INDEX OF SHEETS

IN CASE OF RAILROAD EMERGENCY
CALL UNION PACIFIC RAILROAD COMPANY (UPRR)
AT 888-877-7267
LOCATION: DOT 414012 P
RR MILEPOST: 166.760
SUBDIVISION: FT. WORTH

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: F 2024(330), etc.

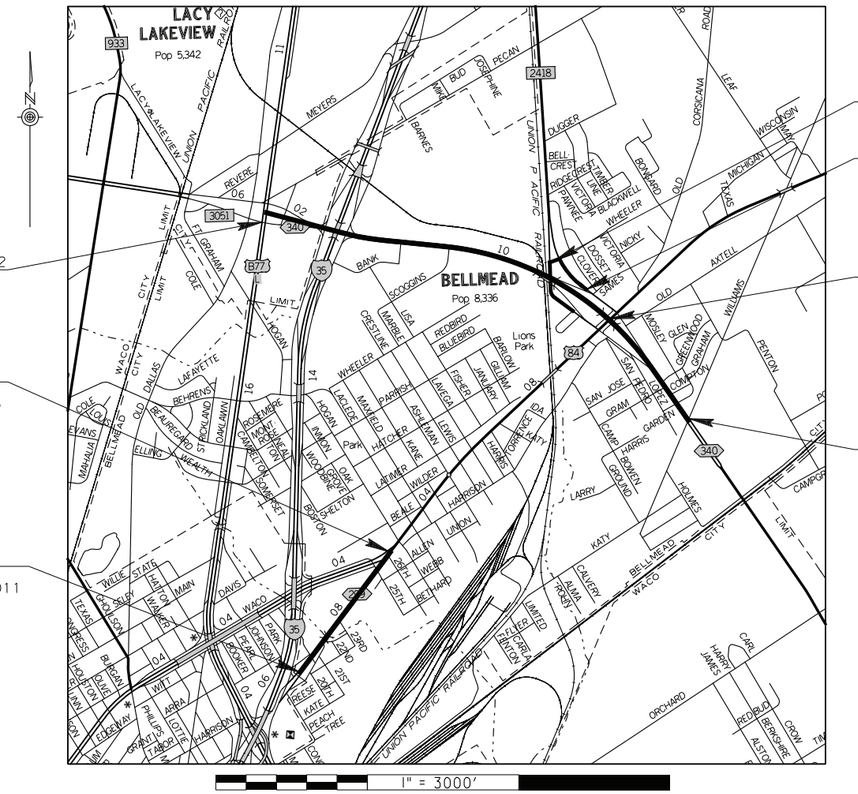
MCLENNAN COUNTY

SL 340, ETC.

	CSJ 2311-01-042		CSJ 2362-01-038		CSJ 0162-01-092		PROJECT NET	
ROADWAY:	FT= 6652.80	MI.= 1.260	FT= 2096.69	MI.= 0.397	FT= 2893.24	MI.= 0.548	FT= 11642.73	MI.= 2.205
BRIDGE:	FT= 438.24	MI.= 0.083	FT= 384.91	MI.= 0.073	FT= 84.48	MI.= 0.016	FT= 907.63	MI.= 0.172
TOTAL:	FT= 7091.04	MI.= 1.343	FT= 2481.60	MI.= 0.470	FT= 2977.72	MI.= 0.564	FT= 12550.38	MI.= 2.377

LIMITS: FROM: FM 3051 TO: US 84 , ETC.

FOR THE CONSTRUCTION OF OVERLAY CONSISTING OF OVERLAY, ETC.



BEGIN INCIDENTAL CONSTRUCTION

END INCIDENTAL CONSTRUCTION

BEGIN PROJECT
BEGIN CSJ: 2311-01-042
STA. 14+11.96
REF. MRKR.572+0.043

END CSJ: 2311-01-042
BEGIN CSJ: 2362-01-38
STA. 85+03.00
REF. MRKR.348+1.293

END PROJECT
CSJ: 0162-01-092
STA. 39+77.72
REF. MRKR.572+0.553

END PROJECT
END CSJ: 2362-01-038
STA. 109+84.60
REF. MRKR.348+1.784

BEGIN PROJECT
CSJ: 0162-01-092
STA. 10+00.00
REF. MRKR.572-0.011

EXCEPTIONS: NONE
EQUATIONS: NONE
RR CROSSINGS: STA. 70+46
(UPRR DOT No. 414 012 P)
SCALE: 1' = 3000'

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, WILL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL - AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023).

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	F 2024(330), etc.		SL 340, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	WAC	MCLENNAN	1
CHECK	CONTROL	SECTION	JOB	
	2311	01	042, ETC.	

DESIGN SPEED = MEETS OR IMPROVES EXISTING CONDITIONS

CSJ 2311-01-042

YEAR	ADT
2022	26,819
2042	40,229

CSJ 2362-01-038

YEAR	ADT
2022	22,613
2042	31,658

CSJ 0162-0162-092

YEAR	ADT
2022	2,736
2042	3,830

PLANS PREPARED BY:

Seiler Lankes Group TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

Submitted for Letting 8/31/2023
Project Manager
Seiler Lankes Group, LLC

Texas Department of Transportation

Recommended for Letting 8/31/2023
DocuSigned by: , P.E.
6D9791C615CF49B...
Area Engineer

Recommended for Letting 8/31/2023
DocuSigned by:
9AD8C743F95E4E3...
Director of Transportation Planning & Development

Approved for Letting 8/31/2023
DocuSigned by: Stanley Swiatek
B69BD796DD564C9...
District Engineer

NODE

STATE OF TEXAS
ANDRES M. CARDENAS
88453
LICENSED
PROFESSIONAL ENGINEER
8/31/2023

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

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

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

INDEX OF SHEETS

SHEET 1 OF 1

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		2

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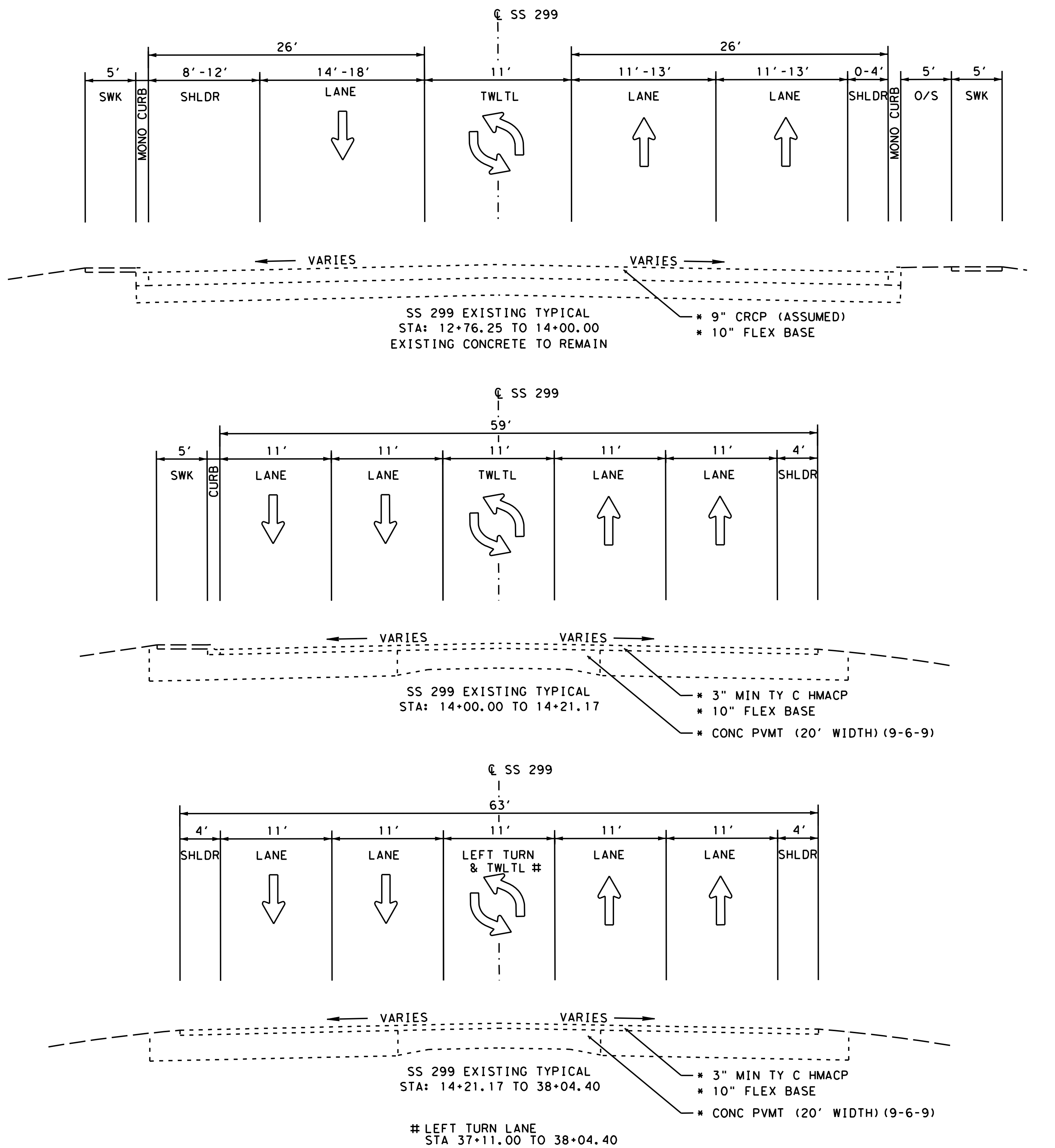

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER

8/31/2023

P.E.

RTG RODRIGUEZ TRANSPORTATION GROUP

FIRM #587

SS 299
TYPICAL SECTIONS

SHEET 1 OF 2

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		3

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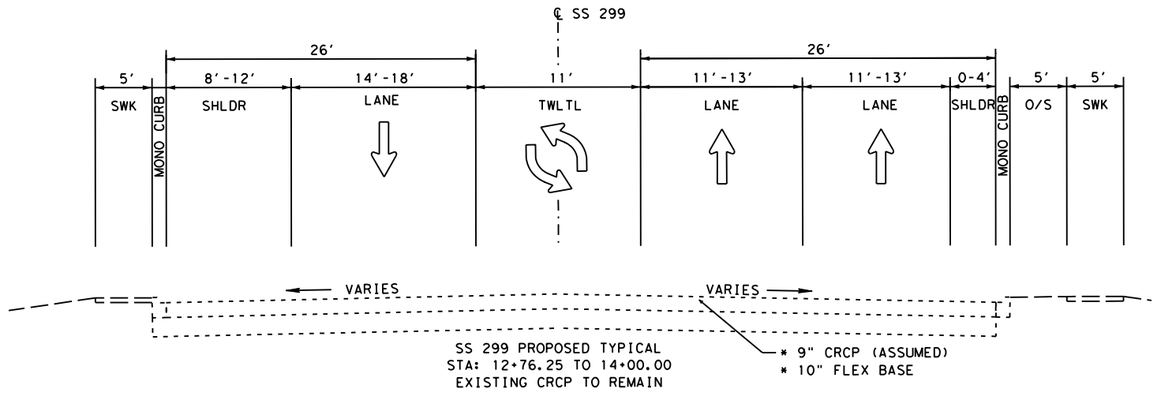
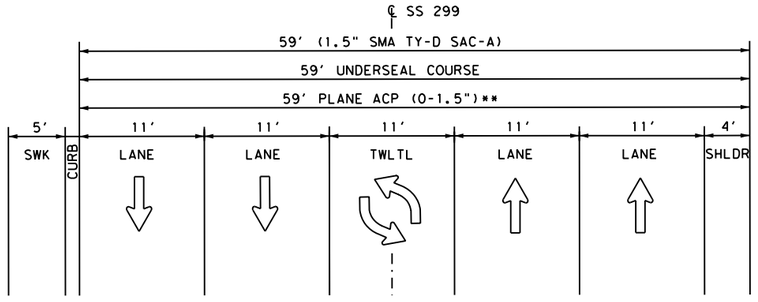
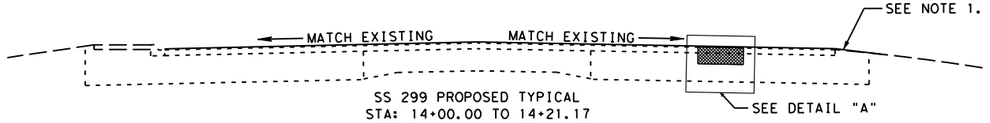


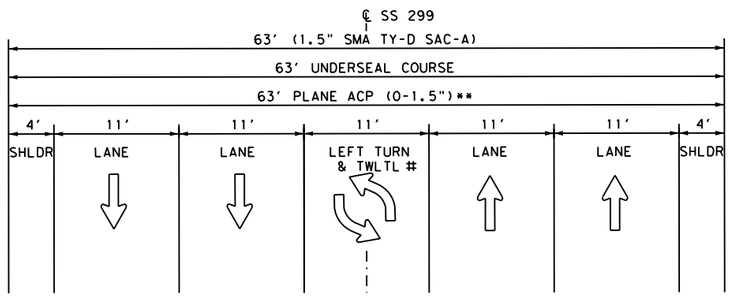
SS 299 PROPOSED TYPICAL
STA: 12+76.25 TO 14+00.00
EXISTING CRCP TO REMAIN

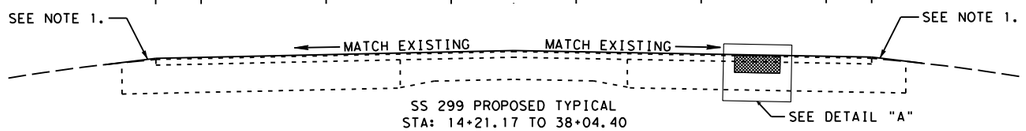




SS 299 PROPOSED TYPICAL
STA: 14+00.00 TO 14+21.17

** MILLING LIMITS
STA 14+00.00 TO 14+21.17





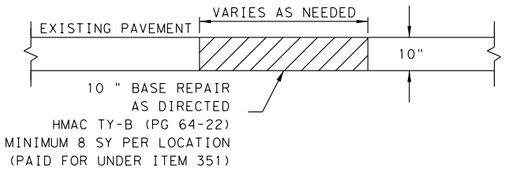
SS 299 PROPOSED TYPICAL
STA: 14+21.17 TO 38+04.40

** MILLING LIMITS
STA 14+21.17 TO 15+50.00
STA 36+54.00 TO 38+04.40

LEFT TURN LANE
STA 37+11.00 TO 38+04.40

NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER
8/31/2023
P.E.

RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SS 299
TYPICAL SECTIONS

SHEET 2 OF 2

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		4

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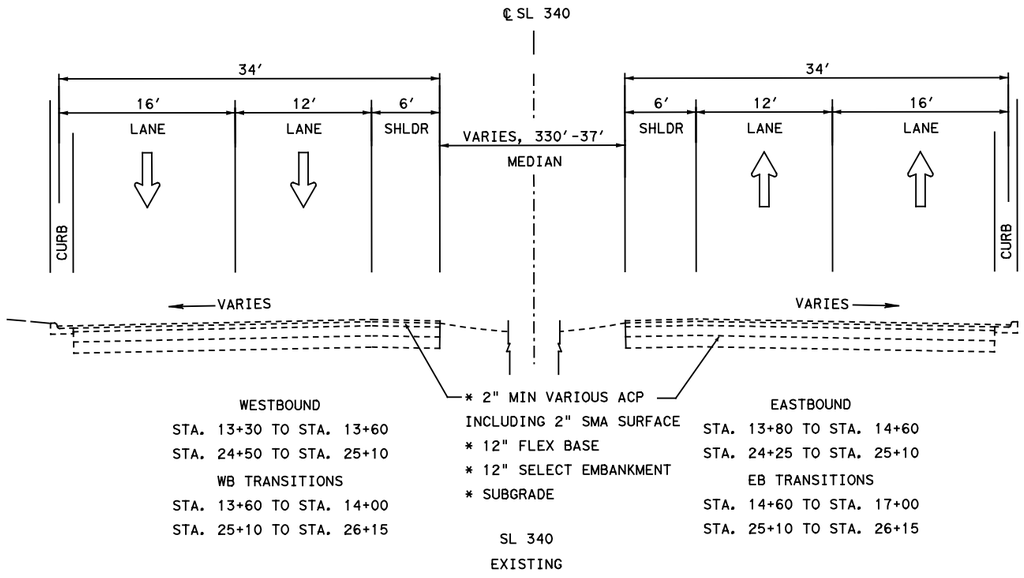

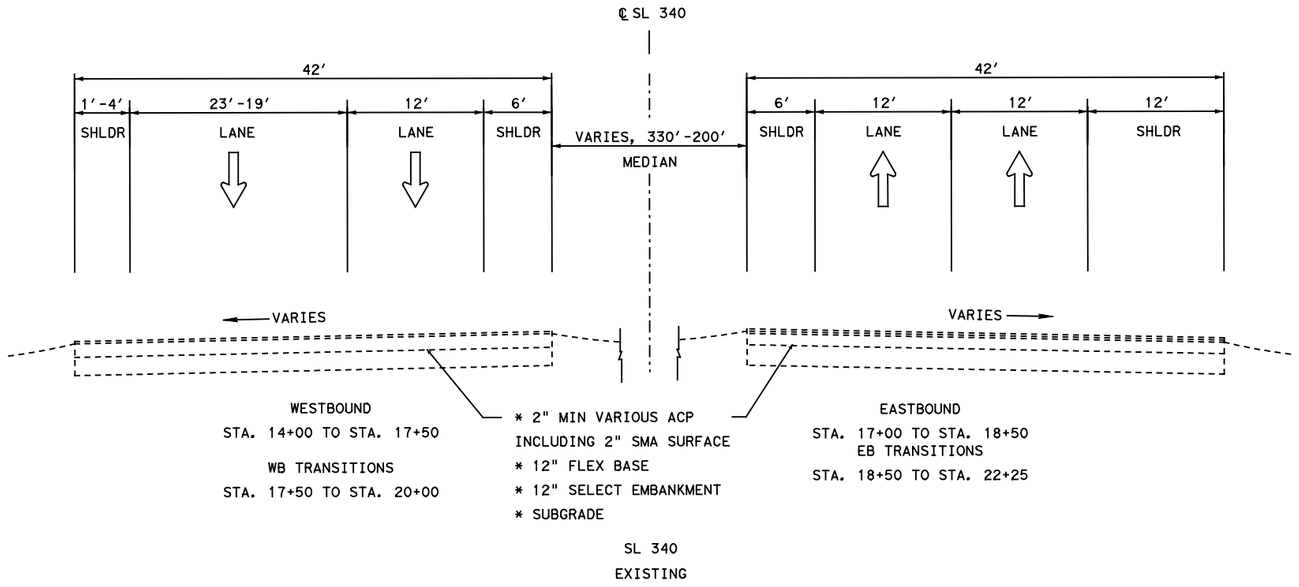

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 1 OF 16

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		5

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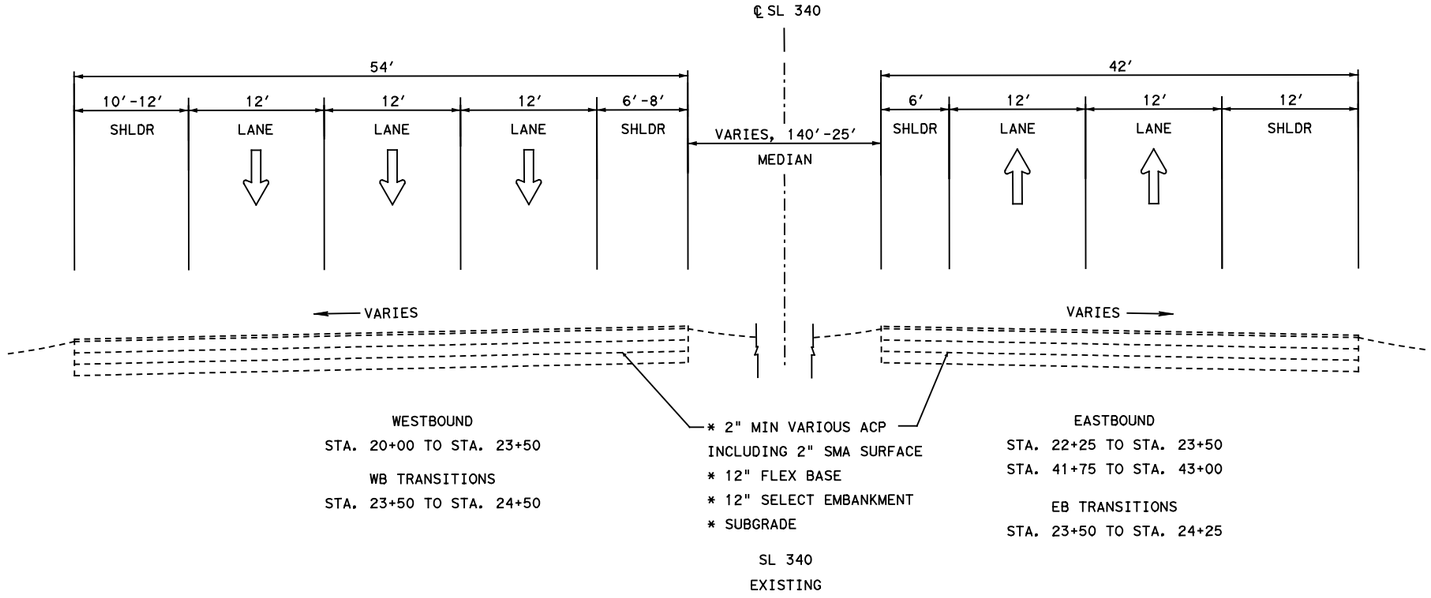

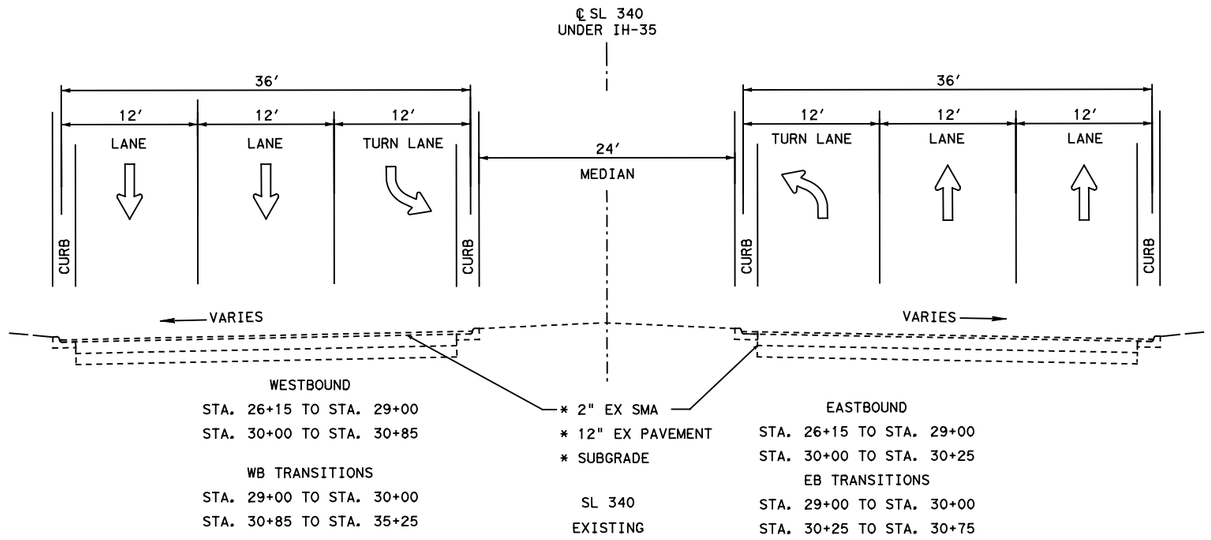

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N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		6

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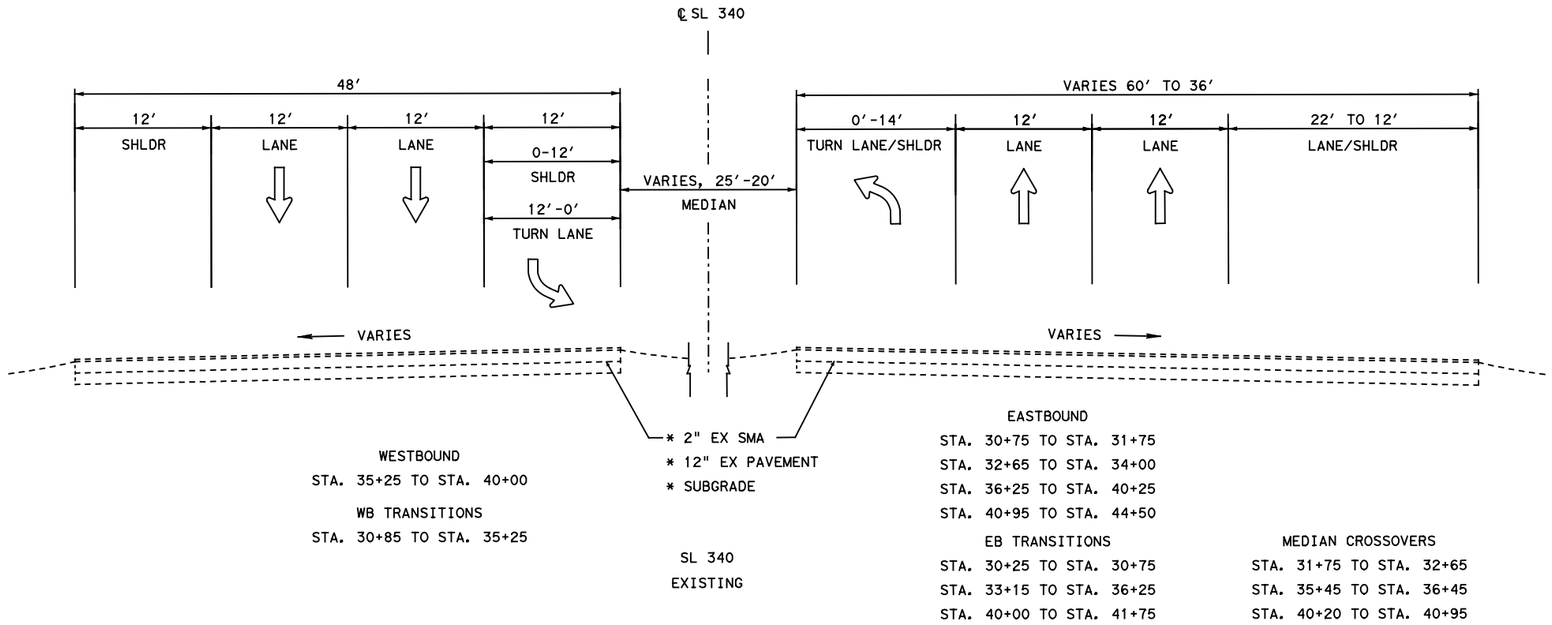


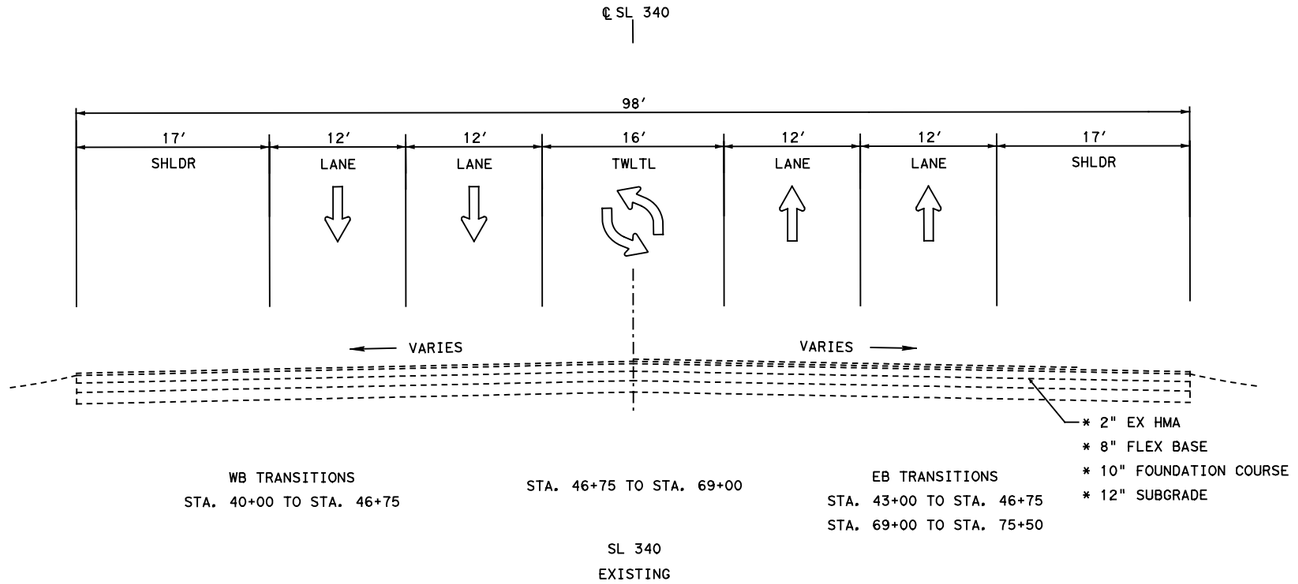
WESTBOUND
STA. 35+25 TO STA. 40+00

WB TRANSITIONS
STA. 30+85 TO STA. 35+25

EASTBOUND
STA. 30+75 TO STA. 31+75
STA. 32+65 TO STA. 34+00
STA. 36+25 TO STA. 40+25
STA. 40+95 TO STA. 44+50

EB TRANSITIONS
STA. 30+25 TO STA. 30+75
STA. 33+15 TO STA. 36+25
STA. 40+00 TO STA. 41+75

MEDIAN CROSSOVERS
STA. 31+75 TO STA. 32+65
STA. 35+45 TO STA. 36+45
STA. 40+20 TO STA. 40+95



WB TRANSITIONS
STA. 40+00 TO STA. 46+75

STA. 46+75 TO STA. 69+00

EB TRANSITIONS
STA. 43+00 TO STA. 46+75
STA. 69+00 TO STA. 75+50

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
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PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 3 OF 16

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
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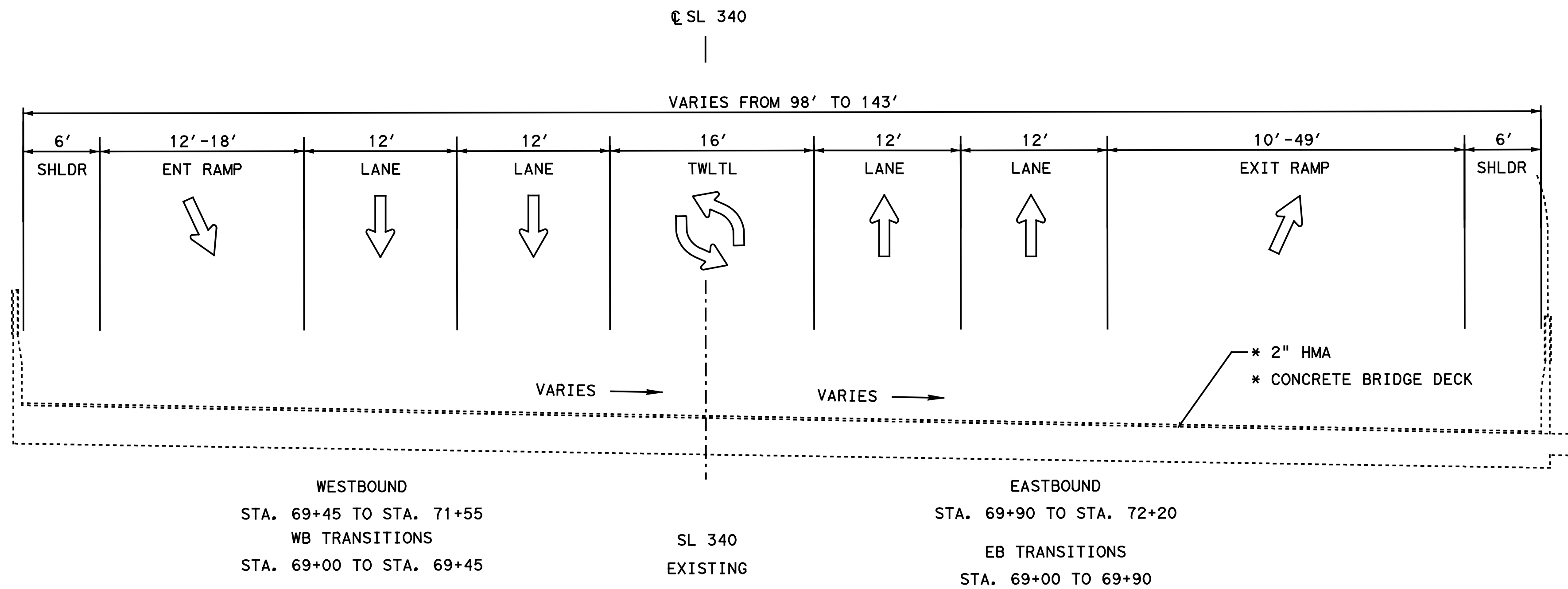

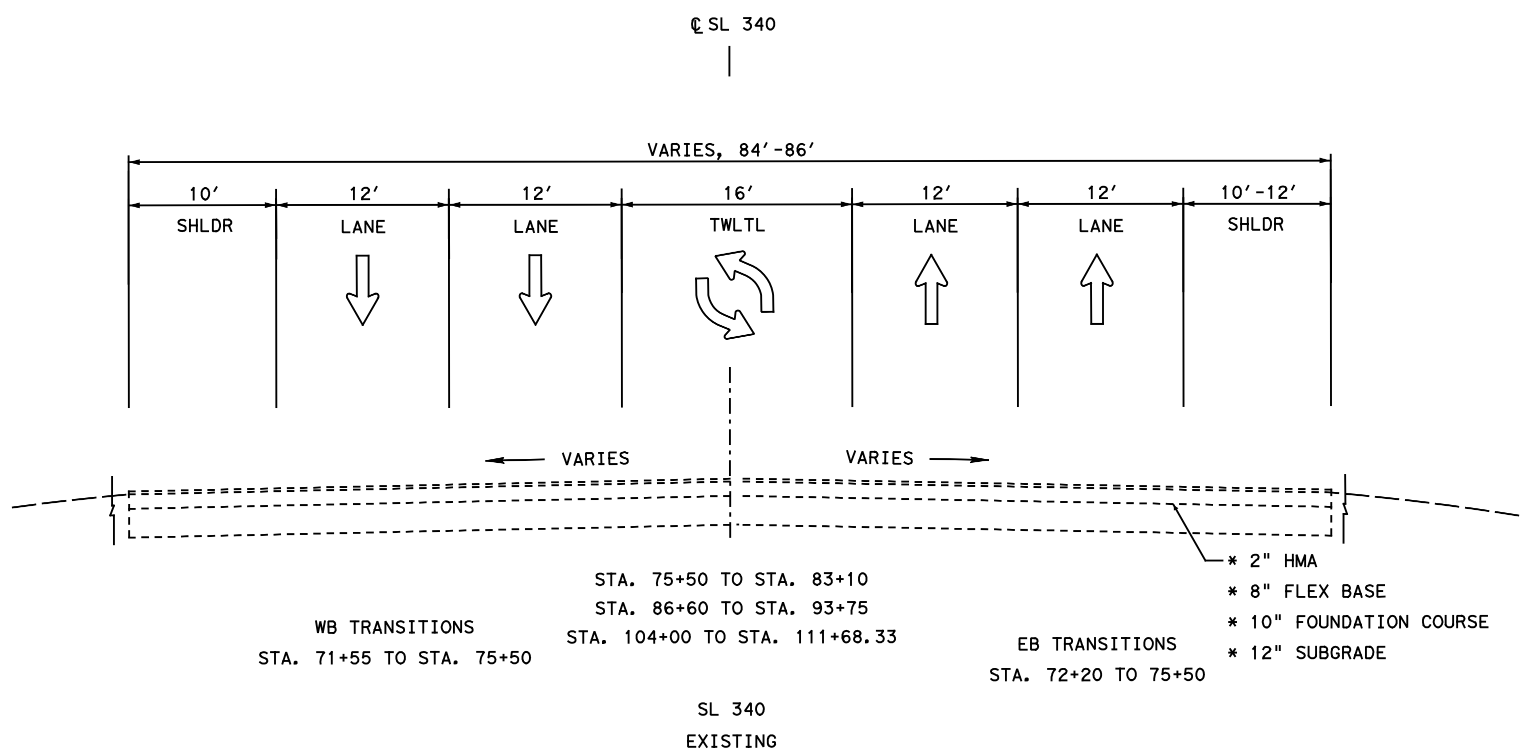

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

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Texas Department of Transportation

SL 340
TYPICAL SECTIONS

SHEET 4 OF 16

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST		COUNTY	SHEET NO.
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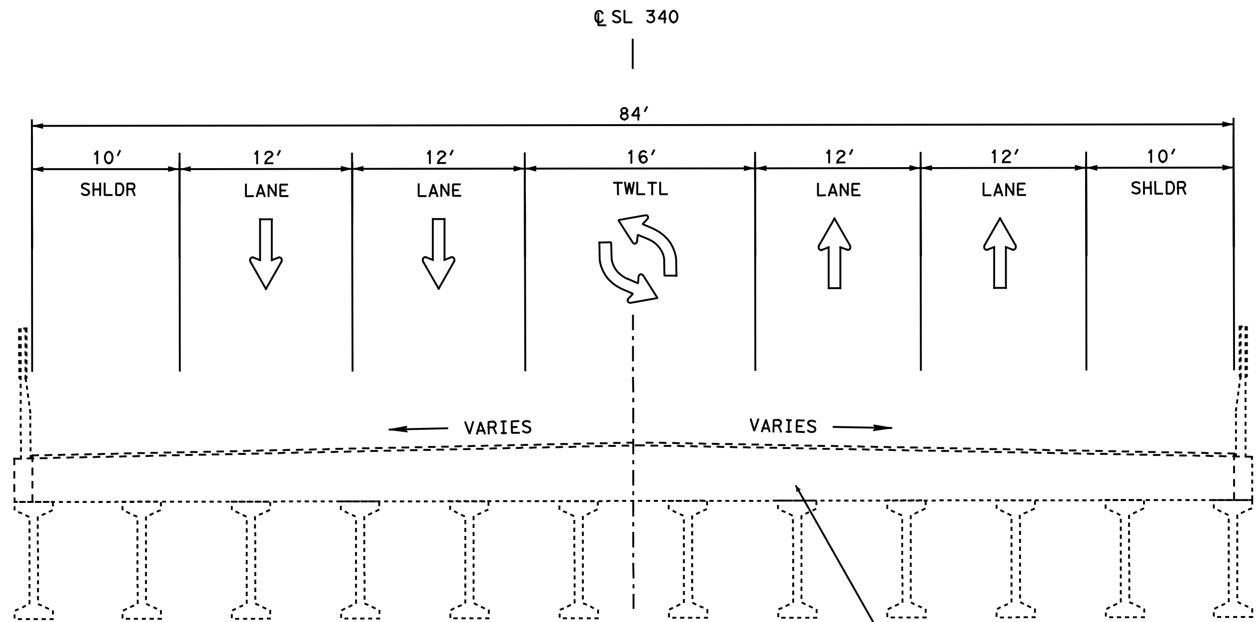
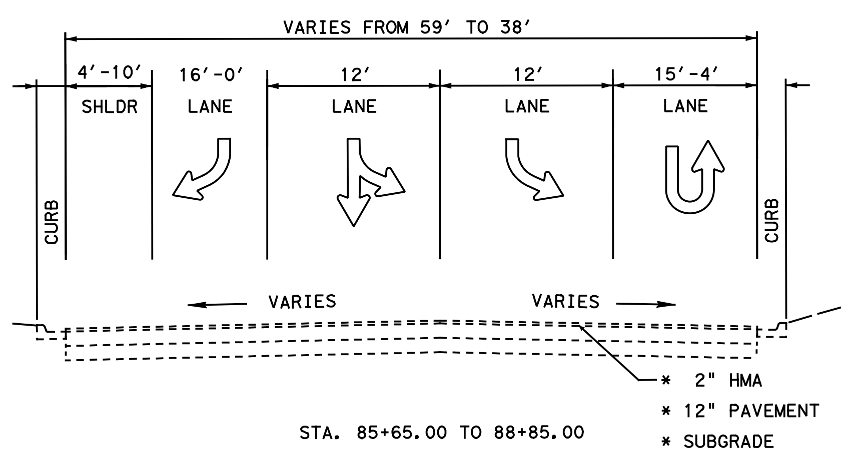


STA. 83+10 TO STA. 86+60
SL 340
EXISTING



STA. 85+65.00 TO 88+85.00

SL 340 (NBFR)
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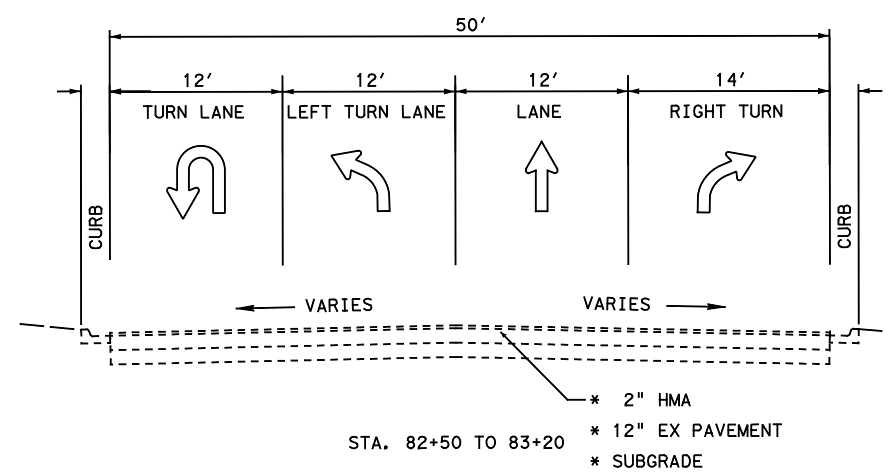
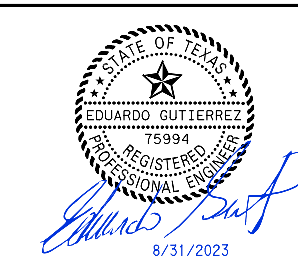


STA. 82+50 TO 83+20

SL 340 (SBFR)
EXISTING

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.



Seiler Lankes Group TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 5 OF 16

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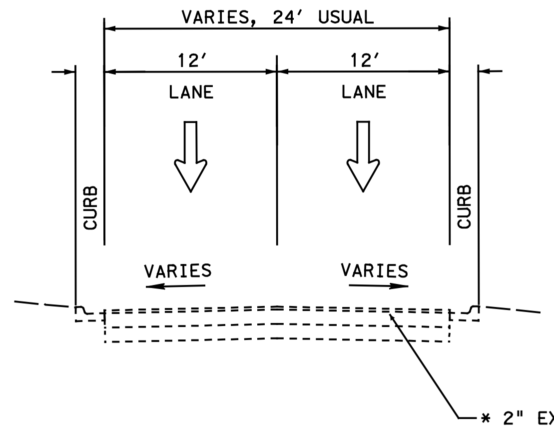
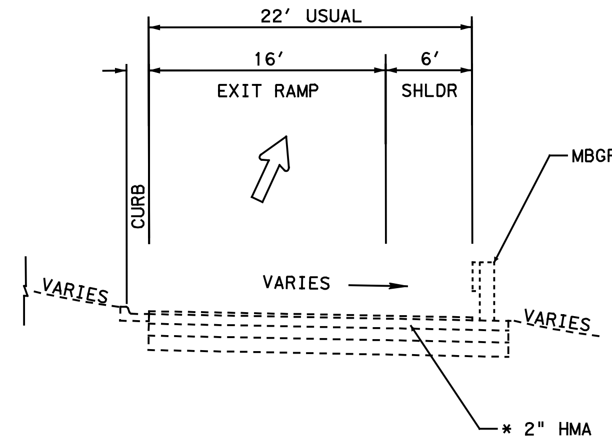


* 2" EX HMA
* 12" EX PAVEMENT
* SUBGRADE

STA. 80+40.00 TO 83+70.00
STA. 88+30.00 TO 93+75.00

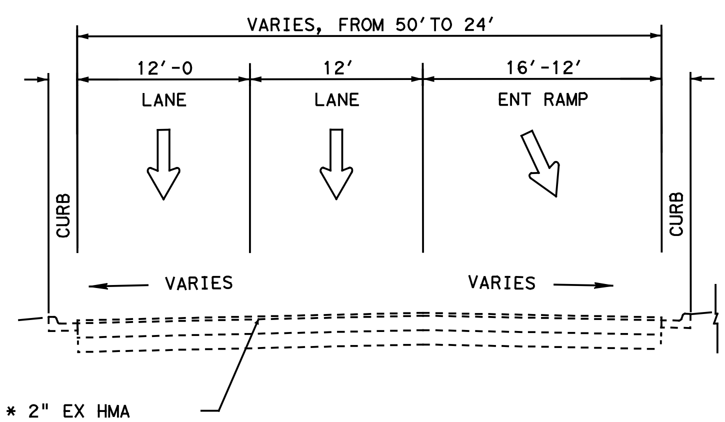
SL 340 (SBFR)
EXISTING



* 2" HMA
* 8" FLEX BASE
* 10" FOUNDATION COURSE
* 12" SUBGRADE

STA. 74+50 TO 79+30

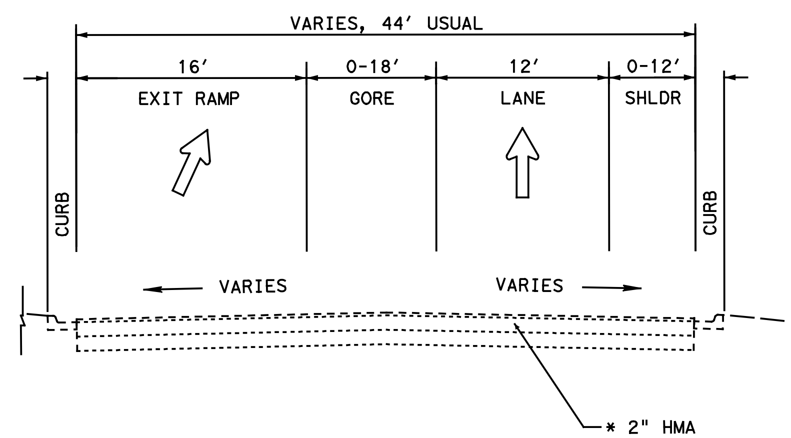
SL 340 (SB) RAMP
EXISTING



* 2" EX HMA
* 12" EX PAVEMENT
* SUBGRADE

STA. 79+15.00 TO 83+70.00

SL 340 (NBFR)
EXISTING



* 2" HMA
* 12" EX PAVEMENT
* SUBGRADE

STA. 79+30.00 TO 82+50.00

SL 340 (SBFR)
EXISTING

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 6 OF 16

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		10

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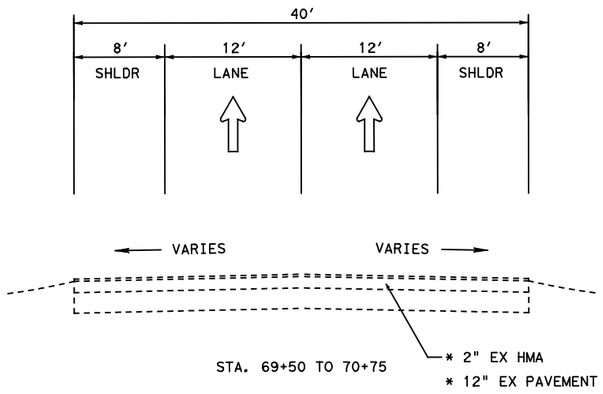

STA. 69+50 TO 70+75

AIR BASE ROAD (SB)
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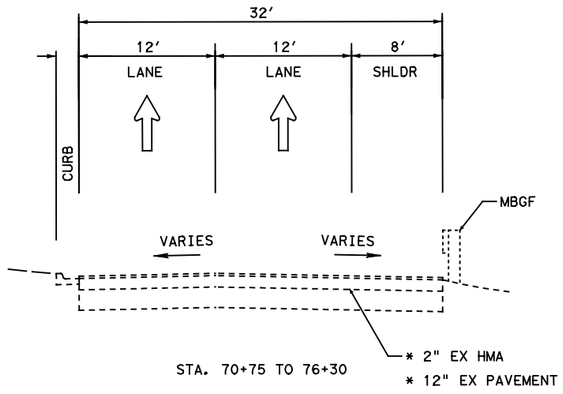

STA. 70+75 TO 76+30

AIR BASE ROAD (SB)
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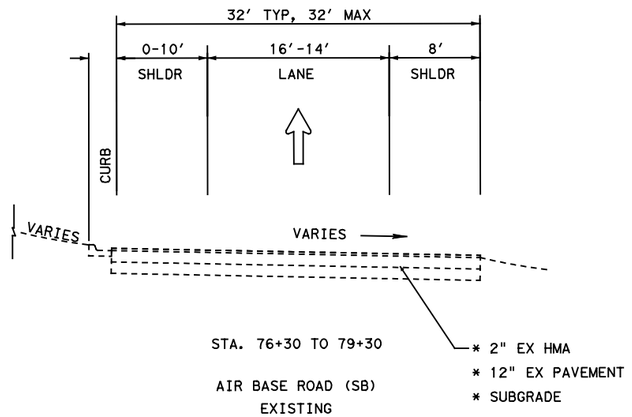

STA. 76+30 TO 79+30

AIR BASE ROAD (SB)
EXISTING

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 7 OF 16

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		11

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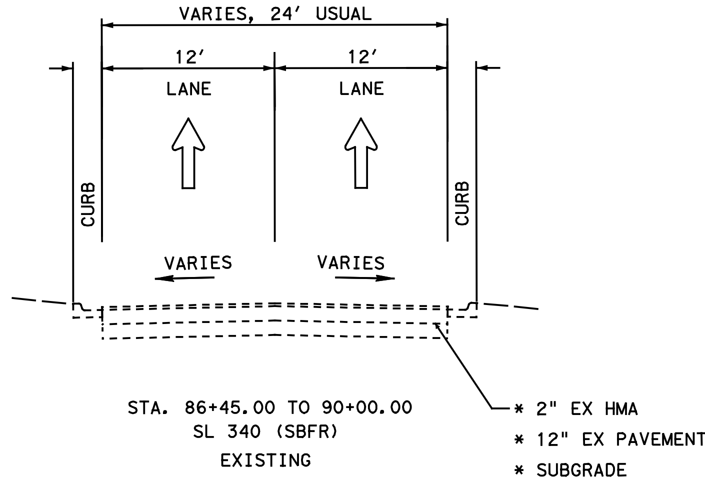
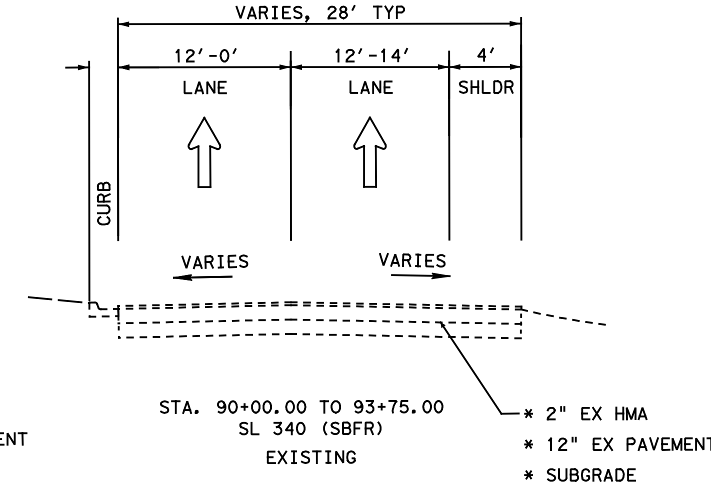
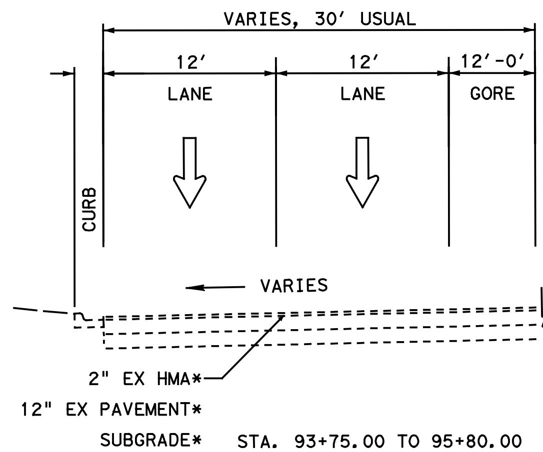


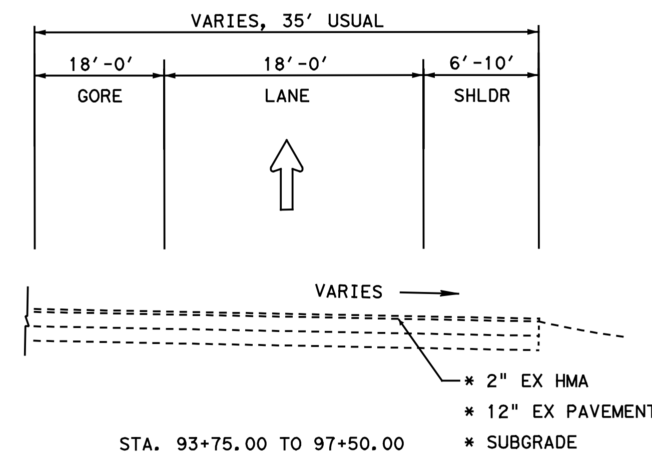
STA. 86+45.00 TO 90+00.00
SL 340 (SBFR)
EXISTING



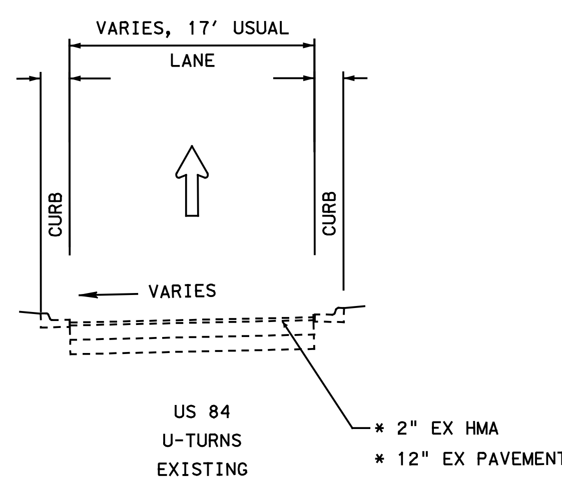
STA. 90+00.00 TO 93+75.00
SL 340 (SBFR)
EXISTING



STA. 93+75.00 TO 95+80.00
SL 340 (NBFR)
EXISTING



STA. 93+75.00 TO 97+50.00
SL 340 (SBFR)
EXISTING



US 84
U-TURNS
EXISTING

* ALL EXISTING DEPTHS ARE APPROXIMATE

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 8 OF 16

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		12

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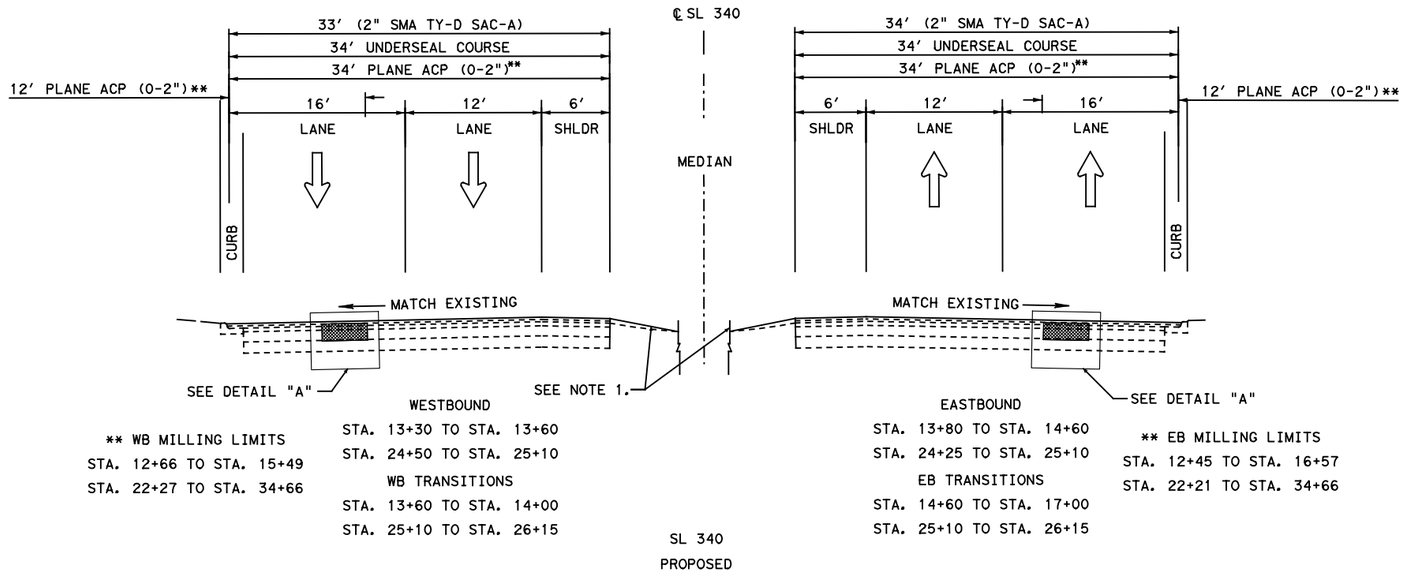
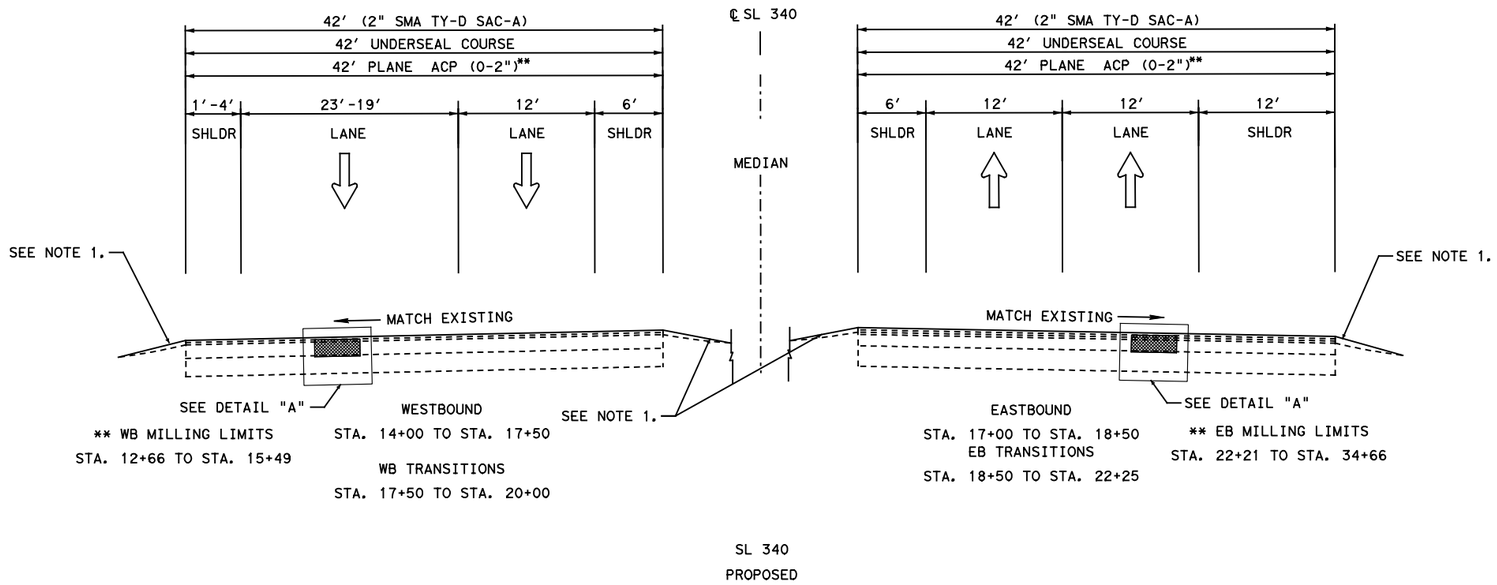
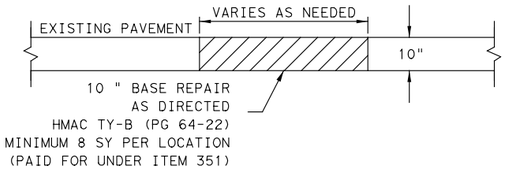




NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		13

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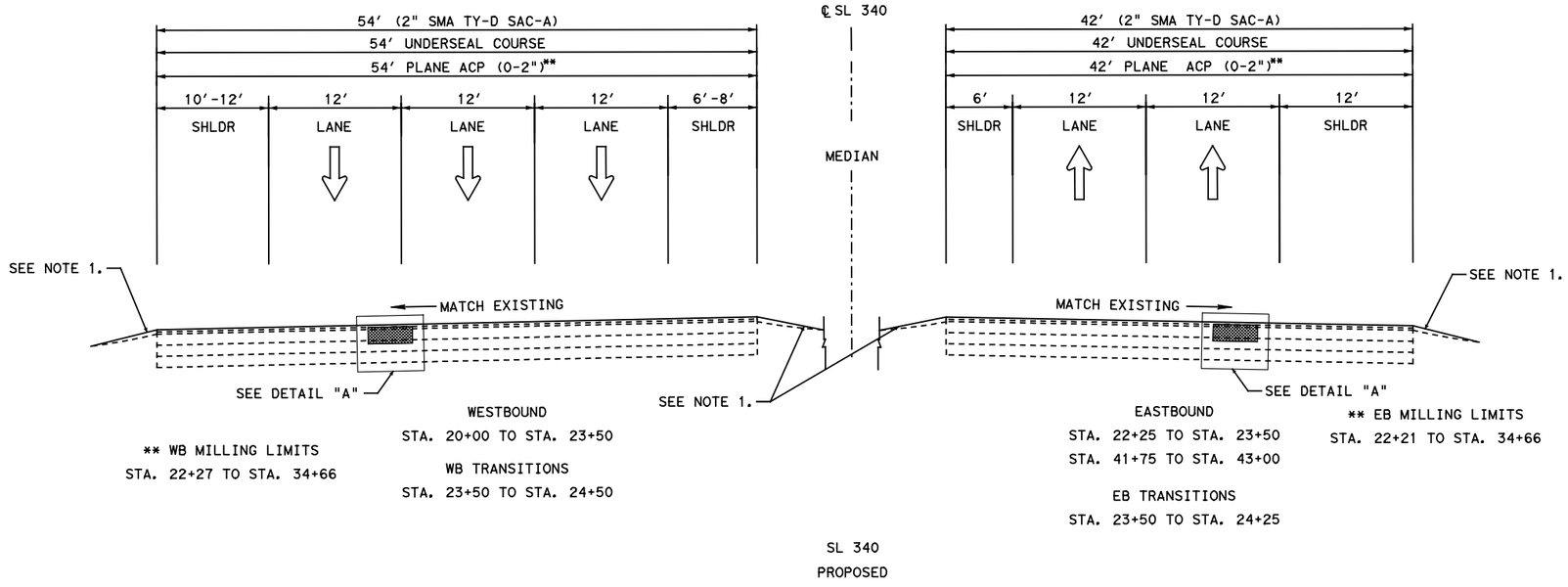

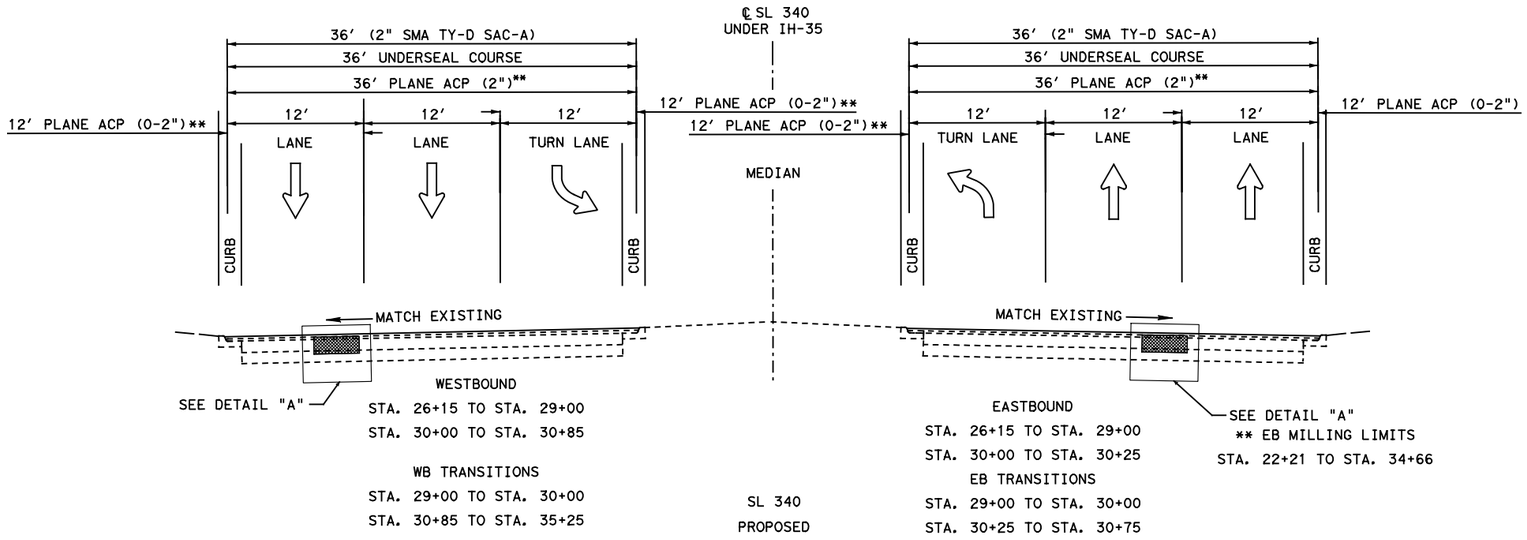

NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
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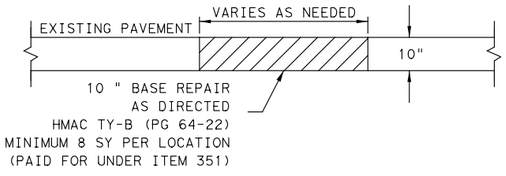

DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		14

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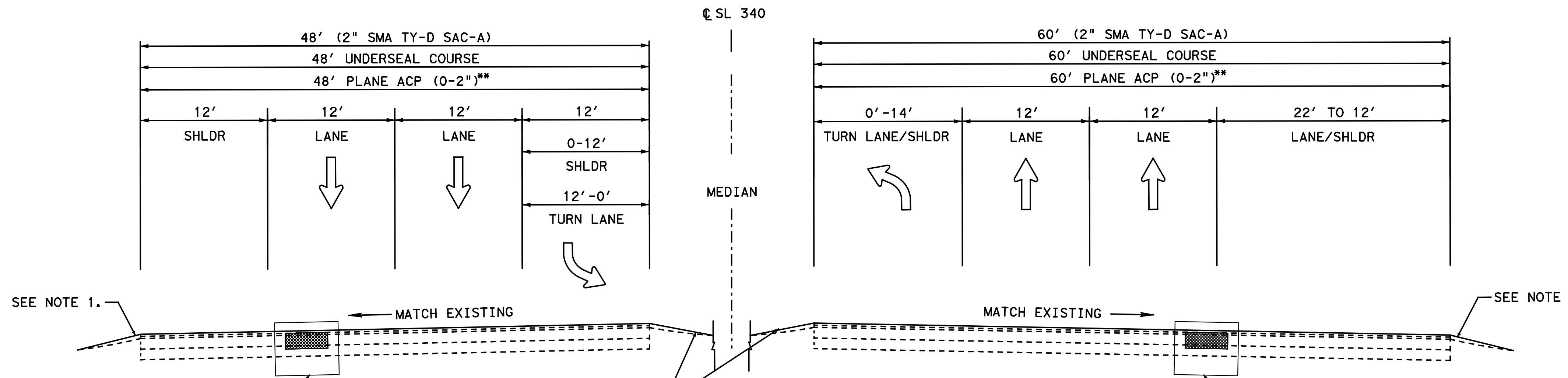
NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.

2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



** WB MILLING LIMITS
STA. 12+27 TO STA. 34+66

WESTBOUND
STA. 35+25 TO STA. 40+00

WB TRANSITIONS
STA. 30+85 TO STA. 35+25

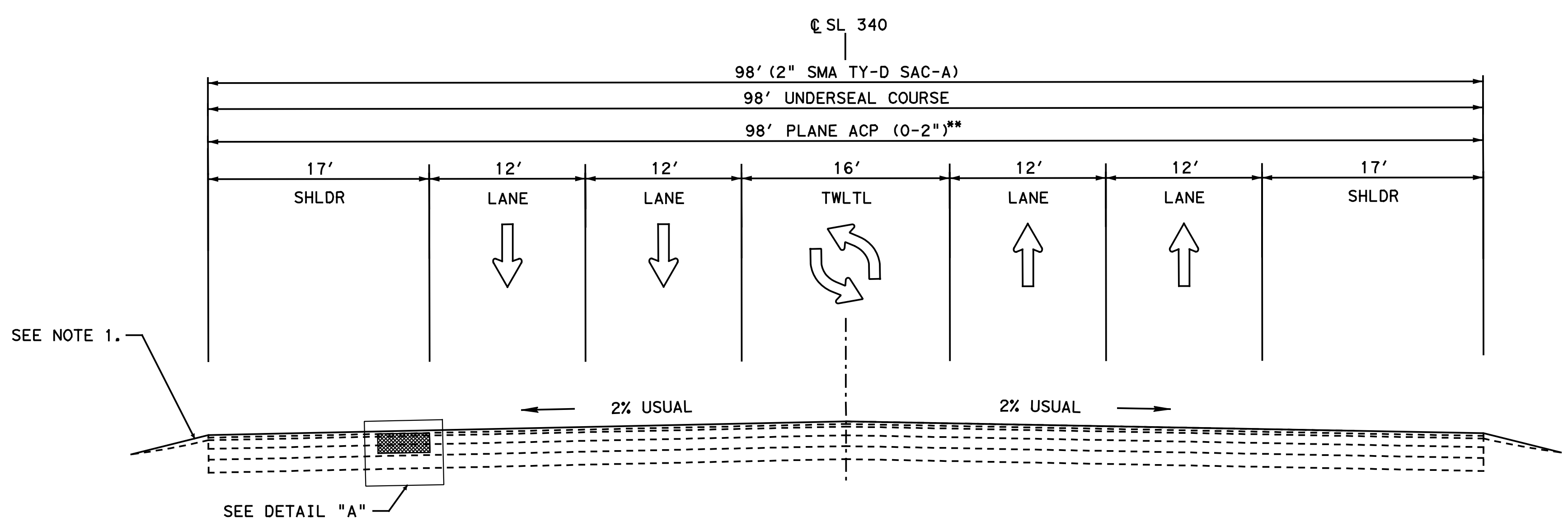
SL 340
PROPOSED

EASTBOUND
STA. 30+75 TO STA. 31+75
STA. 32+65 TO STA. 34+00
STA. 36+25 TO STA. 40+25
STA. 40+95 TO STA. 44+50

EB TRANSITIONS
STA. 30+25 TO STA. 30+75
STA. 33+15 TO STA. 36+25
STA. 40+00 TO STA. 41+75

** EB MILLING LIMITS
STA. 22+21 TO STA. 34+66

MEDIAN CROSSOVERS
STA. 31+75 TO STA. 32+65
STA. 35+45 TO STA. 36+45
STA. 40+20 TO STA. 40+95



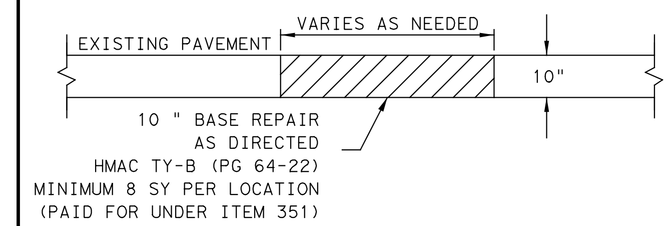
WB TRANSITIONS
STA. 40+00 TO STA. 46+75

STA. 46+75 TO STA. 69+00

SL 340
PROPOSED

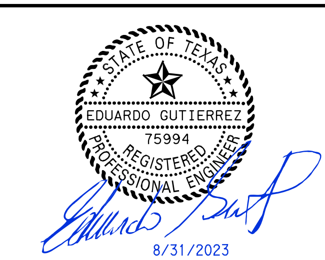
EB TRANSITIONS
STA. 43+00 TO STA. 46+75
STA. 69+00 TO STA. 75+50

** EB MILLING LIMITS
STA. 72+52 TO STA. 84+38



DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.



Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 11 OF 16

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		15

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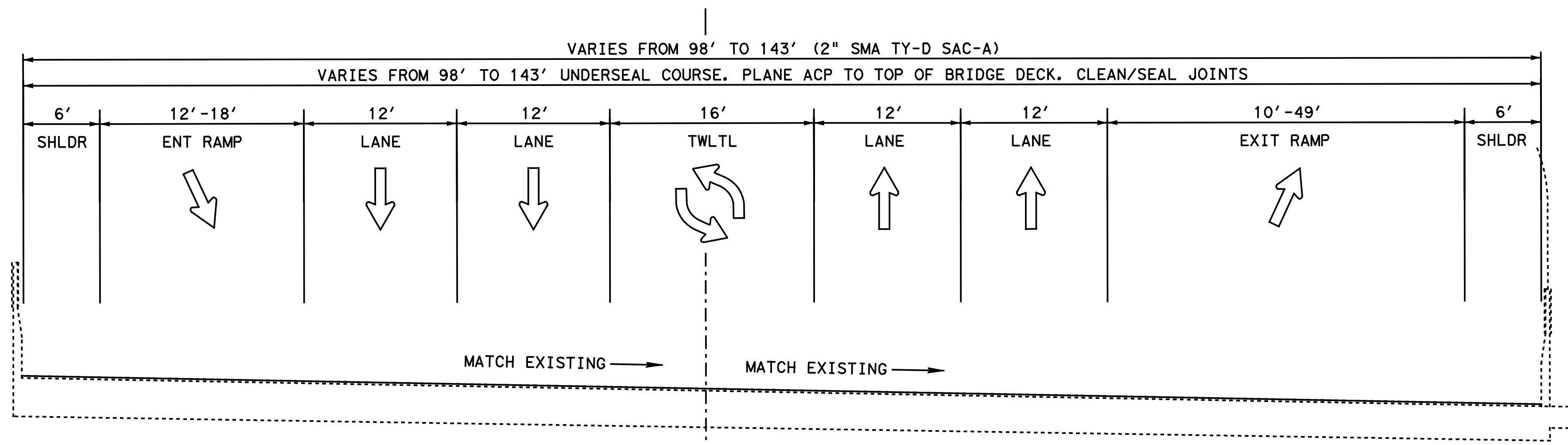
NOTES:

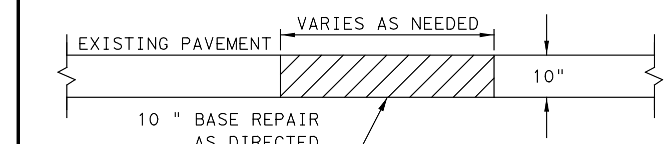
1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



WESTBOUND
STA. 69+45 TO STA. 71+55
WB TRANSITIONS
STA. 69+00 TO STA. 69+45

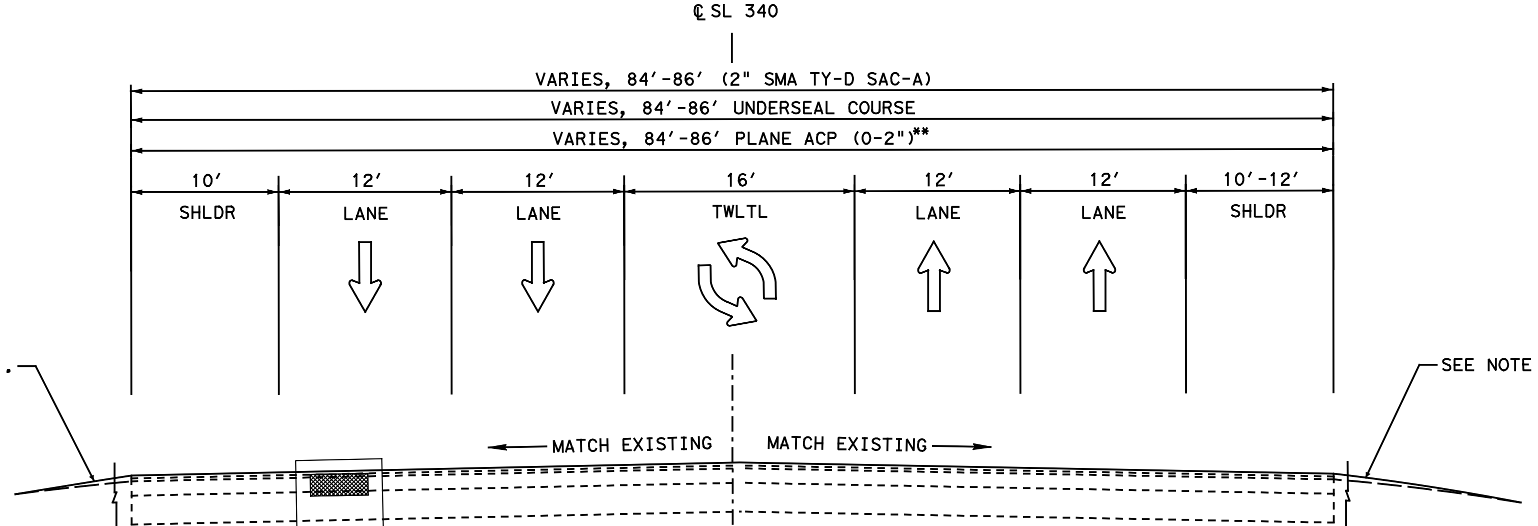
SL 340
PROPOSED

EASTBOUND
STA. 69+90 TO STA. 72+20
EB TRANSITIONS
STA. 69+00 TO 69+90



DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.



STA. 75+50 TO STA. 83+10
STA. 86+60 TO STA. 93+75
STA. 104+00 TO STA. 111+68.33

WB TRANSITIONS
STA. 71+55 TO STA. 75+50

EB TRANSITIONS
STA. 72+20 TO 75+50

** WB MILLING LIMITS
STA. 73+49 TO STA. 84+91

SL 340
PROPOSED

** EB MILLING LIMITS
STA. 72+52 TO STA. 84+38

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

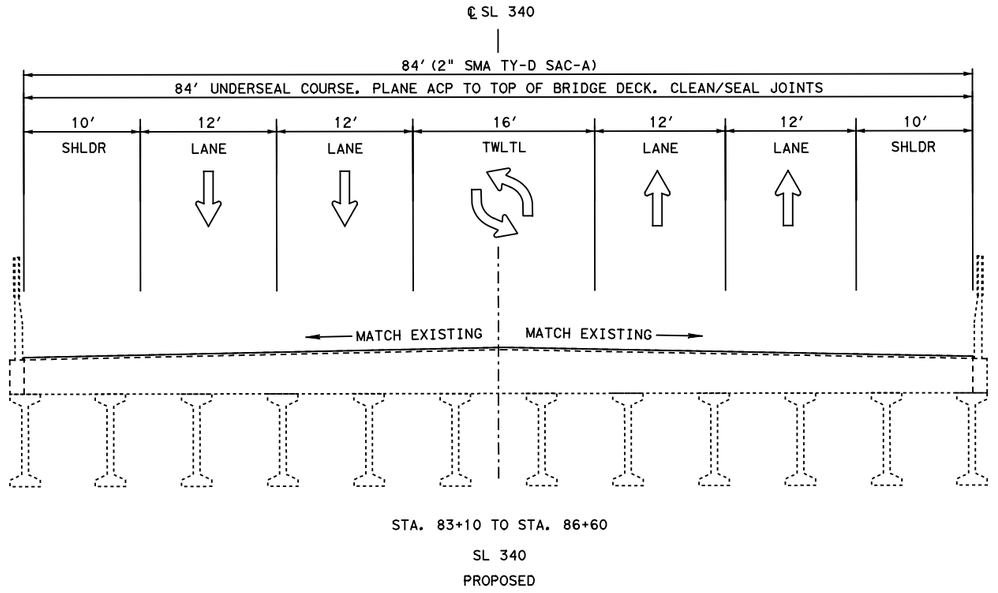
Seiler Lankes Group TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

SHEET 12 OF 16

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WAC		MCLENNAN	16

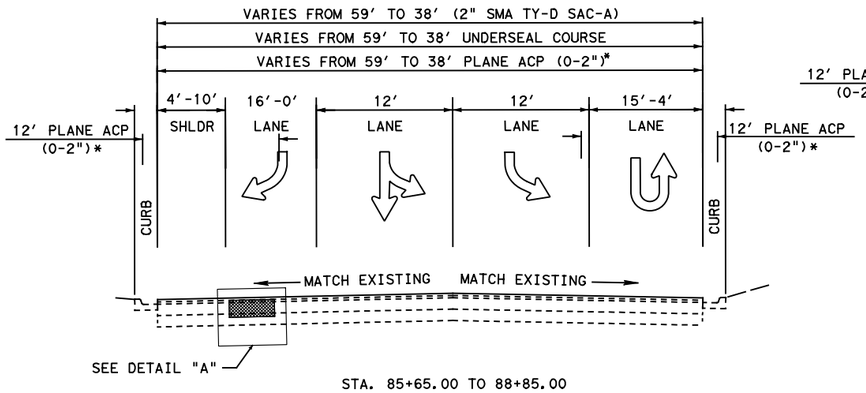
USER: egutierrez
DATE: 8/31/2023 11:36



STA. 83+10 TO STA. 86+60

SL 340

PROPOSED



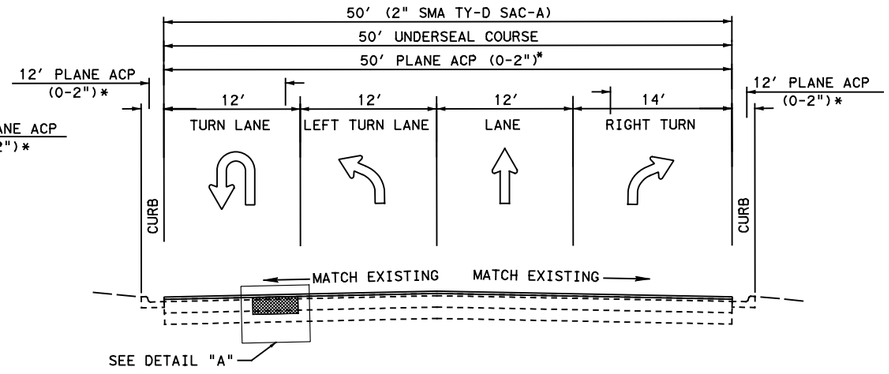
STA. 85+65.00 TO 88+85.00

** WB MILLING LIMITS

STA. 85+74 TO STA. 98+55

SL 340 (NBFR)

PROPOSED



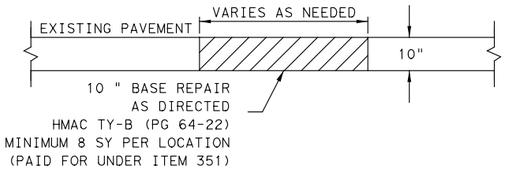
STA. 82+50 TO 83+20

SL 340 (SBFR)

PROPOSED

NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group TBPE License No. 12170

PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		17

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NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
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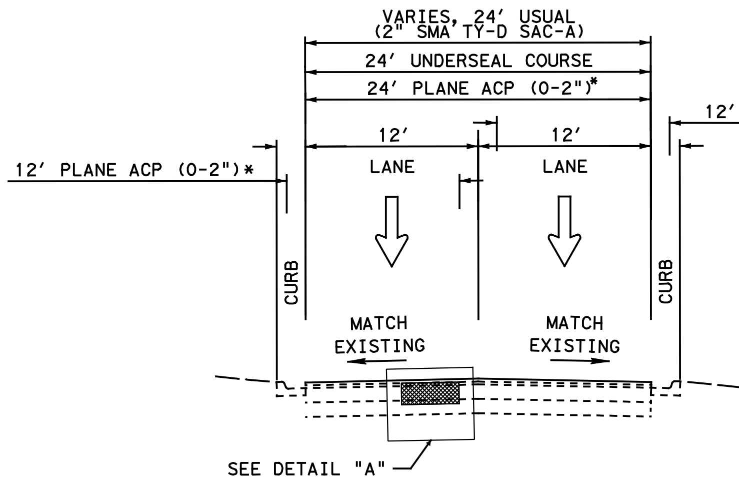
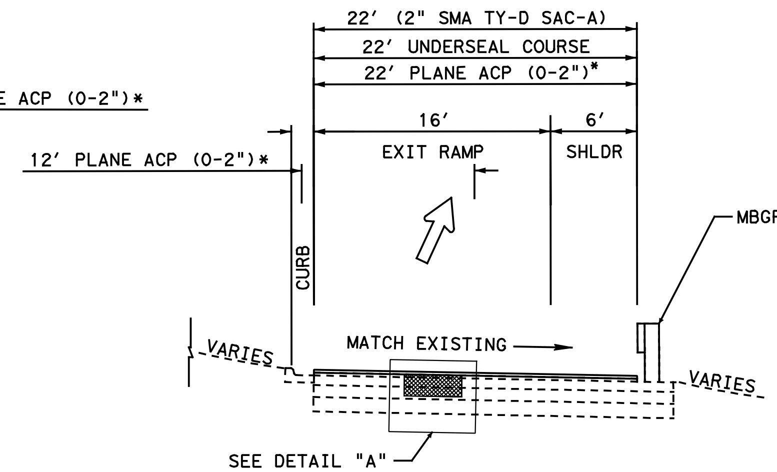


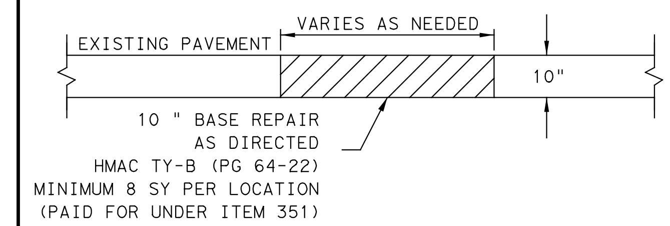
STA. 80+40.00 TO 83+70.00
STA. 88+30.00 TO 93+75.00

SL 340 (SBFR)
PROPOSED



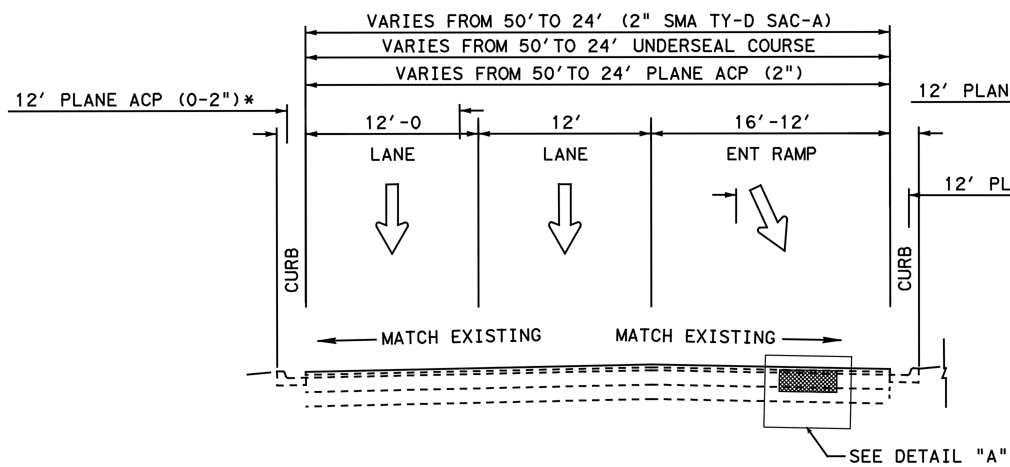
STA. 74+50 TO 79+30

SL 340 (SB) RAMP
PROPOSED



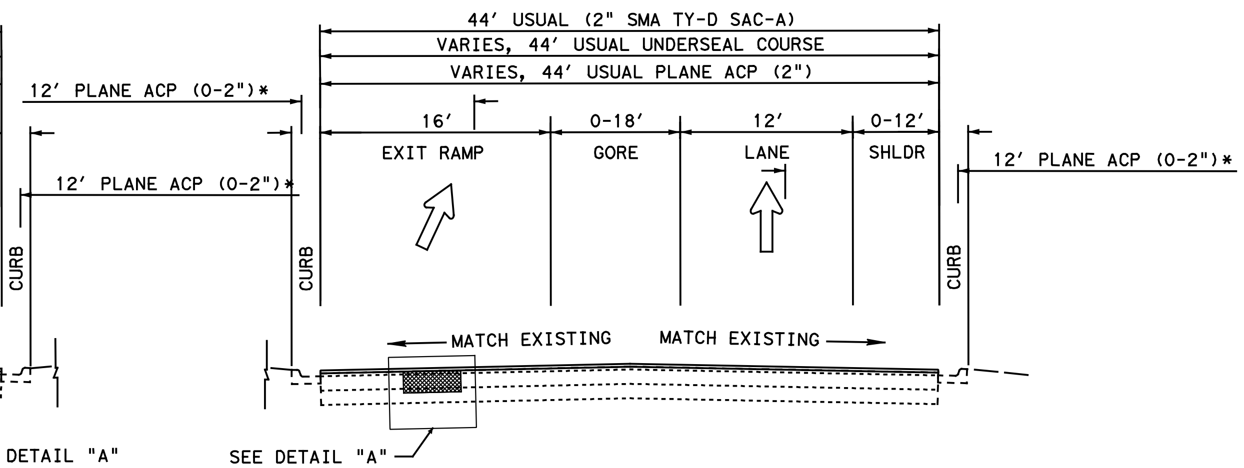
DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.



STA. 79+15.00 TO 83+70.00

SL 340 (NBFR)
PROPOSED



STA. 79+30.00 TO 82+50.00

SL 340 (SBFR)
PROPOSED

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

Texas Department of Transportation

SL 340
TYPICAL SECTIONS

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		18

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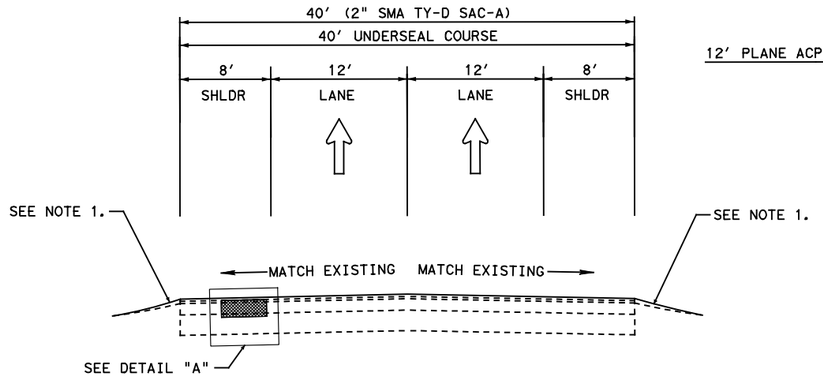
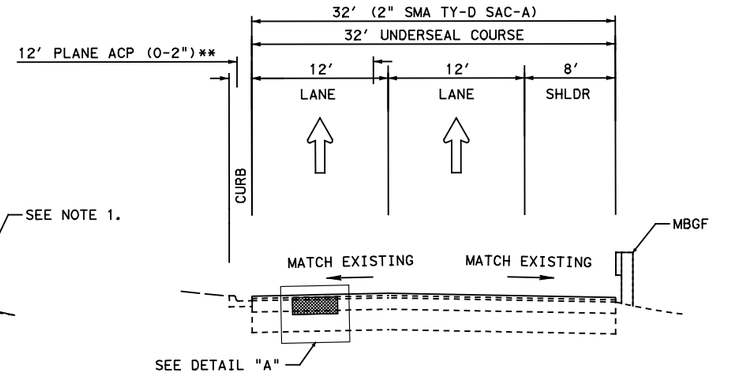
FILE: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_2311-01-042/Design_Data/4 - Design/Plan Set/01. General/042_Typical_Proposed_340_06.dgn



STA. 69+50 TO 70+75

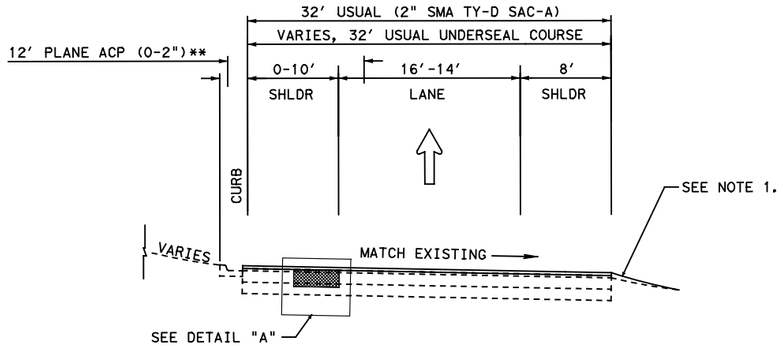
AIR BASE ROAD (SB)
PROPOSED



STA. 70+75 TO 76+30

** EB MILLING LIMITS
STA. 72+52 TO STA. 84+38

AIR BASE ROAD (SB)
PROPOSED

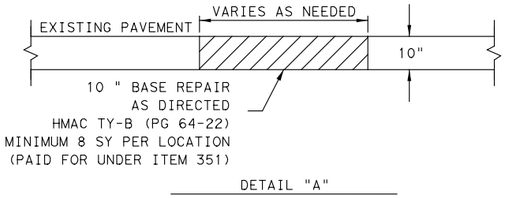


STA. 76+30 TO 79+30

AIR BASE ROAD (SB)
PROPOSED

NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



DETAIL "A"
FLEXIBLE PAVEMENT REPAIR

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
TYPICAL SECTIONS

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		19

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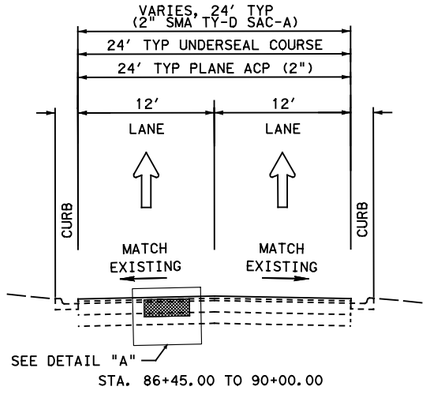
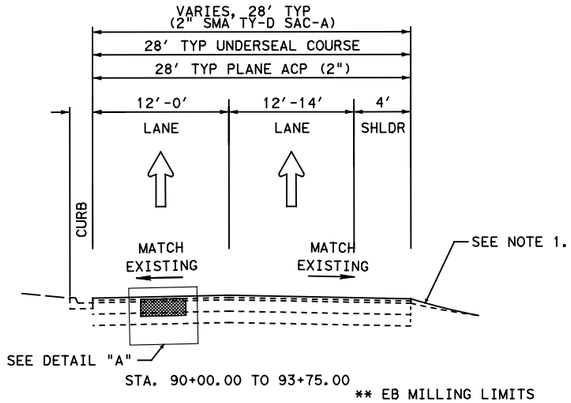


STA. 86+45.00 TO 90+00.00

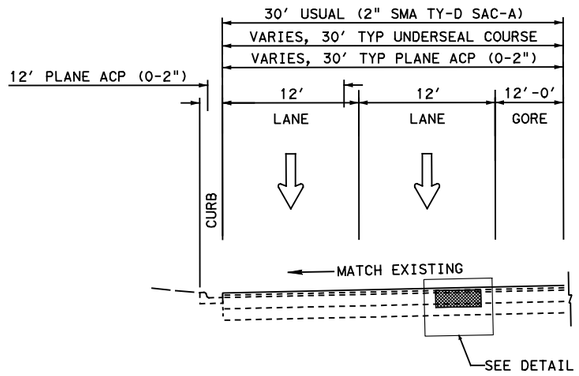
SL 340
PROPOSED (SBFR)



STA. 90+00.00 TO 93+75.00

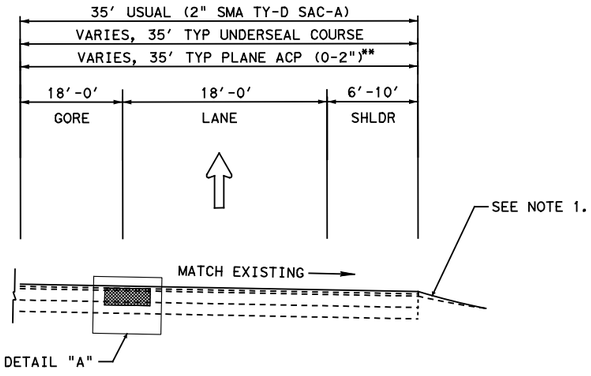
** EB MILLING LIMITS
STA. 85+22 TO STA. 95+79

SL 340
PROPOSED (SBFR)



STA. 93+75.00 TO 95+80.00

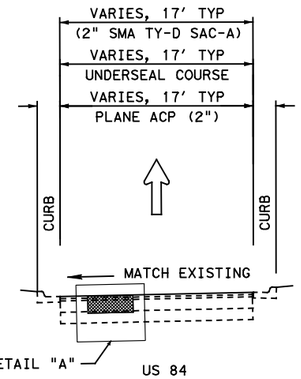
SL 340
PROPOSED (NBFR)



STA. 93+75.00 TO 97+50.00

SL 340
PROPOSED (SBFR)

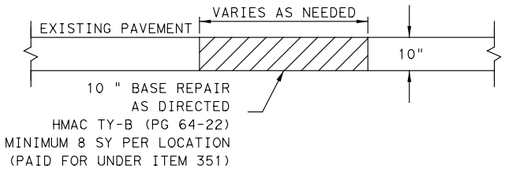
** EB MILLING LIMITS
STA. 85+22 TO STA. 95+79



US 84
U-TURNS

NOTES:

1. BACKFILL PAVEMENT EDGES TY B (TYP.). QUANTITY BASED ON LIMITS OF OVERLAY (WITHOUT PLANING). EXACT LIMITS TO BE DETERMINED IN THE FIELD AND AS DIRECTED BY THE ENGINEER.
2. REFER TO THE "MISCELLANEOUS DETAILS" PLAN SHEET FOR INFORMATION ON MILL TAPERS AND TRANSITIONS.



