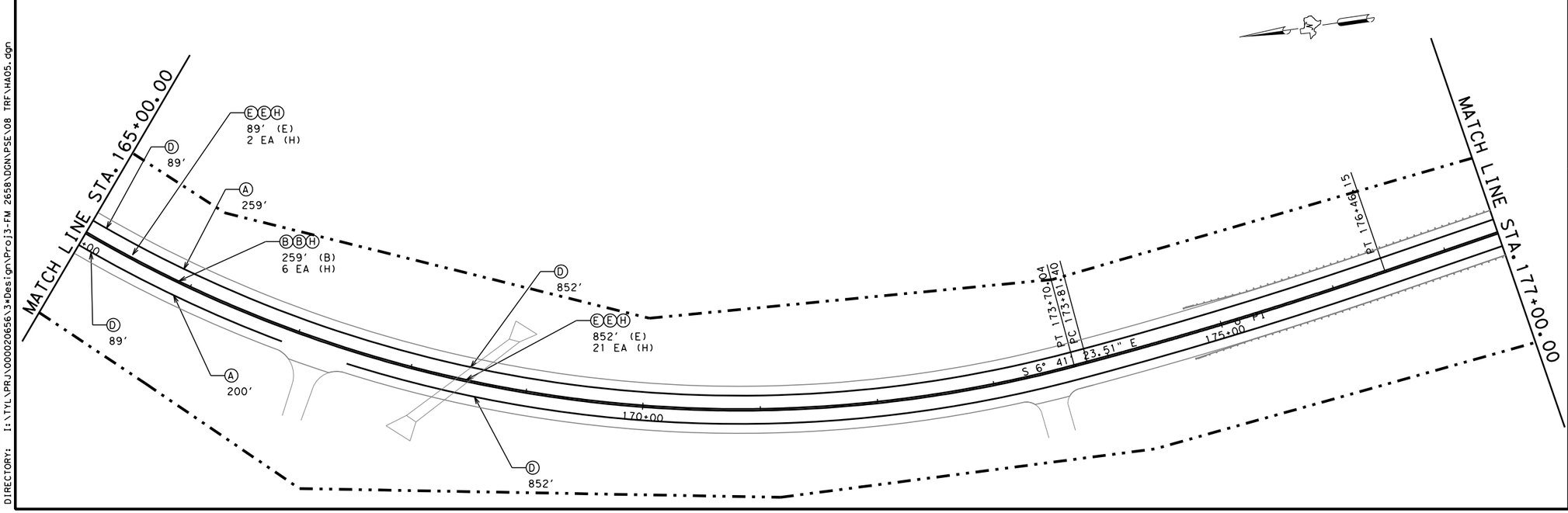

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FM 2658
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SHEET 5 OF 12

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FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		127
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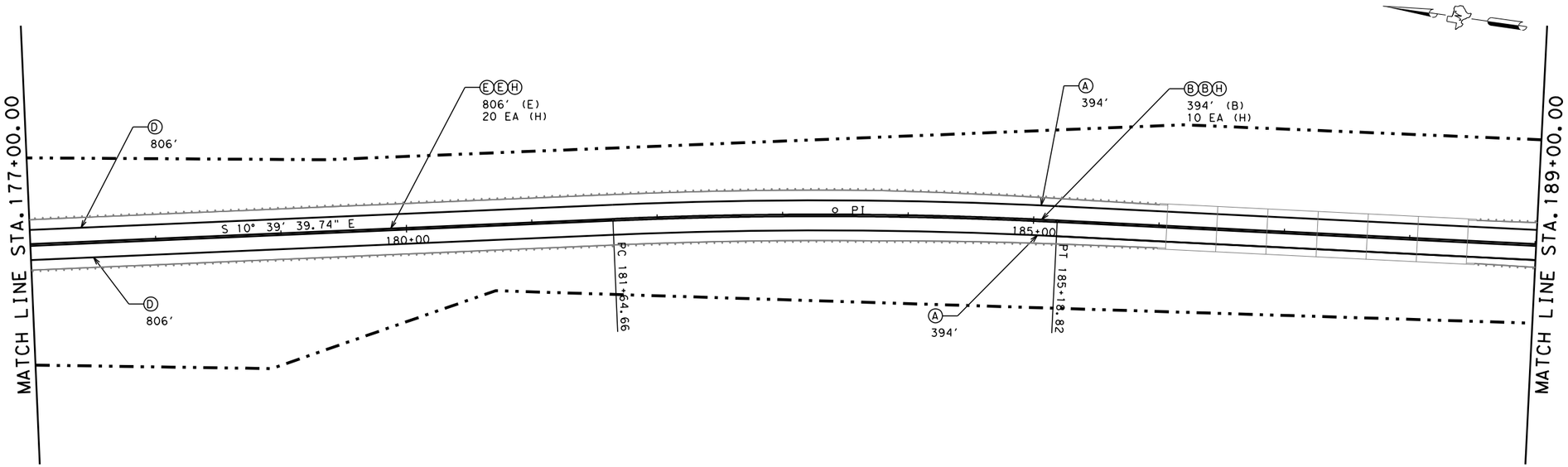

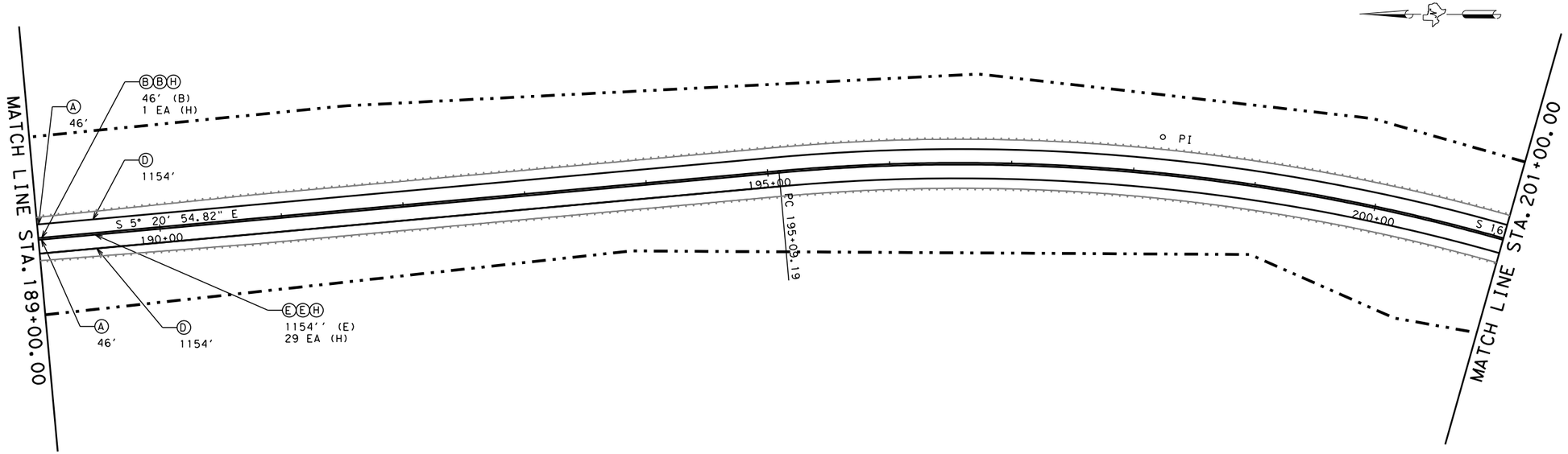

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- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
- (D) REFL PROF PAV MRK TY I (W)6"(SLD)(100MIL)
- (E) REFL PROF PAV MRK TY I (Y)6"(SLD)(100MIL)
- (F) REFL PROF PAV MRK TY I (Y)6"(BRK)(100MIL)
- (G) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 177+00.00 to STA 201+00.00

SHEET 6 OF 12

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		128
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

FILE: HA06.dgn
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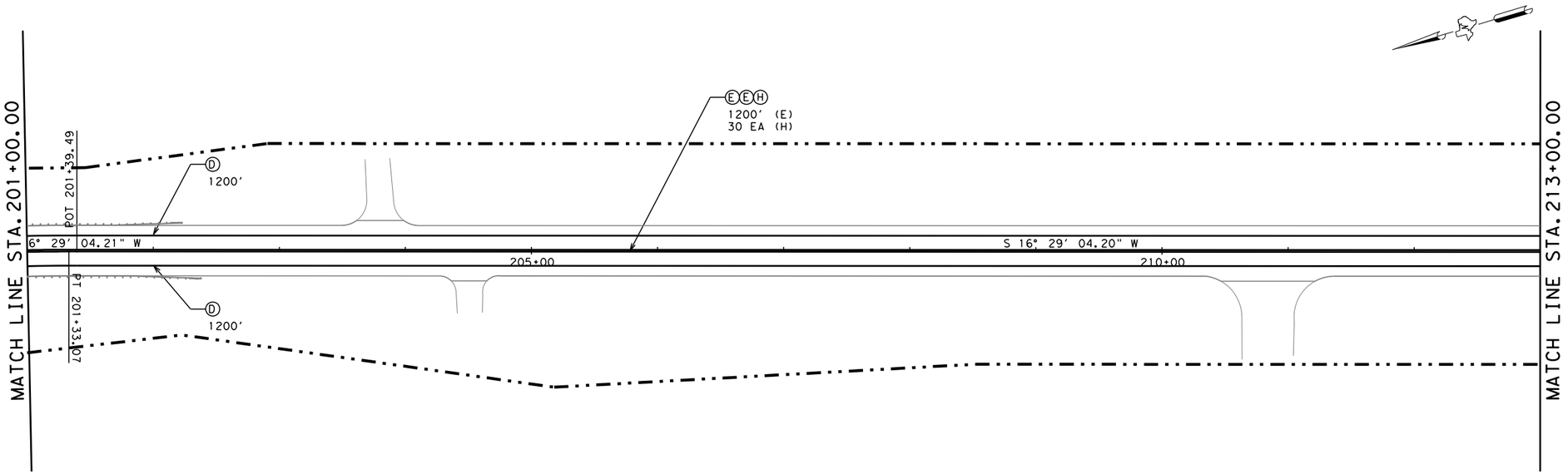

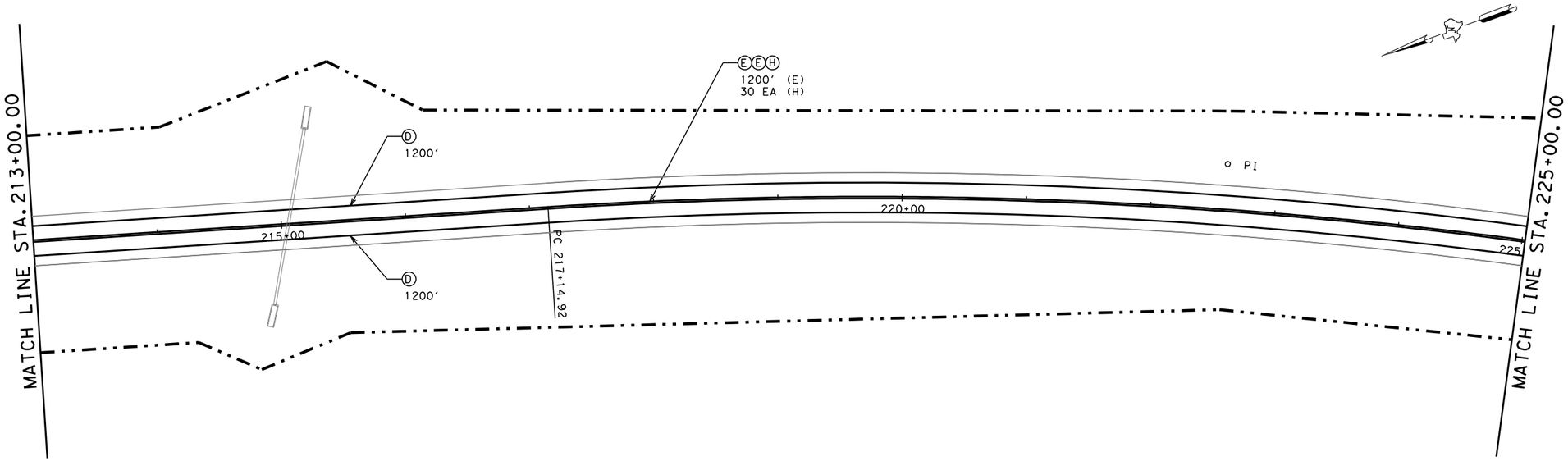

LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
- (D) REFL PROF PAV MRK TY I (W)6"(SLD)(100MIL)
- (E) REFL PROF PAV MRK TY I (Y)6"(SLD)(100MIL)
- (F) REFL PROF PAV MRK TY I (Y)6"(BRK)(100MIL)
- (G) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 201+00.00 to STA 225+00.00

SHEET 7 OF 12

Texas Department of Transportation
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LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		129
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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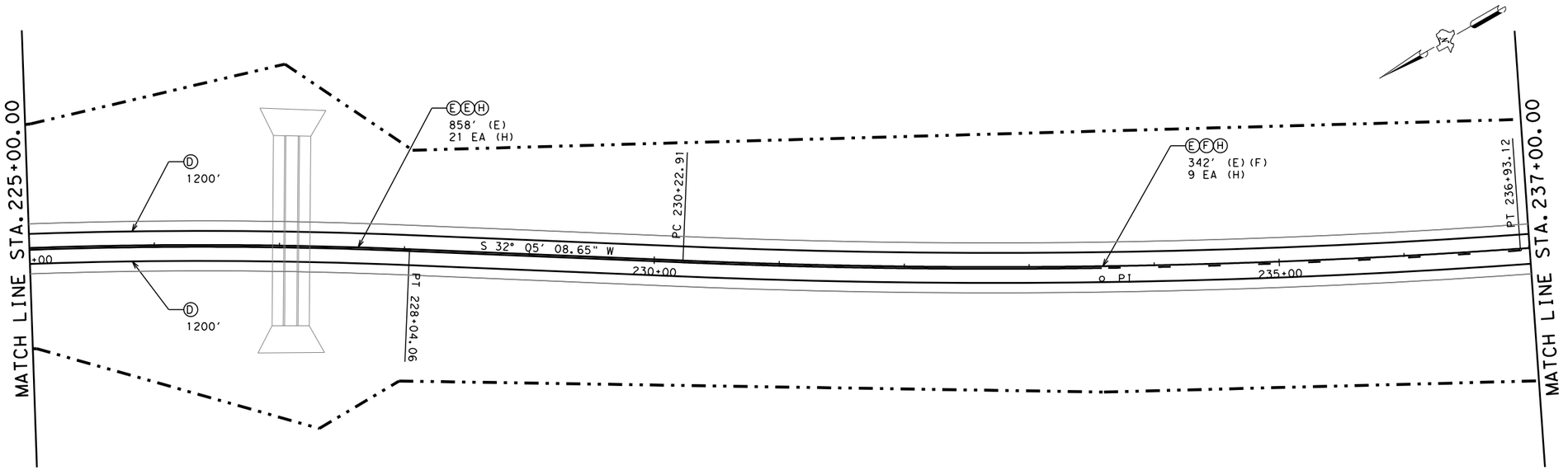

LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
- (D) REFL PROF PAV MRK TY I (W)6"(SLD)(100MIL)
- (E) REFL PROF PAV MRK TY I (Y)6"(SLD)(100MIL)
- (F) REFL PROF PAV MRK TY I (Y)6"(BRK)(100MIL)
- (G) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 225+00.00 to STA 249+00.00

SHEET 8 OF 12

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LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		130
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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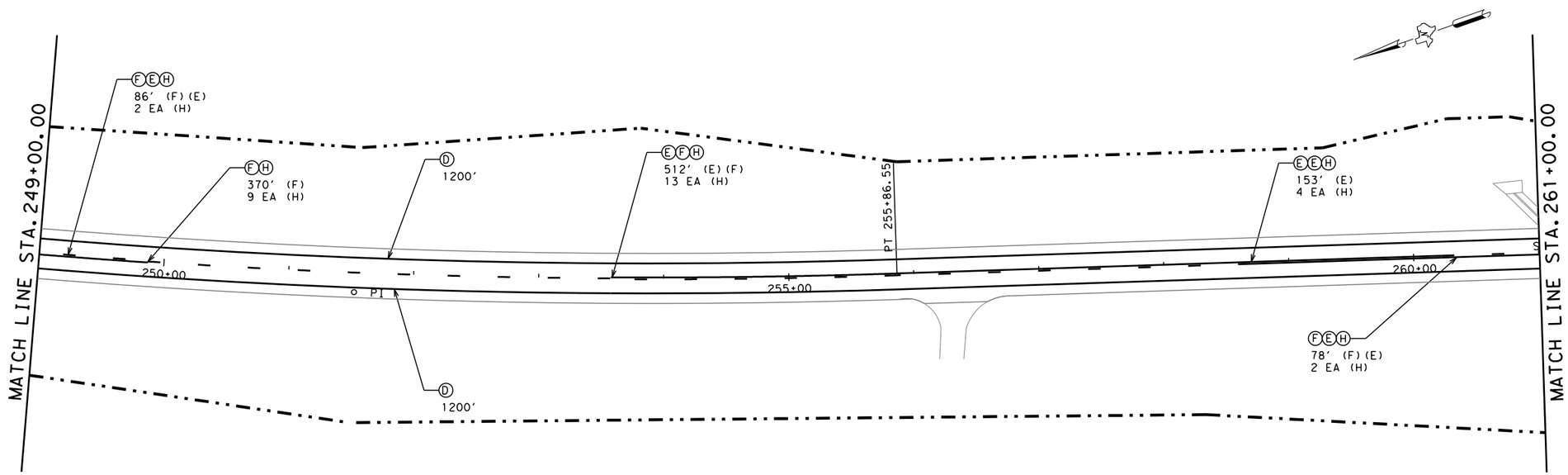

