FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			1
STATE	LOCATION	COUNTY	
TEXAS	TYLER	SMITH	
CONT	SECT	JOB	HIGHWAY NO.
			TOLL 49

INDEX OF SHEETS

NET RMA
NORTH EAST TEXAS REGIONAL MOBILITY AUTHORITY

PLANS OF EXISTING TOLL ROAD

TOLL 49 (SEGMENT 3B NORTH)
OVERLAY PROJECT

SMITH COUNTY

LIMITS: FROM IH 20
TO CR 1150

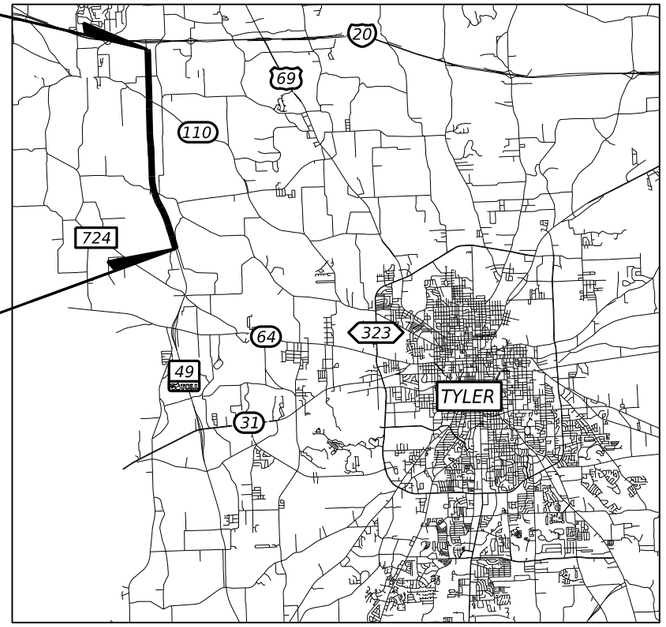
TOTAL LENGTH OF PROJECT =

ROADWAY =	23,607.02 FT. =	4.471	MI.
BRIDGE =	3,015.53 FT. =	0.571	MI.
TOTAL =	26,622.55 FT. =	5.042	MI.

FOR THE CONSTRUCTION OF TOLL ROAD REHABILITATION
CONSISTING OF ASPHALT CONCRETE OVERLAY, MILLING, BASE REPAIR, AND PAVEMENT MARKINGS

BEGIN PROJECT
TOLL 49
SEGMENT 3B
STA 458+12.79

END PROJECT
TOLL 49
SEGMENT 3B
STA 724+35.34



PROJECT LAYOUT
NTS

NO EQUATIONS
NO EXCEPTIONS
NO RAILROAD CROSSINGS

NOTE:
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2024 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER