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	TEXAS	WAC	MCLENNAN		20

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BASIS OF ESTIMATE TABLES

Table 1: Basis of Estimate for Erosion Control Items

Item	Description	Rate	Basis	Quantities
*166	FERTILIZER			
	FERTILIZER (20-10-10) (SOD)	300 LBS / AC	0.05 AC	0.01 TON
	FERTILIZER (20-10-10) (TEMPORARY)	300 LBS / AC	0.05 AC	0.01 TON
168	VEGETATIVE WATERING			
	(2 APPLICATIONS - PERM)	13,100 GAL/AC/APP	0.05 AC	1 MG
	(2 APPLICATIONS - TEMP)	13,100 GAL/AC/APP	0.05 AC	1 MG

Table 2: Basis of Estimate for Asphalt Pavements

Item	Description	Rate	Basis	Quantities
3080	**STONE-MATRIX ASPHALT (SMA)**			
	STONE-MTRX-ASPH SMA-D SAC-A PG76-22 (2 IN) SMA-D SAC-A PG76-22 (1.5 IN)	 110 LB / SY 110 LB / SY	 140,255 SY 16,921 SY	 15,428 TON 1,396 TON

Table 3: Basis of Estimate for Interlayer Material

Item	Description	Rate	Basis	Quantities
3085	**UNDERSEAL COURSE**	**0.25 GAL / SY**	**157,176 SY**	**39,297 GAL**
	FOR CONTRACTORS INFORMATION			
	SPRAY APPLIED MEMBRANE	0.25 GAL / SY	157,176 SY	39,297 GAL
	TRAIL	0.20 GAL / SY	157,176 SY	31,435 GAL
	ASPH (AC-15P, AC-20XP, AC10-2TR, AC-12-5TR)	0.25 GAL / SY	157,176 SY	39,297 GAL
	AGGR (TY-PD GR-5 OR TY-PL GR-5) (SAC-B)	1 CY / 150 SY	157,176 SY	1,048 CY

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 0.05 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

Contractor questions on this project are to be emailed to the Waco District at the following address:

Bill Compton - Wacoprebid@txdot.gov, 254-867-2707, 100 S. Loop Dr., Waco, TX
Carmen Chau - Wacoprebid@txdot.gov, 254-867-2794, 100 S. Loop Dr., Waco, TX

Or Via phone or in person to the following individual(s):
Area Engineer's: Clayton Zacha, P.E. – 254.772.2890
Assistant Area Engineer's: Mohab Samuel, P.E. – 254.772.2890

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

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

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

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

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

GENERAL NOTES

ITEM 5: CONTROL OF THE WORK

Provide the Engineer with a weekly work schedule of planned activities including anticipated quantities of materials to be placed daily (CY of each concrete placement, tons of HMAC to be placed daily, etc.). Schedules will be provided for the following week as part of each week's project meetings or by 5PM on Thursday as approved by the Engineer. Failure to provide notifications are required here may be deemed as insufficient notice per item 5.10.

Provide the Engineer Daily by 3PM the planned activities for the following day including location, quantities of materials to be placed, etc. in a format acceptable to the Engineer.

Submit all fabrication and shop drawings per TxDOT's online shop drawing submittal system and copy the Area Engineer on the email submittal, unless otherwise directed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (254)867-2808 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254)867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

UNION PACIFIC RAILROAD COMPANY
Protection of Fiber Optic Cable Systems

Fiber optic cable systems may be buried on the railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The State and/or its Contractor will telephone the railroad during normal business hours (7:00 A.M. to 9:00 P.M., Central time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour, seven-day number for emergency calls) to determine if fiber optic cable is buried on the railroad's premises to be used by the State. If it is, the State and/or its Contractor will telephone the telecommunications company(ies) involved, arrange for a cable locator and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the railroad's premises.

Work in this contract is required to be done on railroad property. Cooperate with the railroads and comply with all of their requirements including obtaining any training they require before performing work on railroad property.

ITEM 6: CONTROL OF MATERIALS

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

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

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

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer.

Personal vehicles of the contractor's employees will not be parked within the right of way at any time including any section closed to public traffic, unless the vehicle is being utilized for construction procedures. However, the contractor's employees may park on the right of way at the sites where the contractor has his office, equipment and materials storage yard.

The contractor is alerted to the possible presence of swallows under the existing bridges or culverts. Because the migratory bird treaty act prohibits harm to swallows, their eggs or their nestlings, the contractor will not begin potentially disturbing activities on or near the bridge until the birds have abandoned any occupied nests (approximately September 1). Active nests may not be removed regardless of the date.

Prior to the swallows returning to the nests (approximately March 1), abandoned nests will be removed from the bridge. The contractor will prevent the establishment of new nests on any portion of the structure. Methods for preventing the establishment of new nests must be approved by the project Engineer. Examples of acceptable nest prevention methods are bird-deterrent netting and bird-repelling sprays and/or gels to be applied to the structure. This work will not be paid for directly, but will be subsidiary to the various bid items.

The Contractor will submit detailed site-specific plans for work in each "water of the United States" designated on the EPIC sheet. These plans must be approved by the TxDOT Engineer prior to starting any work in these areas. The plans must also describe facilities and work activities adjacent the Ordinary High-Water Marks. The plan must show actual dimensions and materials for:

- Proposed construction roads and work areas leading to or in close proximity to the Ordinary High-Water Marks
- Temporary material or equipment storage areas in close proximity to the Ordinary High-Water Marks

- Locations of proposed sediment and erosion control devices
- Identification of construction equipment and construction techniques to accomplish the work

Once this drawing and supporting information is reviewed and approved by TxDOT, all construction workers should be made aware of the limits designated on the drawings by the Contractor's supervision. Work in all waters of the US will be limited to the minimum necessary required to construct the bridge, culvert or roadway fills. Work will also include all activities needed for bridge and culvert demolitions. Working or disturbing soil in the stream channel outside the limits of the work plan will not be allowed. Orange fencing will be provided and maintained to establish the TxDOT approved boundaries in which work may be conducted between the Ordinary High-Water Marks. Orange fencing will not be paid for but will be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling".

Law Enforcement Personnel.

As approved by the Engineer, provide uniformed off duty police officers and squad cars during the following activities:

- Lane closures on controlled access facilities or 4 lane divided facilities with speed limits above 55mph,
- ramp closures,
- Roadway Closures,
- Support of phase construction traffic switches,
- nighttime work, or
- other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce.

Law Enforcement Personnel must have jurisdictional authority to act in the area of the project.
Law Enforcement Personnel will be paid when use is approved by the Engineer. The Contractor retains the right to have law enforcement personnel on sight at their own cost and discretion when note approved by the Engineer.

Submit charge summary and invoices using the Department form 318. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles. Windows / Windshields may not be blocked.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed.

Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or “show up” fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual “show up” time to the event site due to cancellation will be on a case by case basis at a maximum of 2 hours per officer.

ITEM 8: PROSECUTION AND PROGRESS

This Project will be a Standard Workweek in accordance with Article 8.3.1.4.

Nighttime work is required in accordance with Article 8.3.3.2.1.

Meet weekly or at intervals as agreed upon with the engineer to notify him or her of planned work for the upcoming 3-week period.

For this project, provide a Bar Chart progress schedule.

ITEM 104: REMOVING CONCRETE

In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planning or grinding is considered an acceptable method at these locations. Measurement and payment are in accordance with this item.

ITEM 110: EXCAVATION

In a cut section, when soils are encountered at subgrade depths that are unstable and are deemed unsuitable by the Engineer, undercut this material for a minimum depth of one (1.0) foot below the maximum depth as determined and replace with a material having a plasticity index less than 25 and a liquid limit of less than 50.

ITEMS 110 & 132: EXCAVATION & EMBANKMENT

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.

In those cases where fixed features require, the governing slopes indicated herein and on the cross sections may be varied between the limits and to the extent determined.

ITEM 134: BACKFILLING PAVEMENT EDGES

Start backfilling pavement edges as soon as possible after the surface course is started.

Use Type “A” or “B” material to backfill pavement edges as shown in plans. Type “A” or “B” material shall consist of suitable material that when compacted will support the pavement edge. Rap is considered suitable Type “A” or “B” material.

Blade the existing vegetation into a neat wind-row prior to overlay. After placing Ty A or Ty B backfill and seeding, the material from the wind-row shall be replaced on the completed slopes.

ITEM 162: SODDING FOR EROSION CONTROL

Block sod (Bermuda grass) will be cynodon dactylon Bermuda grass cut to a minimum depth (thickness) of one (1) inch. The sod will have the following characteristics: (1) uniformity; (2) good color; (3) free of weeds, weed seed, insects, and disease; (4) healthy, virile root system of dense, thickly matted roots throughout the soil of the sod; (5) adequate moisture to prevent drying out by exposure to the air and sun to the extent as to damage sod.

Prior to laying the block sod, blade the area and rake smooth. Refer to the plans and details for areas to receive the sod. Remove one (1) in. of soil along paved edges and curb lines before laying sod and dress the slope to match all exposed edges after placing the sod.

ITEM 164: SEEDING FOR EROSION CONTROL

Temporary seeding mixtures (cool and warm) will also include three (3) lbs of Bermuda grass seed per acre, with all seeds being planted concurrently.

Contractor will mow or disc wheat and or oats in spring prior to vegetation going to seed.

ITEM 320: EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT

Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV’s remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

The use of windrow pick-up equipment is allowed except on the first course of roadway material placed over the subgrade.

ITEM 351: FLEXIBLE PAVEMENT STRUCTURE REPAIR

For this project, a laydown machine will be required during the construction & placement of this item.

Locations and Quantities will vary as directed. The minimum area to be repaired will be eight (8) SY.

Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly but is subsidiary to this item.

To remove dirt and debris, and assure reclaimable material is not contaminated per the specification, blade or otherwise make a neat cut along the existing pavement edge to a depth approx. 1” below the milling limits. This work will be required prior to milling operation and is subsidiary to this item.

Take possession of recycled asphalt pavement from the project and recycle the material.

ITEM 354: PLANING AND TEXTURING PAVEMENT

Patch pavement cut to excessive depth by equipment failure with an approved epoxy material. Re-plane patched area to an acceptable approved ride quality. Payment for these corrections is subsidiary to this item

Stockpile milling material for use for backfilling pavement edges. An area for stockpiling material within the project limits or in close proximity of the project limits will be available for use by the Contractor.

Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at Contractor’s expense.

Remove the loose material from the roadway before opening to traffic.

ITEM 421: HYDRAULIC CEMENT CONCRETE

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department’s Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Provide sulfate resistant concrete for box culverts and all drilled shafts.

ITEM 440: REINFORCEMENT FOR CONCRETE

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strip and Rip Rap Items. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved.

ITEM 466: HEADWALLS AND WINGWALLS

Reshape embankment side slopes, provide embankment as required, and add topsoil to achieve a smooth uniform finish around the installation of the safety end treatments and culvert extensions as directed. Finishing and reshaping work will be subsidiary to this item. If such work extends beyond localized efforts within 10’ of the headwall / wingwall, additional work will be paid by as agreed with the Engineer.

ITEM 500: MOBILIZATION

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide a person on the project at all times (24 hours/day, 7 days/week) to patrol, monitor, and maintain the traffic control devices and signs. The person must be knowledgeable of TxDOT Guidelines for traffic control devices and signs.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with

at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

ITEM 504: FIELD OFFICE

Furnish one Asphalt Mix Control Laboratory (Type D) for this project.

ITEM 506: TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" plywood sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text

"SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

No soil disturbing activities will begin on any section of TxDOT ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Cleaning and sweeping of open roadways due to material spillage or loss from Contractor equipment or tires will be the responsibility of the Contractor at no cost to TxDOT. This work will not be charged as Item 738, "Cleaning and Sweeping Highways". Cleaning and sweeping of roadways will be completed as directed, including multiple times per day if necessary, to maintain acceptable roadways for the traveling public and to meet environmental regulations. Construction activities will cease when material deposited on the roadway is not properly removed or when equipment is not available as needed. Adequate construction exits will be planned, constructed and maintained by the Contractor per Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls".

ITEM 540: METAL BEAM GUARD FENCE

Furnish steel post throughout the project except as specifically noted in the plans.

Wooden block out will not be allowed.

ITEMS 542 & 544: REMOVING METAL BEAM GUARD FENCE & GUARDRAIL END TREATMENTS

W-Beam elements, steel posts and composite material blockouts deemed salvageable will remain the property of the State and will be dismantled and returned to the TxDOT Maintenance yard within fifty (50) miles of project as directed. All other guard fence, and SGT's deemed non-salvageable will become the property of the contractor.

ITEM 544: GUARDRAIL END TREATMENTS

The use of wooden block-outs will not be allowed.

ITEM 585: RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule 2 on the travel lanes.

Use Surface Test Type B pay adjustment schedule 3 on the service roads.

Use Surface Test Type B pay adjustment schedule 3 on the ramps.

The contractor will ensure satisfactory profile results in the intermediate paving layers (mixture) to eliminate corrective action for excessive deviations in the final surface layers.

Milling will not be allowed as a corrective action for excessive deviations in the surface layer.

ITEM 644: SMALL ROADSIDE SIGN ASSEMBLIES

Bolt Clamp type will be used on Texas Triangular Slip Base System.

As practical with new construction, leave the existing sign assemblies in place until the proposed foundation, post and sign are in installed, and then remove the old sign assemblies.
Do not leave any sign foundation holes open overnight. Ensure all holes drilled are at least the minimum required depth with no loose material remaining in the hole.

Stake proposed sign locations and receive approval before installation of sign foundations.

Existing Mile Markers Signs are to be relocated to their original location(s) as they were prior to the beginning of the project.

Expanded foam foundations are not permitted.

Cut the bottom of all posts square.

For sign types which design details are not shown on these plans, fabricate according to the "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS".

Removed material that is deemed salvageable (signs and posts) will be the property of TxDOT. Deliver salvageable material to the TxDOT Maintenance Office. Remove unsalvageable material.

The Contractor will relocate the existing double sided street name signs and furnish the post mounted brackets for the street name signs to be paid for as part of the proposed Stop Signs (R1-1). Existing street name signs will be mounted above Stop signs. If damaged while being relocated, the Contractor will furnish new double sided street name sign at their own expense.

ITEM 658: DELINEATOR AND OBJECT MARKER ASSEMBLIES

All flexible and GF2 delineators will have a tubular body.

The delineator assembly BRF Class A (D-SW) and (D-SY) are to be single delineators (Class I) attached to a flat, plastic bracket to facilitate the mounting of the delineator on top of the bridge rail at the locations shown on the plans. Submit a sample for approval before ordering materials.

ITEM 662: WORK ZONE PAVEMENT MARKINGS

Paint and beads may be used for non-removable pavement markings.

ITEM 666: RETROREFLECTORIZED PAVEMENT MARKINGS

The Contractor will layout the proposed striping in accordance with TxDOT Traffic Control Plan Standards and latest version Texas Manual on Uniform Traffic Control Devices (TMUTCD) and project striping layout sheets. The Engineer will verify proposed striping layout prior to the beginning of striping operations.

The Contractor will locate the beginning and ending points of No Pass Zones.

ITEM 668: PREFABRICATED PAVEMENT MARKINGS

Use Type C prefabricated pavement markings.

ITEM 672: RAISED PAVEMENT MARKERS

Existing raised pavement markers to be replaced will be removed at the same time that the new markers are placed (i.e. remove and replace in one operation). Existing raised pavement markers replaced by new markers will be removed in accordance with Item 677, “Eliminating Existing Pavement Markings and Markers”. Immediately fill the damaged area in the pavement due to the removal of existing markers with an approved bituminous material. This removal and backfill work will not be paid for directly, but will be subsidiary to Item 672, "Raised Pavement Markers".

ITEM 3080: STONE-MATRIX ASPHALT

RAP from Contractor owned sources may be used if the RAP is fractionated.

Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class A.

Maximum stripping of 0% is required.

No Recycled Asphalt Shingles (RAS) will be allowed.

ITEM 3096: ASPHLATS, OILS, AND EMULSIONS

Latex additives or modifiers will not be allowed on this project.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

This project will require “full matrix” type portable changeable message signs.

Ensure that the Contractor’s Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish 2 portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

Supply portable changeable message sign(s) in accordance with the Traffic Control Plan standard sheets and Article 6f.55 of the Texas Manual on Uniform Traffic Control Devices for Streets and Highways Part VI.

ITEM 6185: TRUCK MOUNTED ATTENUATORS

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.

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario		Required TMA	
(1-1)-18 / (1-2)-18			1	
(1-3)-18	A	B	1	2
(1-4)-18			1	

TCP 2 Series	Scenario		Required TMA	
(2-1)-18 / (2-2)-18 / (2-4)-18 / (2-5)-18 / (2-6)-18	All		1	
(2-3)-23	A	B	1	2

TCP 3 Series	Scenario			Required TMA
(3-1)-13	All			2
(3-2)-13	All			3
(3-3)-14	A	B	D	2
	C			3

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the day and must be available for use at any time as determined by the Engineer.

Mobile operations will be paid for by the hour, per specifications. For mobile operations, payment will be made only while the TMA is in use.

For mobile operations requiring multiple TMA’s, judgement may be applied in lower speed, urban / in town traffic environments to reduce the numbers of TMA in use where the added TMA may pose a hazard for traffic entering and exiting driveways, side streets, etc.

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the contractor expects compensation will require prior approval from the Engineer.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2311-01-042 **DISTRICT** Waco **COUNTY** McLennan
HIGHWAY SL 340, SS 299

				0162-01-092		2311-01-042		2362-01-038		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB									
		PROJECT ID		**A00004618**		**A00129425**		**A00129424**			
		COUNTY		**McLennan**		**McLennan**		**McLennan**			
		HIGHWAY		**SS 299**		**SL 340**		**SL 340**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)	SY			868.000		417.000		1,285.000	
	106-6002	OBLITERATING ABANDONED ROAD	SY	85.000						85.000	
	110-6002	EXCAVATION (CHANNEL)	CY	25.000						25.000	
	132-6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	30.000						30.000	
	134-6002	BACKFILL (TY B)	STA	25.000		38.000		13.000		76.000	
	162-6002	BLOCK SODDING	SY	120.000						120.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	60.000						60.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	60.000						60.000	
	168-6001	VEGETATIVE WATERING	MG	2.000						2.000	
	351-6006	FLEXIBLE PAVEMENT STRUCTURE REPAIR(10")	SY	100.000		800.000		200.000		1,100.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY			28,560.000		5,617.000		34,177.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY			20,228.000		1,956.000		22,184.000	
	354-6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	2,127.000						2,127.000	
	429-6009	CONC STR REPAIR (STANDARD)	SF	3.000						3.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	15.000						15.000	
	432-6026	RIPRAP (STONE COMMON)(DRY)(18 IN)	CY	52.000						52.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	22.000		186.000		54.000		262.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF			561.000		338.000		899.000	
	466-6151	WINGWALL (FW - 0) (HW=4 FT)	EA	2.000						2.000	
	496-6005	REMOV STR (WINGWALL)	EA	2.000						2.000	
	500-6001	MOBILIZATION	LS	0.050		0.800		0.150		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO			5.000				5.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF			95.000		75.000		170.000	
	506-6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	55.000						55.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	55.000		95.000		75.000		225.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	170.000		135.000				305.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	170.000		135.000				305.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	325.000		3,575.000		1,100.000		5,000.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA			6.000		2.000		8.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA			1.000				1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF			3,575.000		1,100.000		4,675.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA			1.000				1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		7.000		2.000		13.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA			7.000		2.000		9.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA			6.000				6.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA			5.000				5.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA			9.000		4.000		13.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2311-01-042 **DISTRICT** Waco **COUNTY** McLennan
HIGHWAY SL 340, SS 299

				0162-01-092		2311-01-042		2362-01-038		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB									
		PROJECT ID		**A00004618**		**A00129425**		**A00129424**			
		COUNTY		**McLennan**		**McLennan**		**McLennan**			
		HIGHWAY		**SS 299**		**SL 340**		**SL 340**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	6.000		48.000		16.000		70.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	101.000		627.000		192.000		920.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	319.000		900.000		285.000		1,504.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF			1,365.000		75.000		1,440.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	94.000		5,910.000		1,365.000		7,369.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF			830.000		185.000		1,015.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF			1,045.000		535.000		1,580.000	
	666-6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF			50.000		30.000		80.000	
	666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF			600.000				600.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1,220.000		4,400.000		1,650.000		7,270.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	4,810.000		17,025.000		4,925.000		26,760.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1,170.000		2,040.000		1,210.000		4,420.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	4,615.000		16,935.000		5,075.000		26,625.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	7.000		39.000		5.000		51.000	
	668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA			2.000		1.000		3.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	1.000		30.000		2.000		33.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA			78.000				78.000	
	672-6007	REFL PAV MRKR TY I-C	EA	61.000		640.000		119.000		820.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	115.000		360.000		127.000		602.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA			66.000		51.000		117.000	
	3080-6007	STONE-MTRX-ASPH SMA-D SAC-A PG76-22	TON	1,396.000		11,622.000		3,806.000		16,824.000	
	3085-6001	UNDERSEAL COURSE	GAL	4,230.000		26,416.000		8,651.000		39,297.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	28.000		14.000		14.000		56.000	
	6185-6002	TMA (STATIONARY)	DAY	20.000		36.000		16.000		72.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	48.000		80.000		24.000		152.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS			1.000				1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS			1.000				1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS			1.000				1.000	

SUMMARY OF EROSION CONTROL AND WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	506	506	506	506	506	662	662	6001	6185	6185
	6001	6003	6011	6038	6039	6109	6111	6001	6002	6003
	ROCK FILTER DAMS (TY 1)	ROCK FILTER DAMS (TY 3)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LF	LF	LF	LF	LF	EA	EA	DAY	DAY	HR
CSJ 0162-01-092										
STA 10+00.00 TO 29+00.00		55	55	170	170	57	207			
STA 29+00.00 TO END						44	112			
OVERALL								28	20	48
SUBTOTAL		55	55	170	170	101	319	28	20	48
CSJ 2311-01-042										
STA 10+00.00 TO 20+10.00	20		20			72	204			
STA 20+10.00 TO 30+10.00	25		25	90	90	127	49			
STA 30+10.00 TO 40+10.00						73	112			
STA 40+10.00 TO 50+10.00						56	104			
STA 50+10.00 TO 60+10.00						47	113			
STA 60+10.00 TO 69+00.00						35	102			
STA 69+00.00 TO 79+00.00	25		25	45	45	139	135			
STA 79+00.00 TO 85+03.00	25		25			78	81			
OVERALL								14	36	80
SUBTOTAL	95		95	135	135	627	900	14	36	80
CSJ 2362-01-038										
STA 85+03.00 TO 90+00.00						50	57			
STA 90+00.00 TO 101+00.00	25		25			105	125			
STA 101+00.00 TO 111+68.33	50		50			37	103			
OVERALL								14	16	24
SUBTOTAL	75		75			192	285	14	16	24
PROJECT TOTALS	170	55	225	305	305	920	1504	56	72	152

SUMMARY OF ROADWAY ITEMS

LOCATION	106	134	351	354	354	354	3080	3085
	6002	6002	6006	6021	6045	6051	6007	6001
	OBLITERATE ABANDONED ROAD	BACKFILL (TY B)	FLEXIBLE PAVEMENT STRUCTURE REPAIR (10")	PLANE ASPH CONC PAV (0" TO 2")	PLANE ASPH CONC PAV (2")	PLANE ASPH CONC PAV (0" TO 1 1/2")	STONE-MTRX -ASPH SMA - D SAC - A PG 76 - 22	UNDERSEAL COURSE
	SY	STA	SY	SY	SY	SY	TON	GAL
CSJ 0162-01-092								
STA 10+00.00 TO 29+00.00	85					1067	874	2649
STA 29+00.00 TO END						1060	522	1581
OVERALL		25	100					
SUBTOTAL	85	25	100			2127	1396	4230
CSJ 2311-01-042								
STA 10+10.00 TO 20+10.00				6905	488		1654	3759
STA 20+10.00 TO 30+10.00				4728	7592		1397	3176
STA 30+10.00 TO 40+10.00				3209	427		1315	2988
STA 40+10.00 TO 50+10.00							1182	2688
STA 50+10.00 TO 60+10.00							1187	2697
STA 60+10.00 TO 69+00.00				1932			1030	2341
STA 69+00.00 TO 79+00.00				8513	4596		2630	5978
STA 79+00.00 TO 85+03.00				3273	7125		1227	2789
OVERALL		38	800					
SUBTOTAL		38	800	28560	20228		11622	26416
CSJ 2362-01-038								
STA 85+03.00 TO 90+00.00				2672	488		945	2149
STA 90+00.00 TO 101+00.00				2945	1468		1649	3748
STA 101+00.00 TO 111+36.45							1212	2754
OVERALL		13	200					
SUBTOTAL		13	200	5617	1956		3806	8651
PROJECT TOTALS	85	76	1100	34177	22184	2127	16824	39297

SUMMARY OF METAL BEAM GUARD FENCE ITEMS

LOCATION	104	432	540	540	540	542	542	544	544	658	658
	6009	6045	6002	6006	6016	6001	6002	6001	6003	6013	6061
	REMOVING CONC (RIPRAP)	RIPRAP (MOW STRIP) (4")	MTL W-BEAM GD FEN (STL POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	DOWNSTREAM ANCHOR TERMINAL SECTION	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2
	SY	CY	LF	EA	EA	LF	EA	EA	EA	EA	EA
CSJ 0162-01-092											
STA 10+00.00 TO 29+00.00		22	325					4			6
OVERALL											
SUBTOTAL		22	325					4			6
CSJ 2311-01-042											
STA 66+00.00 TO 70+00.00	60	41	620	2		620		3	3	1	10
STA 70+00.00 TO 75+00.00	197	44	982.5	2	1	982.5	1			4	13
STA 75+00.00 TO 80+00.00	390	72	1359			1359		4	4		18
STA 80+00.00 TO 85+00.00	221	29	613.5	2		613.5				4	7
STA 85+00.00 TO 85+03.00											
OVERALL											
SUBTOTAL	868	186	3575	6	1	3575	1	7	7	9	48
CSJ 2362-01-038											
STA 85+03.00 TO 90+00.00	213	27	596.5	2		596.5				4	8
STA 90+00.00 TO 95+00.00	204	27	503.5			503.5		2	2		8
OVERALL											
SUBTOTAL	417	54	1100	2		1100		2	2	4	16
PROJECT TOTALS	1285	262	5000	8	1	4675	1	13	9	13	70

Seiler Lankes Group TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

CONSOLIDATED SUMMARIES

SHEET 1 OF 2

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		23

USER: egutierrez
DATE: 8/31/2023 11:36
SCRIPT: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Miscellaneous/092_ETC_WACO_60.pen
FILE: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_2311-01-042/Design_Data/4 - Design/Plan_Set/01_General/042_Summ1.dgn

SUMMARY OF SIGNING AND PAVEMENT MARKING ITEMS

LOCATION	644	644	666	666	666	666	666	666	666	666	666	666	668	668	668	668	672	672	672
	6001	6076	6018	6036	6042	6048	6138	6147	6306	6309	6318	6321	6077	6080	6085	6092	6007	6009	6010
	IN SM RD SN SUP&AM TY 10BWG(1)SA(P)	REMOVE SM RD SN SUP&AM	REFL PAV MRK TY I (W) 6" (DOT) (100 MIL)	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)	REFL PAV MRK TY I (Y)8"(SLD) (100MIL)	REFL PAV MRK TY I (Y)24"(SLD) (100MIL)	RE PM W/RET REQ TY I (W) 6" (BRK) (100 MIL)	RE PM W/RET REQ TY I (W) 6" (SLD) (100 MIL)	RE PM W/RET REQ TY I (Y) 6" (BRK) (100 MIL)	RE PM W/RET REQ TY I (Y) 6" (SLD) (100 MIL)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (U TURN ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (36") (YLD TRI)	REFL PAV MRKR TY I - C	REFL PAV MRKR TY II -A-A	REFL PAV MRKR TY II - C - R
	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA
CSJ 0162-01-092																			
STA 10+00.00 TO 29+00.00									760	3000	760	3000	4				39	74	
STA 29+00.00 TO END				94					460	1810	410	1615	3		1		22	41	
OVERALL																			
SUBTOTAL				94					1220	4810	1170	4615	7		1		61	115	
CSJ 2311-01-042																			
STA 10+00.00 TO 20+10.00	2	1	195	495		195			630	3315		4080	4		4	6	98	120	
STA 20+10.00 TO 30+10.00		3	270	1595		490	50		630	1110		970	11	1	9	11	102	14	
STA 30+10.00 TO 40+10.00	4		250	675		125		480	520	1965		2235	9		8	42	129	6	
STA 40+10.00 TO 50+10.00		1	214	250		60		65	580	1905	280	1935	4		3	19	69	34	
STA 50+10.00 TO 60+10.00			75	220					480	1870	500	2010	3		2		51	50	
STA 60+10.00 TO 69+00.00			250			70			460	1785	460	1800	2				76	44	
STA 69+00.00 TO 79+00.00			30	1695	830	20			720	3840	500	2440	1				47	50	66
STA 79+00.00 TO 85+03.00			81	980		85		55	380	1235	300	1465	5	1	4		68	42	
OVERALL																			
SUBTOTAL	6	5	1365	5910	830	1045	50	600	4400	17025	2040	16935	39	2	30	78	640	360	66
CSJ 2362-01-038																			
STA 85+03.00 TO 90+00.00			60	290		100			470	1000	260	1000	3	1	2		50	24	
STA 90+00.00 TO 101+00.00				1035	185				710	2210	530	2235					38	55	51
STA 101+00.00 TO 111+68.33			15	40		435	30		470	1715	420	1840	2				31	48	
OVERALL																			
SUBTOTAL			75	1365	185	535	30		1650	4925	1210	5075	5	1	2		119	127	51
PROJECT TOTALS	6	5	1440	7369	1015	1580	80	600	7270	26760	4420	26625	51	3	33	78	820	602	117

SUMMARY OF BRIDGE ITEMS

LOCATION	DESCRIPTION	438
		6002
		CLEANING AND SEALING EXISTING JOINTS (CL 3)
		LF
CSJ 2311-01-042		
Lp 340 at UPRR		561
TOTAL		561
CSJ 2362-01-038		
Lp 340 at US 84		338
TOTAL		338
PROJECT TOTALS		899

SUMMARY OF DRAINAGE ITEMS

LOCATION	DESCRIPTION	110	132	162	164	164	168	429	432	432	466	496
		6002	6019	6002	6009	6011	6001	6009	6002	6026	6151	6005
		EXCAVATION (CHANNEL)	EMBANKMENT (VEHICLE) (ORD COMP) (TY B)	BLOCK SODDING	BROADCAST SEED (TEMP)(WARM)	BROADCAST SEED (TEMP)(COOL)	VEGETATIVE WATERING	CONC STR REPAIR (STANDARD)	RIPRAP (CONC)(5 IN)	RIPRAP (STONE COMMON) (DRY)(18 IN)	WINGWALL (FW-0) (HW=4 FT)	REMOVE STR (WINGWALL)
		CY	CY	SY	SY	SY	MG	SF	CY	CY	EA	EA
CSJ 0162-01-092												
STA 10+00.00 TO 29+00.00		25	30	120	60	60	2	3	15	52	2	2
STA 29+00.00 TO END												
OVERALL												
PROJECT TOTALS		25	30	120	60	60	2	3	15	52	2	2

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CONSOLIDATED SUMMARIES

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		24

USER: eguiterrez 11:36
DATE: 8/31/2023
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FILE: pw://server.sllgeng.com:Sllg-dst/Documents/TxDOT/2202 Waco/CSJ_2311-01-042/Design_Data/4 - Design/Plan_Set/01: General/042_Summ2.dgn

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	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
1	1	R3-5R	RIGHT ARROW ONLY		X		10BWG	1	SA	P		
	2	R3-5R	RIGHT ARROW ONLY		X		10BWG	1	SA	P		
2	1	R3-5R	RIGHT ARROW ONLY		X		10BWG	1	SA	P		
	2	R6-1	ONE WAY		X		10BWG	1	SA	P		
	3	R6-1	ONE WAY		X		10BWG	1	SA	P		
	4	R3-5R	RIGHT ARROW ONLY		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

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		2311	01	042, ETC.	SL 340, ETC.
4-16		DIST	COUNTY		SHEET NO.
8-16		WAC	MCLENNAN		25

DATE: DATE TIME
FILE: DOCUMENT NAME

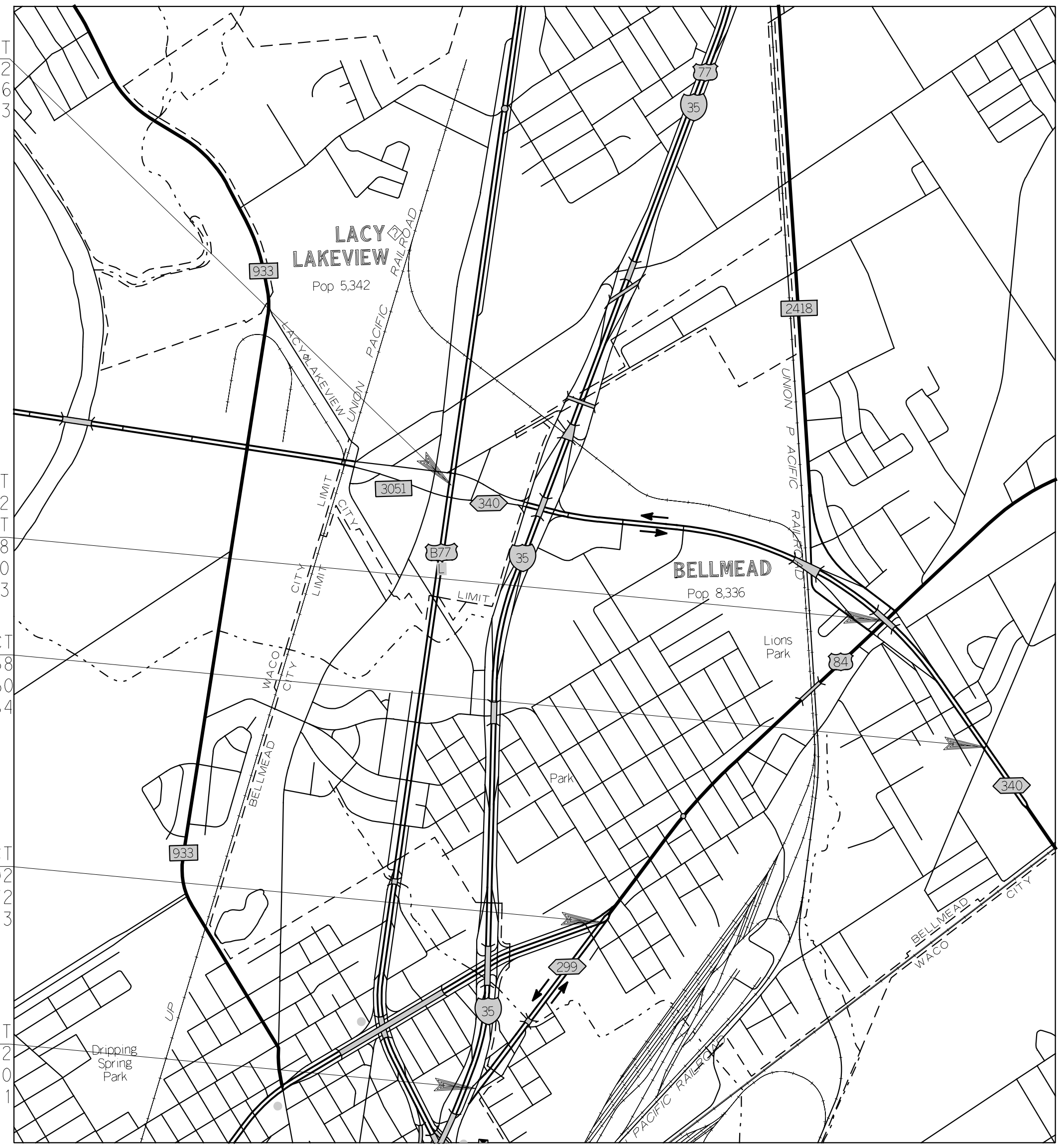
BEGIN PROJECT
CSJ: 2311-01-042
STA: 14+11.96
REF. MRKR. 572+0.043

END PROJECT
CSJ: 2311-01-042
BEGIN PROJECT
CSJ: 2362-01-38
STA: 85+03.00
REF. MRKR. 348+1.293

END PROJECT
CSJ: 2362-01-038
STA: 109+84.60
REF. MRKR. 348+1.784

END PROJECT
CSJ: 0162-01-092
STA: 39+77.72
REF. MRKR. 572+0.553

BEGIN PROJECT
CSJ: 0162-01-092
STA: 10+00.00
REF. MRKR. 572-0.011



VICINITY MAP

1" = 3000' HORIZ.

1. SIGNS G20-IT WITH PLAQE OR G20-5T, G20-6, G20-2a, G20-2b, CW20-ID, R20-3, R20-5, G20-9T AND R20-5 PLAQUE WILL BE REQUIRED AT PROJECT LIMITS.

2. CW20-ID AND G20-2a WILL BE REQUIRED AT ALL CROSSROADS.

3. G20-Ia WILL BE REQUIRED AT ALL MAJOR CROSSROADS.

SIGNAGE LEGEND

G20-IT W/ PLAQUE OR	48X18	BEGIN ROAD WORK NEXT X MILES
G20-5T	48X24	BEGIN ROAD WORK NEXT X MILES
G20-6	48X30	NAME, ADDRESS, CITY, STATE, CONTRACTOR
G20-9T	36X30	BEGIN WORK ZONE
G20-2b	36X18	END WORK ZONE
R20-3	48X42	OBEY WARNING SIGNS STATE LAW
G20-Ia	72X36	ROAD WORK NEXT X MILES
CW20-ID	48X48	ROAD WORK AHEAD
R20-5	36X36	TRAFFIC FINES DOUBLE
R20-5 PLAQUE	36X18	WHEN WORKERS ARE PRESENT
G20-2a	48X24	END ROAD WORK

NOTES:

1. ALL TRAFFIC CONTROL DEVICES WILL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (TMUTCD), AND WILL BE MAINTAINED AS DIRECTED. ADDITIONAL GUIDELINES FOR TRAFFIC CONTROL DEVICES MAY BE FOUND IN THE TMUTCD.

2. FOR CHANNELIZING DEVICE PLACEMENT AND SPACING FOR ALL PHASES, REFER TO THE TCP STANDARDS.

GENERAL

A. INSTALL ALL SIGNS, BARRICADES AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED.

B. ADDITIONAL SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES WILL BE CONSIDERED SUBSIDIARY TO THE ITEM "BARRICADES, SIGNS AND TRAFFIC HANDLING".

C. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN AND IN GOOD REPAIR.

D. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.

E. METAL BEAM GUARD FENCE REPLACEMENT AND CULVERT WORK MAY BE DONE DURING DAYTIME HOURS. MILL, LEVEL-UP AND SMA OVERLAY WORK SHALL BE PERFORMED DURING NIGHTTIME HOURS.

F. THE CONTRACTOR WILL ONLY BE PERMITTED TO MILL AN AREA THAT CAN BE OVERLAID DURING THAT NIGHT'S OPERATION. PLACING TRAFFIC ON A SEGMENT OF ROADWAY AFTER MILLING WILL NOT BE PERMITTED.

G. ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR HIS WRITTEN APPROVAL.

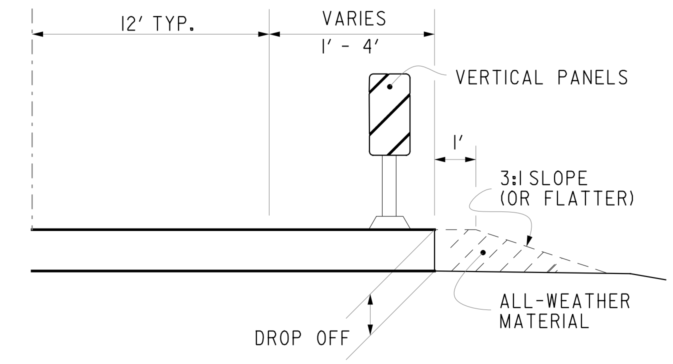
SEQUENCE OF CONSTRUCTION

A. THIS PROJECT CONSISTS OF TWO SEPARATE WORK AREAS AS DEFINED BY CSJ'S:
1. SL 340 (FROM: FM 3051 TO: WILLIAMS ROAD) (CSJ 2311 - 01 - 042 & CSJ 2362- 01- 038)
2. SS 299 (FROM: IH 35 TO: US 84) (CSJ 0162 - 01 - 092)

B. SCHEDULE PROPOSED WORK IN ONLY ONE WORK AREA AT A TIME. THERE WILL BE NO WORK PERFORMED IN MORE THAN ONE WORK AREA AT A TIME. EACH CSJ GROUP WILL BE CONSTRUCTED SEPARATELY IN A SEQUENCE SHOWN IN THE CONTRACTOR'S SCHEDULE.

C. FINISH PROPOSED WORK IN EACH WORK AREA BEFORE PROCEEDING TO PERFORM WORK IN ANOTHER WORK AREA. AT A MINIMUM, ALL SAFETY END TREATMENT AT CROSS DRAINAGE CULVERTS WILL BE COMPLETE AND IN PLACE. OBTAIN APPROVAL BEFORE PROCEEDING TO BEGIN WORK IN ANOTHER WORK AREA.

D. CONTRACTOR WILL COMPLETE THE WORK ACCORDING TO THE FOLLOWING SEQUENCE.
1. SET PROJECT BARRICADES AND EROSION CONTROL MEASURES.
2. USE APPROPRIATE TRAFFIC CONTROL IN EACH AREA OF REPAIR.
3. CONSTRUCT FLEXIBLE PAVEMENT REPAIR AS DIRECTED.
4. COMPLETE SS 299 CULVERT EXTENSION, HEADWALL AND S.E.T.
5. COMPLETE LP 340 LEVEL-UP ACP COURSE AS DIRECTED BY THE ENGINEER. PLACE WORK ZONE MARKINGS AS REQUIRED.
6. ON EACH NIGHT'S OPERATION,
   A. WHEN APPLICABLE, PLANE EXISTING ACP AS SHOWN ON PLANS.
   B. PLACE UNDERSEAL COURSE AND SMA AS SHOWN ON THE PLANS.
   C. PLACE TEMPORARY PAVEMENT MARKINGS (TABS).
7. PLACE PERMANENT PAVEMENT MARKINGS.
8. COMPLETE MBGF AND APPURTENANCES WORK.
9. COMPLETE SL 340 BRIDGE JOINT REPAIRS.
10. COMPLETE ALL OTHER WORK AS SHOWN ON THE PLANS.
11. UPON COMPLETION, PERFORM FINAL CLEAN UP AS DIRECTED, REMOVE EROSION CONTROL MEASURES AND PROJECT BARRICADES.



PAV EDGE DROP-OFF DETAIL

1. LESS THAN 2 INCHES: CW 8-11 SIGNS ARE REQUIRED.

2. GREATER THAN 2 INCHES BUT LESS THAN 24 INCHES: VERTICAL PANELS AND EITHER CW 8-9a OR CW 8-11 SIGNS ARE REQUIRED.

3. THE SAFETY SLOPE WILL BE CONSTRUCTED WITH AN ALL- WEATHER MATERIAL SUCH AS RAP, WHICH IS CLEAN AND FREE OF DEBRIS AND LARGE ROCKS.

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SL 340 & SS 299 SEQUENCE OF CONSTRUCTION

SCALE: FEET
1" = 3000' HORIZ.
SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WAC		MCLENNAN	26

NODE

DATE: 6/30/2023
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ*0162-01-092/Design*Data/4 - Design/Plan*Set/14. Standards/Traffic TCP/bc-21(1).dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

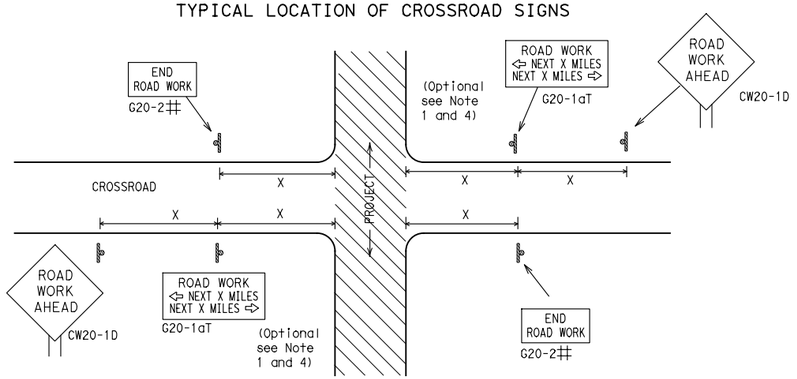
BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		27

95

DATE: 6/30/2023
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(2).dgn

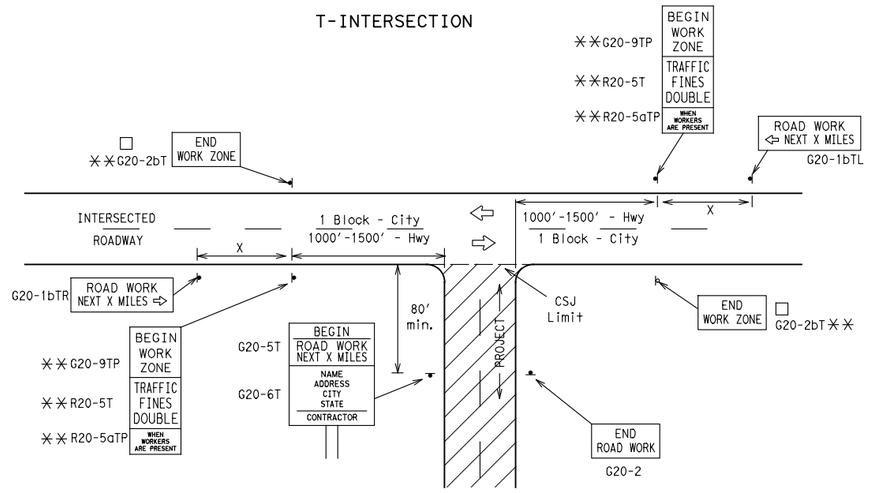
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

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

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
✳	✳[3]

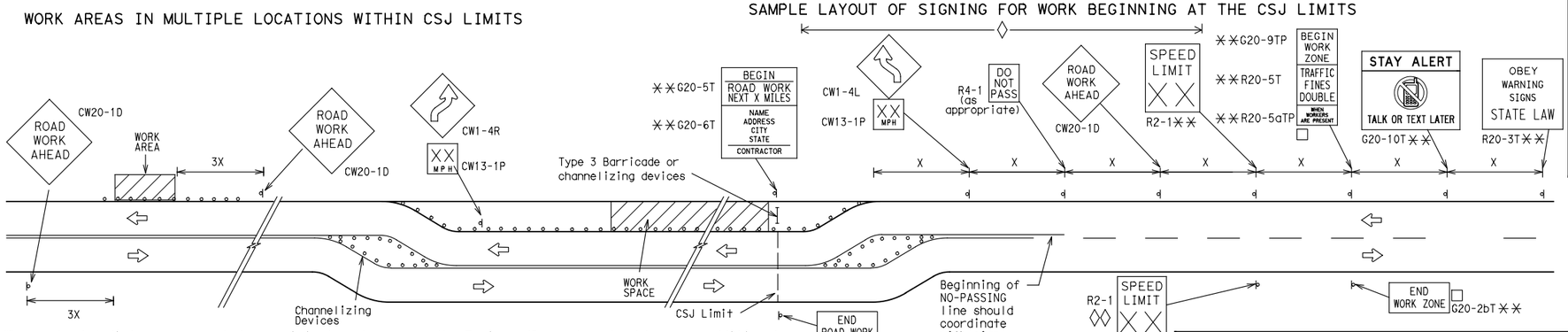
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

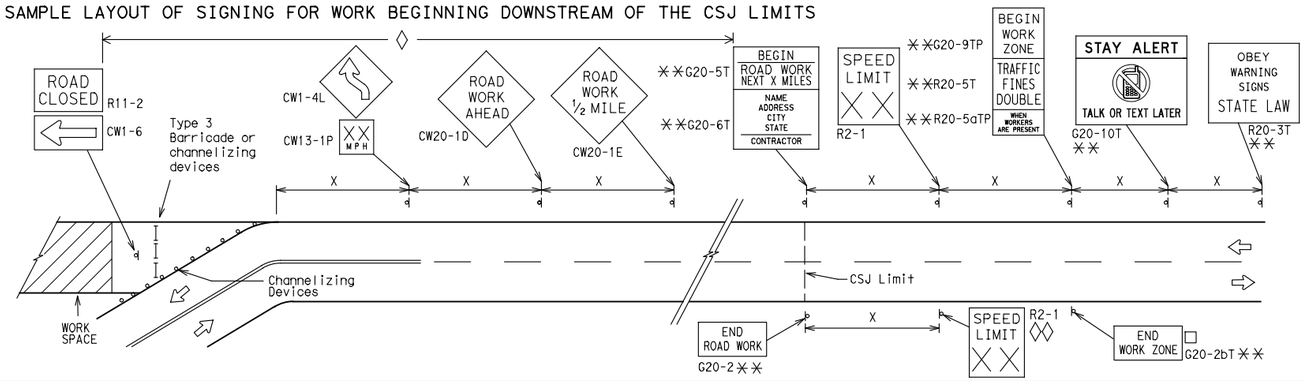
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		28

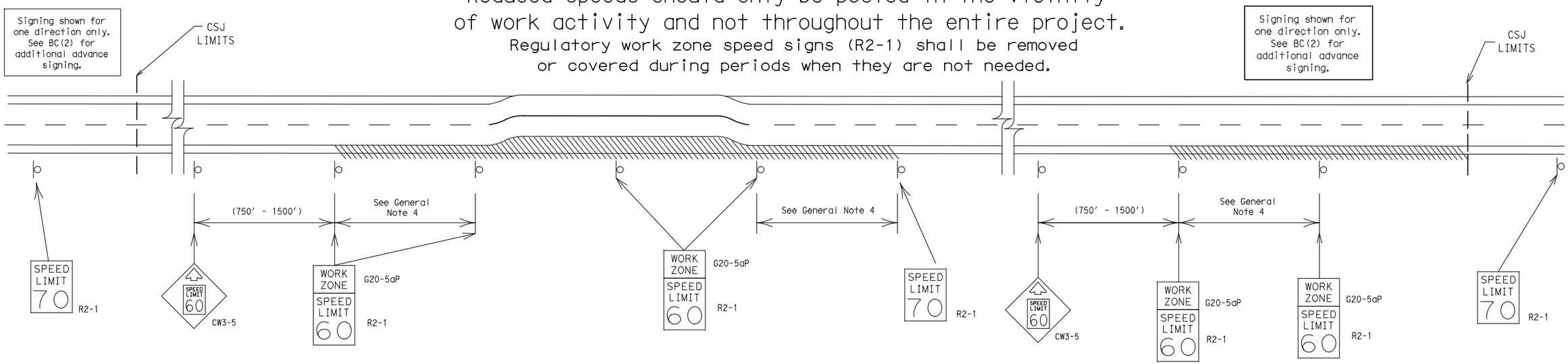
DATE: 6/30/2023
FILE: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(3).dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

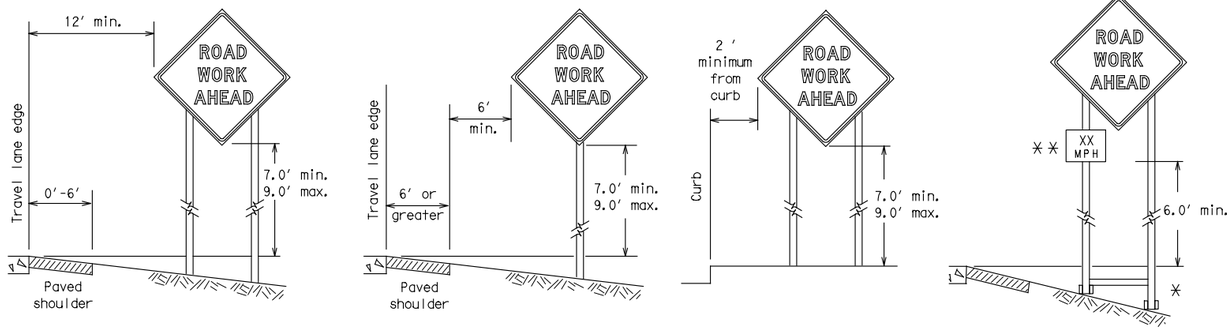
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		29

DATE: 6/30/2023
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(4).dgn

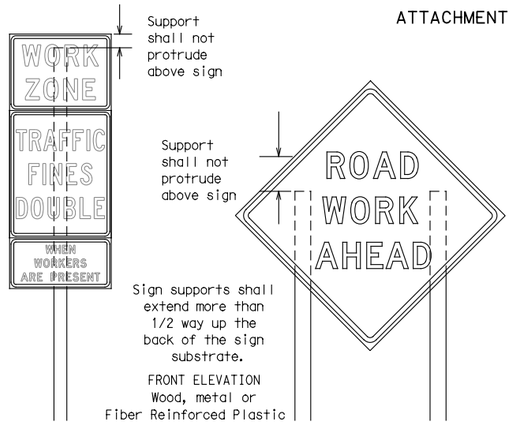
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

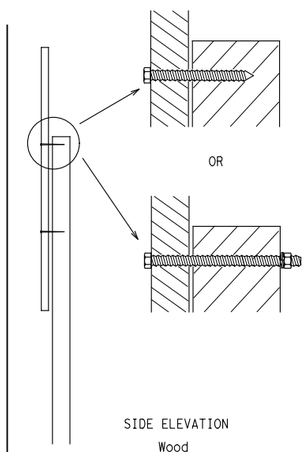


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⚹⚹ 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





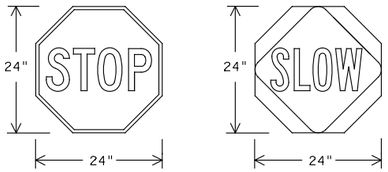
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		30

DATE: 6/30/2023
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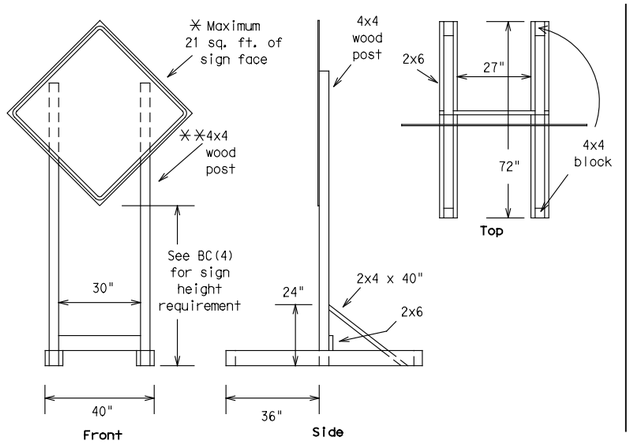
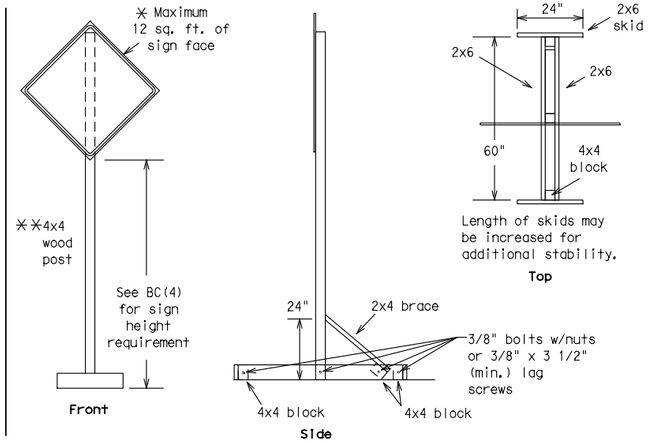
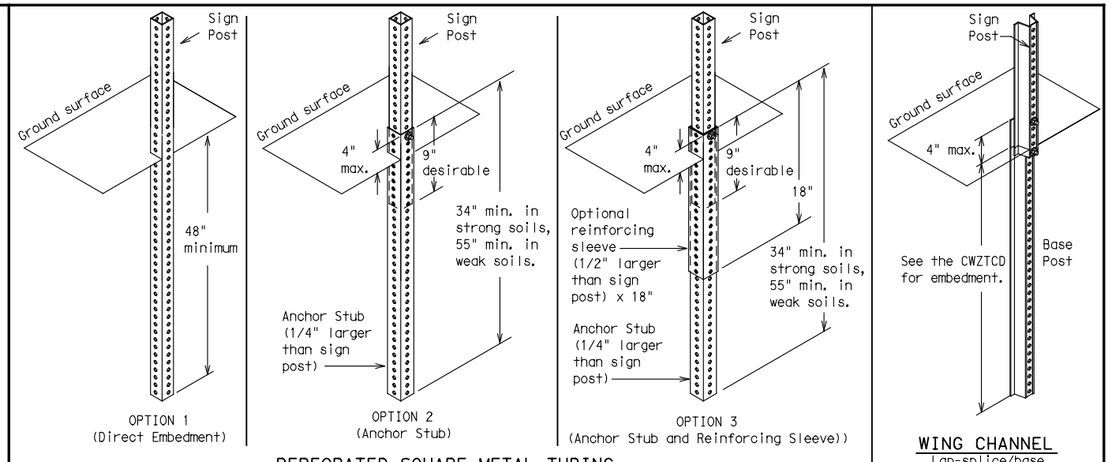




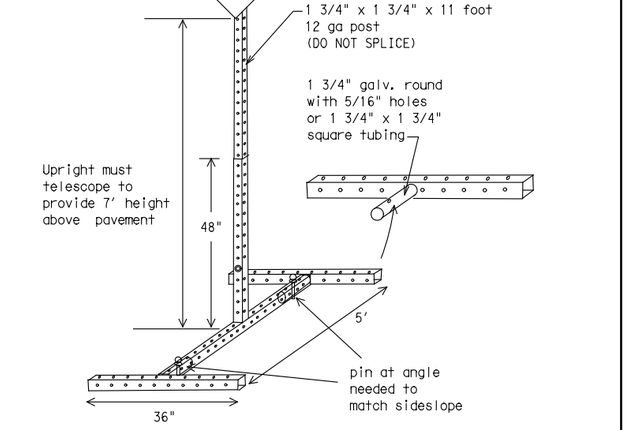
SKID MOUNTED WOOD SIGN SUPPORTS

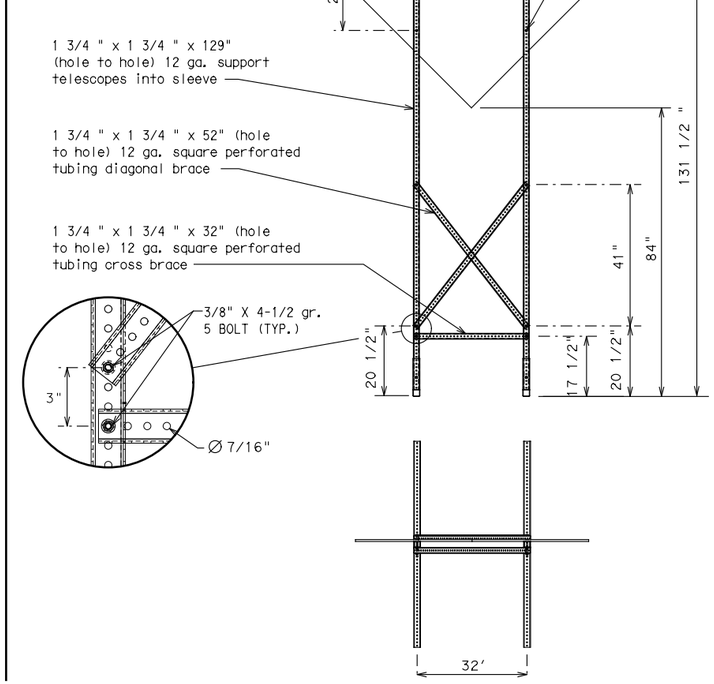
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

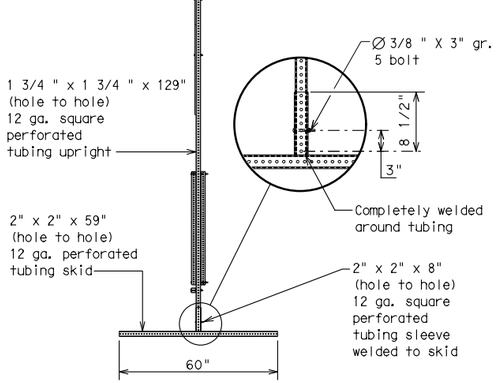


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		31

DATE: 6/30/2023
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(6).dgn

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

✳✳ 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	2311	01	042, ETC.	SL 340, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		32

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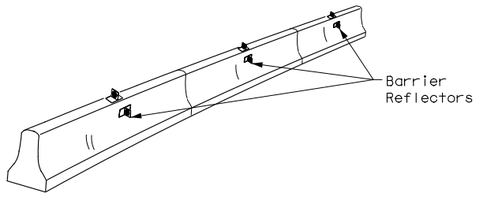
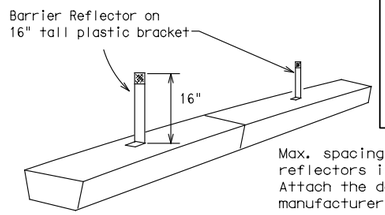
DATE: 6/30/2023
FILE: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(7).dgn

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.



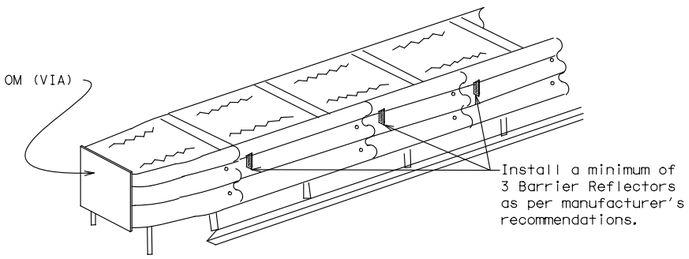
CONCRETE TRAFFIC BARRIER (CTB)

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

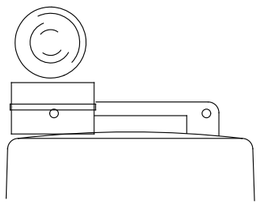
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

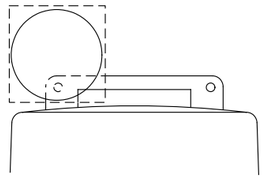
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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.

BARRICADE REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

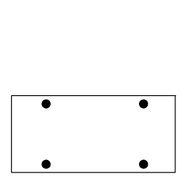
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

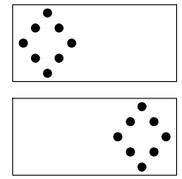
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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:

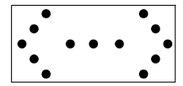


4 CORNER CAUTION

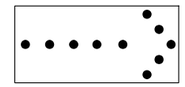
OR



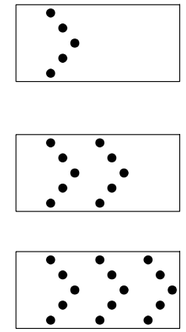
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		33

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DATE: 6/30/2023
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(8).dgn

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:

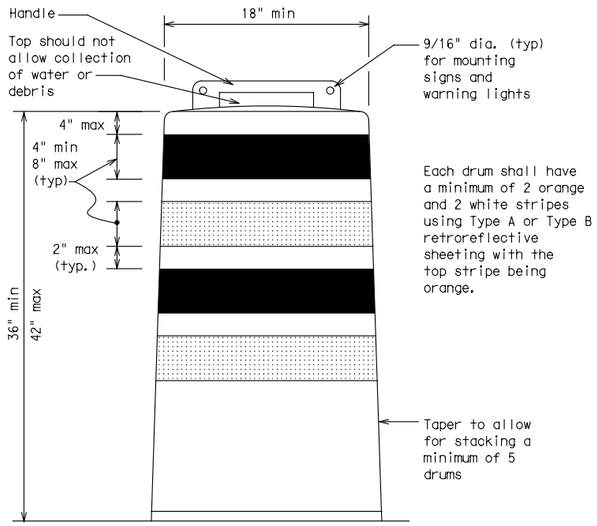
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

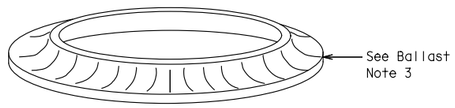
RETROREFLECTIVE SHEETING

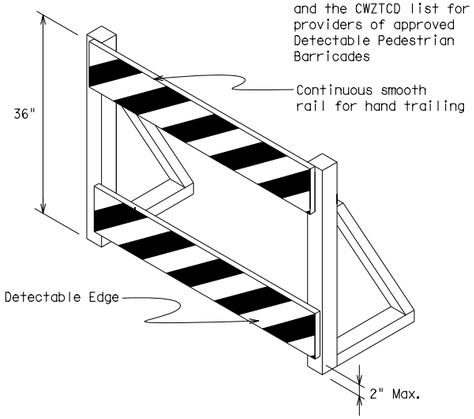
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

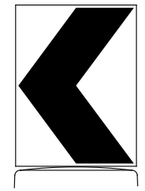




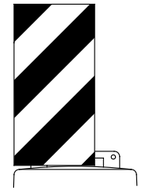


DETECTABLE PEDESTRIAN BARRICADES

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	WAC	MCLENNAN		34
7-13				

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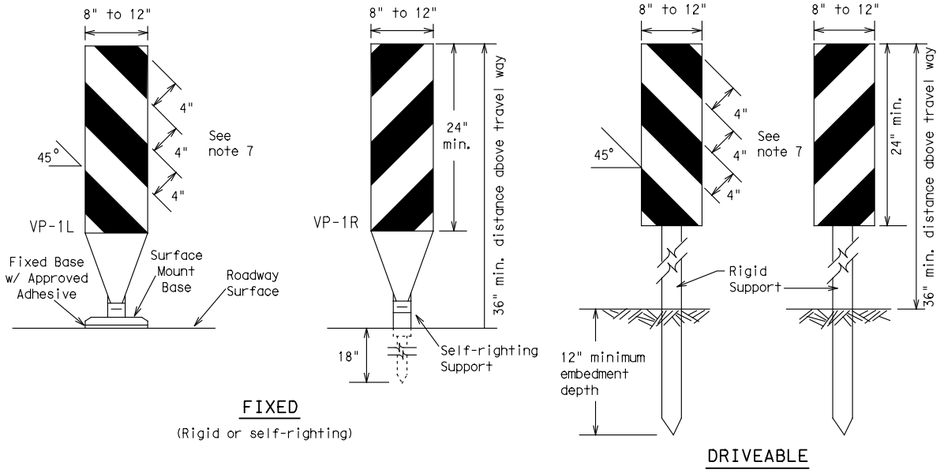
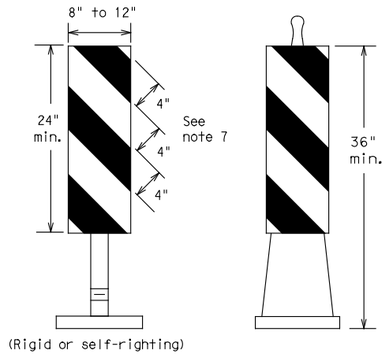
DATE: 6/30/2023
FILE: pw://Server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic TCP/bc-21(9).dgn



FIXED
(Rigid or self-righting)

DRIVEABLE

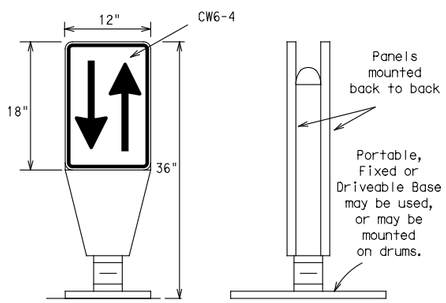


(Rigid or self-righting)

PORTABLE

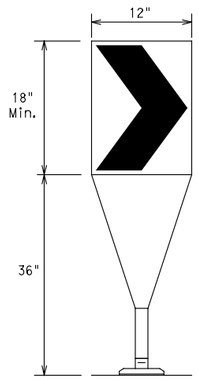
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



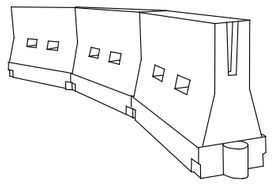
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		35

DATE: 6/30/2023
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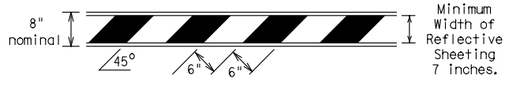
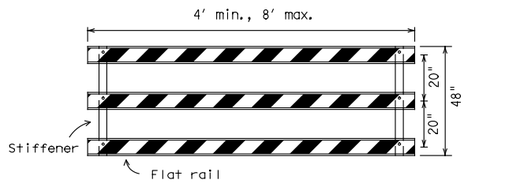
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



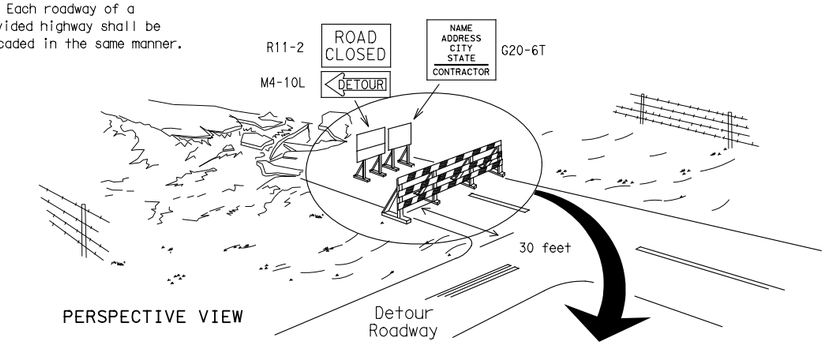
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

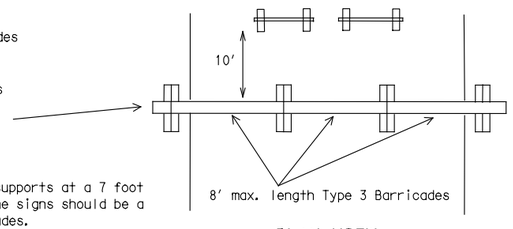
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

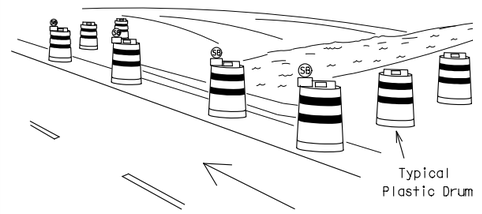
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

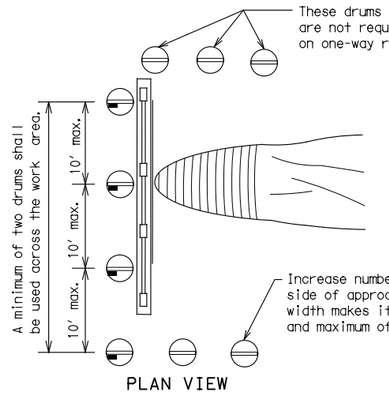
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

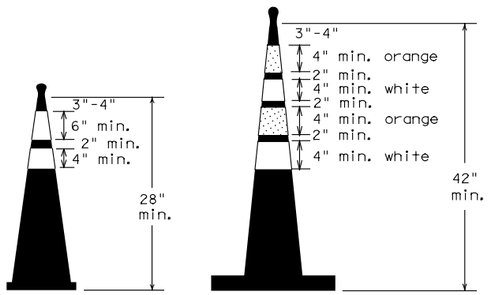
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



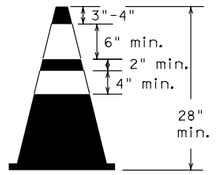
PLAN VIEW

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

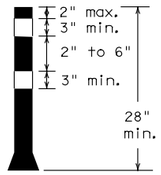
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

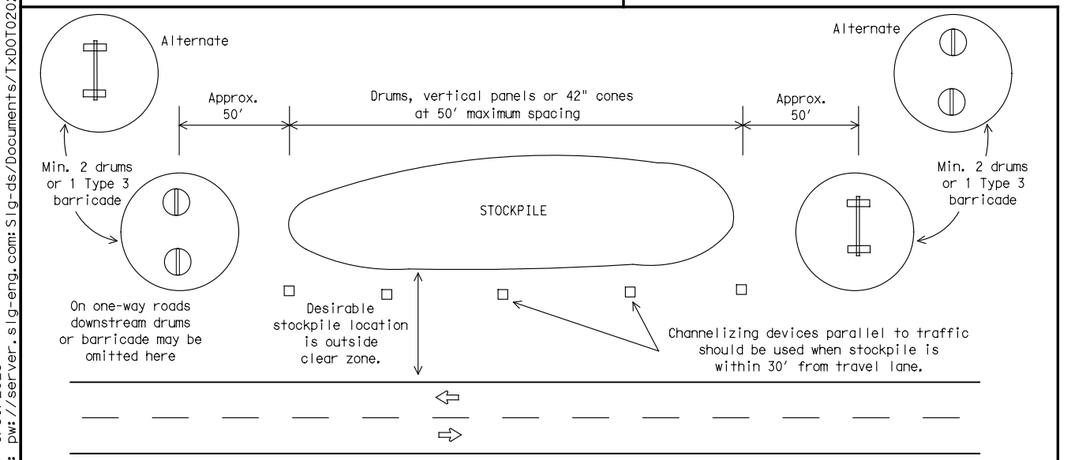


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	MCLENNAN		36

104

DATE: 6/30/2023
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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.

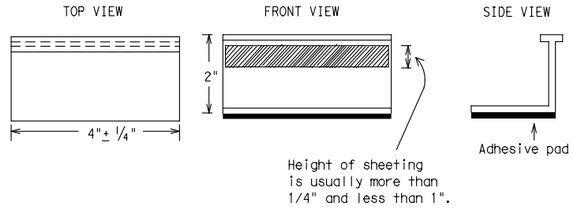
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

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1-02 7-13	WAC	MCLENNAN		37
11-02 8-14				

DATE: 6/30/2023
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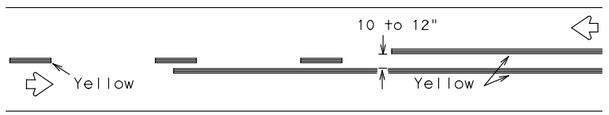
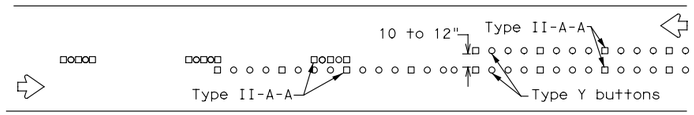
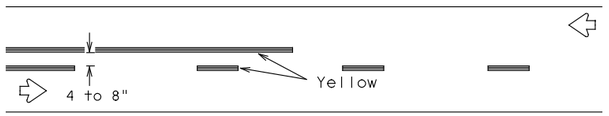
PAVEMENT MARKING PATTERNS



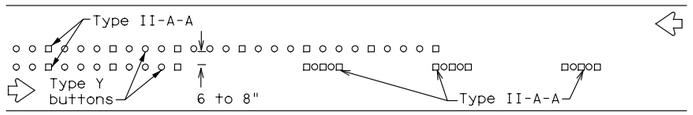
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



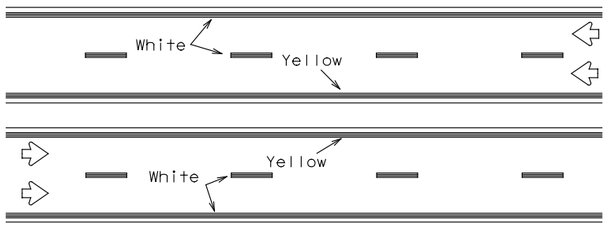
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



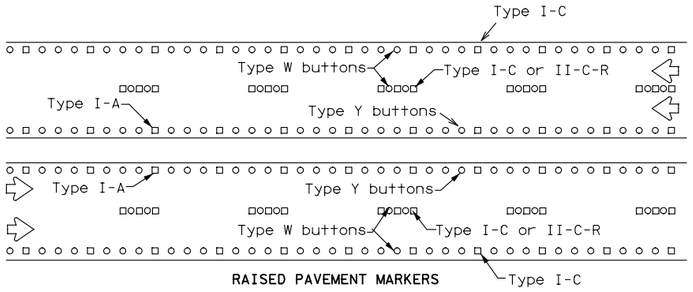
RAISED PAVEMENT MARKERS - PATTERN B

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



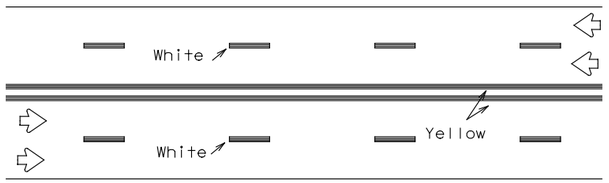
REFLECTORIZED PAVEMENT MARKINGS



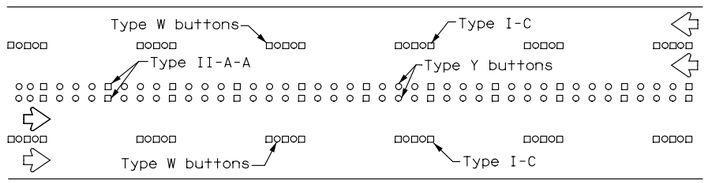
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



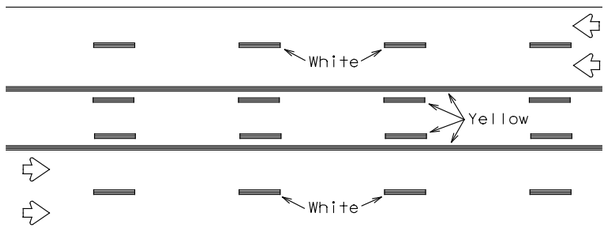
REFLECTORIZED PAVEMENT MARKINGS



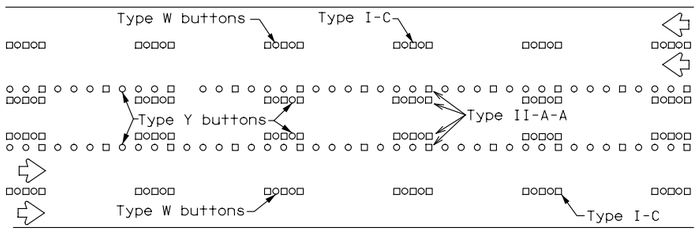
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

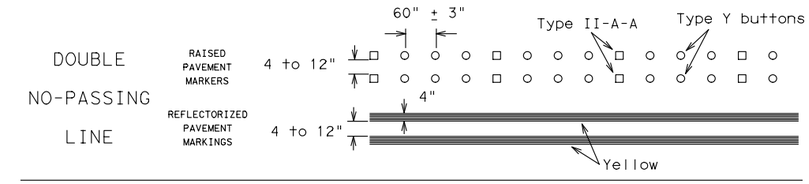
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

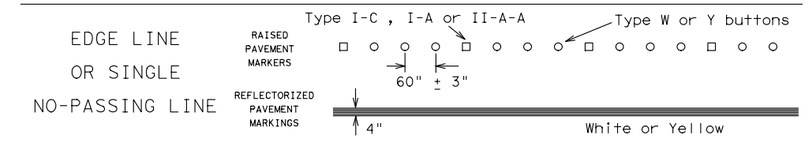
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

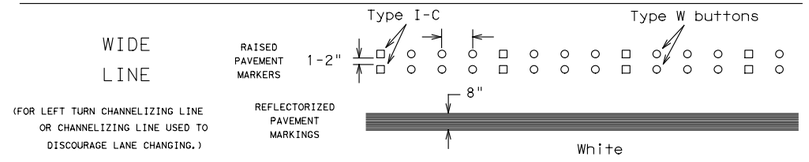


EDGE LINE OR SINGLE NO-PASSING LINE



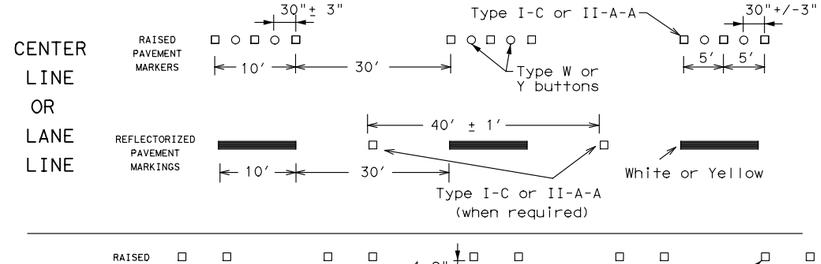
WIDE LINE

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

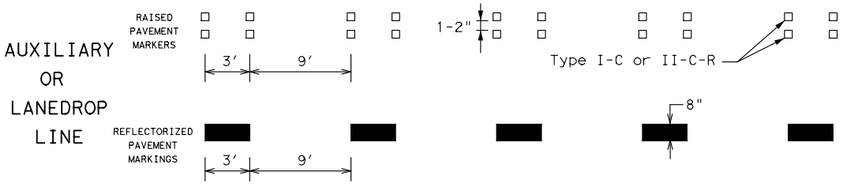


BROKEN LINES

CENTER LINE OR LANE LINE

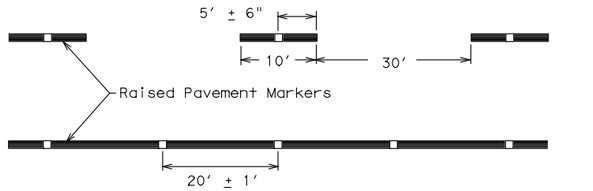


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		38

106

DATE: 6/30/2023 9:19
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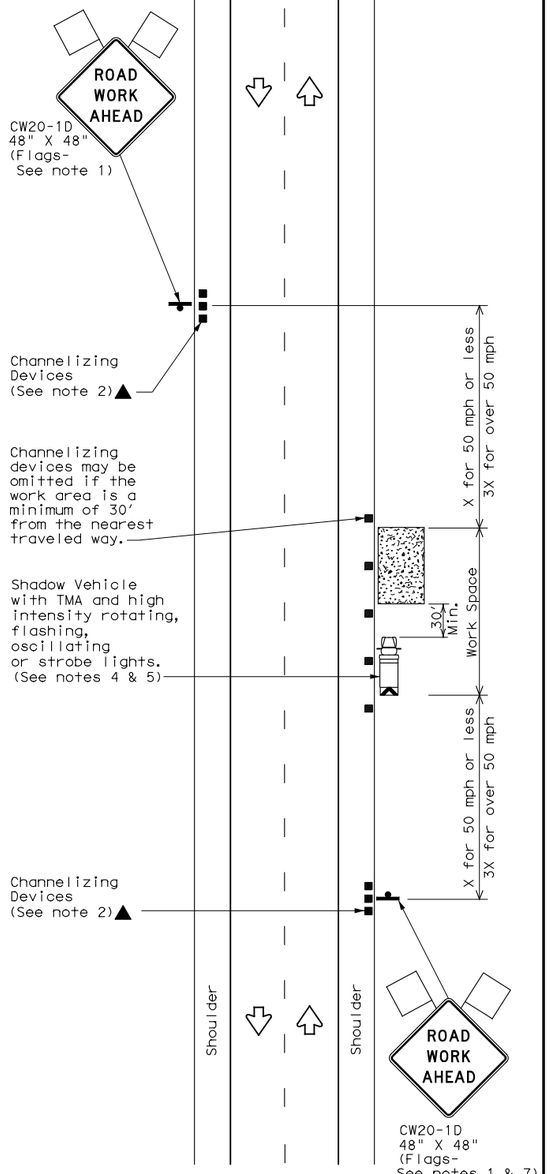
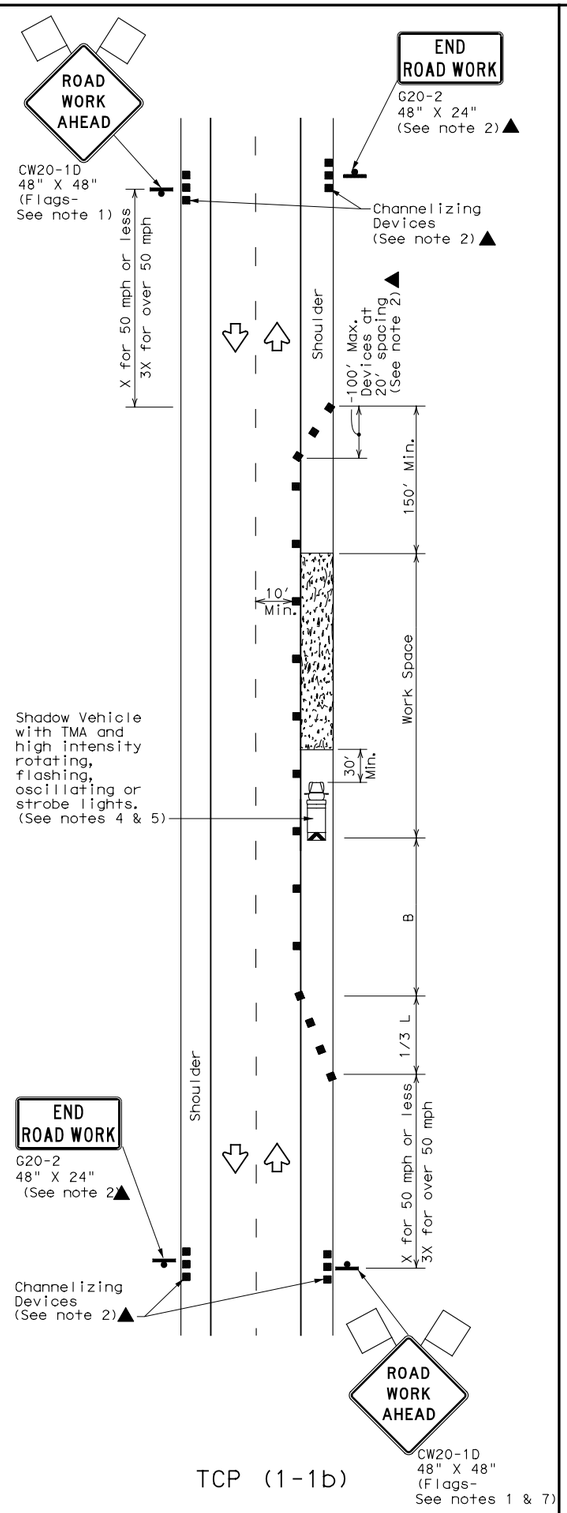


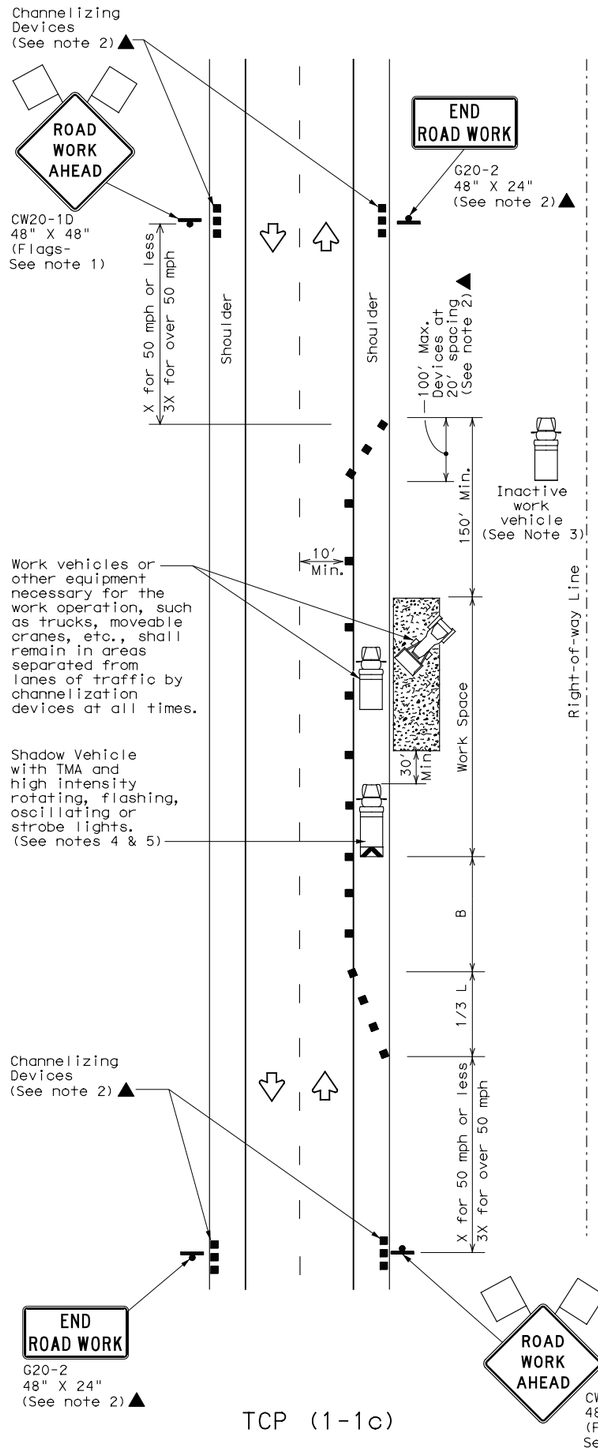
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WAC	MCLENNAN		39
1-97 2-18				