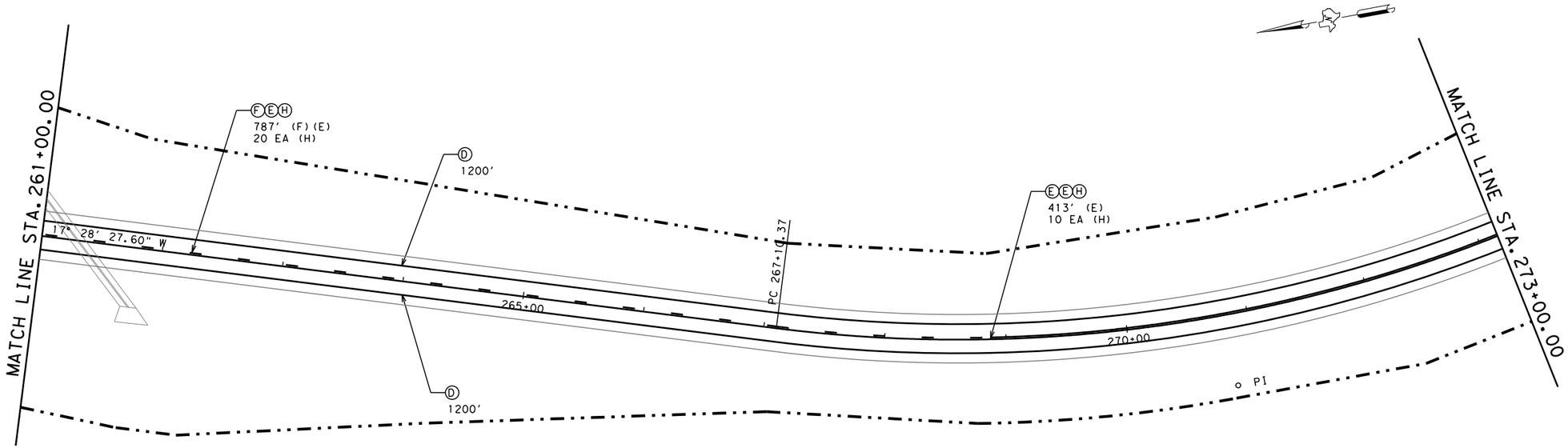

LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
- (D) REFL PROF PAV MRK TY I (W)6"(SLD)(100MIL)
- (E) REFL PROF PAV MRK TY I (Y)6"(SLD)(100MIL)
- (F) REFL PROF PAV MRK TY I (Y)6"(BRK)(100MIL)
- (G) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT

HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 249+00.00 to STA 273+00.00

SHEET 9 OF 12

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		131
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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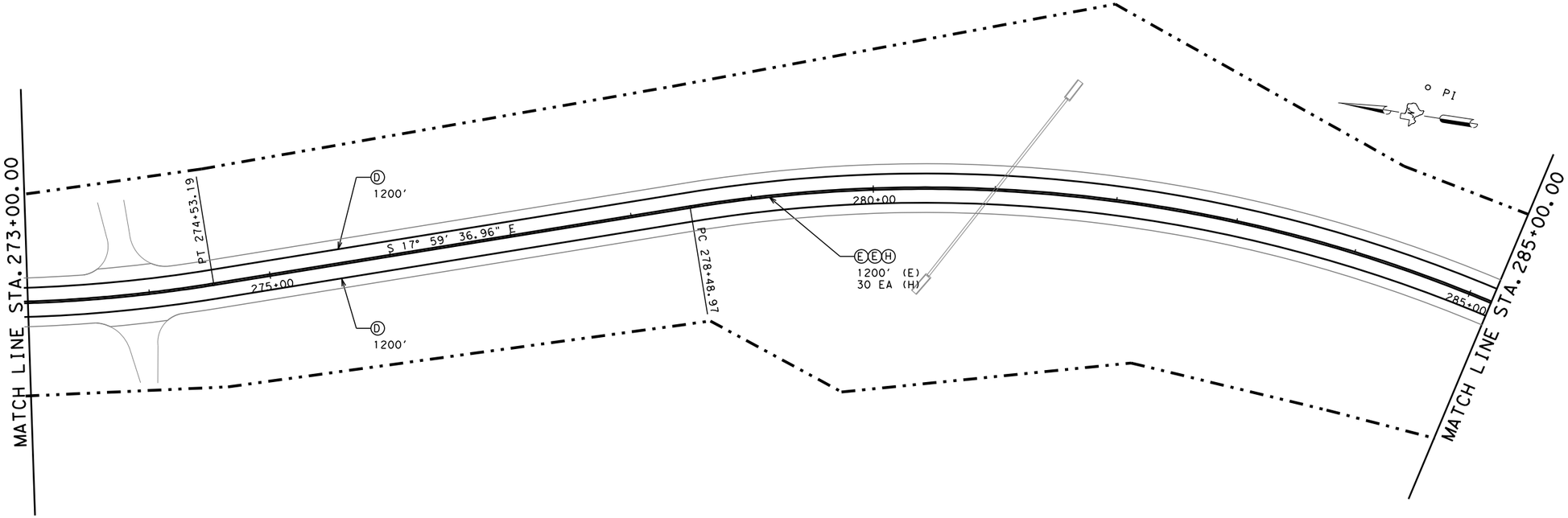

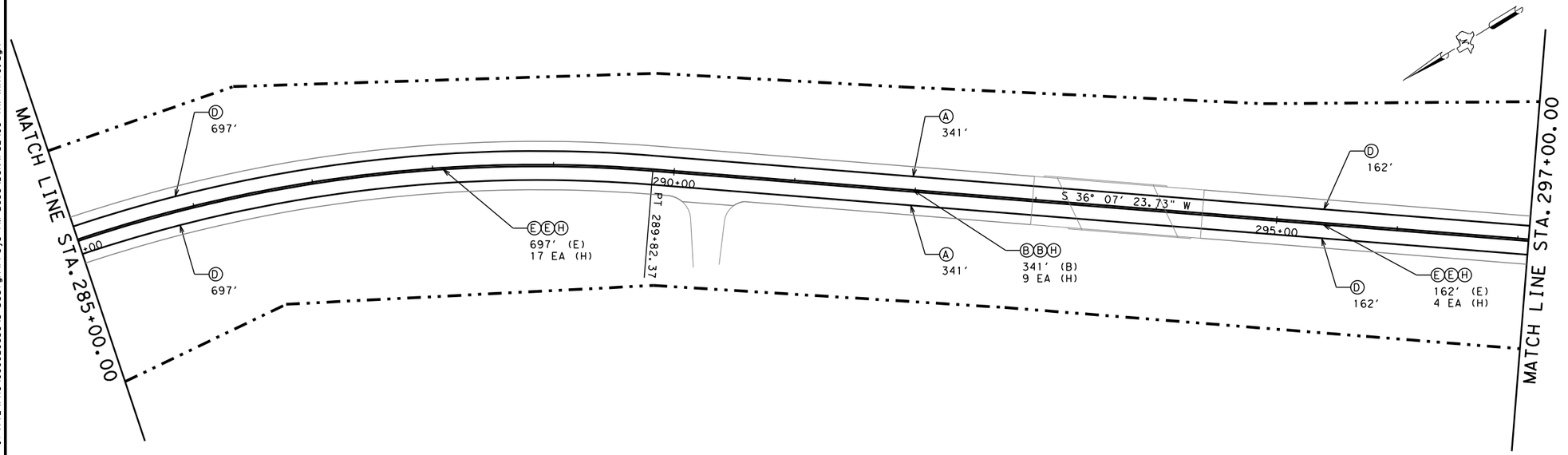

LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
- (D) REFL PROF PAV MRK TY I (W)6"(SLD)(100MIL)
- (E) REFL PROF PAV MRK TY I (Y)6"(SLD)(100MIL)
- (F) REFL PROF PAV MRK TY I (Y)6"(BRK)(100MIL)
- (G) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED
PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 273+00.00 to STA 297+00.00

SHEET 10 OF 12

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		132
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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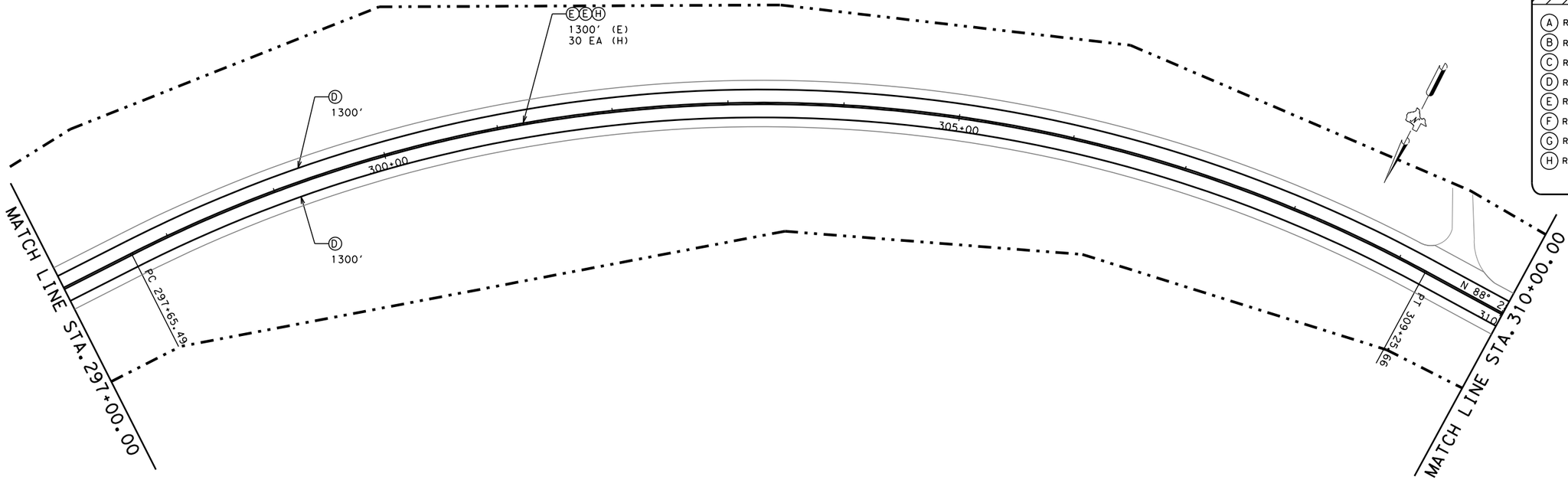

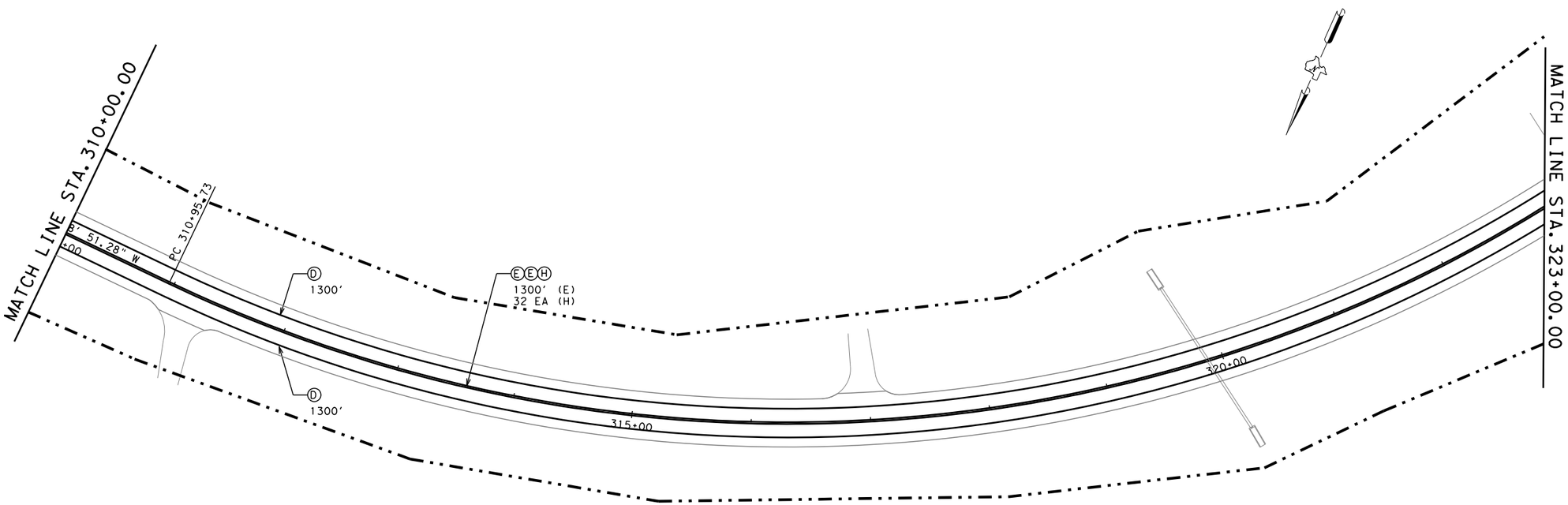

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 297+00.00 to STA 323+00.00

SHEET 11 OF 12

Texas Department of Transportation
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LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		133
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

FILE: Hall.dgn
DATE: 5/17/2023 TIME: 7:05:39 AM
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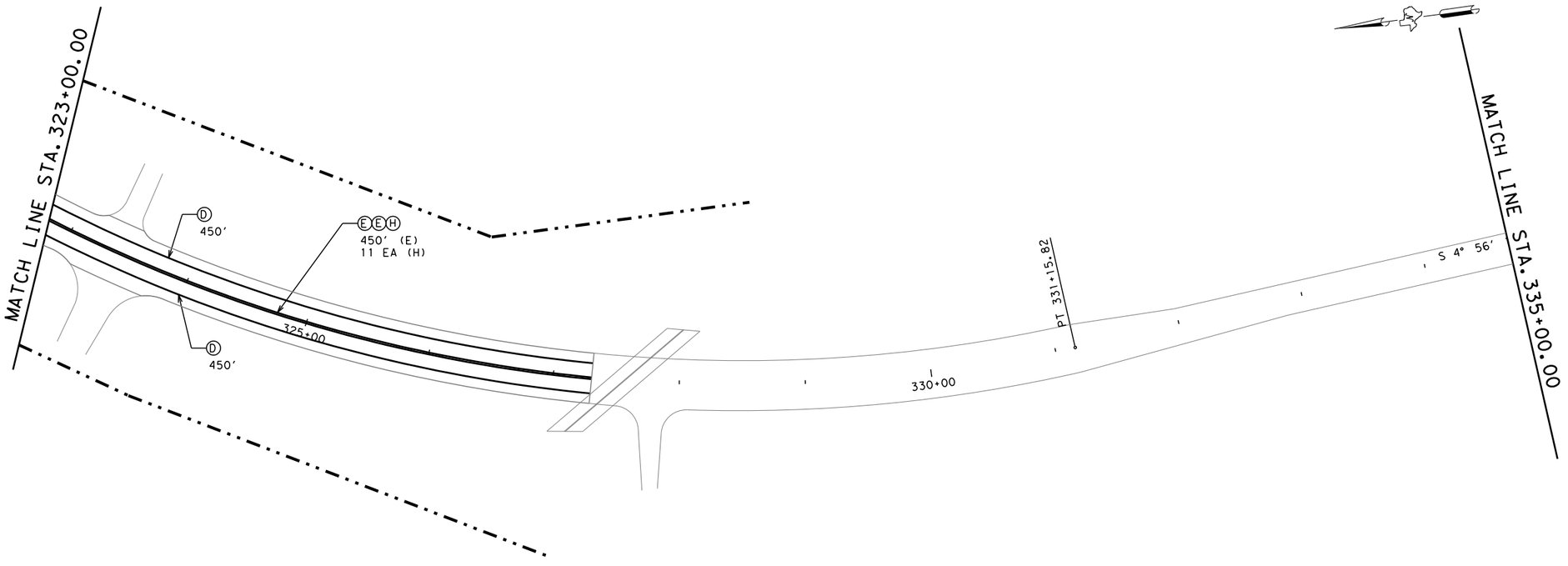

LEGEND

- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)
- (D) REFL PROF PAV MRK TY I (W)6"(SLD)(100MIL)
- (E) REFL PROF PAV MRK TY I (Y)6"(SLD)(100MIL)
- (F) REFL PROF PAV MRK TY I (Y)6"(BRK)(100MIL)
- (G) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (H) REFL PAV MRKR TY II-A-A

0 25 50 100 FT
HORIZONTAL SCALE

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

FM 2658
SIGN & PAVEMENT MARKING LAYOUT

STA 323+00.00 to STA 327+30.00

SHEET 12 OF 12

Texas Department of Transportation

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		134
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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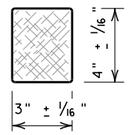
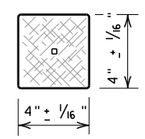
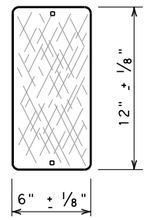
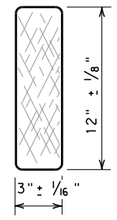
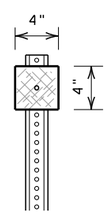
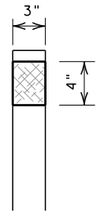
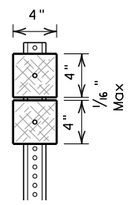
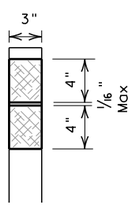
DATE: 5/17/2023 7:07:32 AM
FILE: I:\TYL\PRJ\0000206563_Design\Proj3-FM 2658\DGN\PSE\00 STD\TRF\D & OM(1)-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

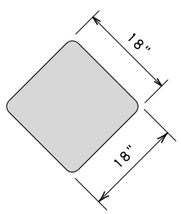
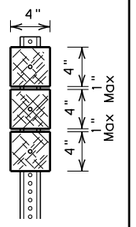
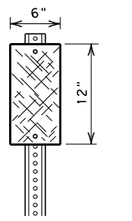
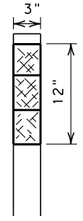
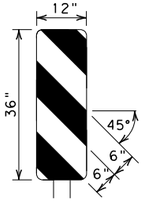
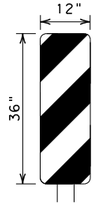
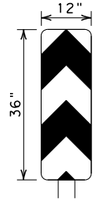
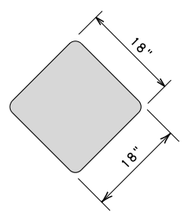
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