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

SUBMITTED FOR LETTING — DATE 01/23/2025
Corey D. Hogue, P.E.
COREY D. HOGUE, P.E.
PROJECT MANAGER, LOCHNER

NET RMA
North East Texas Regional Mobility Authority

REVIEWED BY — DATE 01/23/2025
Mark McClanahan
NET RMA MAINTENANCE DIRECTOR

SUBMITTED BY — DATE 01/23/2025
Glenn H. Green
NET RMA EXECUTIVE DIRECTOR

SHEET NO.		DESCRIPTION
GENERAL		
1		TITLE SHEET
2		SUPPLEMENTAL INDEX OF SHEETS
3	- 4	PROJECT LAYOUTS
5	- 6	TYPICAL SECTION AND DETAILS
7		BASIS OF ESTIMATE
8	- 12	SUMMARY OF QUANTITIES
13	- 20	GENERAL NOTES
TRAFFIC CONTROL PLAN		
21		TRAFFIC CONTROL PLAN NARRATIVE
22		TRAFFIC CONTROL PLAN COMPLETE TOLL 49 CLOSURE
23		TRAFFIC CONTROL PLAN AT IH 20 ENTRANCE RAMP
24		TRAFFIC CONTROL PLAN AT SH 64 ENTRANCE RAMP
25		JOINT LAYOUT AND STRIPING DETAILS
26		TREATMENT FOR VARIOUS EDGE CONDITIONS
TRAFFIC CONTROL PLAN STANDARDS		
27	- 38	# BC(1)-21 TO BC(12)-21
39	- 43	# TCP(1-1)-18 TO TCP(1-5)-18
44		# TCP(3-1)-13
44		# TCP(3-3)-14
45		# TCP(5-1)-18
47		# TCP(6-1)-12
48		# TCP(6-3)-12
49		# TCP(6-6)-12
50		# WZ(STPM)-23
51		# WZ(UL)-13
52		# WZ(RS)-22
ROADWAY		
53	- 54	HORIZONTAL ALIGNMENT DATA
55	- 78	SEGMENT 3B NORTH PAVING & STRIPING
79		TAPERED JOINT DETAILS
ROADWAY STANDARDS		
80		# GF(31)-19
81		# GF(MS)-19
82		# SGT(12S)31-18
83		# SGT(15)31-20
84		# TE(HMAC)-11
PAVEMENT MARKING STANDARD DETAILS		
85	- 87	# PM(1)-22 TO PM(3)-22
88	- 89	# FPM(1)-22-FPM(2)-22
90		# CLB(1)-23
91		# CLB(2)-23
92		# TS2(PL-1)-23
93	- 96	# RS(1)-23 TO RS(4)-23
97		# D & OM(1)-20
98		# D & OM(2)-20
99		# D & OM(5)-20
100		# D & OM(6)-20
101		# D & OM(VIA)-20

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

INDEX OF SHEETS

SHEET 1 OF 1

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	2

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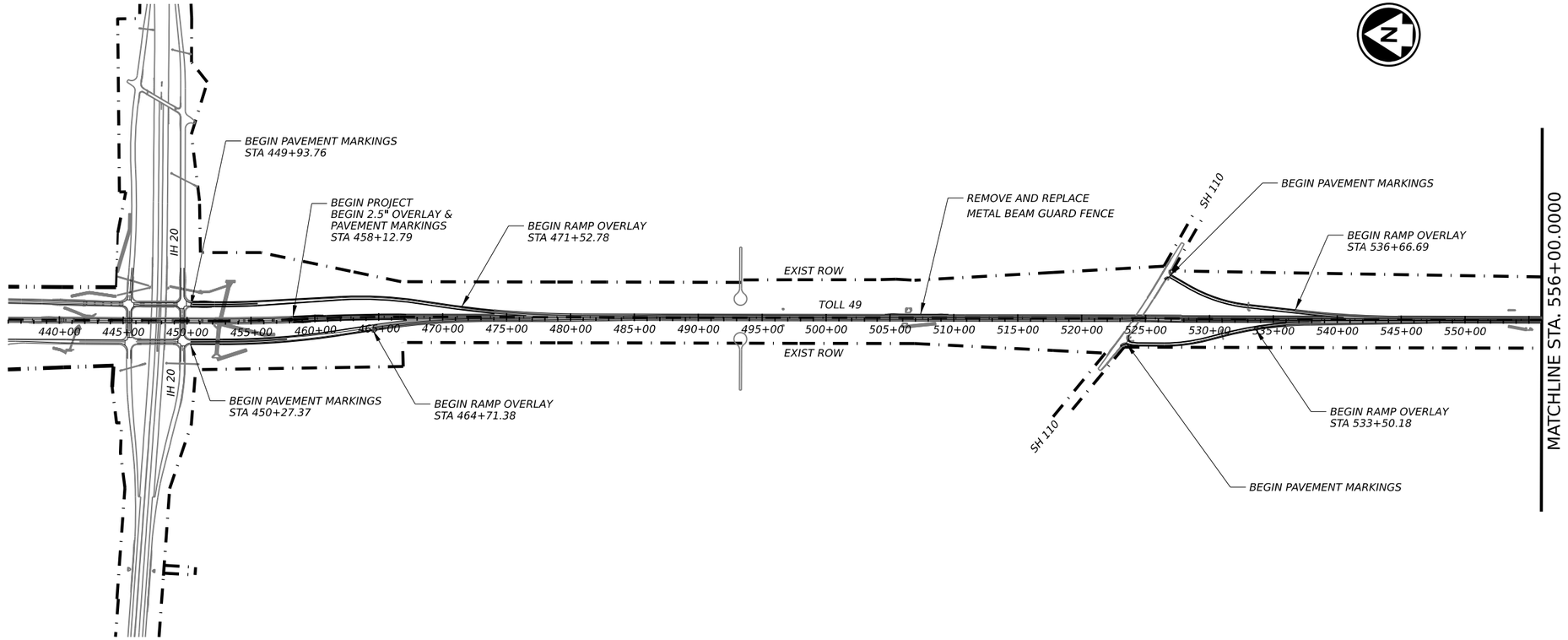