151

DATE: 6/30/2023 9:19
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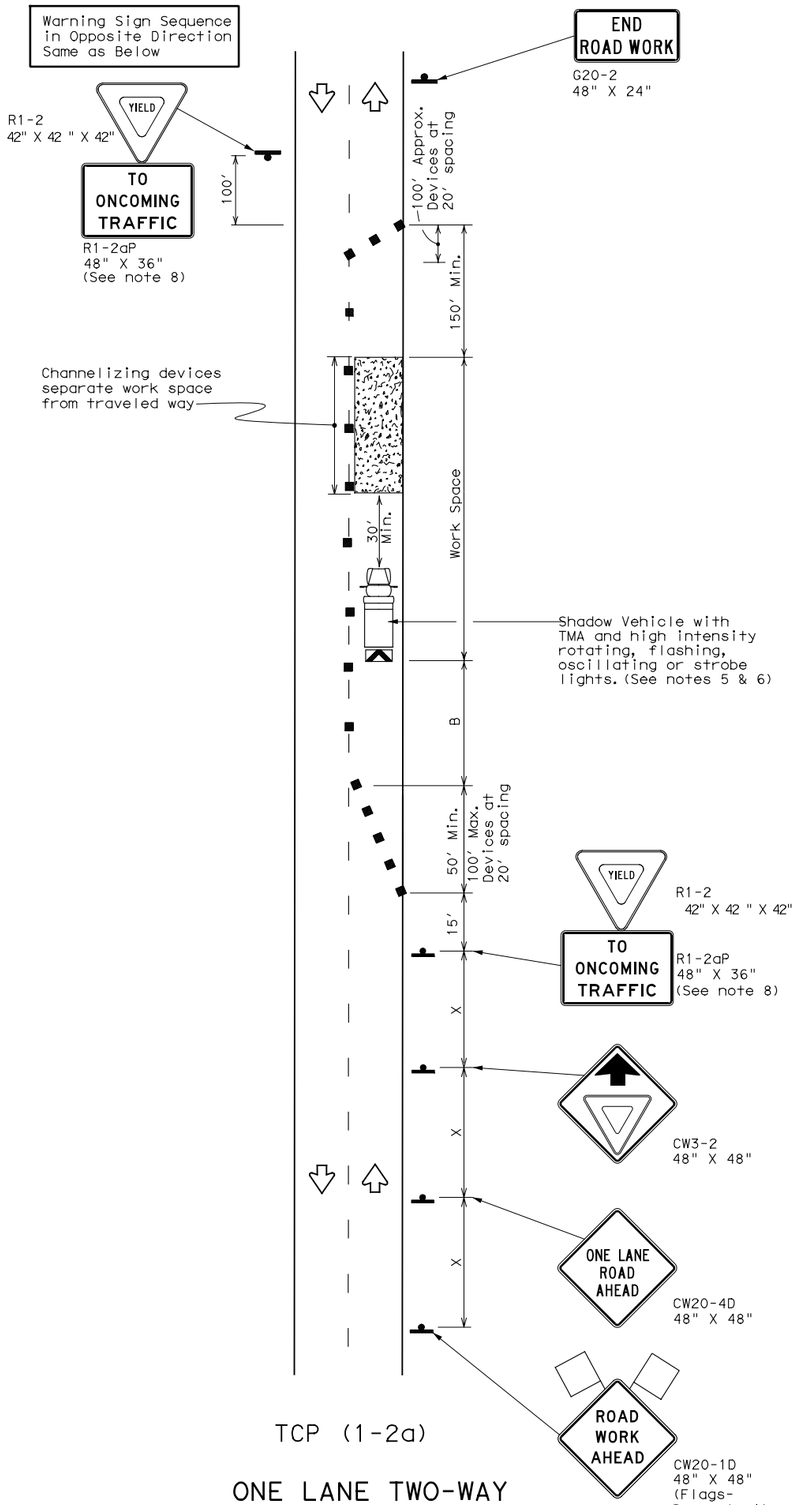
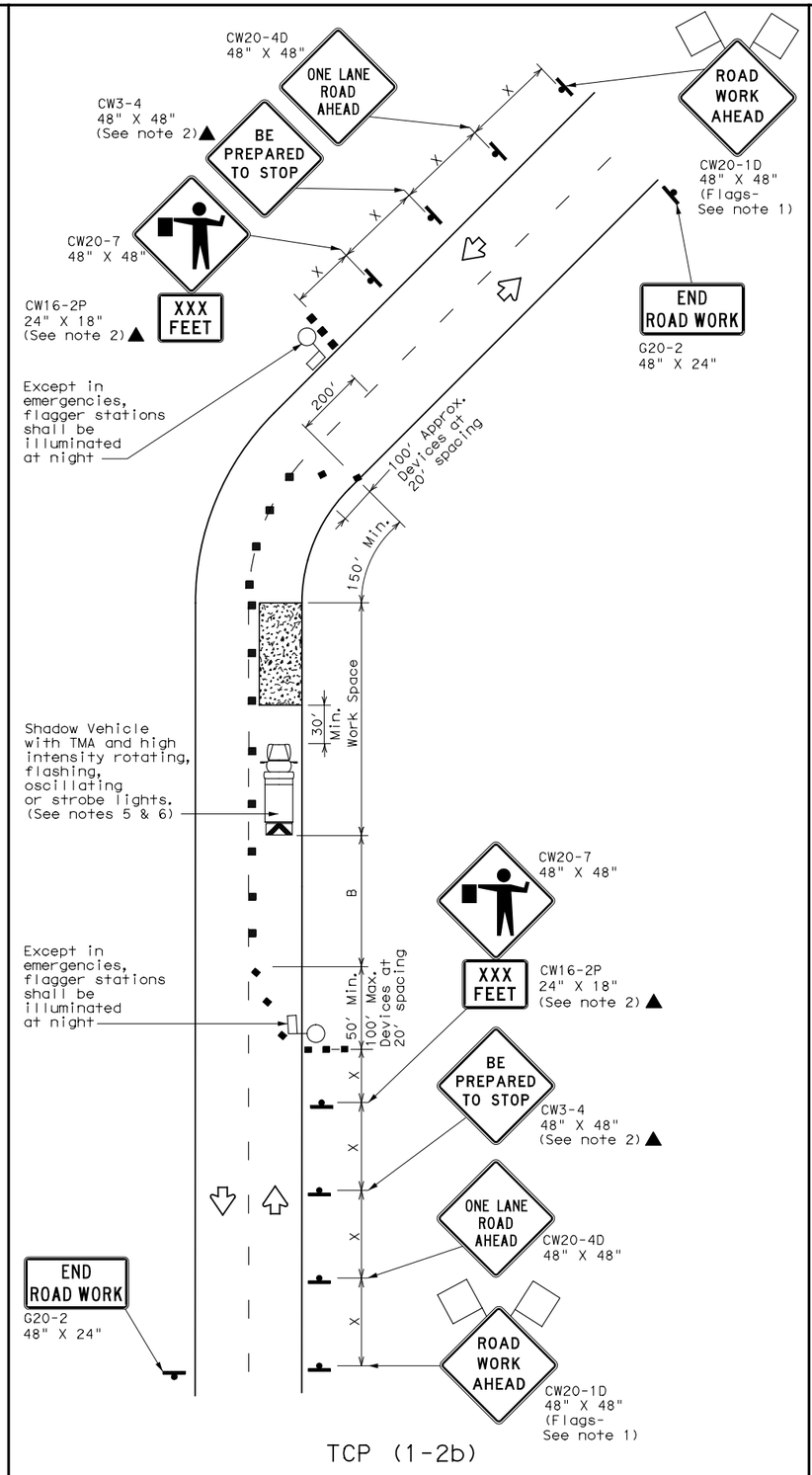


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98	2311	01	042, ETC.	SL 340, ETC.
2-94 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	WAC	MCLENNAN		40

DATE: 6/30/2023 9:19
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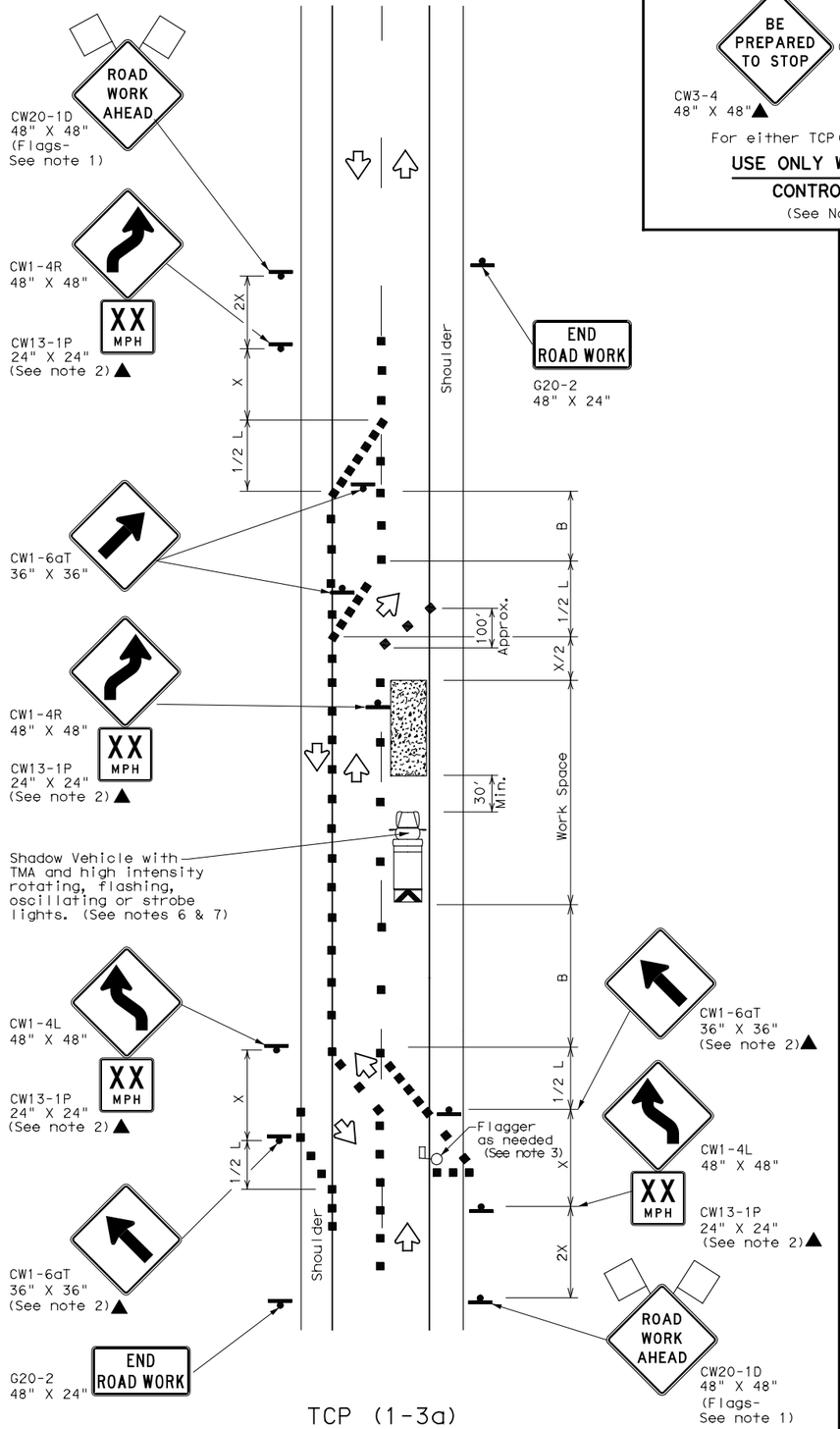
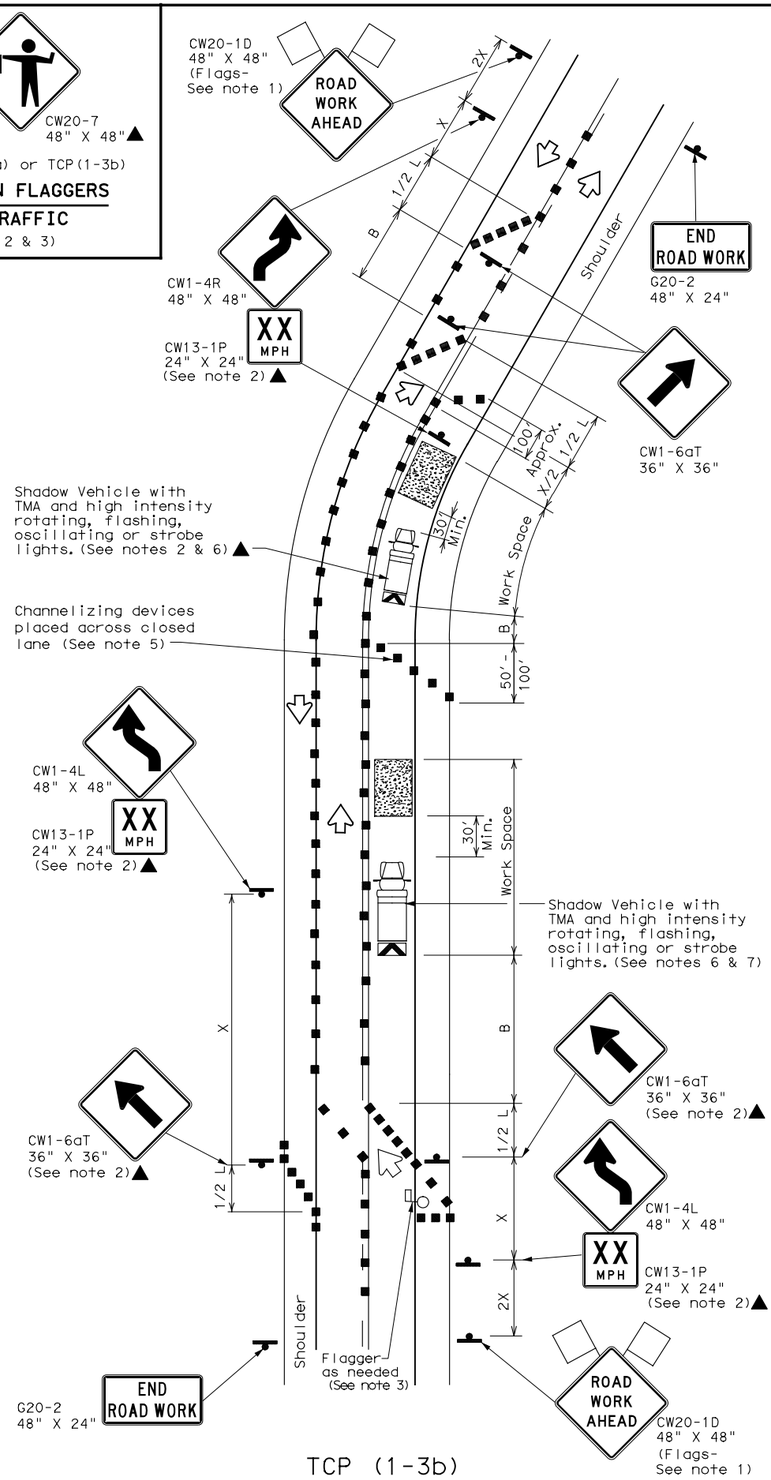


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS
CONTROL TRAFFIC
(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
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 wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		41

DATE: 6/30/2023 9:19
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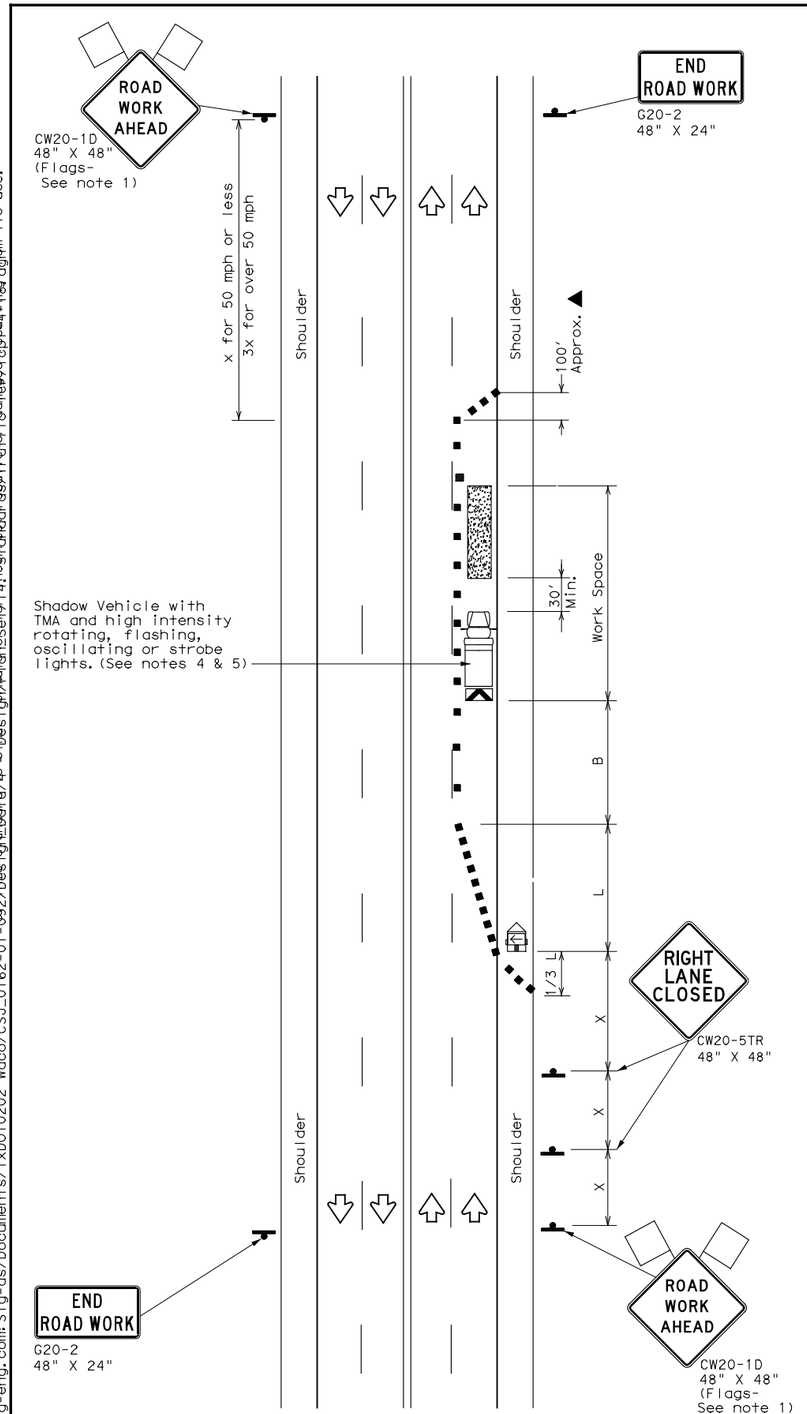
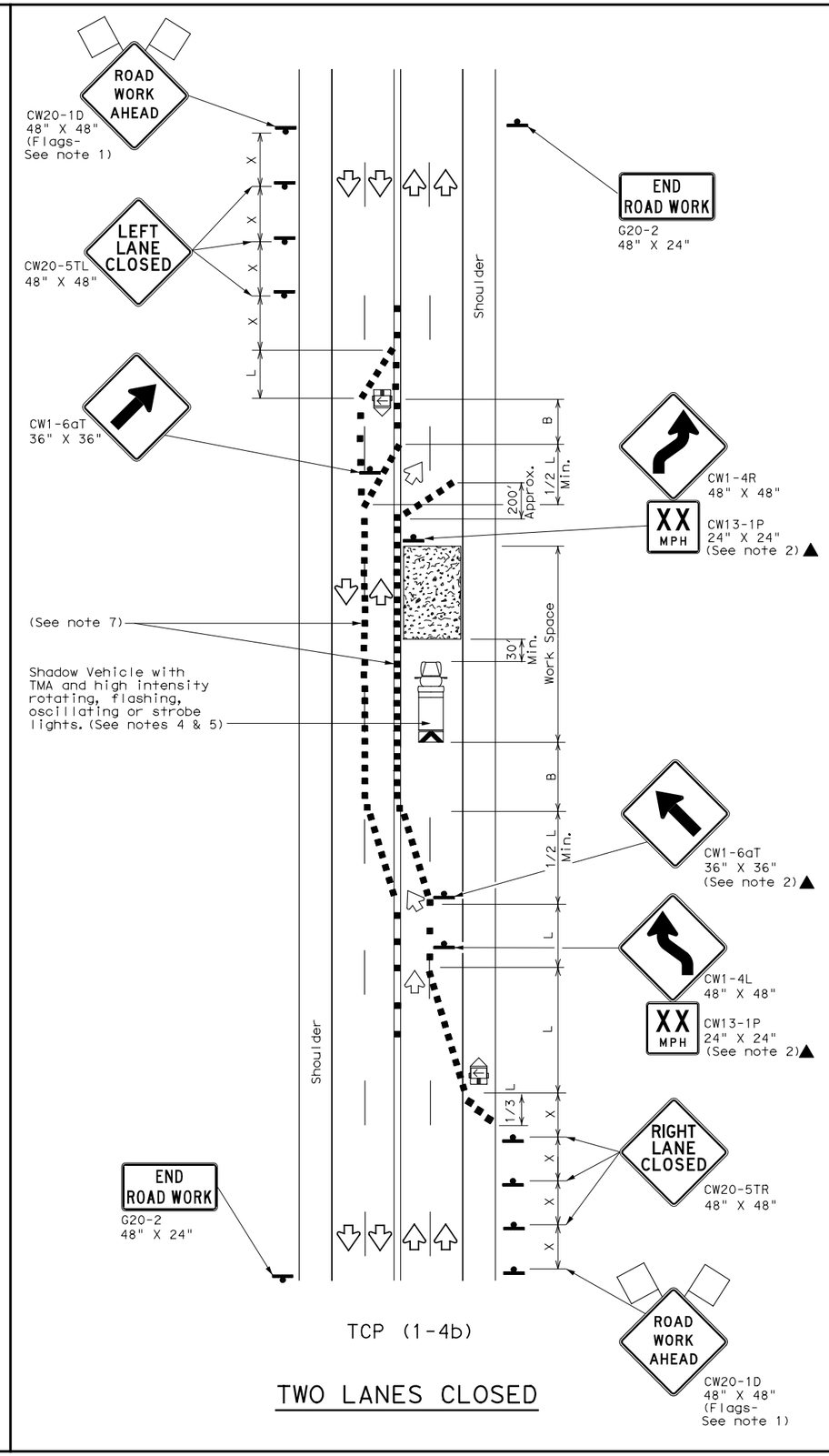


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
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.

TCP (1-4a)

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

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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	WAC	MCLENNAN		42

DATE: 6/30/2023 9:19
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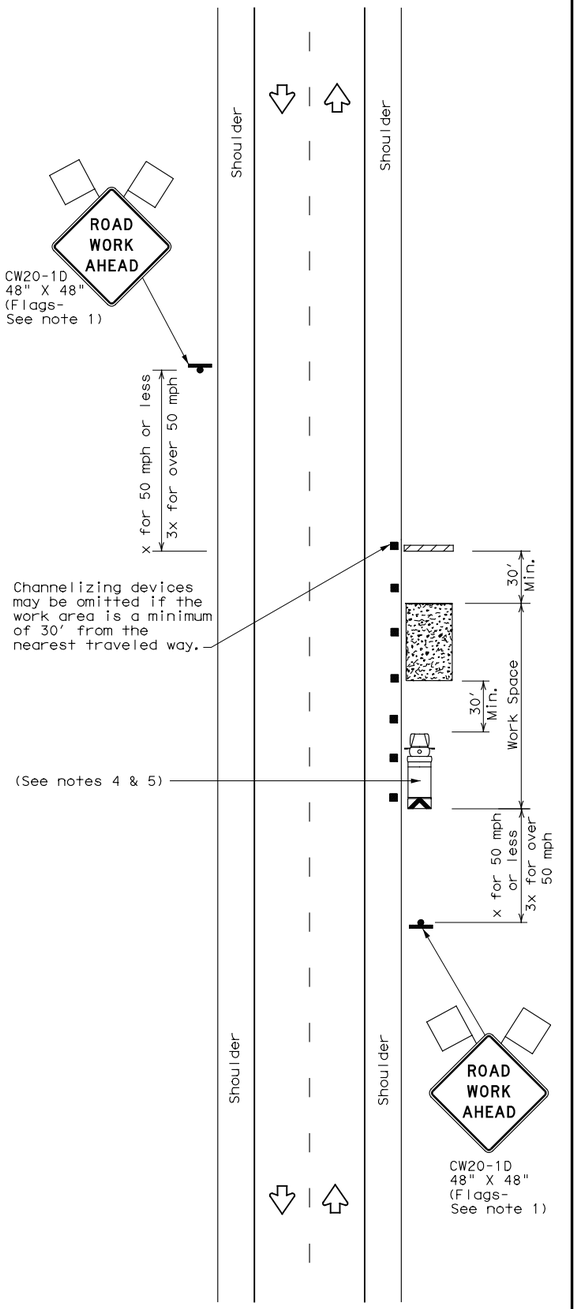
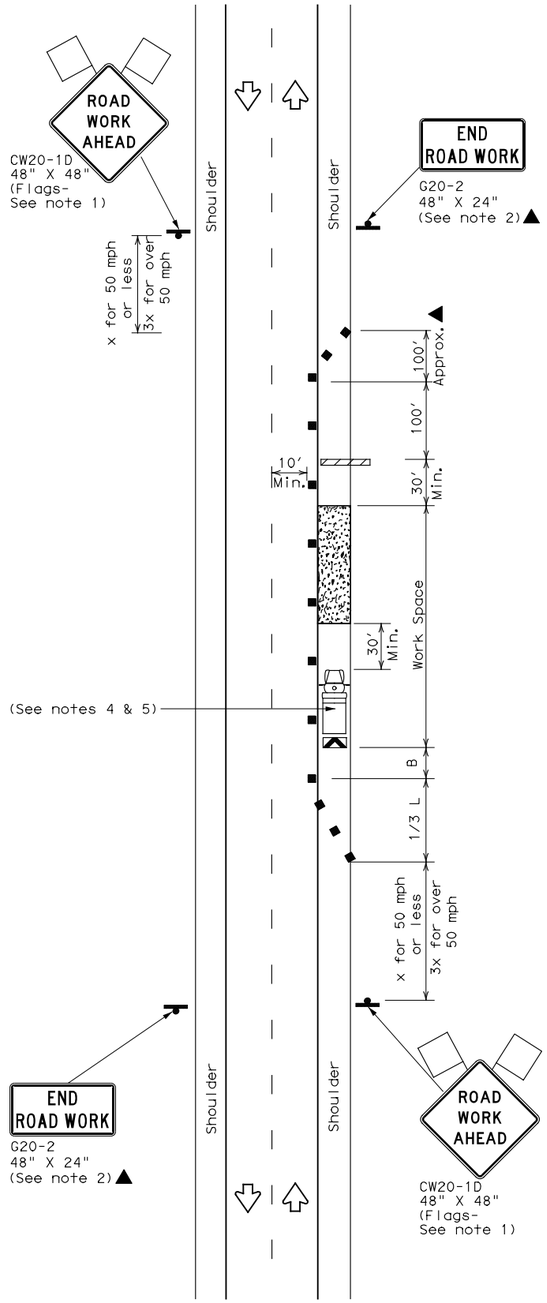


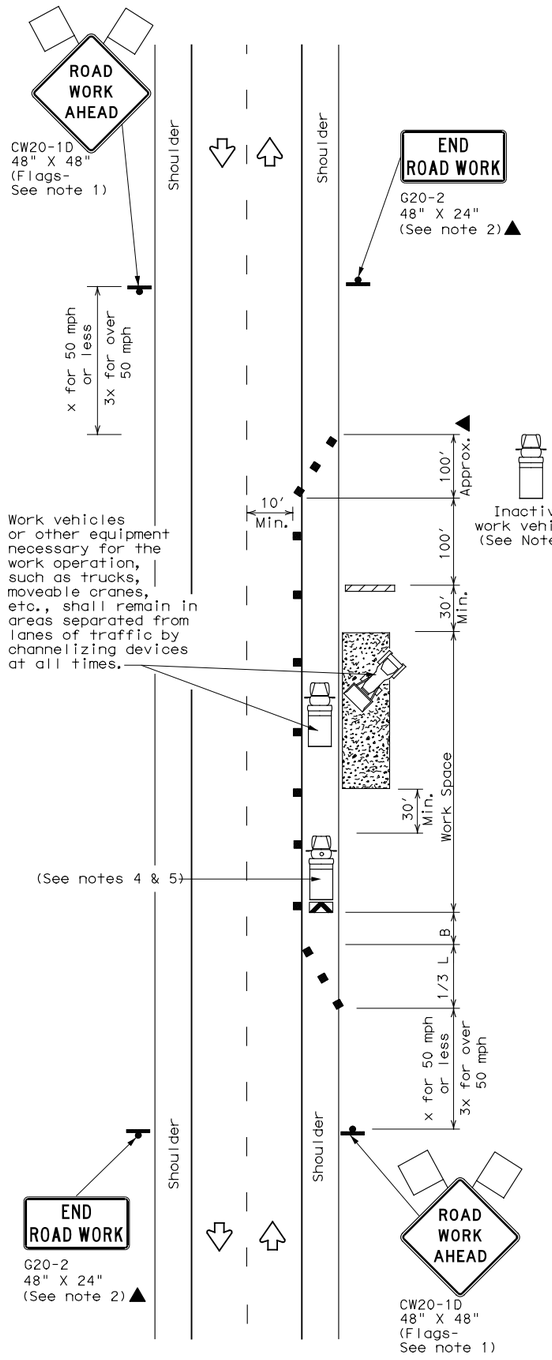
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WAC	MCLENNAN		43
1-97 2-18				

DATE: 6/30/2023 9:19
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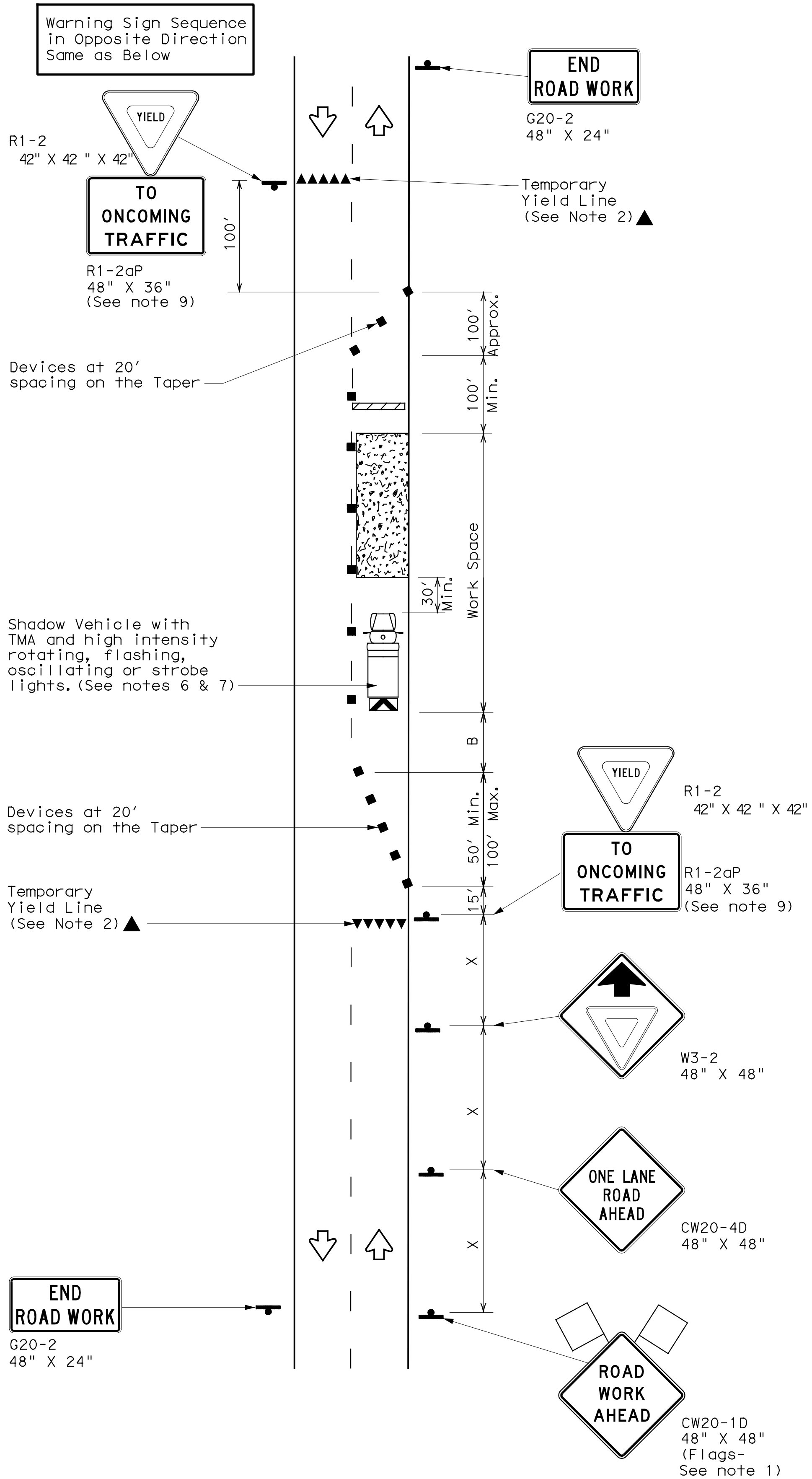
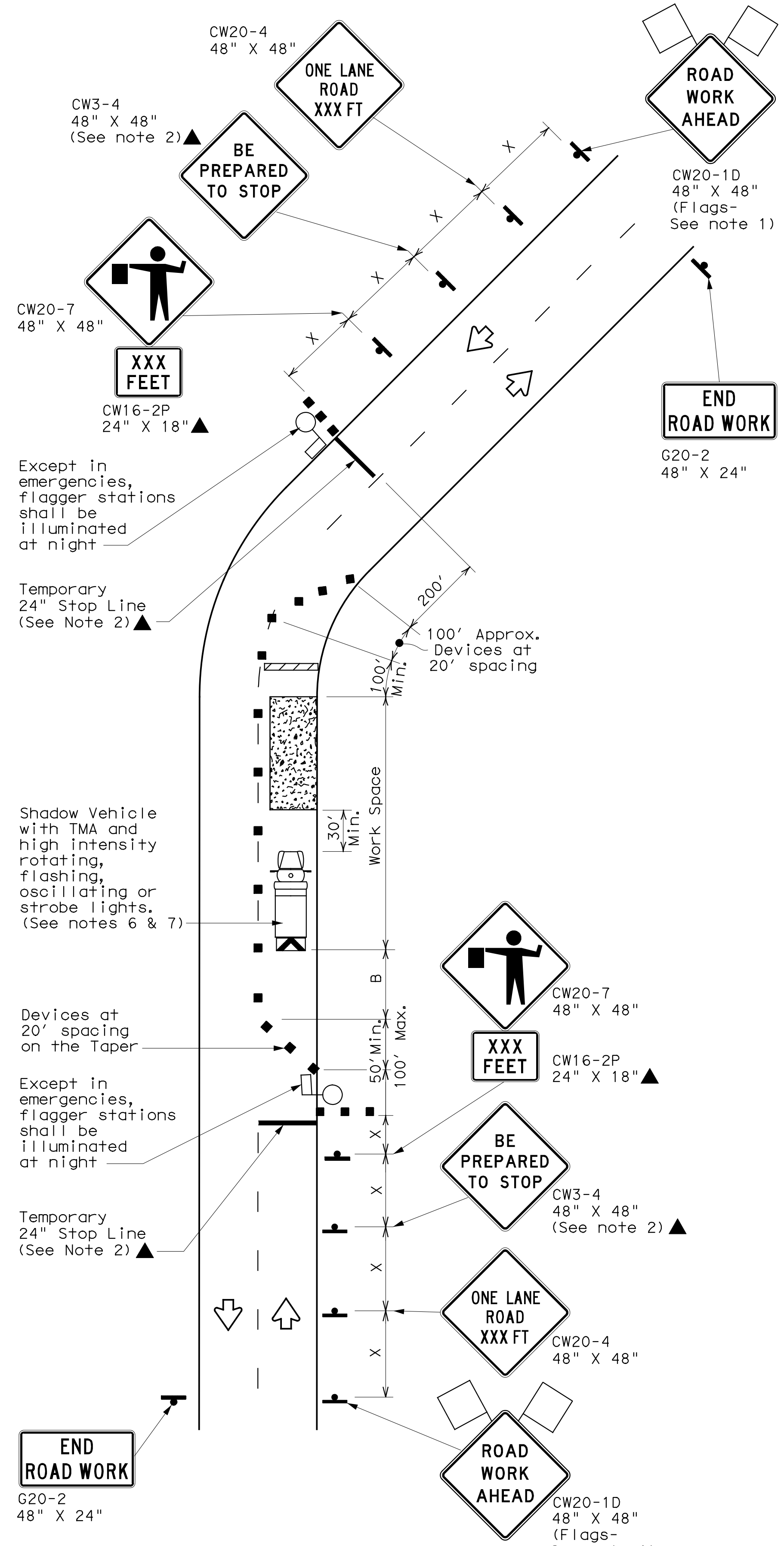


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND

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

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
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	2311	01	042, ETC.	SL 340, ETC.
	DIST		COUNTY	SHEET NO.
	WAC		MCLENNAN	44

DATE: 8/1/2023 9:27
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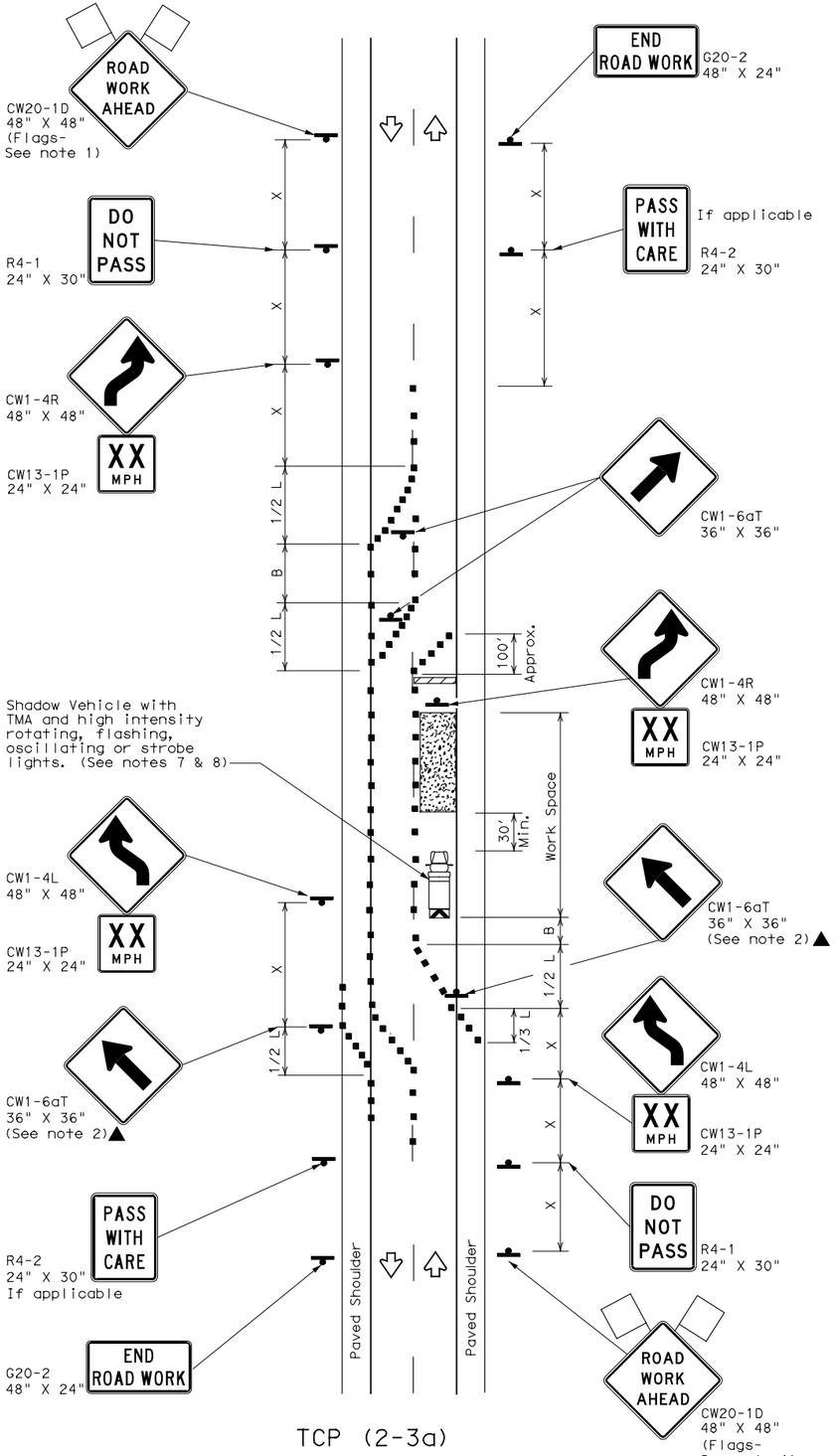
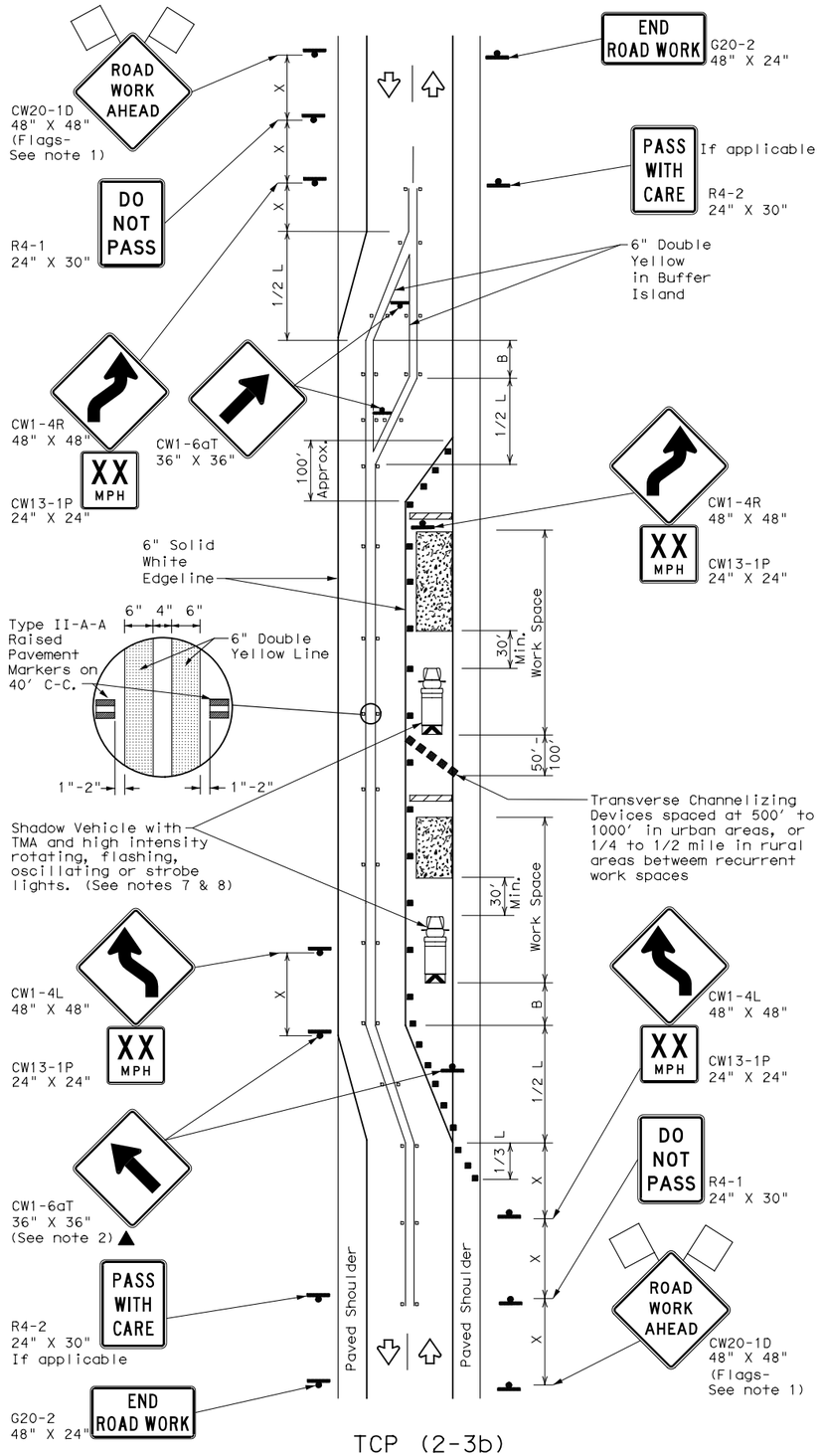


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 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
				TCP(2-3b) ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-23

FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		45

163

DATE: 6/30/2023 9:19
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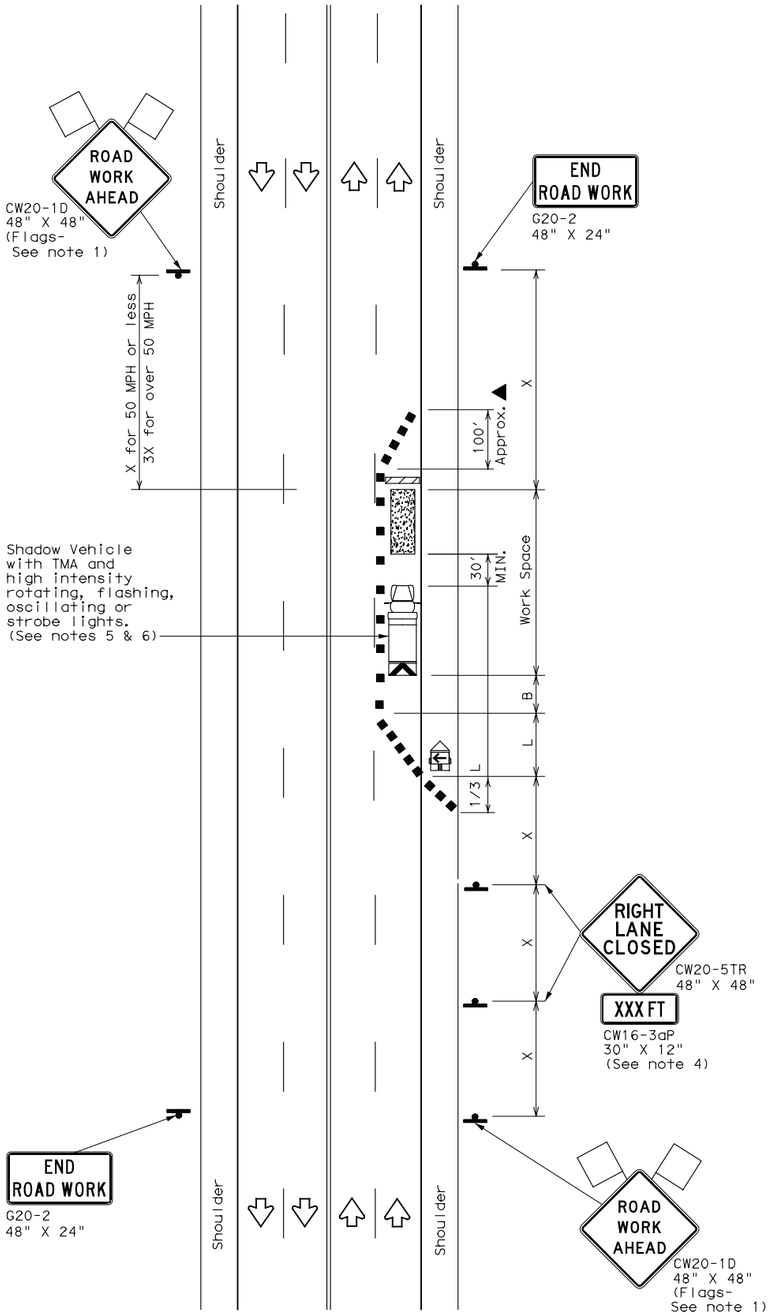
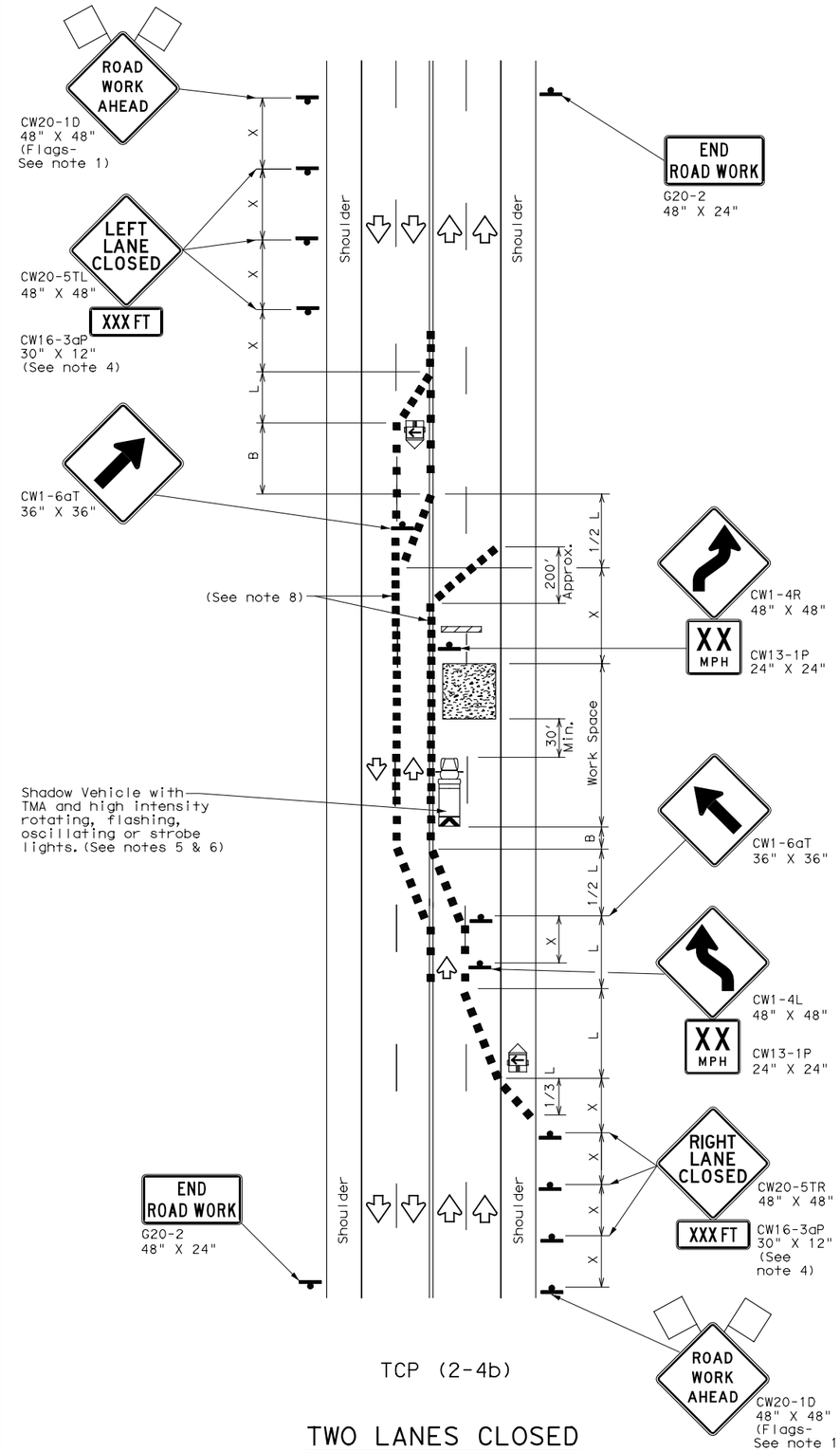


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20′ or 15′ if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	2311	01	042, ETC.	SL 340, ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	WAC	MCLENNAN		46

DATE: 6/30/2023 9:19
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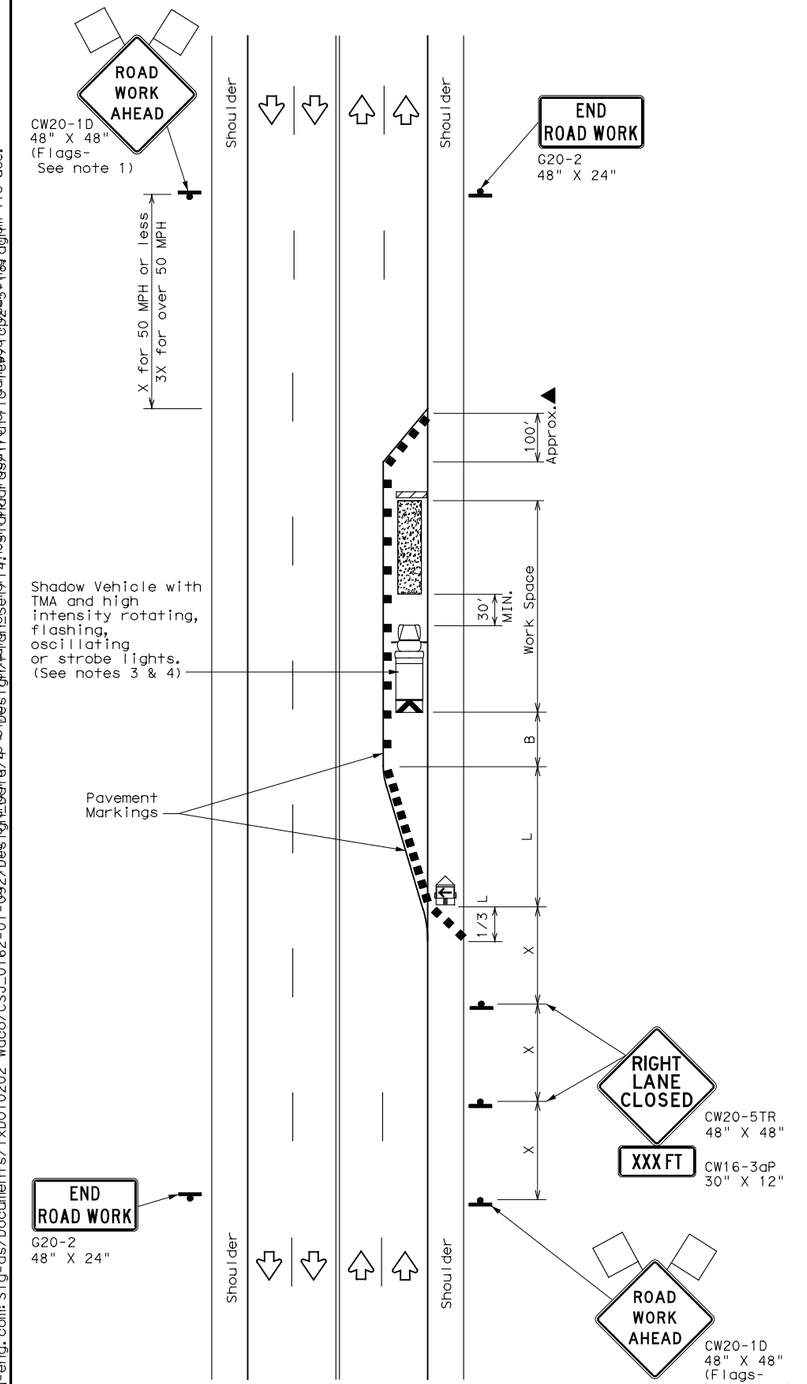
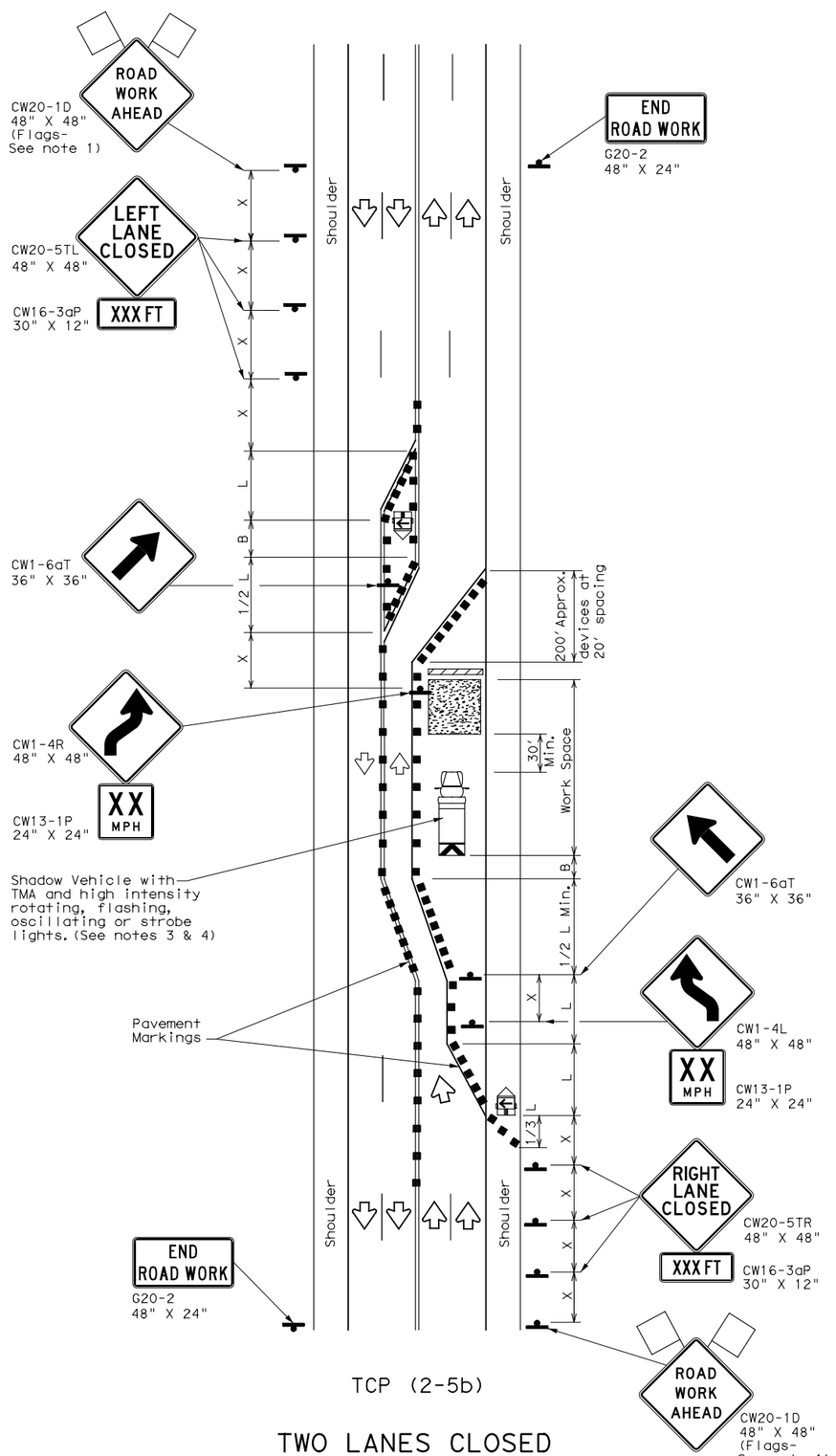


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12	2311	01	042, ETC.	SL 340, ETC.
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	WAC	MCLENNAN		47

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DATE: 6/30/2023 9:19
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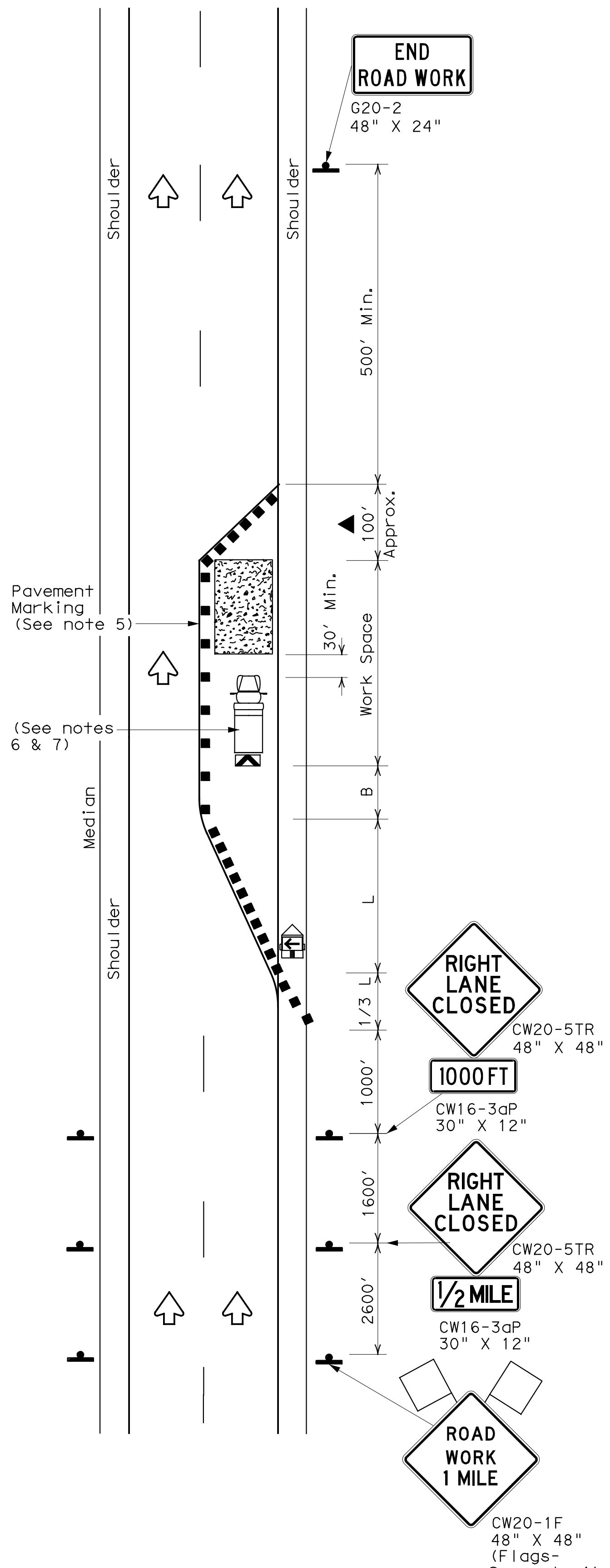
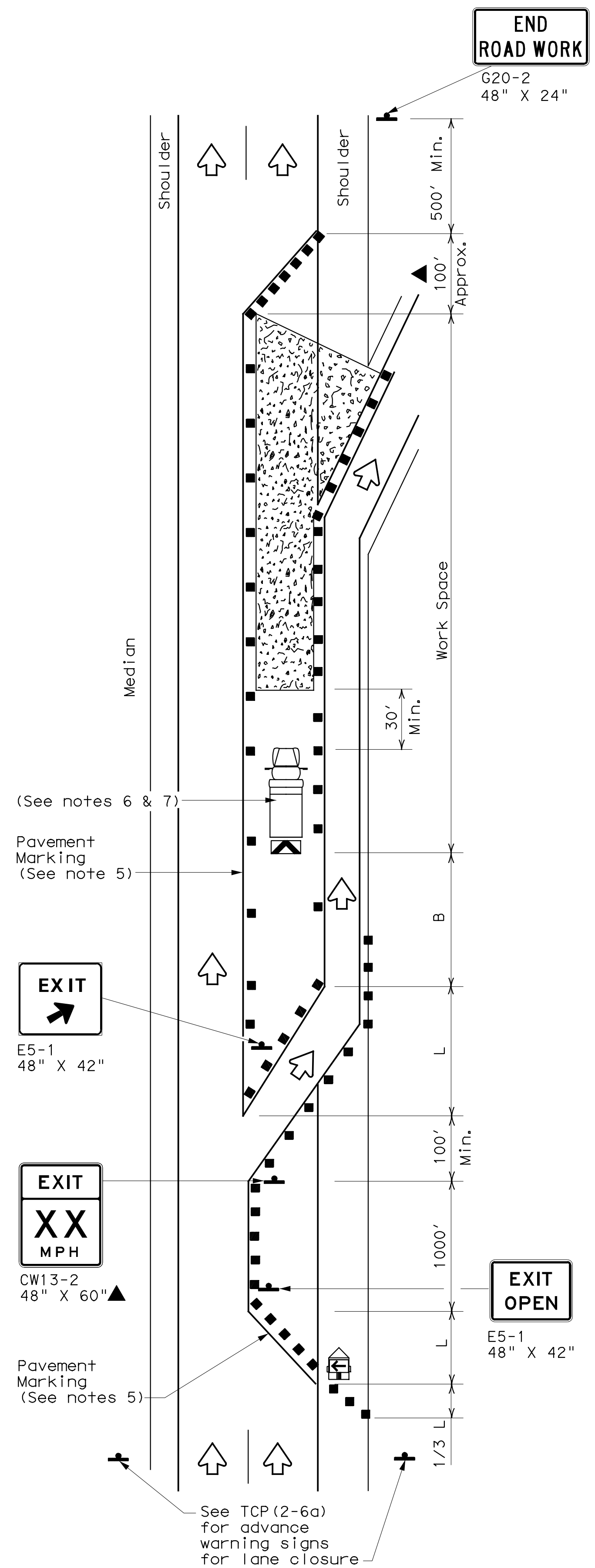


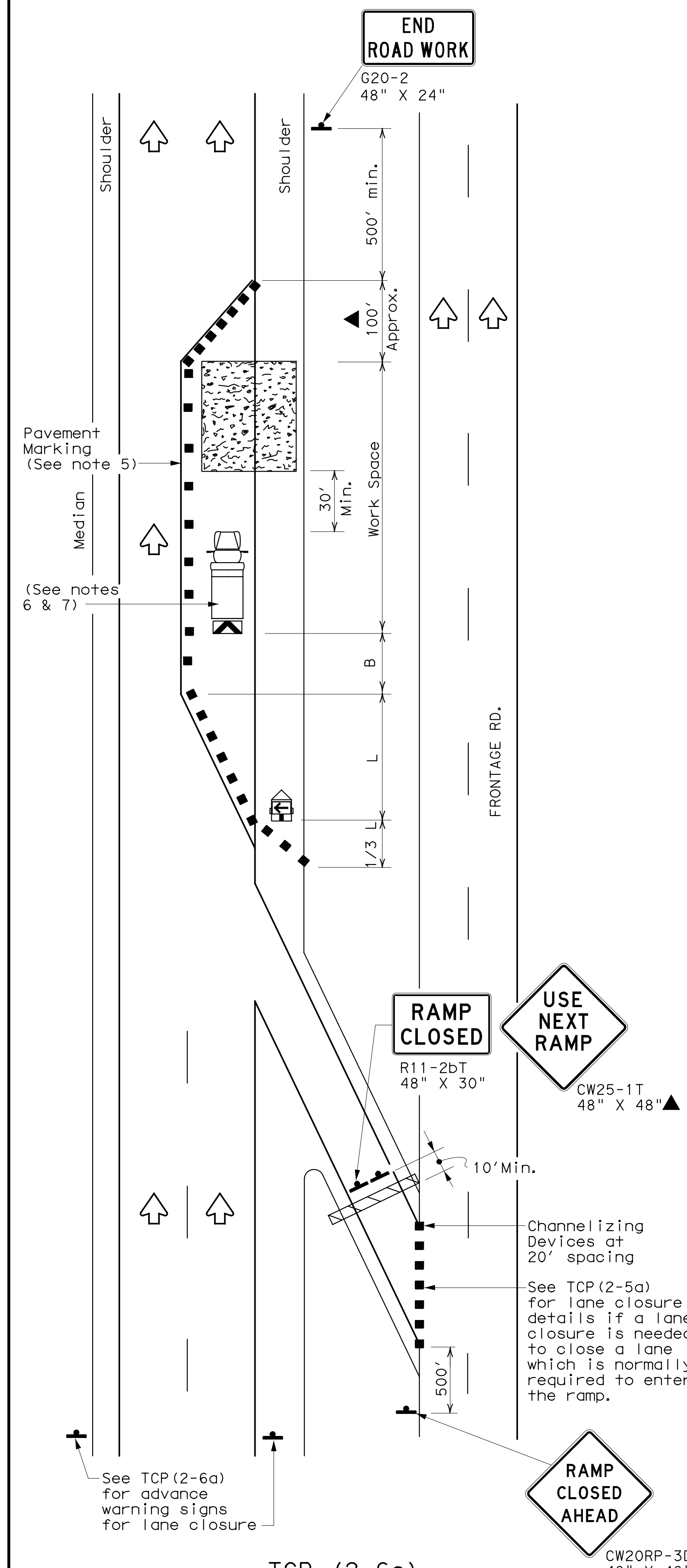
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. 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.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT 2311	SECT 01	JOB 042, ETC.	HIGHWAY SL 340, ETC.
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST WAC		COUNTY MCLENNAN	SHEET NO. 48

DATE: 6/30/2023 9:19
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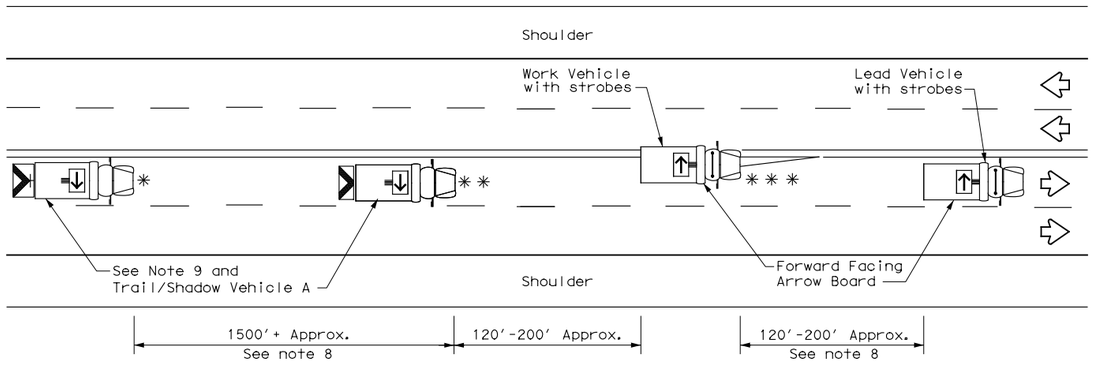
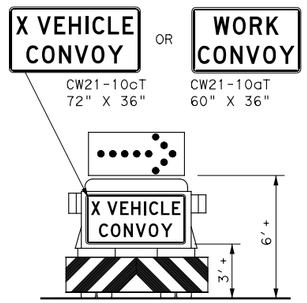


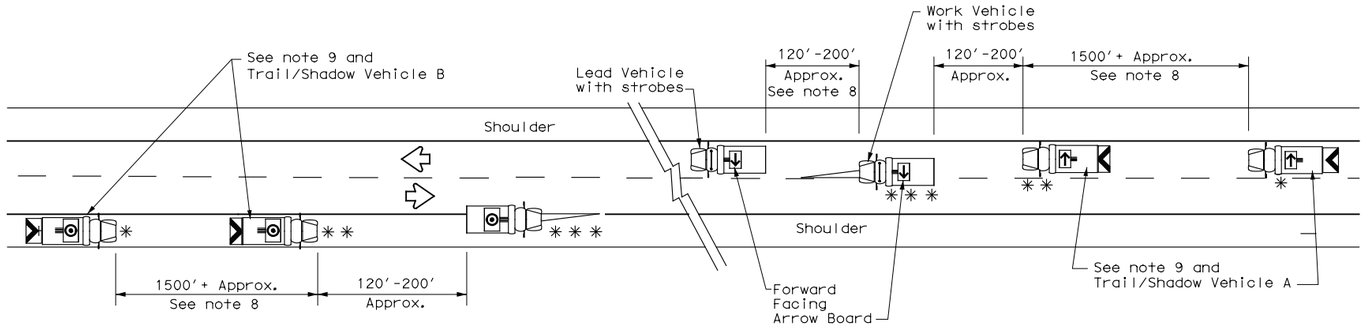
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

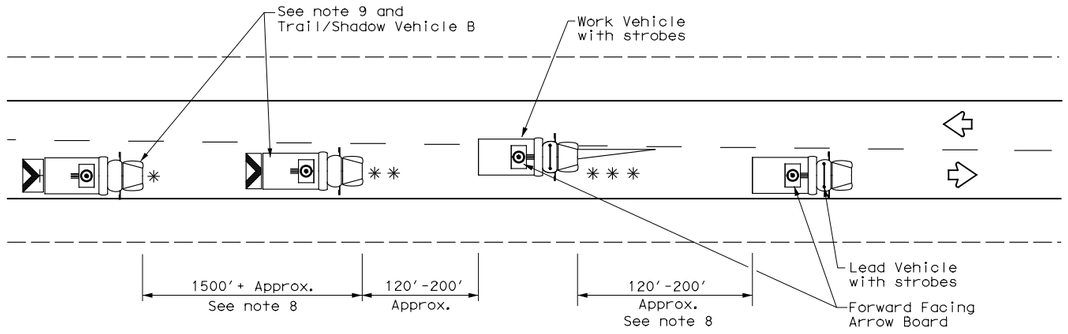


WORK ON SHOULDER

WORK ON TRAVEL LANE

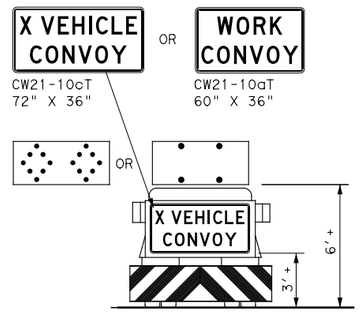
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

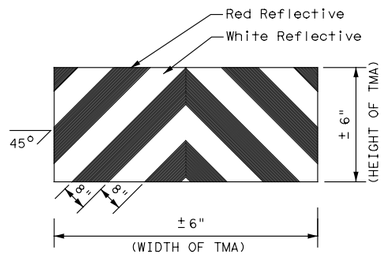
with Flashing Arrow Board in CAUTION display

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

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		49

DATE: 6/30/2023 9:19
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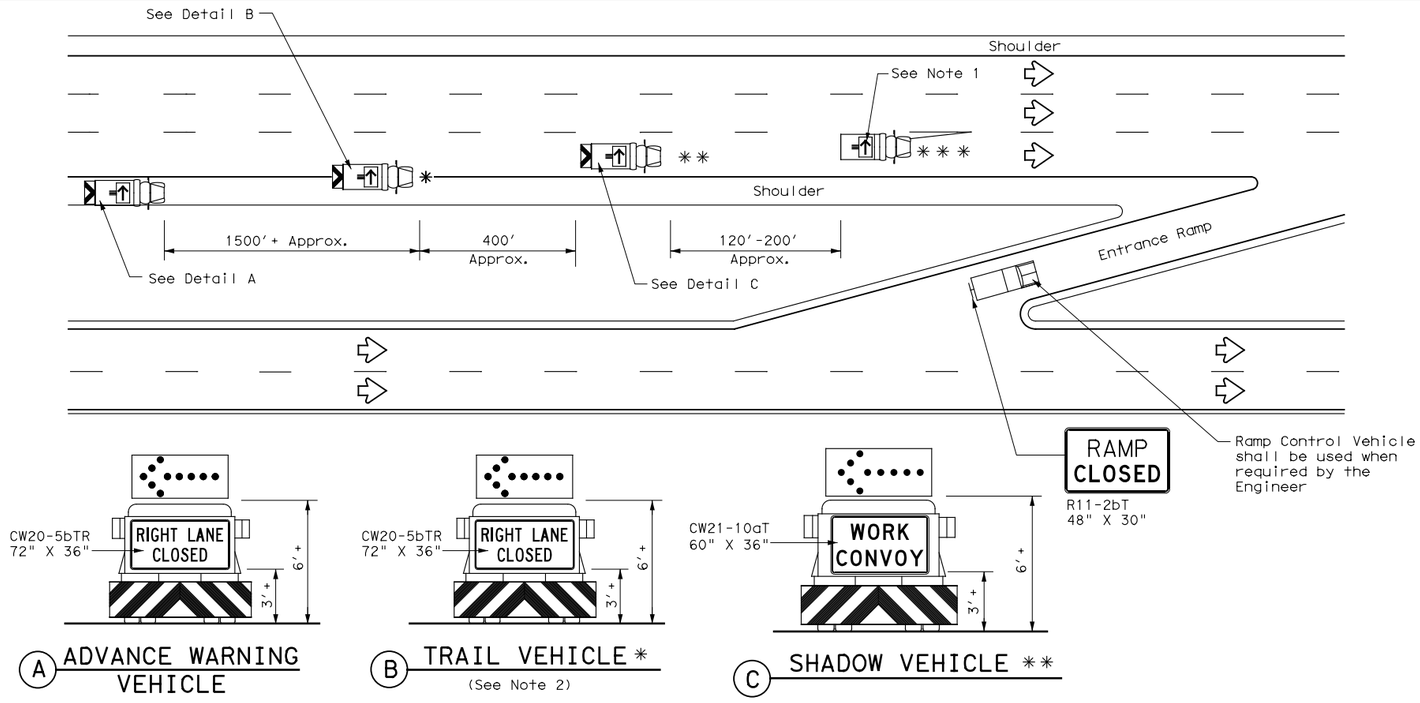
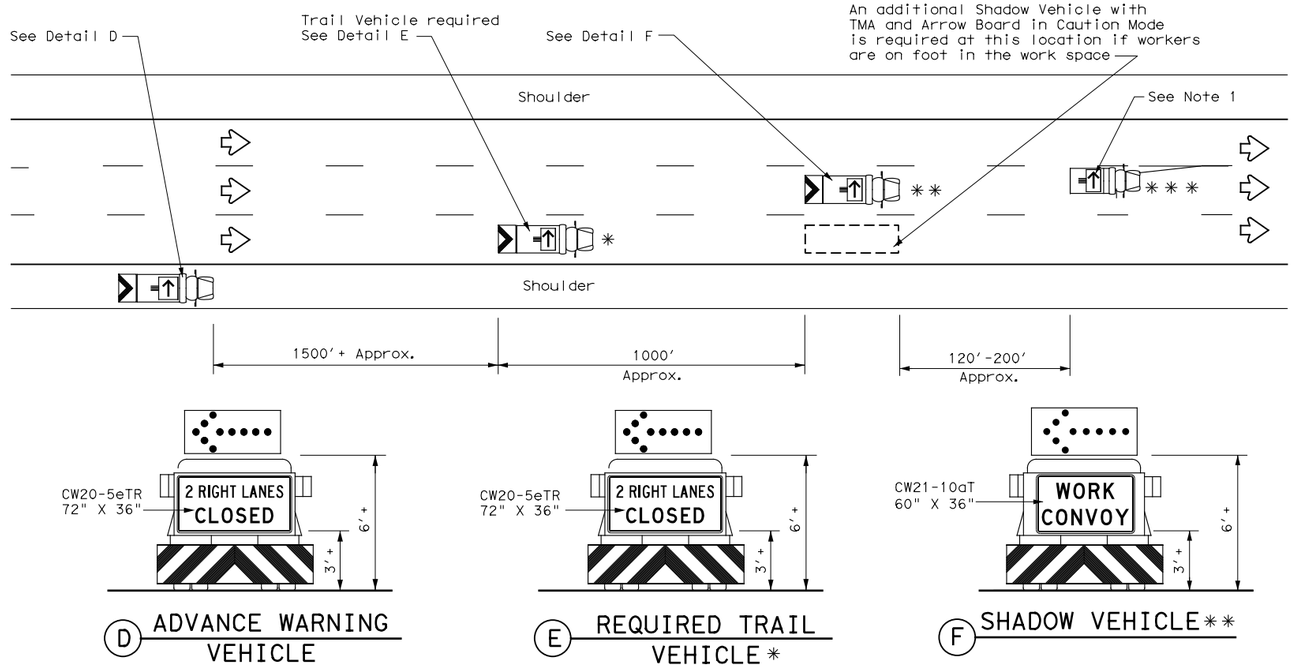


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



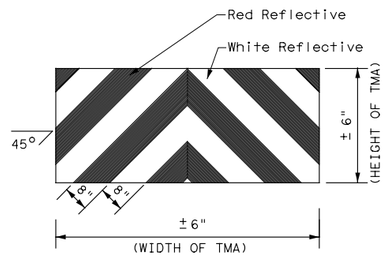
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. 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.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
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 may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a 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, must 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. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

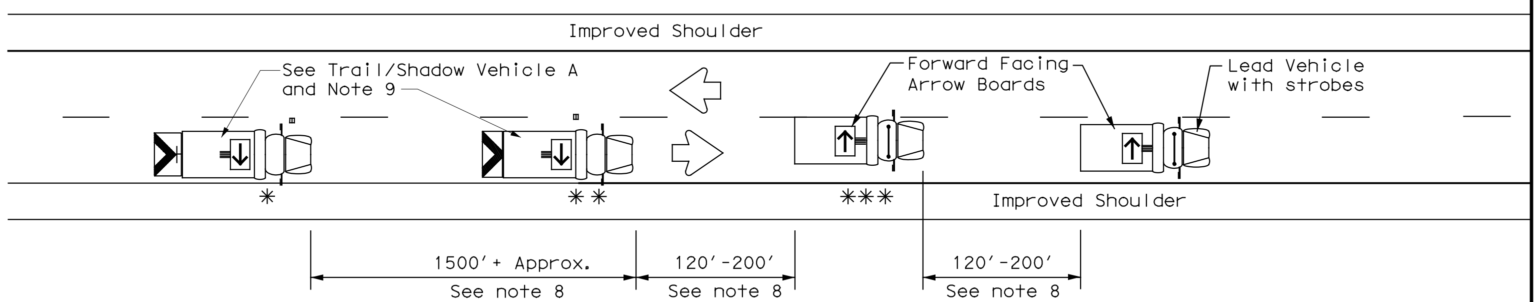
Texas Department of Transportation

Traffic Operations Division Standard

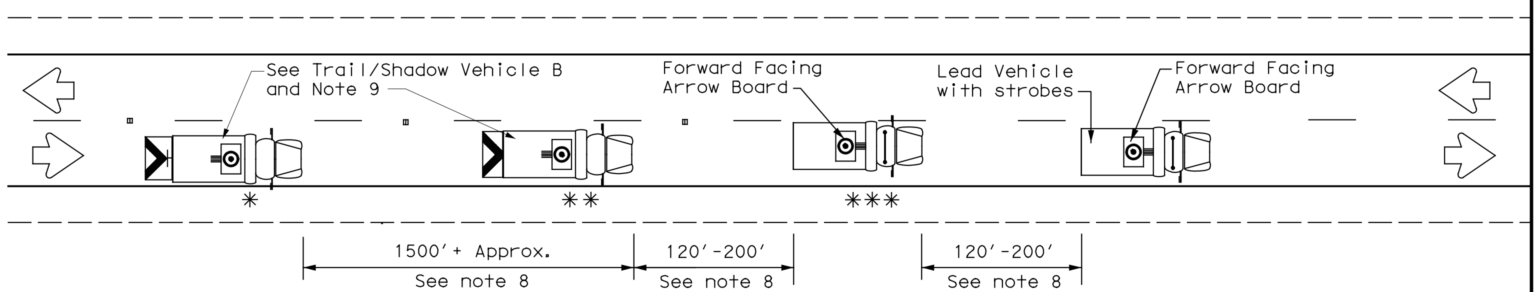
TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

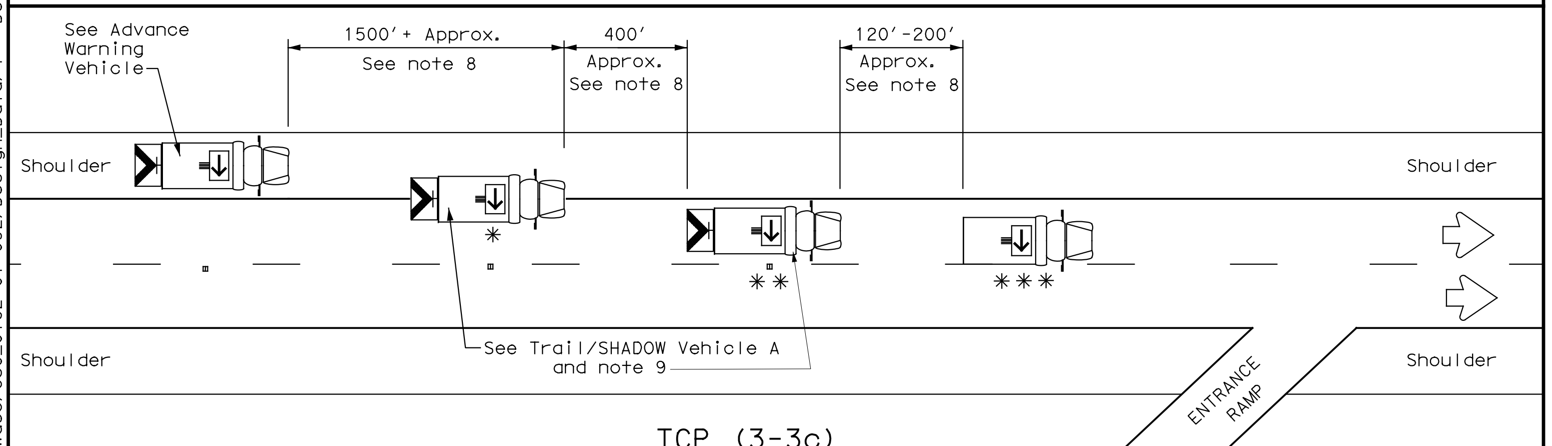
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		50



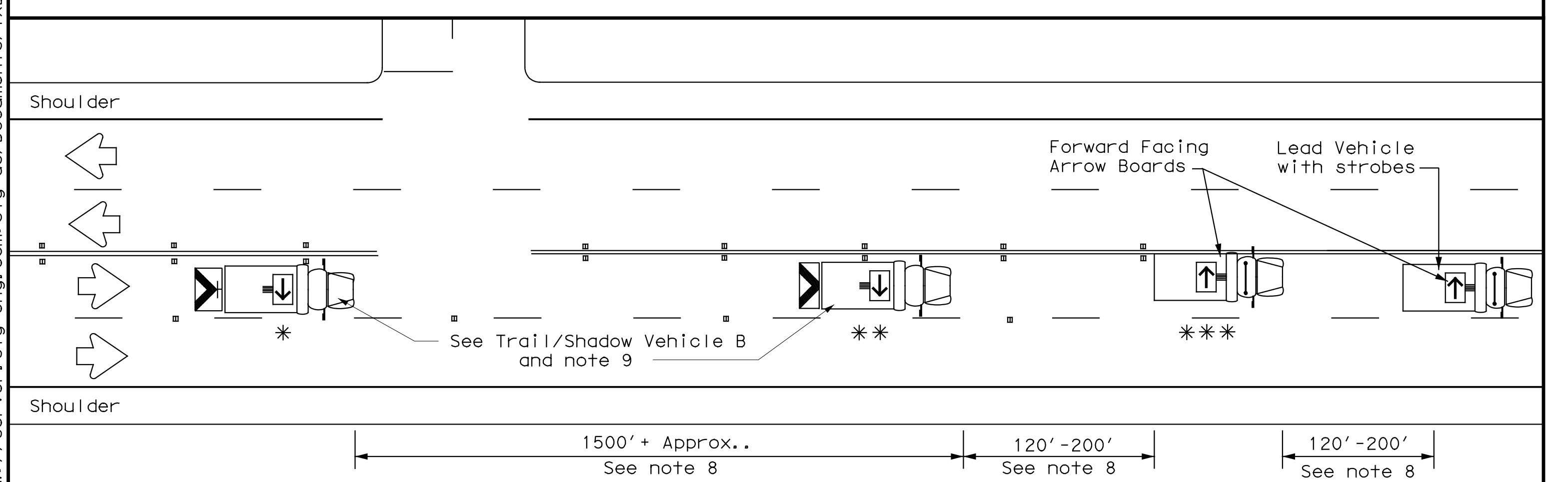
TCP (3-3a)
TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



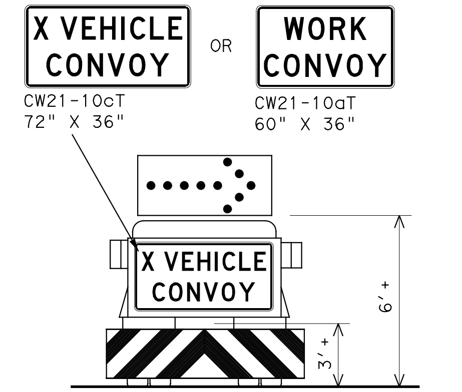
TCP (3-3b)
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



TCP (3-3c)
DIVIDED MULTILANE HIGHWAY

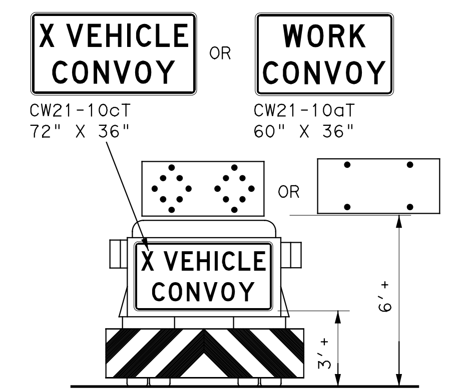


TCP (3-3d)
UNDIVIDED MULTILANE HIGHWAY



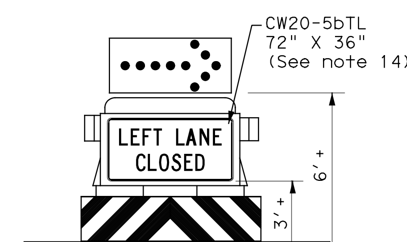
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

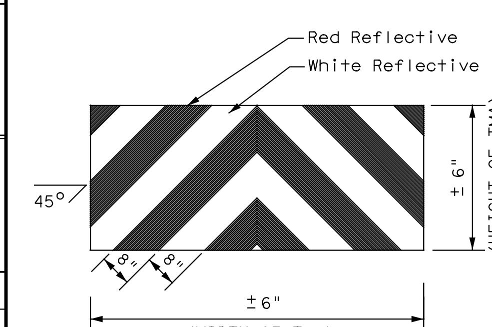


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST		COUNTY	SHEET NO.
8-95 7-13				
1-97 7-14	WAC		MCLENNAN	51

DATE: 6/30/2023 9:19
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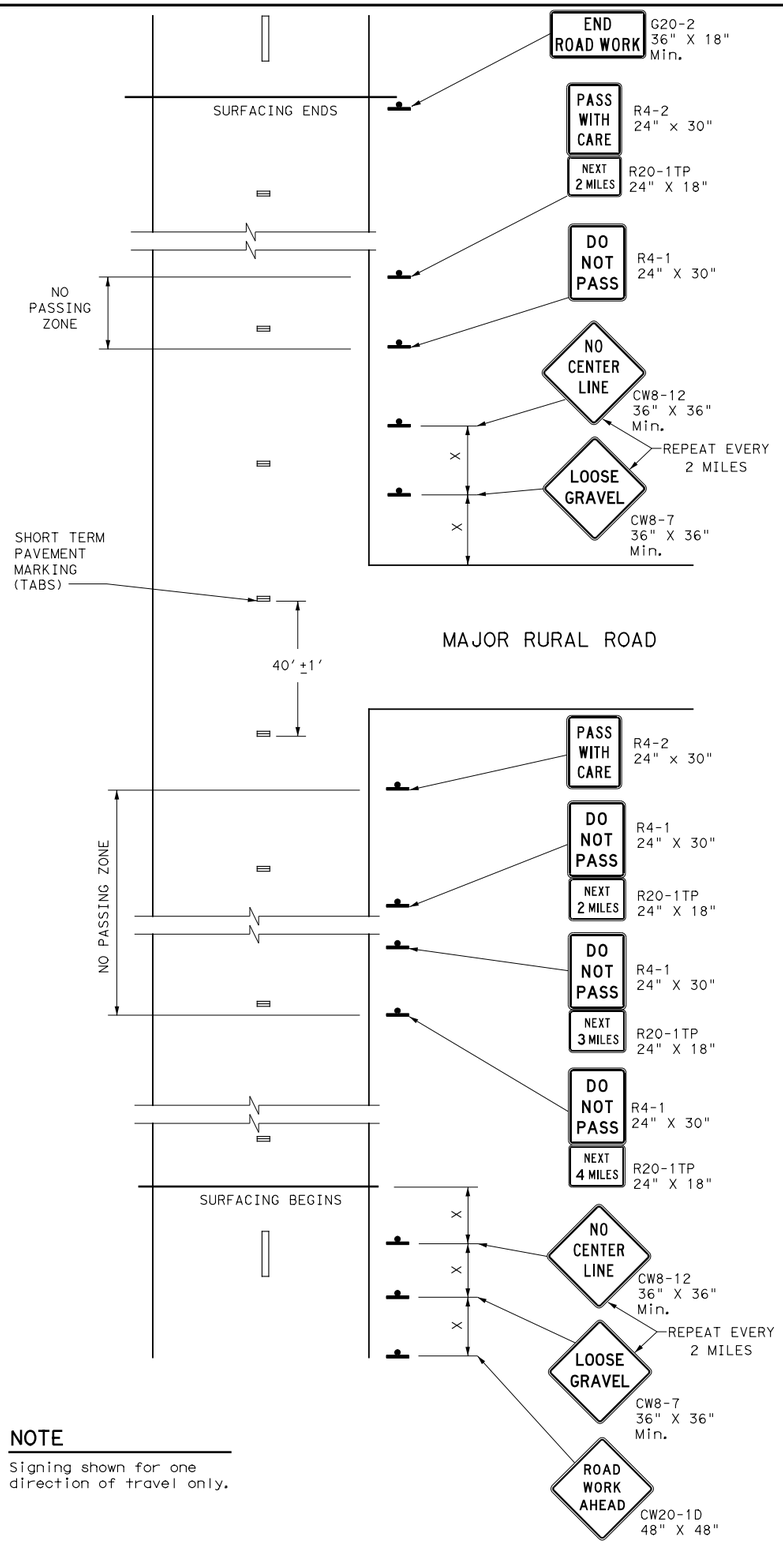
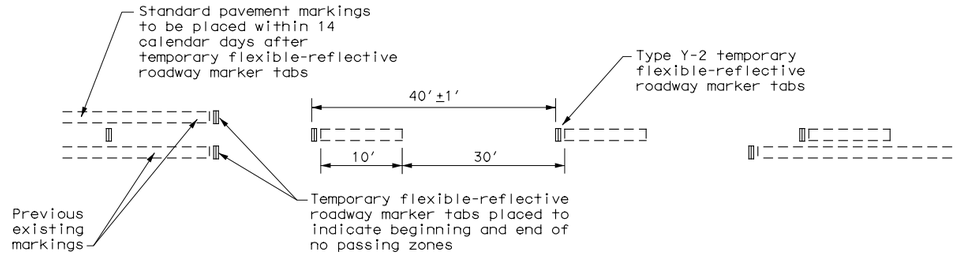


NOTE

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

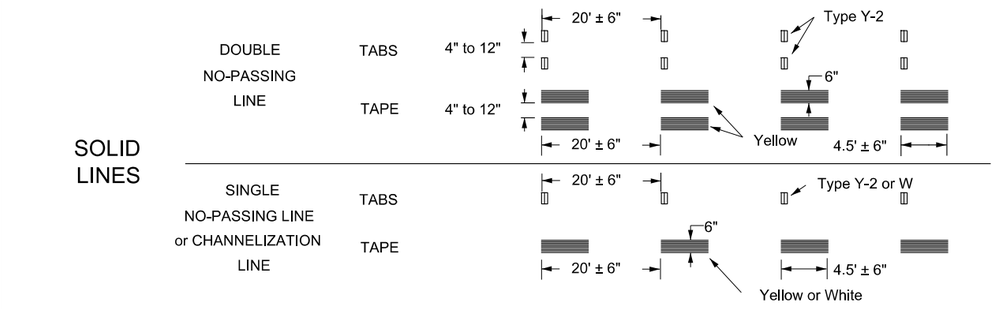
TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 4-98 1-97 7-13	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		52

210

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

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



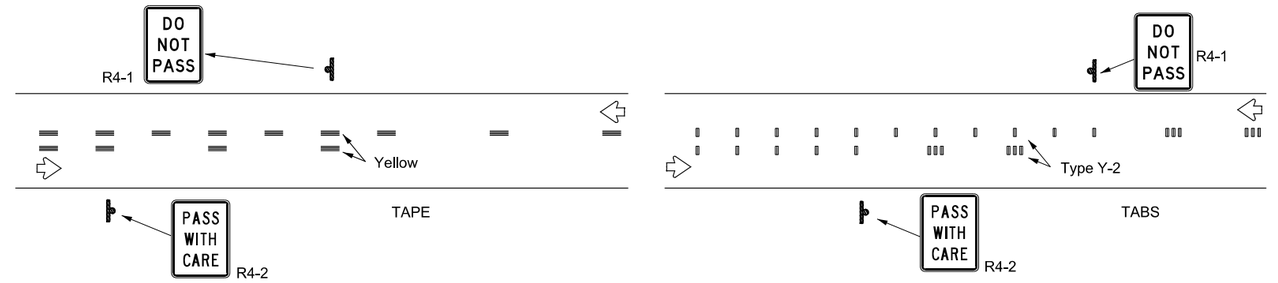
NOTES:

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.