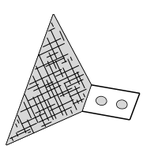
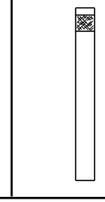
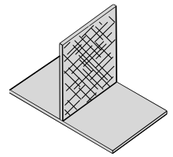
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

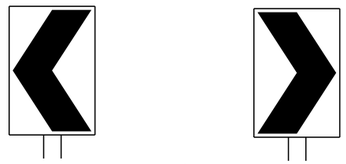
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		 3-Size 2 reflector units	 1-Size 3 reflector unit	 3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

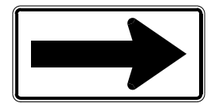
CHEVRONS

DEVICE:  W1-8

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

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE:  W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	2653	01	016,ETC	FM 2658
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	RUSK		135

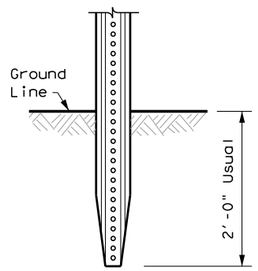
20A

DATE: 5/17/2023 7:07:33 AM
FILE: I:\TYL\PRJ\0000206563_Design\Proj3-FM 2658\DGN\PSE\00 STD\TRF\D & OM#2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

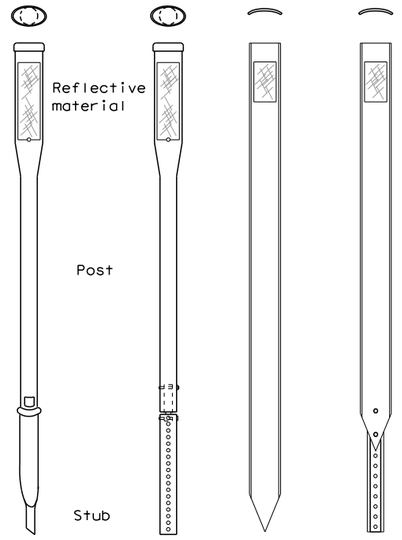


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

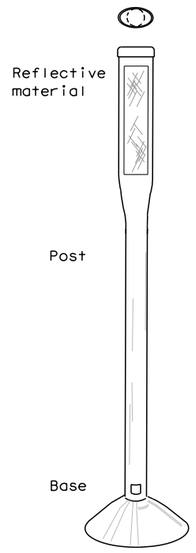
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



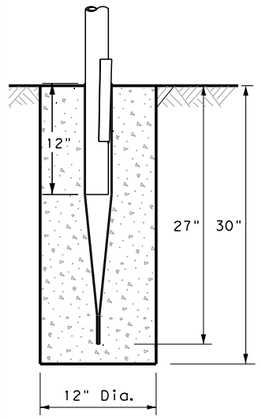
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

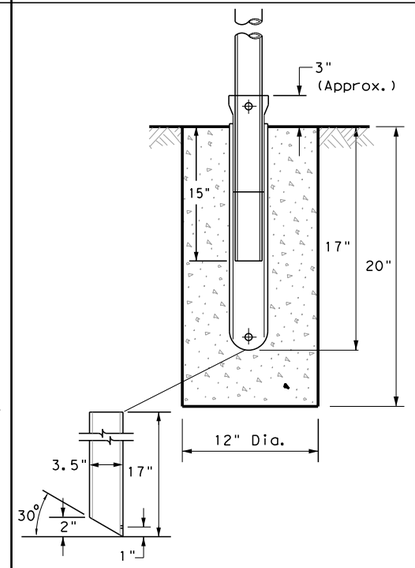
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

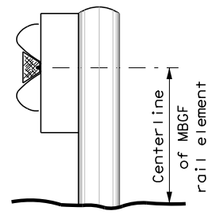
NOTE

1. Install per manufacturer's recommendations.

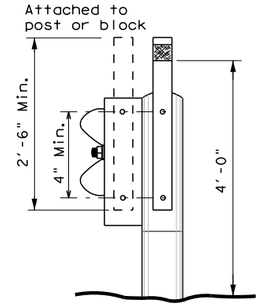
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

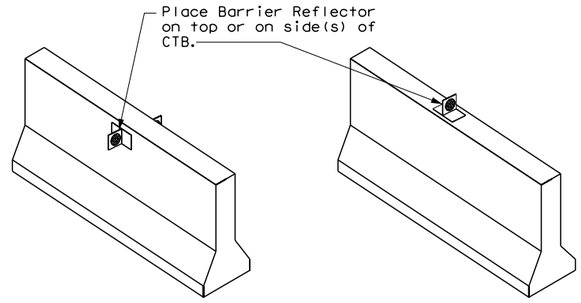
GF1



GF2



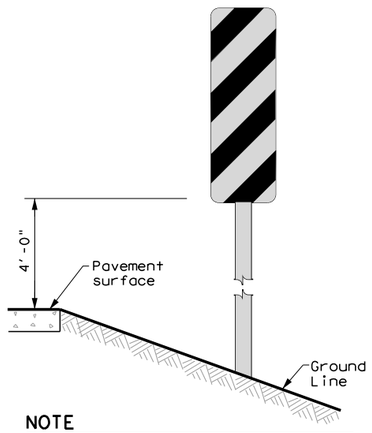
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

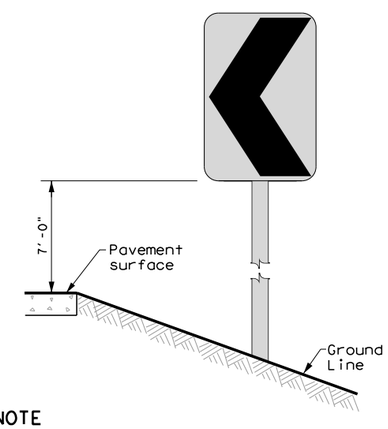
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

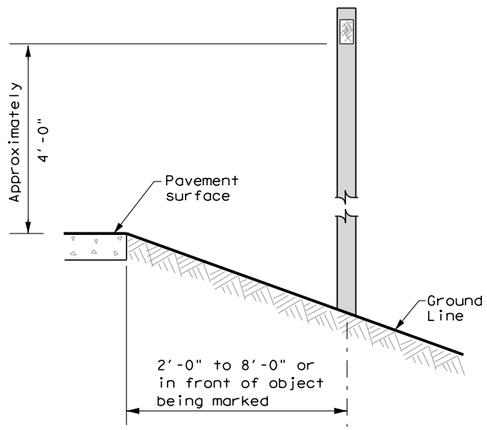
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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4-10 7-20	TYL	RUSK		136

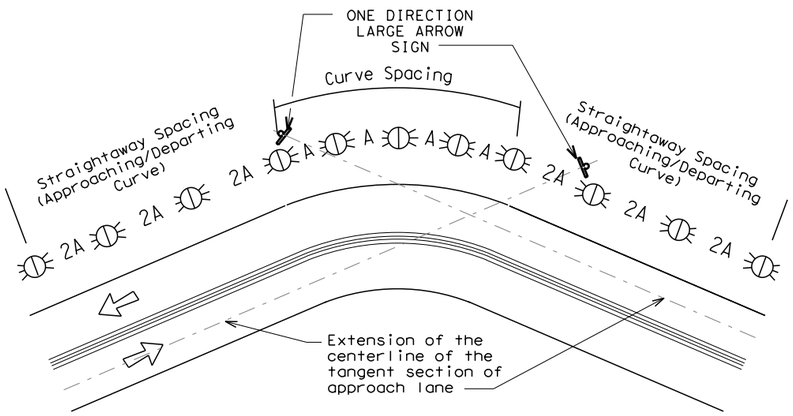
20B

DATE: 5/17/2023 7:07:33 AM
FILE: I:\TYL\PRJ\0000206563_Design\Proj3-FM 2658\DGN\PSE\00 STD\TRF\D & OM(3)-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

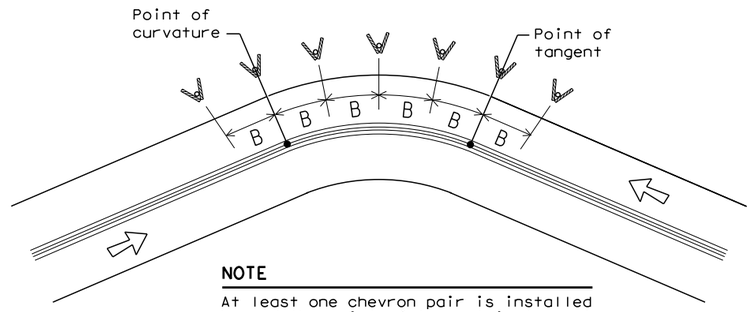
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	TYL	RUSK		137

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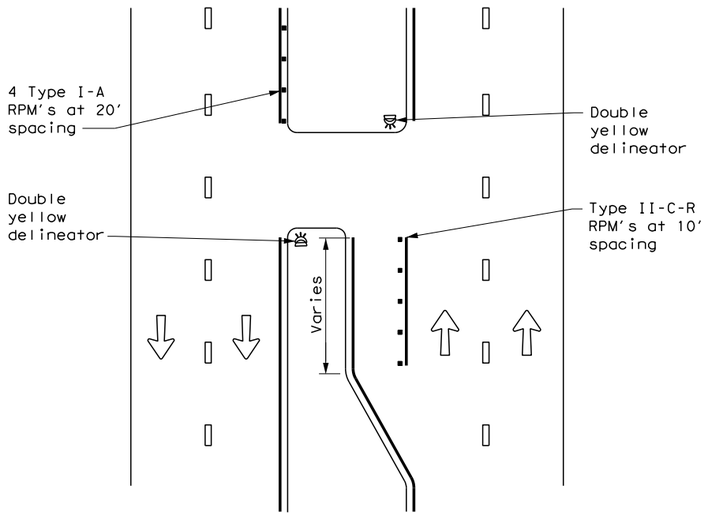
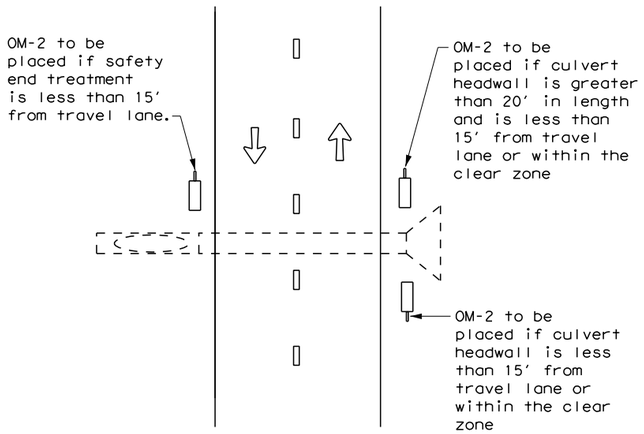
CROSSOVERS



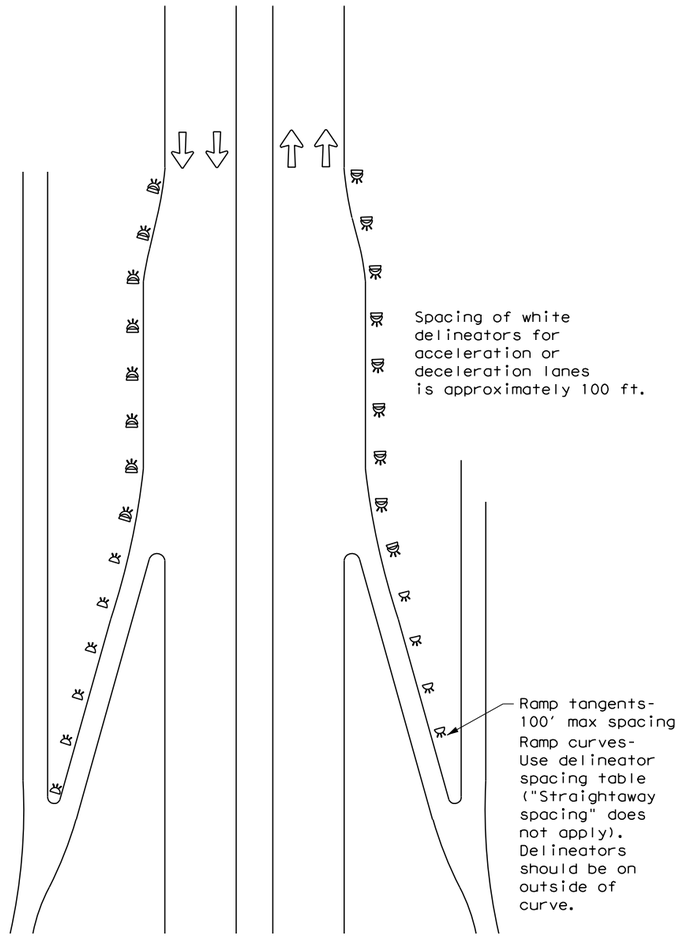
DETAIL 1

FOR CULVERTS WITHOUT MBGF



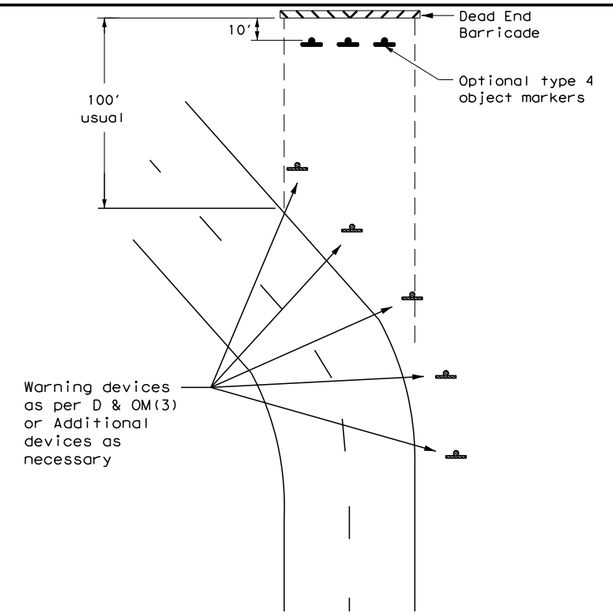
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



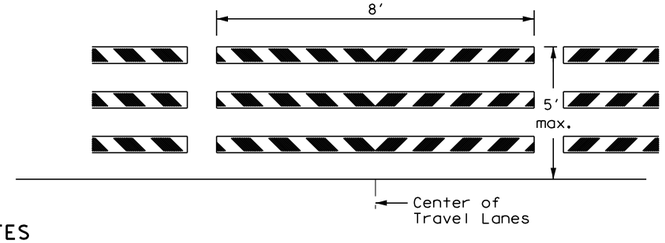
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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3-15 7-20	DIST	COUNTY		SHEET NO.
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20D

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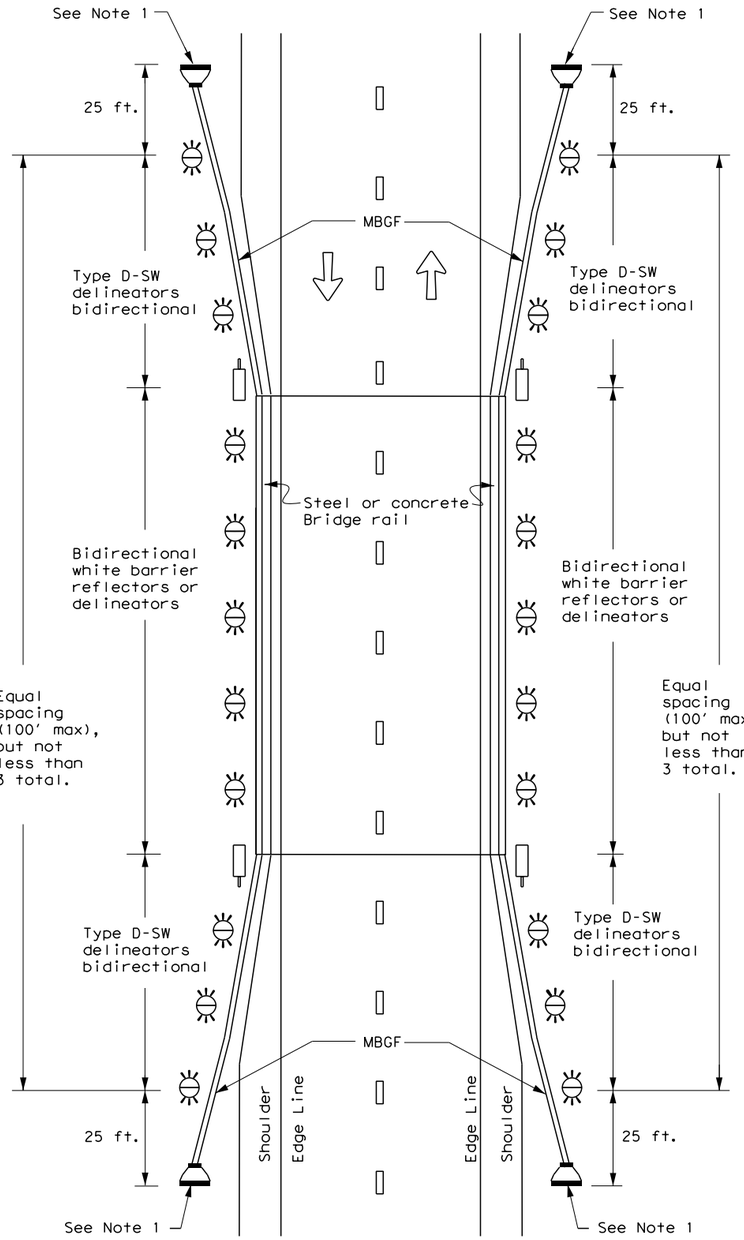
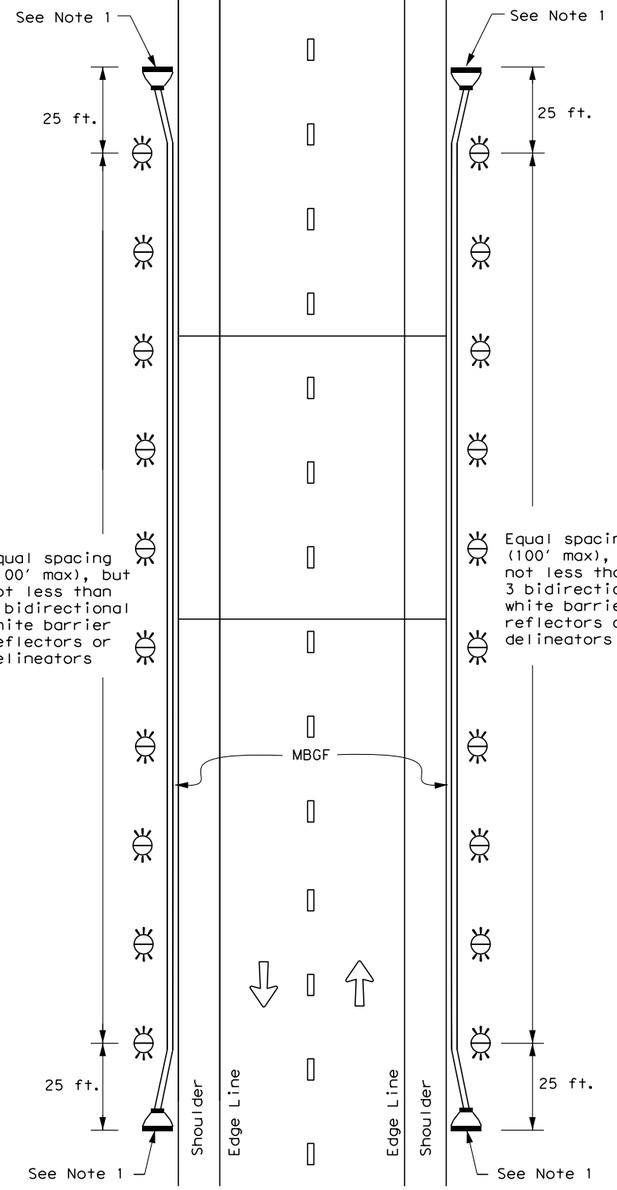
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

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

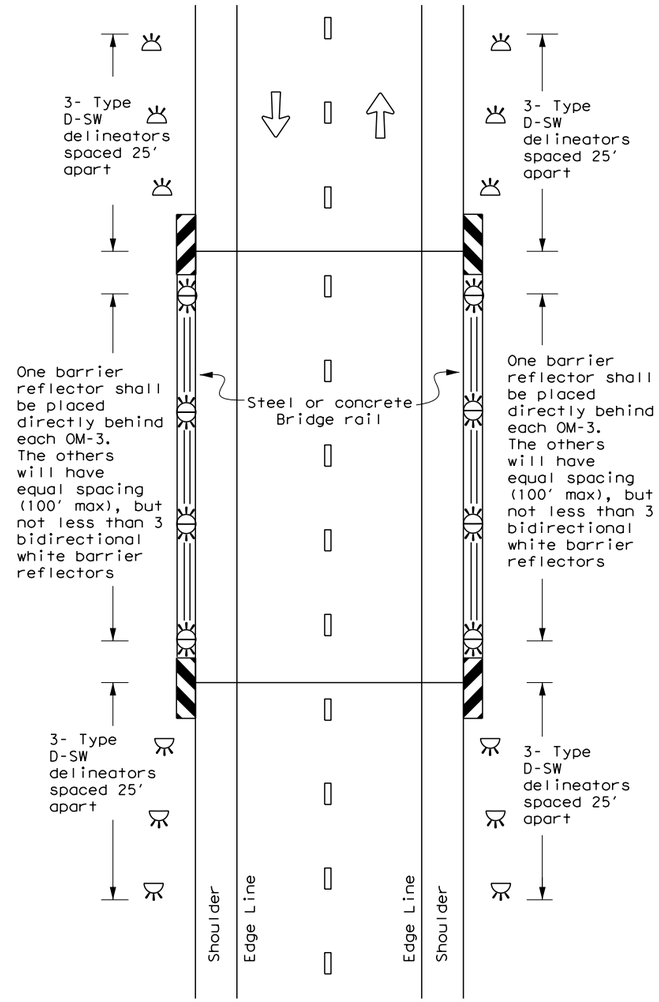
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

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

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



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	2653	01	016, ETC	FM 2658
7-20	DIST	COUNTY		SHEET NO.
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20E

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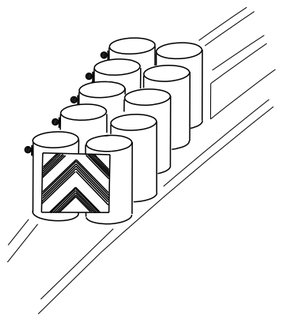
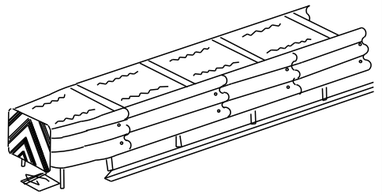
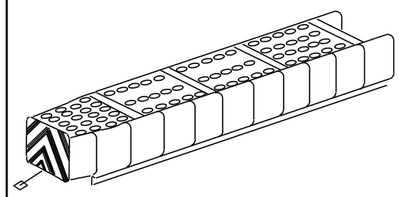
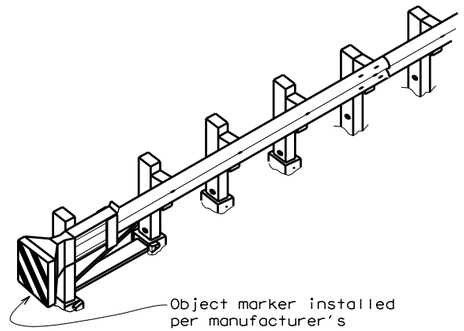
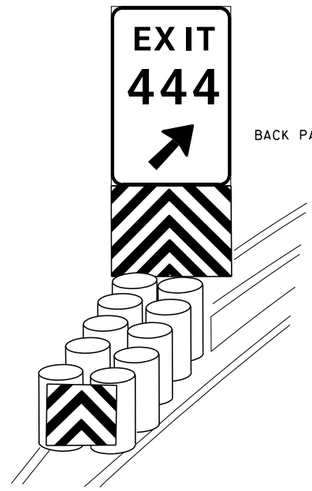
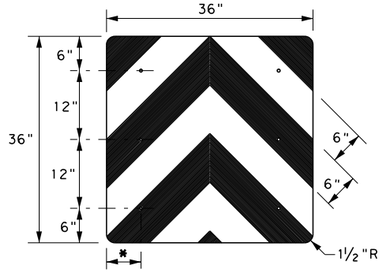


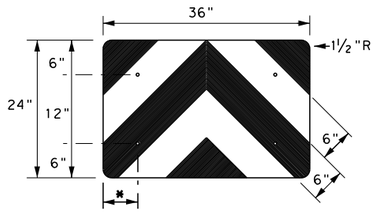




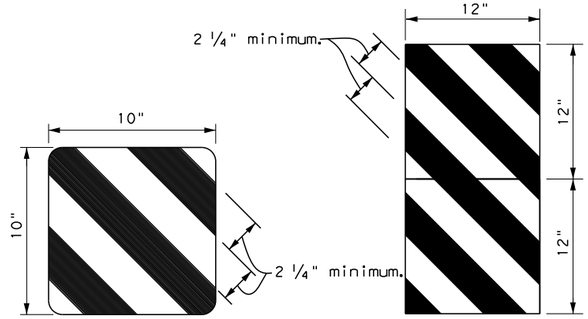




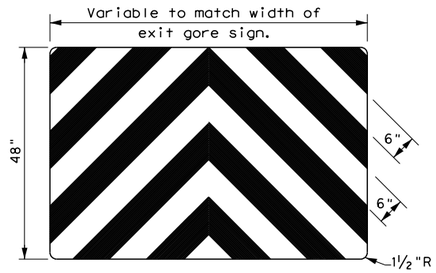


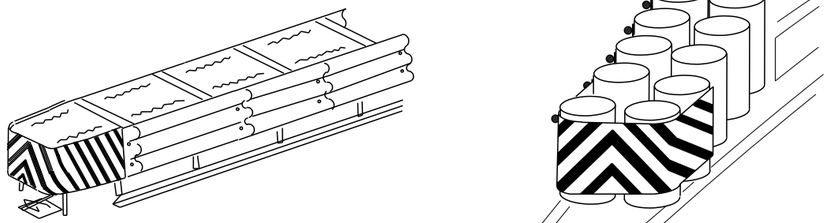


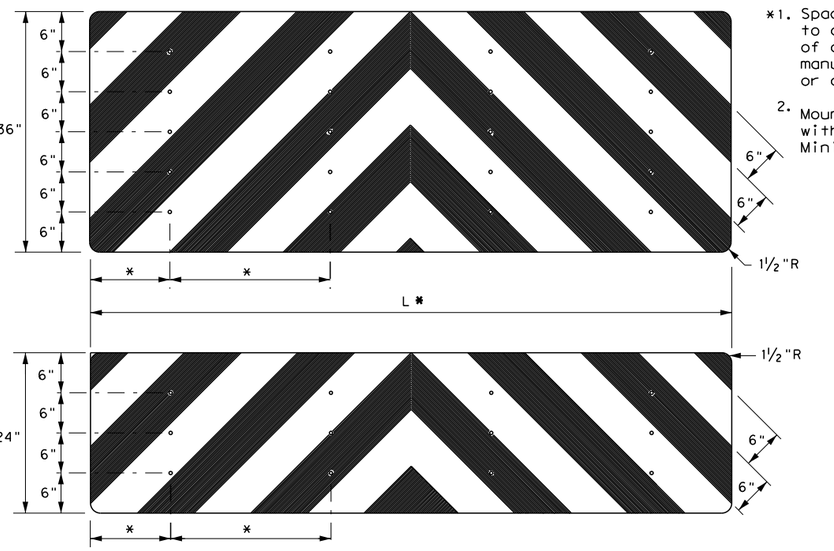
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer



OBJECT MARKERS SMALLER THAN 3 FT^2







NOTES

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

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

NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

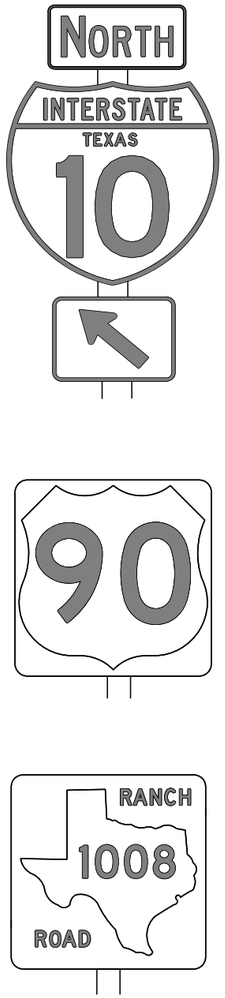
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	TYL	RUSK		140
4-98 7-20				

20G

DATE: 5/17/2023 7:07:35 AM
FILE: I:\TYL\PRJ\0000206613_Design\Proj3-FM 2658\DGN\PSE\00 STD\TRF\TSR(3)-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

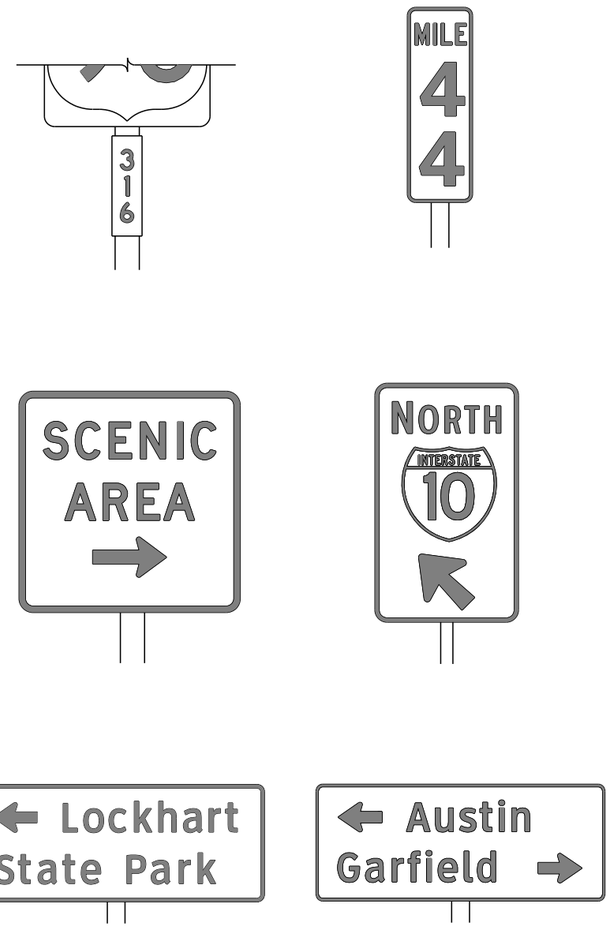
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

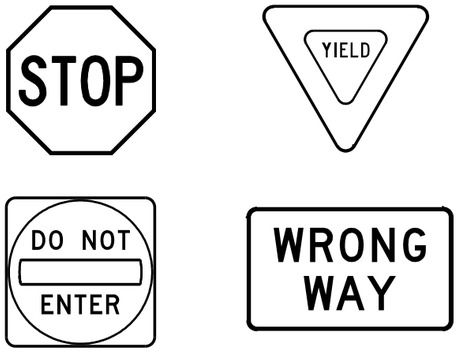
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	TYL	RUSK		141

DATE: 5/17/2023 7:07:36 AM
FILE: I:\TYL\PRJ\0000206563_Design\Proj3-FM 2658\DGN\PSE\00 STD\TRF\TSR(4)-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

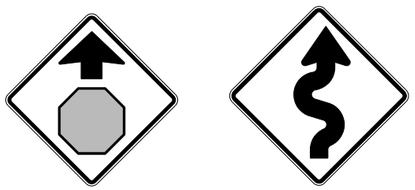
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

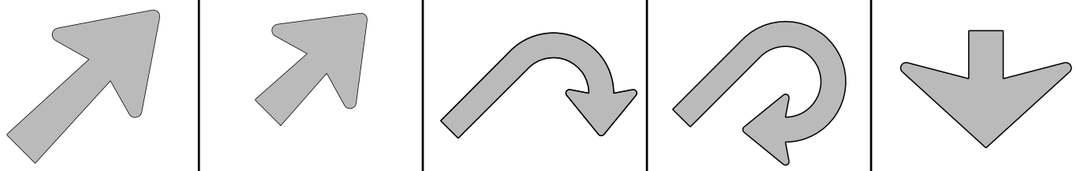
FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		142

4

DATE: 5/17/2023 7:07:36 AM
FILE: I:\TYL\PRJ\0000206563_Design\Proj13-FM 2658\DGN\PSE\00 STD\TRF\TSR(5)-13-tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

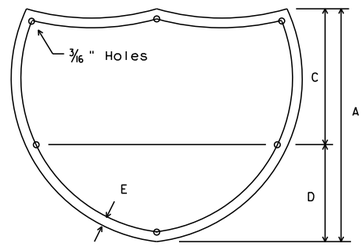
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

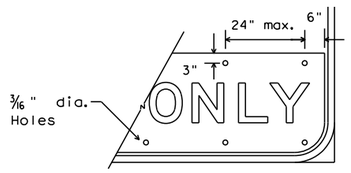
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

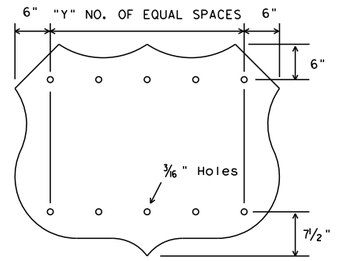


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

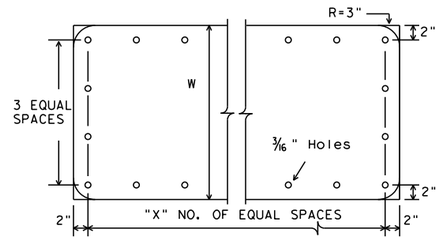


EXIT ONLY PANEL



U.S. ROUTE MARKERS

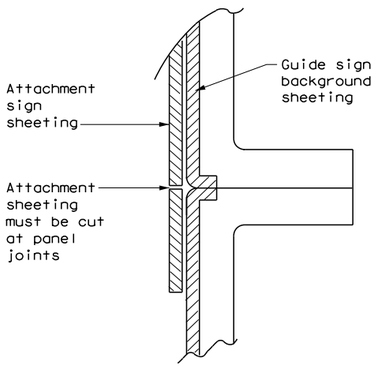
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

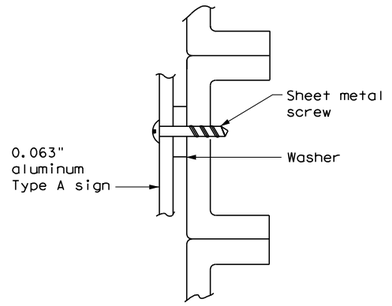
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



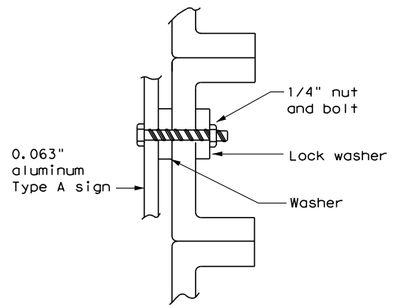
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



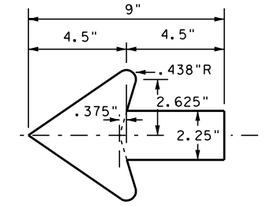
NUT/BOLT ATTACHMENT

NOTE:

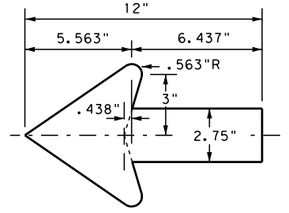
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		143