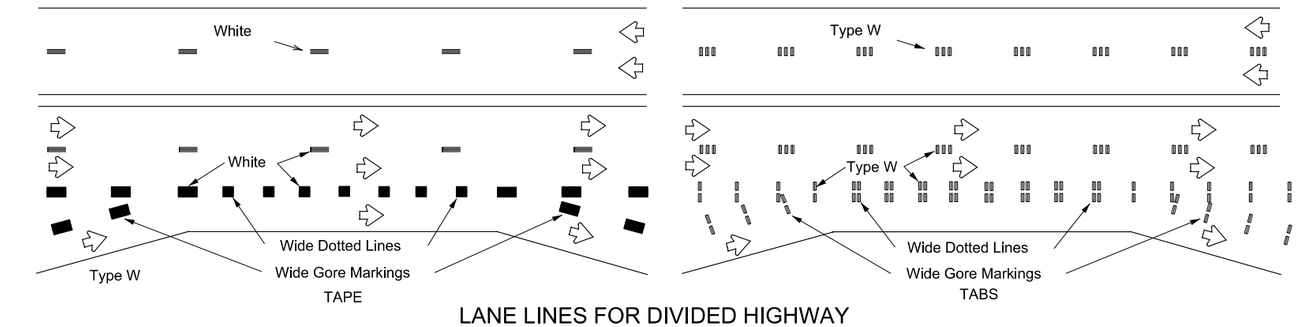
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

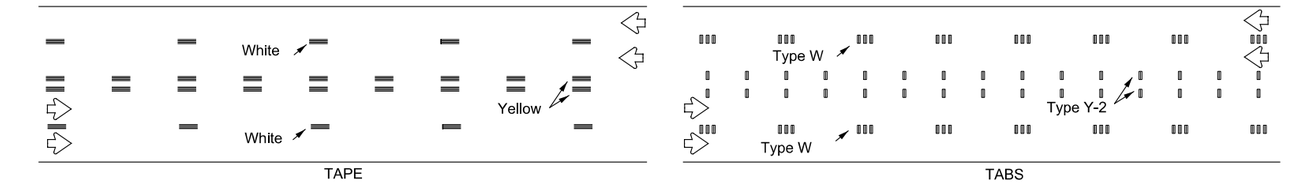
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



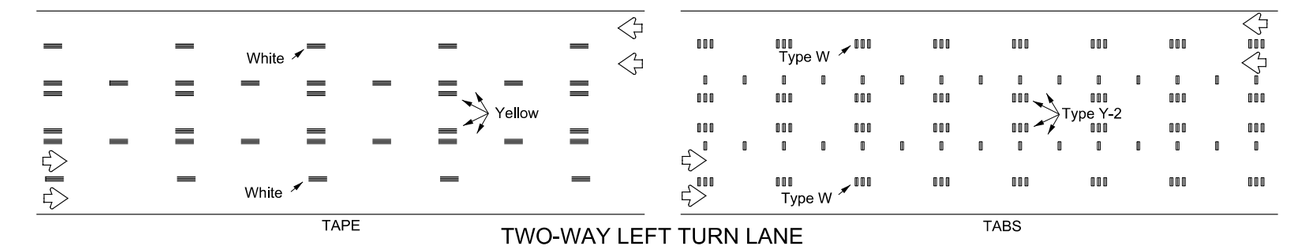
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



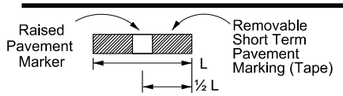
LANE LINES FOR DIVIDED HIGHWAY



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	2311	01	042, ETC.	SL 340, ETC.
4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		53

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DATE:
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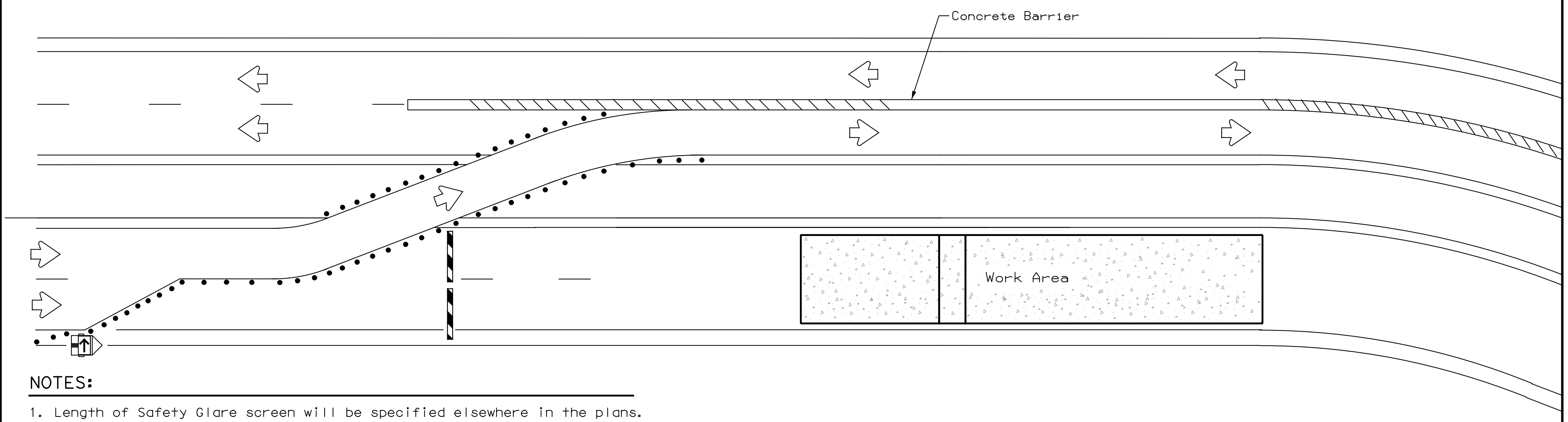


LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

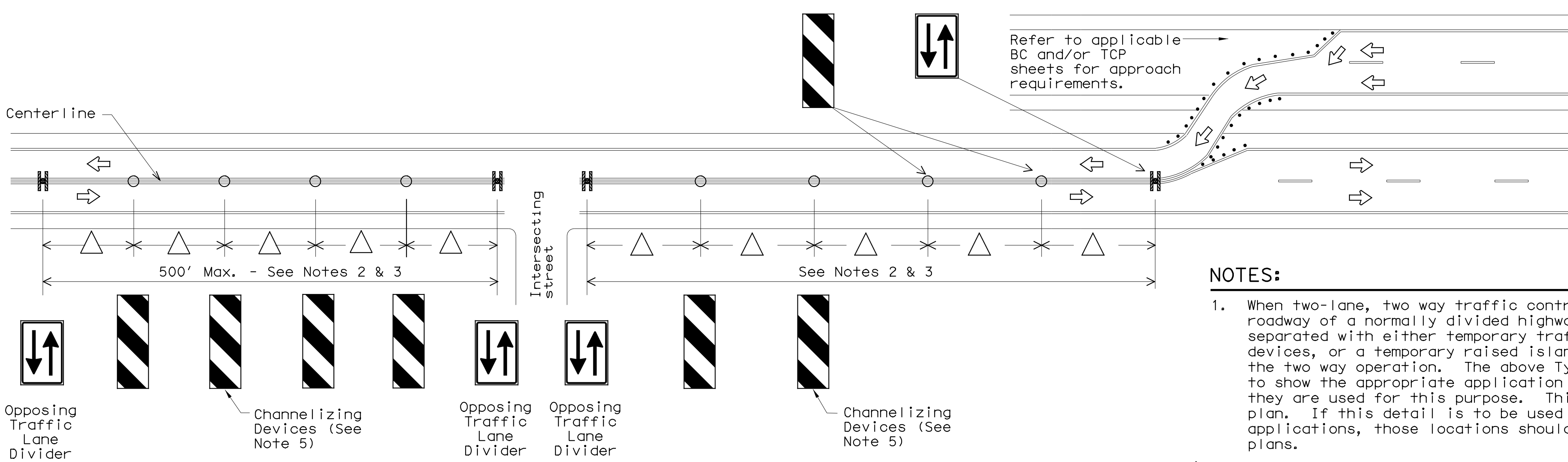
Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html

NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

BARRIER DELINEATION WITH MODULAR GLARE SCREENS



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT 2311	SECT 01	JOB 042, ETC.	HIGHWAY SL 340, ETC.
REVISIONS 4-98 2-17 3-03 7-13	DIST WAC		COUNTY MCLENNAN	SHEET NO. 54

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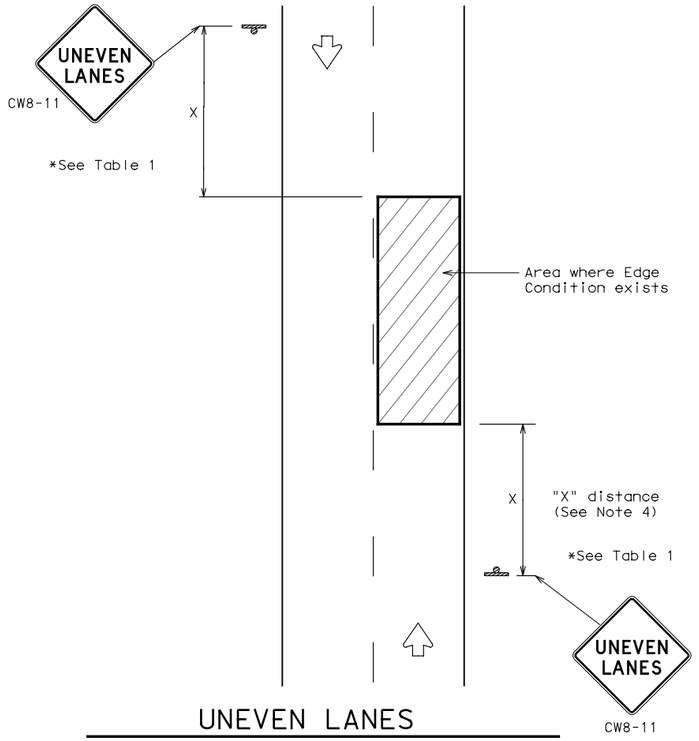
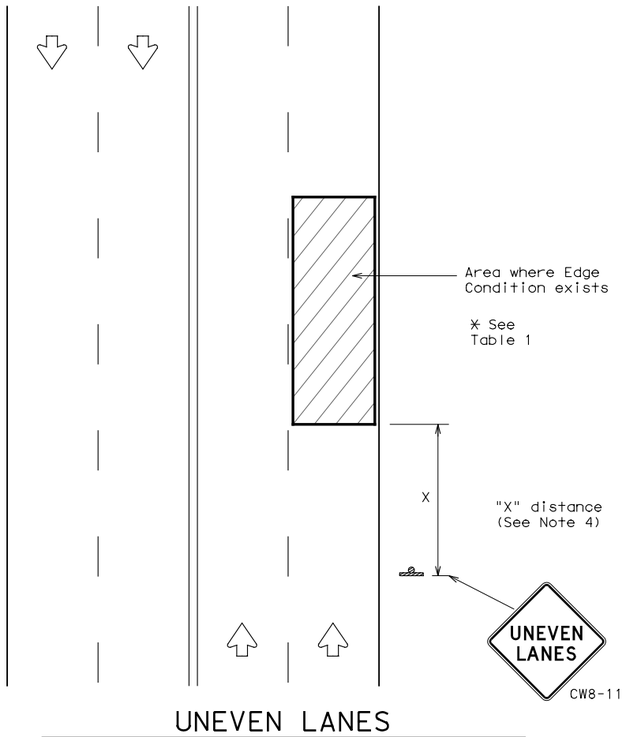
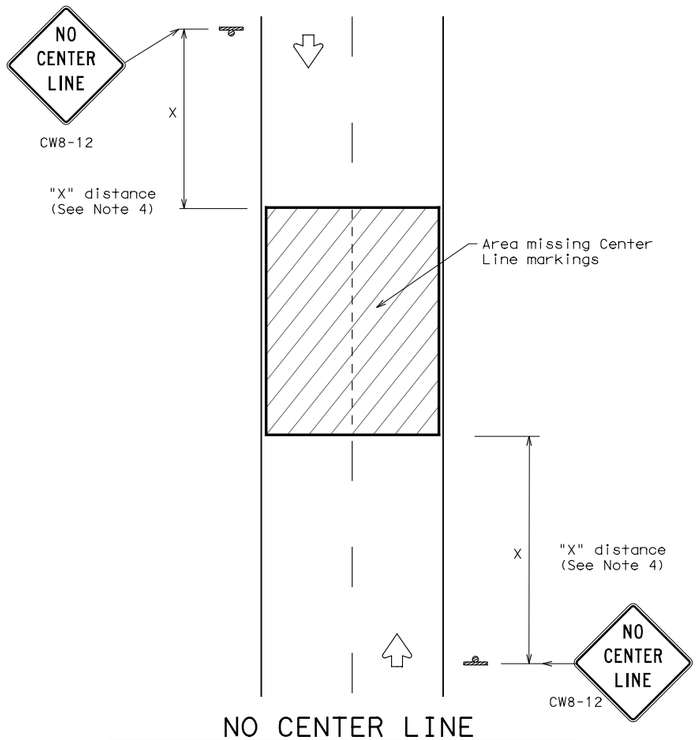
DATE: 6/30/2023 9:19
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-042/Design/Standards/wzul-13.dgn



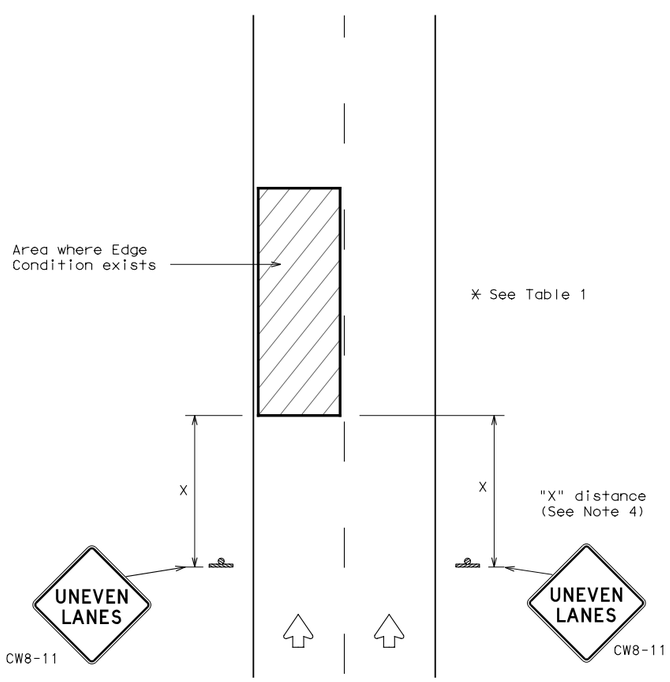
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

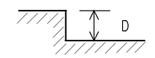
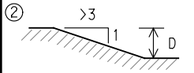
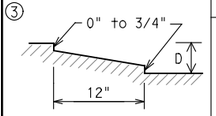
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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	2311	01	042, ETC.	SL 340, ETC.
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	WAC	MCLENNAN		55

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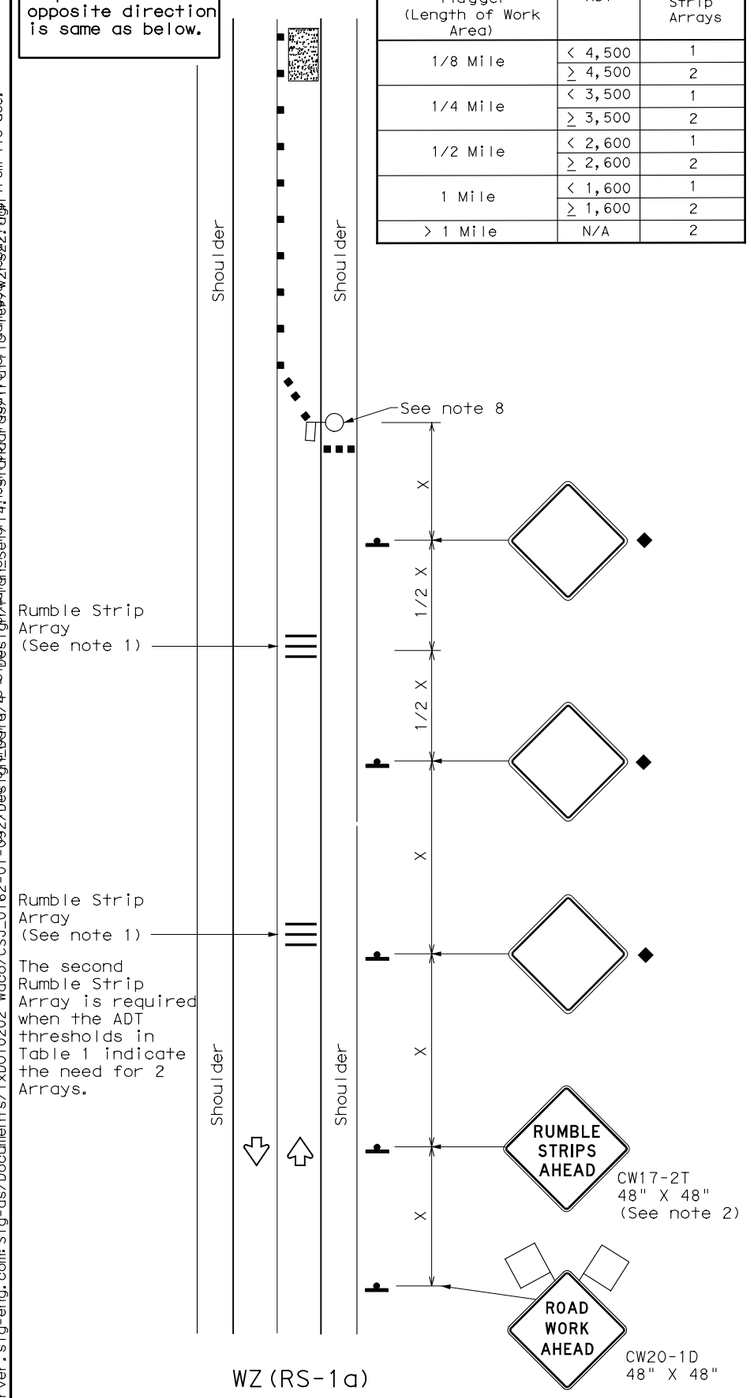
DATE: 6/30/2023 9:19
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Des Sht/wzrs22.dgn

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

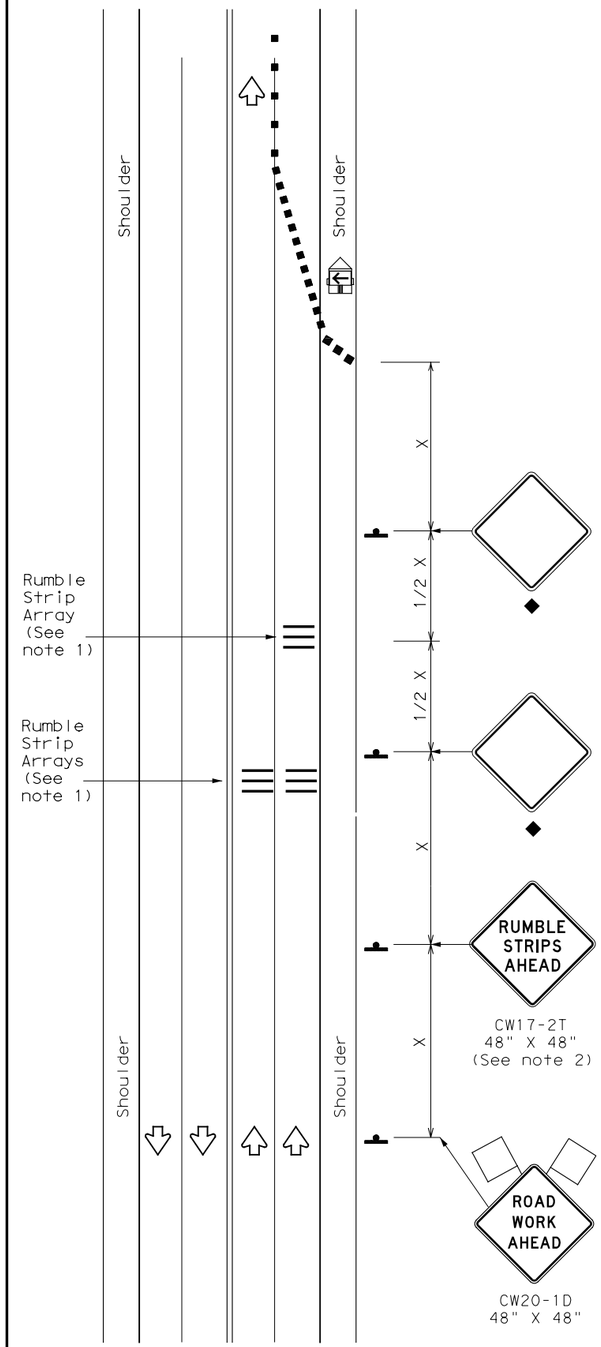


WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

TABLE 1

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



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	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
	✓	✓		

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

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

TABLE 2

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

Texas Department of Transportation — Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		56

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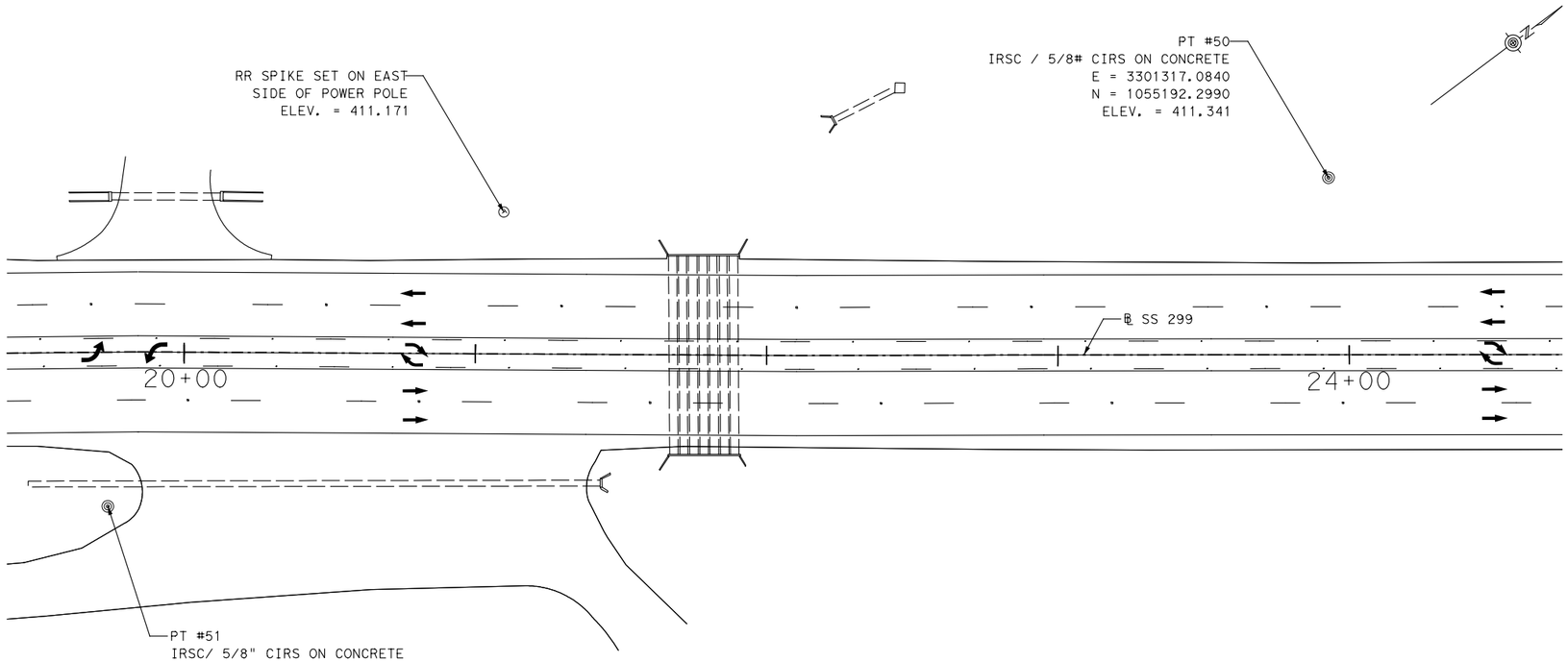
100% SUBMITTAL



Beginning chain SS 299 description

Point 2991	N 10,554,022.2075	E 3,300,479.1027	Sta	9+52.59
Course from 2991 to 2992	N 43° 12′ 33.59"	E Dist 214.5802		
Point 2992	N 10,554,178.6058	E 3,300,626.0184	Sta	11+67.17
Course from 2992 to 2993	N 39° 20′ 27.42"	E Dist 149.6902		
Point 2993	N 10,554,294.3743	E 3,300,720.9121	Sta	13+16.86
Course from 2993 to 2994	N 36° 48′ 37.29"	E Dist 177.3436		
Point 2994	N 10,554,436.3597	E 3,300,827.1708	Sta	14+94.20
Course from 2994 to 2995	N 36° 48′ 37.28"	E Dist 160.7675		
Point 2995	N 10,554,565.0738	E 3,300,923.4976	Sta	16+54.97
Course from 2995 to 2996	N 36° 20′ 06.65"	E Dist 163.2322		
Point 2996	N 10,554,696.5679	E 3,301,020.2140	Sta	18+18.20
Course from 2996 to 2997	N 36° 59′ 46.43"	E Dist 96.2699		
Point 2997	N 10,554,773.4563	E 3,301,078.1456	Sta	19+14.47
Course from 2997 to 2998	N 36° 21′ 30.58"	E Dist 69.7480		
Point 2998	N 10,554,829.6260	E 3,301,119.4947	Sta	19+84.22
Course from 2998 to 2999	N 37° 13′ 41.26"	E Dist 87.4640		
Point 2999	N 10,554,899.2677	E 3,301,172.4095	Sta	20+71.69
Course from 2999 to 3000	N 37° 13′ 41.26"	E Dist 66.3460		
Point 3000	N 10,554,952.0946	E 3,301,212.5482	Sta	21+38.03
Course from 3000 to 3001	N 37° 13′ 41.26"	E Dist 72.2062		
Point 3001	N 10,555,009.5875	E 3,301,256.2322	Sta	22+10.24
Course from 3001 to 3002	N 36° 46′ 52.07"	E Dist 84.8894		

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
LICENSED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SS 299
HAL DATA AND SURVEY CONTROL

SCALE: 1" = 50' HORIZ. SHEET 1 OF 1

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		57

USER: eguti6mez
DATE: 6/30/2023
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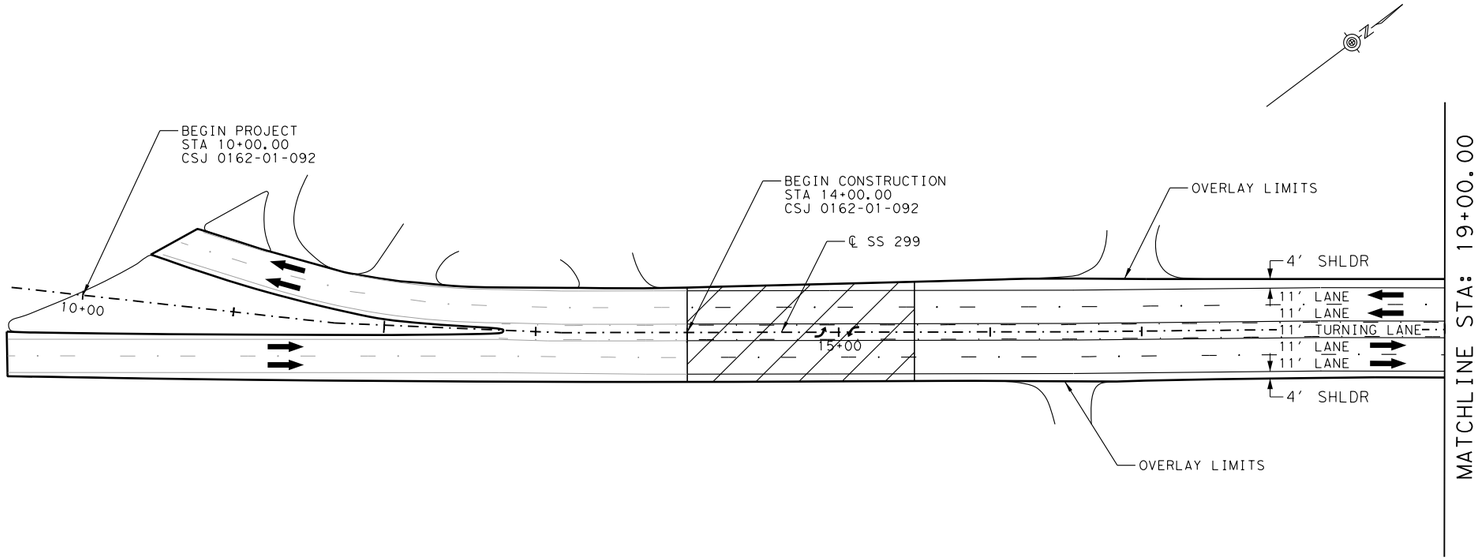

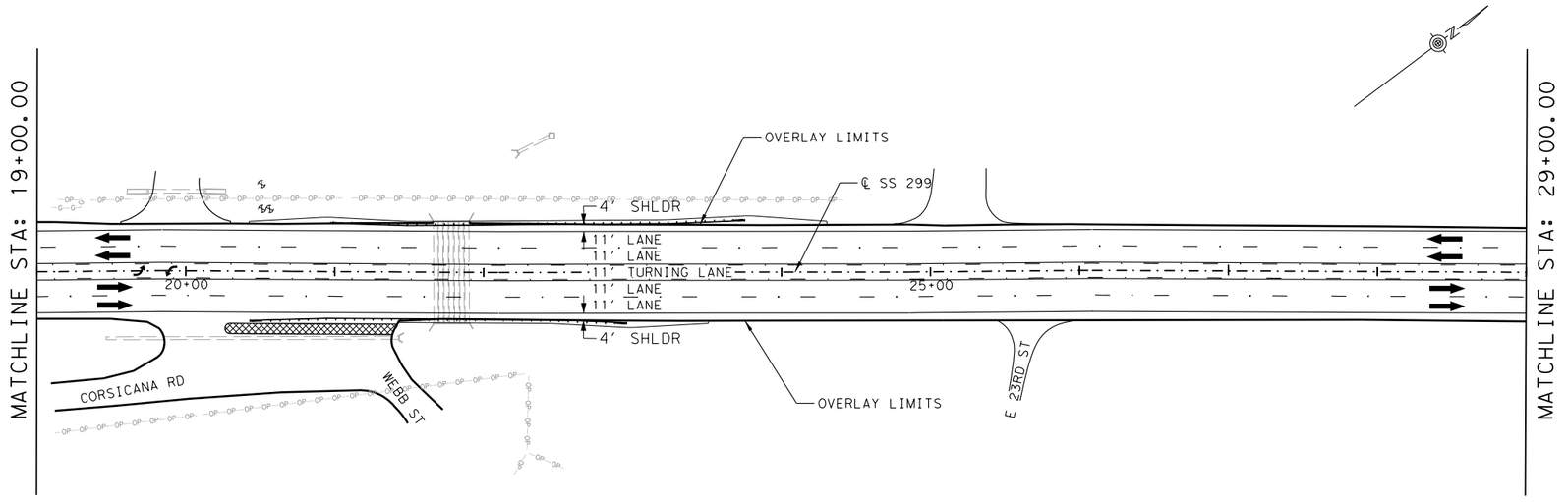

NOTES:

150' TRANSITION FROM 0" DEPTH TO 1.5" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS.

LEGEND

PLANE ASPH CONC PVMT

ITEM	DESCRIPTION	UNIT
354-6051	PLANE ASPH CONC PAV (0" TO 11/2")	1067 SY
3080-6007	STONE-MTRX-ASPH SMA-D SAC-A PG76-22	874 TON
3085-6001	UNDERSEAL COURSE	2649 GAL

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
6/30/2023
P.E.

RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

Texas Department of Transportation

SS 299
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 1 OF 2

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		58

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DATE: 6/30/2023
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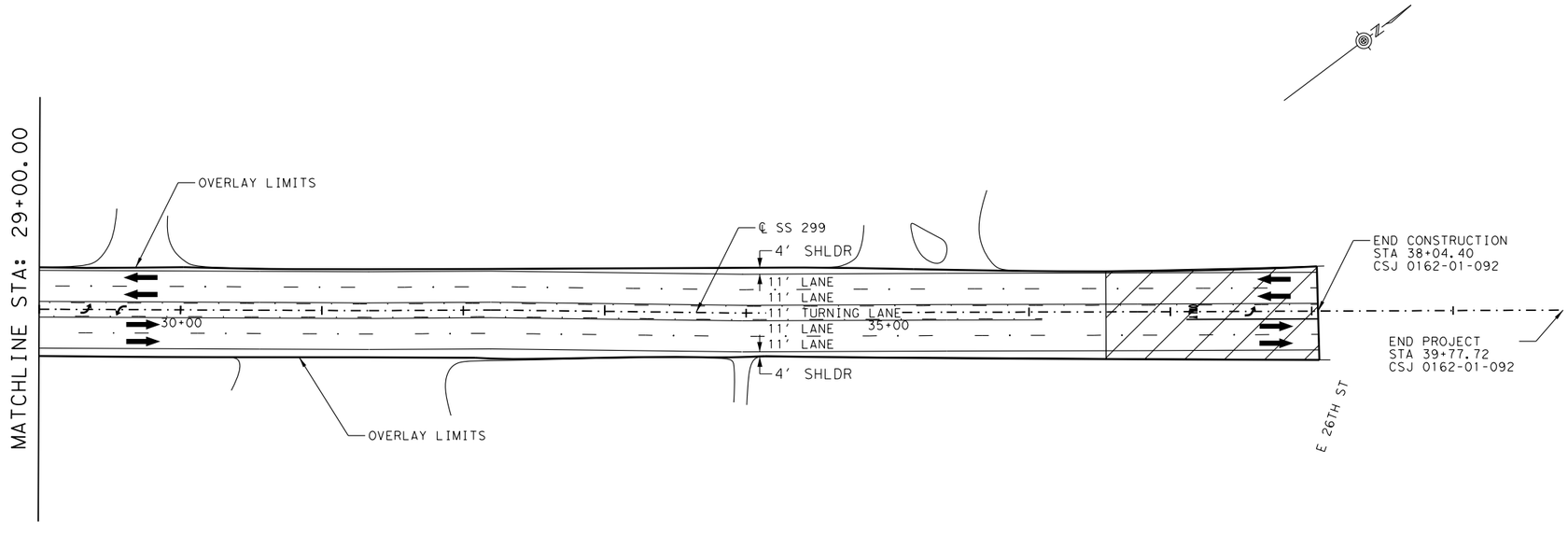

NOTES:

150' TRANSITION FROM 0" DEPTH TO 1.5" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS.

LEGEND

PLANE ASPH CONC PVMT

ITEM	DESCRIPTION	UNIT
354-6051	PLANE ASPH CONC PAV (0" TO 11/2")	1060 SY
3080-6007	STONE-MTRX-ASPH SMA-D SAC-A PG76-22	522 TON
3085-6001	UNDERSEAL COURSE	1581 GAL

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
6/30/2023

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

SS 299
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 2 OF 2

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		59

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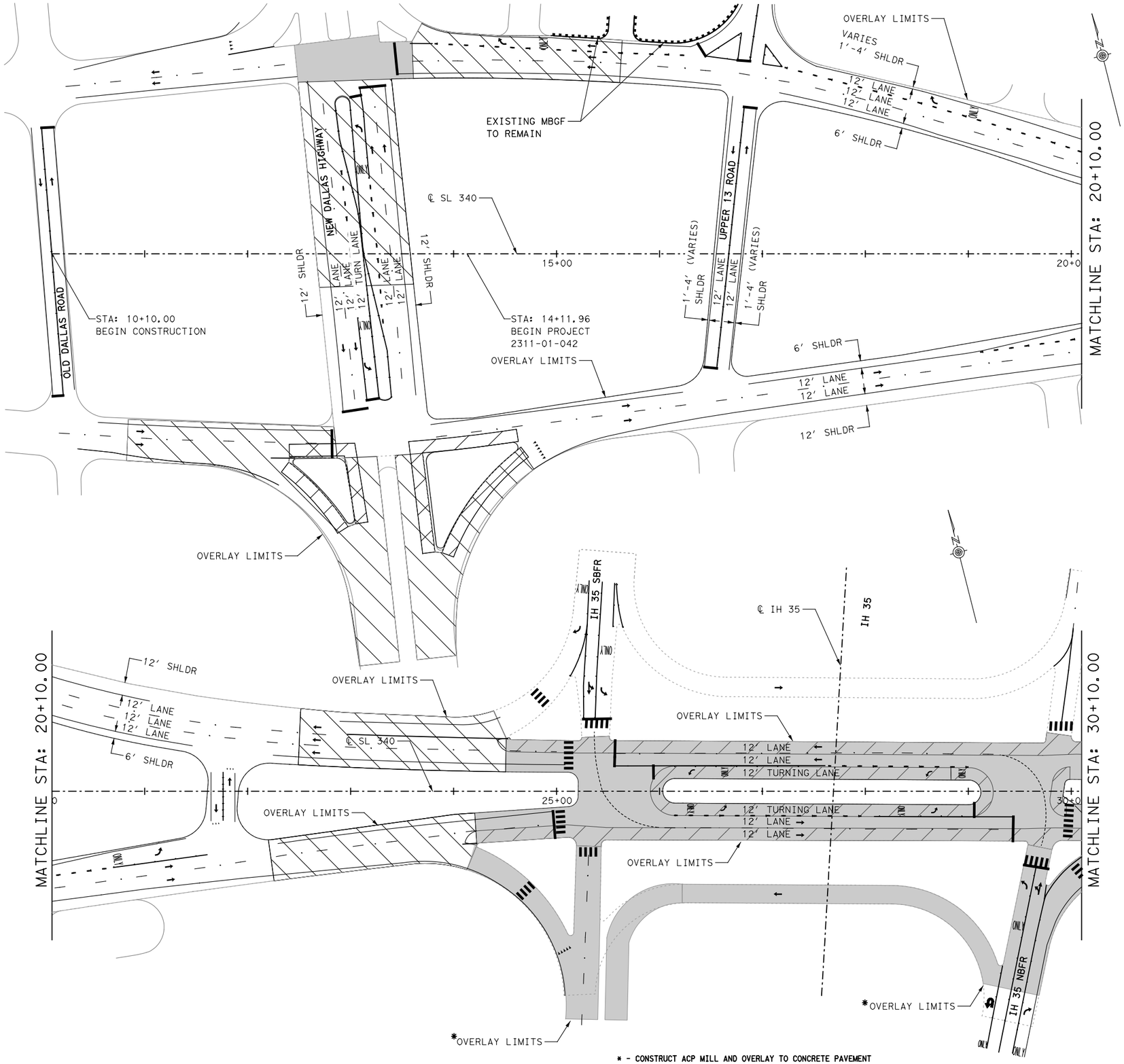

* - CONSTRUCT ACP MILL AND OVERLAY TO CONCRETE PAVEMENT

NOTES:

200' TRANSITION FROM 0" DEPTH TO 2" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS AND ALL PLANING TRANSITONS.

LEGEND

- PLANE ASPH CONC PVMT (0 TO 2 IN TRANSITION)
- PLANE ASPH CONC PVMT (0 TO 2 IN TAPER MILL)
- PLANE ASPH CONC PVMT (2 IN)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	11633 SY
0354-6045	PLANE ASPH CONC PAV (2")	8080 SY
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	3051 TON
3085-6001	UNDERSEAL COURSE	6935 GAL

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
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8/31/2023

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SL 340
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 1 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		60

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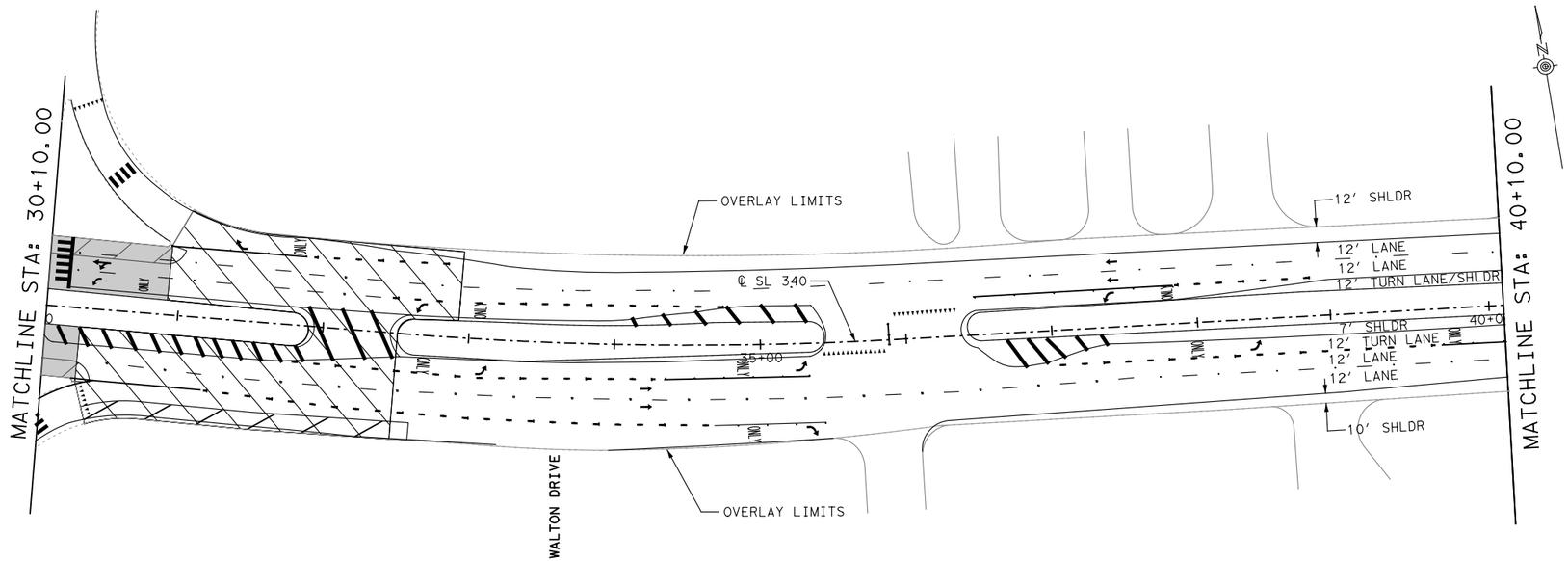

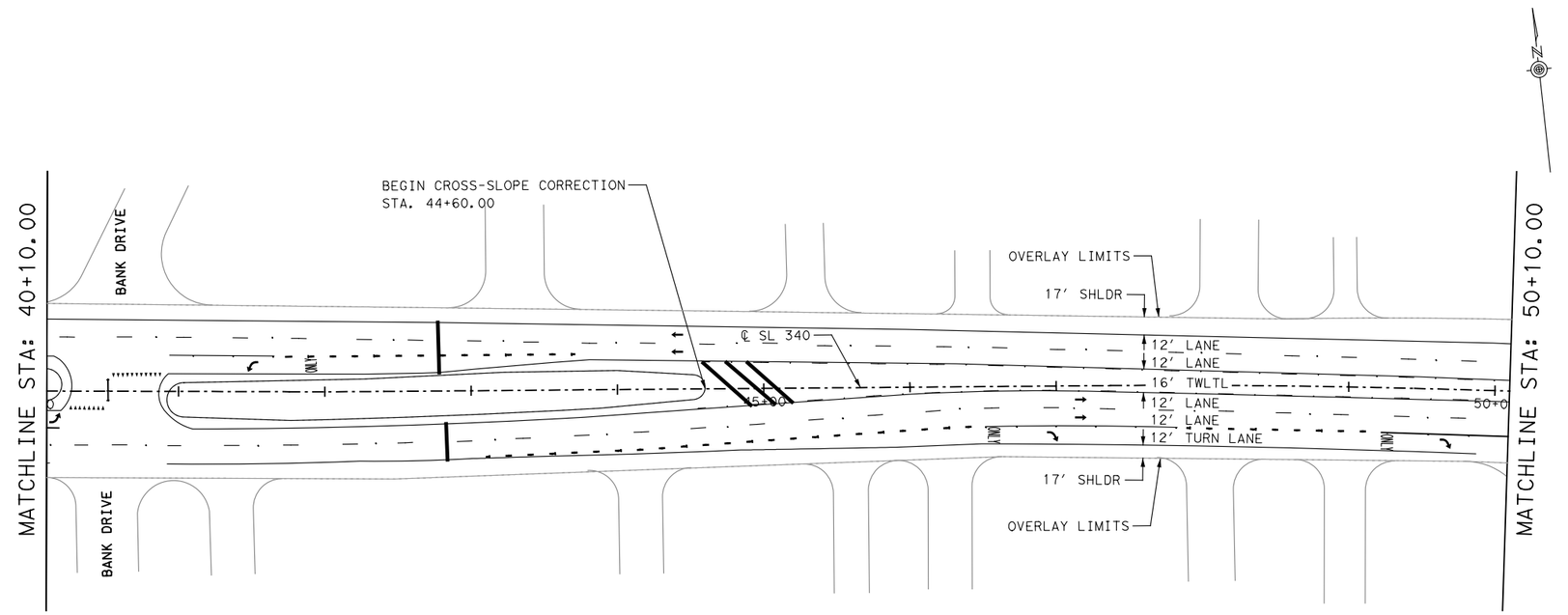

NOTES:

200' TRANSITION FROM 0" DEPTH TO 2" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS AND ALL PLANING TRANSITONS.

LEGEND

- PLANE ASPH CONC PVMT (0 TO 2 IN TRANSITION)
- PLANE ASPH CONC PVMT (0 TO 2 IN TAPER MILL)
- PLANE ASPH CONC PVMT (2 IN)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	3209 SY
0354-6045	PLANE ASPH CONC PAV (2")	427 SY
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	2497 TON
3085-6001	UNDERSEAL COURSE	5676 GAL

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SL 340
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		61

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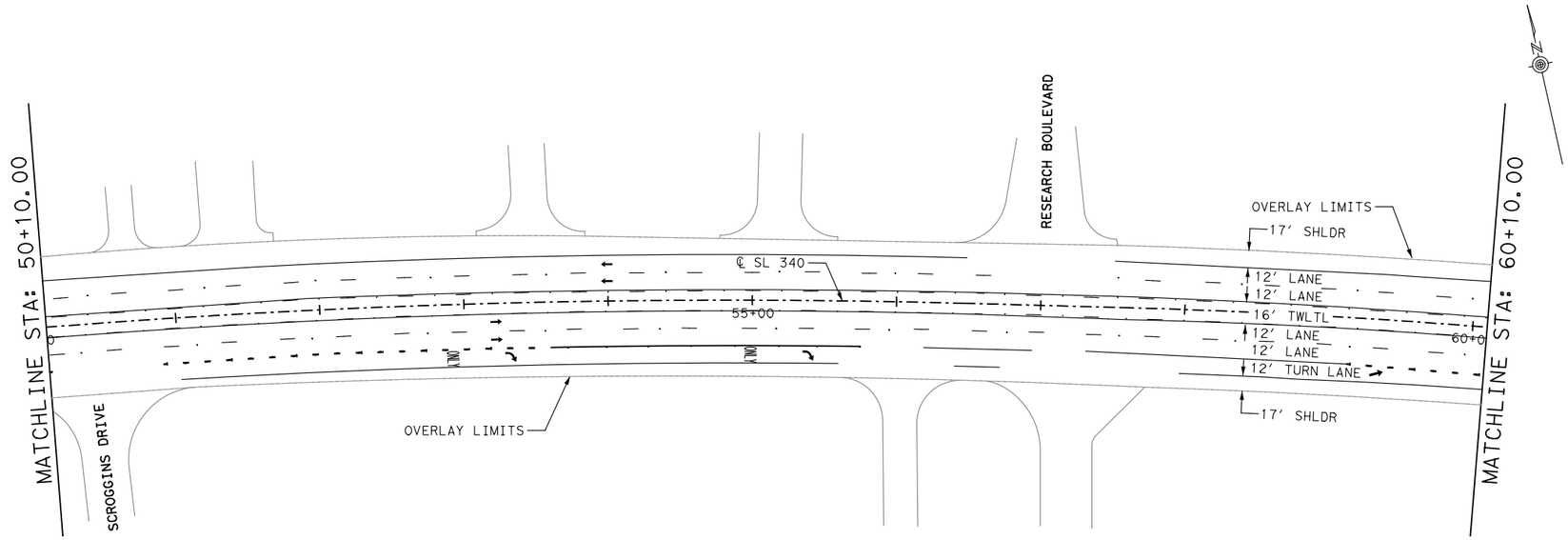

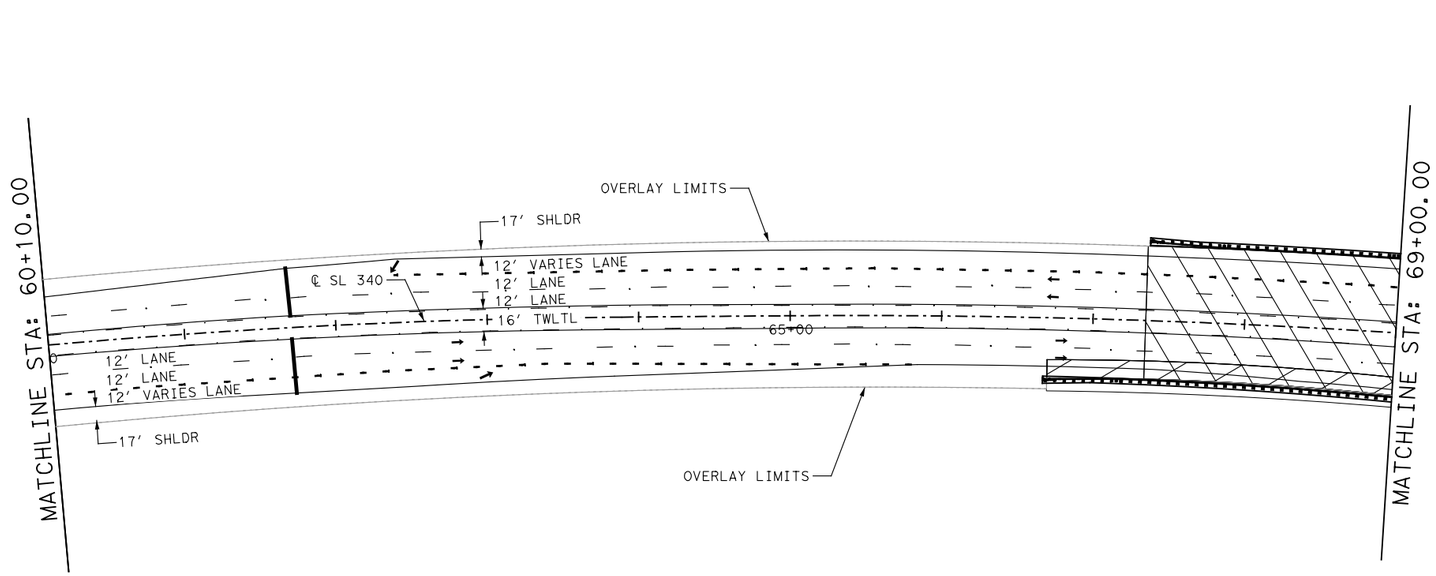

NOTES:

200' TRANSITION FROM 0" DEPTH TO 2" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS AND ALL PLANING TRANSITONS.

LEGEND

- PLANE ASPH CONC PVMT (0 TO 2 IN TRANSITION)
- PLANE ASPH CONC PVMT (0 TO 2 IN TAPER MILL)
- PLANE ASPH CONC PVMT (2 IN)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	1932 SY
0354-6045	PLANE ASPH CONC PAV (2")	-
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	2217 TON
3085-6001	UNDERSEAL COURSE	5038 GAL

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SL 340
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		62

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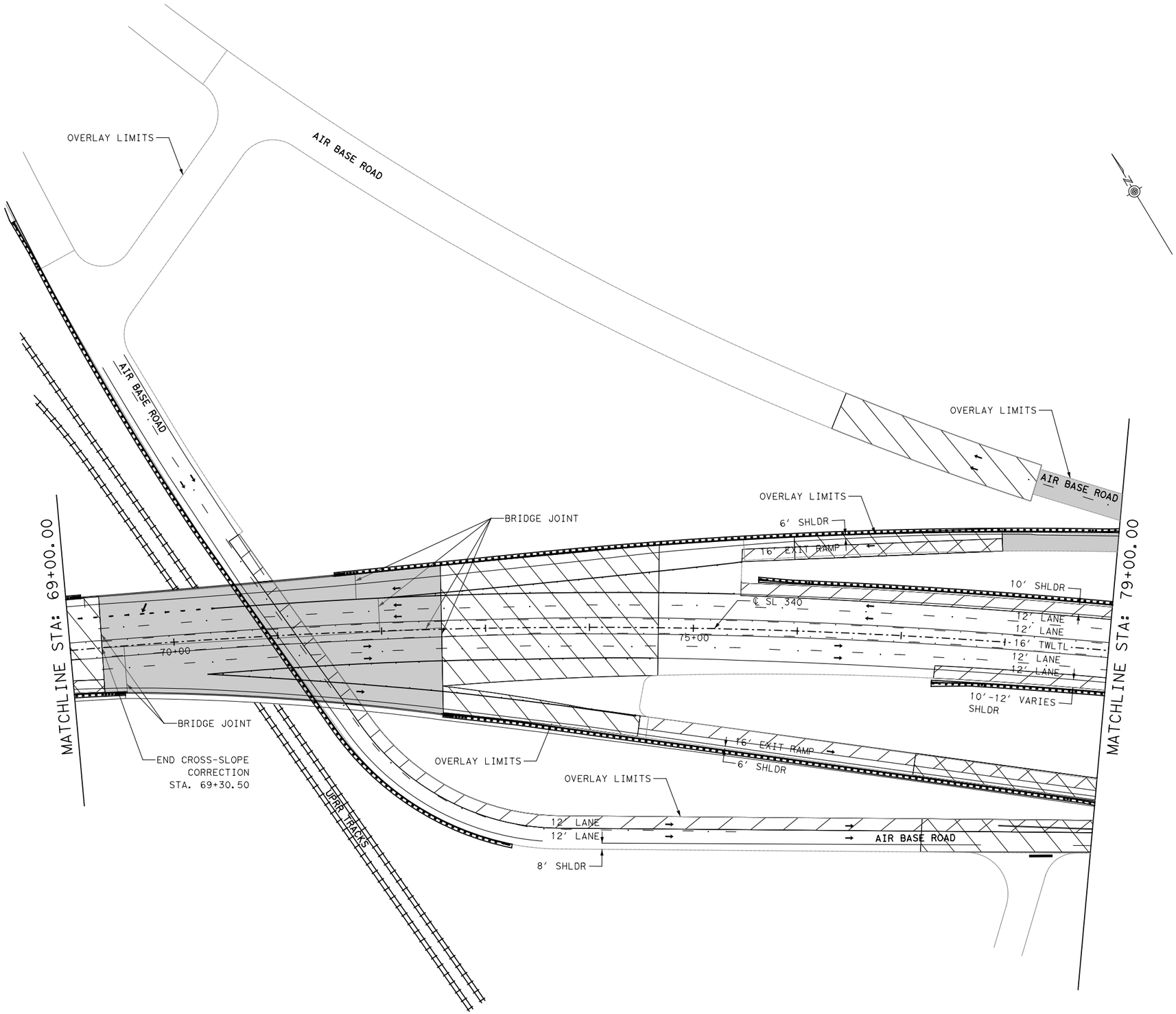

NOTES:

200' TRANSITION FROM 0" DEPTH TO 2" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS AND ALL PLANING TRANSITONS.

LEGEND

- PLANE ASPH CONC PVMT (0 TO 2 IN TRANSITION)
- PLANE ASPH CONC PVMT (0 TO 2 IN TAPER MILL)
- PLANE ASPH CONC PVMT (2 IN)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	8513 SY
0354-6045	PLANE ASPH CONC PAV (2")	4596 SY
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	2630 TON
3085-6001	UNDERSEAL COURSE	5978 GAL

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SL 340
ROADWAY LAYOUTS

SCALE: FEET
1" = 100' HORIZ.

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		63

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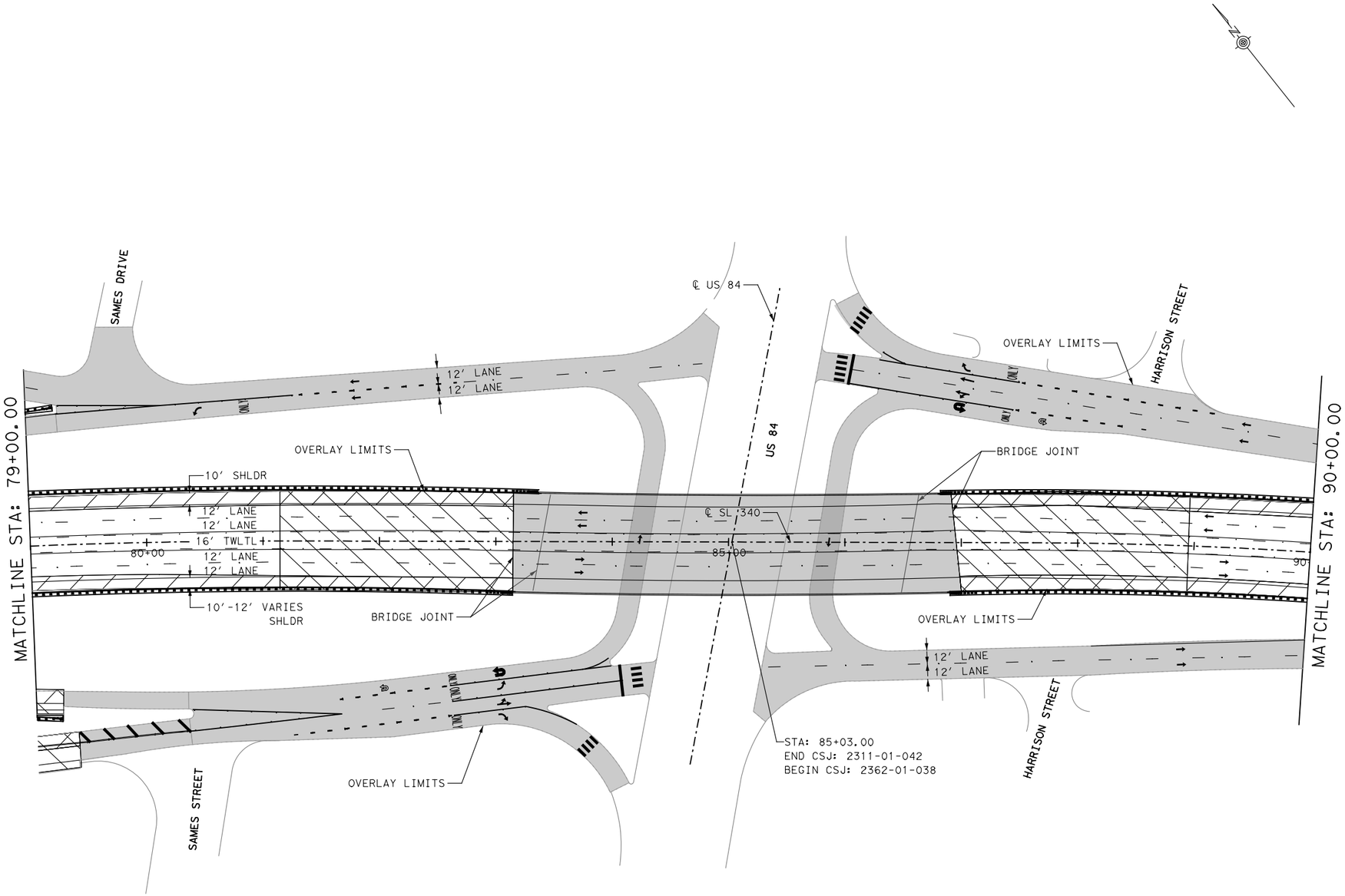

NOTES:

200' TRANSITION FROM 0" DEPTH TO 2" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS AND ALL PLANING TRANSITONS.

LEGEND

- PLANE ASPH CONC PVMT (0 TO 2 IN TRANSITION)
- PLANE ASPH CONC PVMT (0 TO 2 IN TAPER MILL)
- PLANE ASPH CONC PVMT (2 IN)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	3273 SY
0354-6045	PLANE ASPH CONC PAV (2")	7125 SY
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	1227 TON
3085-6001	UNDERSEAL COURSE	2789 GAL

QUANTITIES (CSJ: 2362-01-038)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	2672 SY
0354-6045	PLANE ASPH CONC PAV (2")	488 SY
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	945 TON
3085-6001	UNDERSEAL COURSE	2149 GAL

STATE OF TEXAS
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SL 340
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 5 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		64

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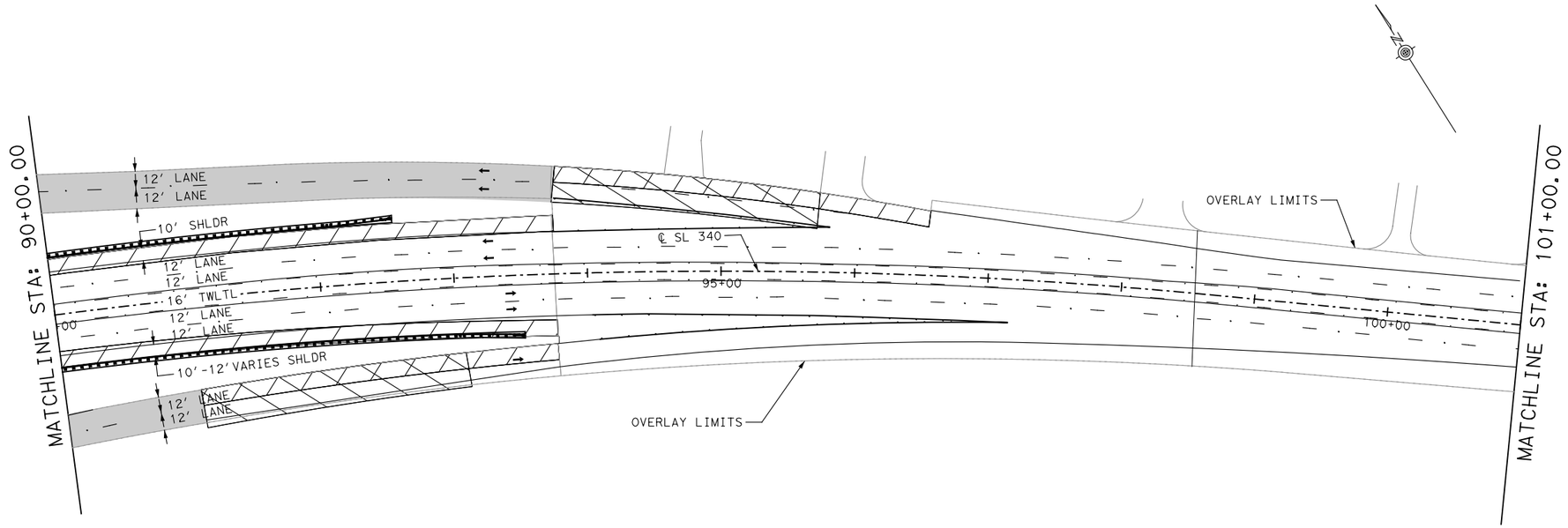

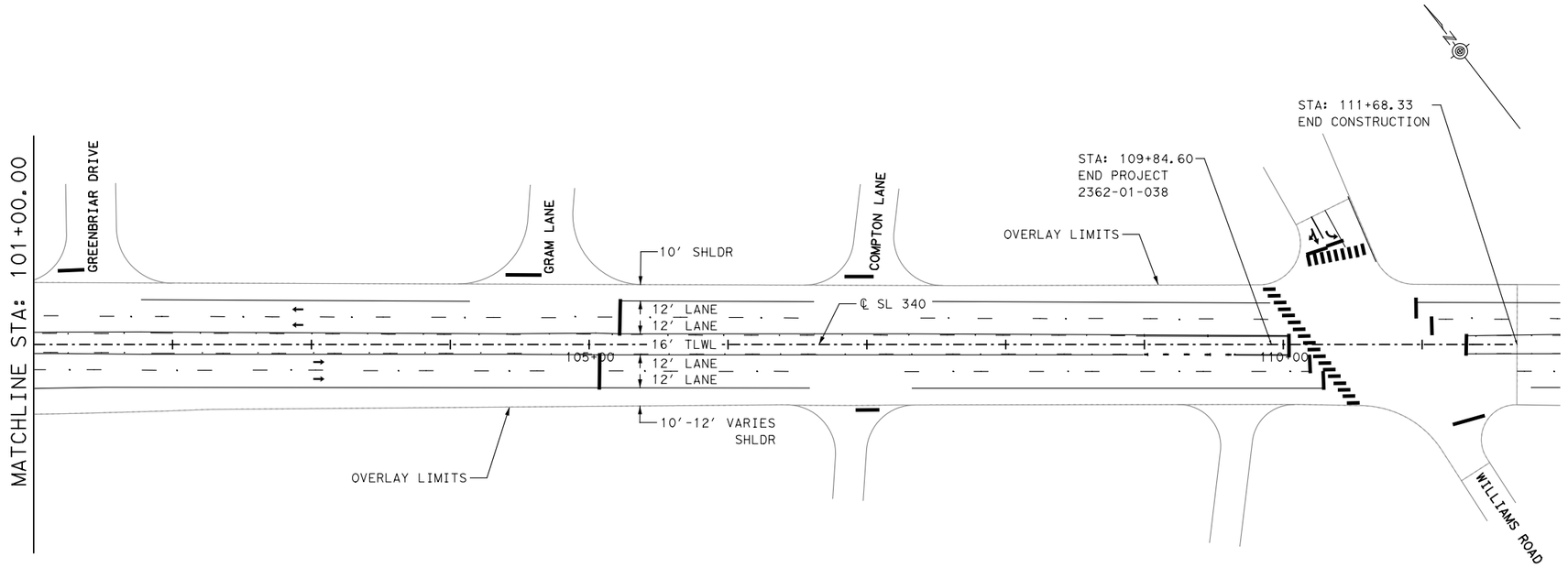

NOTES:

200' TRANSITION FROM 0" DEPTH TO 2" DEPTH OF ASPH SMA-D AT PROJECT END LIMITS AND ALL PLANING TRANSITONS.

LEGEND

- PLANE ASPH CONC PVMT (0 TO 2 IN TRANSITION)
- PLANE ASPH CONC PVMT (0 TO 2 IN TAPER MILL)
- PLANE ASPH CONC PVMT (2 IN)

QUANTITIES (CSJ: 2362-01-038)

ITEM	DESCRIPTION	QTY
0354-6021	PLANE ASPH CONC PAV (0" TO 2")	2945 SY
0354-6045	PLANE ASPH CONC PAV (2")	1468 SY
3080-6007	STONE-MTRX ASPH SMA-D SAC-A PG76-22	286I TON
3085-6001	UNDERSEAL COURSE	6502 GAL

STATE OF TEXAS
EDUARDO GUTIERREZ
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6/30/2023

Seiler Lankes Group
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PLANNING • ENGINEERING • CONSTRUCTION

SL 340
ROADWAY LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 6 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		65

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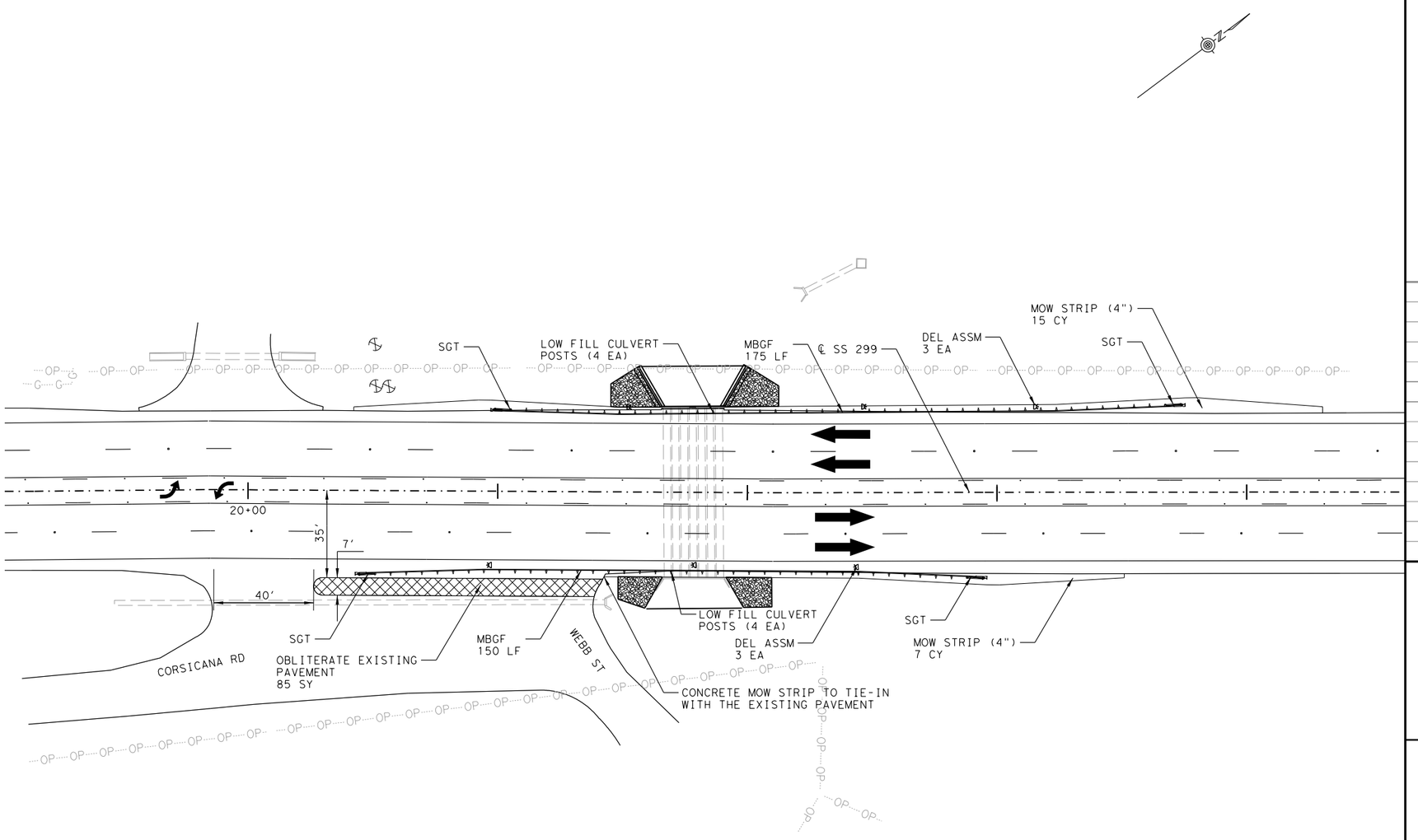

NOTES:

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (GF2)

ITEM	DESCRIPTION	UNIT
106-6002	OBLITERATING ABANDONED ROAD	85 SY
432-6045	RIPRAP (MOW STRIP)(4 IN)	22 CY
540-6002	MTL W-BEAM GD FEN (STEEL POST)	325 LF
544-6001	GUARDRAIL END TREATMENT (INSTALL)	4 EA
658-6061	INSTL DEL ASSM (D-SW)SZ I(BRF)GF2	6 EA

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FIRM #587

SS 299
METAL BEAM GUARD FENCE LAYOUT

SCALE: 1" = 50' HORIZ. FEET

SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		66

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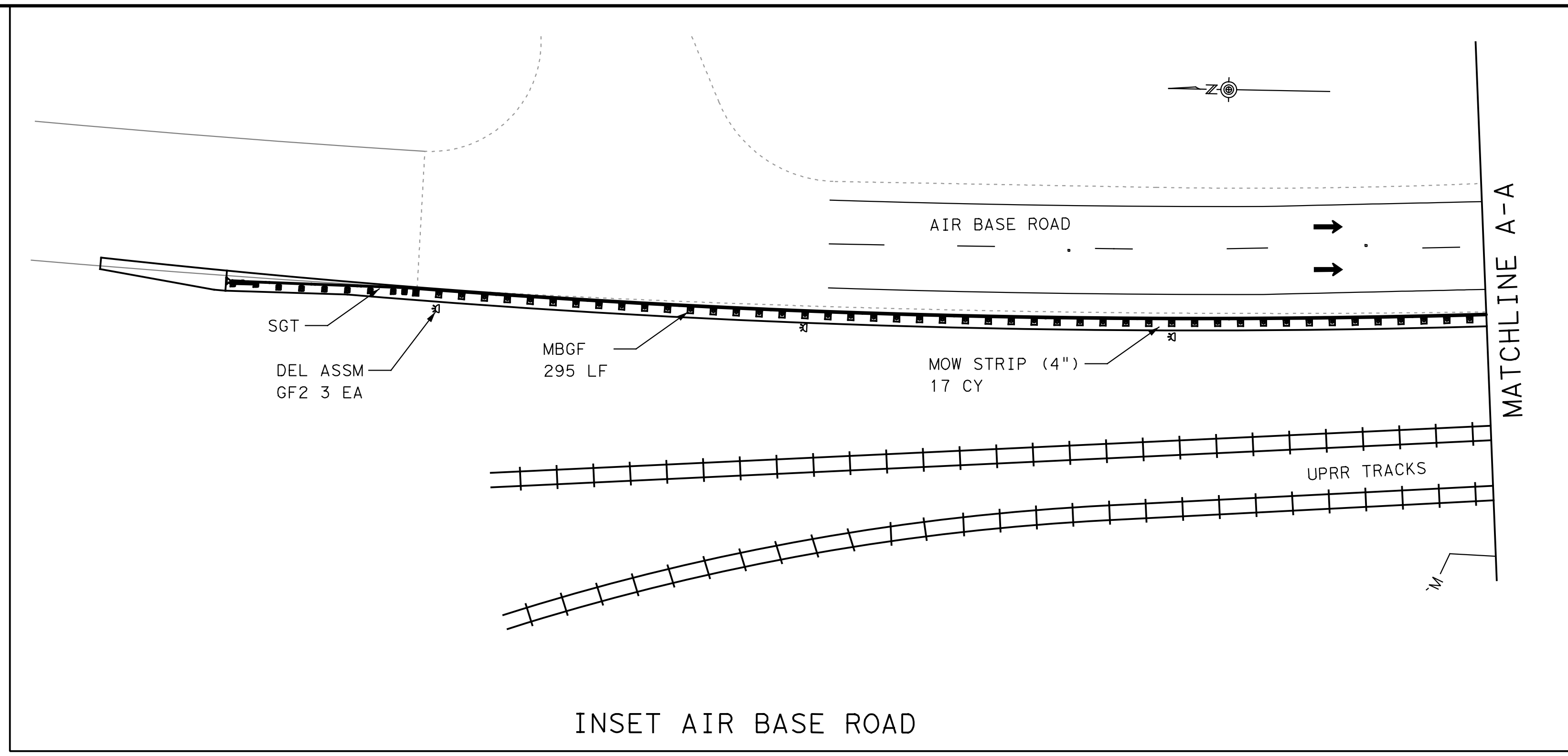

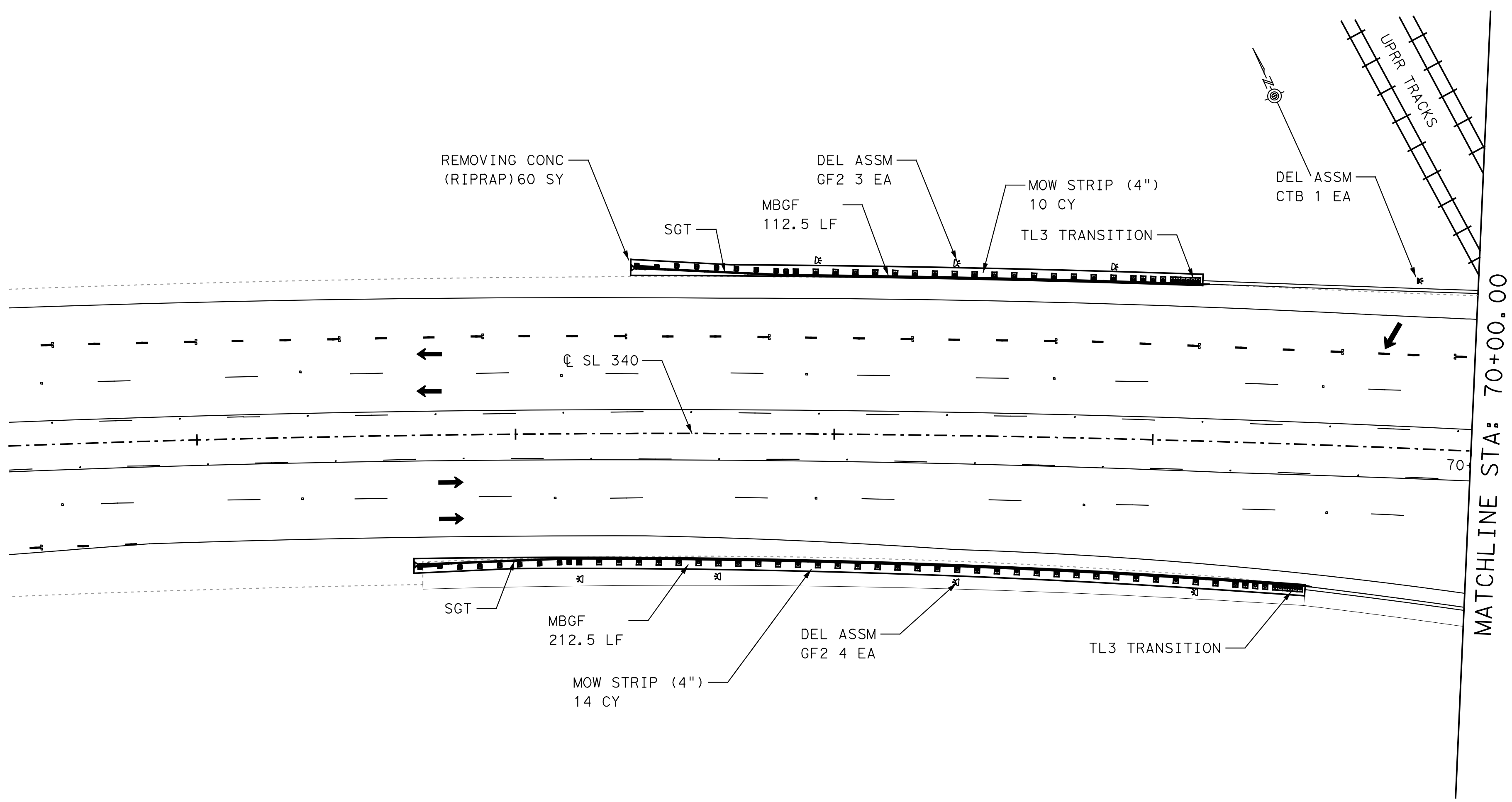

NOTES:

SEE MATCHLINE A-A NEXT SHEET

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (CTB)
- D-SW DELINEATOR (GF2)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0104-6009	REMOVING CONC (RIPRAP)	60 SY
0432-6045	RIPRAP (MOW STRIP) (4")	41 CY
0540-6002	MTL W-BEAM GD FEN (STL POST)	620 LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	2 EA
0540-6016	DOWNSTREAM ANCHOR TERM SECTION	-
0542-6001	REMOVE METAL BEAM GUARD FENCE	620 LF
0542-6002	REMOVE TERMINAL ANCHOR SECTION	-
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	3 EA
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	3 EA
0658-6013	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	1 EA
0658-6061	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2	10 EA

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Texas Department of Transportation

SL 340 METAL BEAM GUARD FENCE LAYOUTS

SCALE: 1" = 50' HORIZ. FEET

SHEET 1 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WAC		MCLENNAN	67

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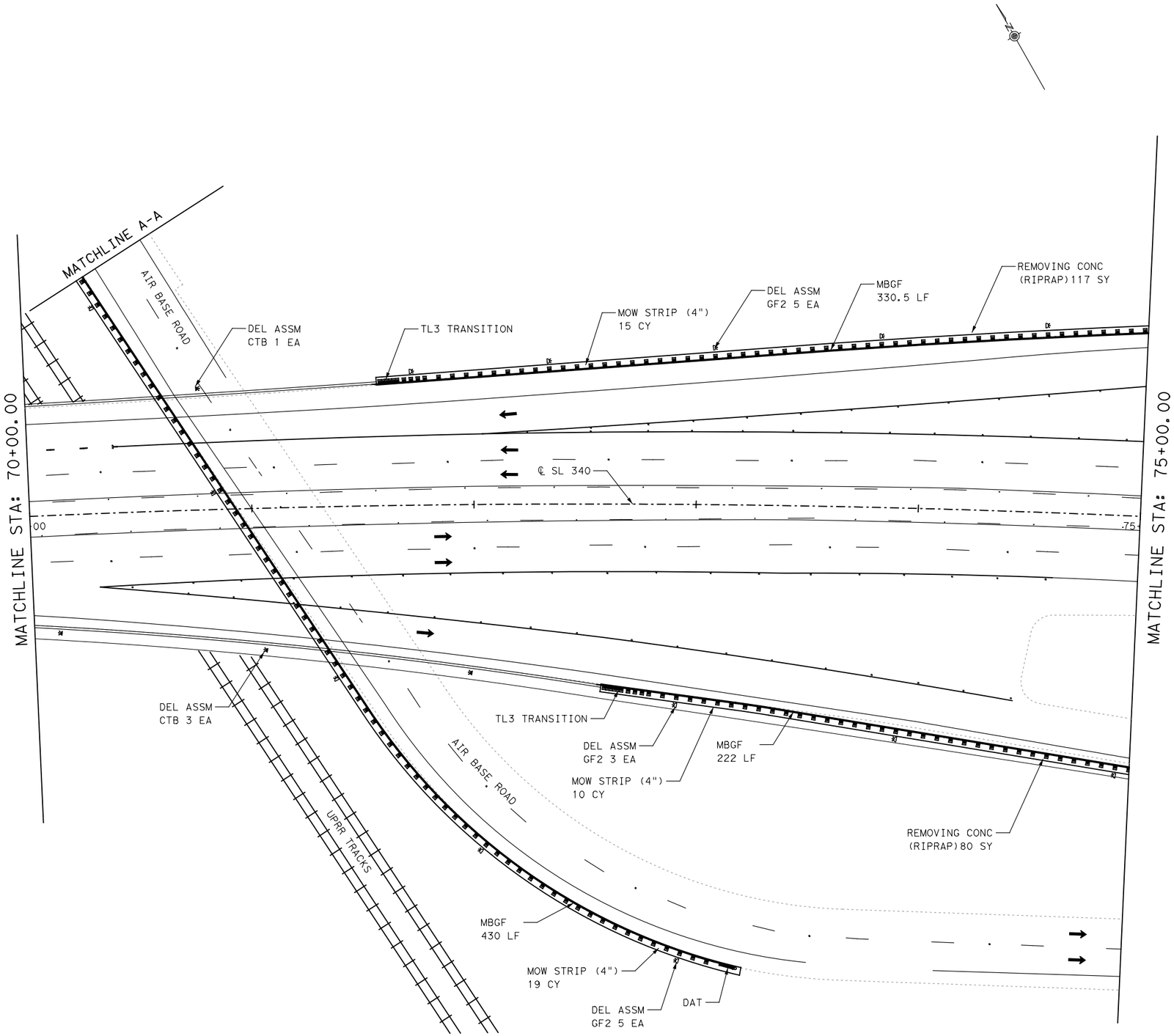

NOTES:

SEE MATCHLINE A-A PREVIOUS SHEET

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (CTB)
- D-SW DELINEATOR (GF2)

QUANTITIES (2311-01-042)

ITEM	DESCRIPTION	QTY
0104-6009	REMOVING CONC (RIPRAP)	197 SY
0432-6045	RIPRAP (MOW STRIP) (4")	44 CY
0540-6002	MTL W-BEAM GD FEN (STL POST)	982.5 LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	2 EA
0540-6016	DOWNSTREAM ANCHOR TERM SECTION	1 EA
0542-6001	REMOVE METAL BEAM GUARD FENCE	982.5 LF
0542-6002	REMOVE TERMINAL ANCHOR SECTION	1 EA
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	-
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	-
0658-6013	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	4 EA
0658-6061	INSTL DEL ASSM (D-SW) SZ 1(BRF) GF2	13 EA

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SL 340
METAL BEAM GUARD FENCE LAYOUTS

SCALE: 1" = 50' HORIZ. FEET

SHEET 2 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		68

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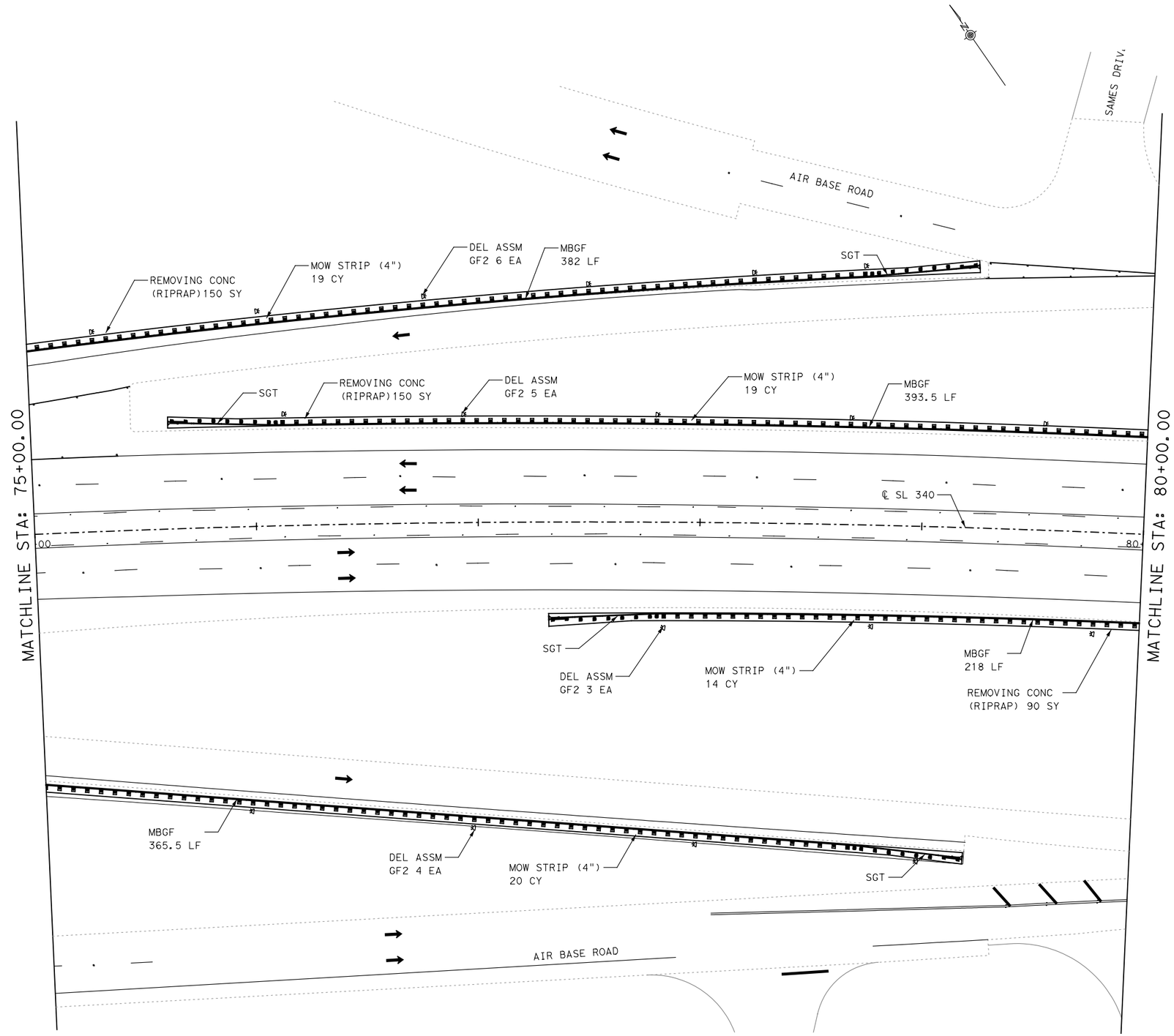

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (CTB)
- D-SW DELINEATOR (GF2)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0104-6009	REMOVING CONC (RIPRAP)	390 SY
0432-6045	RIPRAP (MOW STRIP) (4")	72 CY
0540-6002	MTL W-BEAM GD FEN (STL POST)	1359 LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	-
0540-6016	DOWNSTREAM ANCHOR TERM SECTION	-
0542-6001	REMOVE METAL BEAM GUARD FENCE	1359 LF
0542-6002	REMOVE TERMINAL ANCHOR SECTION	-
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	4 EA
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	4 EA
0658-6013	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	-
0658-6061	INSTL DEL ASSM (D-SW) SZ 1(BRF) GF2	18 EA

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

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SL 340
METAL BEAM GUARD FENCE LAYOUTS

SCALE: 1" = 50' HORIZ. FEET

SHEET 3 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		69

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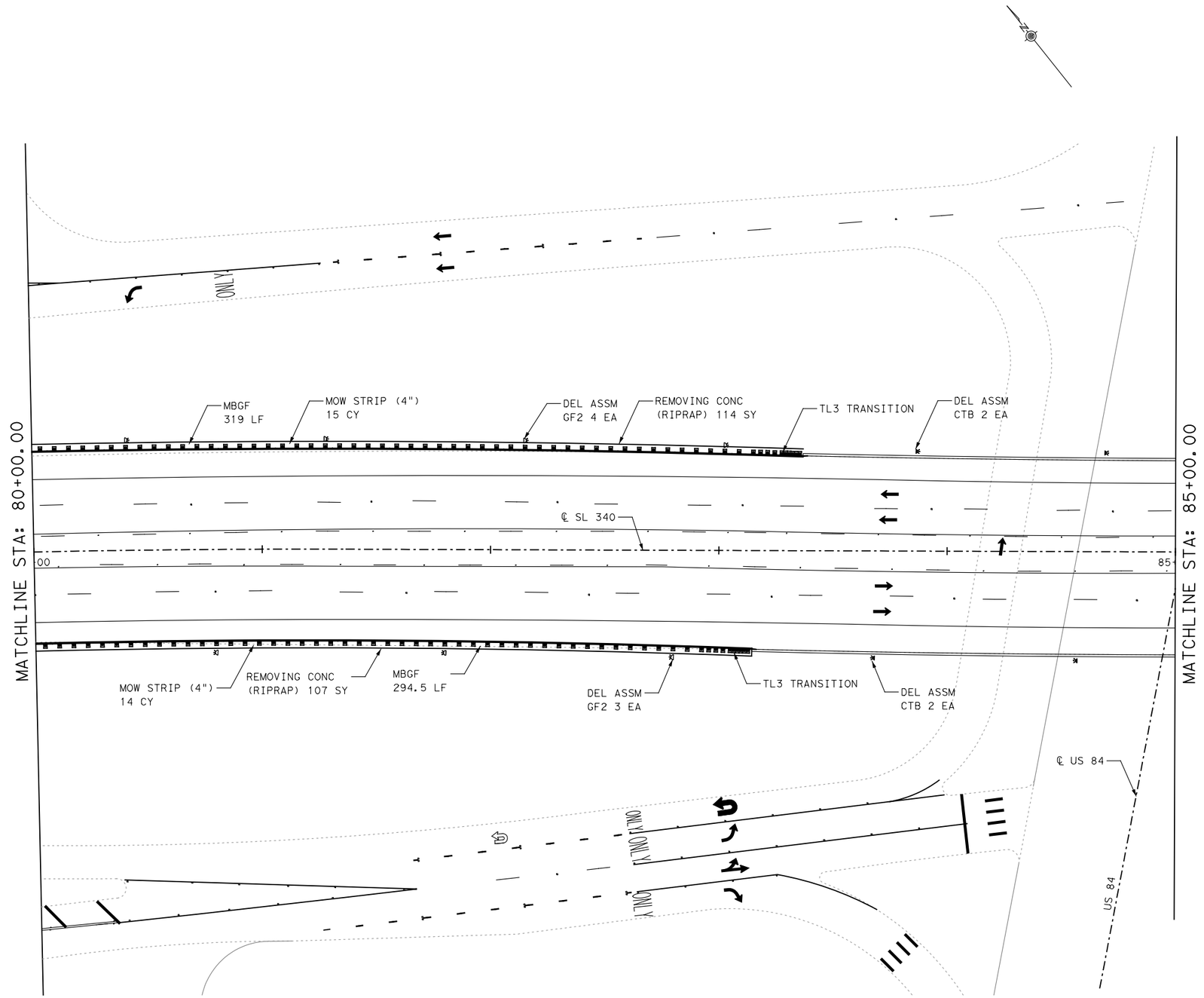

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (CTB)
- D-SW DELINEATOR (GF2)

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0104-6009	REMOVING CONC (RIPRAP)	221 SY
0432-6045	RIPRAP (MOW STRIP) (4")	29 CY
0540-6002	MTL W-BEAM GD FEN (STL POST)	613.5 LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	2 EA
0540-6016	DOWNSTREAM ANCHOR TERM SECTION	-
0542-6001	REMOVE METAL BEAM GUARD FENCE	613.5 LF
0542-6002	REMOVE TERMINAL ANCHOR SECTION	-
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	-
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	-
0658-6013	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	4 EA
0658-6061	INSTL DEL ASSM (D-SW) SZ 1(BRF) GF2	7 EA

STATE OF TEXAS
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SL 340
METAL BEAM GUARD FENCE LAYOUTS

SCALE: 1" = 50' HORIZ. FEET

SHEET 4 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		70

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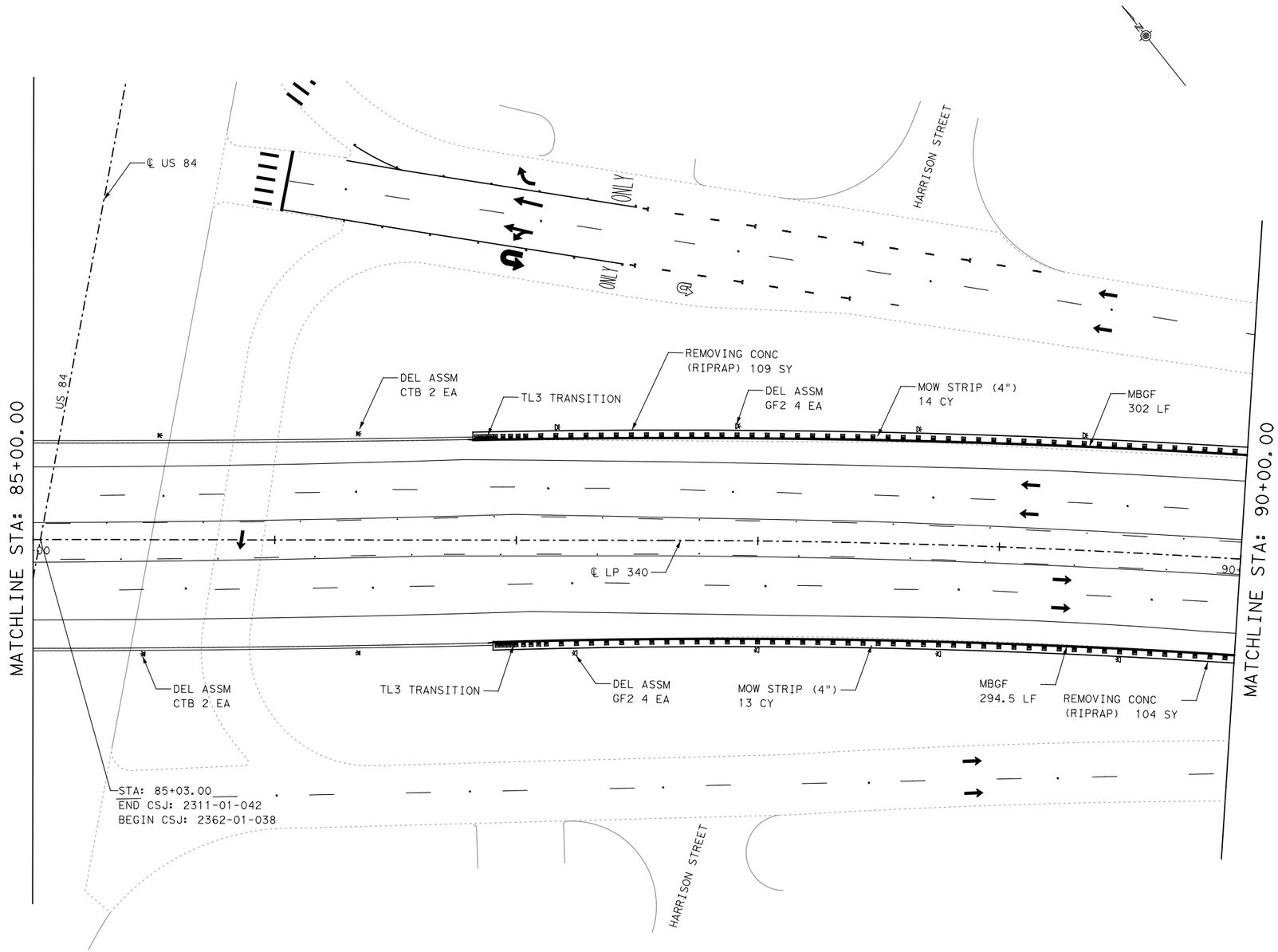

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (CTB)
- D-SW DELINEATOR (GF2)

QUANTITIES (CSJ: 2362-01-038)

ITEM	DESCRIPTION	QTY
0104-6009	REMOVING CONC (RIPRAP)	213 SY
0432-6045	RIPRAP (MOW STRIP) (4")	27 CY
0540-6002	MTL W-BEAM GD FEN (STL POST)	596.5 LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	2 EA
0540-6016	DOWNSTREAM ANCHOR TERM SECTION	-
0542-6001	REMOVE METAL BEAM GUARD FENCE	596.5 LF
0542-6002	REMOVE TERMINAL ANCHOR SECTION	-
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	-
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	-
0658-6013	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	4 EA
0658-6061	INSTL DEL ASSM (D-SW) SZ I(BRF) GF2	8 EA

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SL 340
METAL BEAM GUARD FENCE LAYOUTS

SCALE: 1" = 50' HORIZ. FEET

SHEET 5 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		71

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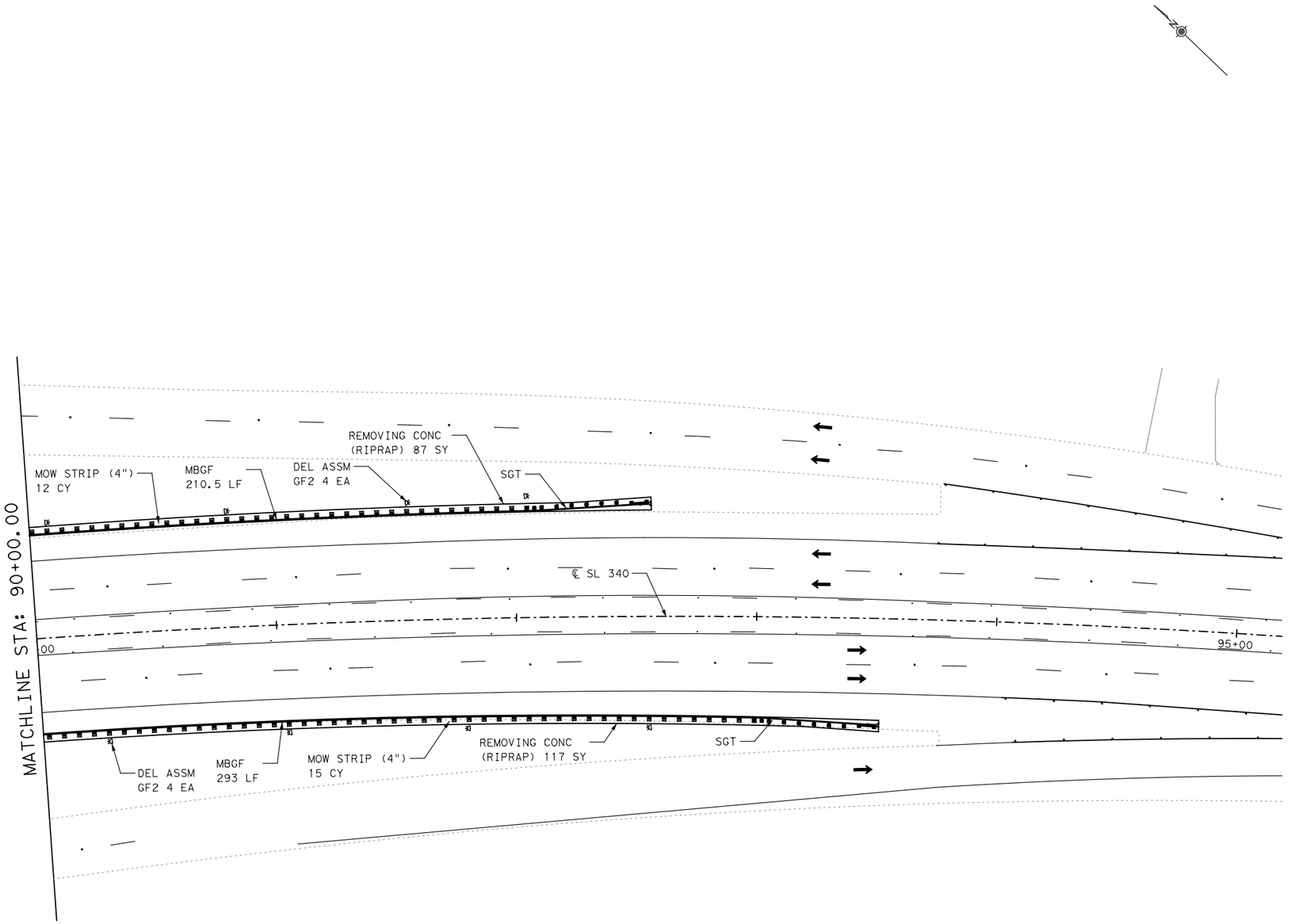

LEGEND

- METAL BEAM GUARD FENCE
- GUARDRAIL END TREATMENT
- D-SW DELINEATOR (CTB)
- D-SW DELINEATOR (GF2)

QUANTITIES (2362-01-038)

ITEM	DESCRIPTION	QTY
0104-6009	REMOVING CONC (RIPRAP)	204 SY
0432-6045	RIPRAP (MOW STRIP) (4")	27 CY
0540-6002	MTL W-BEAM GD FEN (STL POST)	503.5 LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	-
0540-6016	DOWNSTREAM ANCHOR TERM SECTION	-
0542-6001	REMOVE METAL BEAM GUARD FENCE	503.5 LF
0542-6002	REMOVE TERMINAL ANCHOR SECTION	-
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	2 EA
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	2 EA
0658-6013	INSTL DEL ASSM (D-SW) SZ (BRF) CTB	-
0658-6061	INSTL DEL ASSM (D-SW) SZ 1(BRF) GF2	8 EA

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SL 340
METAL BEAM GUARD FENCE LAYOUTS

SCALE: 1" = 50' HORIZ. FEET

SHEET 6 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		72

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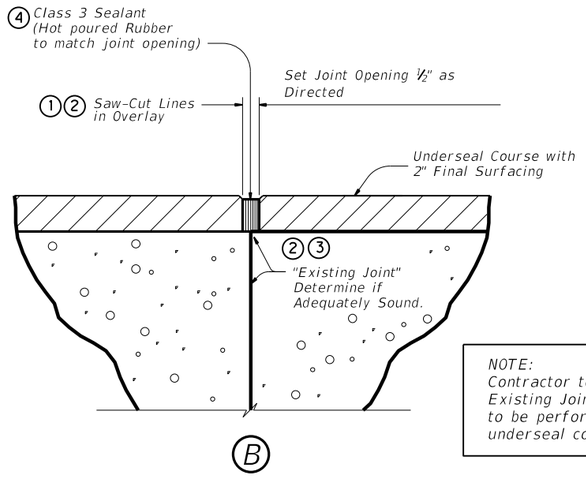
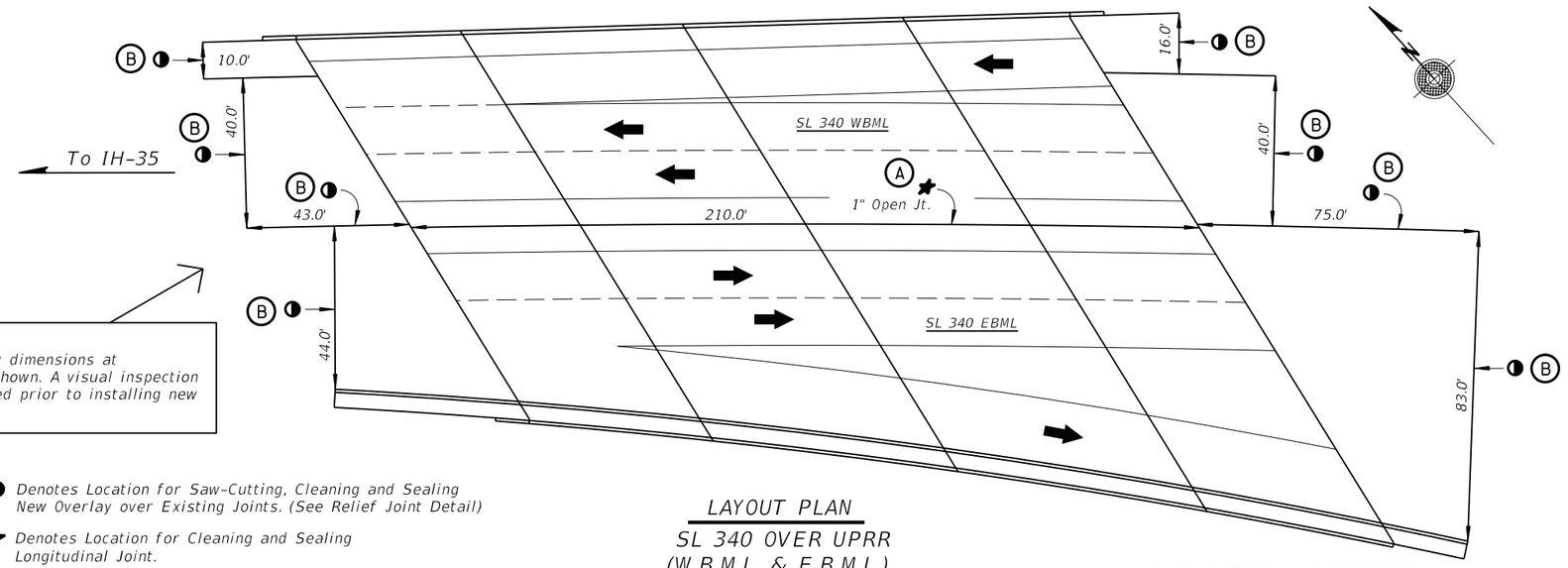


(END OF APPROACH SLAB)

SECTION THRU RELIEF JOINT

NOT TO SCALE

NOTE:
Contractor to field verify dimensions at Existing Joint locations shown. A visual inspection to be performed and noted prior to installing new underseal course.