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

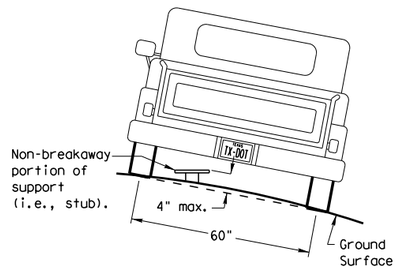
Anchor Type

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

Sign Mounting Designation

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

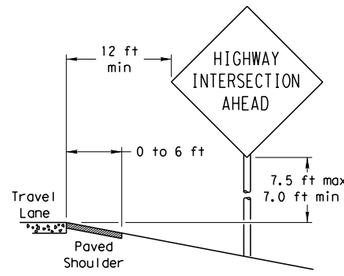
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

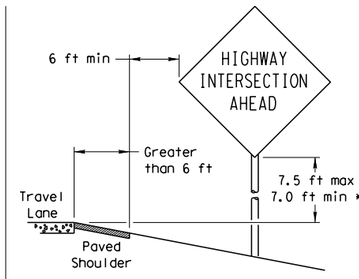
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

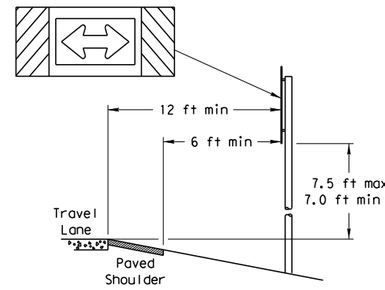
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



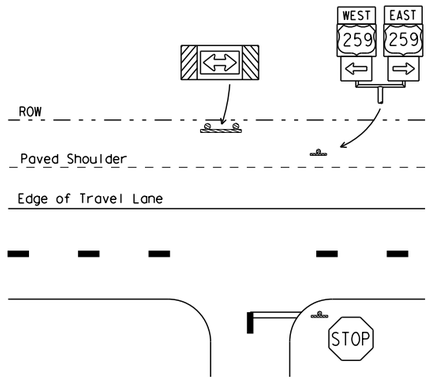
GREATER THAN 6 FT. WIDE

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

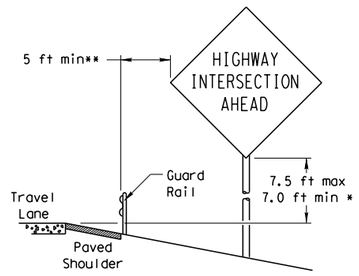
T-INTERSECTION



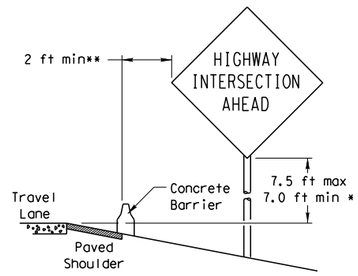
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



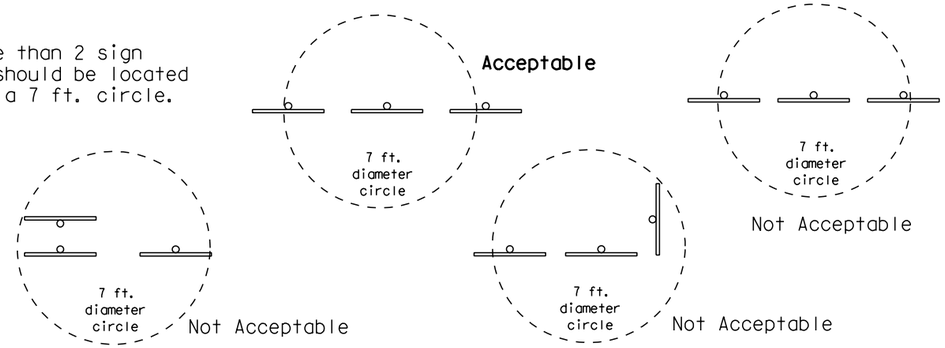
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

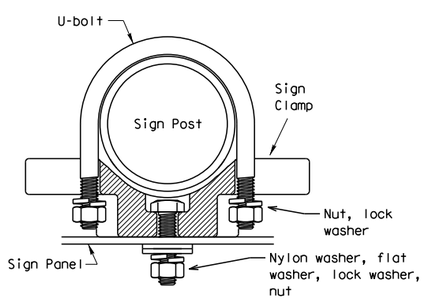
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

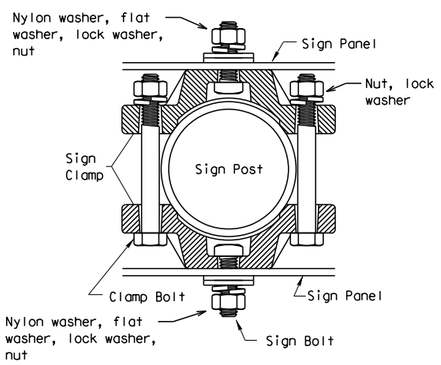


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

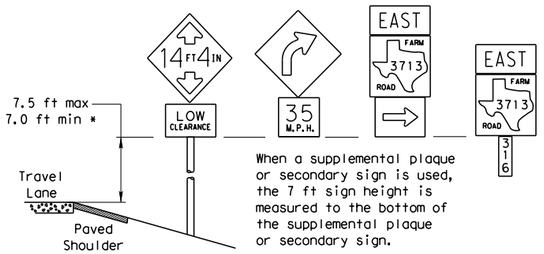
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



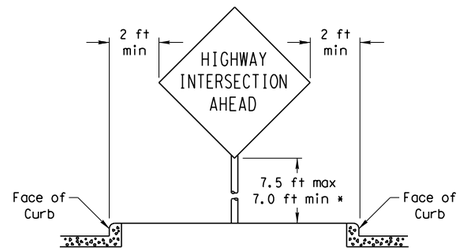
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



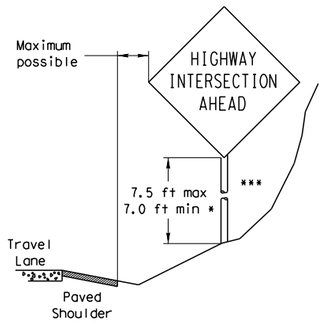
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

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

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

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

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

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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

9-08 REVISIONS

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

CONT	SECT	JOB	HIGHWAY
2653	01	016,ETC	FM 2658

DIST	COUNTY	SHEET NO.
TYL	RUSK	144

26A

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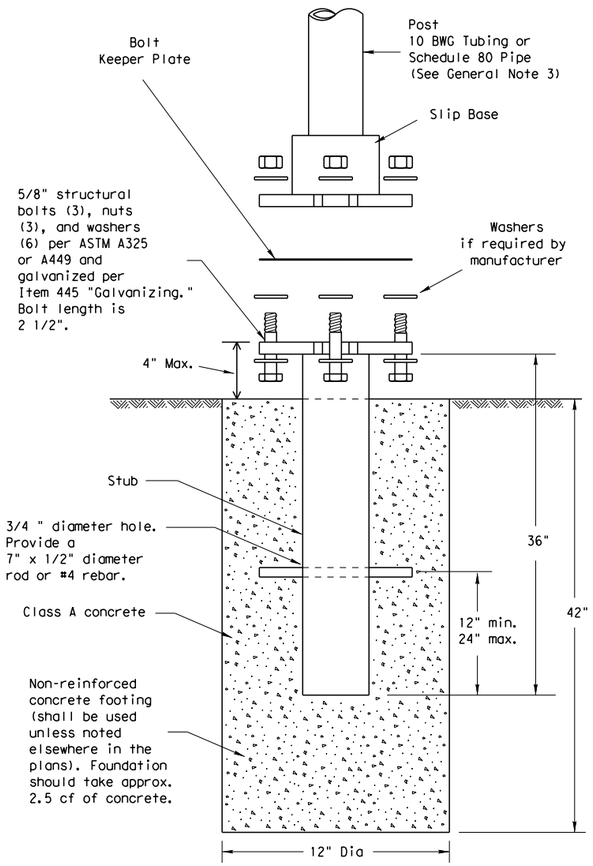
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

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

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

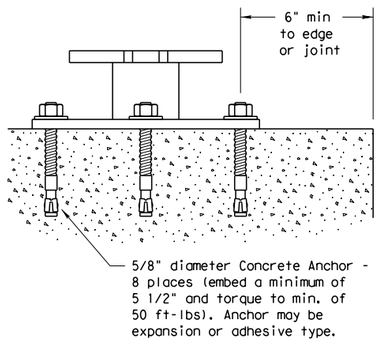
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

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

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

CONCRETE ANCHOR



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

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

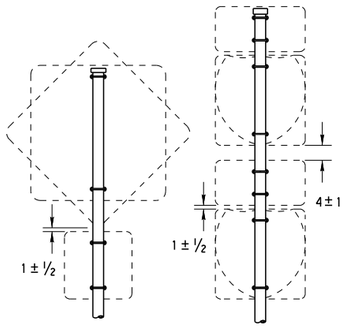
SMD(SLIP-1)-08

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

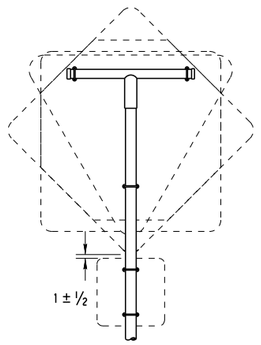
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
2653	01	016, ETC	FM 2658

DIST	COUNTY	SHEET NO.
TYL	RUSK	145



SM RD SGN ASSM TY XXXXX(1)XX(P)



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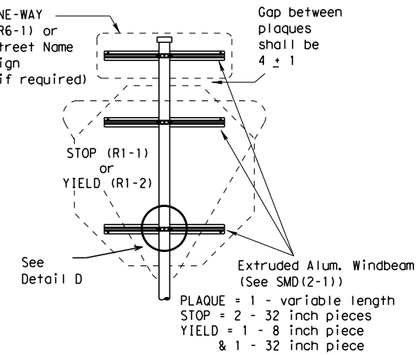
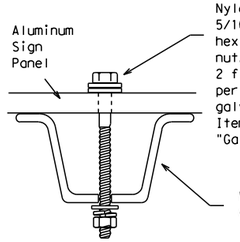
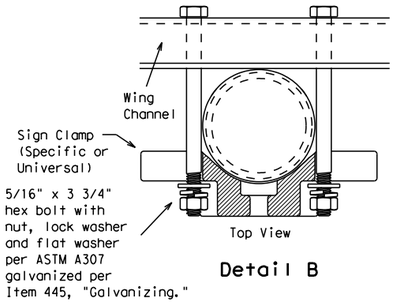


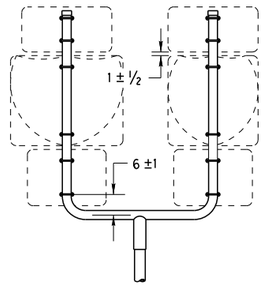
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



Detail B



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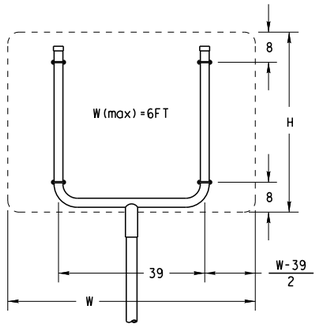

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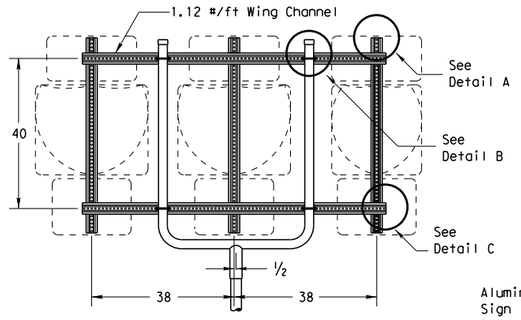
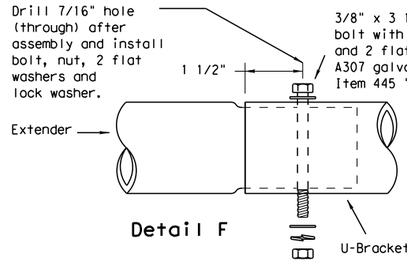
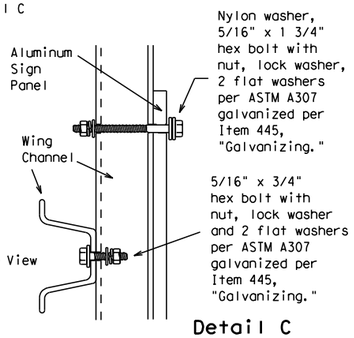


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

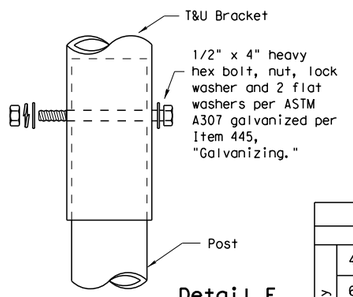


Detail F

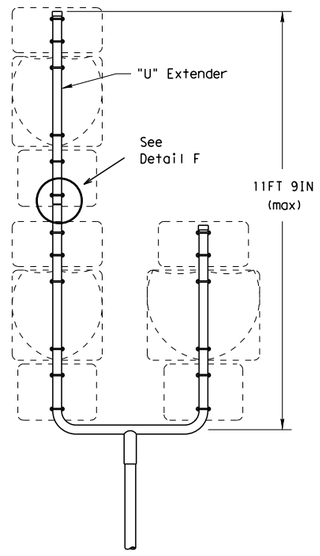
Splices shall only be allowed behind the sign substrate.



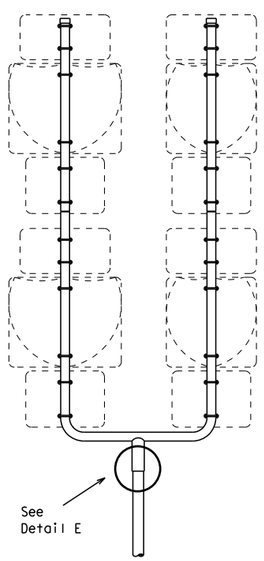
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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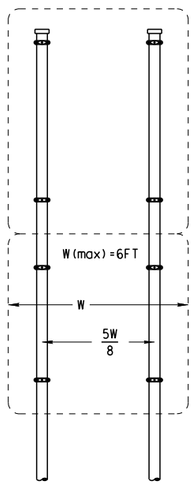
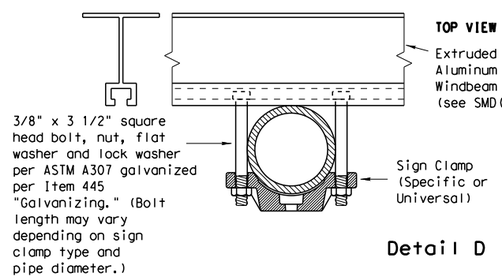
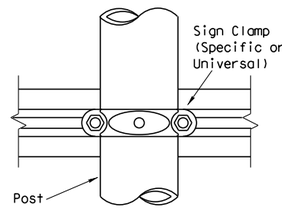


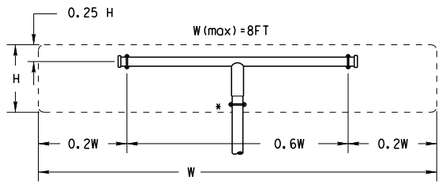
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

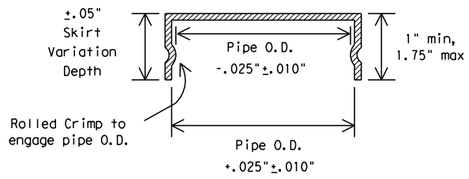




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

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

REQUIRED SUPPORT

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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

CONT	SECT	JOB	HIGHWAY
2653	01	016,ETC	FM 2658

DIST	COUNTY	SHEET NO.
TYL	RUSK	146

9-08 REVISIONS

26C

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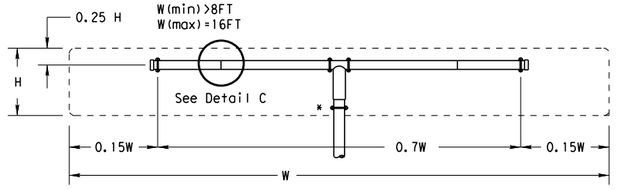
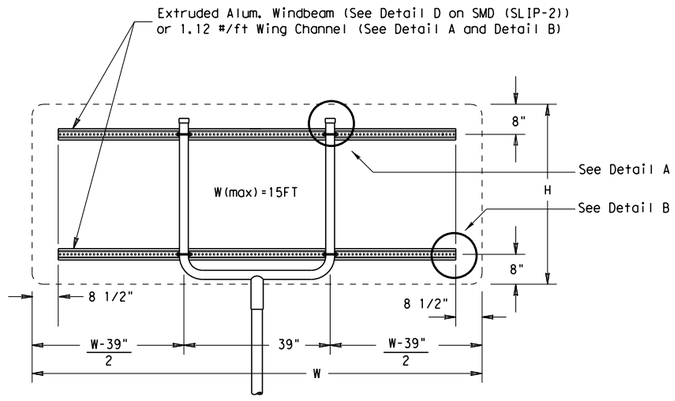
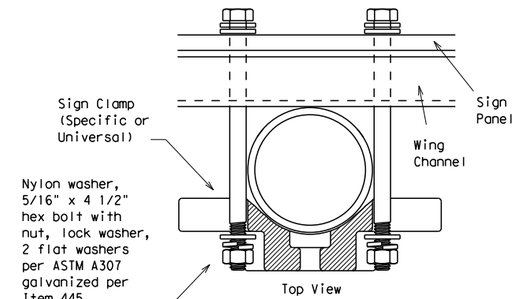


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

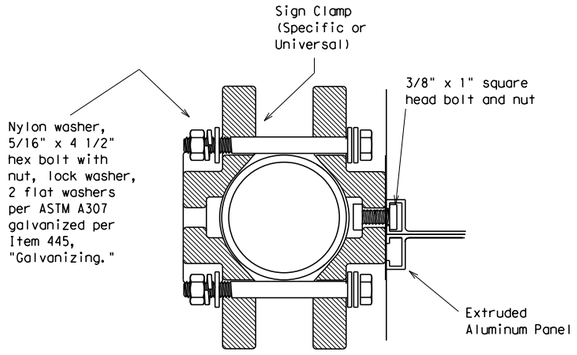
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

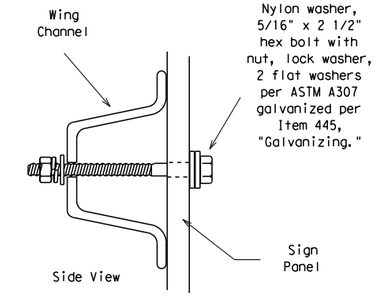


Detail A

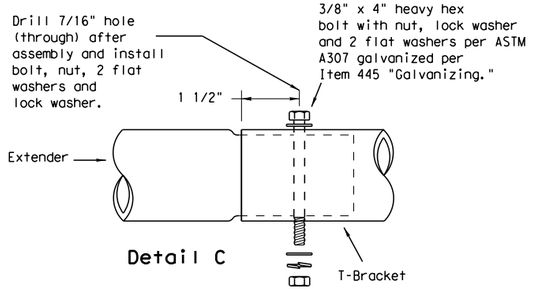


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

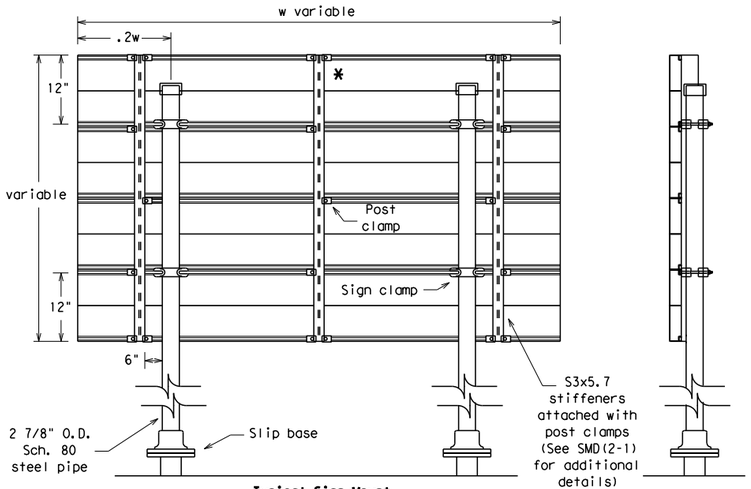


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

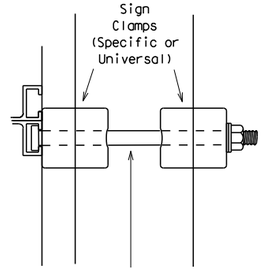


Typical Sign Mount

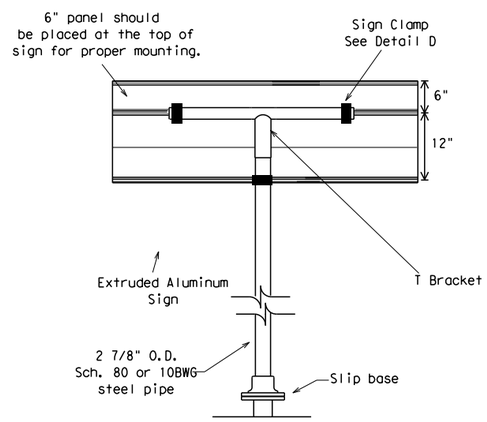
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

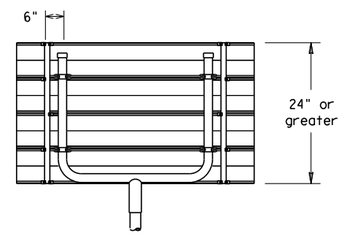
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



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

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

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

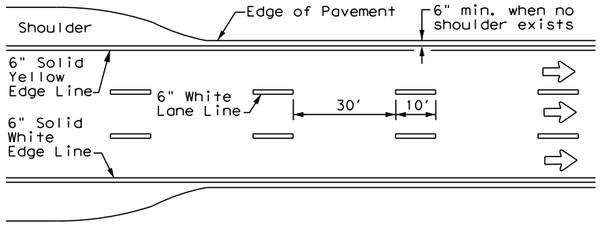
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)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

Texas Department of Transportation
Traffic Operations Division

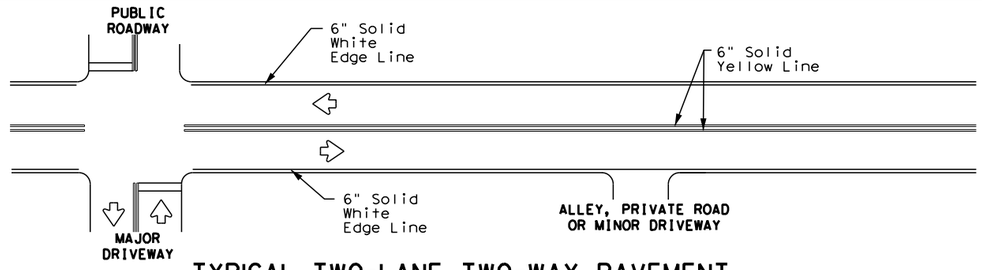
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

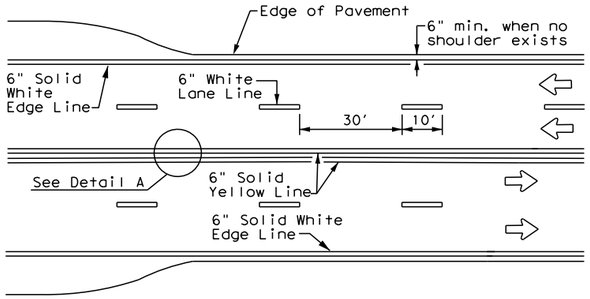
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		147

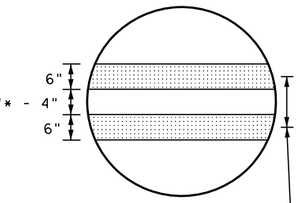


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





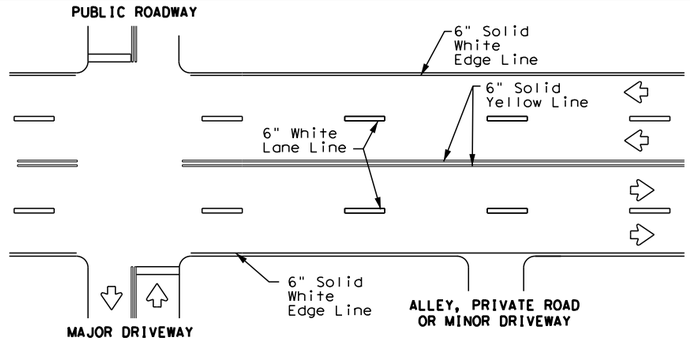
DETAIL "A"

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

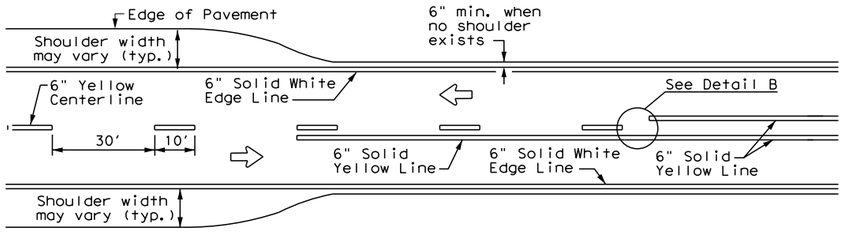
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

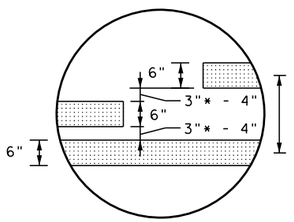
** 8" minimum for restripe projects when approved by the Engineer.



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

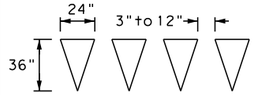


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



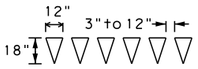
DETAIL "B"

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

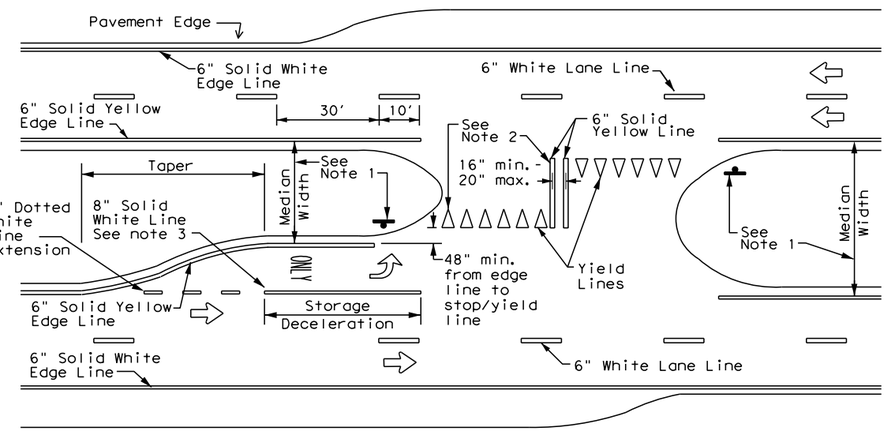


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

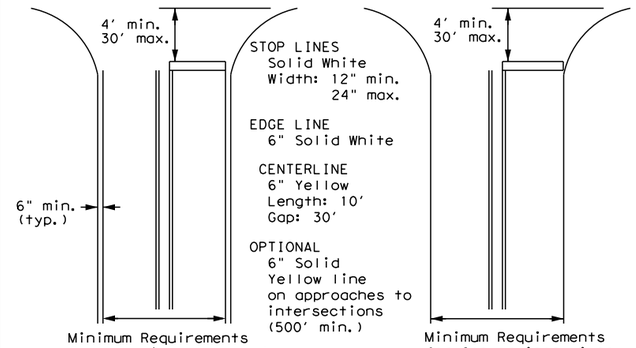
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

GENERAL NOTES

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

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 / 8-95 3-03 12-22 / 5-00 2-12	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		148

22A

DATE: 5/17/2023 7:07:39 AM
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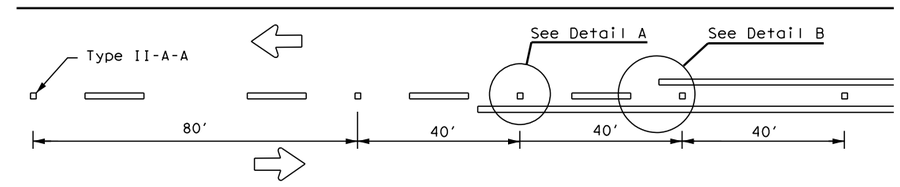
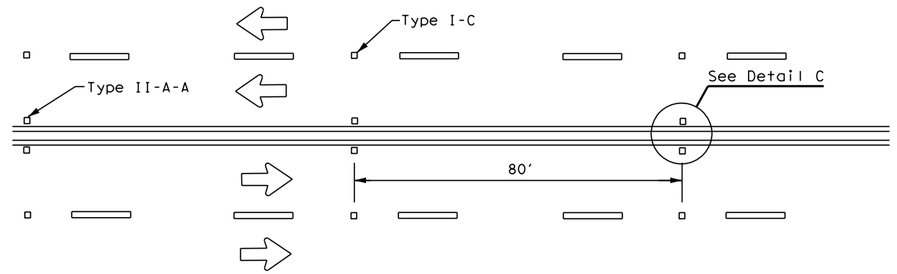
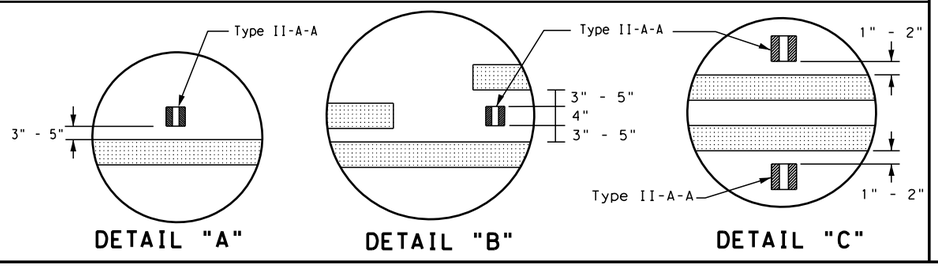
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

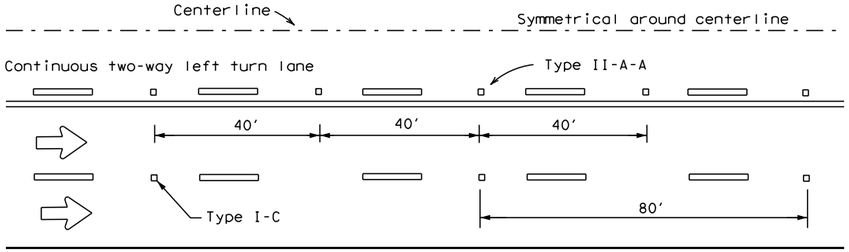


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

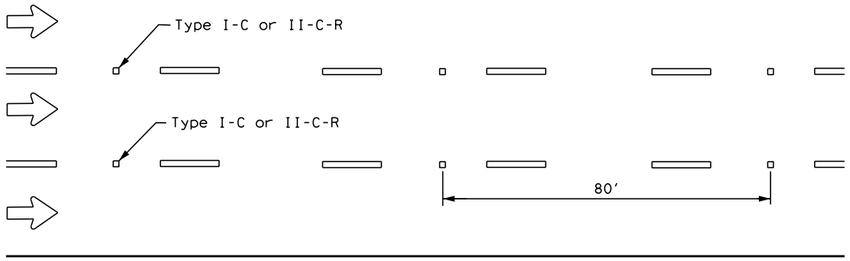


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



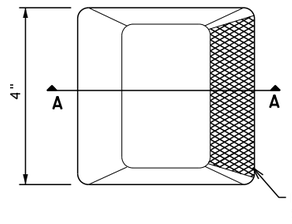
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

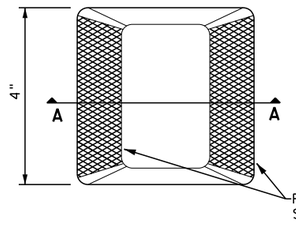
See Note 3.

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

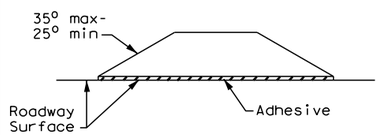
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

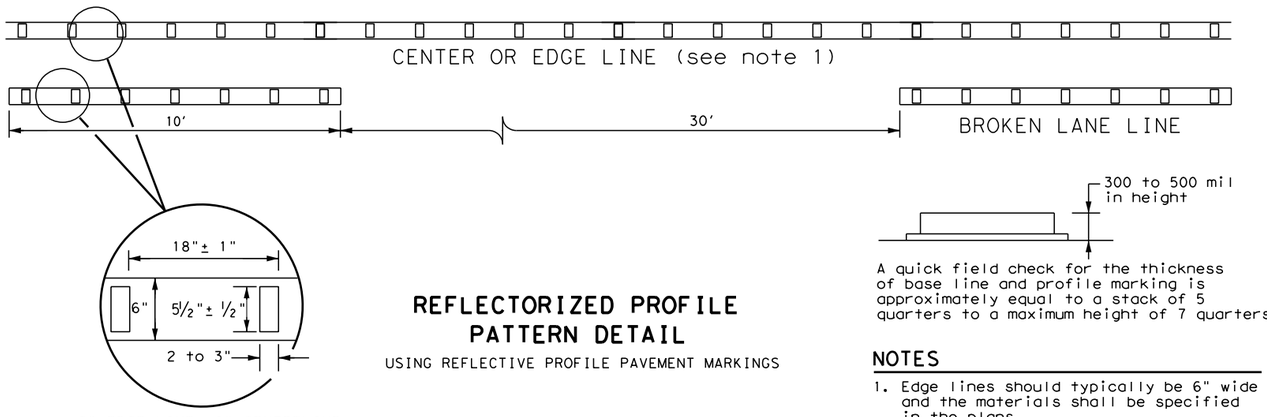


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

NOTES

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

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

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		149

22B

DATE: 5/17/2023 7:07:40 AM
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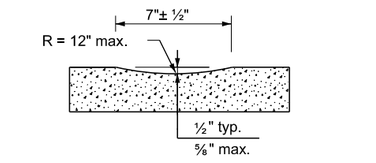
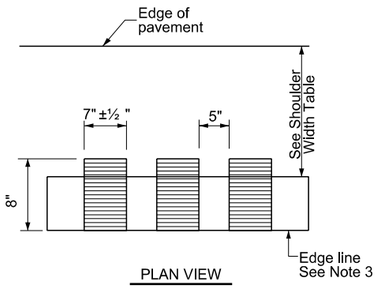
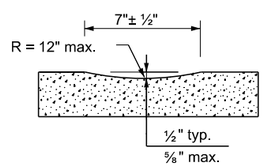