◑ Denotes Location for Saw-Cutting, Cleaning and Sealing New Overlay over Existing Joints. (See Relief Joint Detail)

★ Denotes Location for Cleaning and Sealing Longitudinal Joint.

NOTE:
REMOVE APPROX. 2" OF EXISTING OVERLAY DOWN TO BRIDGE DECK.

LAYOUT PLAN

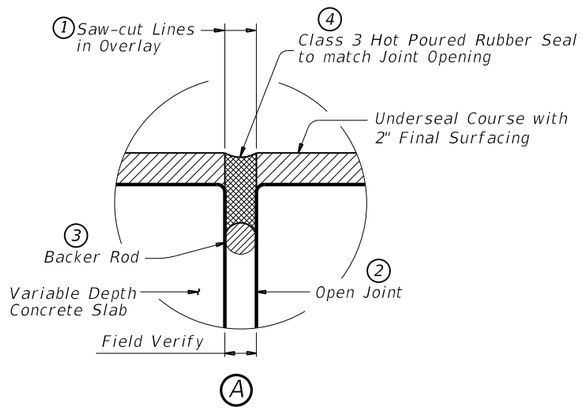
SL 340 OVER UPRR
(W.B.M.L. & E.B.M.L.)

WBML N.B.I.# 09-161-0-2311-01-005
EBML N.B.I.# 09-161-0-2311-01-006

NOTE:
If joint is open, see Detail (A) which incorporates a backer rod.

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

1. Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
2. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3. If applicable, place backer rod into joint opening below top of concrete. Backer rod must be of the type that can handle the heat and be compatible with the Hot Poured Rubber seal. The backer rod must be 25% larger than thejoint opening.
4. Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement. Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."



EXPANSION JOINT DETAIL

(LONGITUDINAL JOINT)
(END OF APPROACH SLAB)

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

1. Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
2. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3. Place backer rod into joint opening below top of concrete as shown. Backer rod must be of the type that can handle the heat and be compatible with the Hot Poured Rubber seal. The backer rod must be 25% larger than the joint opening.
4. Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement. Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING OF ALL DEBRIS, PROVIDING AND PLACING BACKER ROD, SAW-CUTTING JOINT OPENING, AND SEALING JOINT IS PAID FOR BY ITEM 438, "CLEANING AND SEALING JOINTS" AND MEASURED BY THE L.F. OF "CLEANING AND SEALING OF EXISTING JOINTS (CL 3)."

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE TO PREPARE THE JOINT.

PROVIDE THE CLASS 3 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILLERS."

REPAIR ANY SIGNIFICANT SPALLED OR CRACKED AREAS, AS DETERMINED BY THE ENGINEER, AROUND THE JOINT OPENING WITH TYPE II POLYMER CONCRETE IN ACCORDANCE WITH DMS-6140, "POLYMER CONCRETE FOR JOINT SYSTEMS". THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 438.

ESTIMATED QUANTITIES

ITEM	438-6002
LOCATION	CLEANING AND SEALING EXISTING JOINTS (CL 3)
	L.F.
STR. #005 SL 340 (WBML) OVER UPRR	(B) 224.0
STR. #006 SL 340 (EBML) OVER UPRR	(B) 127.0
STR. #005 SL 340 (WBML) OVER UPRR (LONGITUDINAL)	(A) 210.0
TOTAL	561.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

Sheet 1 of 2 Sheets

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LAYOUT & DETAILS FOR CLEANING AND SEALING BRIDGE JOINTS

SL 340 (WB & EB) OVER UPRR

(STR'S# 005, 006)

FILE: LP340JT.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: OCT. 2020	DIST	FED REG	FEDERAL AID PROJECT NO.●	SHEET
REVISIONS	WACO	6		73
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	MCLENNAN	2311	01	042	SL 340

Etc. Etc. Etc.

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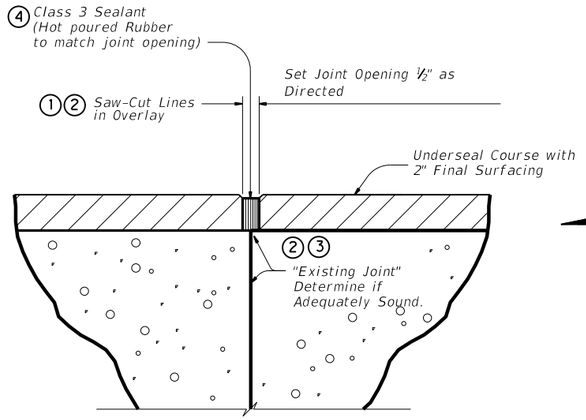


(END OF BRIDGE – ABUTMENT)
(END OF APPROACH SLAB)

SECTION THRU RELIEF JOINT

NOT TO SCALE

NOTE:
If joint is open, see Detail (A) which incorporates a backer rod.

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

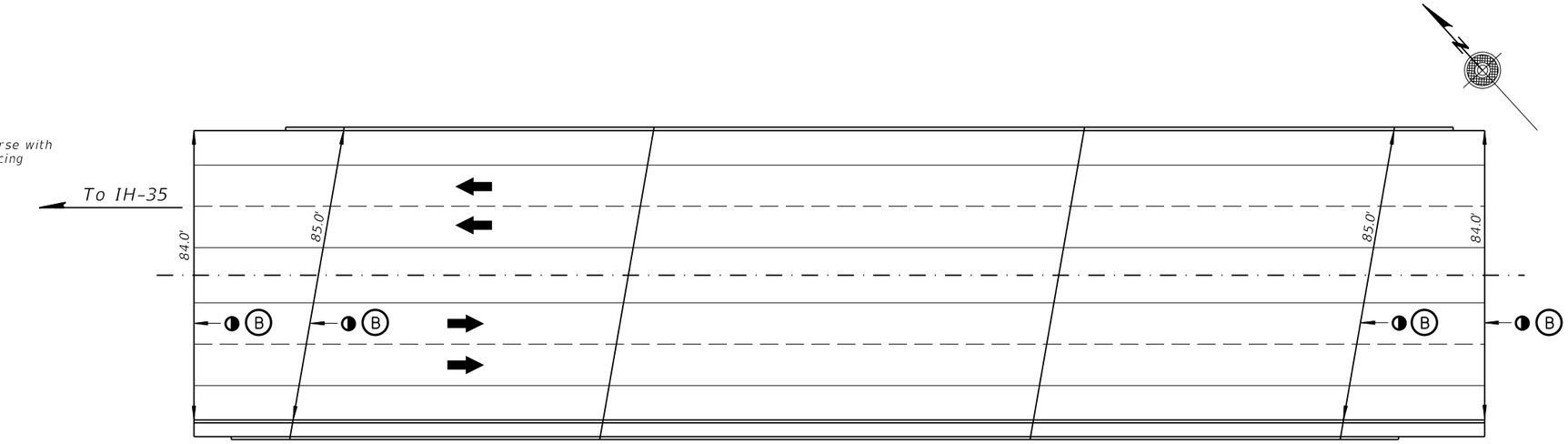
1. Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
2. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3. If applicable, place backer rod into joint opening below top of concrete. Backer rod must be of the type that can handle the heat and be compatible with the Hot Poured Rubber seal. The backer rod must be 25% larger than thejoint opening.
4. Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement. Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING OF ALL DEBRIS, PROVIDING AND PLACING BACKER ROD, SAW-CUTTING JOINT OPENING, AND SEALING JOINT IS PAID FOR BY ITEM 438, "CLEANING AND SEALING JOINTS" AND MEASURED BY THE L.F. OF "CLEANING AND SEALING OF EXISTING JOINTS (CL 3)."

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE TO PREPARE THE JOINT.

PROVIDE THE CLASS 3 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILLERS."



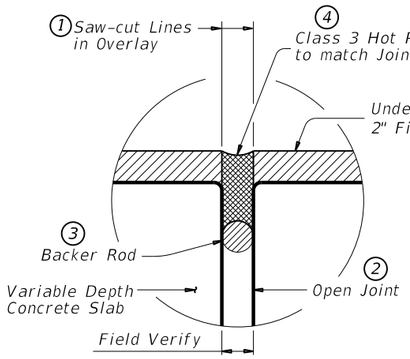
◑ Denotes Location for Saw-Cutting, Cleaning and Sealing New Overlay over Existing Joints. (See Relief Joint Detail)

LAYOUT PLAN

SL 340 OVER US 84

N.B.I.# 09-161-0-0162-01-084

NOTE:
REMOVE APPROX. 2" OF EXISTING OVERLAY DOWN TO BRIDGE DECK.



EXPANSION JOINT DETAIL

(LONGITUDINAL JOINT)
◬ (END OF APPROACH SLAB)

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

1. Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
2. Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
3. Place backer rod into joint opening below top of concrete as shown. Backer rod must be of the type that can handle the heat and be compatible with the Hot Poured Rubber seal. The backer rod must be 25% larger than the joint opening.
4. Seal the joint opening with a Class 3, "Hot Poured Rubber." Seal flush to the top of the asphaltic concrete pavement. Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

REPAIR ANY SIGNIFICANT SPALLED OR CRACKED AREAS, AS DETERMINED BY THE ENGINEER, AROUND THE JOINT OPENING WITH TYPE II POLYMER CONCRETE IN ACCORDANCE WITH DMS-6140, "POLYMER CONCRETE FOR JOINT SYSTEMS". THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 438.

ESTIMATED QUANTITIES

ITEM	438-6002
LOCATION	CLEANING AND SEALING EXISTING JOINTS (CL 3)
	L.F.
STR. #084 SL 340 OVER US 84	338.0
TOTAL	338.0

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross Langdale, P.E.

Sheet 2 of 2 Sheets

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LAYOUT & DETAILS FOR CLEANING AND SEALING BRIDGE JOINTS

SL 340 OVER US 84

(STR.# 084)

FILE: LP340JT.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: OCT. 2020	DIST	FED REG	FEDERAL AID PROJECT NO.	SHEET
REVISIONS	WACO	6		74
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	MCLENNAN	2311	01	042	SL 340

Etc. Etc. Etc.

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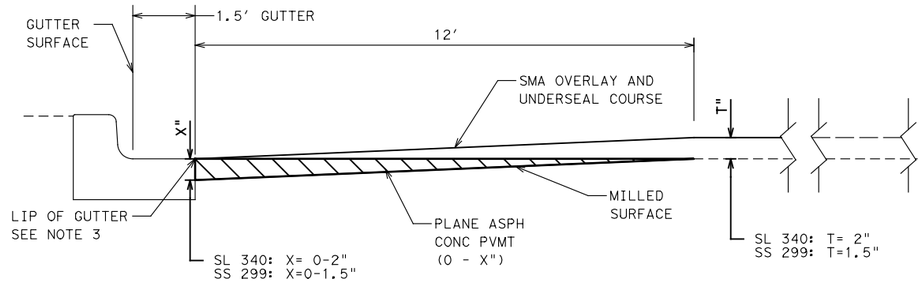
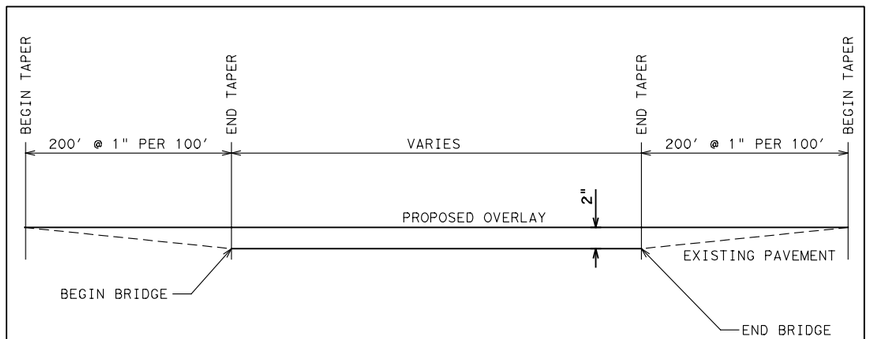
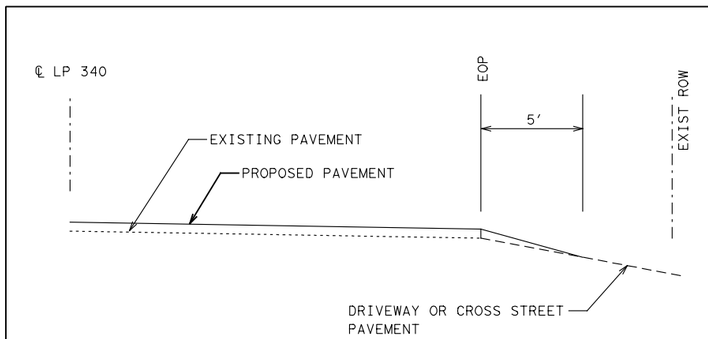


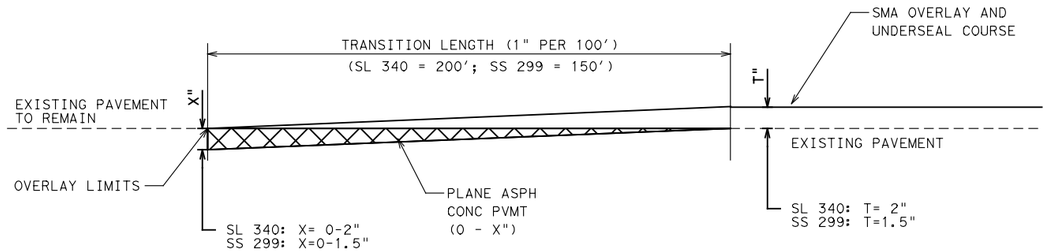
TAPER MILL FOR CURB AND GUTTER SECTION



VERTICAL TRANSITION AT BRIDGE STRUCTURES



PAVEMENT TAPER AT DRIVEWAY AND CROSS STREET



VERTICAL TRANSITION AT BUTT JOINT

NOTES:

1. SEE ROADWAY LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
2. DRIVEWAY TAPER ASPHALT SHALL BE SMA-TY D PER ITEM 3080 CONSISTENT WITH FINAL SURFACE COURSE.
3. WHERE APPLICABLE, PLANE EXISTING OVERLAY ABOVE CURB AND GUTTER PRIOR TO TAPER MILL OPERATION. SEE ROADWAY LAYOUT FOR LOCATIONS.

N.T.S.

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
6/30/2023

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MISCELLANEOUS DETAILS

SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		75

USER: eguti̇errez
DATE: 6/30/2023 9:20
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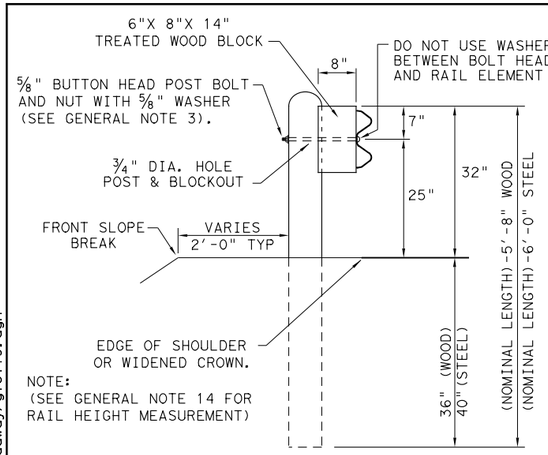
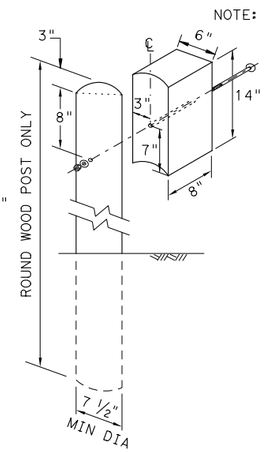
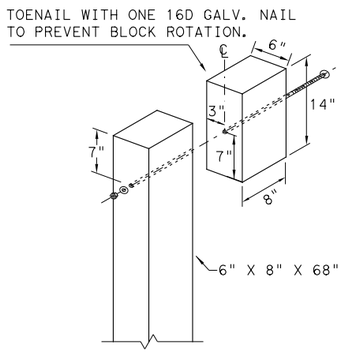


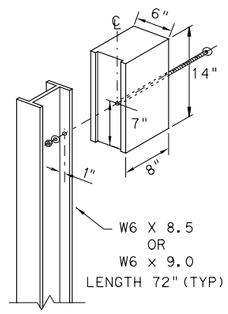
TYPICAL POST PLACEMENT



WOOD BLOCK TO
ROUND WOOD POST

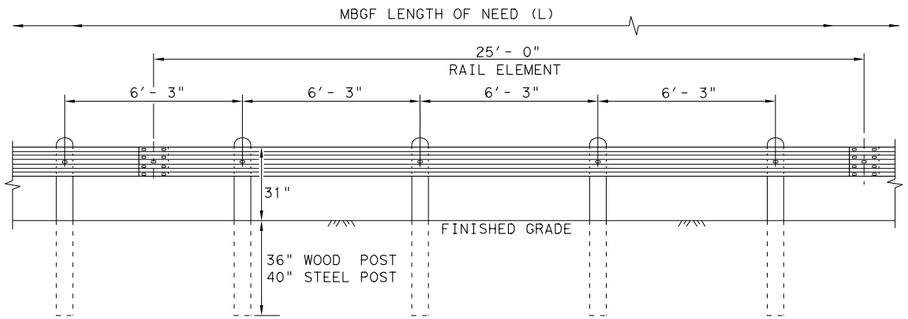


WOOD BLOCK TO
RECTANGULAR WOOD POST



ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

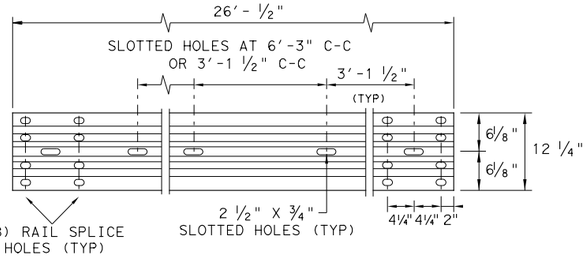
NOTE: ✳✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



DIRECTION OF TRAFFIC

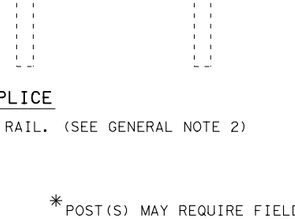
ELEVATION
MID-SPAN RAIL SPLICE

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



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

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



✳ 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).

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

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.

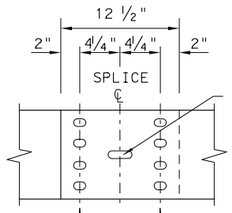
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH
FBBO1 = 1 1/4"
FBBO2 = 2"
VARIES
5/8"

POST & BLOCK LENGTH
FBBO3 = 10"
FBBO4 = 18"

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.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" 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.

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	
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	WAC	MCLENNAN		76	

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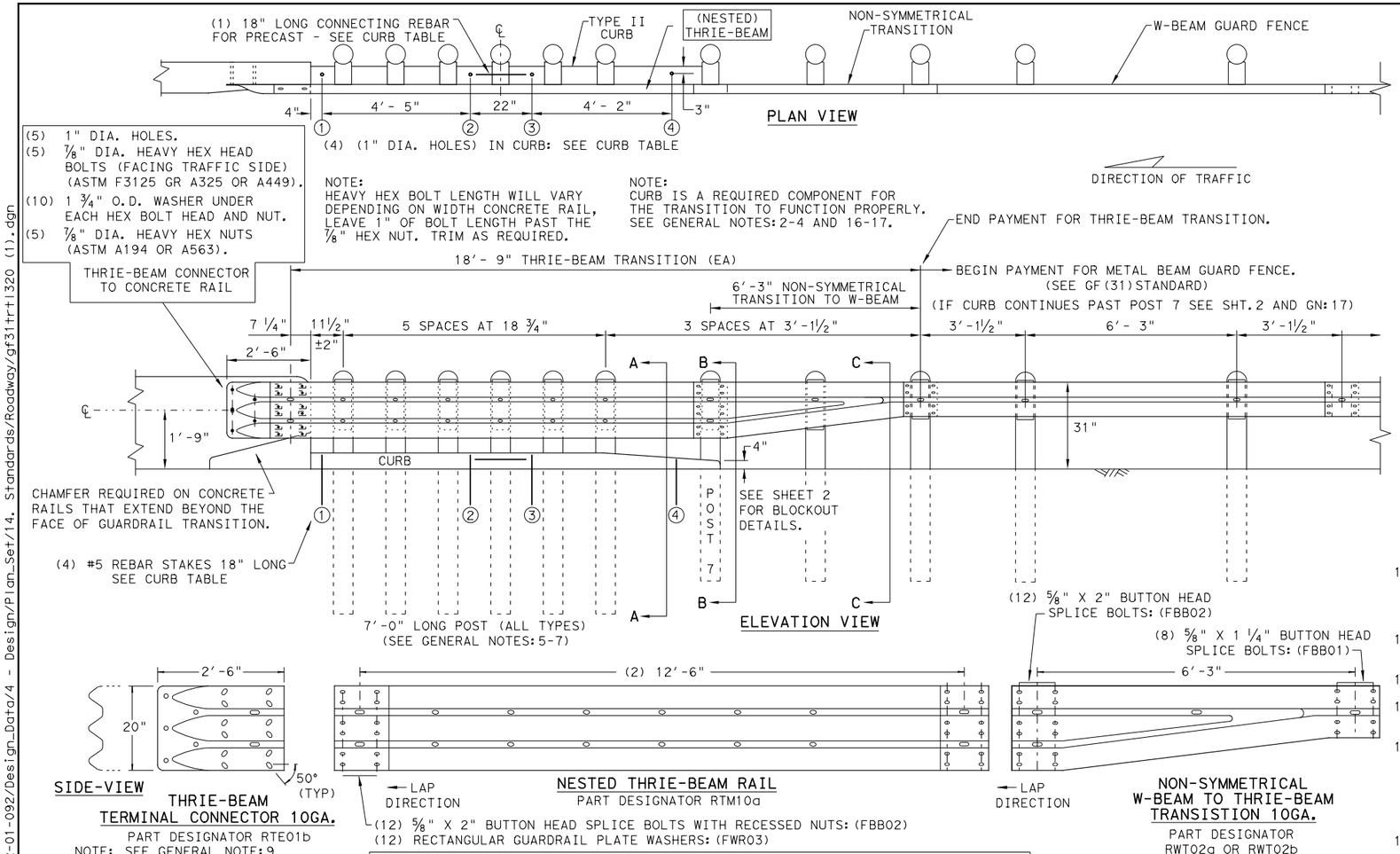
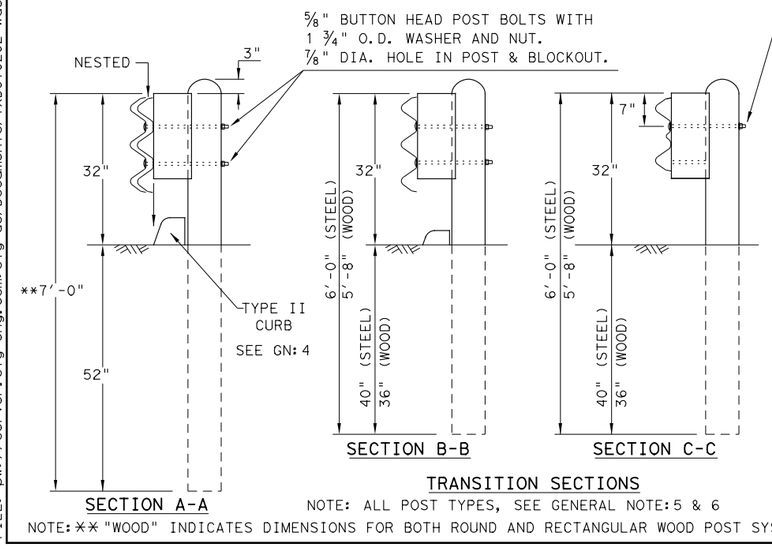
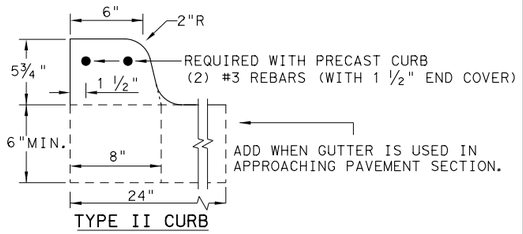




THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB 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

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		77

DATE: 6/30/2023
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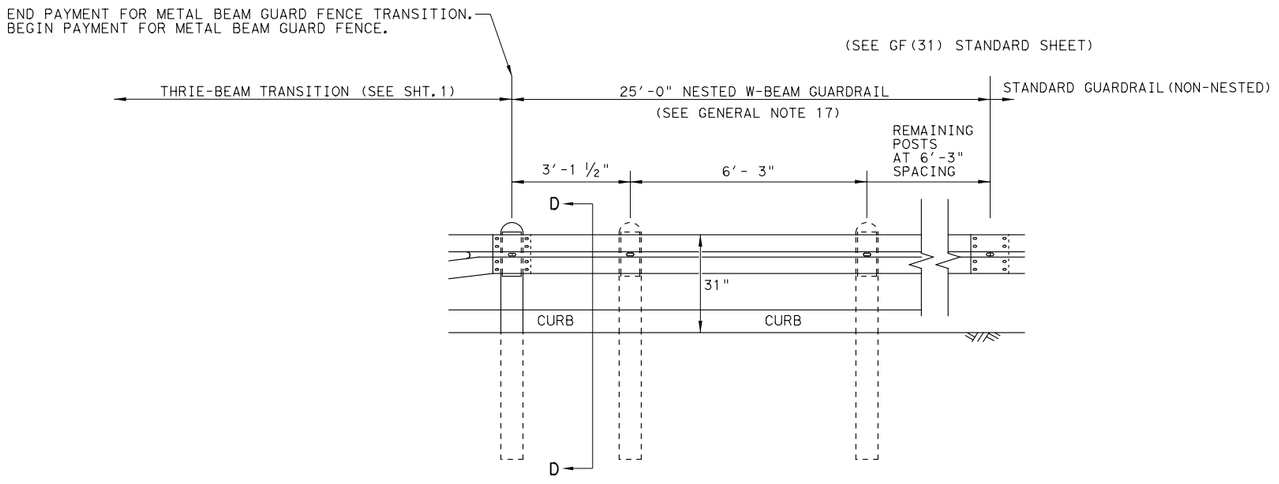
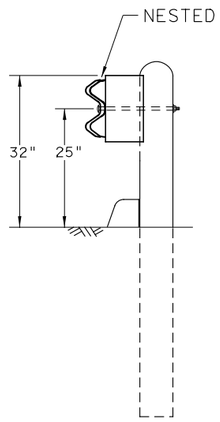
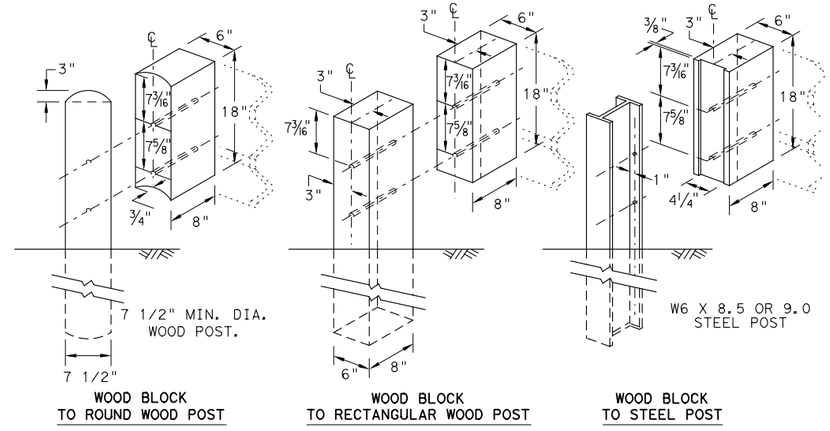
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
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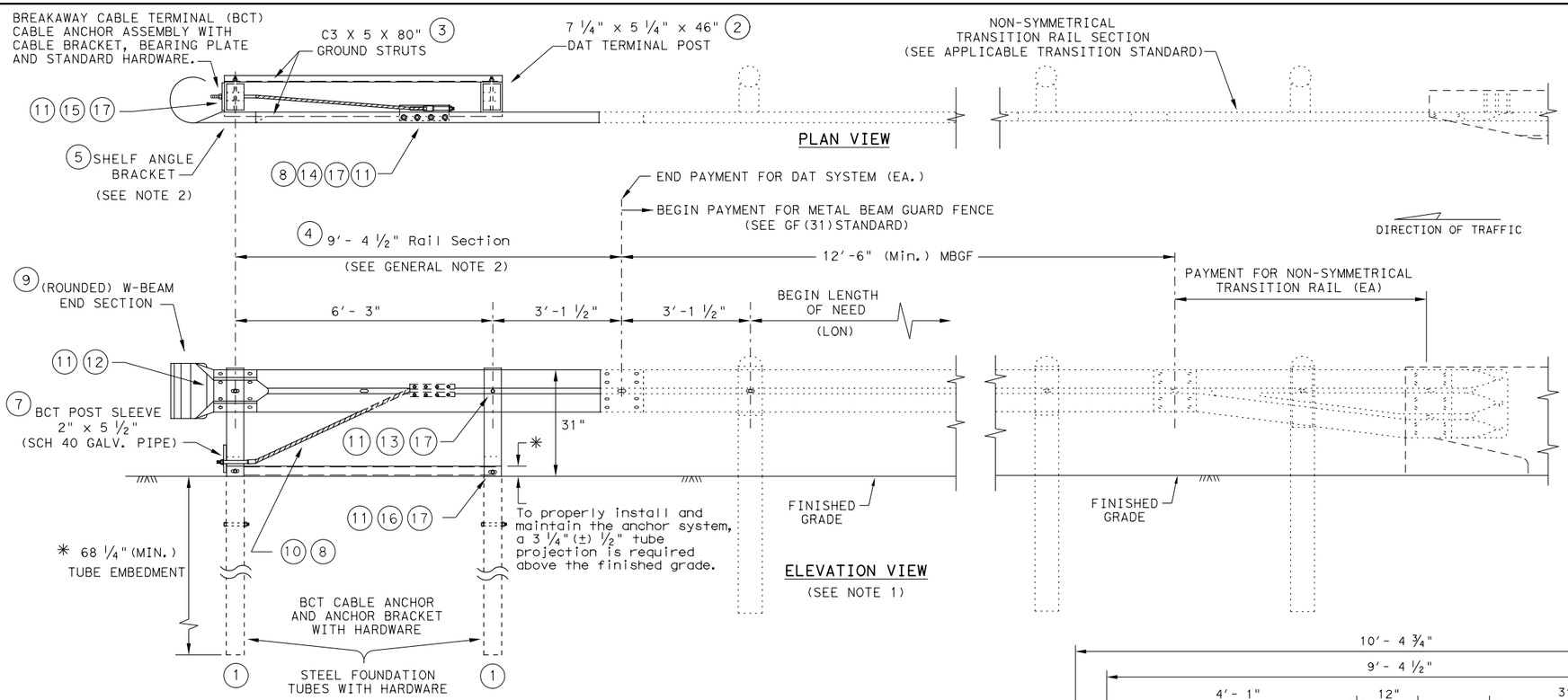


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

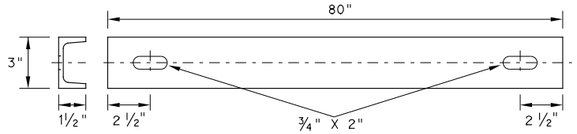
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

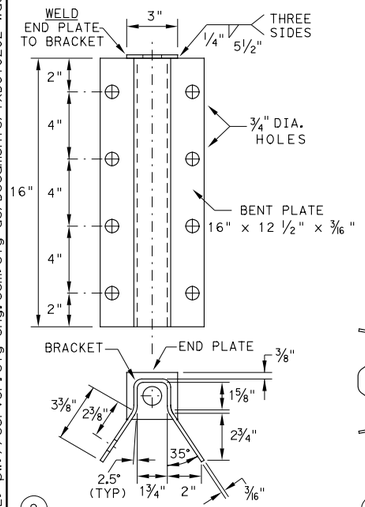
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

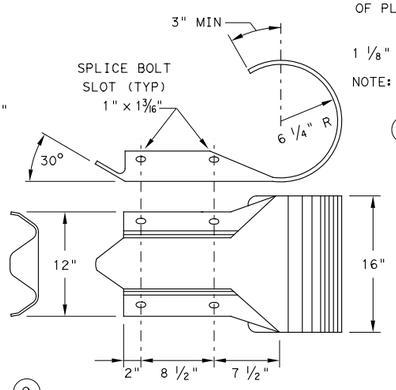
(4) TERMINAL RAIL ELEMENT FOR DAT



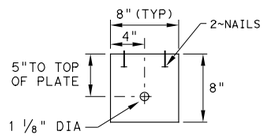
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

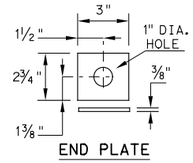


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

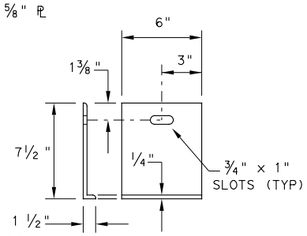


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

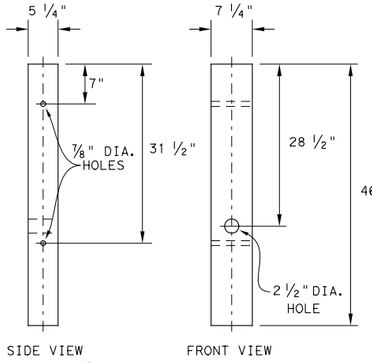
(6) BEARING PLATE
8"x 8"x 5/8" PL



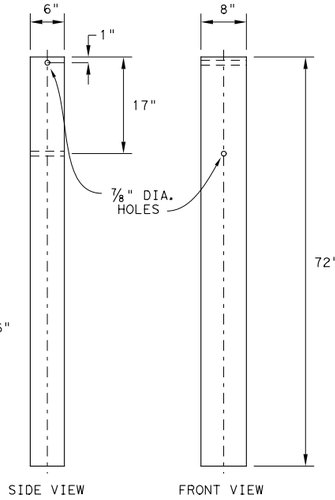
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

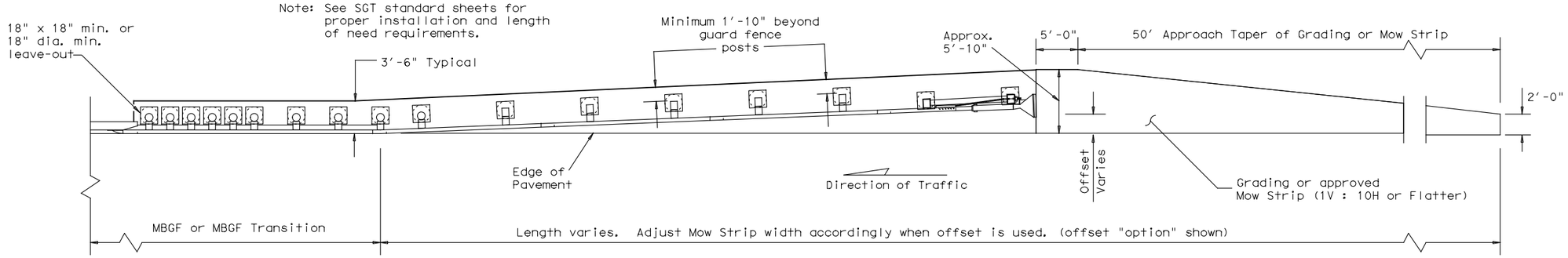
Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

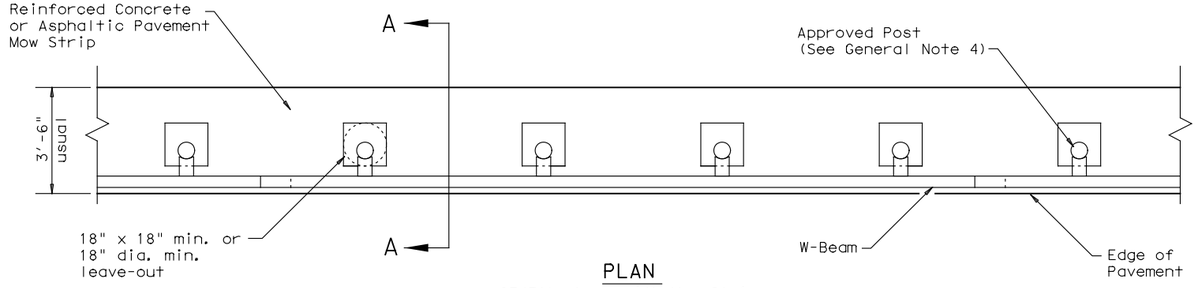
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	2311	01	042, ETC.	SL 340, ETC.	
	DIST	COUNTY		SHEET NO.	
	WAC	MCLENNAN		79	

DATE: 6/30/2023
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Roadway/gf31ms19.dgn

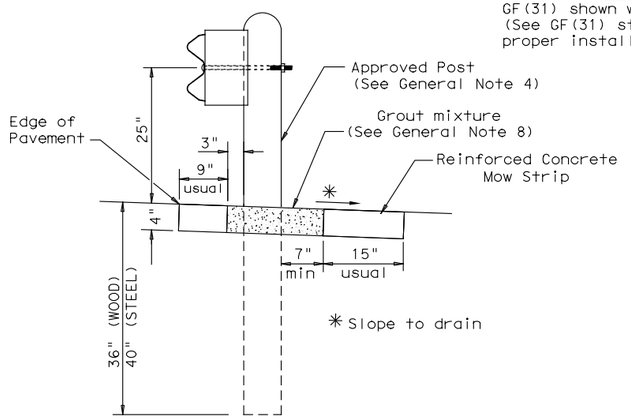


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



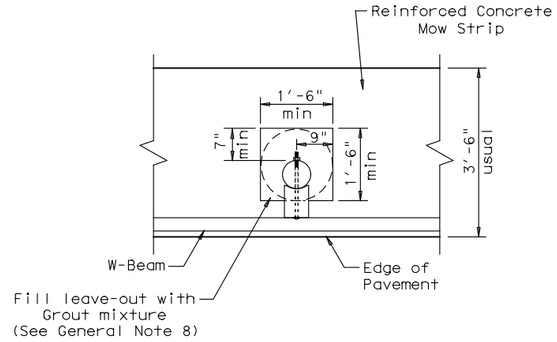
PLAN

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



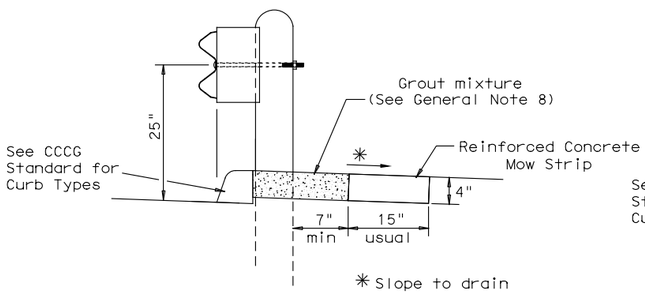
SECTION A-A

Typical



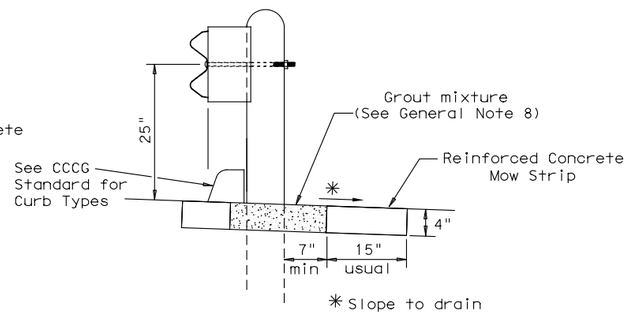
MOW STRIP DETAIL

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



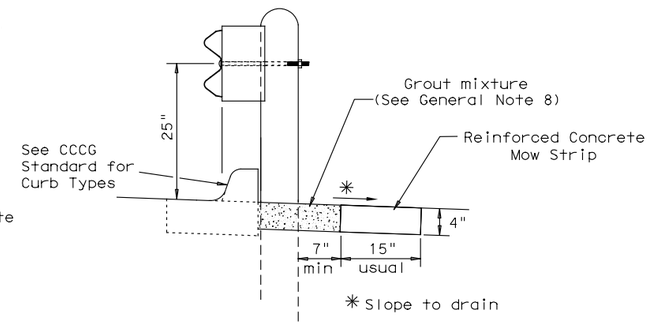
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	2311	01	042, ETC.	SL 340, ETC.	
	DIST	COUNTY		SHEET NO.	
	WAC	MCLENNAN		80	

DATE: 6/30/2023
FILE: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design/Standards/sgt11s3118.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE SEE DETAIL (C)

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-5/8" FROM REFERENCE LINE

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

RAIL 4 RAIL 3 RAIL 2 RAIL 1

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE
OF RAIL 2 WITH THE PANEL ARROWS
POINTING TOWARDS THE HEAD.

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

MBGF RAIL 2
INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE
MBGF RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

INSTALLATION LENGTH 55'- 1/2"

49'-8 9/16"

6'-3" 6'-3" 6'-3" 6'- 3/4" 6'-3" 6'-3" 6'-3" 37 1/2" 5'-3 11/16"

RAIL HEIGHT 31"

ARROWS

DETAIL (D)

RAIL HEIGHT 31"

HEAD HEIGHT

DETAIL (B)

ITEM (13) RAIL 4 ITEM (13) RAIL 3 ITEM (13) RAIL 2 ITEM (13) RAIL 1

FINISHED GRADE

CABLES

FINISHED GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

32-1/4"

68-1/8"

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2 POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

SOIL
ANCHOR POST
ITEM (1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE

DETAIL (D)

HEAD HEIGHT
32-1/4"
68-1/8"
ANCHOR POST DEPTH

TOP OF POST
31-7/8"
FINISHED GRADE
40-1/8"

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN),
TO BE INSTALLED AT SAME DEPTH
AS LINE POSTS.)

SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16"
2 1/8"
UPPER CABLE
(BACK SIDE)
LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL 5/8" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)
ITEM (20) 8X
ITEM (17) 8X
ITEM (23) 6X
3 SCREWS
EACH SIDE
ITEM (22)
BRACKET
SHIPPED FLAT
ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING
ITEM (3)
ITEM (16) 4X
(RAIL 1)

NOTE: DELINEATION MARKER IN
ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

APPROX 5'-10"
5'-0"
50' APPROACH GRADING
2'-0"

STANDARD
MBGF

EDGE OF PAVEMENT

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

2'-0" MAX.
RAIL OFFSET

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

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION 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: 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

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		81

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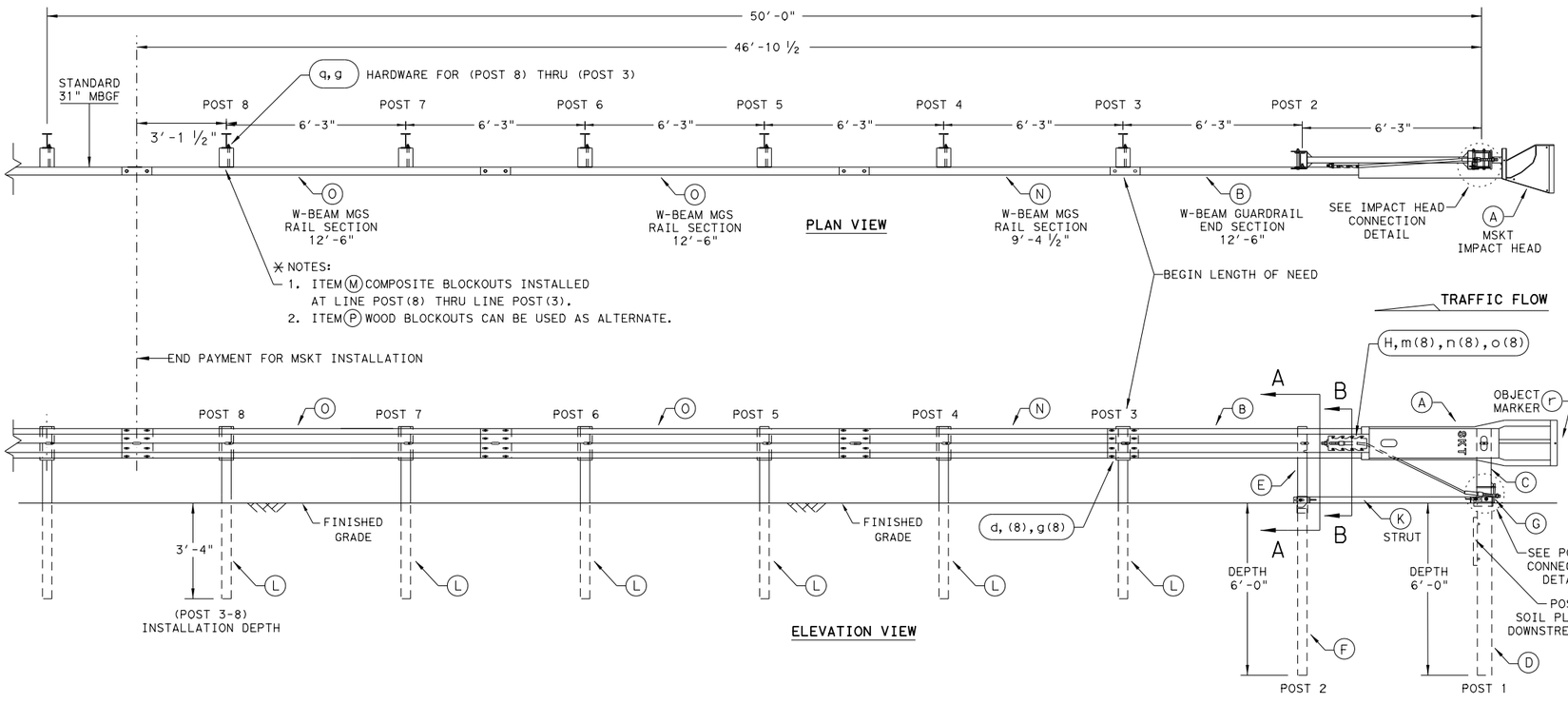
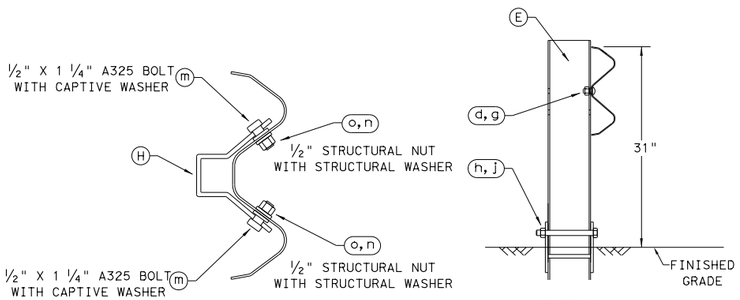
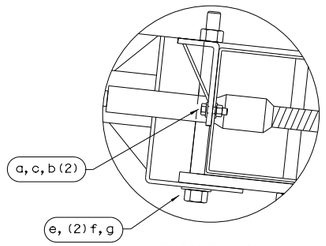


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

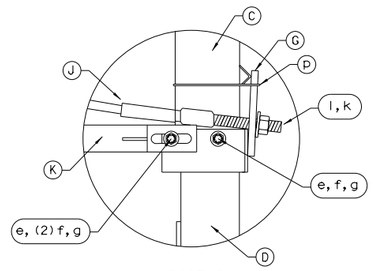


SECTION B-B
ANCHOR BRACKET

POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

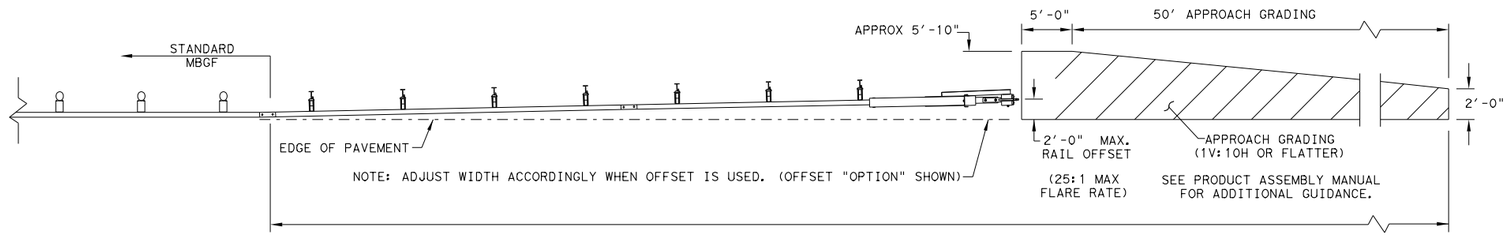
GENERAL NOTES

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

SEE NOTES: ✳

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

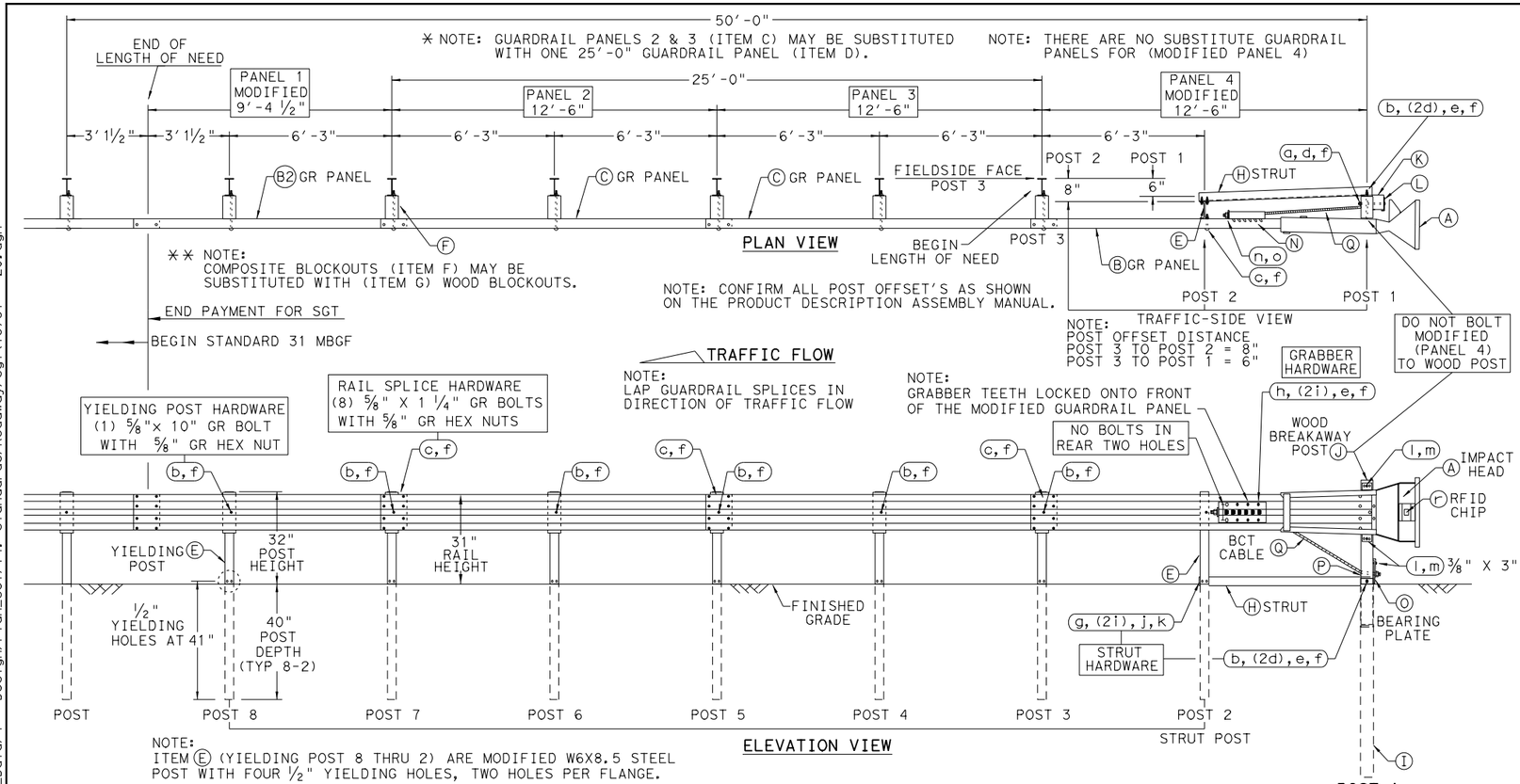
Texas Department of Transportation

Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	2311	01	042, ETC.	SL 340, ETC.	
	DIST	COUNTY		SHEET NO.	
	WAC	MCLENNAN		82	

DATE: 6/30/2023
FILE: pw://server.slg-eng.com:Slg-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Roadway/sgt(15)31 - 20.dgn



* NOTE: GUARDRAIL PANELS 2 & 3 (ITEM C) MAY BE SUBSTITUTED WITH ONE 25'-0" GUARDRAIL PANEL (ITEM D).

NOTE: THERE ARE NO SUBSTITUTE GUARDRAIL PANELS FOR (MODIFIED PANEL 4)

** NOTE: COMPOSITE BLOCKOUTS (ITEM F) MAY BE SUBSTITUTED WITH (ITEM G) WOOD BLOCKOUTS.

NOTE: CONFIRM ALL POST OFFSET'S AS SHOWN ON THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

NOTE: POST OFFSET DISTANCE
POST 3 TO POST 2 = 8"
POST 3 TO POST 1 = 6"

NOTE: LAP GUARDRAIL SPLICES IN DIRECTION OF TRAFFIC FLOW

NOTE: GRABBER TEETH LOCKED ONTO FRONT OF THE MODIFIED GUARDRAIL PANEL

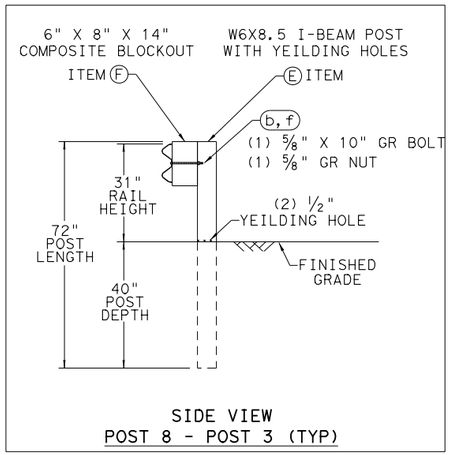
NOTE: ITEM E (YIELDING POST 8 THRU 2) ARE MODIFIED W6X8.5 STEEL POST WITH FOUR 1/2" YIELDING HOLES, TWO HOLES PER FLANGE.

GENERAL NOTES

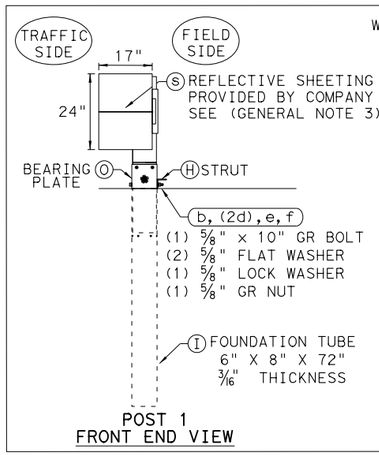
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY 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

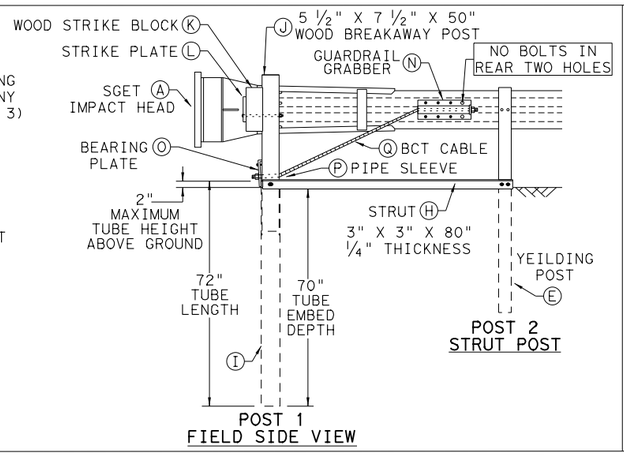
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

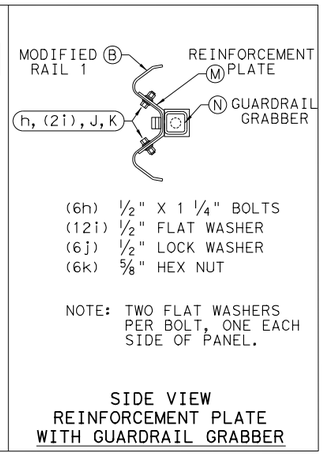


POST 1
FRONT END VIEW

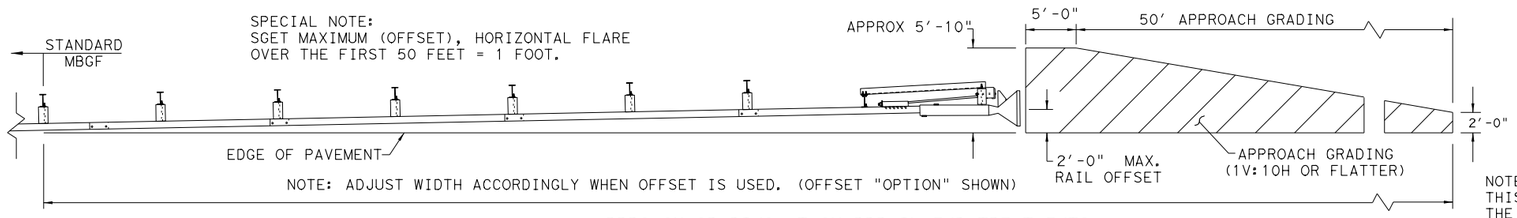


POST 1
FIELD SIDE VIEW

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: sgt15320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP		
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	2311	01	042, ETC.	SL 340, ETC.		
	DIST	COUNTY		SHEET NO.		
	WAC	MCLENNAN		83		

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 414 012 P
Crossing Type: ** RR UNDER
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR
RR MP: 166.760
RR Subdivision: FT. WORTH
City: BELLMEAD
County: MCLENNAN
CSJ at this Crossing: 2311-01-042
Highway/Roadway name crossing the railroad: SL 340
# of regularly scheduled trains per day at this crossing: 24
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

Scope of Work at this Crossing to Be Performed by State Contractor:
MILL AND OVERLAY

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

N/A

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 2

On this project, night or weekend flagging is:

[X] Expected
[ ] Not Expected

Flagging services will be provided by:

[ ] Railroad Company: TxDOT will pay flagging invoices
[X] Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

[X] UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- UP.request@nrssinc.net
Call Center 877-984-6777

[ ] BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

[ ] KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

[ ] OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

[X] Not Required

[ ] Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

[ ] Required
[X] Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit

Railroad Protective Liability		
[ ]	Not Required	
[X]	Non - Bridge Projects	$2,000,000 / $6,000,000
[ ]	Bridge Projects	$5,000,000 / $10,000,000
[ ]	Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

[ ] Not Required

[ ] Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)

[X] Required: UPRR Maintenance Consent Letter. TxDOT CST to assist.

[ ] Required: Contractor to obtain (see Item 5, Article 8.4)
With the following railroad companies:

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

[X] Not Required
[ ] Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

IN CASE OF RAILROAD EMERGENCY
CALL UNION PACIFIC RAILROAD COMPANY (UPRR)
AT 888-877-7267
LOCATION: DOT 414 012 P
RR MILEPOST: 166.760
SUBDIVISION: FT. WORTH

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:		
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY		
REVISIONS 9/2021	2311	01	042, ETC.	SL 340, ETC.		
	DIST	COUNTY		SHEET NO.		
	09	MCLENNAN		84		

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

DATE:
FILE:

SHEET 1 OF 2

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		85

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of ¼ inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

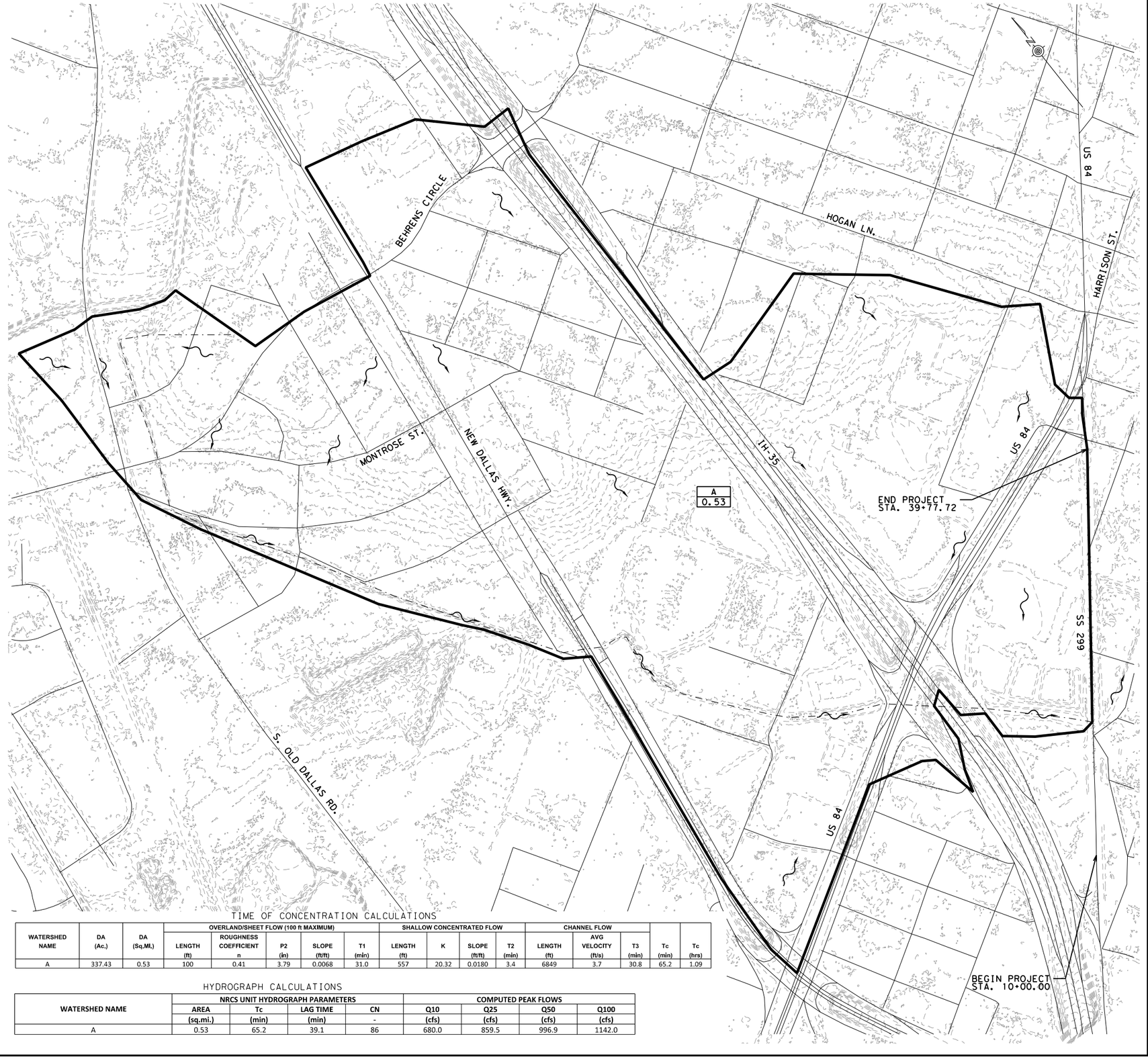
When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		86

DATE:
FILE:



LEGEND

- 1B-16 / 0.18 — AREA I.D. / AREA IN SQUARE MILES
- DIRECTION OF FLOW (ON GROUND)
- DRAINAGE AREA BOUNDARY

NOTES:

1. HYDROLOGIC ANALYSIS PERFORMED USING HEC-HMS (VERSION 4.6.1) (HYDROGRAPH METHOD)
2. TIME OF CONCENTRATION CALCULATED USING NRCS METHOD.
3. ELEVATION DATA OBTAINED FROM TNIRS. DEM FROM CAPCOG LIDAR, KILEEN AND WACO REGION.
4. CONTOURS ARE SHOWN AT 2-FOOT INTERVALS.
5. PRECIPITATION DEPTHS OBTAINED FROM NOAA ATLAS 14, VOLUME 11, VERSION 2.
6. FEMA PUBLISHED FLOW RATES UPSTREAM OF IH-35 ACCORDING TO FLOOD INSURANCE STUDY 48309CV001B DATED DECEMBER 20, 2019.
   10%-AEP = 640 CFS
   2%-AEP = 870 CFS
   1%-AEP = 960 CFS

TIME OF CONCENTRATION CALCULATIONS

WATERSHED NAME	DA (Ac.)	DA (Sq.Mi.)	OVERLAND/SHEET FLOW (100 ft MAXIMUM)					SHALLOW CONCENTRATED FLOW				CHANNEL FLOW				
			LENGTH (ft)	ROUGHNESS COEFFICIENT n	P2 (in)	SLOPE (ft/ft)	T1 (min)	LENGTH (ft)	K	SLOPE (ft/ft)	T2 (min)	LENGTH (ft)	AVG VELOCITY (ft/s)	T3 (min)	Tc (min)	Tc (hrs)
A	337.43	0.53	100	0.41	3.79	0.0068	31.0	557	20.32	0.0180	3.4	6849	3.7	30.8	65.2	1.09

HYDROGRAPH CALCULATIONS

WATERSHED NAME	NRCS UNIT HYDROGRAPH PARAMETERS				COMPUTED PEAK FLOWS			
	AREA (sq.mi.)	Tc (min)	LAG TIME (min)	CN	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
A	0.53	65.2	39.1	86	680.0	859.5	996.9	1142.0

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LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
7/5/2023

RTG RODRIGUEZ TRANSPORTATION GROUP FIRM #587

SS 299
DRAINAGE AREA MAP

SCALE: 1" = 600' HORIZ. FEET

SHEET 1 OF 1

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		87

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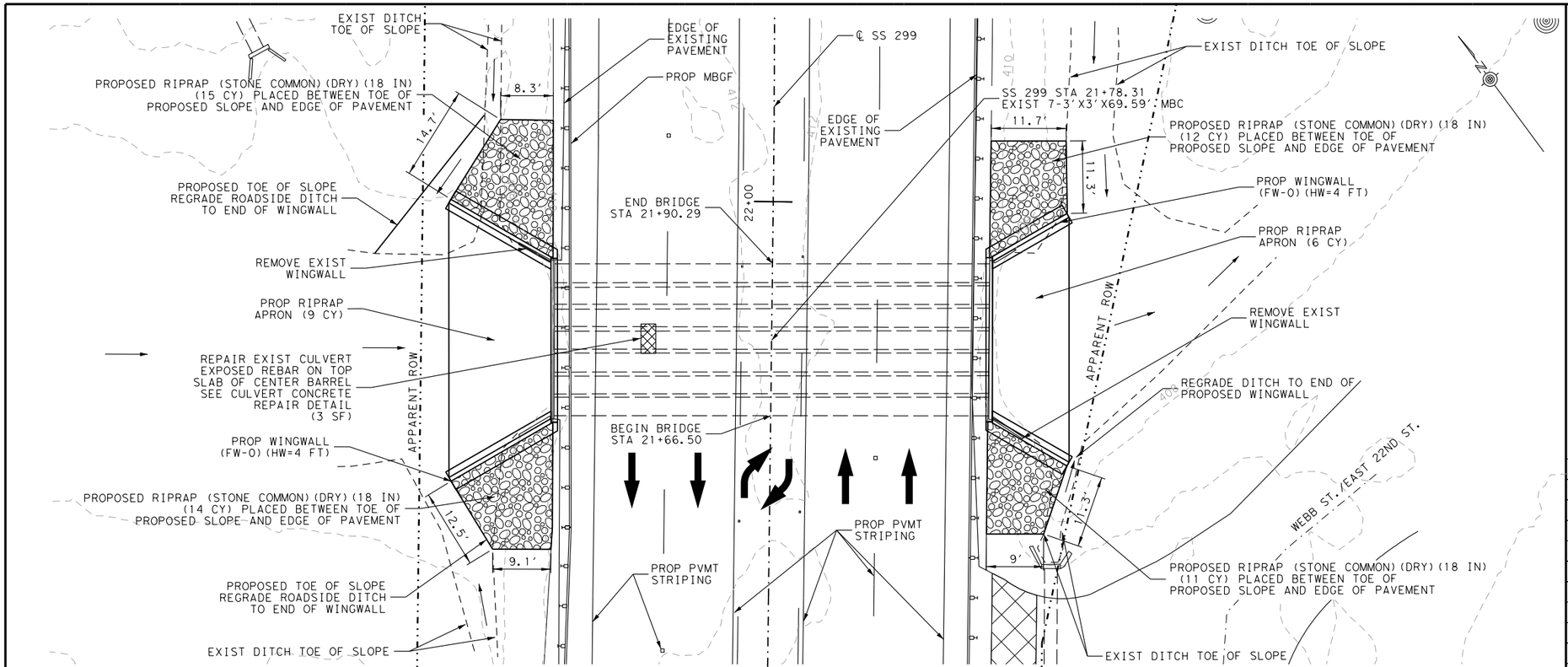

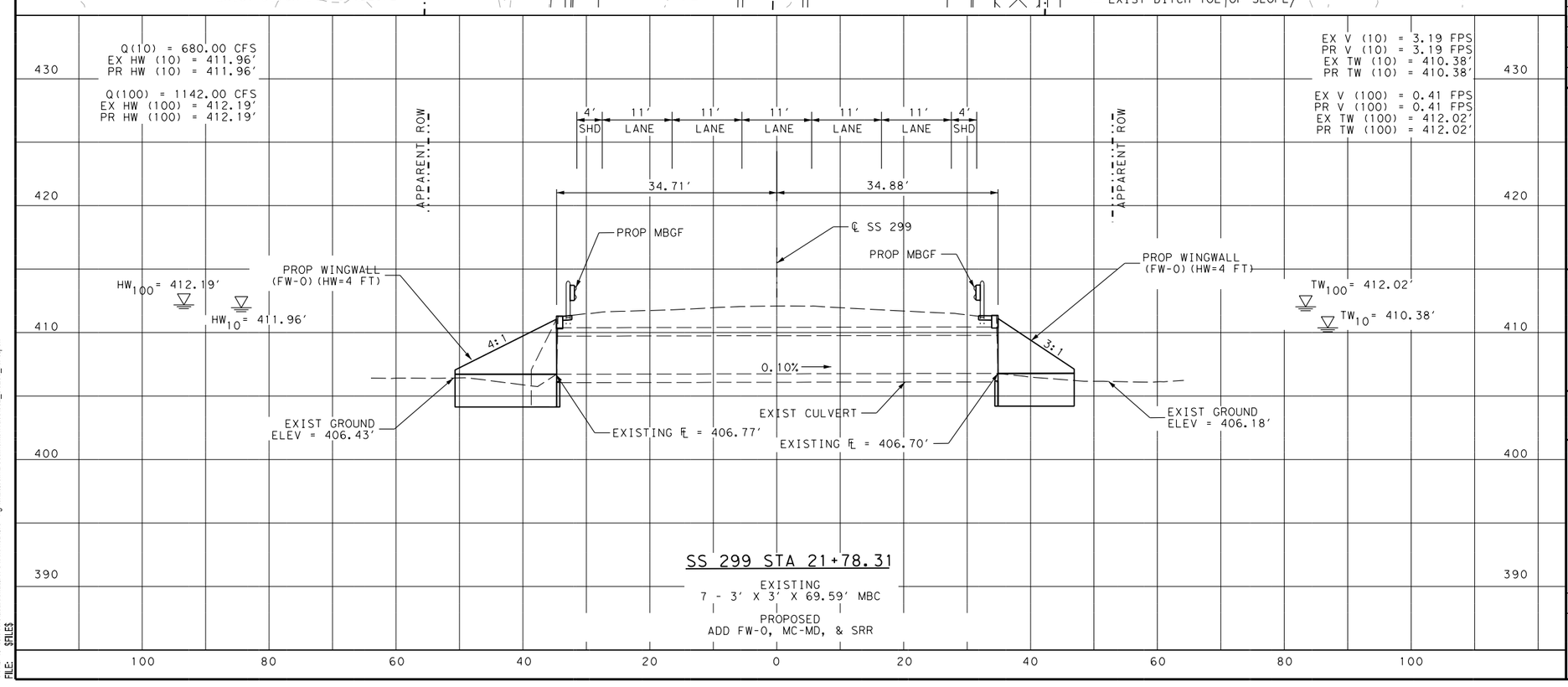

SS 299 STA 21+78.31

EXISTING
7 - 3' X 3' X 69.59' MBC

PROPOSED
ADD FW-0, MC-MD, & SRR

0 10 20
0 5 10
HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'

NOTES:

1. ALL DIMENSIONS ARE MEASURED NORMAL TO SS 299 CENTERLINE UNLESS OTHERWISE NOTED.
2. HEADWATER/TAILWATER ELEVATIONS AND VELOCITIES WERE CALCULATED USING HEC-RAS (5.0.7).

ITEM	DESCRIPTION	QTY
110 6002	EXCAVATION (CHANNEL)	25 CY
132 6019	EMBANKMENT (VEHICLE) (ORD COMP) (TY B)	30 CY
162 6002	BLOCK SODDING	120 SY
164 6009	BROADCAST SEED (TEMP) (WARM)	60 SY
164 6011	BROADCAST SEED (TEMP) (COOL)	60 SY
168 6001	VEGETATIVE WATERING	2 MG
429 6009	CONC STR REPAIR (STANDARD)	3 SF
432 6002	RIPRAP (CONC) (5 IN)	15 CY
432 6026	RIPRAP (STONE COMMON) (DRY) (18 IN)	52 CY
466 6151	WINGWALL (FW-0) (HW=4 FT)	2 EA
496 6005	REMOV STR (WINGWALL)	2 EA

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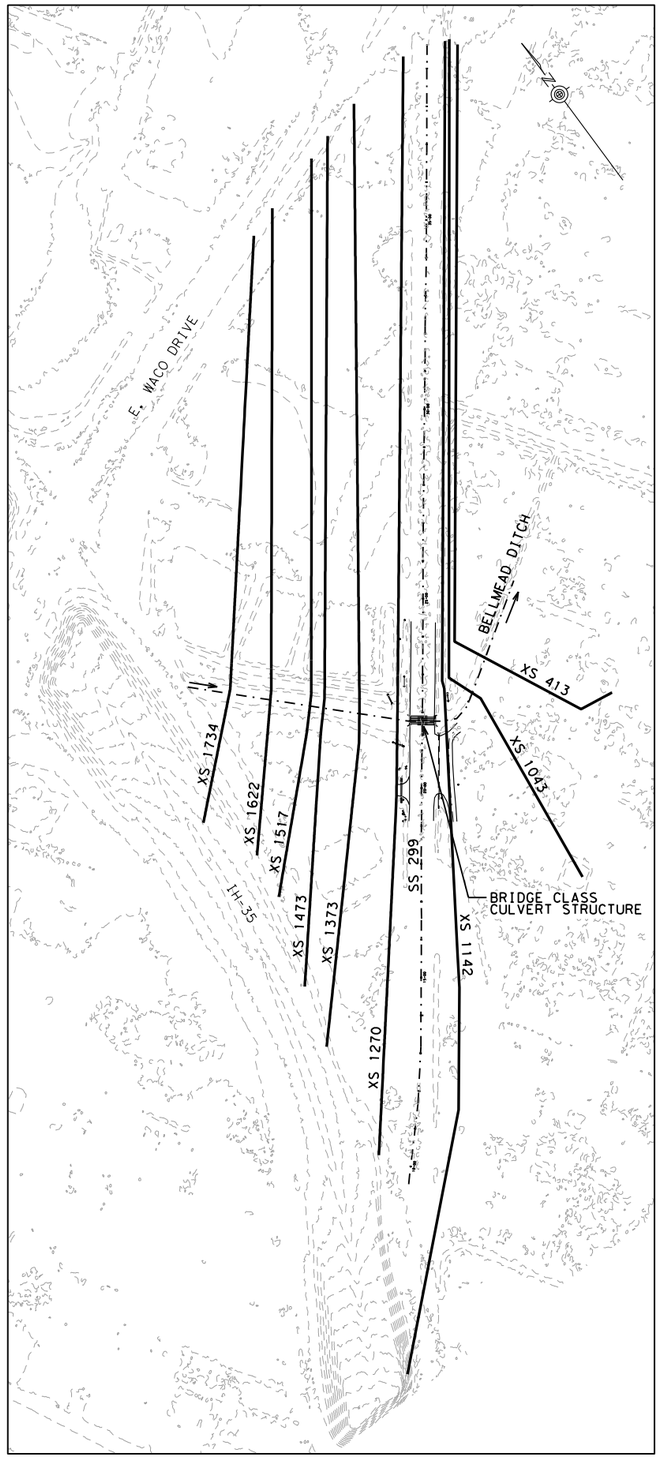
FIRM #587

SS 299
BRIDGE CLASS CULVERT LAYOUT
NBI NO. 09-161-0-0162-01-001

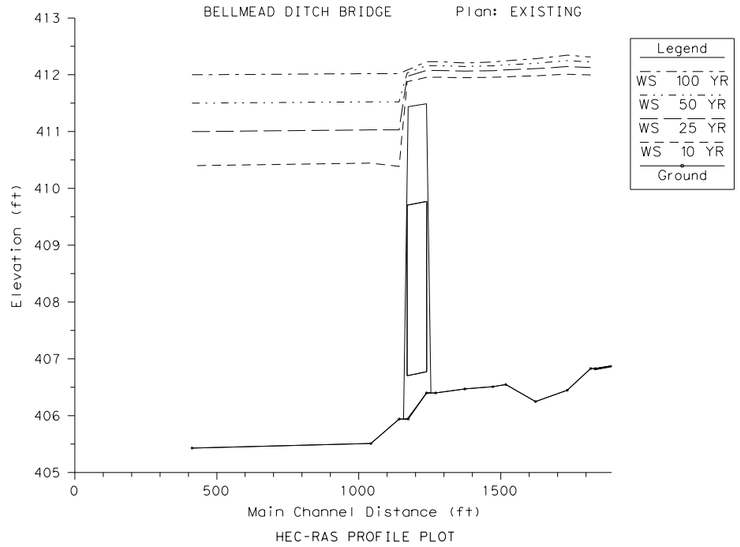
SHEET 1 OF 1

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		88

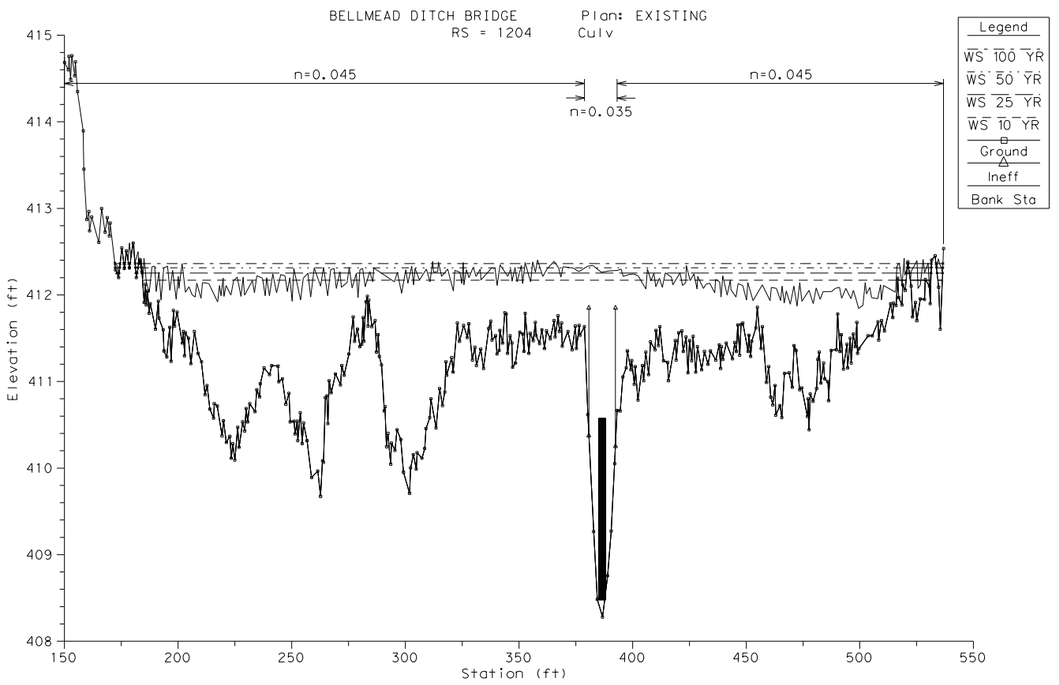


HEC-RAS RIVER STATIONS
SCALE: 1" = 400'

River Sta	Profile	Q Total (cfs)	Pre-Project W.S. Elev (ft)	Pre-Project Vel Chnl (ft/s)	Post-Project W.S. Elev (ft)	Post-Project Vel Chnl (ft/s)
1734	10 YR	542	412.01	0.49	412.01	0.49
1734	100 YR	910	412.30	0.71	412.30	0.71
1622	10 YR	542	411.98	1.23	411.98	1.23
1622	100 YR	910	412.24	1.85	412.24	1.85
1517	10 YR	542	411.97	1.33	411.97	1.33
1517	100 YR	910	412.20	2.07	412.20	2.07
1473	10 YR	542	411.96	1.36	411.96	1.36
1473	100 YR	910	412.18	2.15	412.18	2.15
1373	10 YR	542	411.95	1.09	411.95	1.09
1373	100 YR	910	412.16	1.74	412.16	1.74
1270	10 YR	680	411.96	0.35	411.96	0.35
1270	100 YR	1142	412.19	0.49	412.19	0.49
1204		Culvert				
1142	10 YR	680	410.38	3.19	410.38	3.19
1142	100 YR	1142	412.02	0.41	412.02	0.41
1043	10 YR	680	410.44	0.68	410.44	0.68
1043	100 YR	1142	412.02	0.44	412.02	0.44
413	10 YR	680	410.4	2.20	410.4	2.20
413	100 YR	1142	412.00	1.47	412.00	1.47



HEC-RAS PROFILE PLOT



HEC-RAS CROSS SECTION PLOT
UPSTREAM CULVERT SECTION

NOTES:

1. HEC-RAS VERSION 5.0.7 WAS USED FOR THE CULVERT HYDRAULIC ANALYSIS. PUBLISHED FIS WATER SURFACE ELEVATIONS WERE USED AS THE DOWNSTREAM BOUNDARY CONDITIONS FOR BOTH PRE-PROJECT AND POST-PROJECT CONDITIONS
2. THE PROJECT IS LOCATED WITHIN A ZONE AE SPECIAL FLOOD HAZARD AREA PER FEMA FIRM PANEL 48309C0380D, EFFECTIVE DATE: DECEMBER 20, 2019.
3. EXISTING CULVERT DOES NOT MEET CURRENT DESIGN CRITERIA FOR PASSING THE DESIGN EVENT WITHOUT OVERTOPPING. NO CONVEYANCE IMPROVEMENTS ARE PROPOSED WITH THIS PROJECT.
4. COORDINATION WITH THE CITY OF BELLMEAD FLOODPLAIN ADMINISTRATOR OCCURRED ON 05/31/2023.

STATE OF TEXAS
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7/5/2023

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RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SS 299
HYDRAULIC DATA SHEET

SHEET 1 OF 1

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		89

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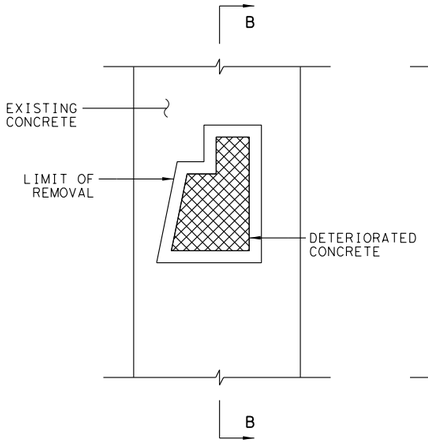
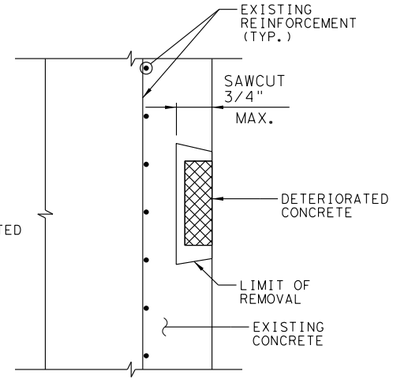


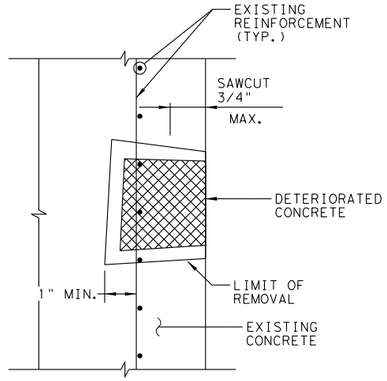
ELEVATION VIEW



SECTION B-B

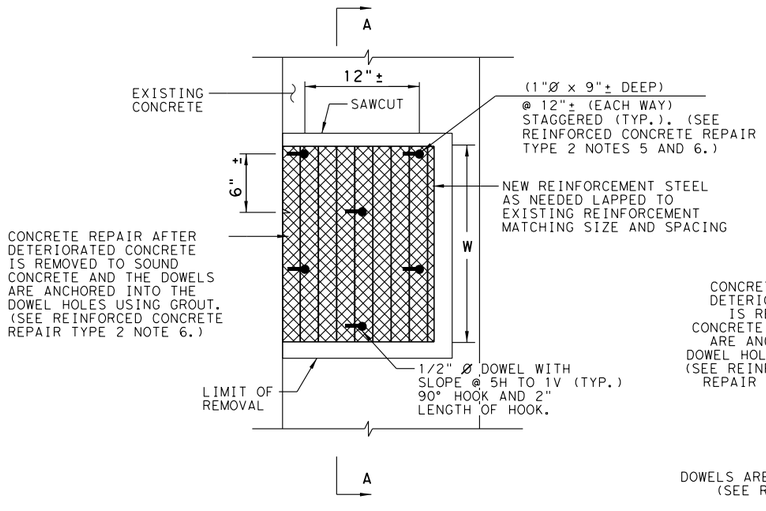
CONCRETE REPAIR TYPE 1

NOTE: REPAIR TYPE 1 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS LESS THAN OR EQUAL TO 3/4".

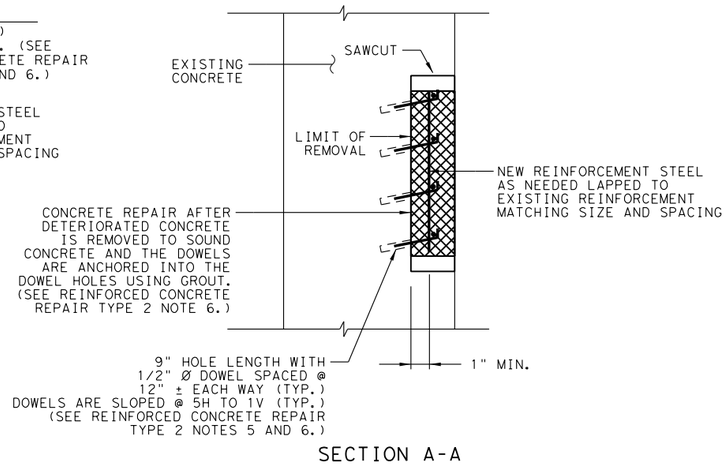


CONCRETE REPAIR TYPE 2
EXISTING REINFORCEMENT

NOTE: CONCRETE REPAIR TYPE 2 DETAIL FOR AREAS WITH EXISTING REINFORCEMENT.



ELEVATION VIEW



SECTION A-A

CONCRETE REPAIR TYPE 2
NEW REINFORCEMENT

NOTE: REPAIR TYPE 2 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS GREATER THAN 3/4"

REINFORCED CONCRETE REPAIR TYPE 1 NOTES:

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF 3/4" MAXIMUM.
2. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND EPOXY MORTAR.
3. APPLY A RAPID HARDING CONCRETE PATCHING MATERIAL.

REINFORCED CONCRETE REPAIR TYPE 2 NOTES:

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF 3/4" MINIMUM BUT NOT TO THE DEPTH OF THE REINFORCEMENT STEEL.
2. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND EPOXY MORTAR.
3. IF DETERIORATED CONCRETE EXTENDS BEYOND THE PRIMARY REINFORCEMENT, REMOVE THE CONCRETE TO AT LEAST 1" BELOW THE REINFORCEMENT.
4. APPLY AN EPOXY BONDING COMPOUND BETWEEN THE OLD AND THE NEW CONCRETE.
5. W REPRESENTS LEAST DIMENSION OF DETERIORATED CONCRETE.
6. USE DOWELS ONLY WHEN W DIMENSION OF DETERIORATED CONCRETE IS GREATER THAN 2'-0" AND NEW OR EXISTING REINFORCEMENT CANNOT ADEQUATELY BE DEVELOPED BY LAPPING WITH EXISTING REINFORCEMENT.
7. WIRE MESH MAY BE SUBSTITUTED FOR NEW REINFORCEMENT IF INDICATED ON DESIGN DRAWINGS.

LEGEND

- REMOVE DETERIORATED CONCRETE.

NOTE:
ALL REINFORCED CONCRETE REPAIR SHALL BE PERFORMED IN ACCORDANCE TO THE TXDOT CONCRETE REPAIR MANUAL (2021).

CONTRACTOR TO ONLY USE PREAPPROVED MATERIALS THAT MEET THE REQUIREMENTS OF DMS-4655 (CONCRETE REPAIR MATERIALS).

STATE OF TEXAS
ANDRES M. CARDENAS
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LICENSED PROFESSIONAL ENGINEER
7/5/2023

RTG RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SS 299
CULVERT CONCRETE REPAIR DETAIL

SHEET 1 OF 1

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		90

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (1) (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
21+78.31 (Lt)	7 ~ 3'x 3'	2'	MC-3-23	FW-0	0°	4:1	8"	7"	1.000'	4.417'	16.333'	9.430'	18.860'	N/A	N/A	8.8	1.0	6.2	90
21+78.31 (Rt)	7 ~ 3'x 3'	2'	MC-3-23	FW-0	0°	3:1	8"	7"	1.000'	4.417'	12.250'	7.073'	14.145'	N/A	N/A	6.3	1.0	4.7	67

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

DATE: 7/5/2023 3:35
FILE: $FILE$

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

STATE OF TEXAS
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7/5/2023

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042,ETC.	SL 340,ETC.
	DIST	COUNTY		SHEET NO.
	WACO	MCLENNAN		91

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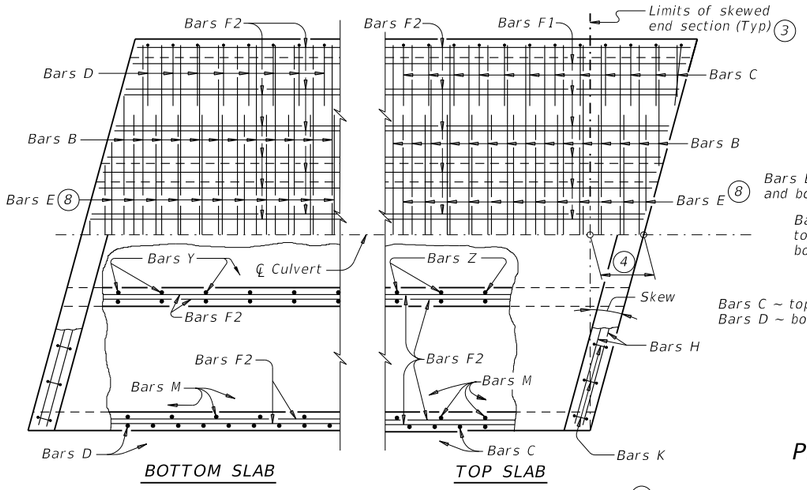
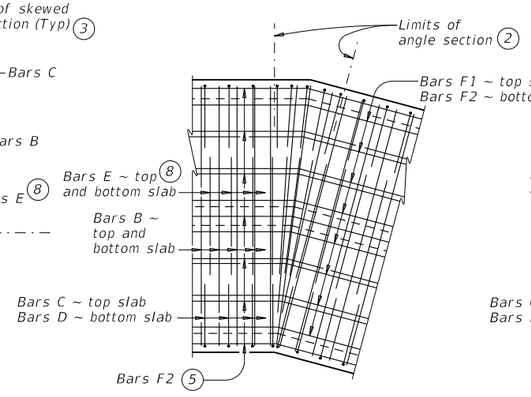
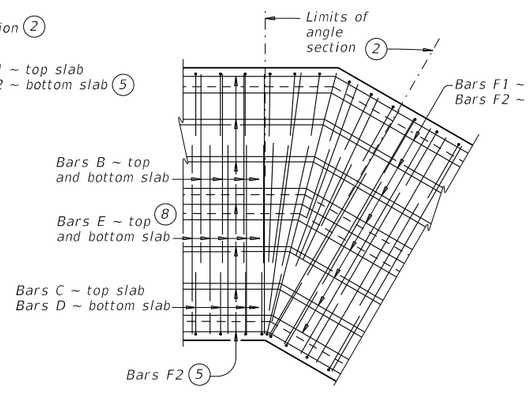


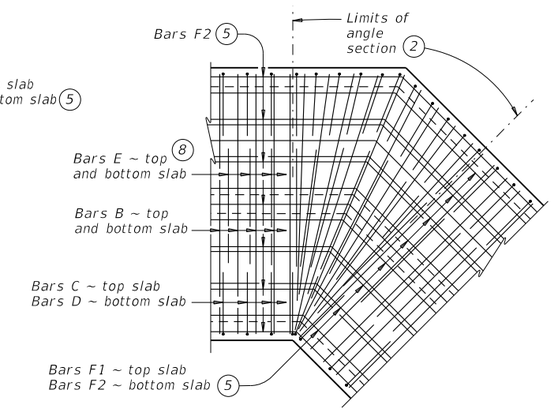
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7



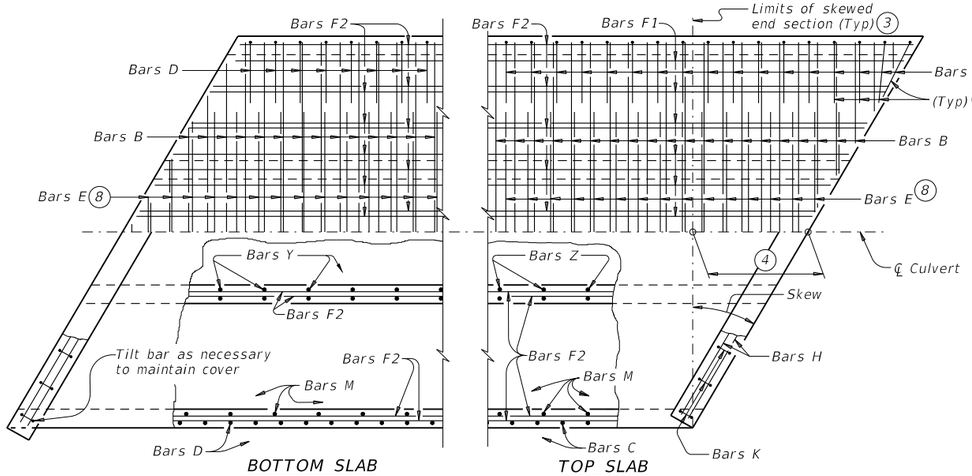
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



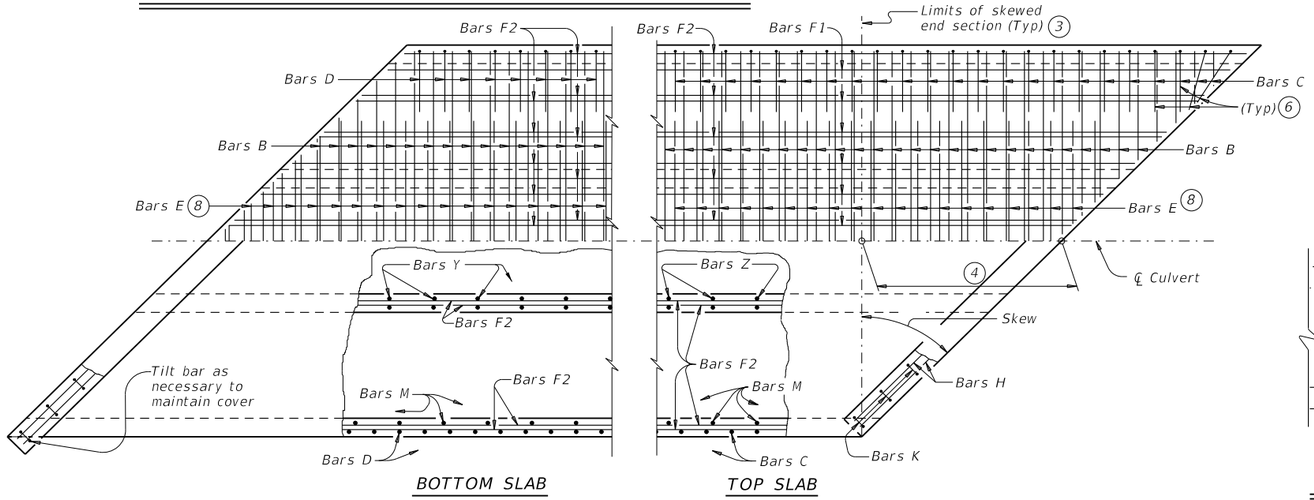
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



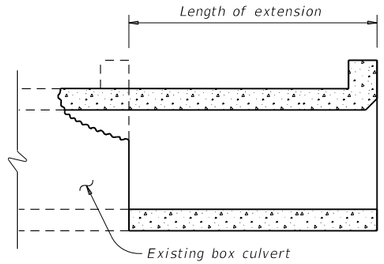
PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



LENGTHENING DETAIL 1

1. For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
   For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. 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." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.
   Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.
2. When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.
3. The length of Bars B and Bars E will vary in the skewed end sections.
4. [One half of overall width] x [tangent of the skew angle]
5. Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.
6. When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.
7. At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.
8. Extend Bars E as shown on the MC standard sheet for direct traffic culverts.

CONSTRUCTION NOTES:
Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

MC-MD

FILE: mc-mdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042,ETC.	SL 340,ETC.
	DIST	COUNTY		SHEET NO.
	WACO	MCLENNAN		92

DATE: 7/5/2023 3:35
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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

Hw = H + T + C - 0.250'
A = (Hw - 0.333') (SL)
B = (A) tangent (30°)
Lw = (A) ÷ cosine (30°)

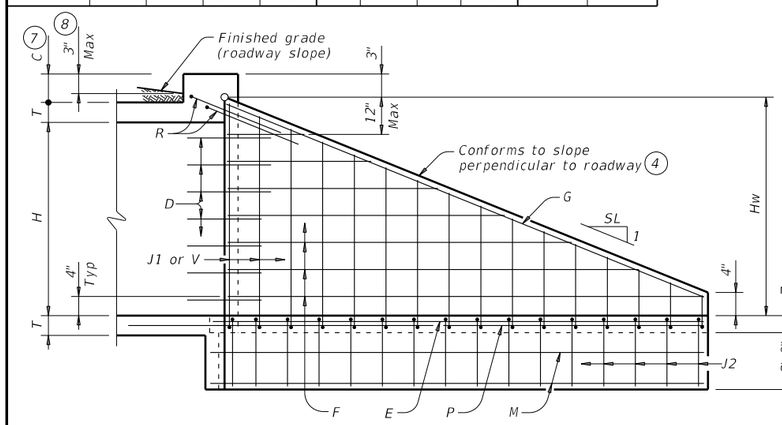
For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)

For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.5')

Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

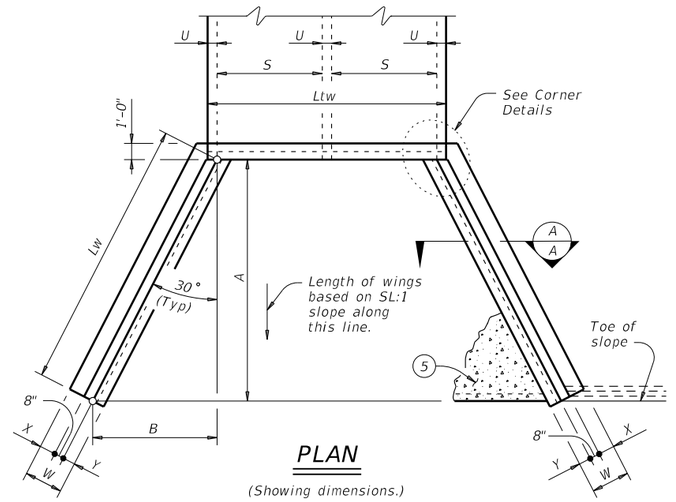
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.



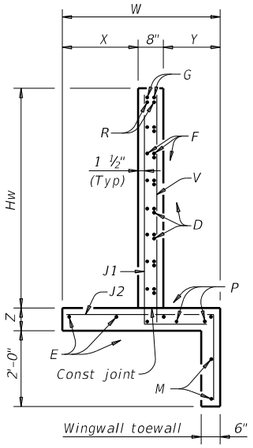
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

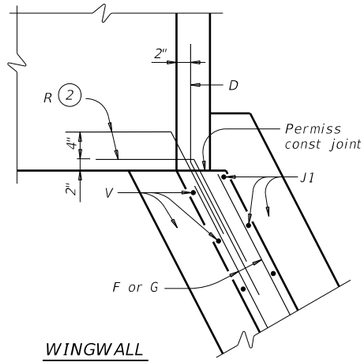


PLAN

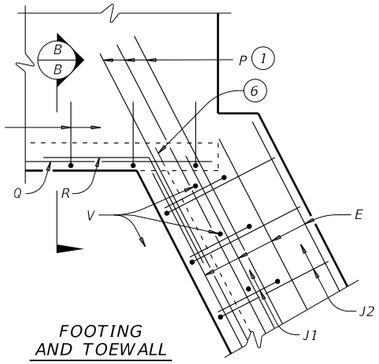
(Showing dimensions.)



SECTION A-A



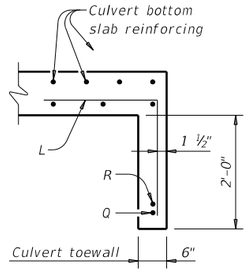
WINGWALL



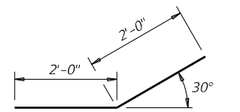
FOOTING AND TOEWALL

CORNER DETAILS

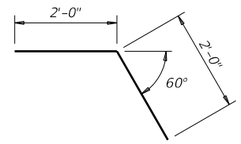
(Culvert and culvert toewall reinforcing not shown for clarity.)



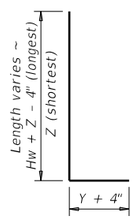
SECTION B-B (5)



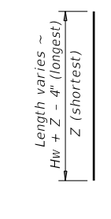
BARS D



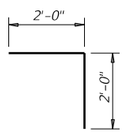
BARS R



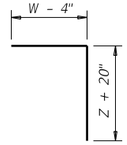
BARS J1



BARS V



BARS L



BARS J2

(1) Extend Bars P 3'-0" minimum into bottom slab of box culvert.

(2) Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

FILE: fw-0stde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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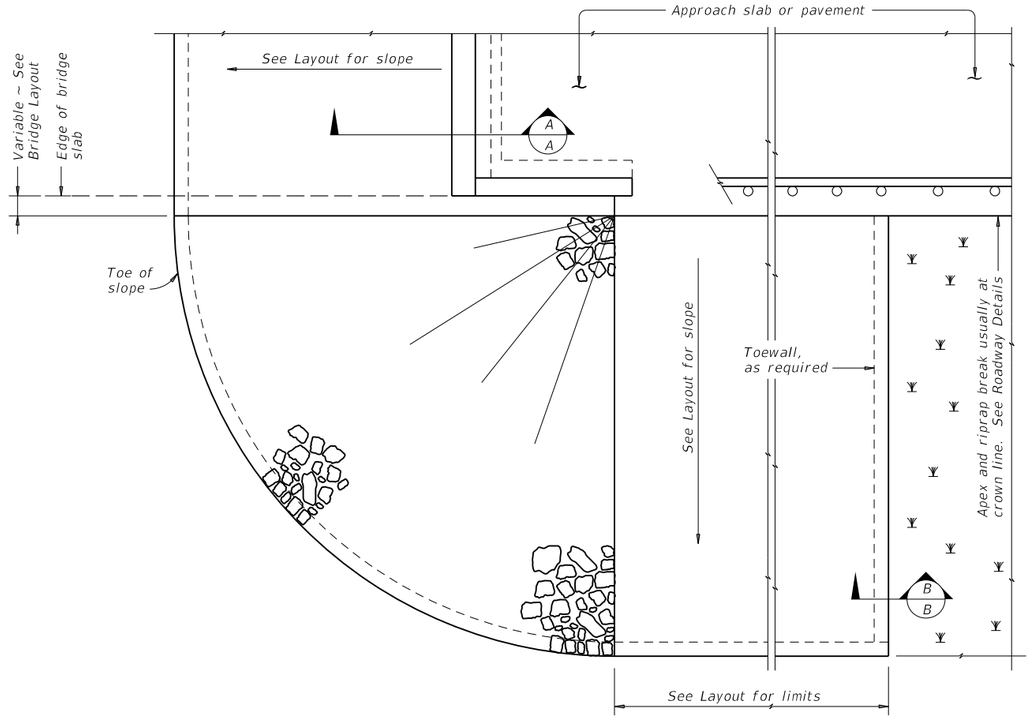
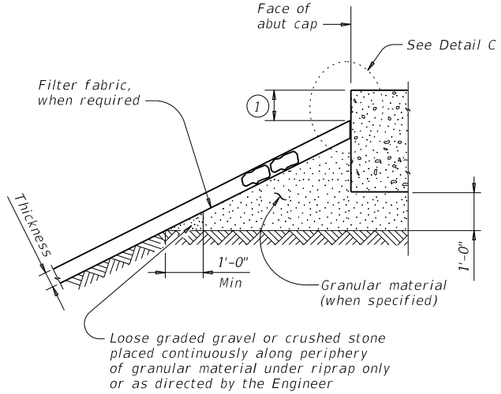
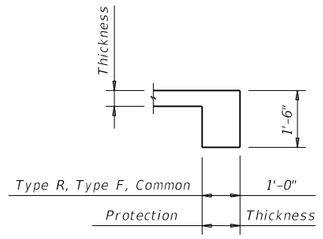
	DIST	COUNTY		SHEET NO.
	WACO	MCLENNAN		93



PLAN

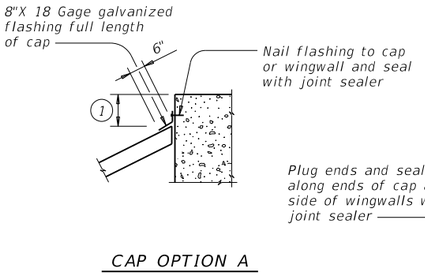


SECTION A-A AT CAP

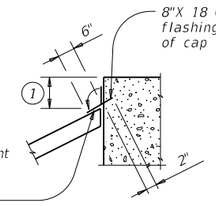


SECTION B-B

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

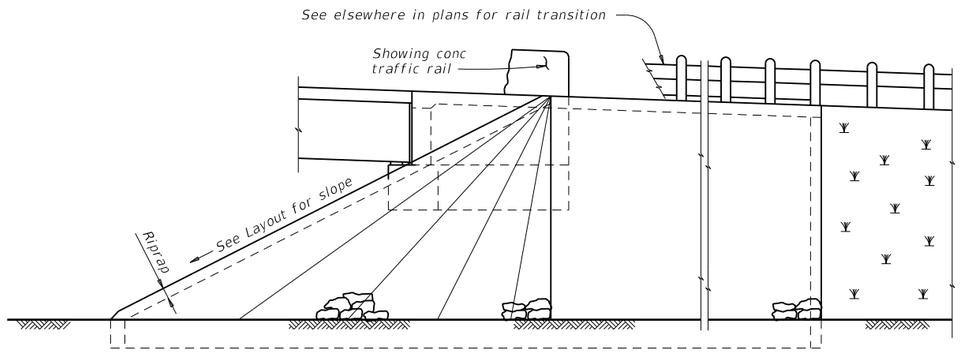


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

(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		
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REVISIONS	2311	01	042,ETC.	SL 340,ETC.		
	DIST	COUNTY		SHEET NO.		
	WACO	MCLENNAN		94		

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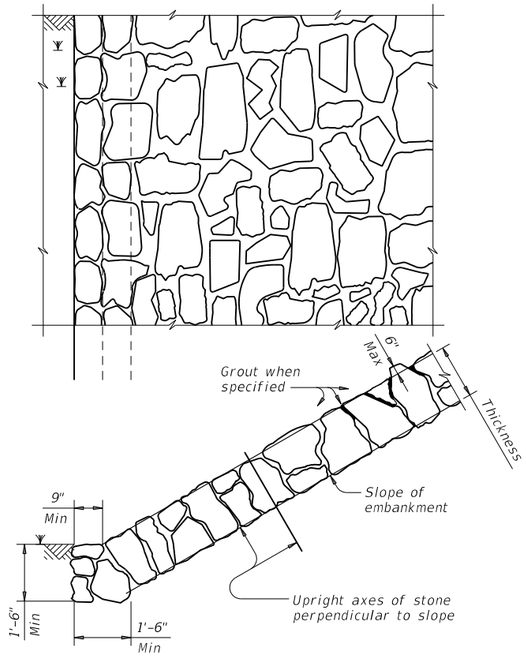


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

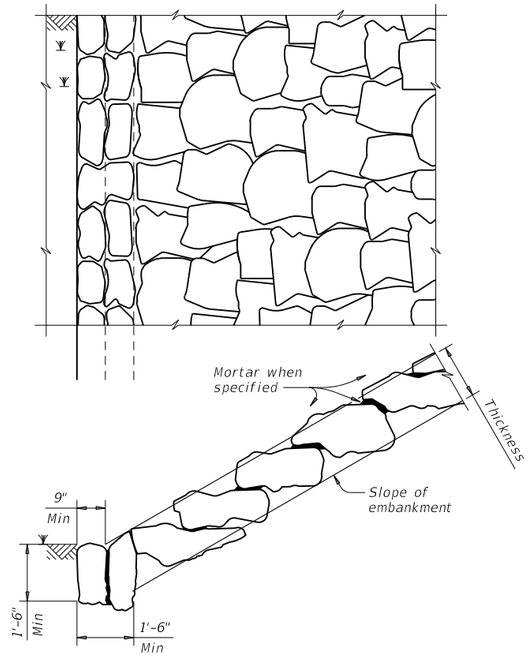


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

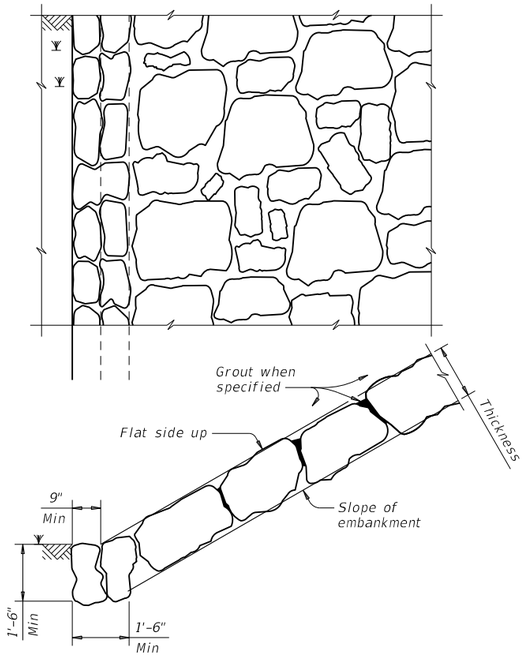


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

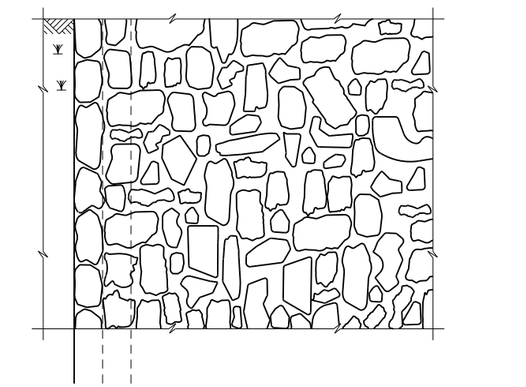


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

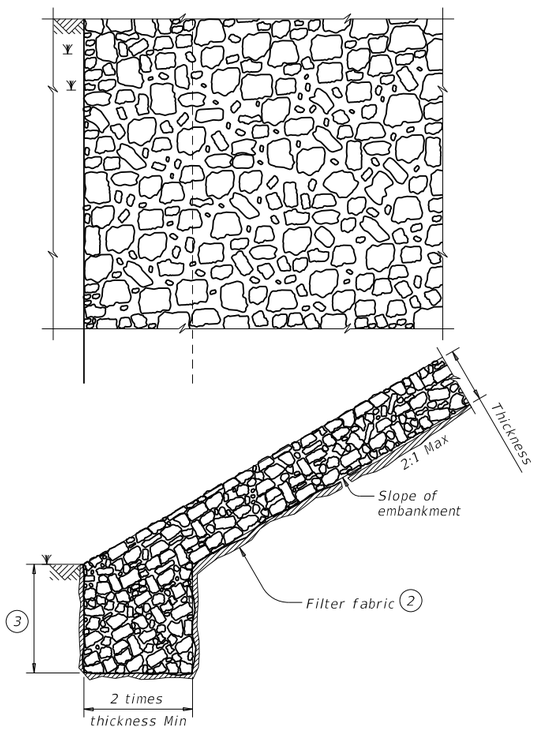


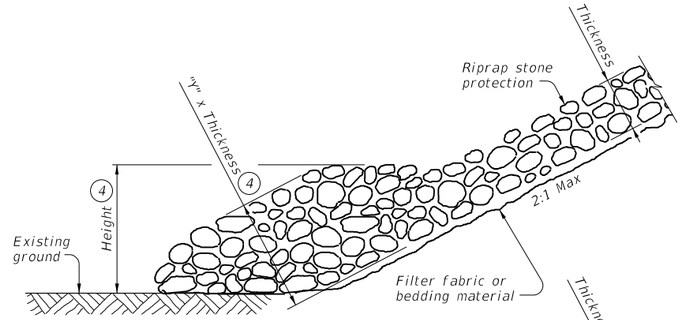
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

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

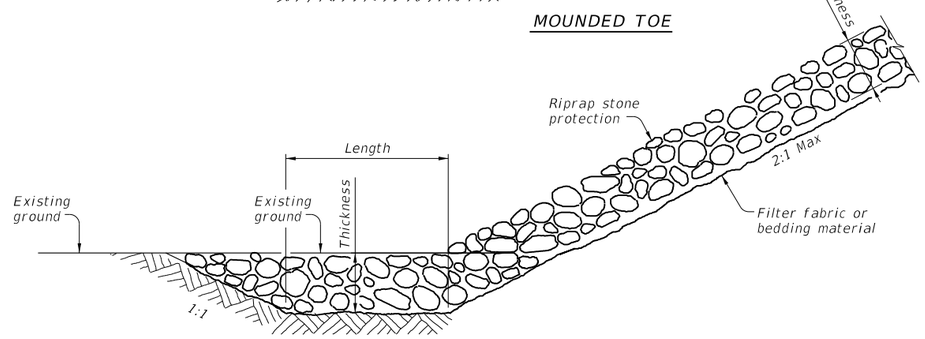
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(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)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
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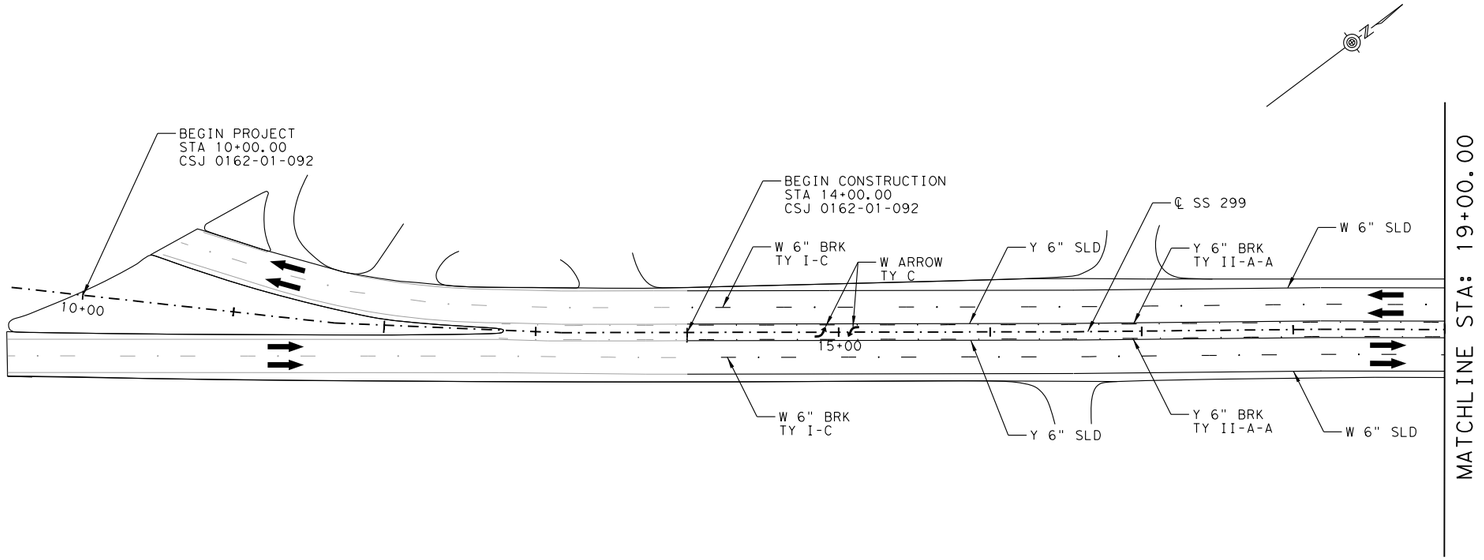
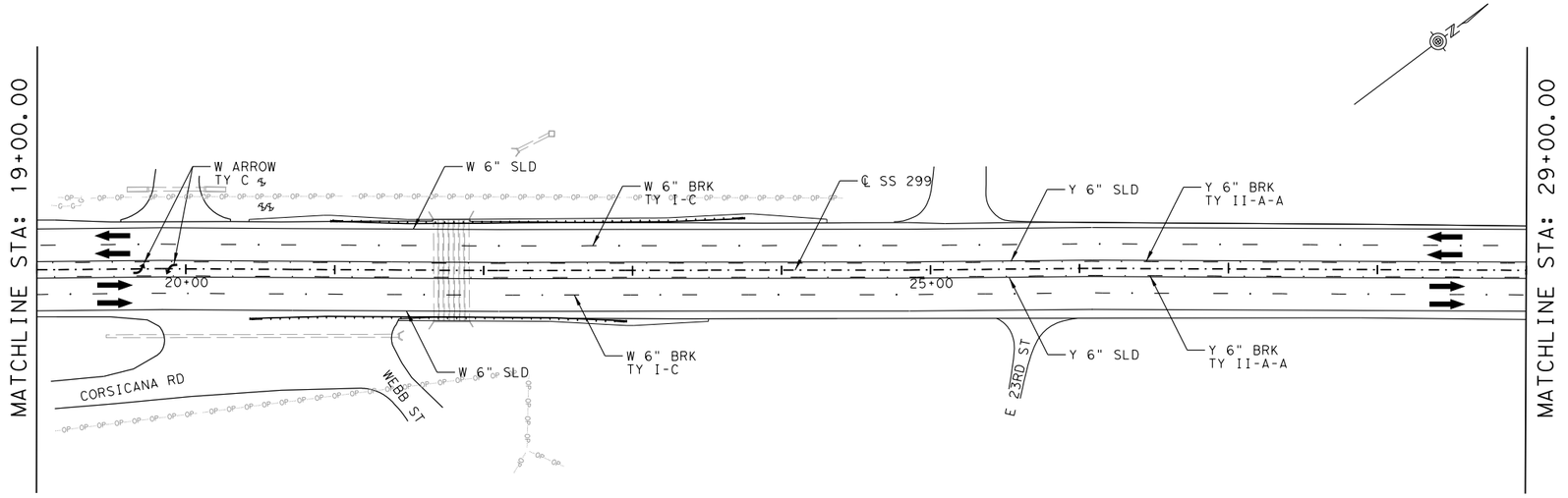
REVISIONS	2311	01	042,ETC.	SL 340,ETC.
	DIST	COUNTY		SHEET NO.
	WACO	MCLENNAN		95





ITEM	DESCRIPTION	UNIT
666-6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	760 LF
666-6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	3000 LF
666-6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	760 LF
666-6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	3000 LF
668-6077	PREFAB PAV MRK TY C (W)(ARROW)	4 EA
672-6007	REFL PAV MRKR TY I-C	39 EA
672-6009	REFL PAV MRKR TY II-A-A	74 EA

STATE OF TEXAS
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PROFESSIONAL ENGINEER
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RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SS 299
STRIPING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 1 OF 2

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		96

USER: benns
DATE: 6/30/2023
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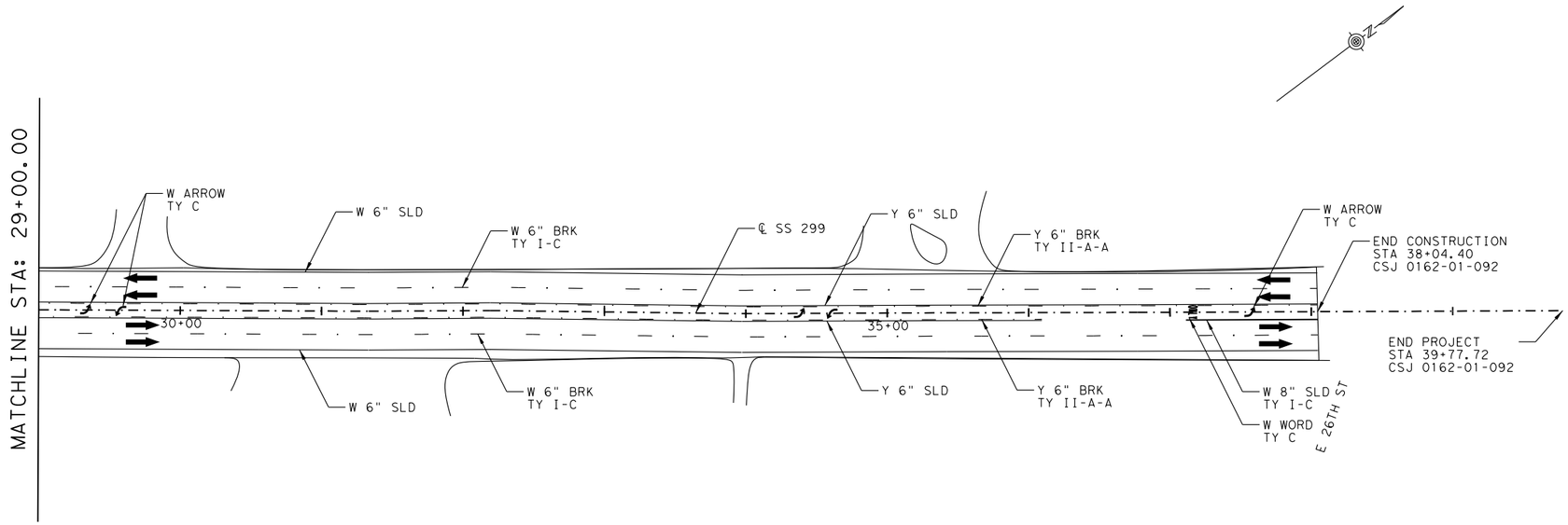

ITEM	DESCRIPTION	UNIT
666-6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	94 LF
666-6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	460 LF
666-6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	1810 LF
666-6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	410 LF
666-6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	1615 LF
668-6077	PREFAB PAV MRK TY C (W)(ARROW)	3 EA
668-6085	PREFAB PAV MRK TY C (W)(WORD)	1 EA
672-6007	REFL PAV MRKR TY I-C	22 EA
672-6009	REFL PAV MRKR TY II-A-A	41 EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

6/30/2023

Brian Enns P.E.

RTG RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SS 299
STRIPING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 2 OF 2

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		97

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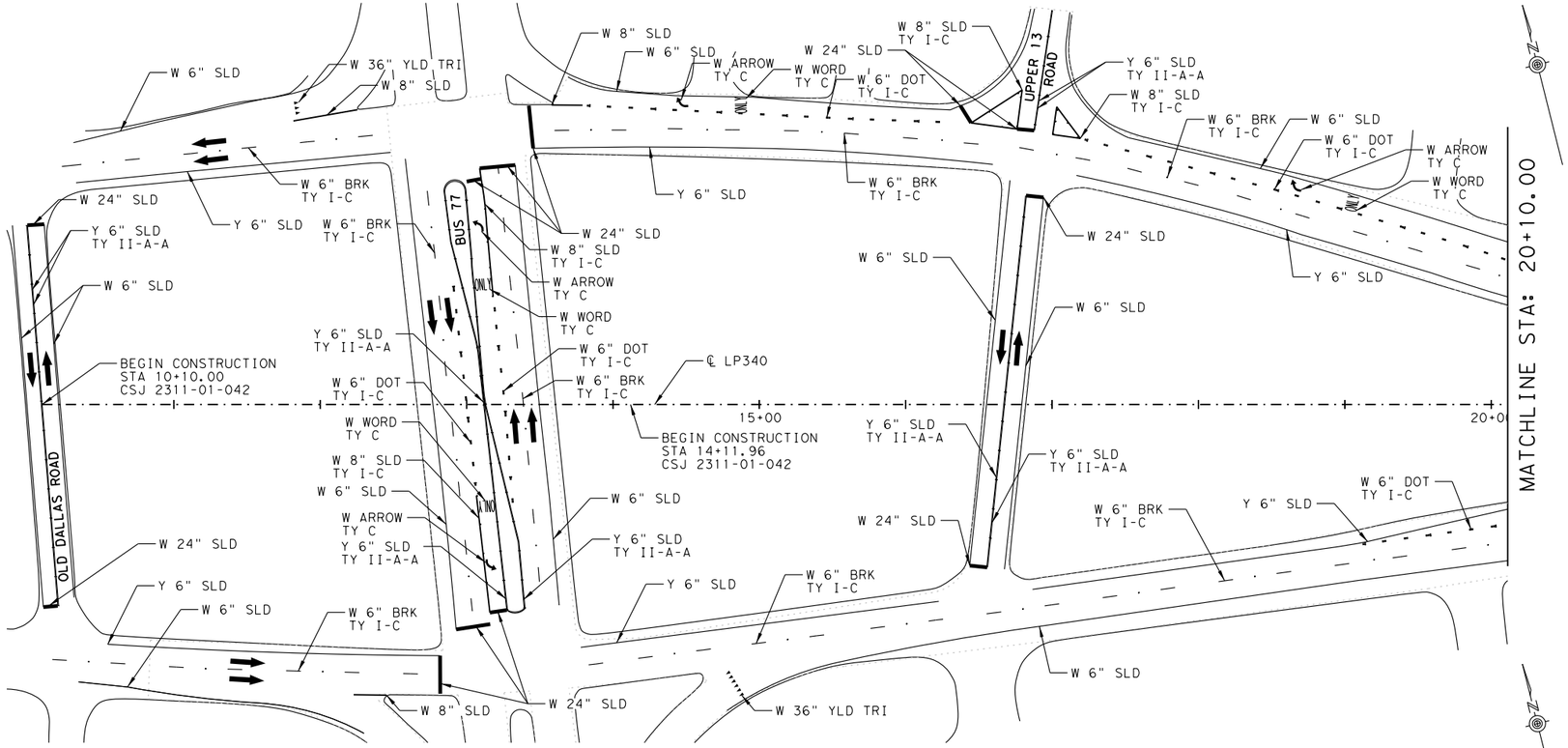

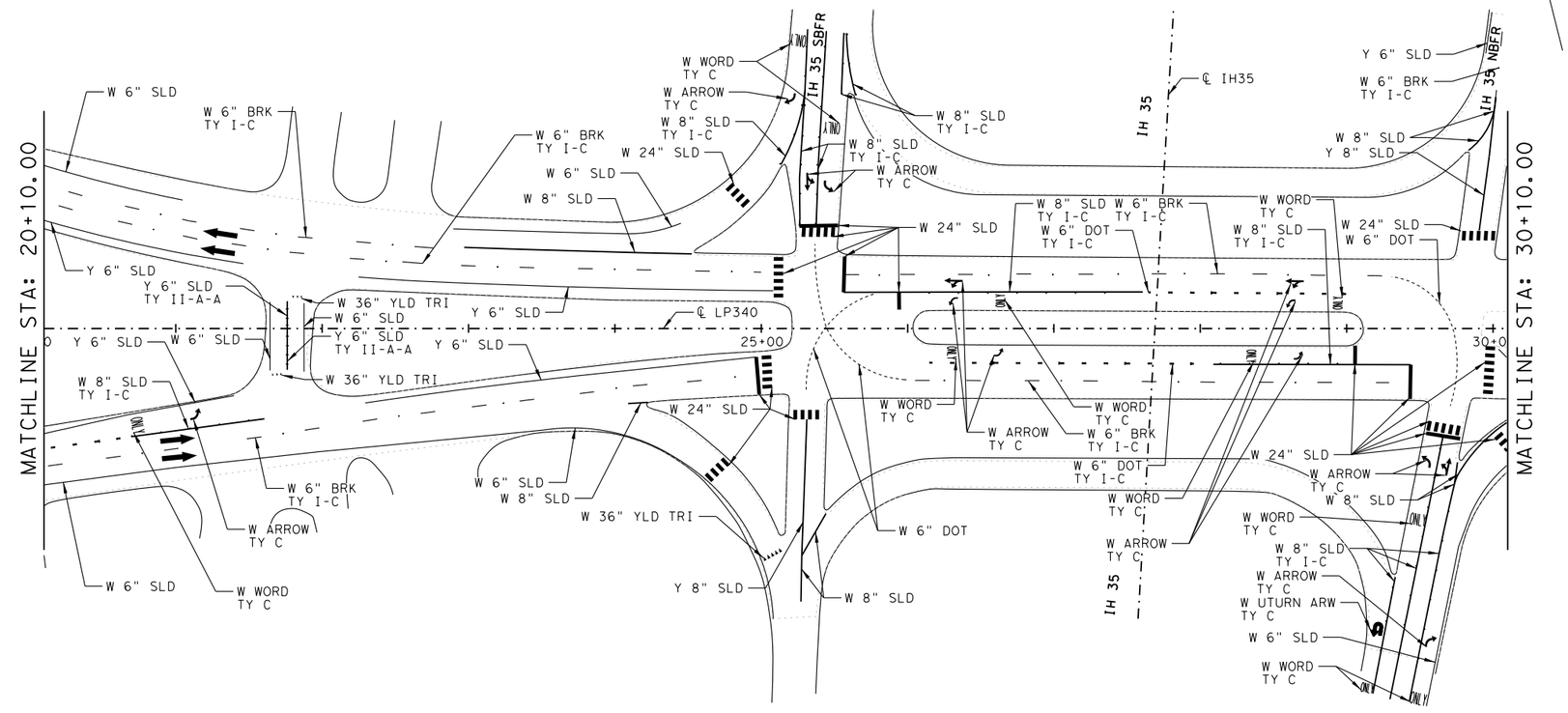

ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	525 LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	2155 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	0 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	685 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	145 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	0 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	1160 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	4425 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	0 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	5050 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	17 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	1 EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	14 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	17 EA
672 6007	REFL PAV MRKR TY I-C	198 EA
672 6009	REFL PAV MRKR TY II-A-A	134 EA
672 6010	REFL PAV MRKR TY II-C-R	0 EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED
PROFESSIONAL ENGINEER

P.E. 6/30/2023

RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SL 340
STRIPING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 1 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		98

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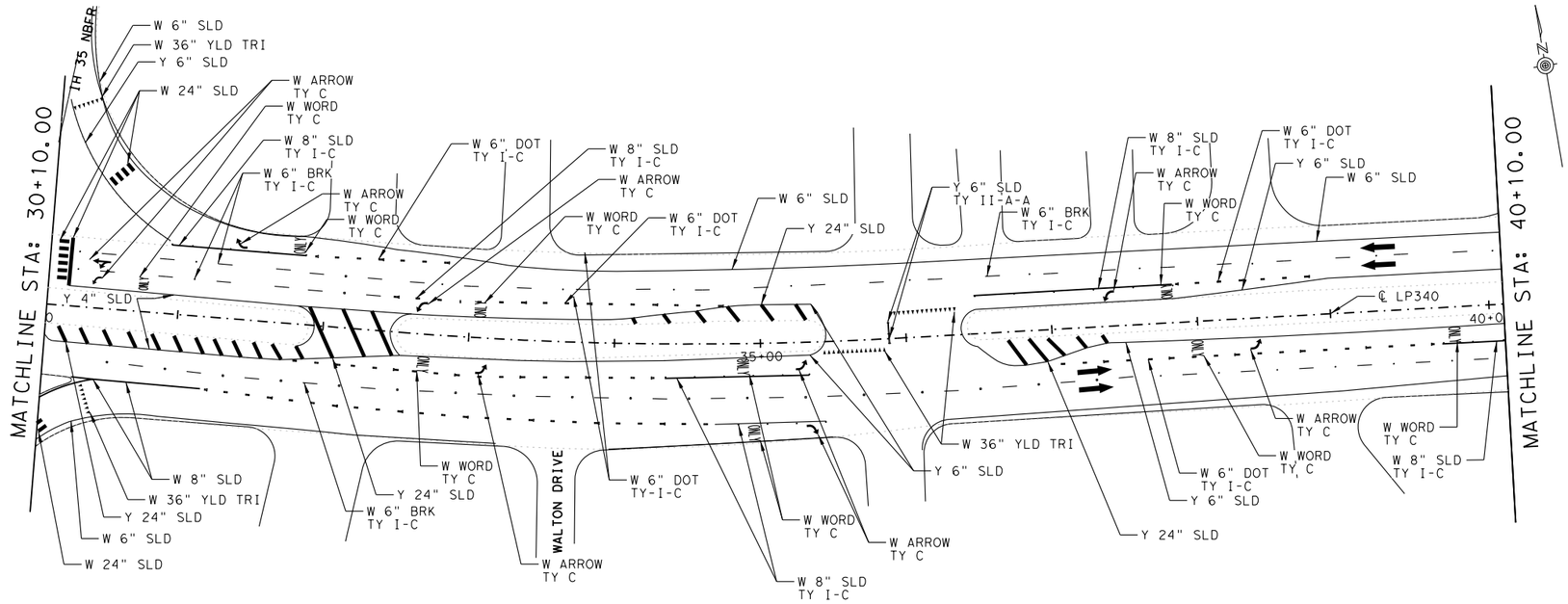

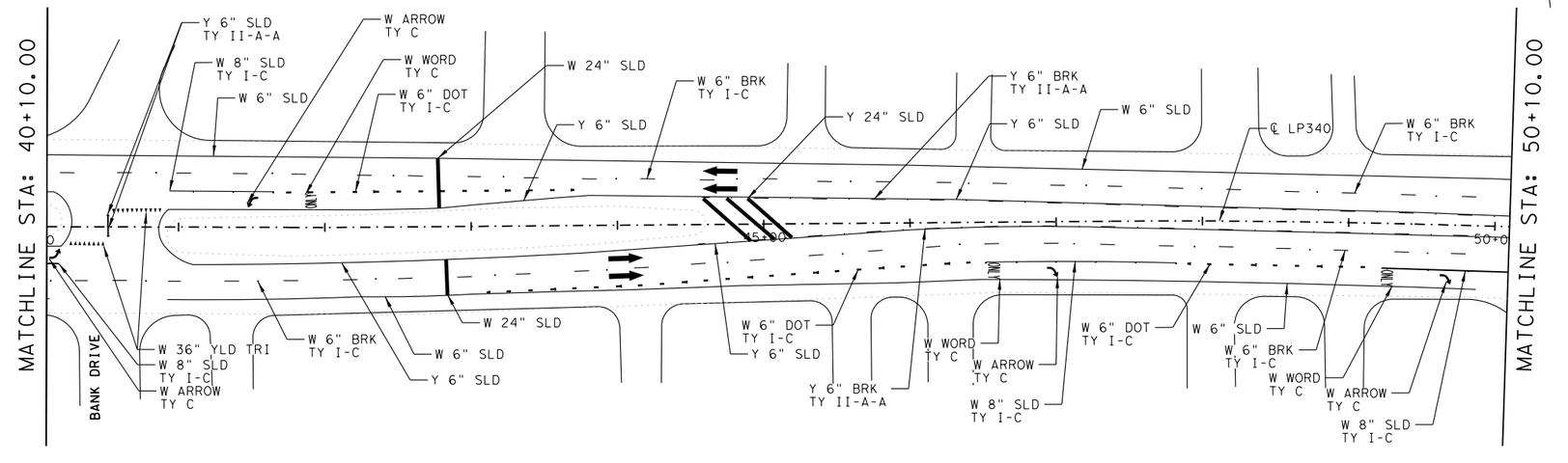

ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	464 LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	925 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	0 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	185 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	0 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	545 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	1100 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	3870 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	280 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	4170 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	13 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	0 EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	11 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	61 EA
672 6007	REFL PAV MRKR TY I-C	198 EA
672 6009	REFL PAV MRKR TY II-A-A	40 EA
672 6010	REFL PAV MRKR TY II-C-R	0 EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

P.E. 6/30/2023

RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SL 340
STRIPING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 2 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		99

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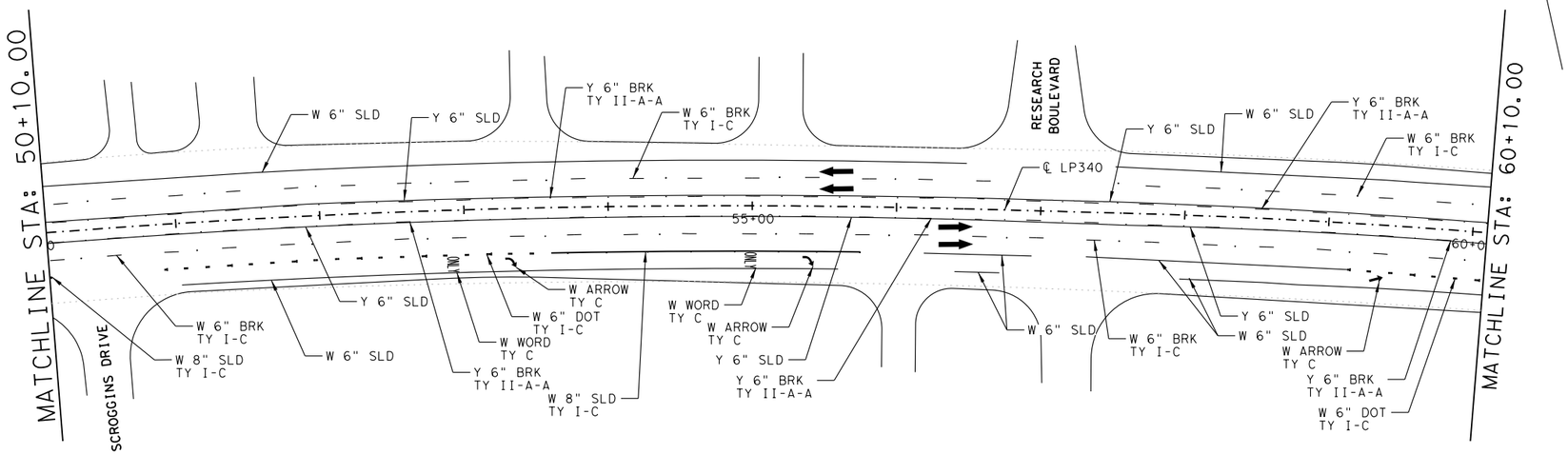

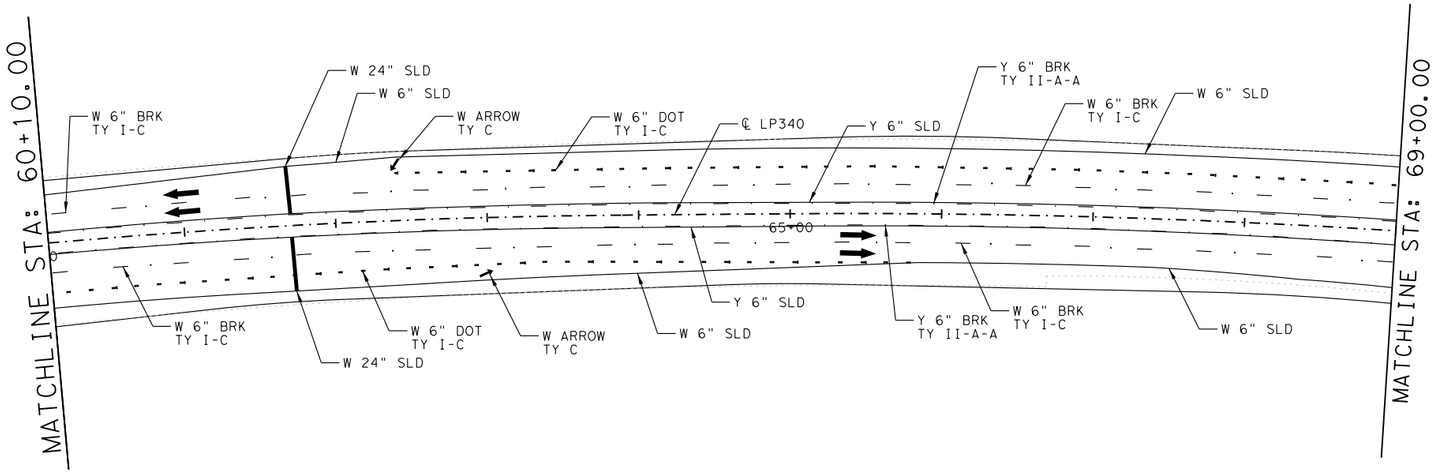

ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	325 LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	220 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	0 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	70 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	0 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	0 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	940 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	3655 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	960 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	3810 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	5 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	0 EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	2 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	0 EA
672 6007	REFL PAV MRKR TY I-C	127 EA
672 6009	REFL PAV MRKR TY II-A-A	94 EA
672 6010	REFL PAV MRKR TY II-C-R	0 EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER
P.E. 6/30/2023

RTG RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SL 340
STRIPING LAYOUTS

SCALE: FEET
1" = 100' HORIZ.

SHEET 3 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		100

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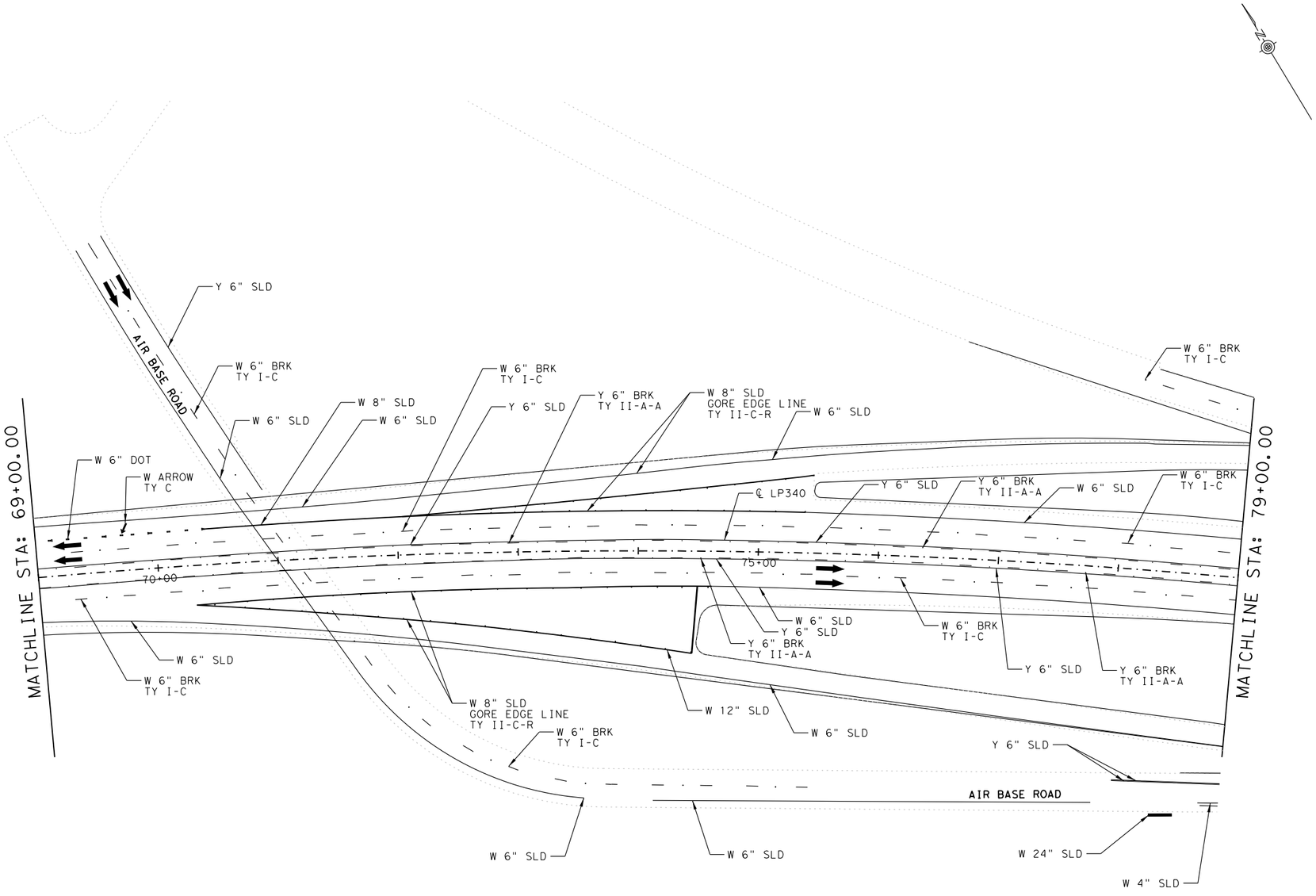

ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	30 LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	1695 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	830 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	20 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	0 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	0 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	720 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	3840 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	500 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	2440 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	1 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	0 EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	0 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	0 EA
672 6007	REFL PAV MRKR TY I-C	47 EA
672 6009	REFL PAV MRKR TY II-A-A	50 EA
672 6010	REFL PAV MRKR TY II-C-R	66 EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

B. Enns P.E. 6/30/2023

RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SL 340
STRIPING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 4 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		101

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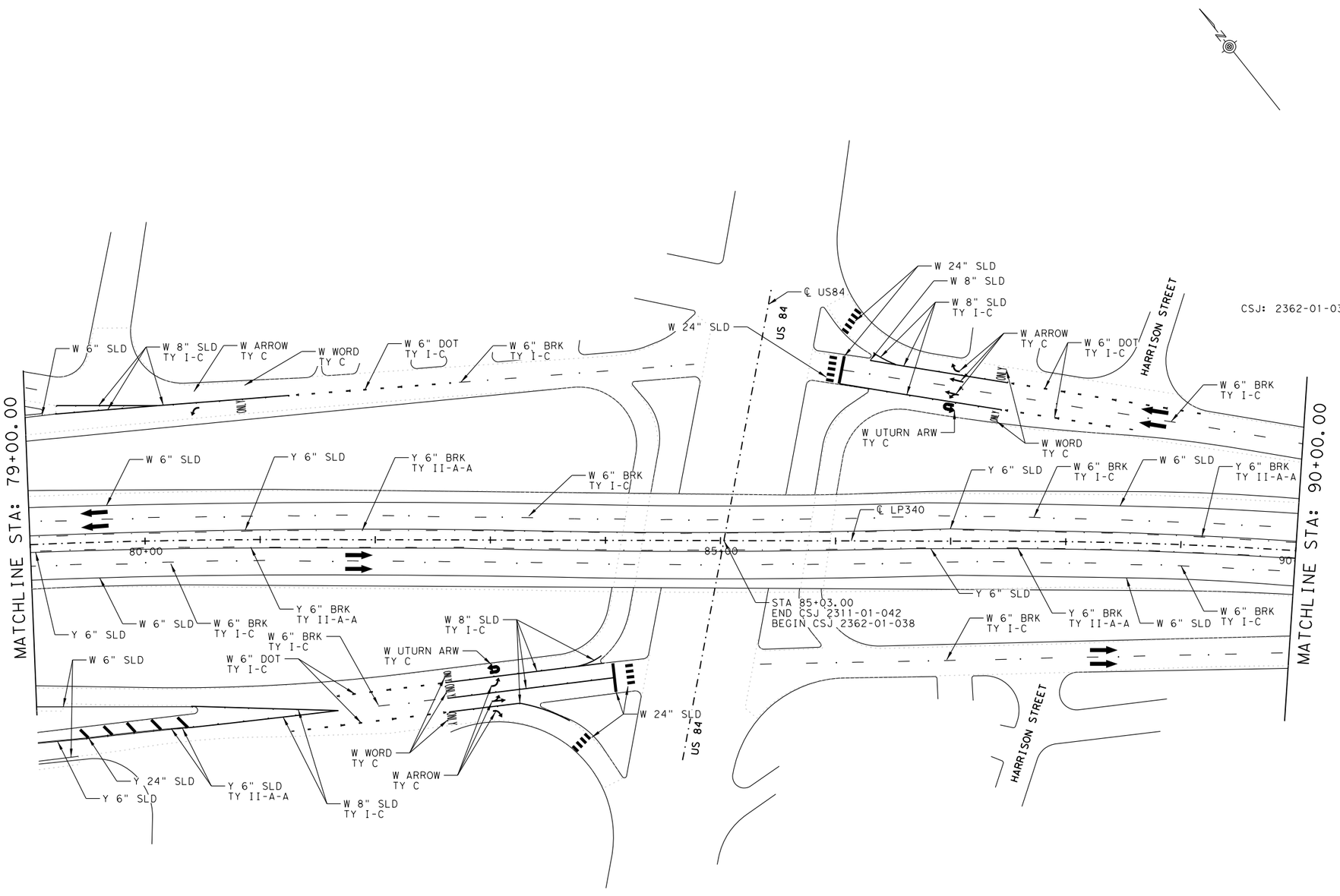
CSJ: 2362-01-038



ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	81LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	980 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	0 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	85 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	0 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	55 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	380 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	1235 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	300 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	1465 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	5 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	1EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	4 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	0 EA
672 6007	REFL PAV MRKR TY I-C	68 EA
672 6009	REFL PAV MRKR TY II-A-A	42 EA
672 6010	REFL PAV MRKR TY II-C-R	0 EA

ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	60 LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	290 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	0 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	100 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	0 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	0 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	470 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	1000 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	260 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	1000 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	3 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	1EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	2 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	0 EA
672 6007	REFL PAV MRKR TY I-C	50 EA
672 6009	REFL PAV MRKR TY II-A-A	24 EA
672 6010	REFL PAV MRKR TY II-C-R	0 EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

Brian Enns P.E. 6/30/2023

RTG RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SL 340
STRIPING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 5 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		102

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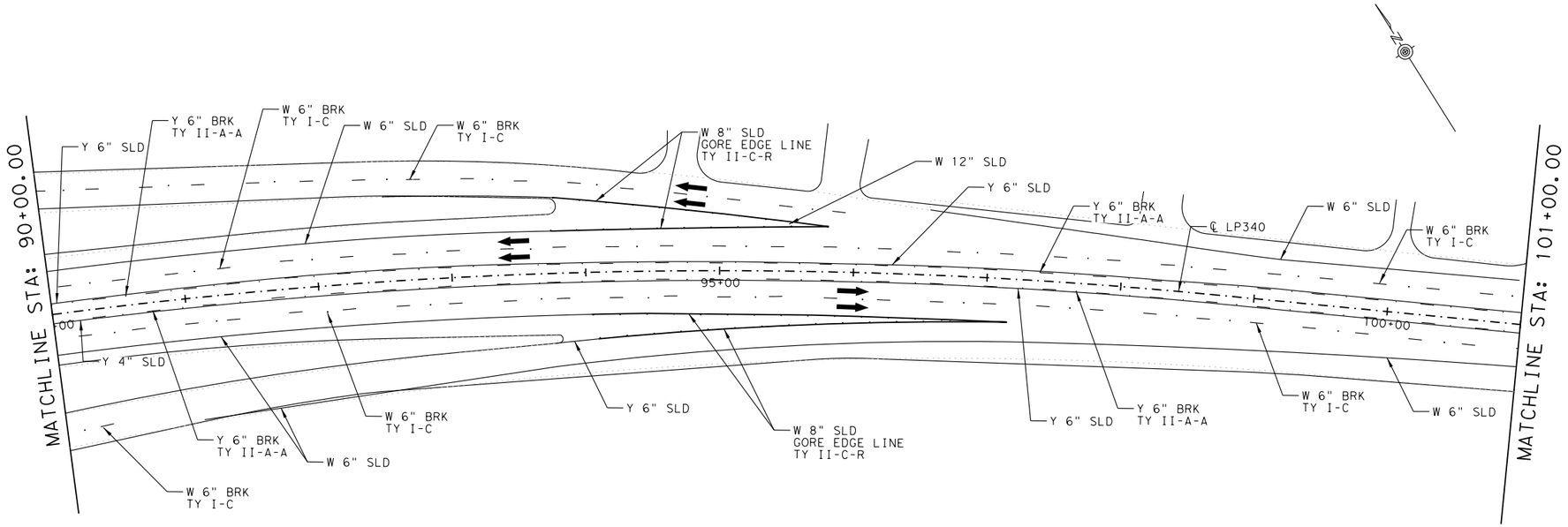

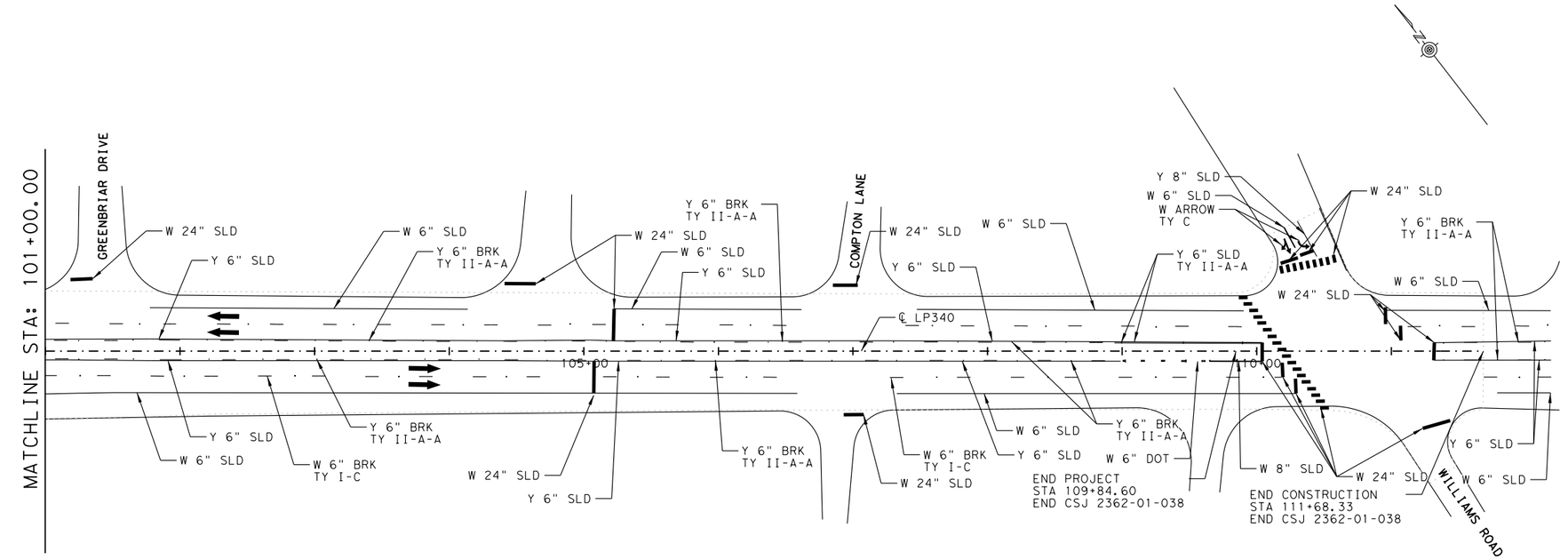

ITEM	DESCRIPTION	QTY
666 6018	REFL PAV MRK TY I(W)6"(DOT)(100MIL)	15 LF
666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	1075 LF
666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	185 LF
666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	435 LF
666 6138	REFL PAV MRK TY I(Y)8"(SLD)(100MIL)	30 LF
666 6147	REFL PAV MRK TY I(Y)24"(SLD)(100MIL)	0 LF
666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	1180 LF
666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	3925 LF
666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	950 LF
666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	4075 LF
668 6077	PREFAB PAV MRK TY C (W)(ARROW)	2 EA
668 6080	PREFAB PAV MRK TY C (W)(UTURN ARROW)	0 EA
668 6085	PREFAB PAV MRK TY C (W)(WORD)	0 EA
668 6092	PREFAB PAV MRK TY C (W)(36")(YLD TRI)	0 EA
672 6007	REFL PAV MRKR TY I-C	69 EA
672 6009	REFL PAV MRKR TY II-A-A	103 EA
672 6010	REFL PAV MRKR TY II-C-R	51EA

STATE OF TEXAS
BRIAN ENNS
93801
LICENSED PROFESSIONAL ENGINEER

Brian Enns P.E. 6/30/2023

RTG
RODRIGUEZ TRANSPORTATION GROUP
FIRM #587

SL 340
STRIPING LAYOUTS

SCALE: FEET
1" = 100' HORIZ.

SHEET 6 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042,ETC.	SL 340,ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WACO	MCLENNAN		103

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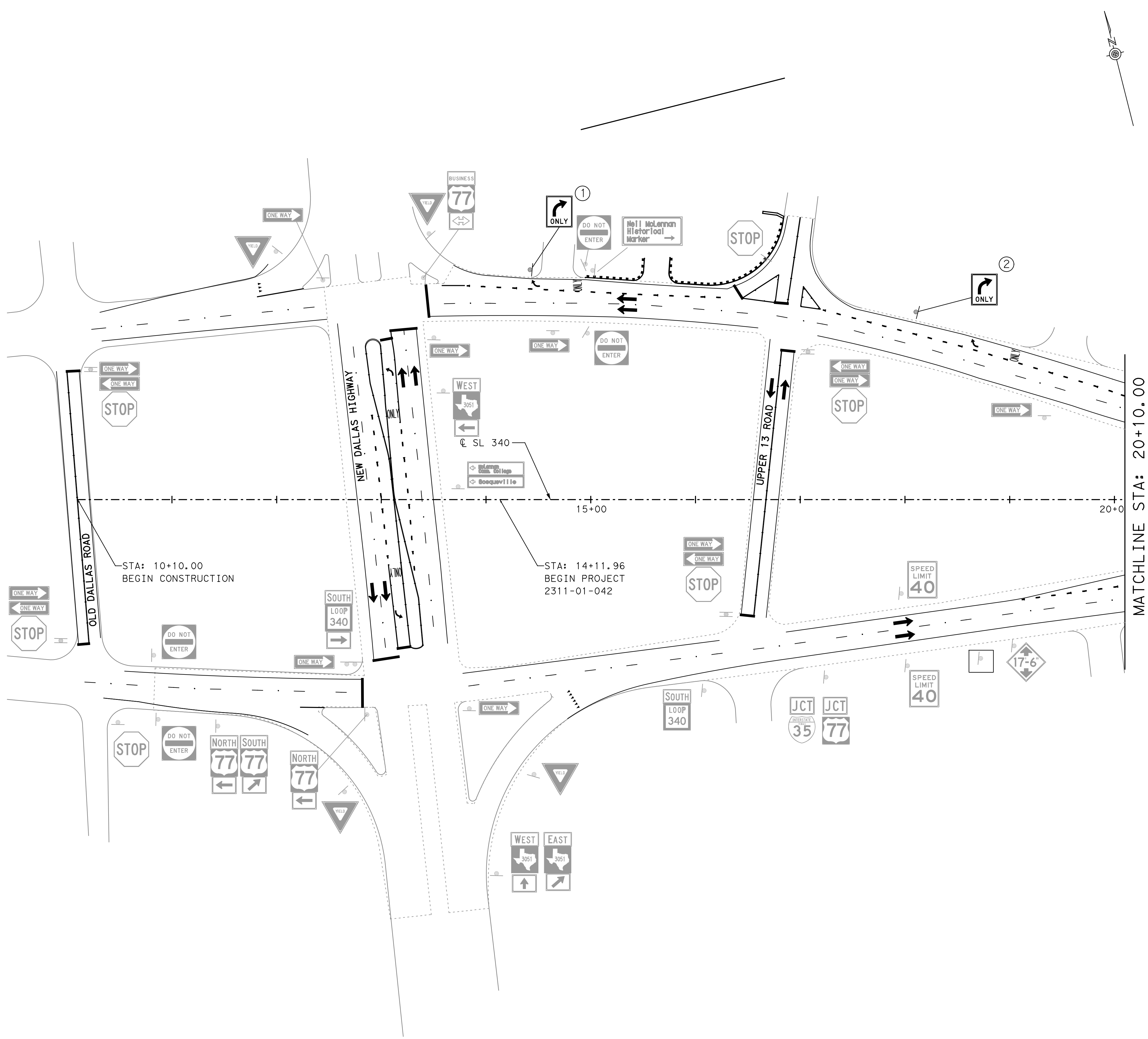

NOTES:

1. REFER TO SUMMARY OF SMALL SIGN (SOSS) SHEET FOR SIGN DETAIL INFORMATION.
2. REFER TO TXDOT STANDARD SHEETS FOR SIGN MOUNTING AND PLACEMENT DETAILS.

LEGEND

- SMALL SIGN NUMBER
- EXISTING SIGN TO REMAIN
- PROPOSED SIGN
- EXISTING SIGN TO BE REMOVED

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	2 EA
0644-6076	REMOVE SM RD SN SUP&AM	1 EA

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

Texas Department of Transportation

SL 340 SIGNING LAYOUTS

SCALE: FEET
1" = 100' HORIZ.

SHEET 1 OF 4

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WAC		MCLENNAN	104

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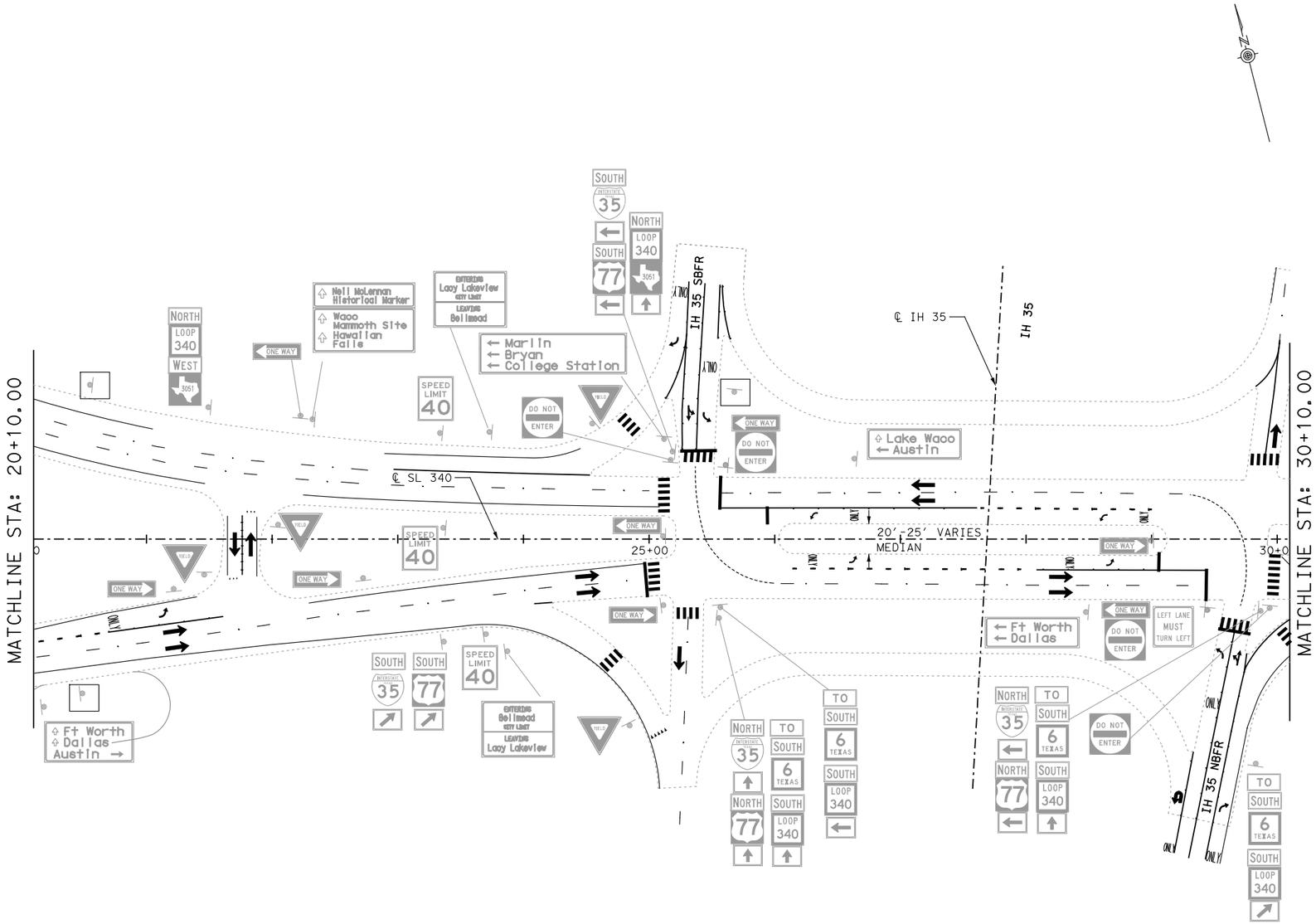

NOTES:

1. REFER TO SUMMARY OF SMALL SIGN (SOSS) SHEET FOR SIGN DETAIL INFORMATION.
2. REFER TO TXDOT STANDARD SHEETS FOR SIGN MOUNTING AND PLACEMENT DETAILS.

LEGEND

(#)	SMALL SIGN NUMBER
	EXISTING SIGN TO REMAIN
	PROPOSED SIGN
	EXISTING SIGN TO BE REMOVED

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	-
0644-6076	REMOVE SM RD SN SUP&AM	3 EA

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340 SIGNING LAYOUTS

SCALE: 1" = 100' HORIZ. FEET

SHEET 2 OF 4

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		105

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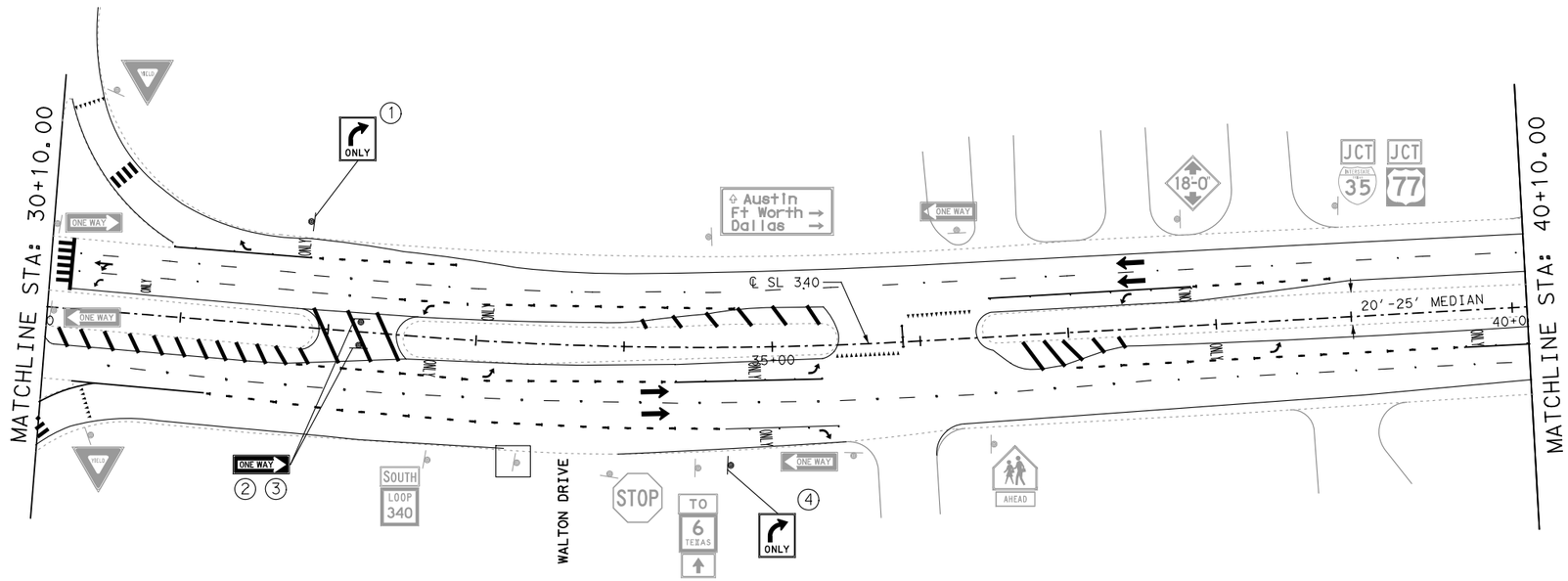


NOTES:

1. REFER TO SUMMARY OF SMALL SIGN (SOSS) SHEET FOR SIGN DETAIL INFORMATION.
2. REFER TO TXDOT STANDARD SHEETS FOR SIGN MOUNTING AND PLACEMENT DETAILS.

LEGEND

(#)	SMALL SIGN NUMBER
	EXISTING SIGN TO REMAIN
	PROPOSED SIGN
	EXISTING SIGN TO BE REMOVED

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	4 EA
0644-6076	REMOVE SM RD SN SUP&AM	-

EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
STATE OF TEXAS
8/31/2023

Seiler Lankes Group
TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

Texas Department of Transportation

SL 340
SIGNING
LAYOUTS

SCALE: 1" = 100' HORIZ.

SHEET 3 OF 4

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		106

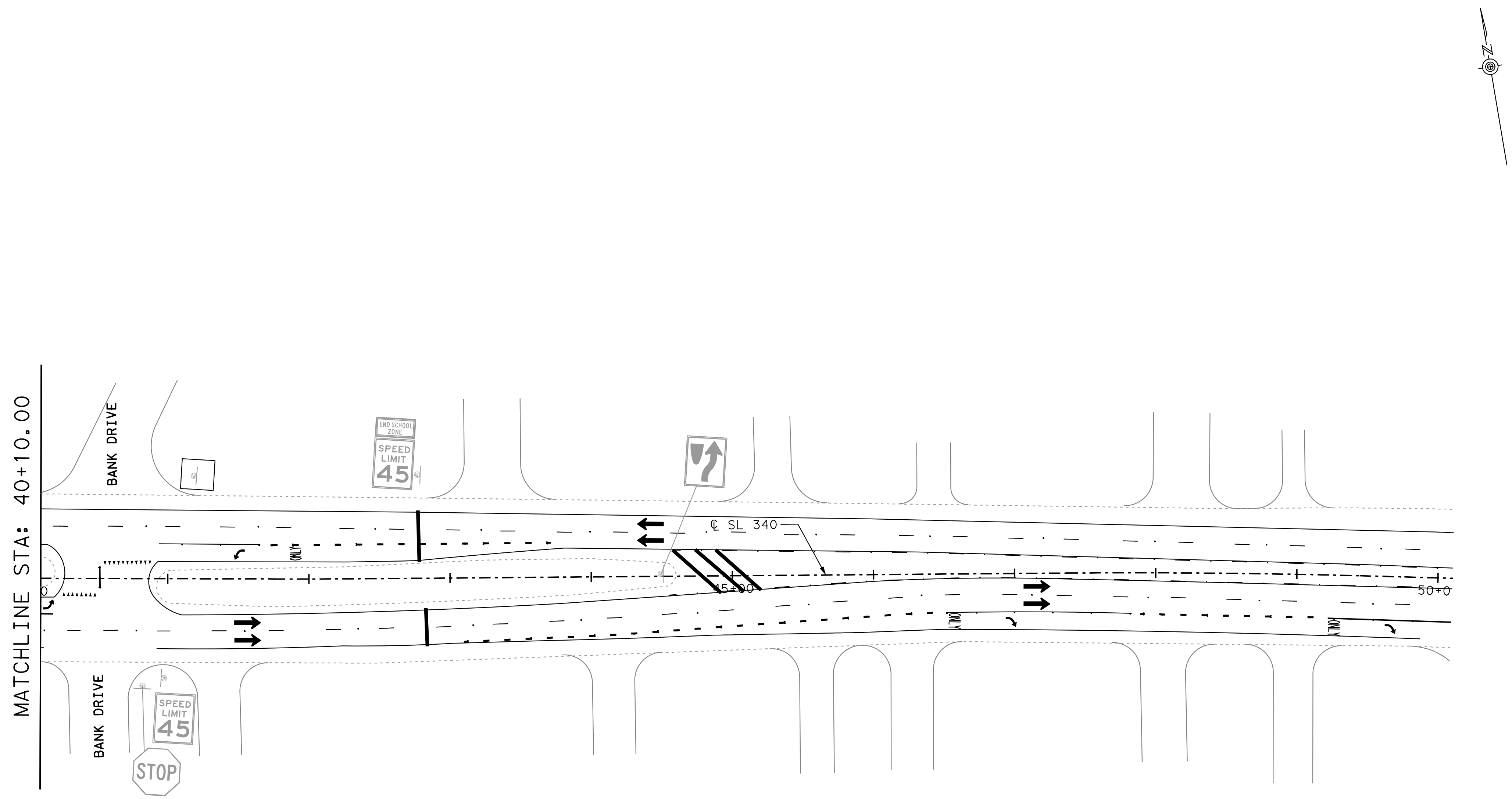
USER: eguti
DATE: 8/31/2023 11:37
SCRIPT: pw:\\server.sig-eng.com:Sig-nasDocuments\TxDOT2020 Waco\CSJ_0162-01-092\Design_Data\4 - Design\Miscellaneous\092_ETC_WACO_60.pen
FILE: pw:\\server.sig-eng.com:Sig-nasDocuments\TxDOT2020 Waco\CSJ_2311-01-042\Design_Data\4 - Design\Plan_Set\08. Traffic Signing\042_Sign_340_03.dgn

NOTES:

1. REFER TO SUMMARY OF SMALL SIGN (SOSS) SHEET FOR SIGN DETAIL INFORMATION.
2. REFER TO TXDOT STANDARD SHEETS FOR SIGN MOUNTING AND PLACEMENT DETAILS.

LEGEND

- SMALL SIGN NUMBER
- EXISTING SIGN TO REMAIN
- PROPOSED SIGN
- EXISTING SIGN TO BE REMOVED



QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	-
0644-6076	REMOVE SM RD SN SUP&AM	1 EA

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
8/31/2023

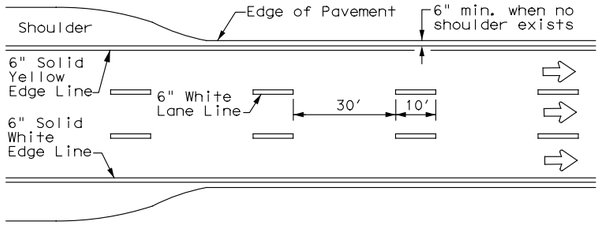
Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340 SIGNING LAYOUTS

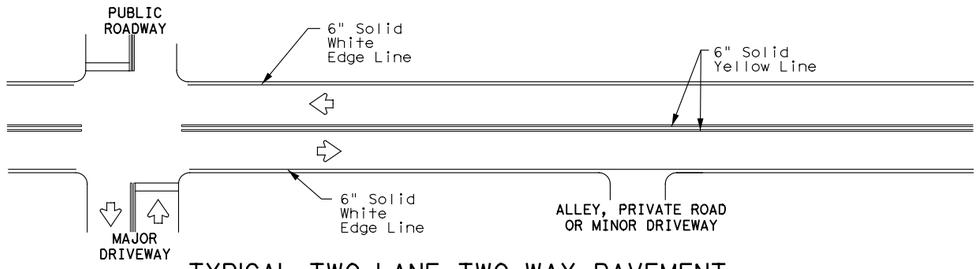
SCALE: FEET
1" = 100' HORIZ.

SHEET 4 OF 4

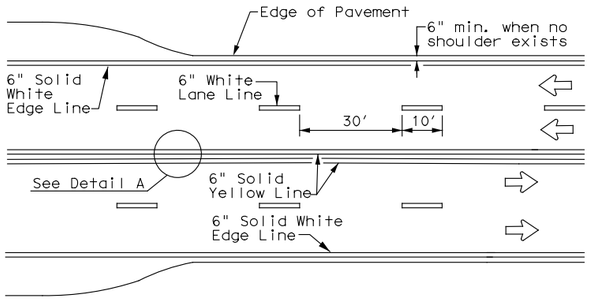
CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		107

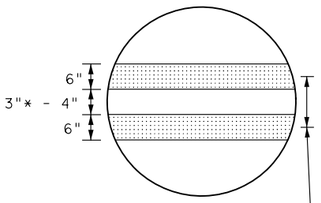


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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

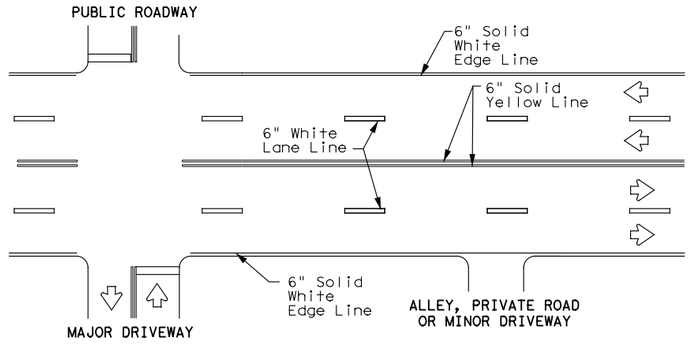




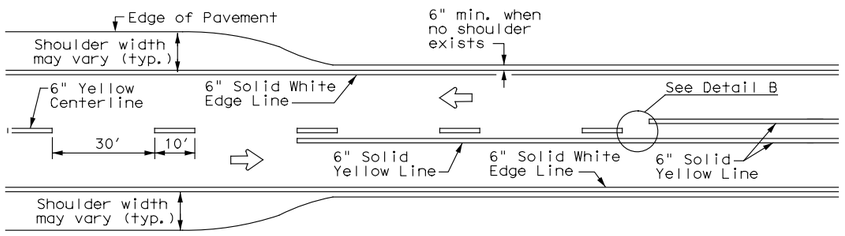
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

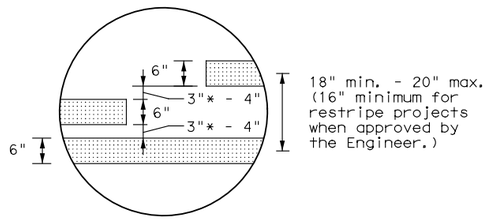
** 8" minimum for restripe projects when approved by the Engineer.