PROFILE VIEW
OPTION 1

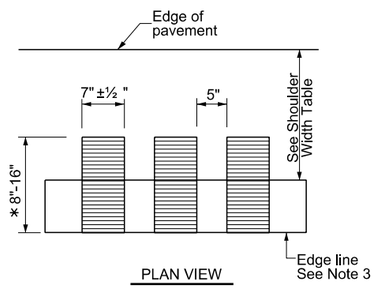


PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



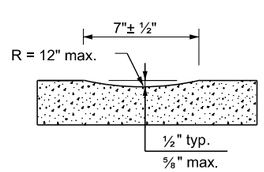
PROFILE VIEW
OPTION 2



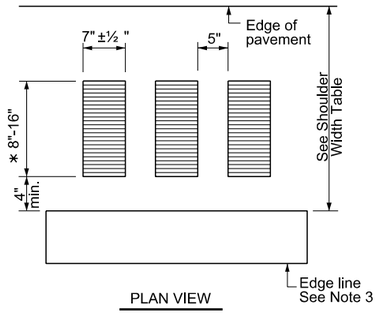
PLAN VIEW

∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



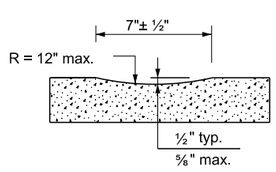
PROFILE VIEW
OPTION 3



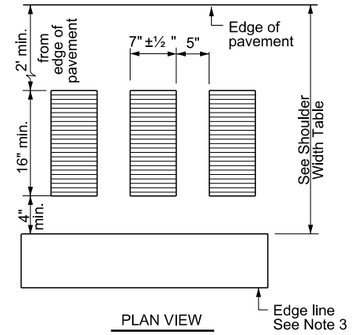
PLAN VIEW

∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

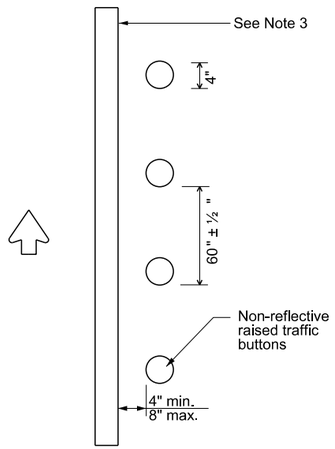


PROFILE VIEW
OPTION 4



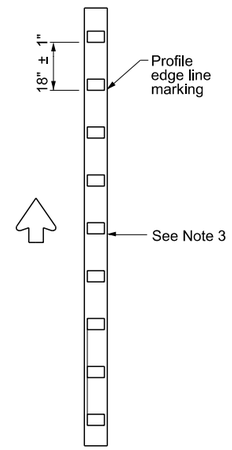
PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



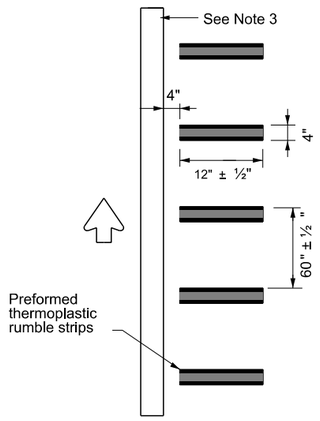
PLAN VIEW
OPTION 5

RAISED EDGE LINE (Rumble Strips)



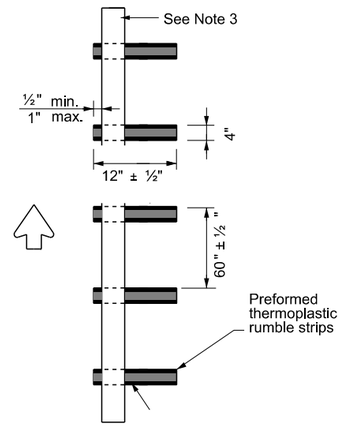
PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS (Rumble Strips)



PLAN VIEW
OPTION 7

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



PLAN VIEW
OPTION 8

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 6 or 8	Option 1, 2, 3 5, 6 or 7	Option 2, 4, 5 6 or 7

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edgeline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble strip.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

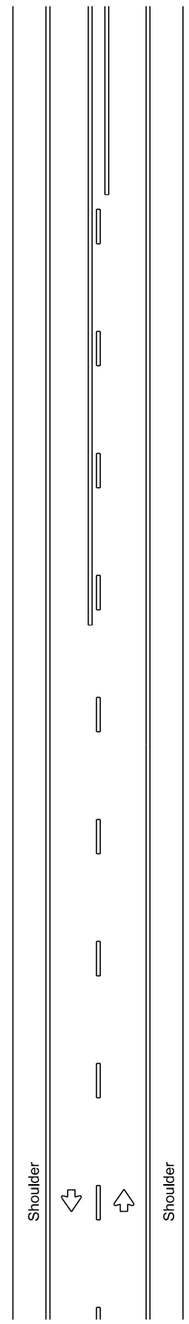
Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(2)-23

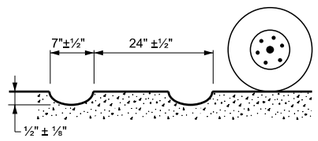
FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
10-13 1-23	DIST	COUNTY		SHEET NO.
	TYL	RUSK		150

DATE: 5/17/2023 7:07:41 AM
FILE: I:\TYL\PRJ\0000206613_Design\Proj3-FM 2658\DGN\PSE\00 STD\TRF\RS(4)-23.dgn

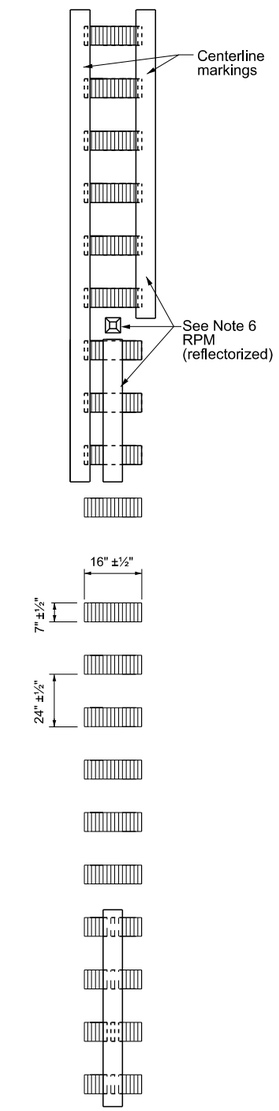
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

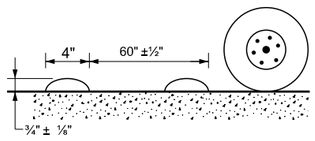


PROFILE VIEW

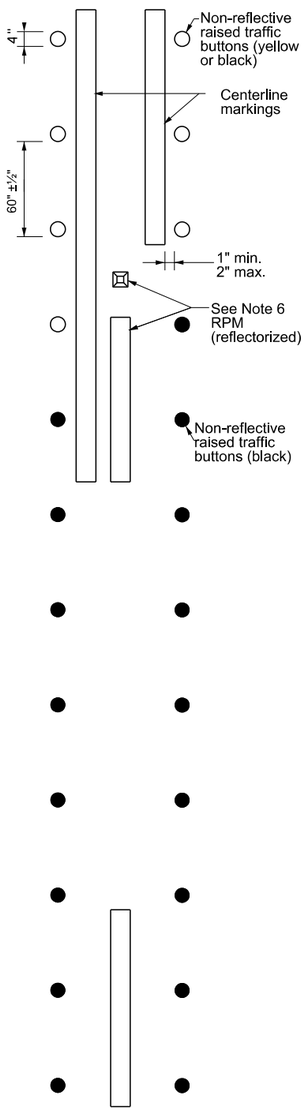


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

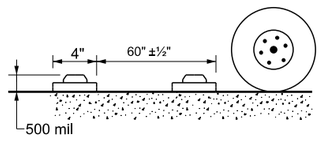


PROFILE VIEW

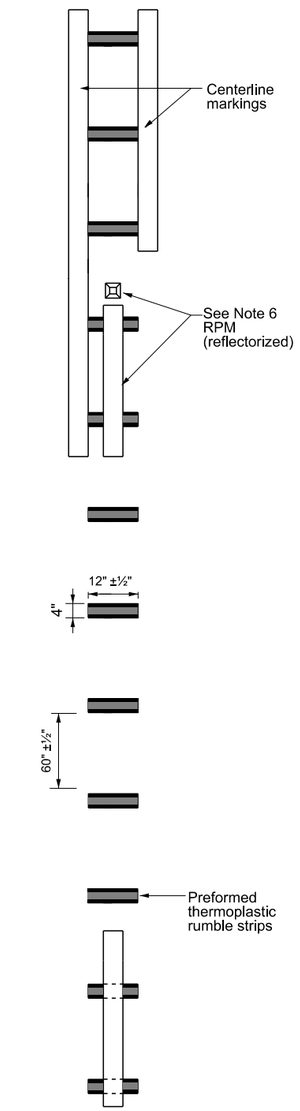


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

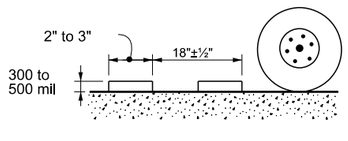


PROFILE VIEW

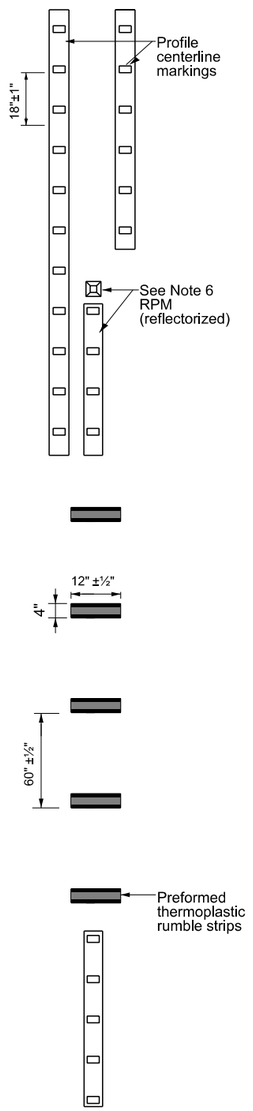


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC RUMBLE STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edge line rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections or driveways with high usage of large trucks.
6. Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
12. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

13. See standard sheet RS(2).

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS RS(4)-23

FILE: rs(4)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
10-13	DIST	COUNTY		SHEET NO.
1-23	TYL	RUSK		151

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

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

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

1. Panther Creek

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to specs listed above in IV.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Bald eagles are protected under the Bald and Golden Eagle Act. Due to the presence of an active bald eagle nest within 660 feet of FM 2658, work between station 274+00 (@ County Road 392) and station 292+97 (@ beginning of bridge at Martin Creek Branch) should be done by Decemeber 1.

2.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

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

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

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

☒ Yes ☐ No

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

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

☐ Yes ☒ No

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

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

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

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

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

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 12-12-2011 (DS)	2653	01	016,ETC	FM 2658
05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	DIST	COUNTY		SHEET NO.
	TYL	RUSK		152

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
2653-01-016, Etc

1.2 PROJECT LIMITS:
From: AT PANTHER CREEK / FROM CR 2144,

To: SOUTH TO CR 399D

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 32.2730832 (32.2573853), (Long) -94.5880438 (-94.5891054)
END: (Lat) 32.2691984 (32.2016609), (Long) -94.5882245 (-94.6081680)

1.4 TOTAL PROJECT AREA (Acres): 6.1 / 56.1

1.5 TOTAL AREA TO BE DISTURBED (Acres): 3.6 / 5.6

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Bridge replacement at Panther Creek / Restoration of FM 2658 consisting of salvaging existing base, cement treating subbase & base, prime, TCST, MBGF, bridge repair and rail retrofit

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Eastwood very fine sandy loam, 5 to 20% slopes	Very fine sandy loam, well drained, very high rate of runoff
Scottsville - Latex complex 0 to 2% slopes	Very fine sandy loam, moderately well drained, very high rate of runoff
Sacul fine sandy loam 5 to 20% slopes	Fine sandy loam, moderately well drained, very high rate of runoff
Woodtell loam, 5 to 15% slopes	Loam and clay loam, well drained, very high rate of runoff

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

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

Tributaries	Classified Waterbody
Panther Creek	Martin Creek Reservior (0505F); No Impairments
Dry Creek	Martin Creek Reservior (0505F); No Impairments
Martin Creek Tributary	Martin Creek Reservior (0505F); No Impairments
Martin Creek Branch	Martin Creek Reservior (0505F); No Impairments

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- X Post Construction Site Notice
- X Submit NOI/CSN to local MS4
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- X Complete and submit Notice of Termination to TCEQ
- X Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- X Post Construction Site Notice
- X Submit NOI/CSN to local MS4
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- X Complete and submit Notice of Termination to TCEQ
- X Maintain SWP3 records for 3 years
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
No MS4s receive stormwater discharge from the site

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		153
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - X Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
Rock Riprap at Panther Creek	32+50 LT 32+50 RT	35+40 LT 35+40 RT

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To
Existing vegetated buffer zones shall be maintained at all Martin Creek Reservior crossings		

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

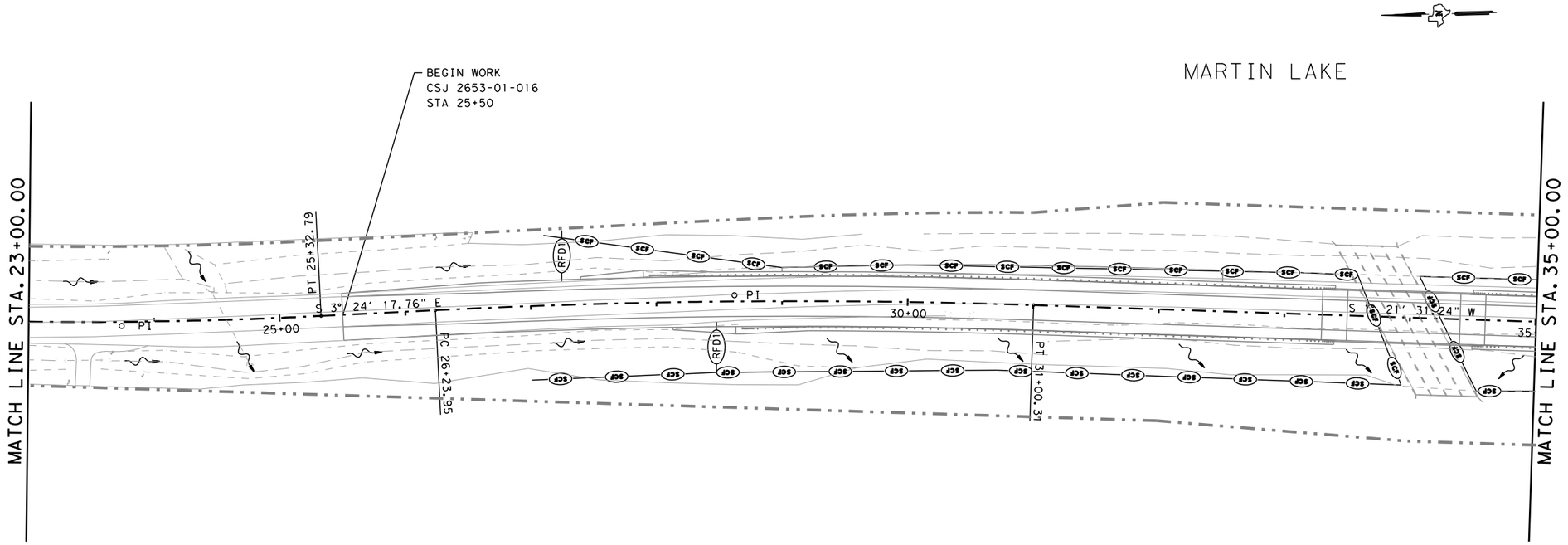
2.9 MAINTENANCE:

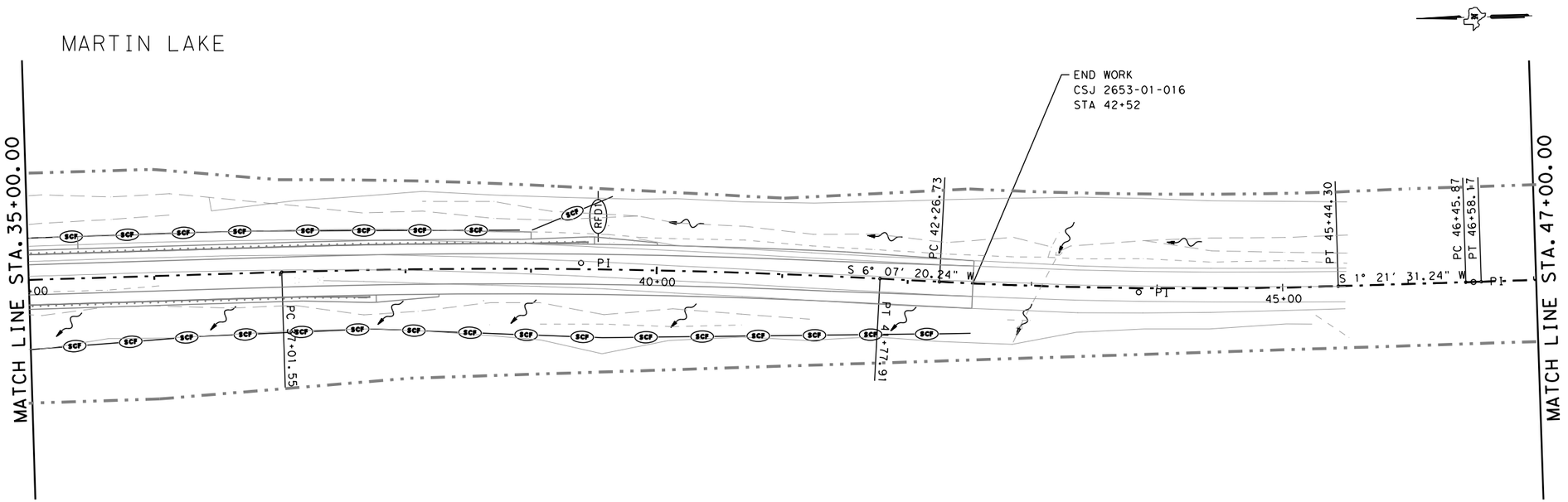
Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		154
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658





LEGEND

- EXISTING ROW
- FLOW DIRECTION
- RFD1 — ROCK FILTER DAM TY 1 (15' TYP)
- RFD2 — ROCK FILTER DAM TY 2 (15' TYP)
- SCF — SEDIMENT CONTROL FENCE

EXACT LOCATIONS AND QUANTITIES OF EROSION CONTROL ITEMS TO BE DETERMINED BY THE ENGINEER.