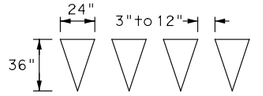
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



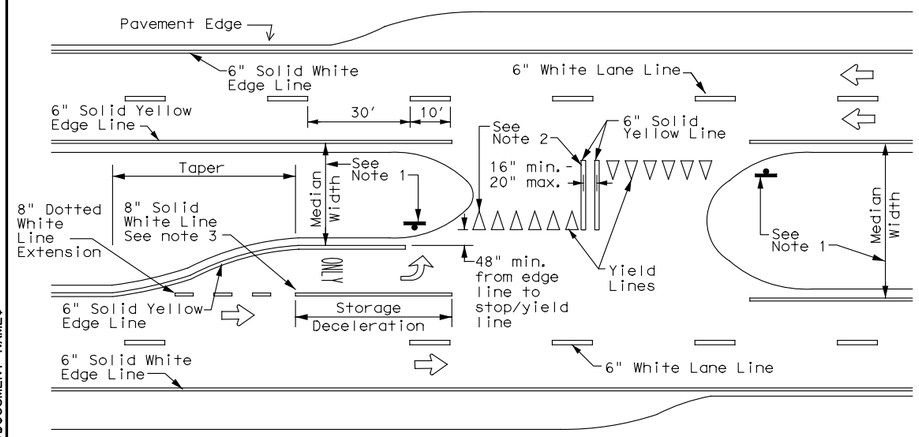
* 2" minimum for restripe projects when approved by the Engineer.



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

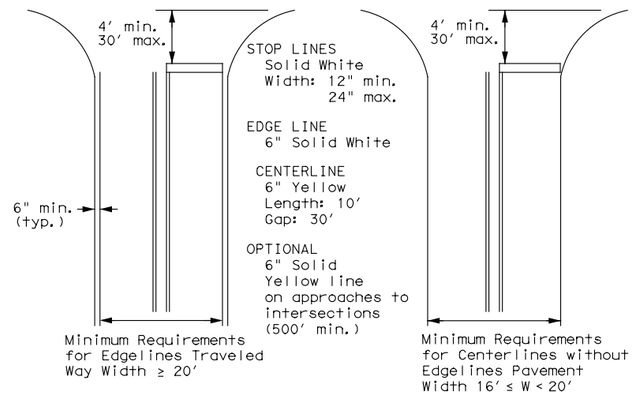
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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

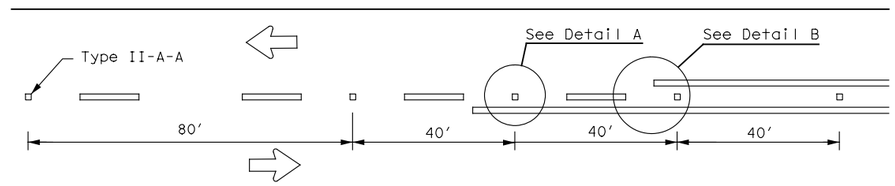
PM(1)-22

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	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		108

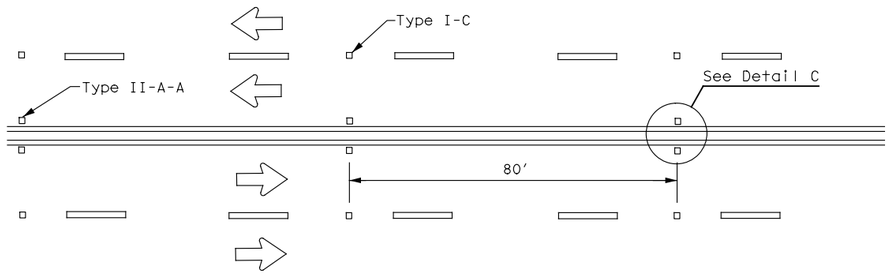
22A

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

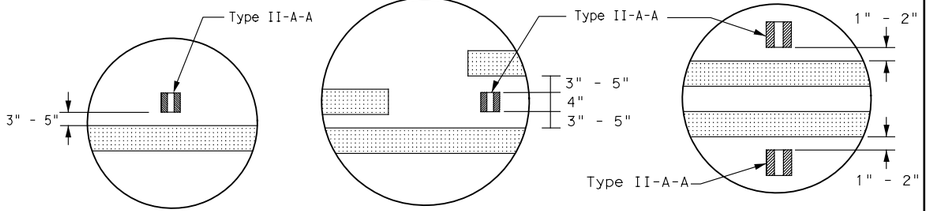
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

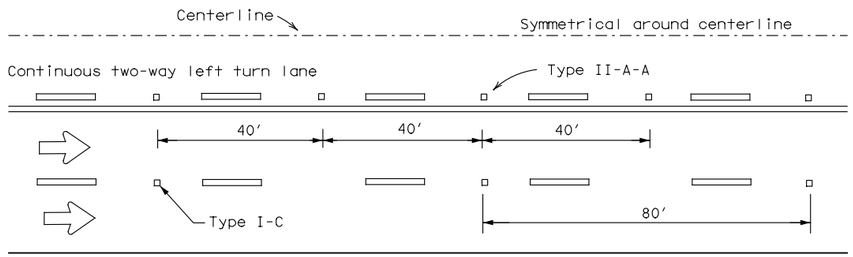


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

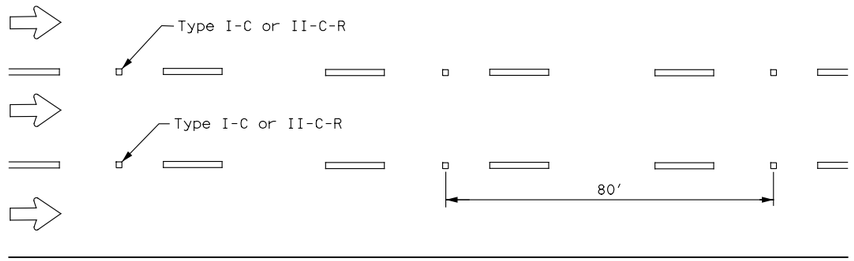


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



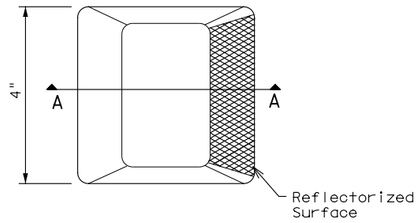
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

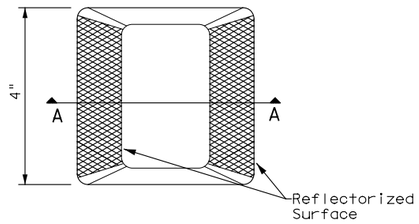
See Note 3.

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

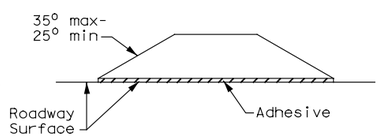
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

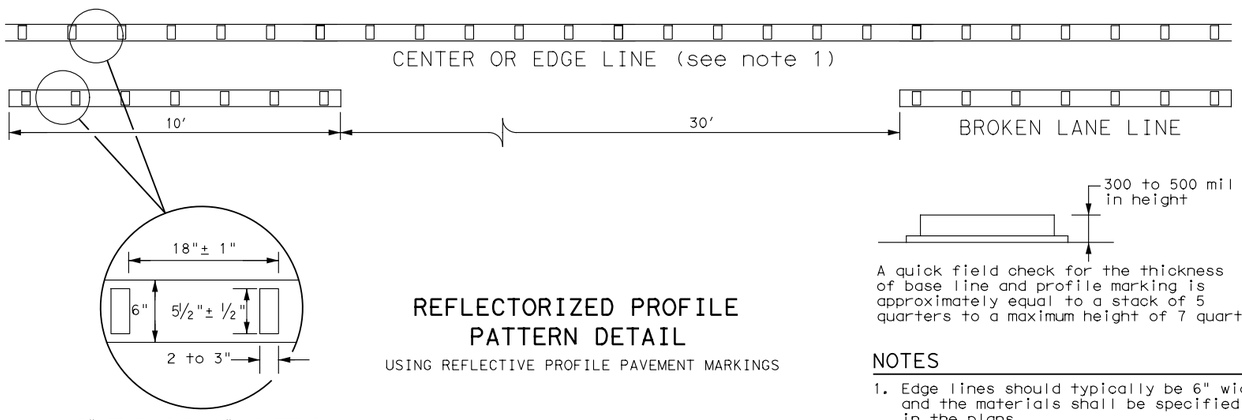


Type II (Top View)



SECTION A

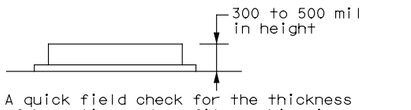
RAISED PAVEMENT MARKERS



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

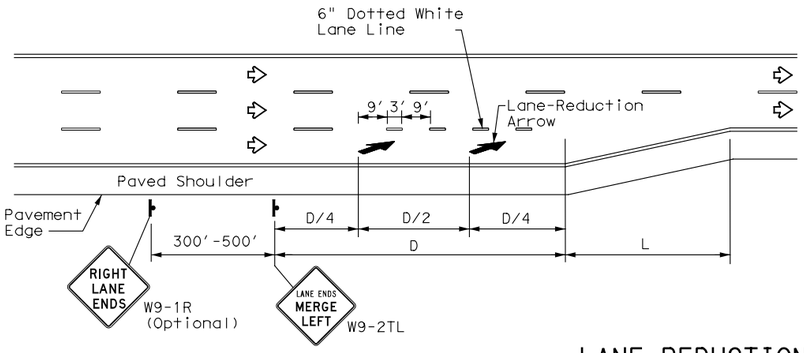
Traffic Safety Division Standard

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	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		109

22B

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

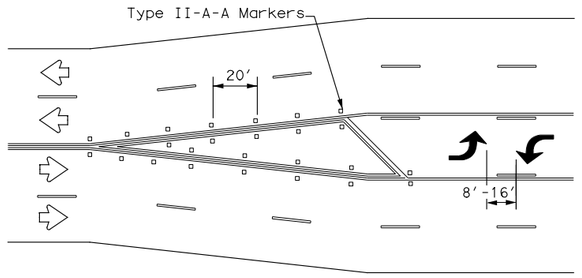


LANE REDUCTION

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

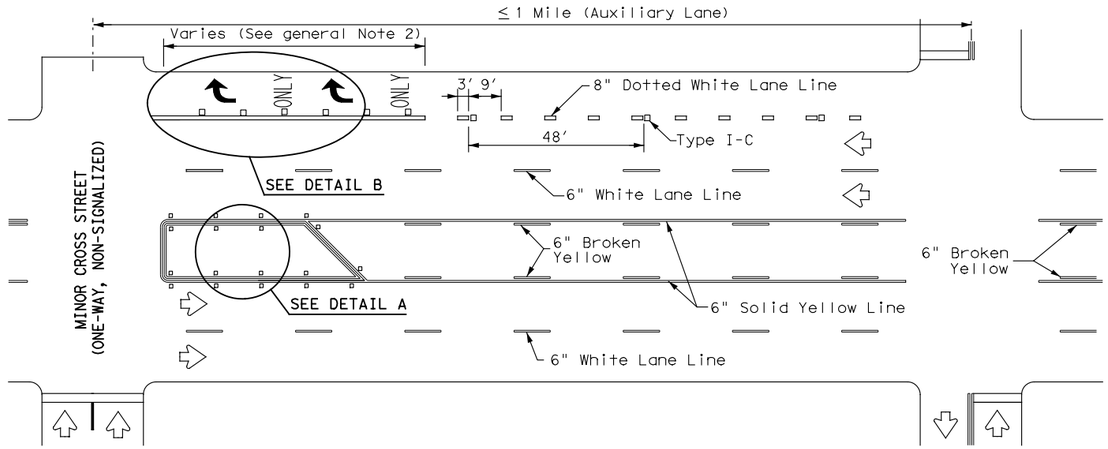
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

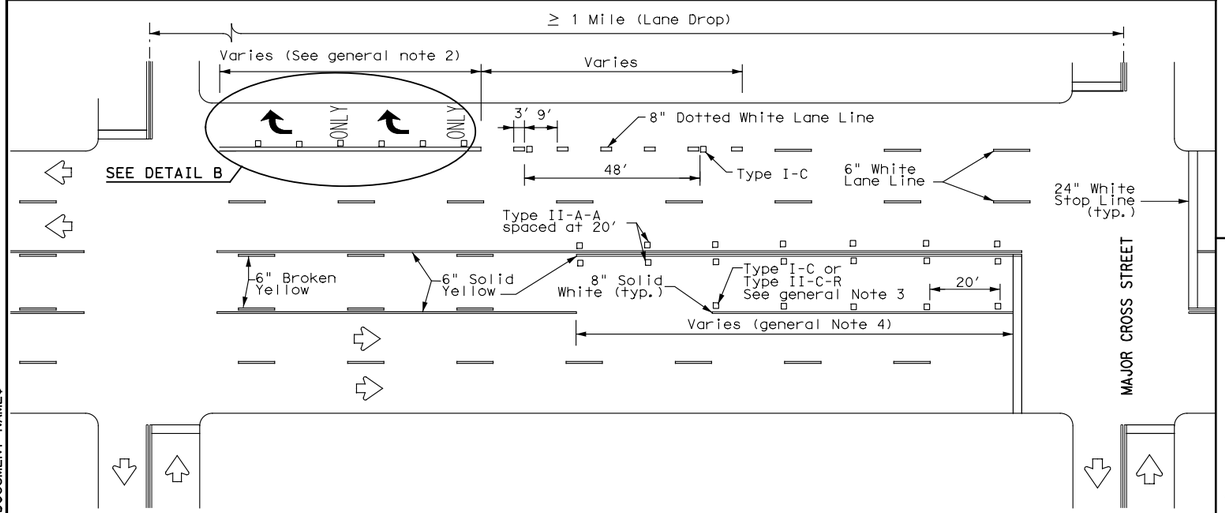
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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

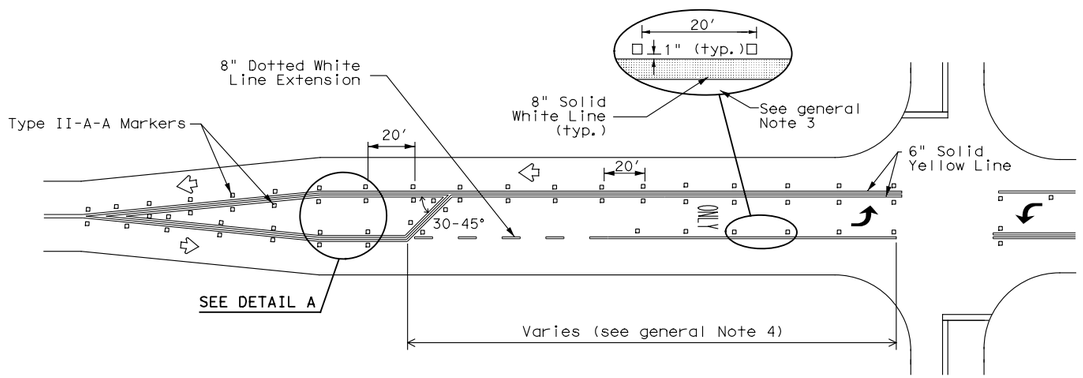
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



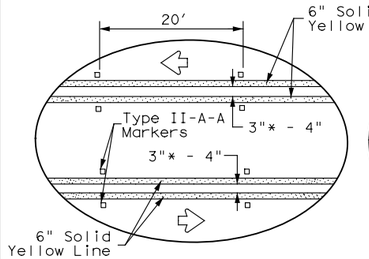
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



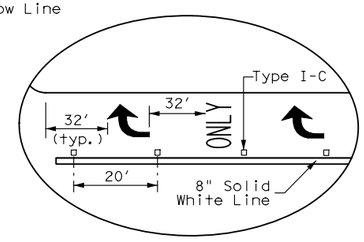
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

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

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

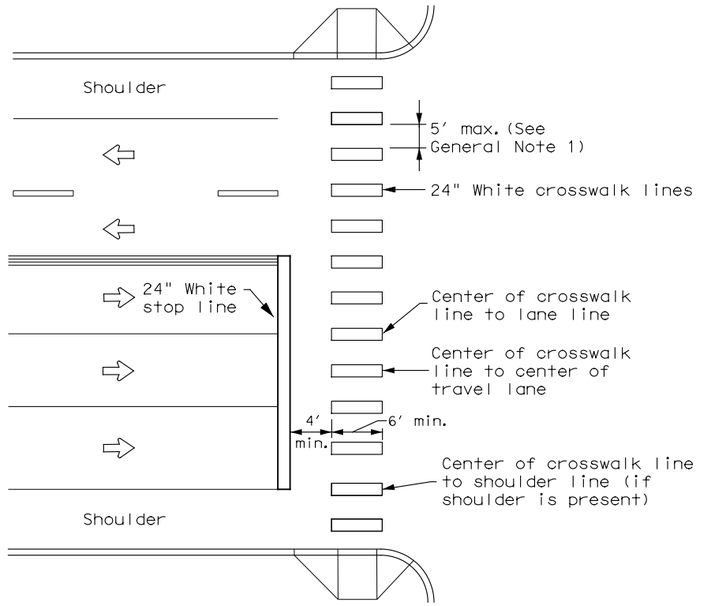
PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		110

22C

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

DATE: 6/30/2023 9:20
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design/Plan Sheets/pm4-22a.dgn



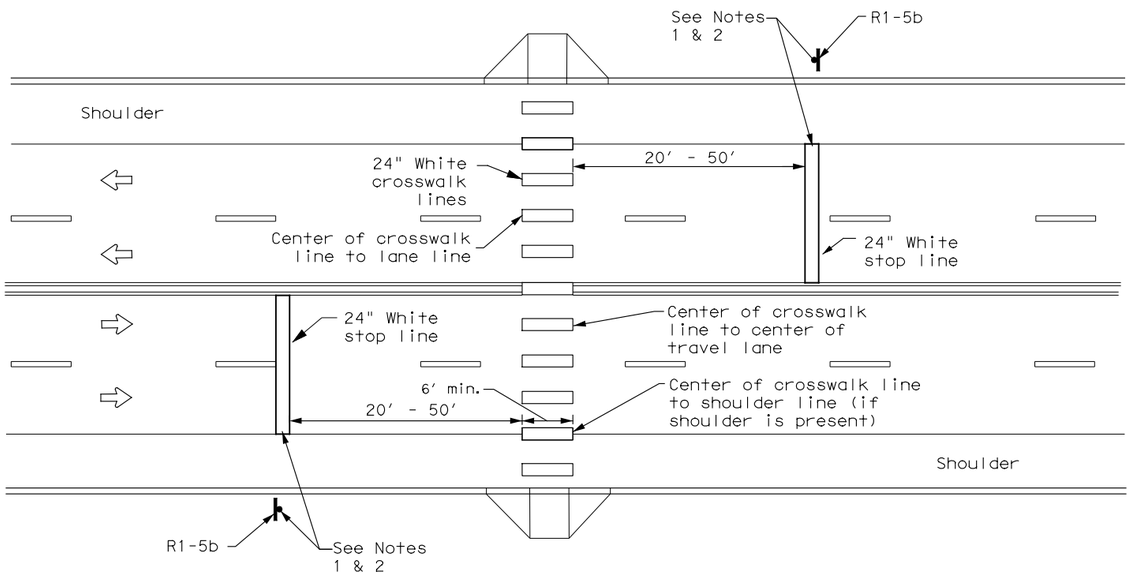
HIGH-VISIBILITY LONGITUDINAL CROSSWALK
AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6′ wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY
LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

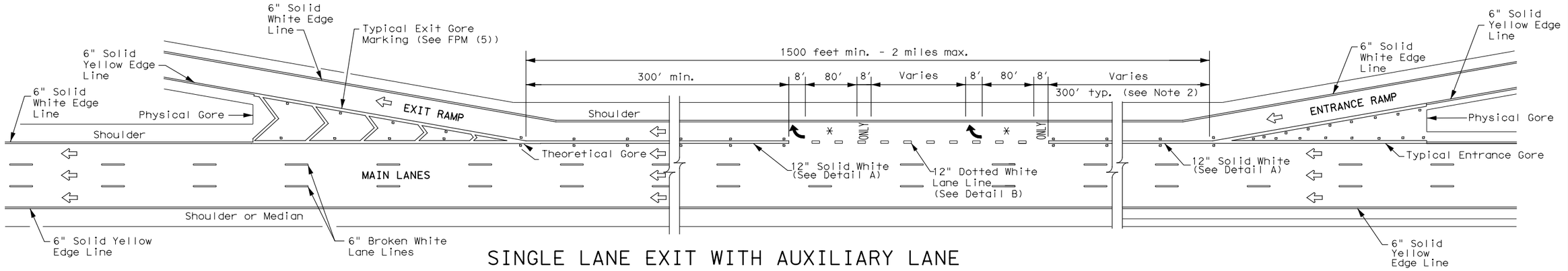
Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

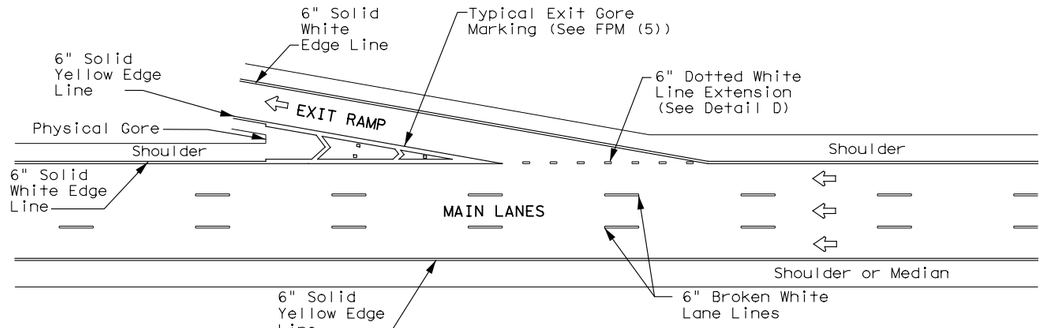
PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
6-20	DIST	COUNTY		SHEET NO.
6-22	WAC	MCLENNAN		111
12-22				
22D				



SINGLE LANE EXIT WITH AUXILIARY LANE

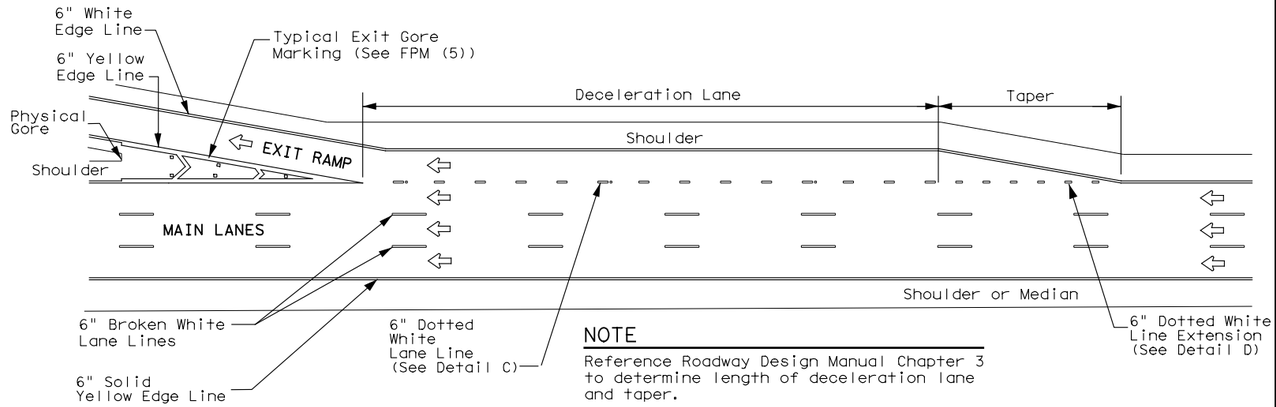
(See Note 2)



NOTE

Reference Roadway Design Manual Chapter 3 to determine if tapered deceleration lane may be used.

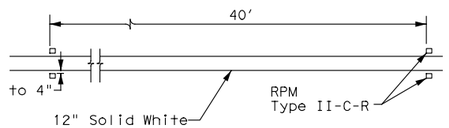
TAPERED DECELERATION LANE



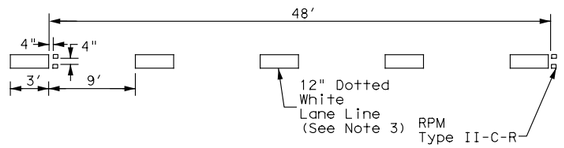
NOTE

Reference Roadway Design Manual Chapter 3 to determine length of deceleration lane and taper.

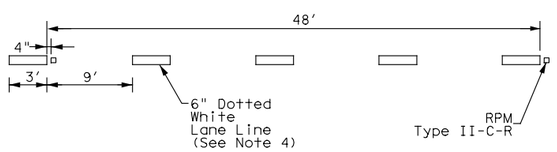
PARALLEL DECELERATION LANE



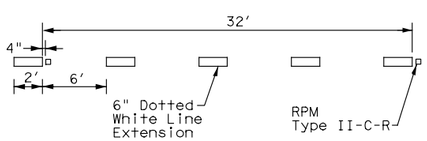
DETAIL A



DETAIL B



DETAIL C



DETAIL D

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Normal (6") dotted lane line (see Detail C) is used at parallel acceleration and deceleration lanes.
5. See FPM(1) for traffic lane line pavement marking details.

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

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.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-22

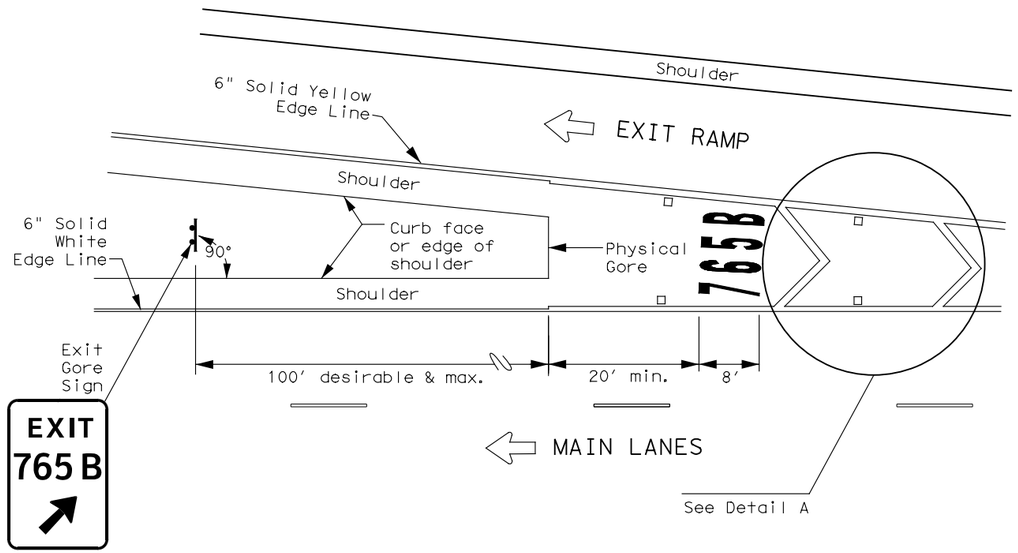
FILE: fpm(2)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-77 5-00 2-12 4-92 8-00 10-22 8-95 2-10	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		112

23B

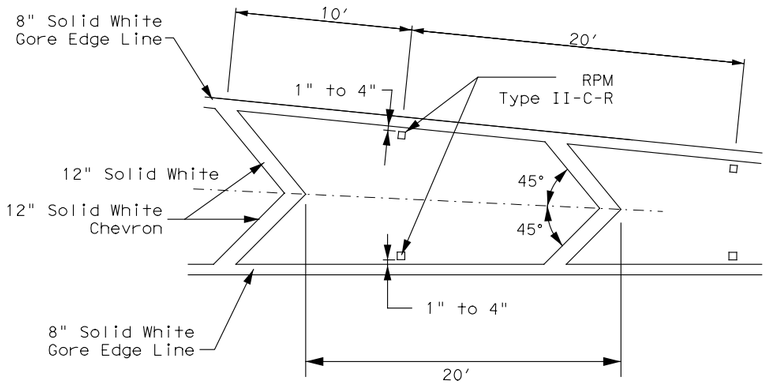
DATE: $DATE TIME$
FILE: $DOCUMENT NAME$

EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white exit number pavement markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Section 12 at http://www.txdot.gov



MARKINGS WITH EXIT NUMBER



NOTES

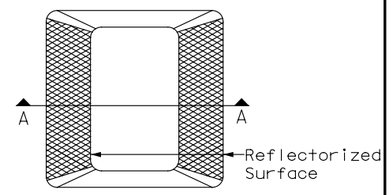
1. Raised pavement markers shall be centered between each chevron or neutral area line.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

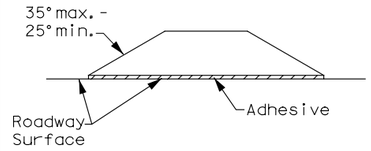
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

LEGEND	
⇦	Traffic flow
□	Reflectorized Raised Markers (RPM) Type II-C-R

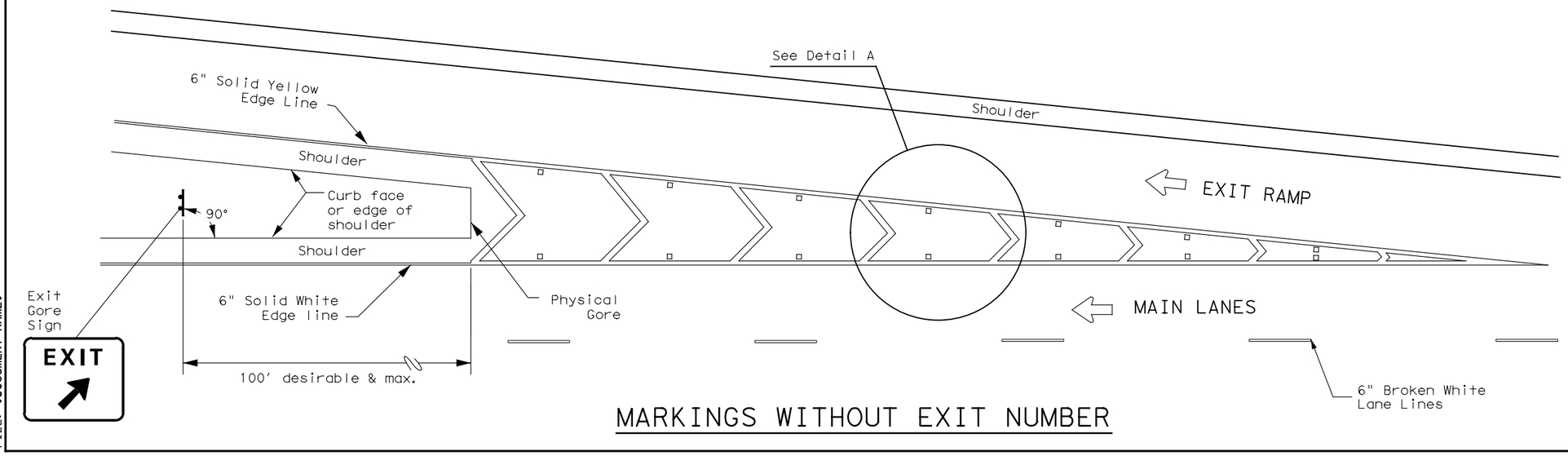


Type II (Top View)



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)



MARKINGS WITHOUT EXIT NUMBER

Texas Department of Transportation

Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

FPM(5)-22

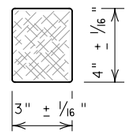
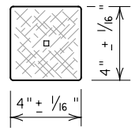
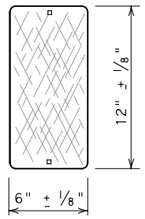
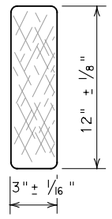
FILE: fpm(5)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-19 10-22	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		113

23E

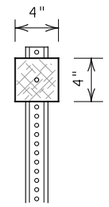
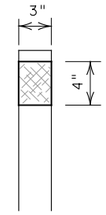
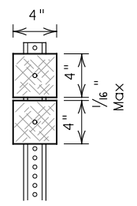
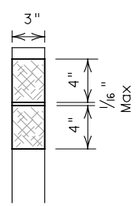
DATE: $DATE TIME$
FILE: $DOCUMENT NAME$

DATE: DATE/TIME 9:20
FILE: DOCUMENTNAME dom1-20.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

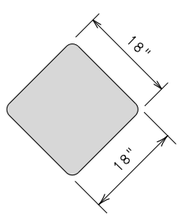
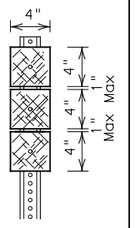
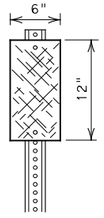
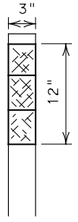
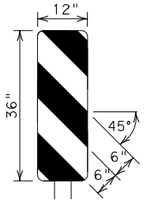
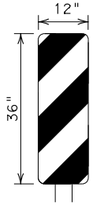
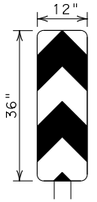
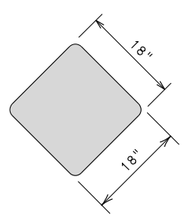
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

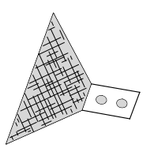
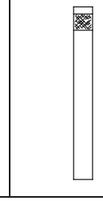
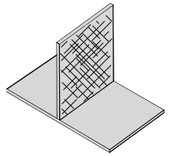
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

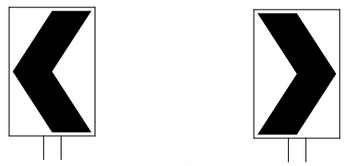
OBJECT MARKERS

	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

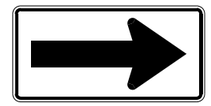
BARRIER REFLECTORS (BRF)

	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
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WAC	MCLENNAN		114

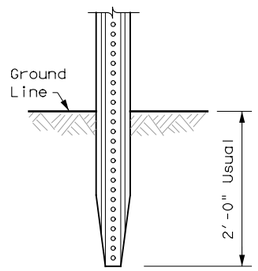
20A

DATE: 6/30/2023 9:20
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design/dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

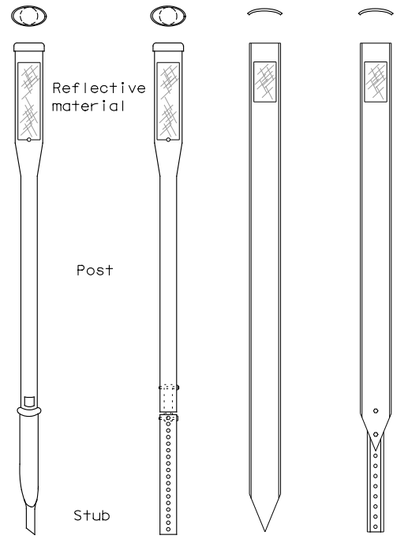


NOTES

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.

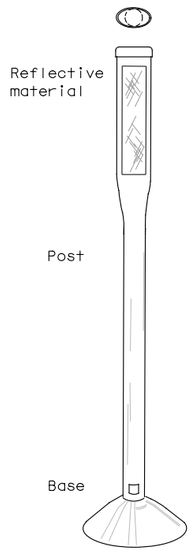
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



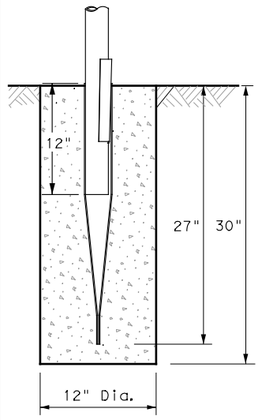
SURFACE MOUNT

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.

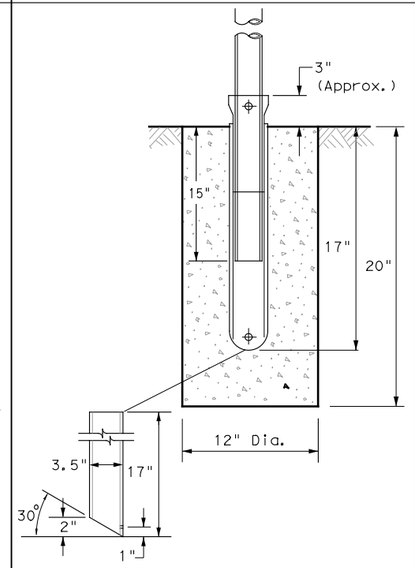
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

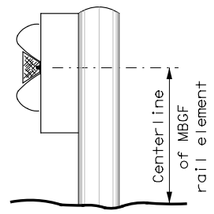
NOTE

1. Install per manufacturer's recommendations.

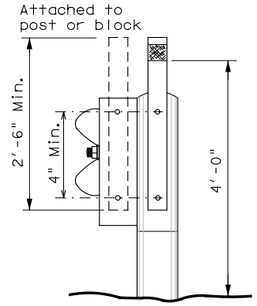
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

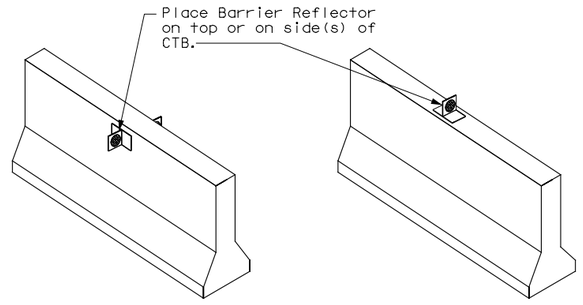
GF1



GF2



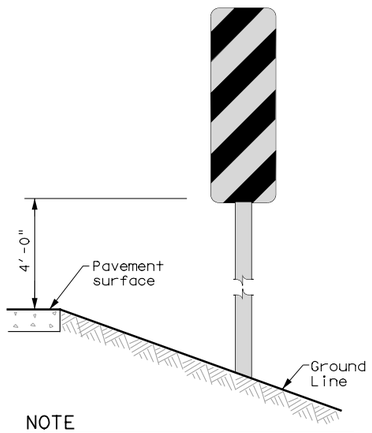
CONCRETE TRAFFIC BARRIER (CTB)



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.

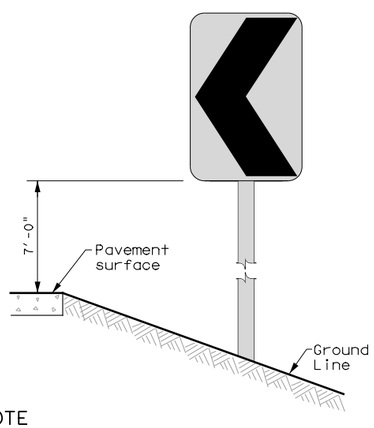
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

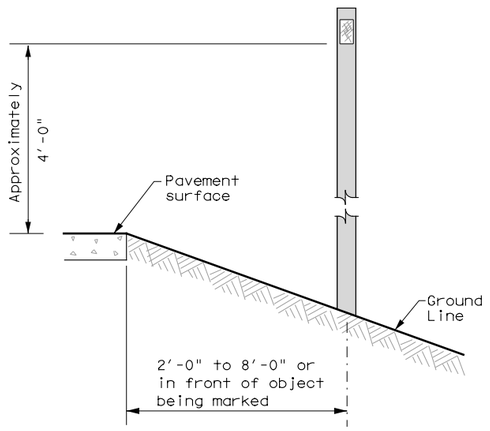
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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

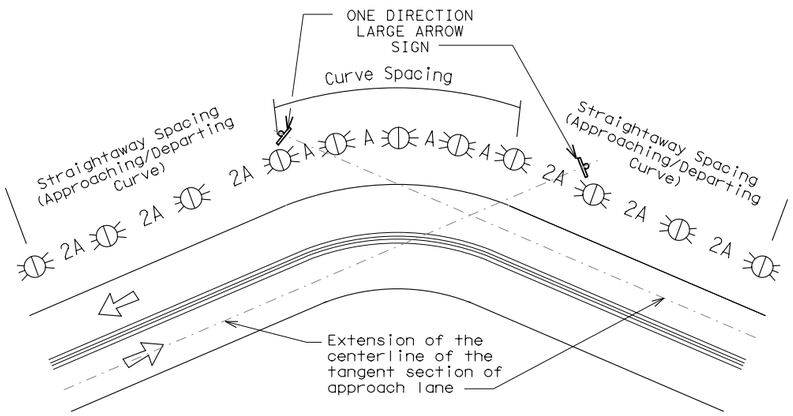
D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WAC	MCLENNAN		115
20B				

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

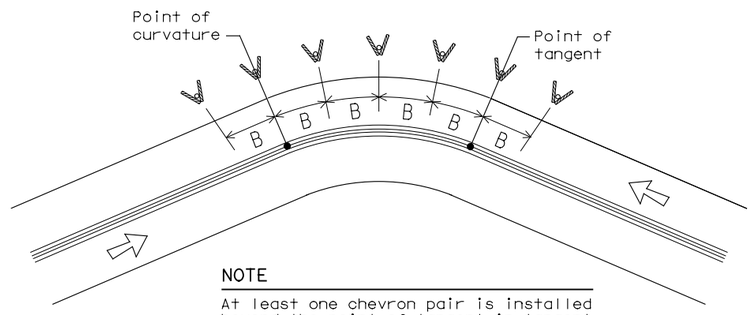
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

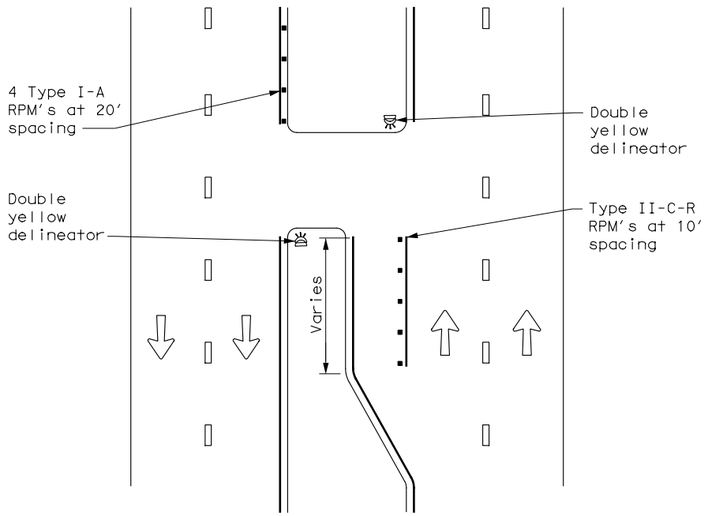
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	WAC	MCLENNAN		116

20C

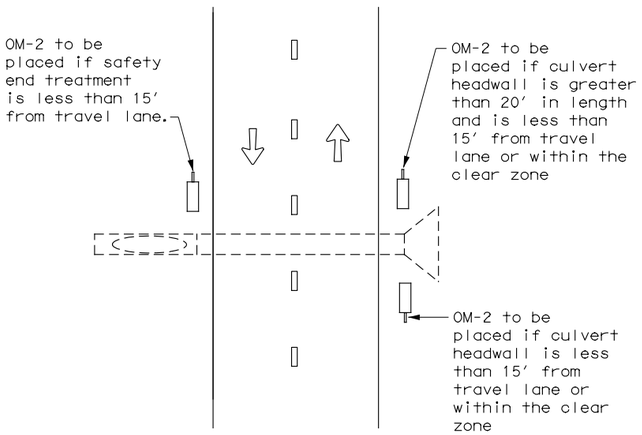
DATE: $DATE TIME$
FILE: $DOCUMENT NAME$

CROSSOVERS



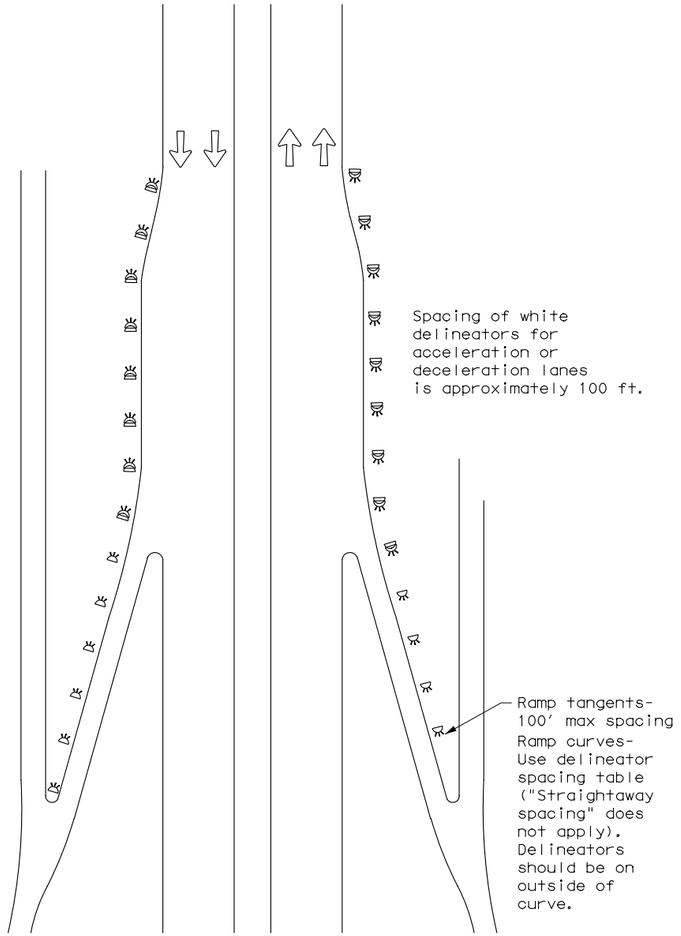
DETAIL 1

FOR CULVERTS WITHOUT MBGF



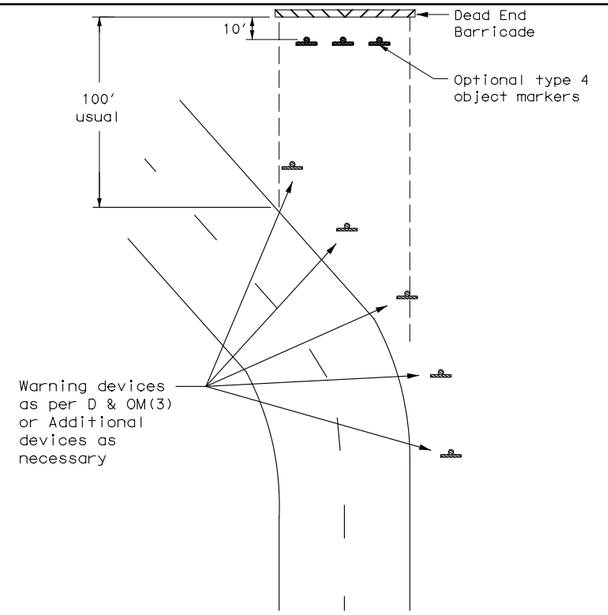
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



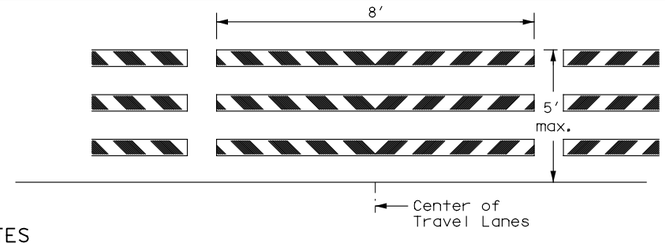
DETAIL 3

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
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
3-15	DIST	COUNTY		SHEET NO.
7-20	WAC	MCLENNAN		117

20D

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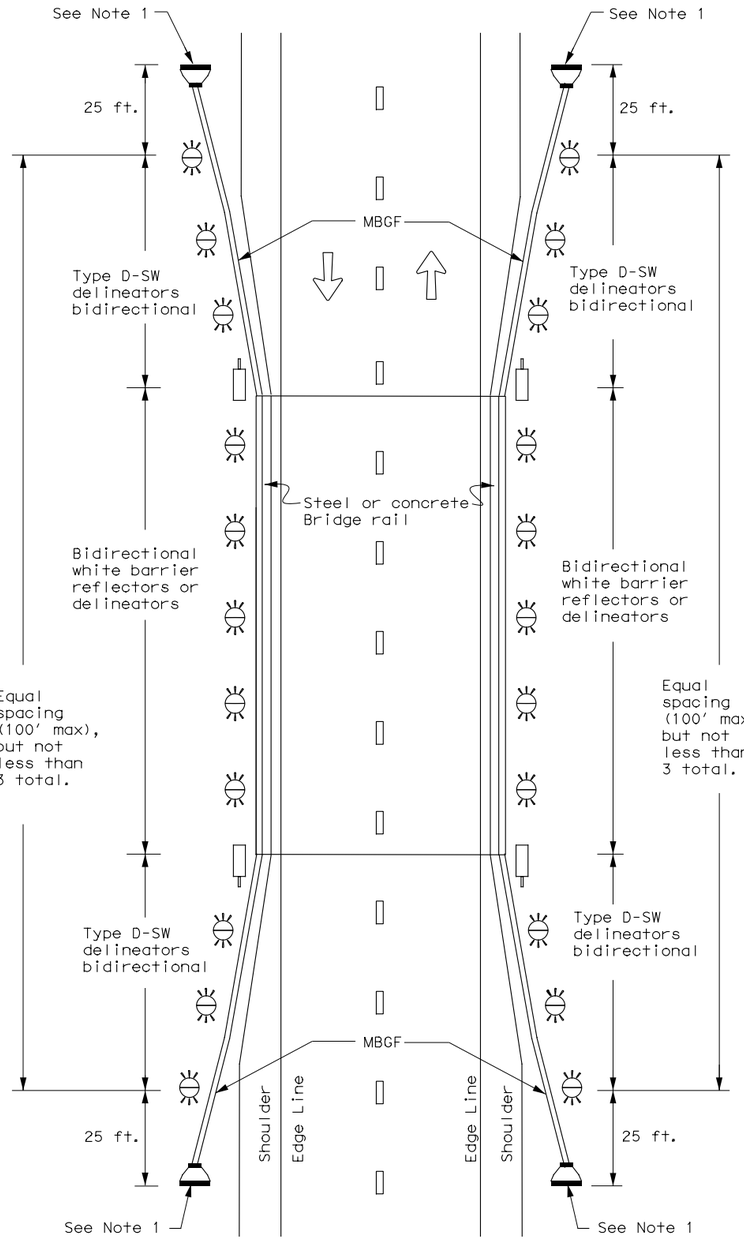
DATE: $DATE TIME$
FILE: $DOCUMENT NAME$

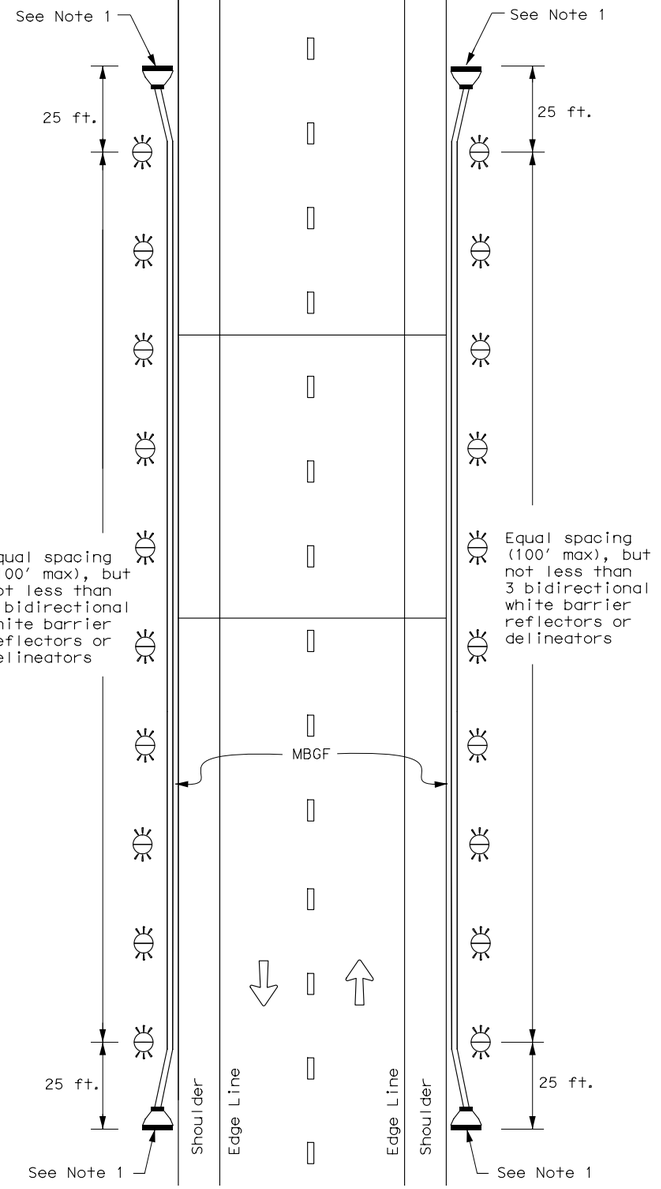
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

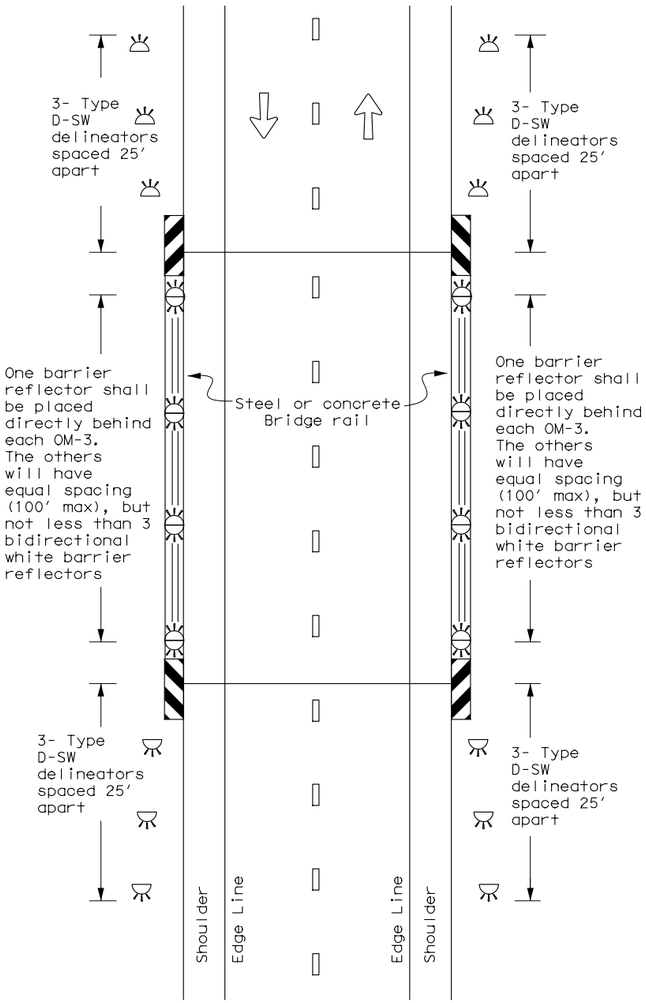
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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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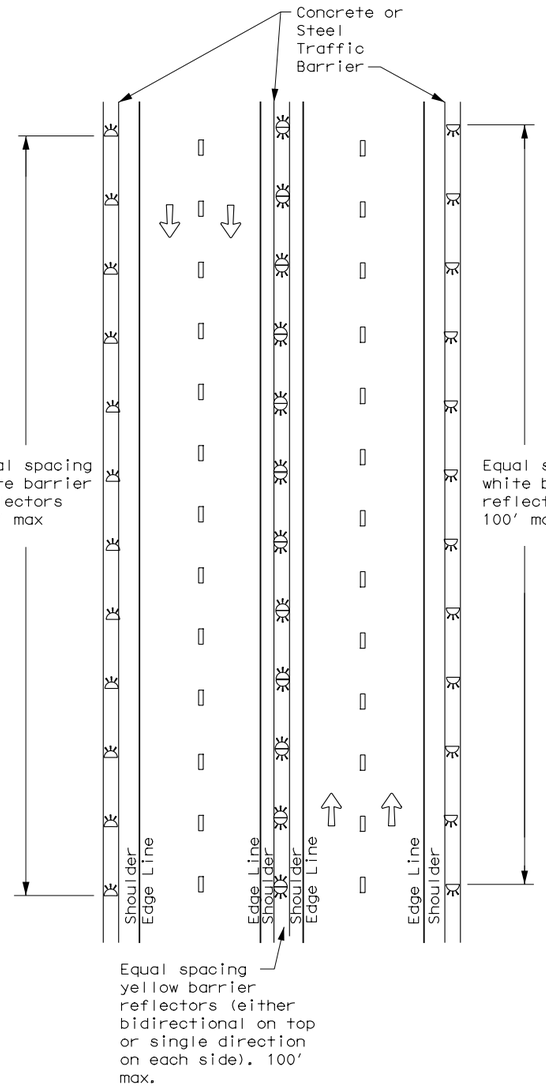
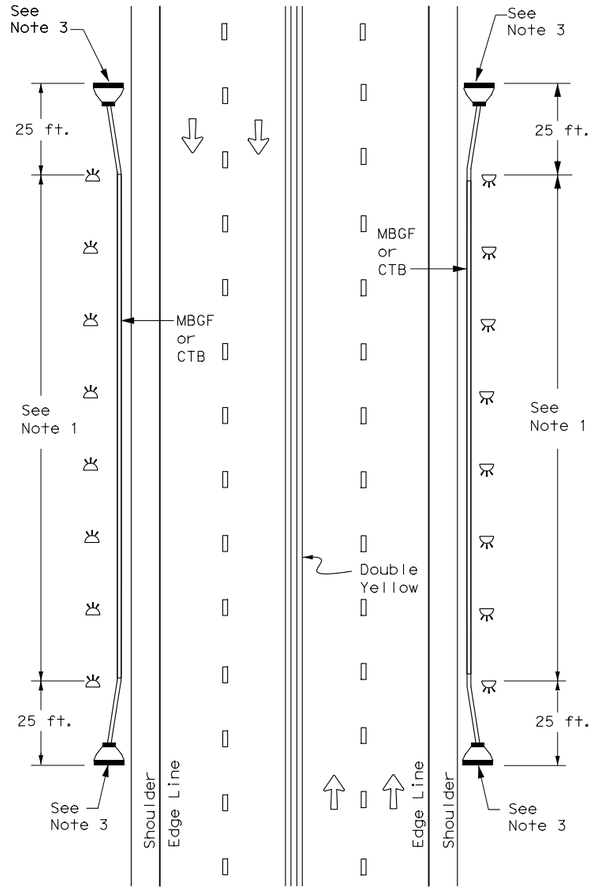
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
7-20	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		118

20E

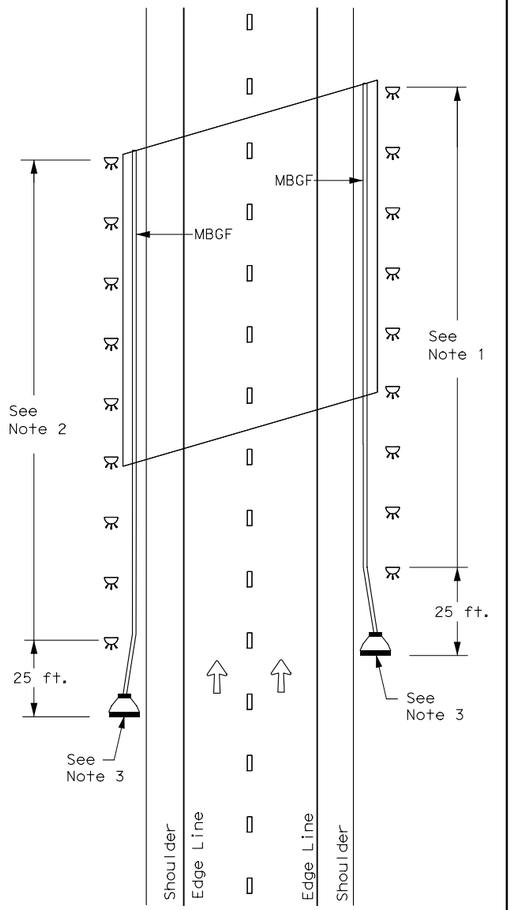
CONTINUOUS CONCRETE OR STEEL BARRIER



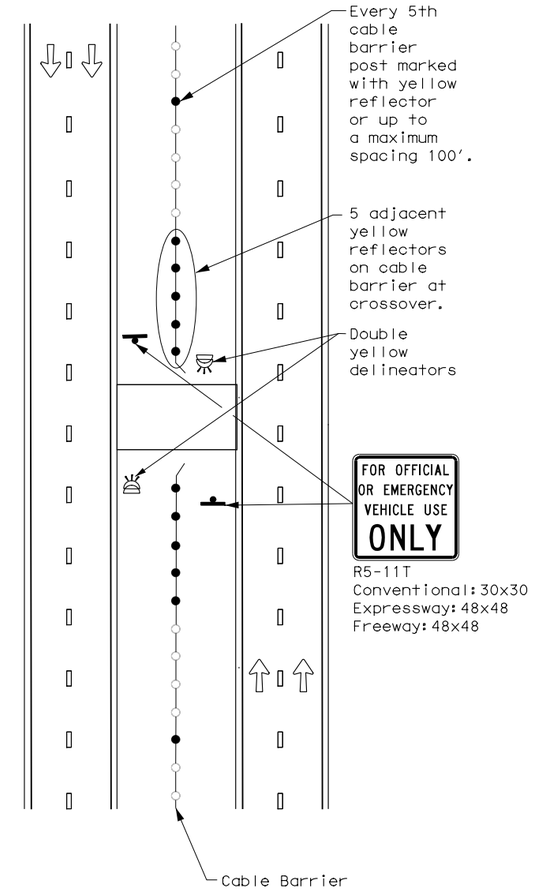
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100′ max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100′ max.)
2. Equal spacing (100′ max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	2311	01	042, ETC.	SL 340, ETC.
7-20	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		119

20F

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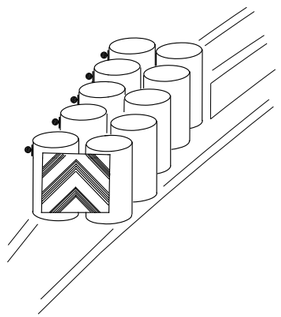
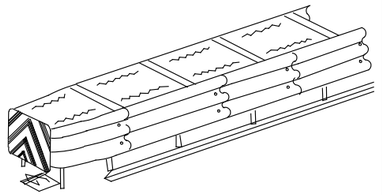
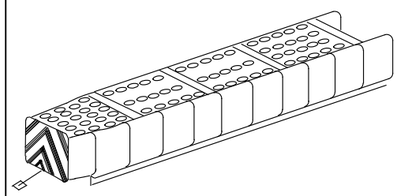
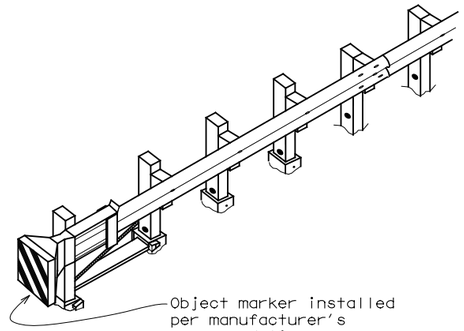
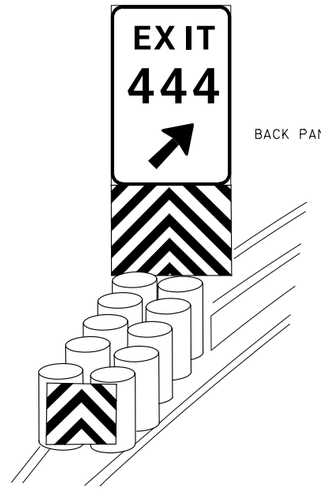
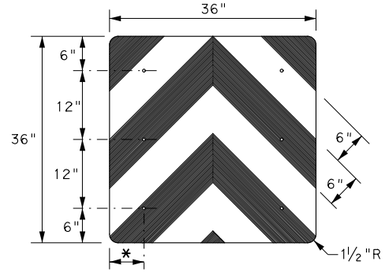


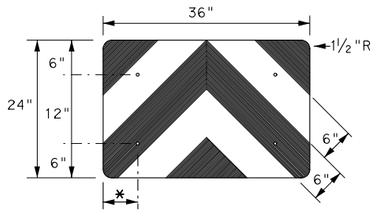




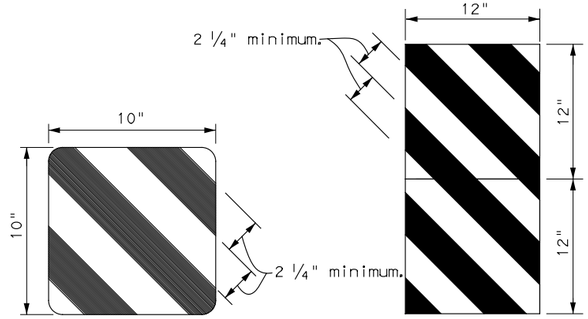




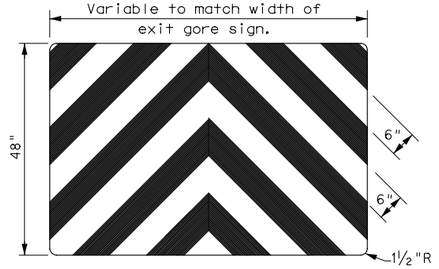


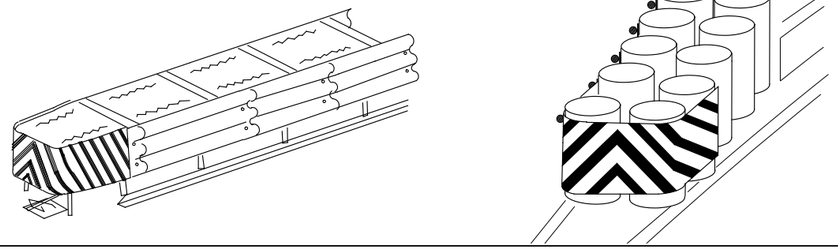


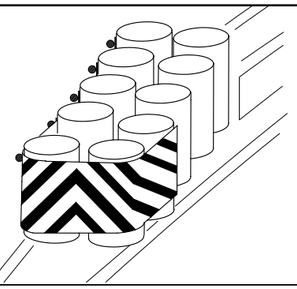
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

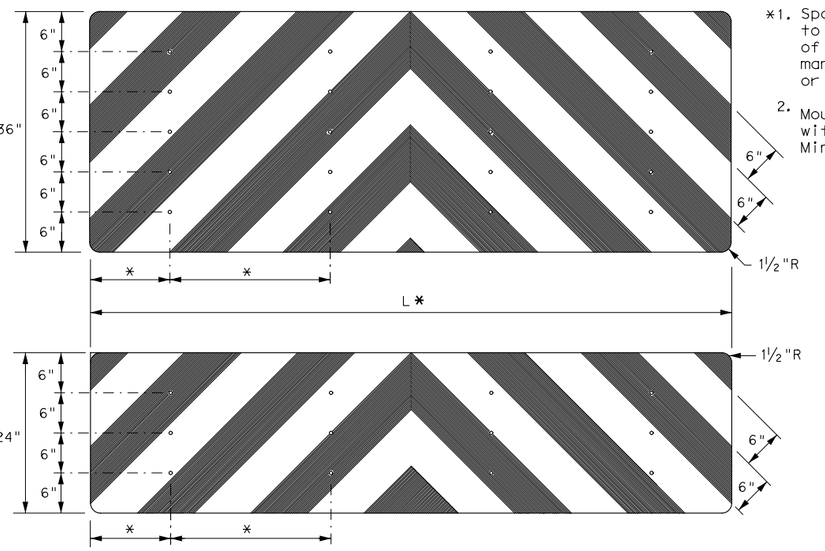


OBJECT MARKERS SMALLER THAN 3 FT^2









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

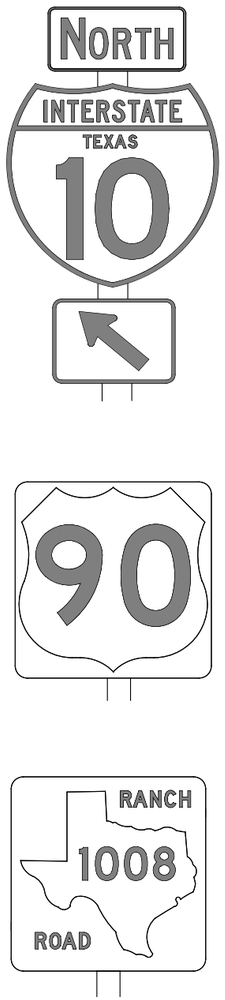
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	WAC	MCLENNAN		120
4-98 7-20				

20G

DATE: 6/30/2023 9:20
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic/tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

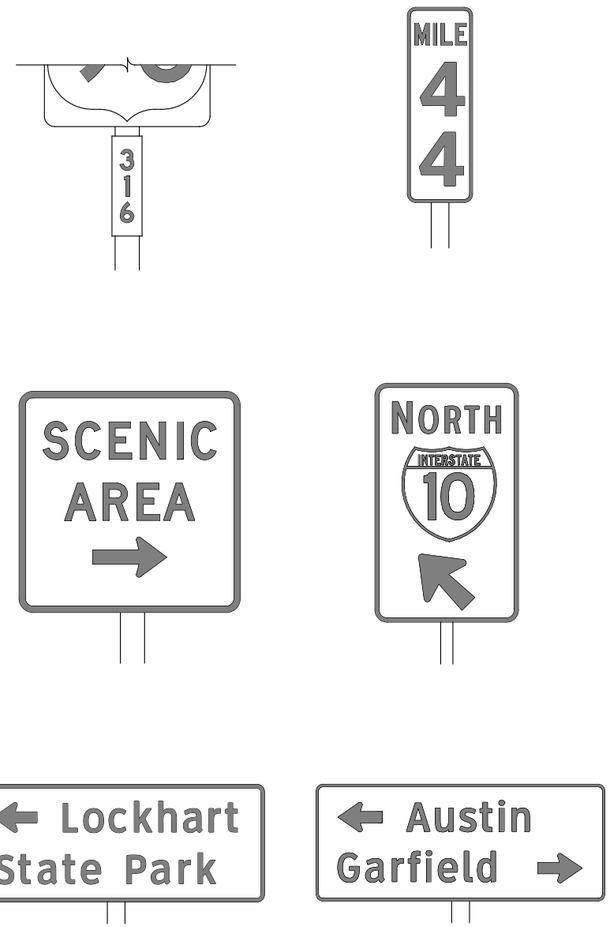
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

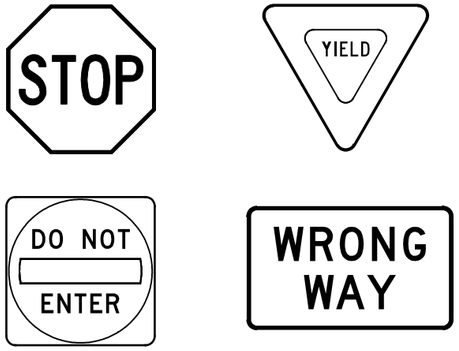
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	WAC	MCLENNAN		121

DATE: 6/30/2023 9:20
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ_0162-01-092/Design_Data/4 - Design/Plan_Set/14. Standards/Traffic/tsr4-13.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

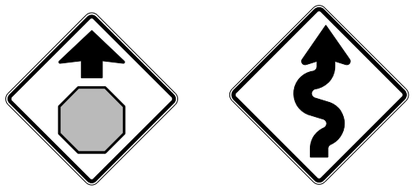
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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

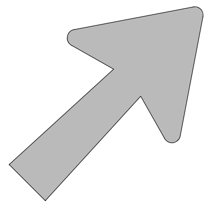
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

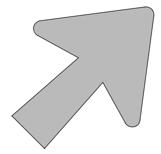
FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	WAC	MCLENNAN		122

ARROW DETAILS

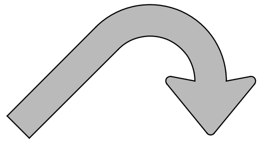
for Large Ground-Mounted and Overhead Guide Signs



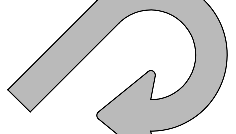
Type A



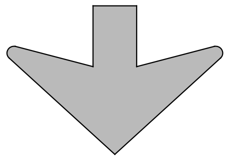
Type B



E-3



E-4



Down Arrow

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

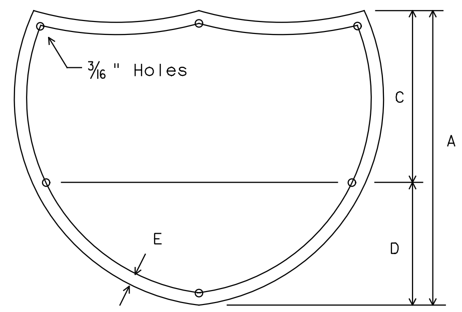
NOTE

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.

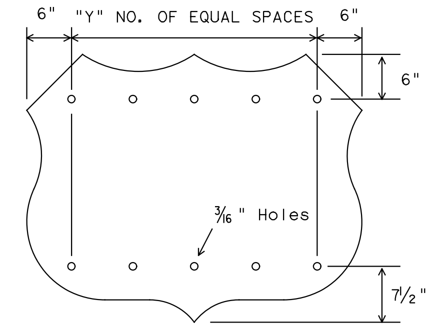
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)



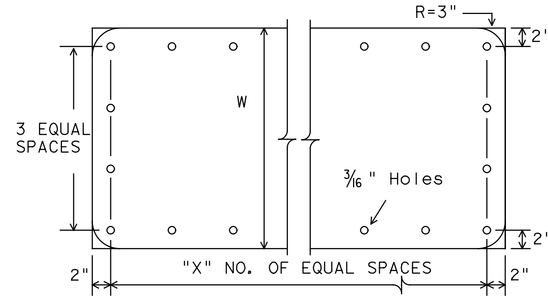
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4



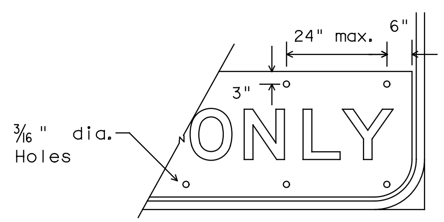
U.S. ROUTE MARKERS

Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



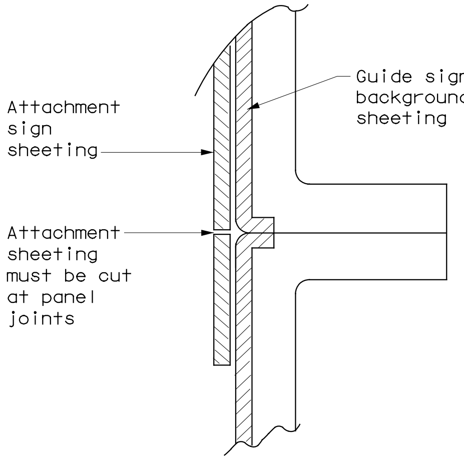
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5



EXIT ONLY PANEL

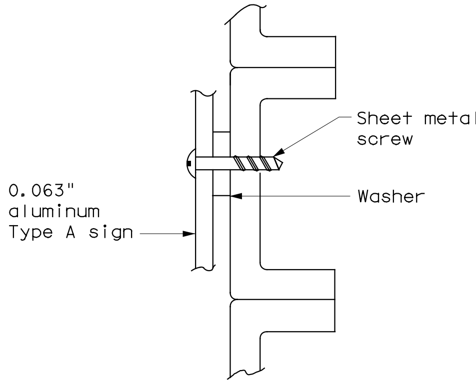
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



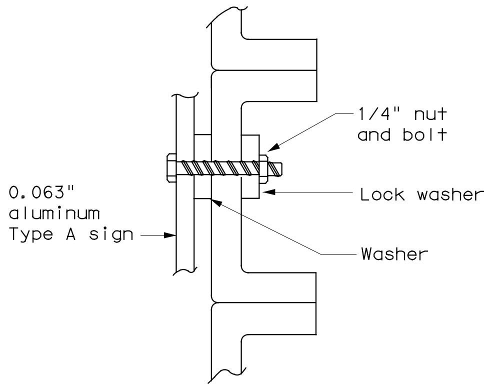
DIRECT APPLIED ATTACHMENT

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



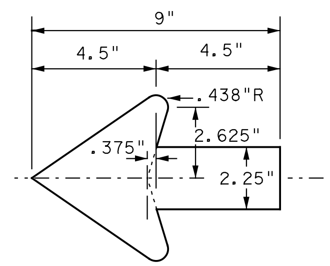
NUT/BOLT ATTACHMENT

NOTE:

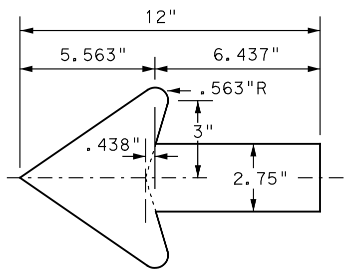
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

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 2311	SECT 01	JOB 042, ETC.	HIGHWAY SL 340, ETC.
REVISIONS 12-03 7-13 9-08	DIST WAC		COUNTY MCLENNAN	SHEET NO. 123

5

DATE: 6/30/2023
CSJ*0162-01-092/Design*Data/4 - Design/Plan*Set/14. Standards/Traffic/tsr5-13.dgn

DATE: 6/30/2023 9:20
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ#0162-01-092/Design#Data/4 - Design/Plan#Set/14. Standards/Traffic/smdgen.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

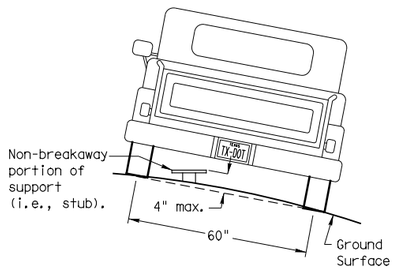
Anchor Type

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

Sign Mounting Designation

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

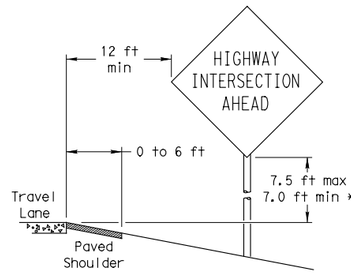
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

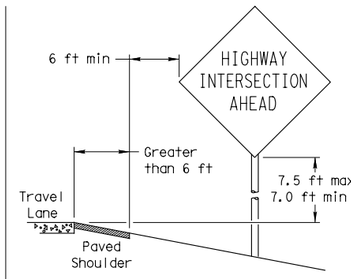
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

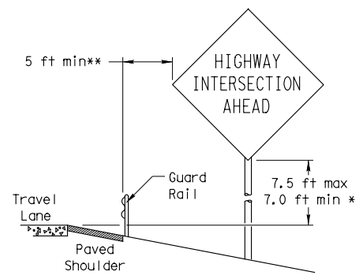
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



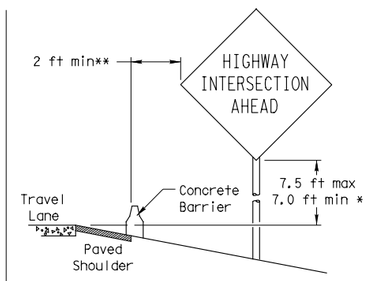
GREATER THAN 6 FT. WIDE

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

BEHIND BARRIER



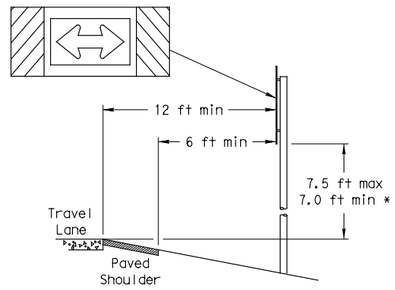
BEHIND GUARDRAIL



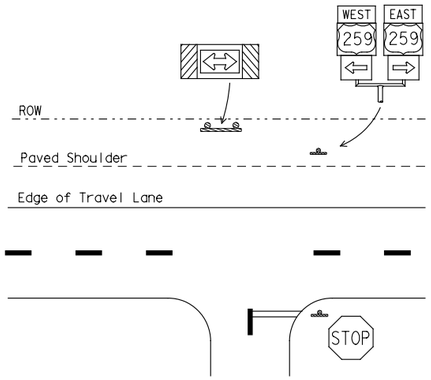
BEHIND CONCRETE BARRIER

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

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.



* 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

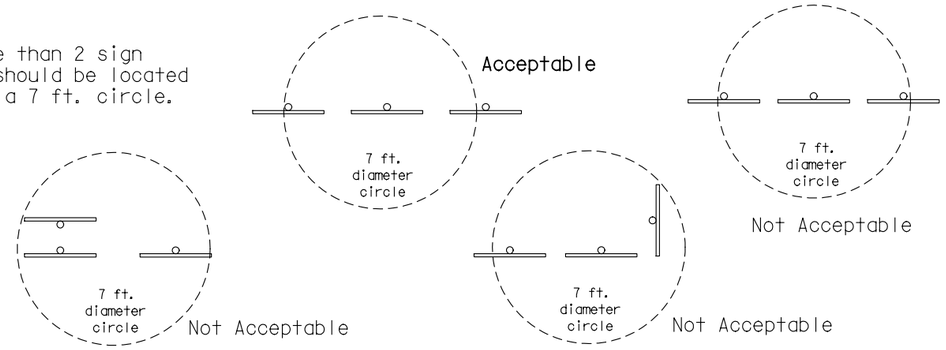
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

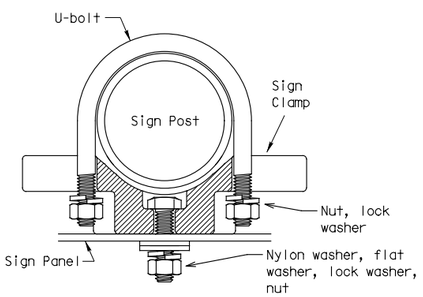
The website address is:
http://www.txdot.gov/publications/traffic.htm

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

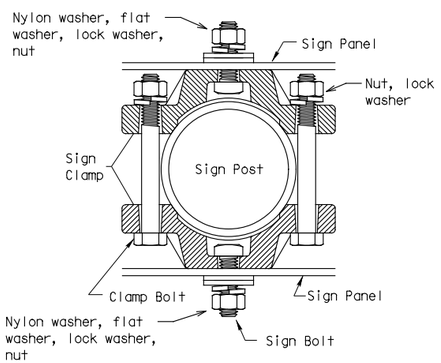


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

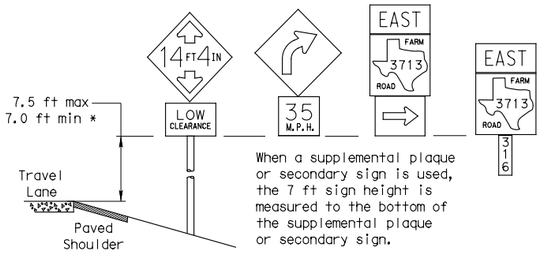
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



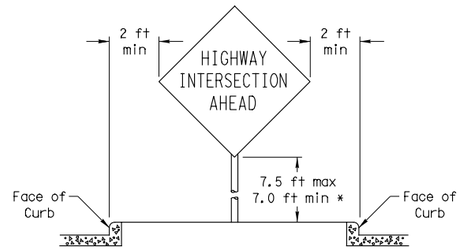
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



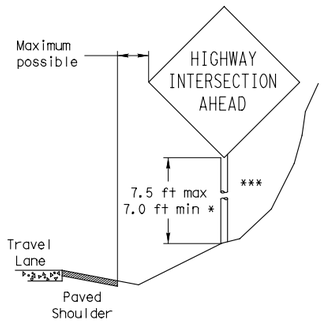
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

Texas Department of Transportation
Traffic Operations Division

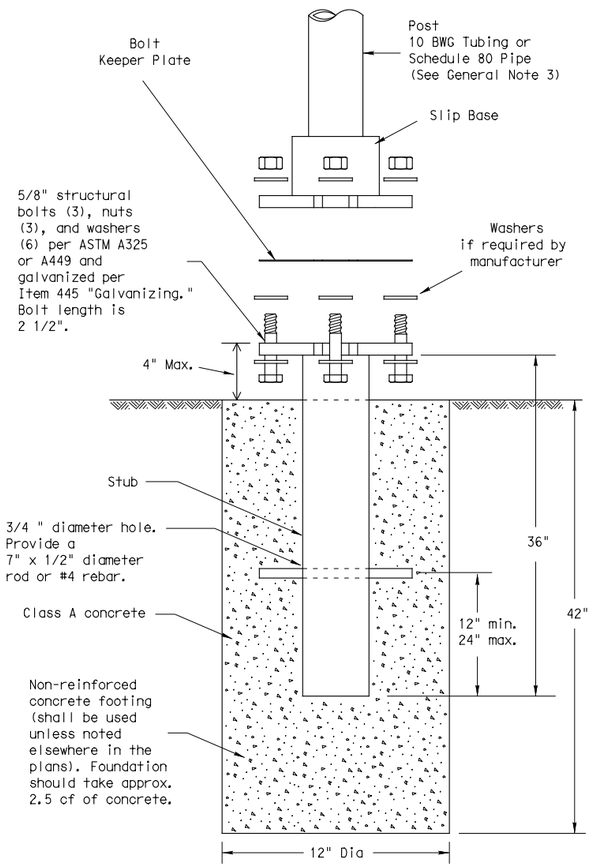
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		124

DATE: 6/30/2023 9:20
FILE: pw://server.sig-eng.com:Sig-ds/Documents/TxDOT0202 Waco/CSJ*0162-01-092/Design*Data/4 - Design/Plan*Set/14. Standards/Traffic/smds1.dgn

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.

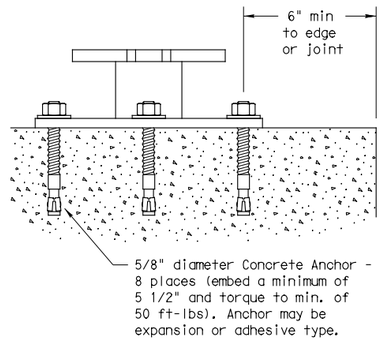
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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
2311	01	042, ETC.	SL 340, ETC.
DIST	COUNTY		SHEET NO.
WAC	MCLENNAN		125

DATE: 6/30/2023 9:20
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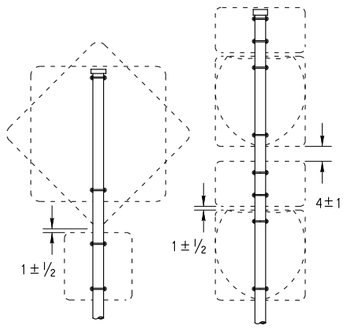
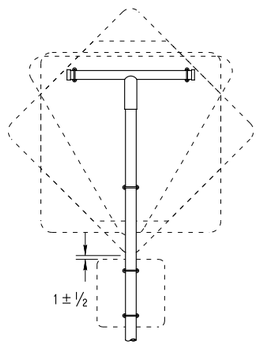


SM RD SGN ASSM TY XXXXX(1)XX(P)



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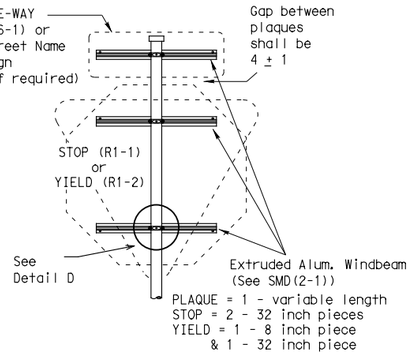

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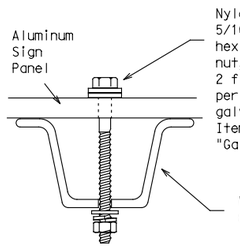

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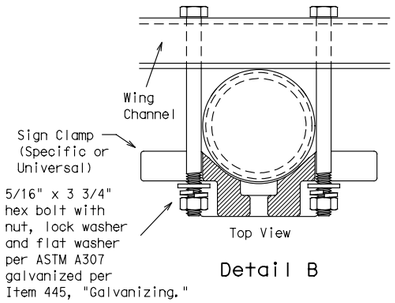
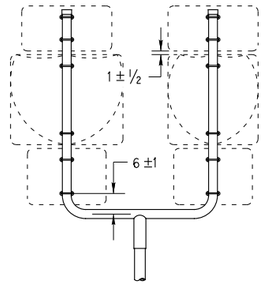


Detail B



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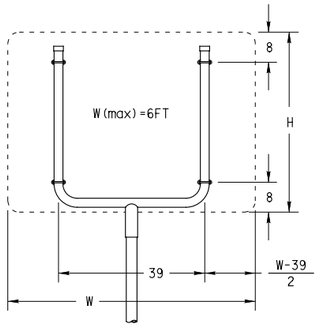

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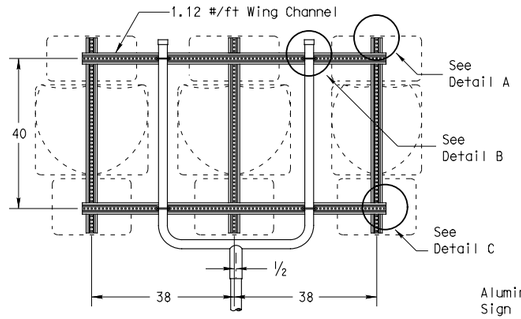
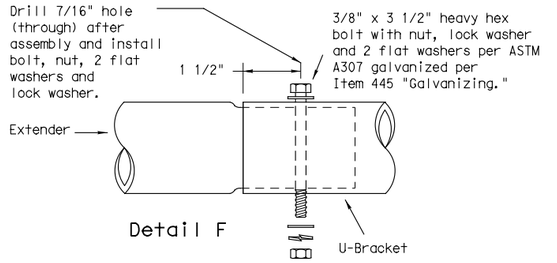
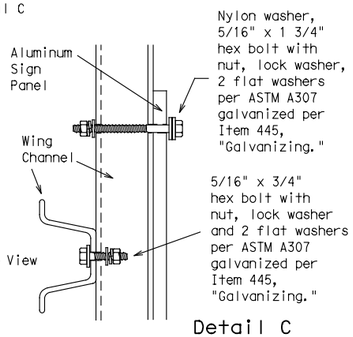


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



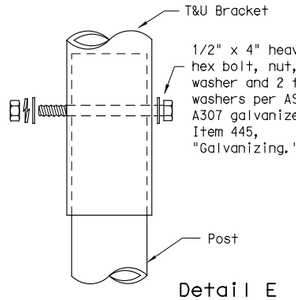
Detail F

Splices shall only be allowed behind the sign substrate.

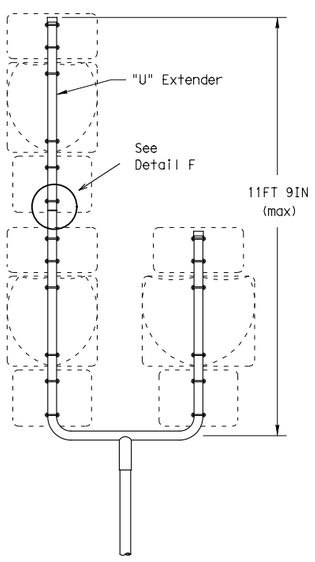


SIDE VIEW

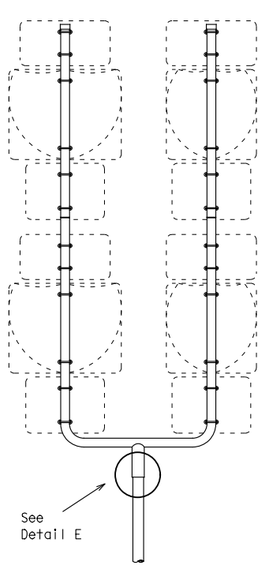
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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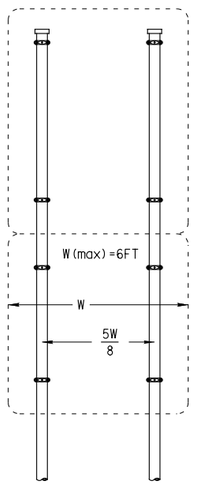

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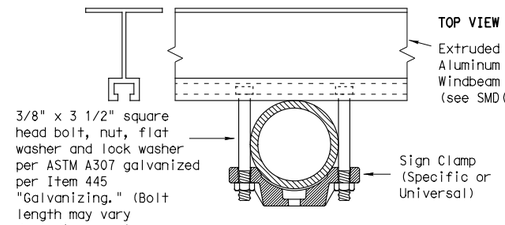
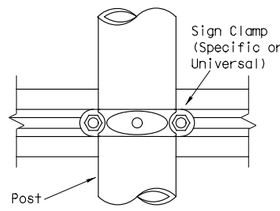
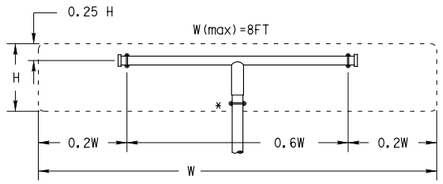


Detail D

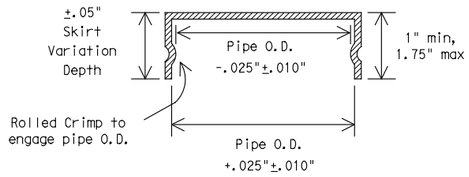




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		126

26C

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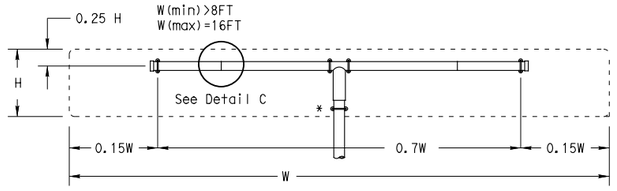
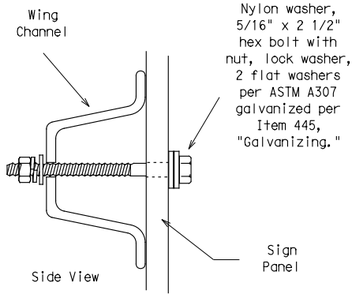
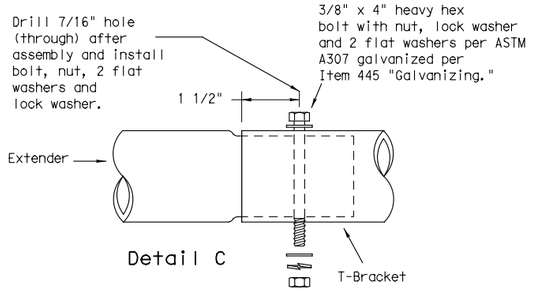


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



Detail C

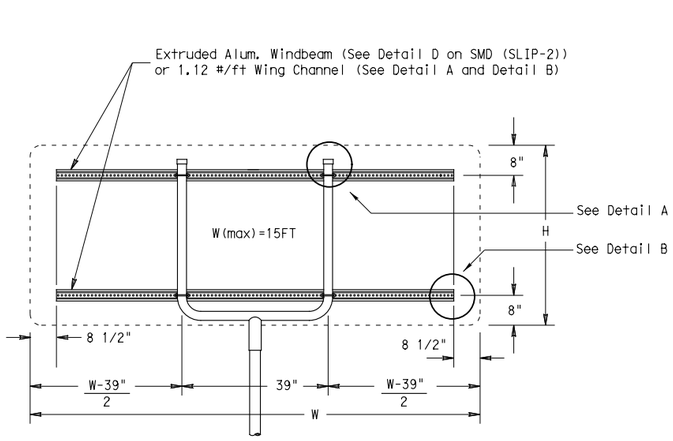
Splices shall only be allowed behind the sign substrate.