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

SWP3 LAYOUT (AT PANTHER CREEK)

STA 23+00.00 to STA 47+00.00

HORIZONTAL SCALE: 1" = 100'

SHEET 1 OF 1

LOCHNER
TBPE Firm Reg. No. 10488

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		155
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016, ETC	FM 2658

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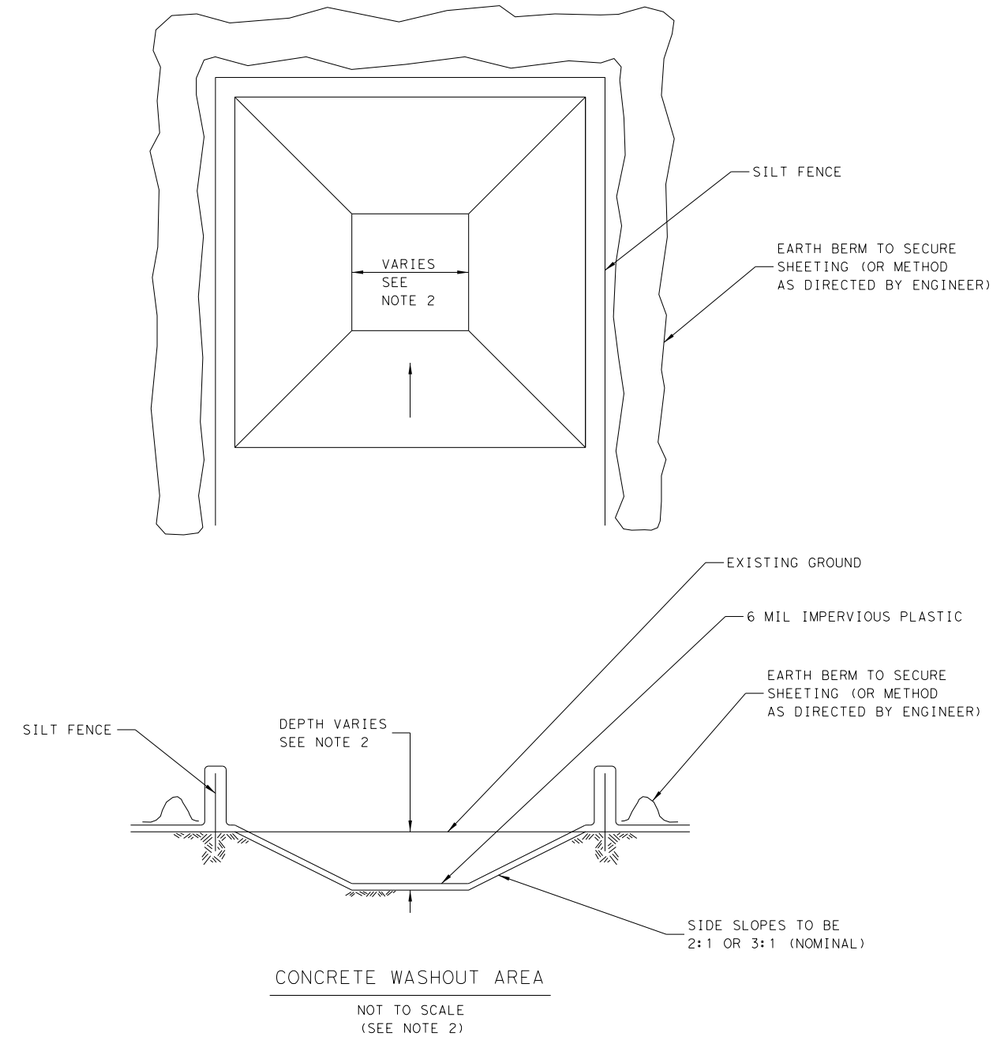

CONCRETE WASHOUT AREA

NOT TO SCALE
(SEE NOTE 2)

NOTES

1. CONCRETE WASHOUT AREA(S) SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE. THE CONCRETE WASHOUT AREA SHALL BE ENTIRELY SELF-CONTAINED.

2. THE CONTRACTOR SHALL SUBMIT THE DESIGN, LOCATION AND SIZING OF THE CONCRETE WASHOUT AREA(S) WITH THE PROJECT'S EROSION AND SEDIMENTATION CONTROL PLAN AND SHALL BE APPROVED BY THE ENGINEER.

LOCATION: WASHOUT AREA(S) ARE TO BE LOCATED AT LEAST 50 FEET FROM ANY STREAM, WETLAND, STORM DRAINS, OR OTHER SENSITIVE RESOURCE. THE FLOOD CONTINGENCY PLAN MUST ADDRESS THE CONCRETE WASHOUT IF THE WASHOUT IS TO BE LOCATED WITHIN THE FLOODPLAN.

SIZE: THE WASHOUT MUST HAVE SUFFICIENT VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS INCLUDING, BUT NOT LIMITED TO, OPERATIONS ASSOCIATED WITH GROUT AND MORTAR.

3. SURFACE DISCHARGE IS UNACCEPTABLE, THERFORE EARTH BERM OR OTHER CONTROL MEASURES, AS APPROVED BY THE ENGINEER, SHOULD BE USED AROUND THE PERIMETER OF THE CONCRETE WASHOUT AREA FOR CONTAINMENT.

4. SIGNS SHOULD BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CONCRETE AREA(S) AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS. WASHOUT AREA(S) SHOULD BE FLAGGED WITH SAFETY FENCING OR OTHER APPROVED METHOD.

5. CONCRETE WASH-OUT AREAS SHALL BE LINED WITH IMPERVIOUS PLASTIC WITH A MINIMUM THICKNESS OF 6 MILS AND BE REPLACED IF DAMAGED DURING CLEAN-OUT OF HARDENED CONCRETE FROM THE WASH-OUT AREA.

6. WASHOUT AREA(S) ARE TO BE INSPECTED AT LEAST ONCE A WEEK FOR STRUCTURAL INTEGRITY, ADEQUATE HOLDING CAPACITY AND CHECKED FOR LEAKS, TEARS, OR OVERFLOWS. (AS DIRECTED BY THE CONSTRUCTION SITE ENVIRONMENTAL INSPECTION REPORT) WASHOUT AREA(S) SHOULD BE CHECKED AFTER HEAVY RAINS.

7. HARDENED CONCRETE WASTE SHOULD BE REMOVED AND DISPOSED OF WHEN THE WASTE HAS ACCUMULATED TO HALF OF THE CONCRETE WASHOUT'S HEIGHT. THE WASTE CAN BE STORED AT AN UPLAND LOCATION, AS APPROVED BY THE ENGINEER. ALL CONCRETE WASTE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH ALL APPLICABLE LAWS, REGULATIONS, AND GUIDELINES.

8. PAYMENT FOR THIS ITEM IS TO BE INCLUDED UNDER THE GENERAL COST OF THE WORK FOR THE PROJECT, INCLUDING SITE RESTORATION.

05/17/2023

STATE OF TEXAS
RICHARD P. MATHIS
91061
LICENSED PROFESSIONAL ENGINEER

Richard P. Mathis

CONCRETE WASHOUT DETAIL

SHEET 1 OF 1

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LOCHNER
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FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	See Title Sheet		156
STATE	DIST.	COUNTY	
TEXAS	TYL	RUSK	
CONT.	SECT.	JOB	HIGHWAY NO.
2653	01	016,ETC	FM 2658

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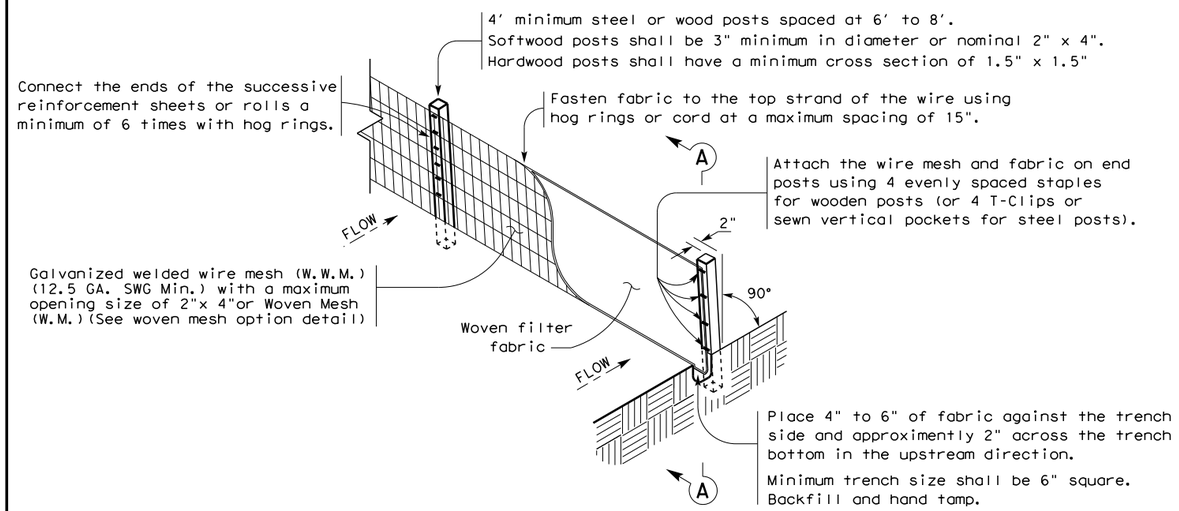
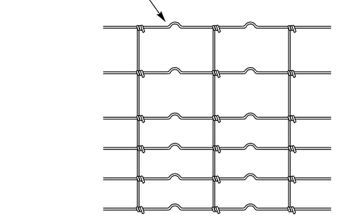
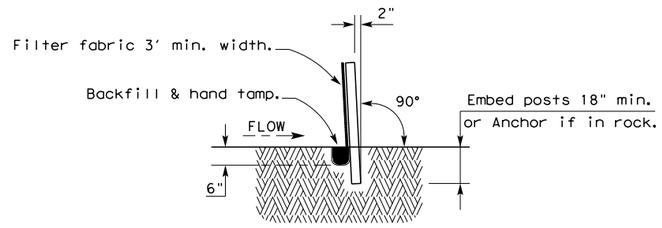


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

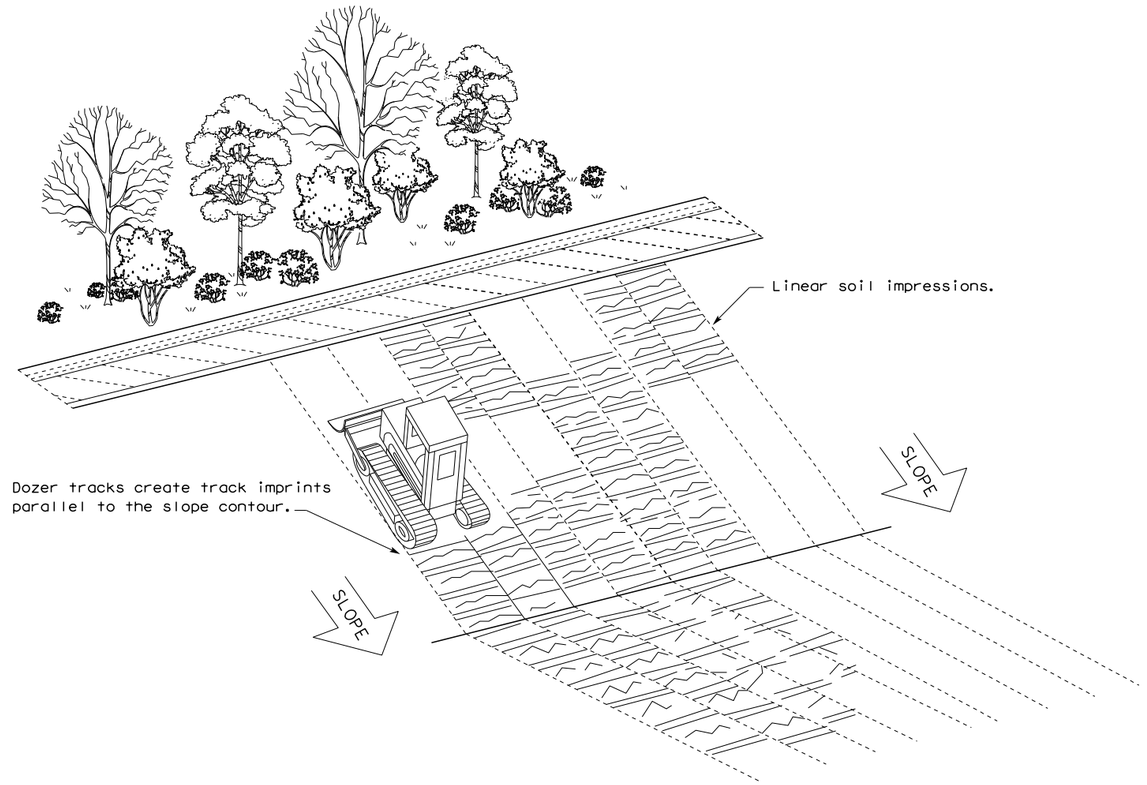
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

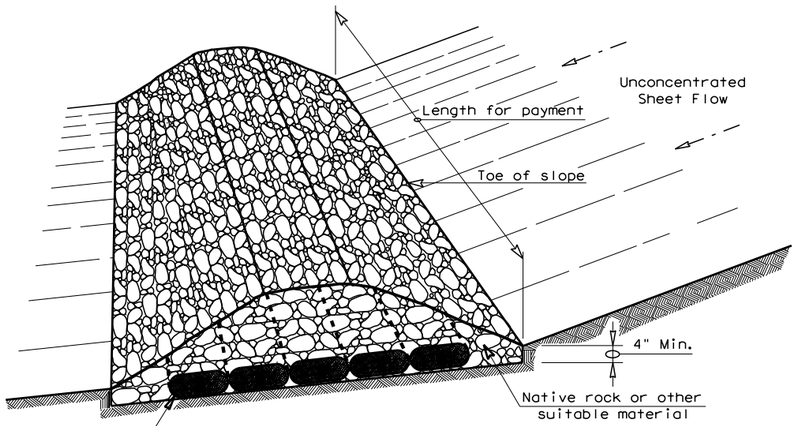
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

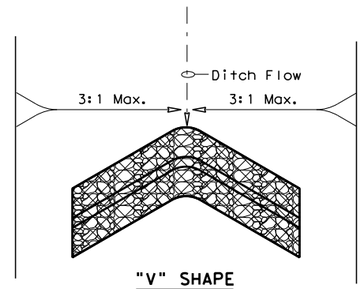
EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	2653	01	016,ETC	FM 2658
	DIST	COUNTY		SHEET NO.
	TYL	RUSK		157

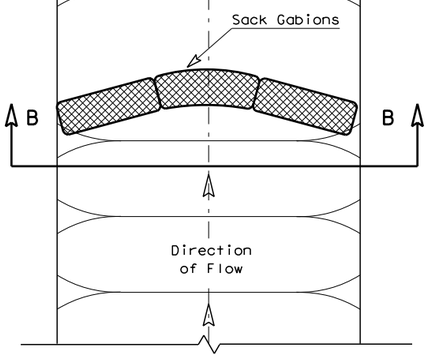


FILTER DAM AT TOE OF SLOPE

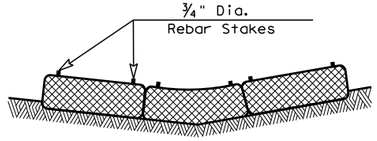
RFD1



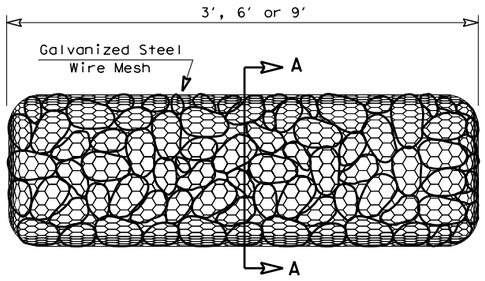
"V" SHAPE
PLAN VIEW



PLAN VIEW

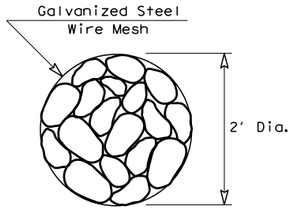


SECTION B-B

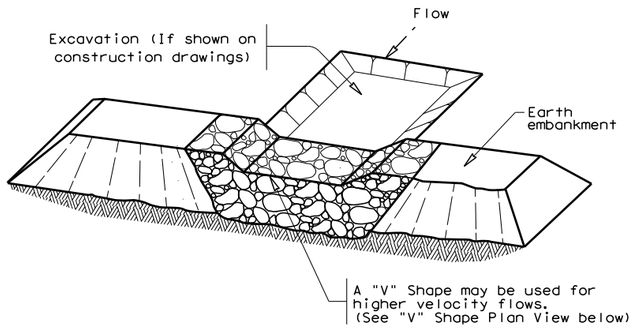


TYPE 4 (SACK GABIONS)

RFD4

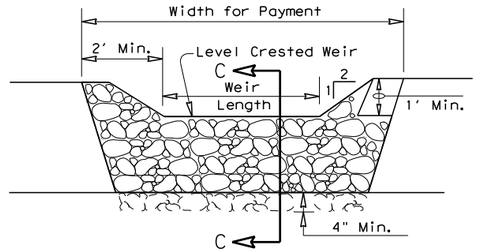


SECTION A-A

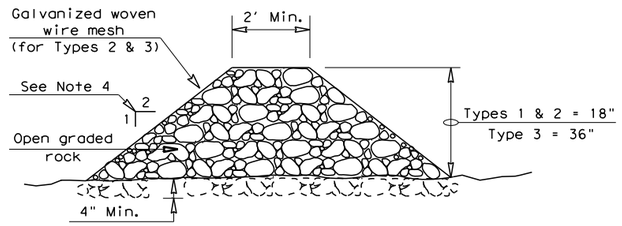


FILTER DAM AT SEDIMENT TRAP

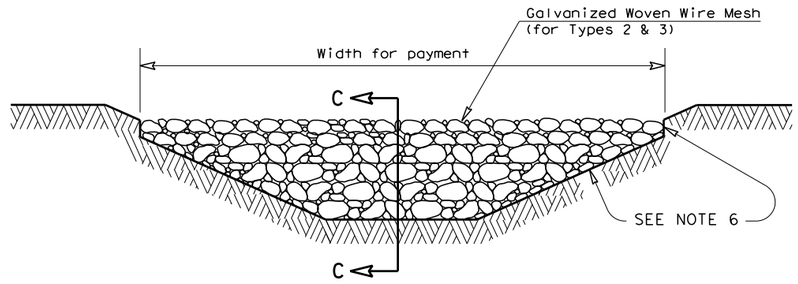
RFD1 — OR — RFD2



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		
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REVISIONS	2653	01	016, ETC	FM 2658		
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