GENERAL NOTES:

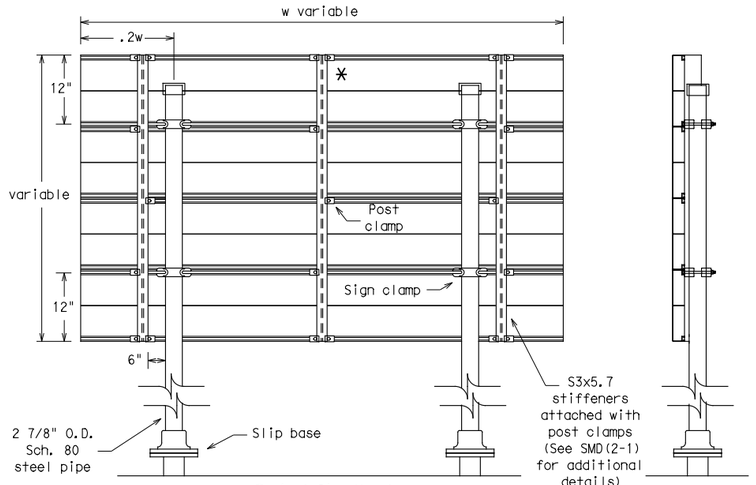
1.

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. Sign blanks shall be the sizes and shapes shown on the plans.
11. 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.
12. Post open ends shall be fitted with Friction Caps.



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

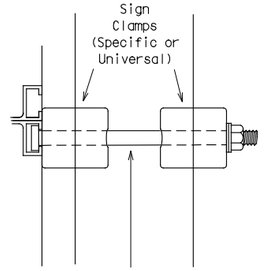


Typical Sign Mount

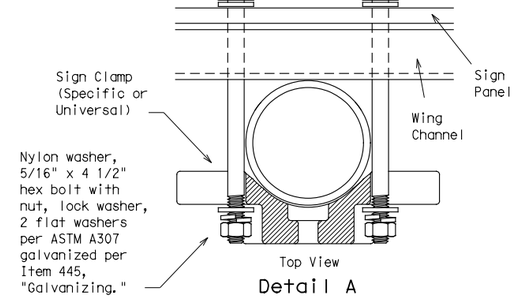
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

✳ Additional stiffener placed at approximate center of signs when sign width is greater than 10′.

See Detail E
for clamp installation

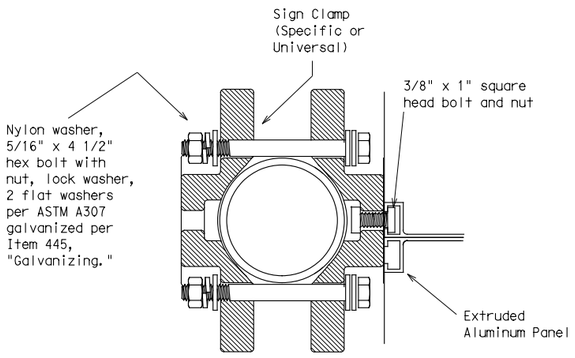


Detail E

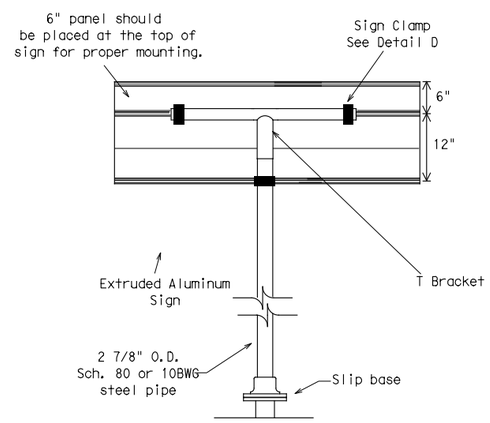


Top View

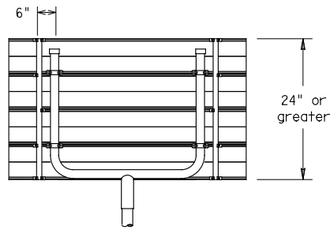
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



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

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
	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		127

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

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

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
2311-01-042, etc.

1.2 PROJECT LIMITS:

From: SL 340: FM 3051 SS 299: IH 35

To: SL 340: Williams Rd. SS 299: US 84

1.3 PROJECT COORDINATES:

BEGIN: (Lat) SL 340: 31.6053539 SS 299: 31.5792641 ,(Long) SL 340: -97.1108477 SS 299: -97.1104611

END: (Lat) SL 340: 31.5935407 SS 299: 31.5856852 ,(Long) SL 340: -97.0844162 SS 299: -97.1044983

1.4 TOTAL PROJECT AREA (Acres): 75.87

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.48

1.6 NATURE OF CONSTRUCTION ACTIVITY:
SL 340: For the construction of overlay, MBGF, and striping.
SS 299: For the construction of culvert extension, overlay, MBGF, and striping

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Sandy Loam	Along SL 340 and north end of SS 299 projects. Project in urban corridor with roadside vegetation.
Clayey Loam	Along sorth end of SS 299 project. Project in urban corridor with roadside vegetation.

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:

- [X] PSLs determined during preconstruction meeting
- [ ] PSLs determined during construction
- [ ] No PSLs planned for construction

Type	Sheet #s

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

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

- [X] Mobilization
- [X] Install sediment and erosion controls
- [ ] Blade existing topsoil into windrows, prep ROW, clear and grub
- [X] Remove existing pavement
- [ ] 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
- [X] Install culverts, culvert extensions, SETs
- [X] Install mow strip, MBGF, bridge rail
- [ ] Place flex base
- [ ] Rework slopes, grade ditches
- [ ] Blade windrowed material back across slopes
- [ ] 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
- [ ] Solvents, paints, adhesives, etc. from various construction activities
- [ ] Transported soils from offsite vehicle tracking
- [X] Construction debris and waste from various construction activities
- [ ] 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
SL 340: Overland flow in a S/SW direction uslng Martln Branch and unnamed draws and tributaries toward the Brazos Rliver.	Brazos River (Segment 1256)
SS 299: Overland flow in a south direction using unnamed draws and tributaries toward the Brazos Rliver.	Brazos RIver (Segment 1256)

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

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

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			128
STATE	STATE DIST.	COUNTY	
TEXAS	WAC	MCLENNAN	
CONT.	SECT.	JOB	HIGHWAY NO.
2311	01	042, ETC.	SL 340, ETC.

STORMWATER POLLUTION PRVENTION 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
☐ ☐ Vegetated Buffer Zones
☐ ☐ Soil Retention Blankets
☐ ☐ Geotextiles
☐ ☐ Mulching/ Hydromulching
☐ ☐ Soil Surface Treatments
☐ ☐ Temporary Seeding
☐ ☐ 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
☐ ☐ 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
☐ ☐ Vegetated Filter Strips
☐ ☐ Other: _____
☐ ☐ Other: _____
☐ ☐ Other: _____
☐ ☐ Other: _____

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
N/A		

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
☐ Haul roads dampened for dust control
☐ Loaded haul trucks to be covered with tarpaulin
☐ Stabilized construction exit
☐ Other: _____
☐ Other: _____
☐ Other: _____
☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To
N/A		

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 2.3 of this SWP3 .

2.9 MAINTENANCE:

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

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

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			129
STATE	STATE DIST.	COUNTY	
TEXAS	WAC	MCLENNAN	
CONT.	SECT.	JOB	HIGHWAY NO.
2311	01	042, ETC.	SL 340, ETC.

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

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

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. 5.
2. 6.
3. 7.
4. 8.

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. SEE STATEMENT ABOVE
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. SEE STATEMENT ABOVE
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. SEE STATEMENT BELOW
2.
3.
4.

If any wildlife species are threatened by construction activities, 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.

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

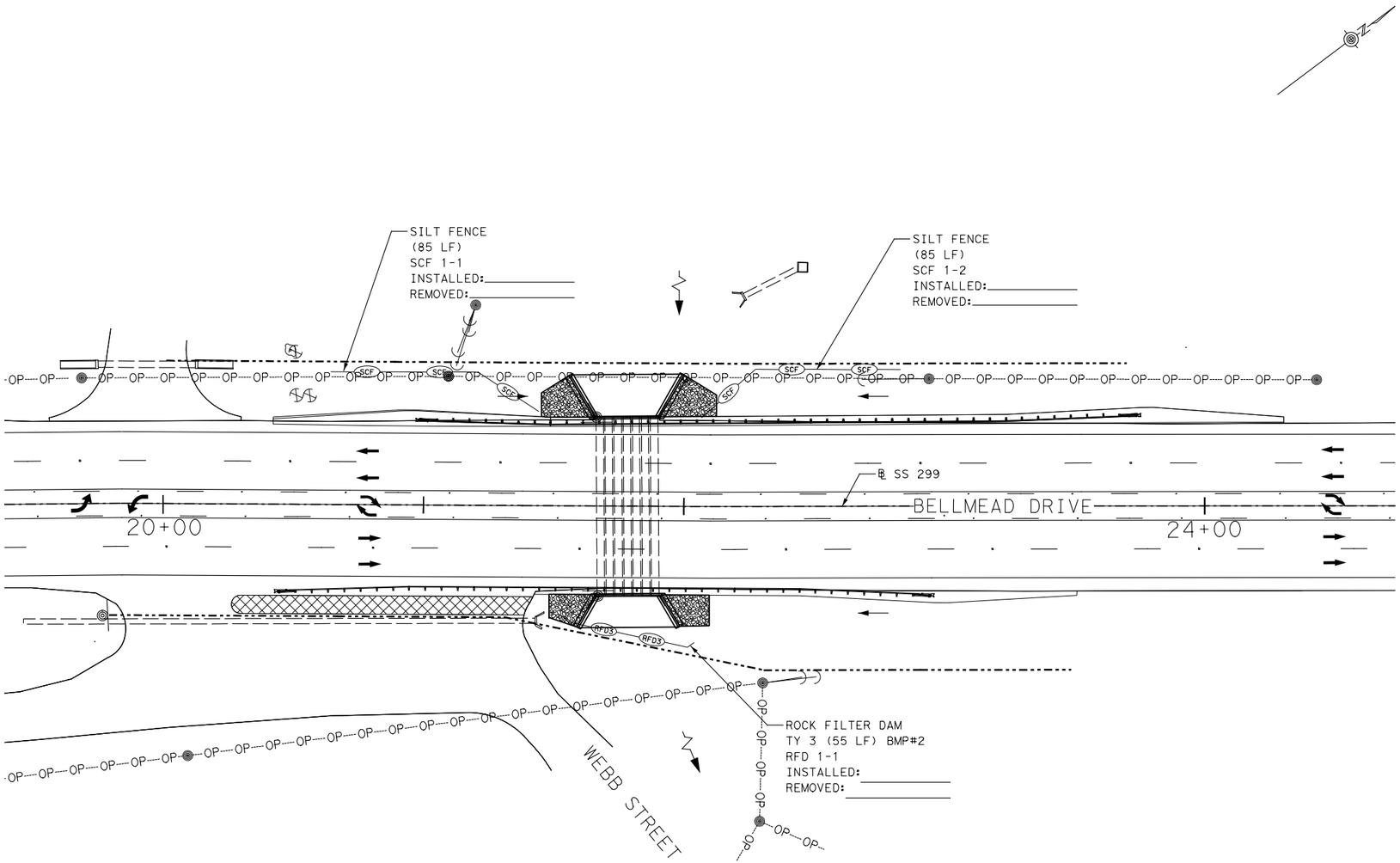
Design Division Standard

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) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		130

100% SUBMITTAL



LEGEND

- FENCE LINE
- OUTFALL DIRECTION
- FLOW DIRECTION
- RFD — ROCK FILTER DAM TY 1
- RFD3 — ROCK FILTER DAM TY 3
- SCF — SEDIMENT CONTROL FENCE

ITEM	DESCRIPTION	QTY
0506-6001	ROCK FILTER DAMS (INSTALL)(TY 1)	-
0506-6003	ROCK FILTER DAMS (INSTALL)(TY 3)	55 LF
0506-6011	ROCK FILTER DAMS (REMOVE)	55 LF
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	170 LF
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	170 LF

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group — TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

Texas Department of Transportation

SS 299
SWP3 LAYOUT

SCALE: 1" = 50' HORIZ. FEET

SHEET 1 OF 1

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		131

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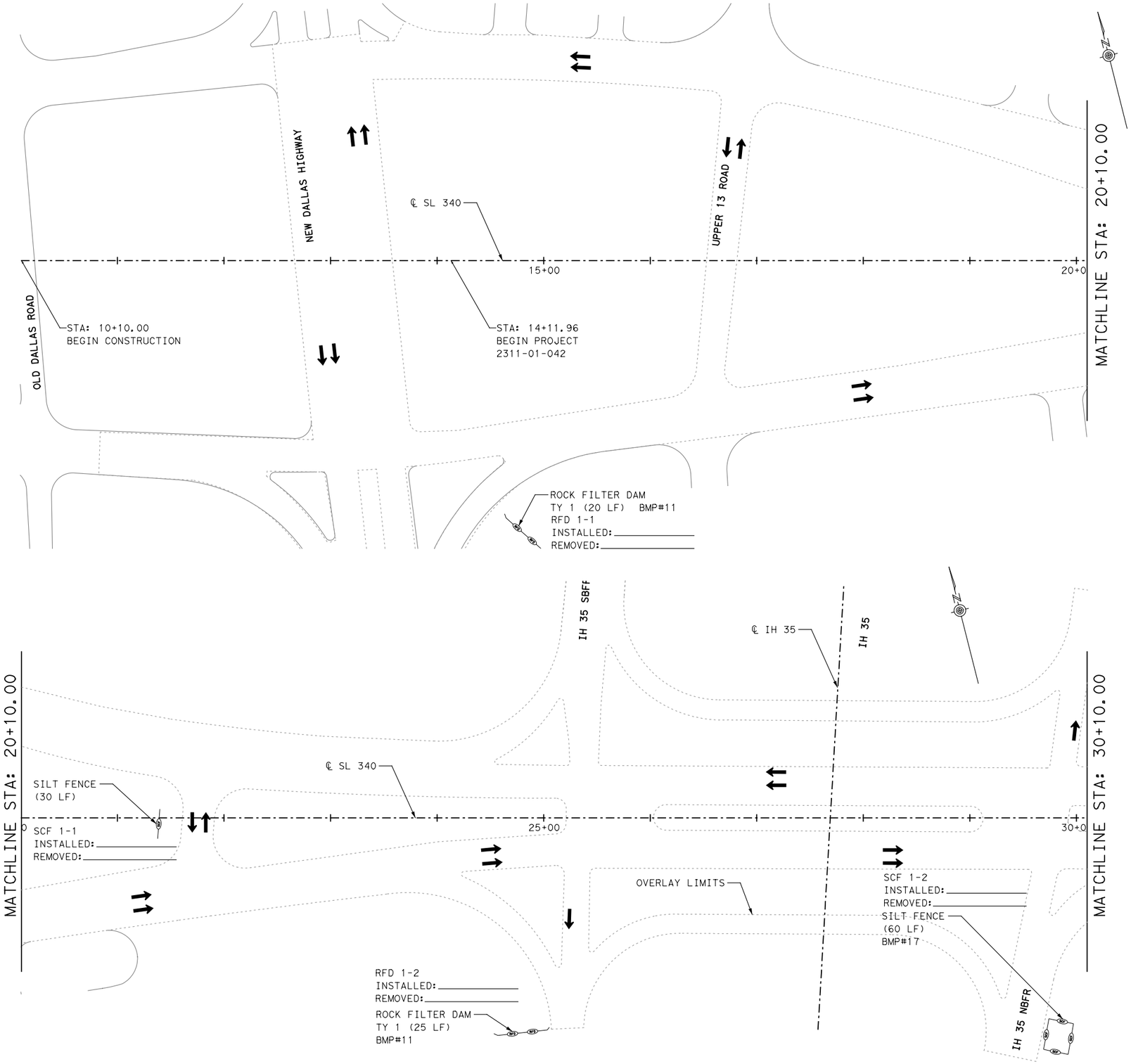

LEGEND

- FENCE LINE
- OUTFALL DIRECTION
- FLOW DIRECTION
- RFD — ROCK FILTER DAM TY 1
- RFD3 — ROCK FILTER DAM TY 3
- SCF — SEDIMENT CONTROL FENCE

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0506-6001	ROCK FILTER DAMS (INSTALL)(TY 1)	45 LF
0506-6003	ROCK FILTER DAMS (INSTALL)(TY 3)	-
0506-6011	ROCK FILTER DAMS (REMOVE)	45 LF
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	90 LF
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	90 LF

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group
TBPE License No. 12170
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SL 340
SWP3 LAYOUT

SCALE: 1" = 100' HORIZ. FEET

SHEET 1 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		132

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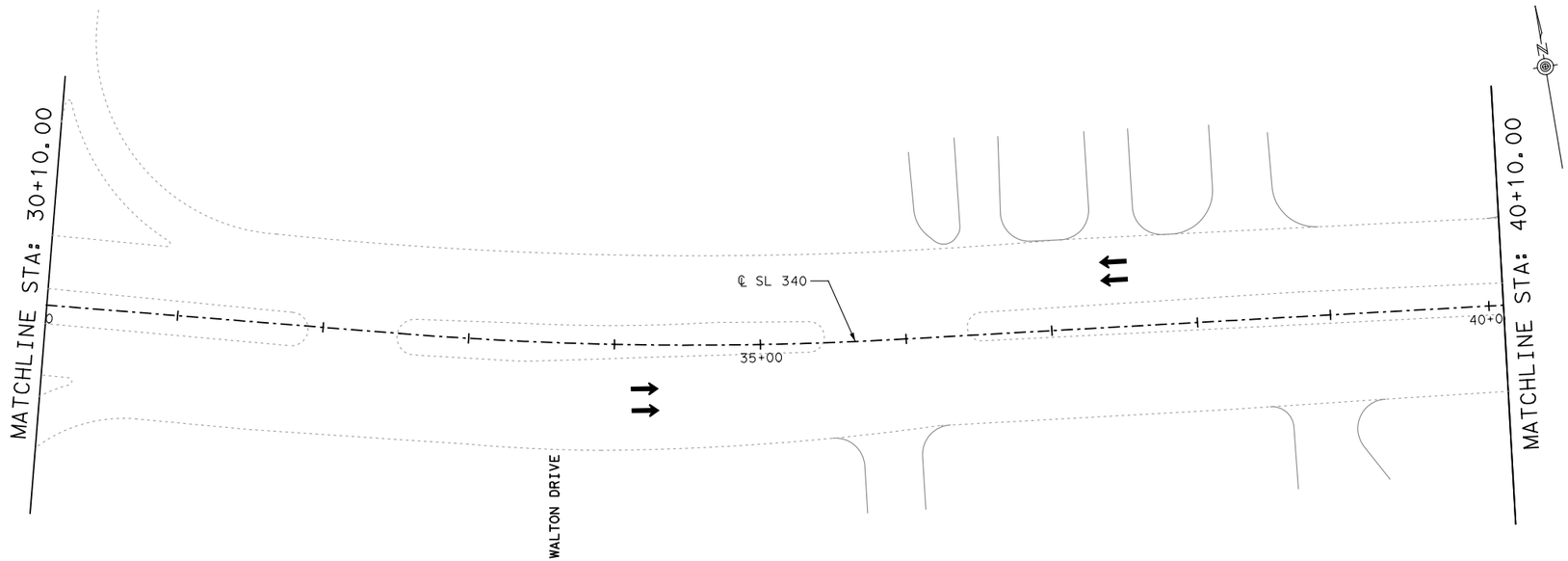

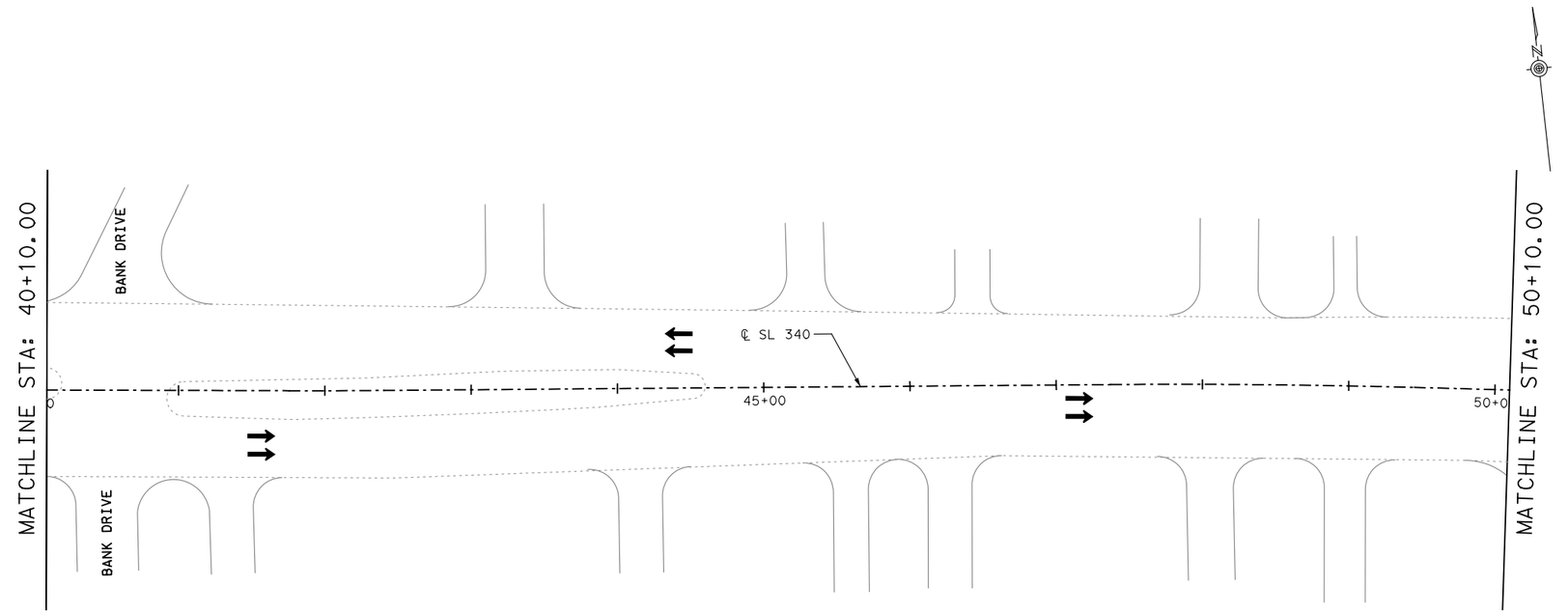

LEGEND

- FENCE LINE
- OUTFALL DIRECTION
- FLOW DIRECTION
- RFD — ROCK FILTER DAM TY 1
- RFD3 — ROCK FILTER DAM TY 3
- SCF — SEDIMENT CONTROL FENCE

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0506-6001	ROCK FILTER DAMS (INSTALL)(TY 1)	-
0506-6003	ROCK FILTER DAMS (INSTALL)(TY 3)	-
0506-6011	ROCK FILTER DAMS (REMOVE)	-
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	-
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	-

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group
TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
SWP3 LAYOUT

SCALE: 1" = 100' HORIZ. FEET

SHEET 2 OF 6

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		133

USER: egutierrez
DATE: 6/30/2023 9:20
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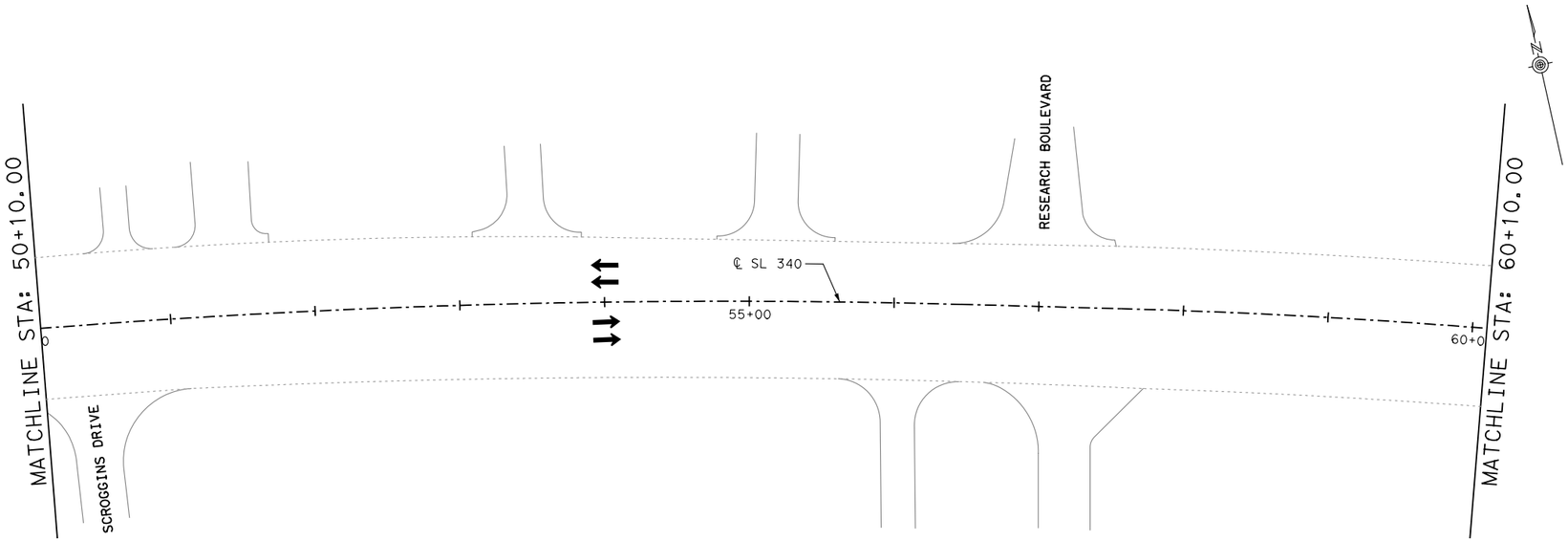

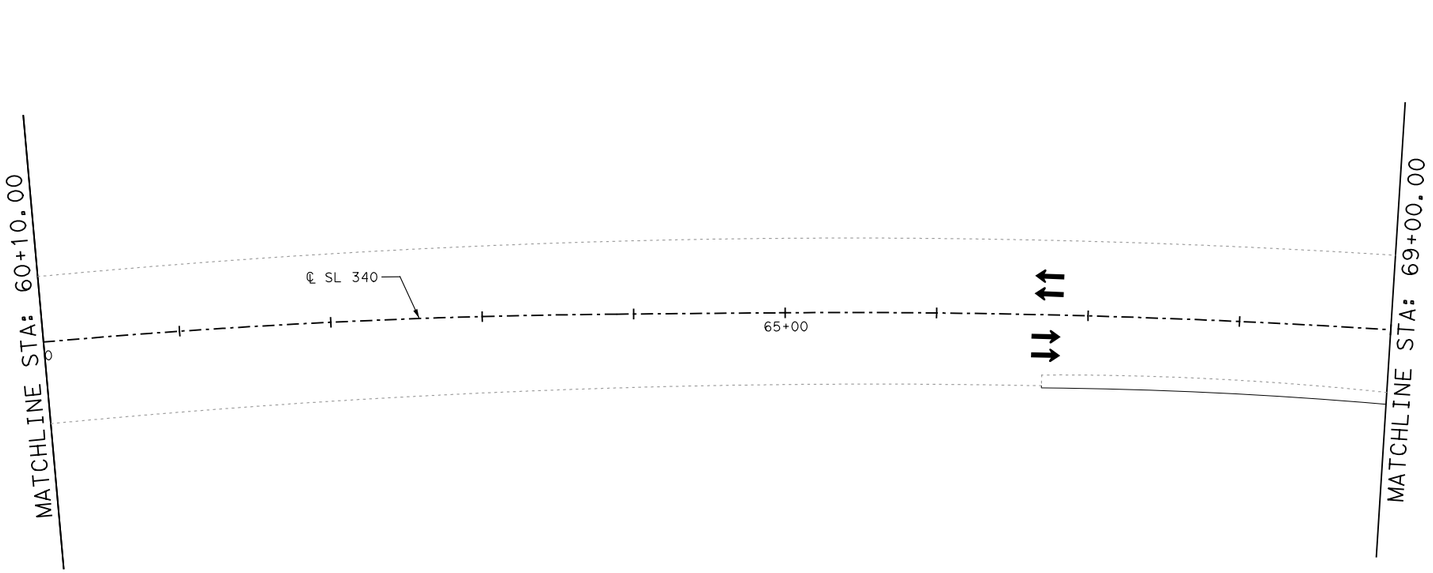

LEGEND

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- RFD — ROCK FILTER DAM TY 1
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QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0506-6001	ROCK FILTER DAMS (INSTALL)(TY 1)	-
0506-6003	ROCK FILTER DAMS (INSTALL)(TY 3)	-
0506-6011	ROCK FILTER DAMS (REMOVE)	-
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	-
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	-

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group
TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
SWP3 LAYOUT

SCALE: 1" = 100' HORIZ. FEET

SHEET 3 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		134

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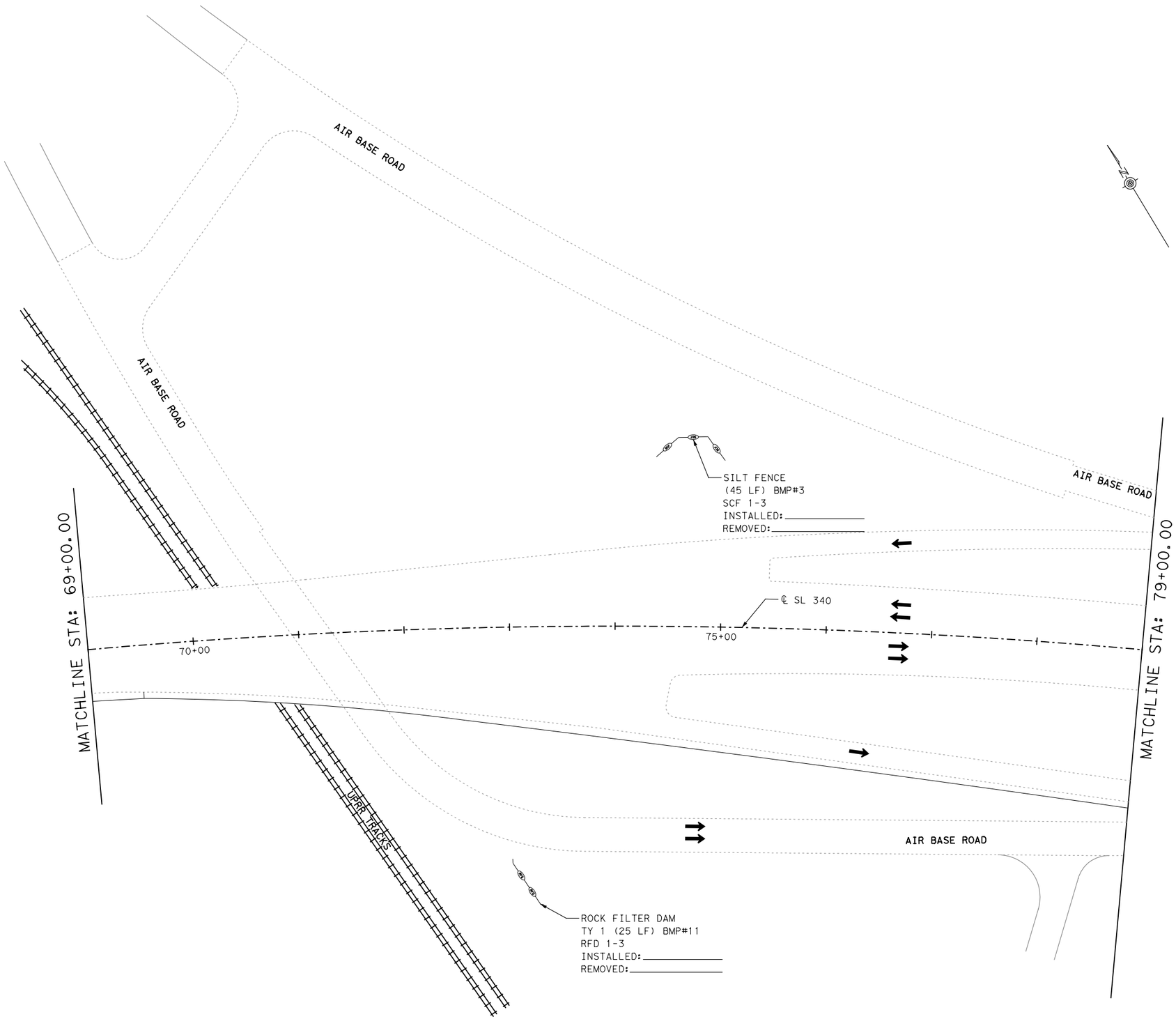

LEGEND

- FENCE LINE
- OUTFALL DIRECTION
- FLOW DIRECTION
- RFD — ROCK FILTER DAM TY 1
- RFD3 — ROCK FILTER DAM TY 3
- SCF — SEDIMENT CONTROL FENCE

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0506-6001	ROCK FILTER DAMS (INSTALL)(TY 1)	25 LF
0506-6003	ROCK FILTER DAMS (INSTALL)(TY 3)	-
0506-6011	ROCK FILTER DAMS (REMOVE)	25 LF
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	45 LF
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	45 LF

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group — TBPE License No. 12170
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Texas Department of Transportation

SL 340
SWP3 LAYOUT

SCALE: 1" = 100' HORIZ. FEET

SHEET 4 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		135

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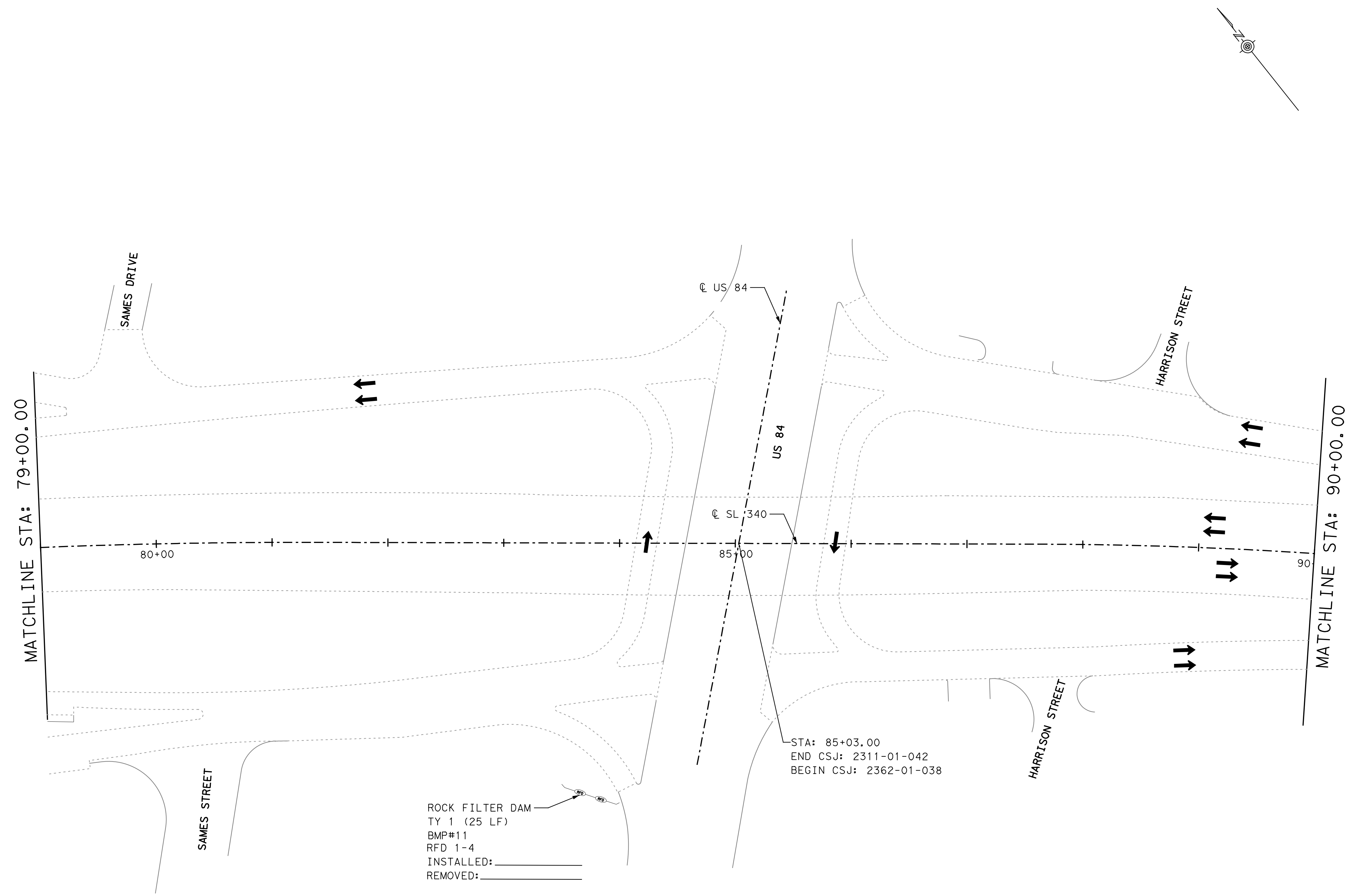

LEGEND

- FENCE LINE
- OUTFALL DIRECTION
- FLOW DIRECTION
- RFD — ROCK FILTER DAM TY 1
- RFD3 — ROCK FILTER DAM TY 3
- SCF — SEDIMENT CONTROL FENCE

QUANTITIES (CSJ: 2311-01-042)

ITEM	DESCRIPTION	QTY
0506-6001	ROCK FILTER DAMS (INSTALL)(TY 1)	25 LF
0506-6003	ROCK FILTER DAMS (INSTALL)(TY 3)	-
0506-6011	ROCK FILTER DAMS (REMOVE)	25 LF
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	-
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	-

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group
TBPE License No. 12670
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
SWP3 LAYOUT

SCALE: FEET
1" = 100' HORIZ.

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
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	STATE	DIST		COUNTY	SHEET NO.
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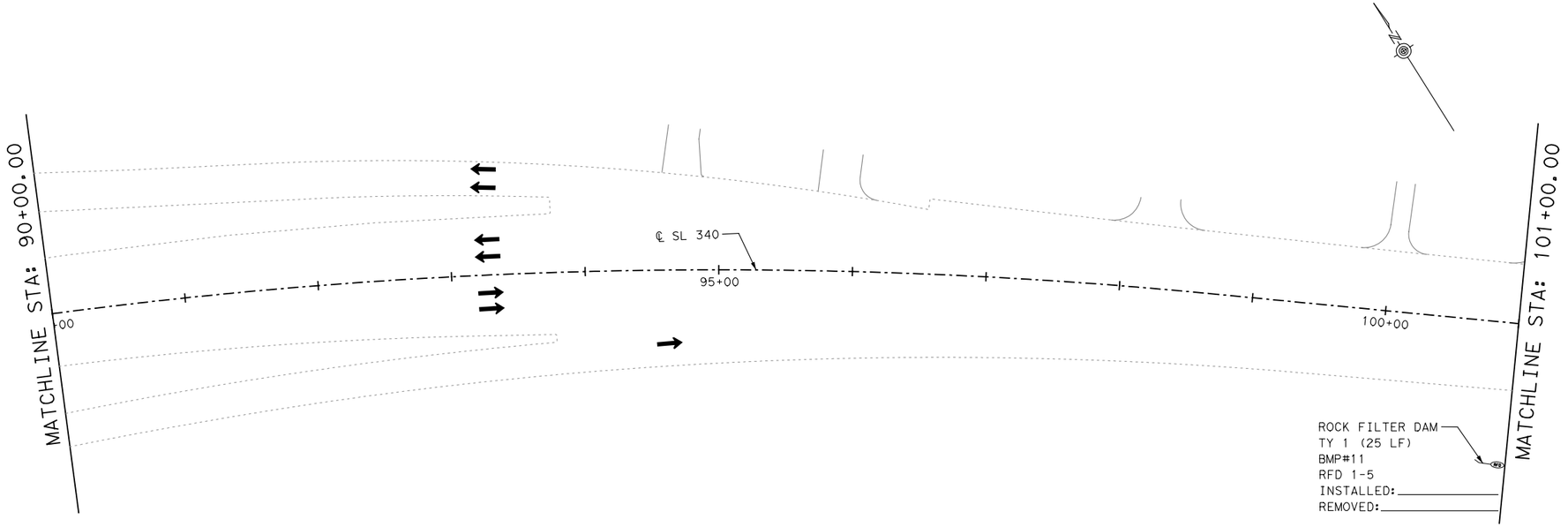

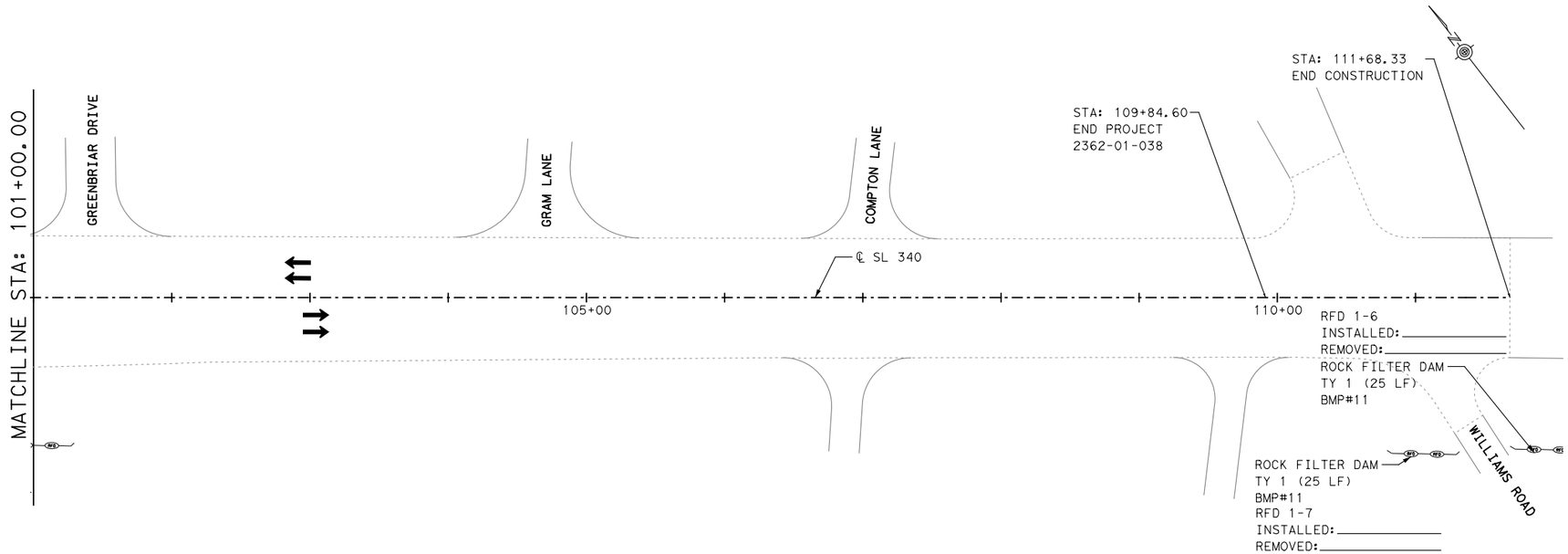

LEGEND

- FENCE LINE
- OUTFALL DIRECTION
- FLOW DIRECTION
- RFD — ROCK FILTER DAM TY 1
- RFD3 — ROCK FILTER DAM TY 3
- SCF — SEDIMENT CONTROL FENCE

QUANTITIES (CSJ: 2362-01-038)

ITEM	DESCRIPTION	QTY
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0506-6011	ROCK FILTER DAMS (REMOVE)	75 LF
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	-
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	-

STATE OF TEXAS
EDUARDO GUTIERREZ
75994
REGISTERED
PROFESSIONAL ENGINEER
6/30/2023

Seiler Lankes Group TBPE License No. 12170
PLANNING • ENGINEERING • CONSTRUCTION

SL 340
SWP3 LAYOUT

SCALE: 1" = 100' HORIZ. FEET

SHEET 6 OF 6

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	2311	01	042, ETC.	SL 340, ETC.
	STATE	DIST	COUNTY		SHEET NO.
	TEXAS	WAC	MCLENNAN		137

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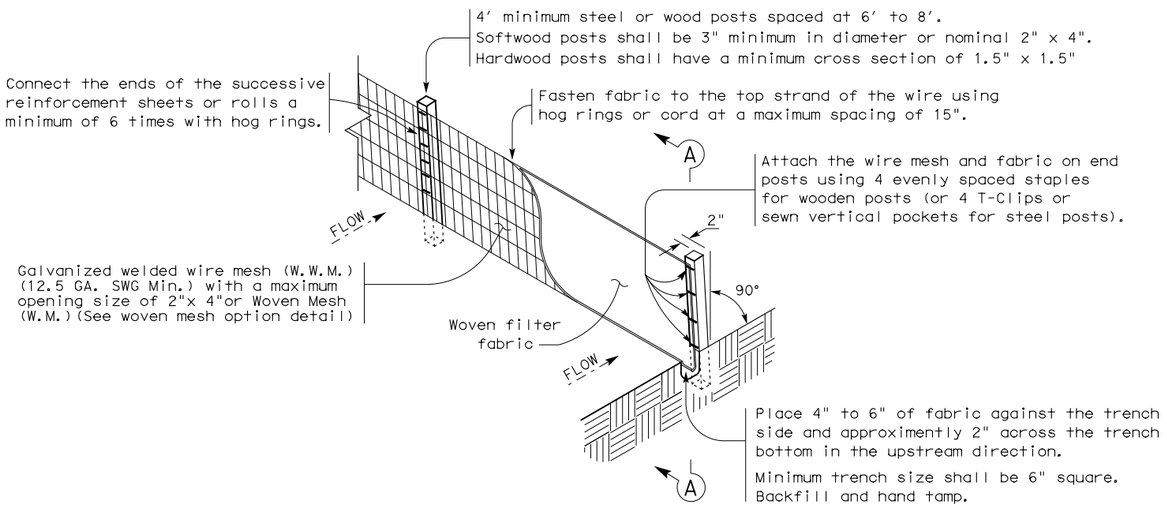
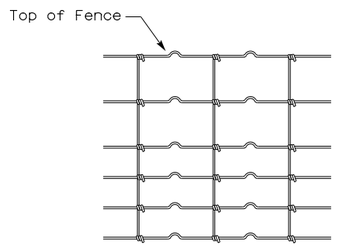
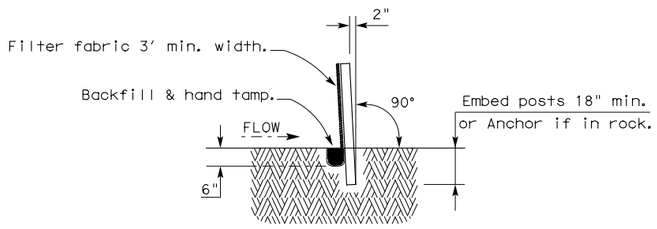


TEMPORARY SEDIMENT CONTROL FENCE

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.

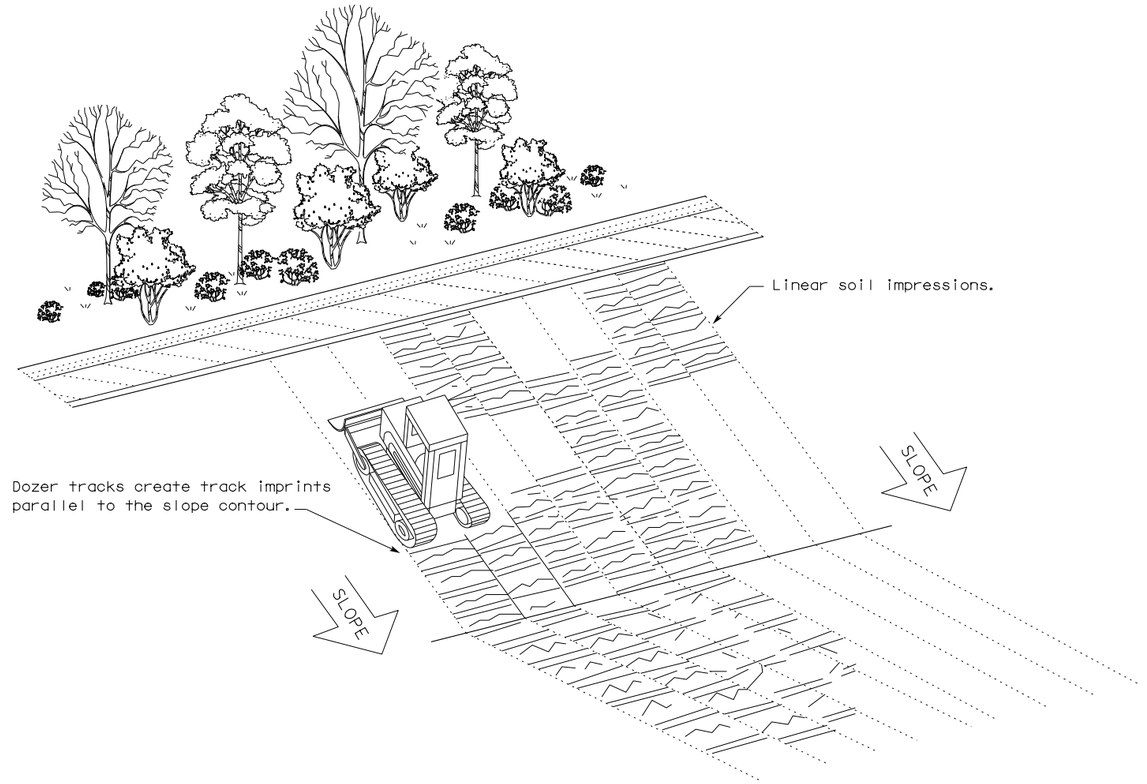
LEGEND

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	2311	01	042, ETC.		SL 340, ETC.	
	DIST	COUNTY			SHEET NO.	
	WAC	MCLENNAN			138	

DATE: 6/30/2023
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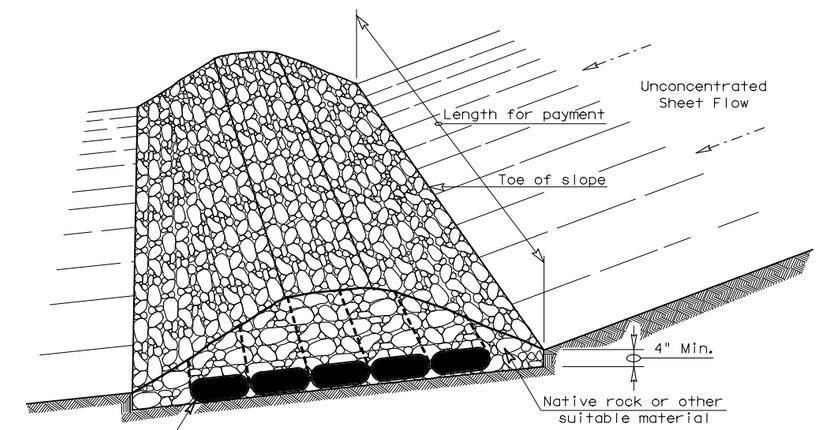
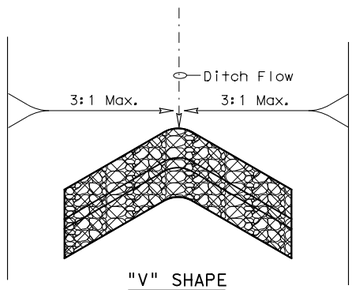
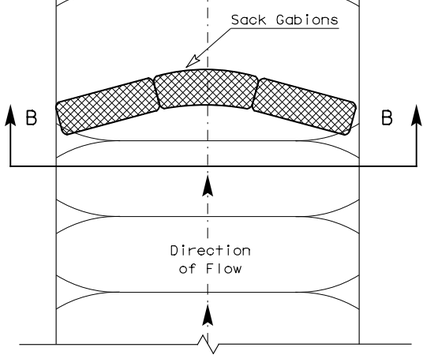


FILTER DAM AT TOE OF SLOPE

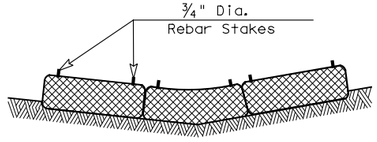
RFD1



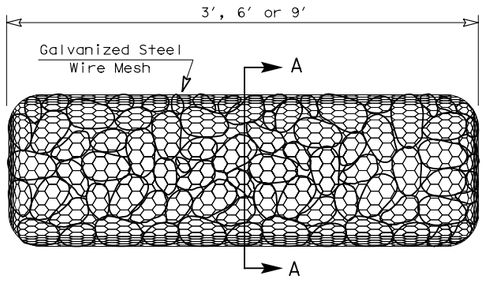
"V" SHAPE
PLAN VIEW



PLAN VIEW

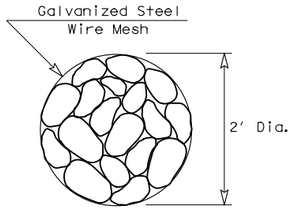


SECTION B-B

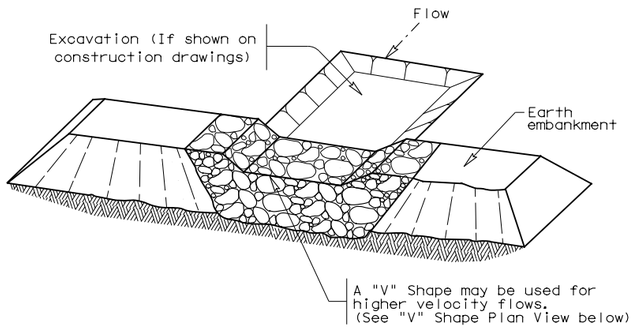


TYPE 4 (SACK GABIONS)

RFD4

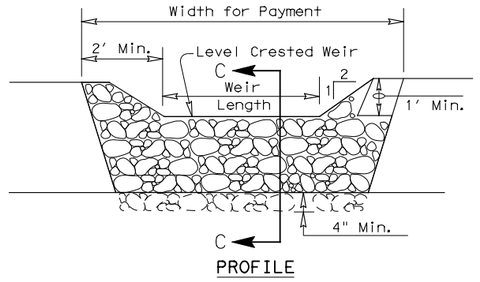


SECTION A-A

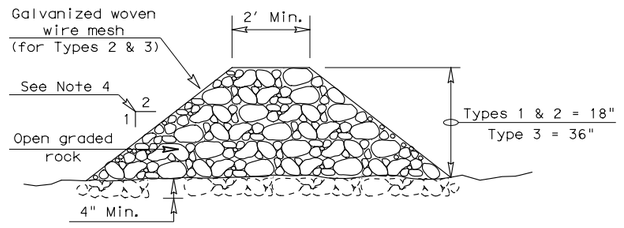


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

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.

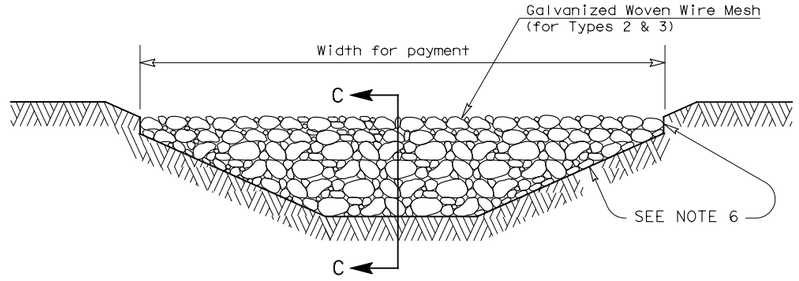
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

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

PLAN SHEET LEGEND

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

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
	DIST	COUNTY		SHEET NO.
	WAC	MCLENNAN		139

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:

   - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.

   - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.

   - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.

   - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.

   - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.

   - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.

   - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.

   - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.

   - Provide documentation required for Waters of the US, Note #3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.

   - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.

   - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.

2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.

3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.

4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).

5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.

6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.

7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.

8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE = NTS SHEET 1 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (1)

FILE: BMPLAYOUTS.dgn	DN:	CK:	DW:	CK:
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS	2311	01	042, ETC.	SL 340, ETC.
DEC 2013	DIST	COUNTY		SHEET NO.
FEB 2015	WAC	MCLENNAN		140

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.

10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.

11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.

12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.

13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.

14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

    The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.

16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.

17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.

18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.

19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.

20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.

21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.

22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.

23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.

24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.

25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (2)

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.

27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls; on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.

28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.

29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.

30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.

31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.

32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.

33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.

34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.

35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.

36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.

37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.

38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.

39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.

40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.

41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.

42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.

43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

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Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (3)

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.

45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.

46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.

47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.

48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.

49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.

50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.

51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

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Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (4)

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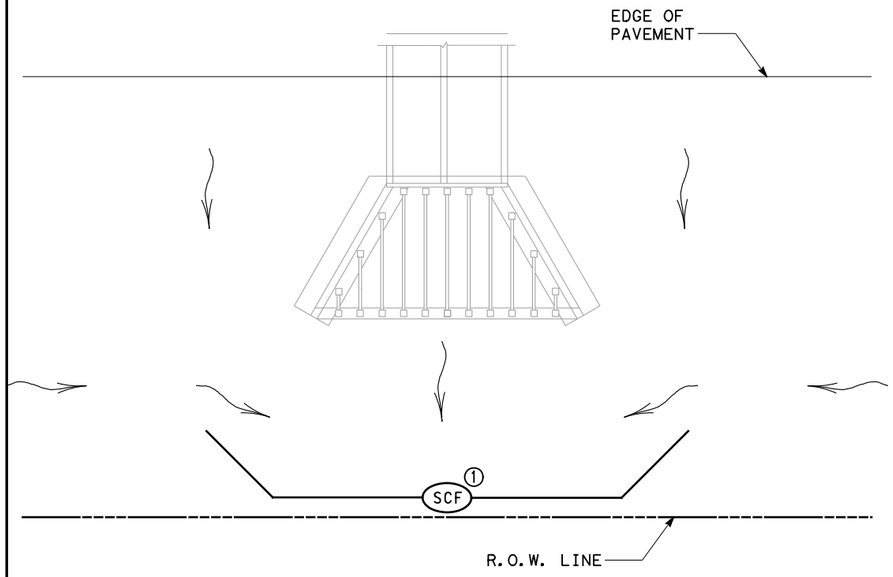
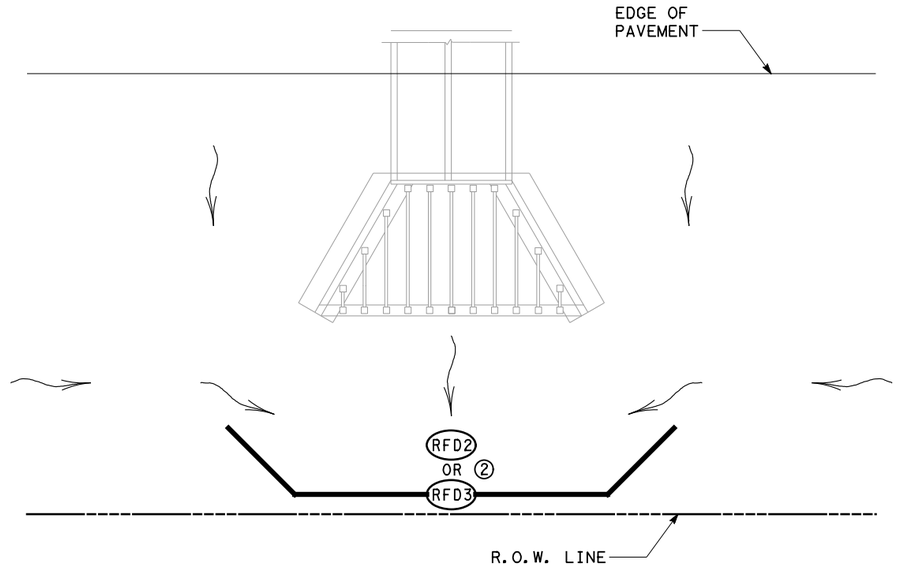


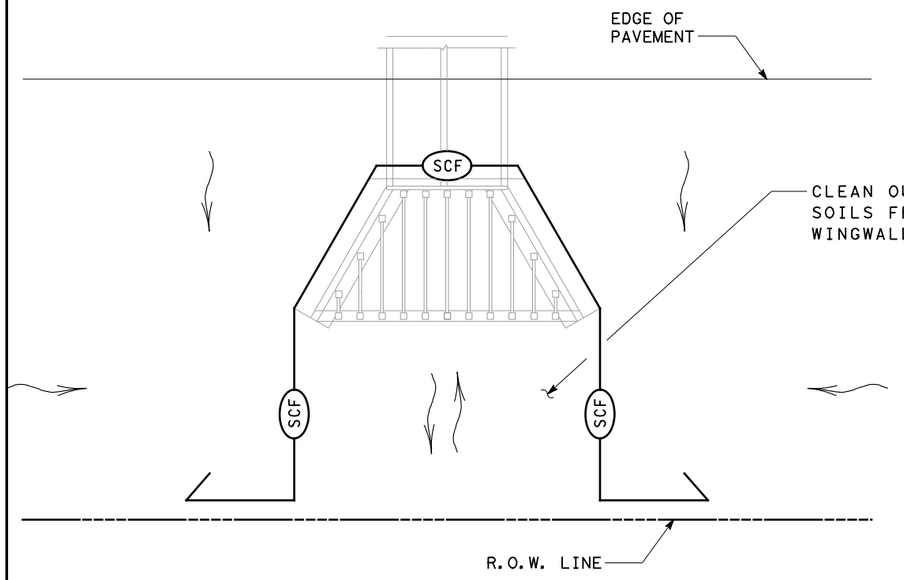
BEST MANAGEMENT PRACTICE (BMP) #1

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



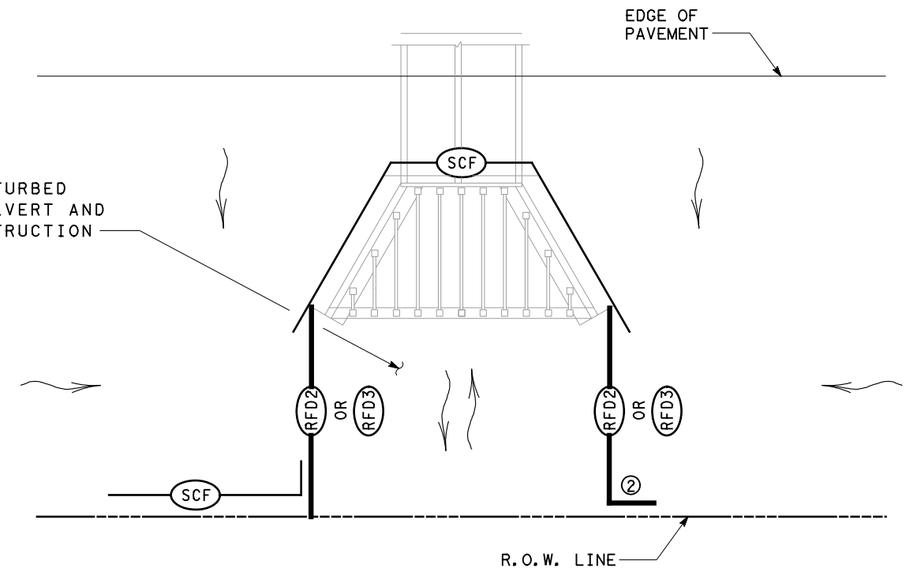
BEST MANAGEMENT PRACTICE (BMP) #2

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



BEST MANAGEMENT PRACTICE (BMP) #3

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



BEST MANAGEMENT PRACTICE (BMP) #4

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

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

NOTES:

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

② EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

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Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (5)

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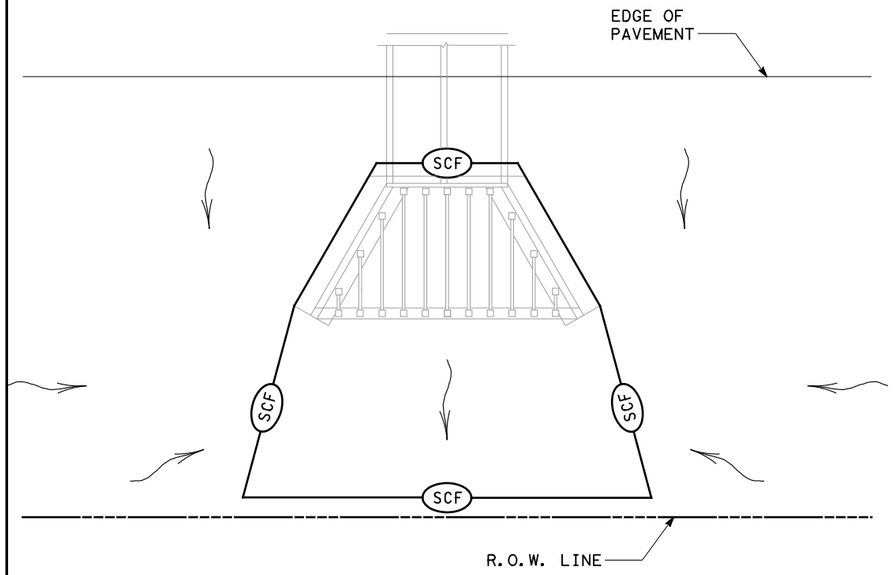
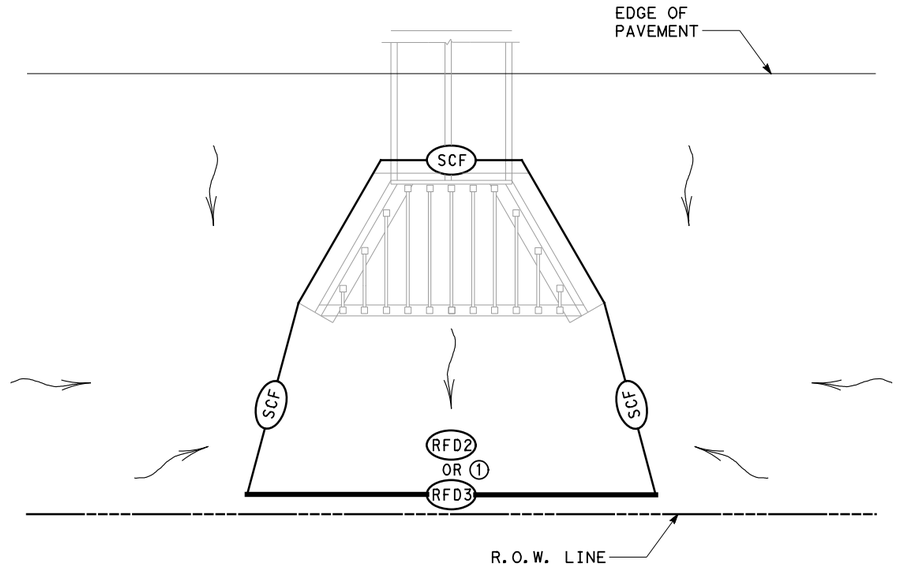


BEST MANAGEMENT PRACTICE (BMP) #5

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



BEST MANAGEMENT PRACTICE (BMP) #6

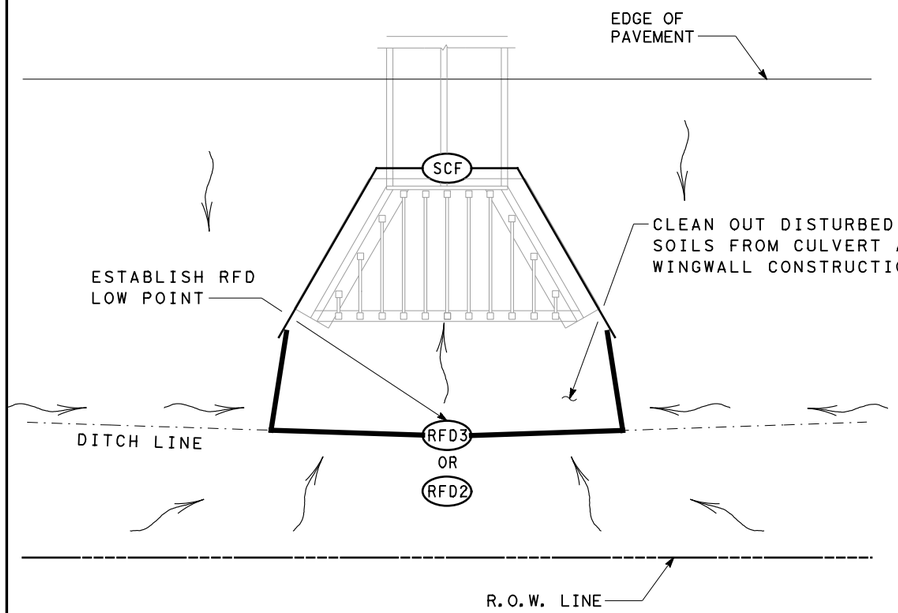
FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

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

NOTES:

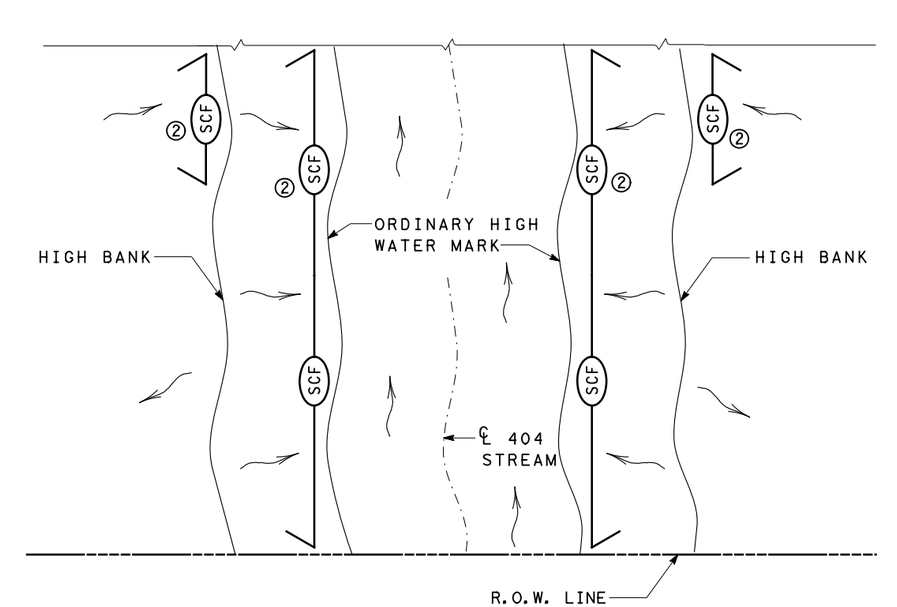
① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT



BEST MANAGEMENT PRACTICE (BMP) #7

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



BEST MANAGEMENT PRACTICE (BMP) #8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (6)

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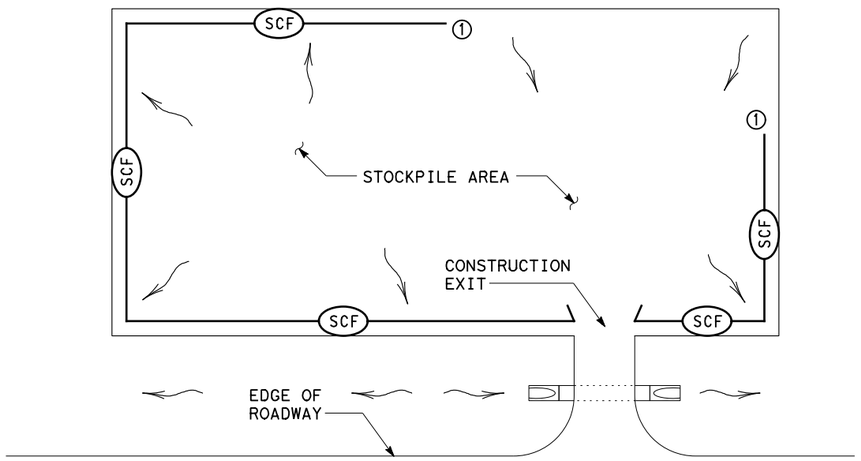
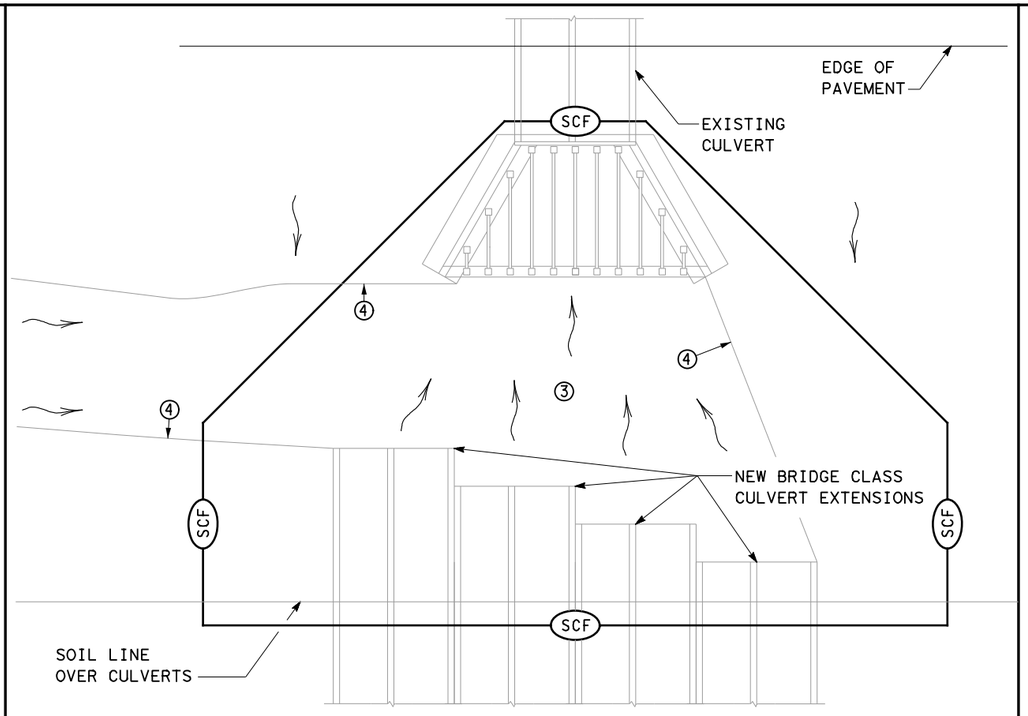


BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



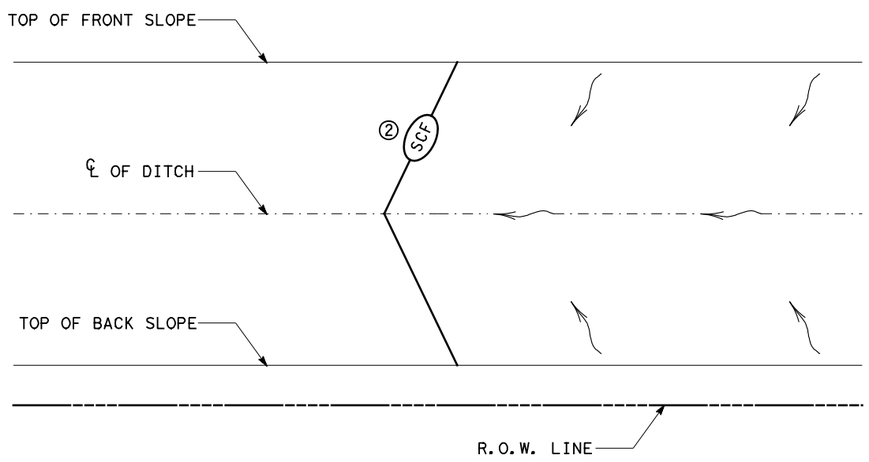
BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY ~
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS

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

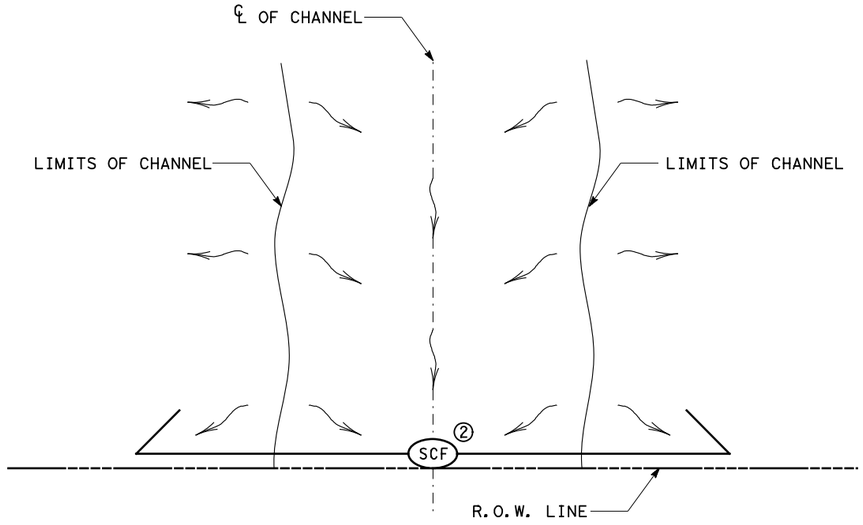
NOTES:

1. START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
2. ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.
3. PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.
4. PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE



BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (7)

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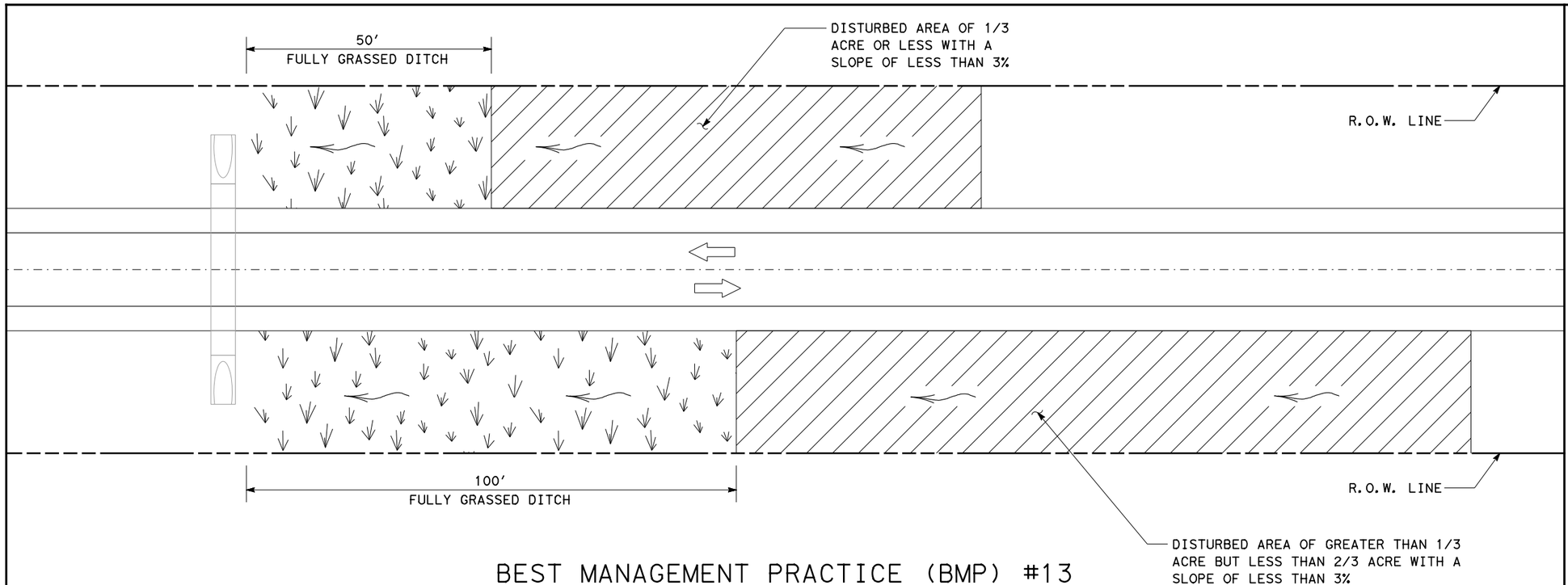
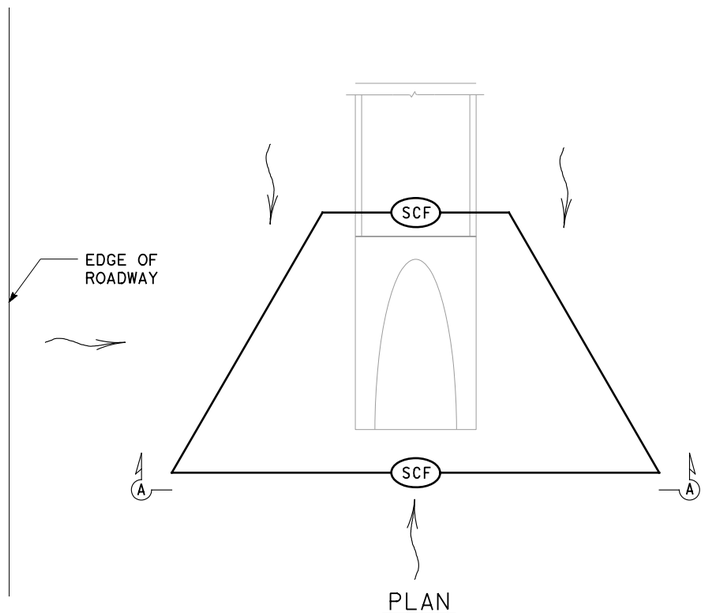
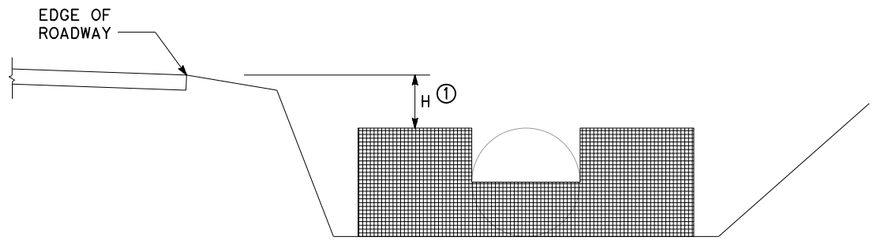


BEST MANAGEMENT PRACTICE (BMP) #13

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



PLAN



VIEW A-A

BEST MANAGEMENT PRACTICE (BMP) #14

NON-404 STREAMS AND DITCHES ONLY ~ SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE

① FOR H DIMENSIONS LESS THAN 1.5′ SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.

② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (8)

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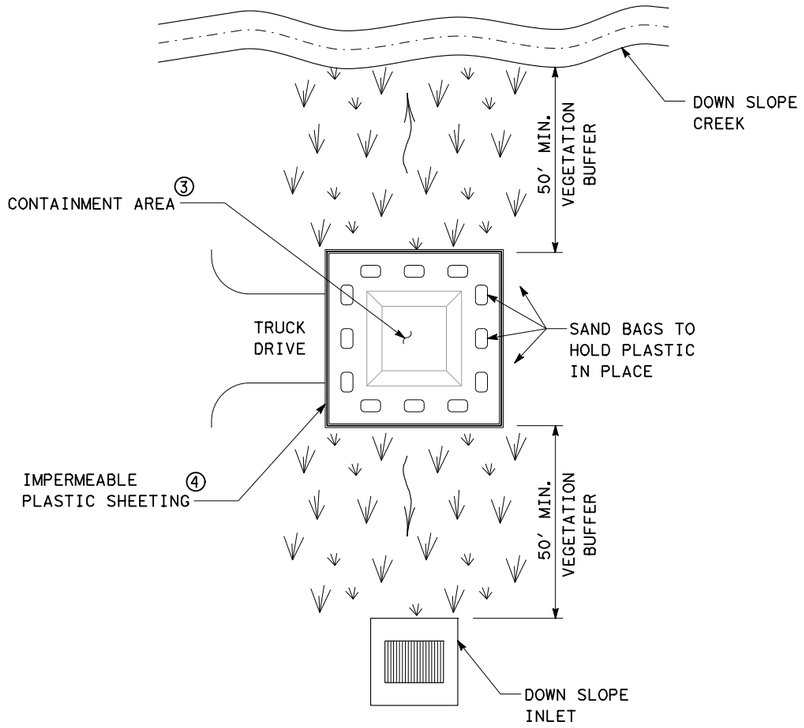
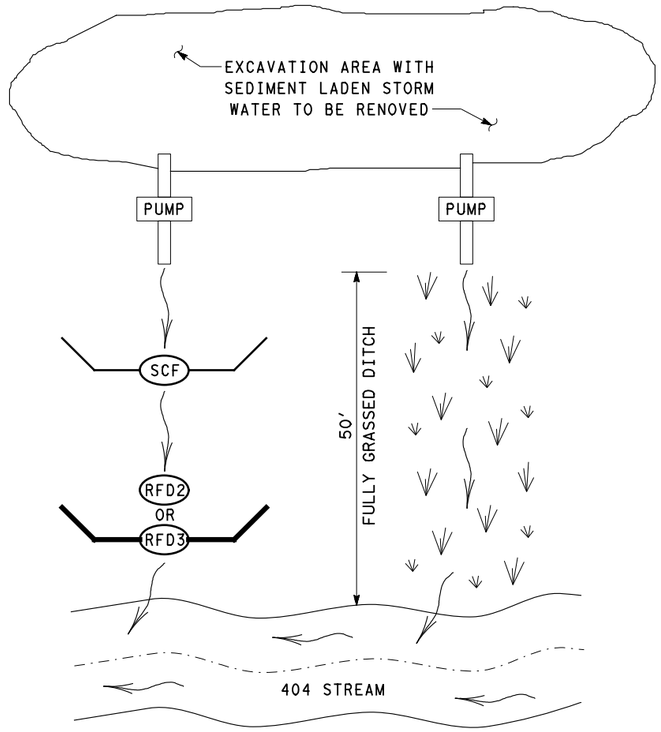


BEST MANAGEMENT PRACTICE (BMP) #15

CONCRETE TRUCK WASHOUT AREA



BEST MANAGEMENT PRACTICE (BMP) #16

PUMPED STORM WATER SEDIMENT CONTROLS ①

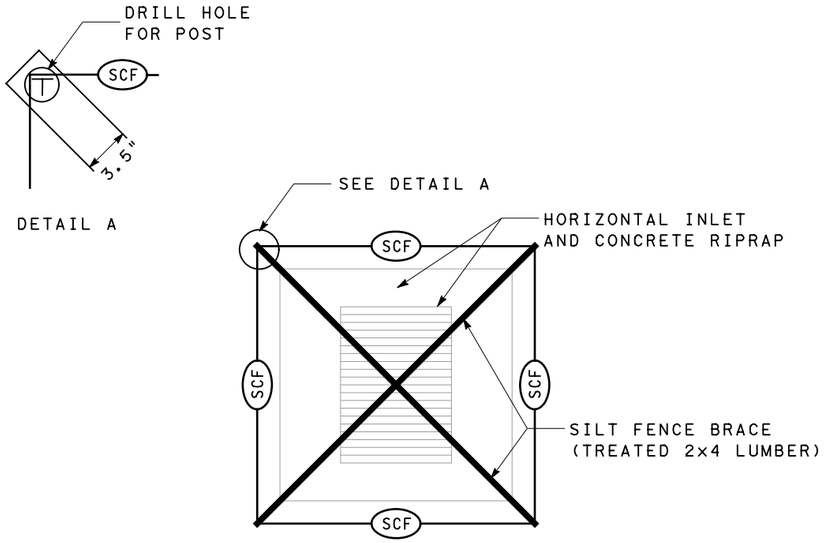
	FULLY GRASSED DITCH
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

① PUMPED STROM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.

② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.

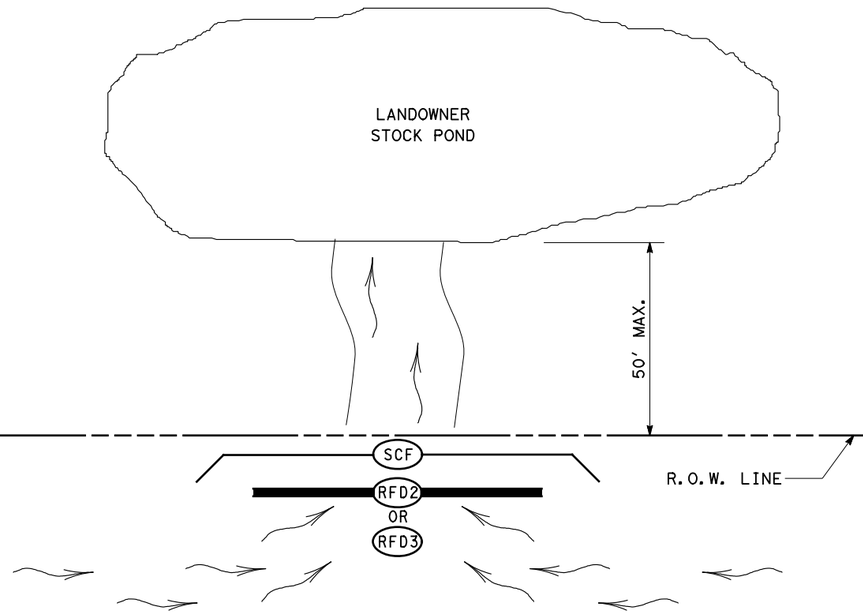
③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.

④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



BEST MANAGEMENT PRACTICE (BMP) #17

HORIZONTAL INLET SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #18

LANDOWNER STOCKPOND SEDIMENT CONTROL ②

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (9)

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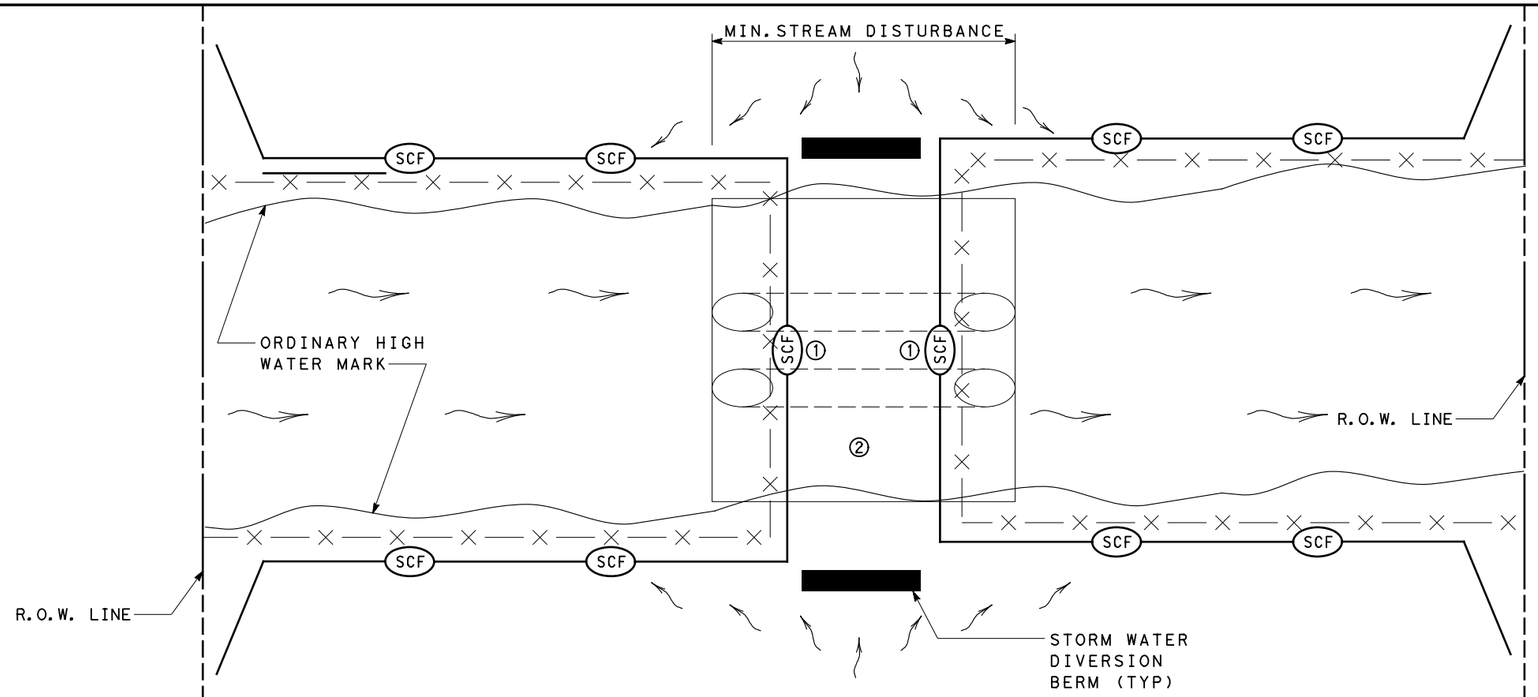


BEST MANAGEMENT PRACTICE (BMP) #19

TYPICAL 404 STREAM CROSSING (SEDIMENT CONTROL AT CROSSING)

	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD	ROCK FILTER DAM
× — ×	SECURITY FENCING

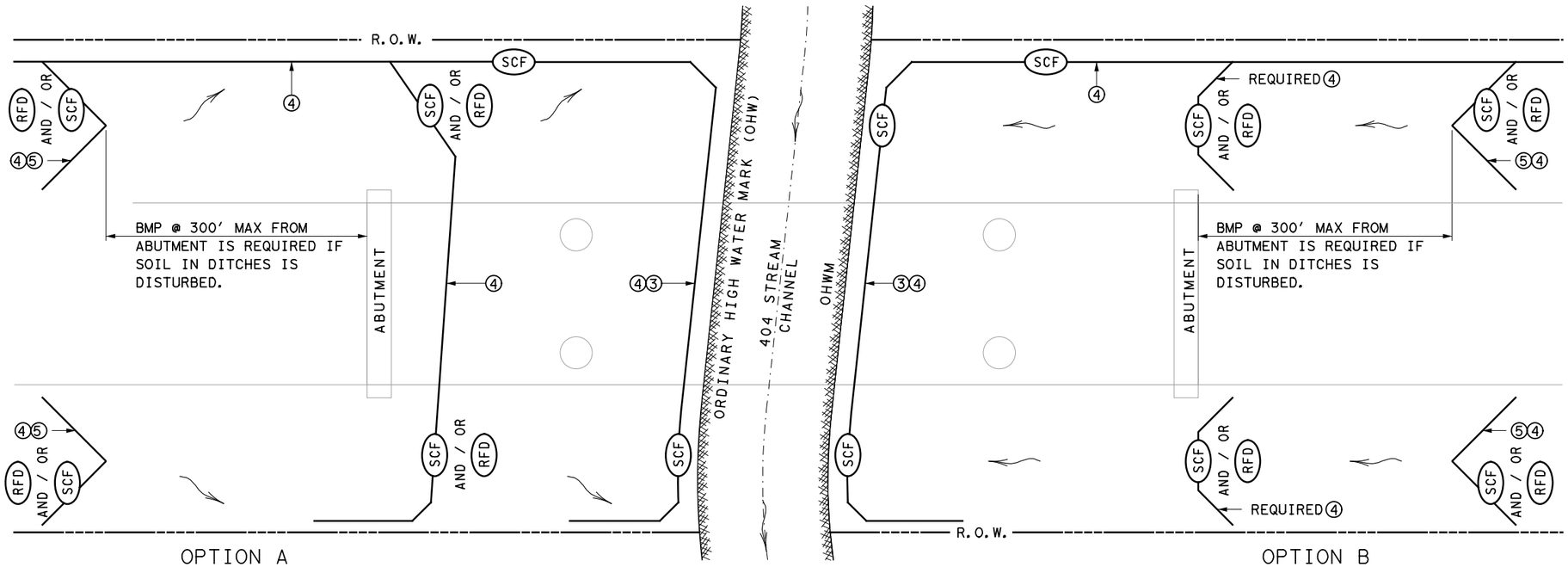
① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.

② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.

③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.

④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT

⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



BEST MANAGEMENT PRACTICE (BMP) #20

FOR 404 STREAMS ~ BMP'S AT BRIDGES

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP (10)

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