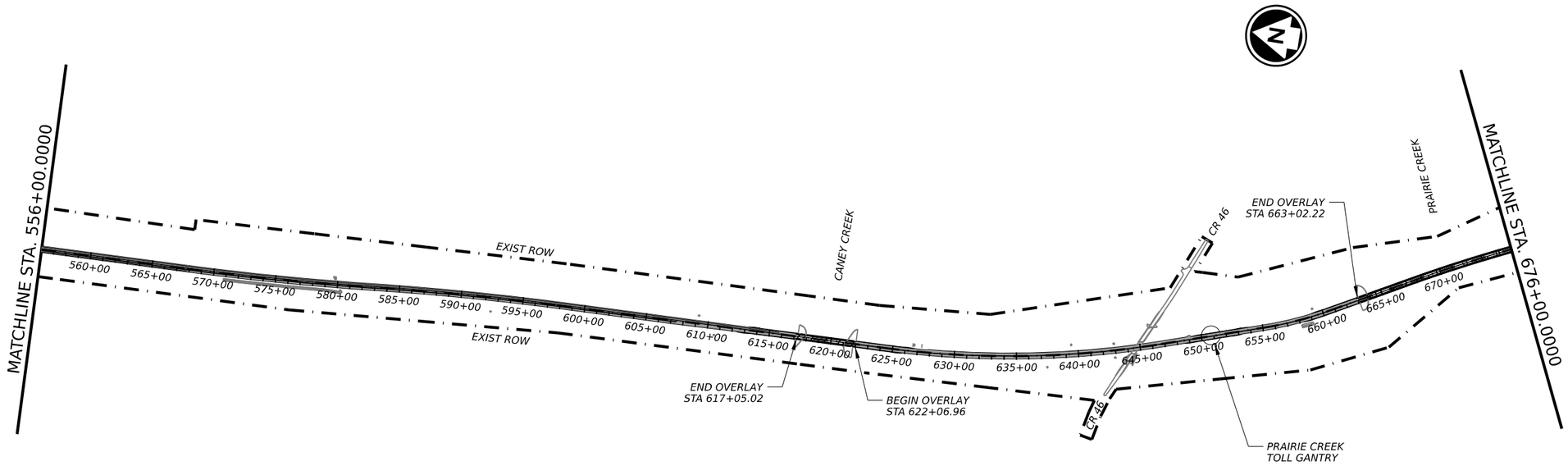

0 200 1000

SCALE IN FEET

HORIZONTAL SCALE: 1" = 1000'

STATE OF TEXAS
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01/23/2025

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NETRMA
North East Texas Regional Mobility Authority

SEGMENT 3B PROJECT LAYOUT BEGIN TO 676+00

SHEET 1 OF 2

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	3

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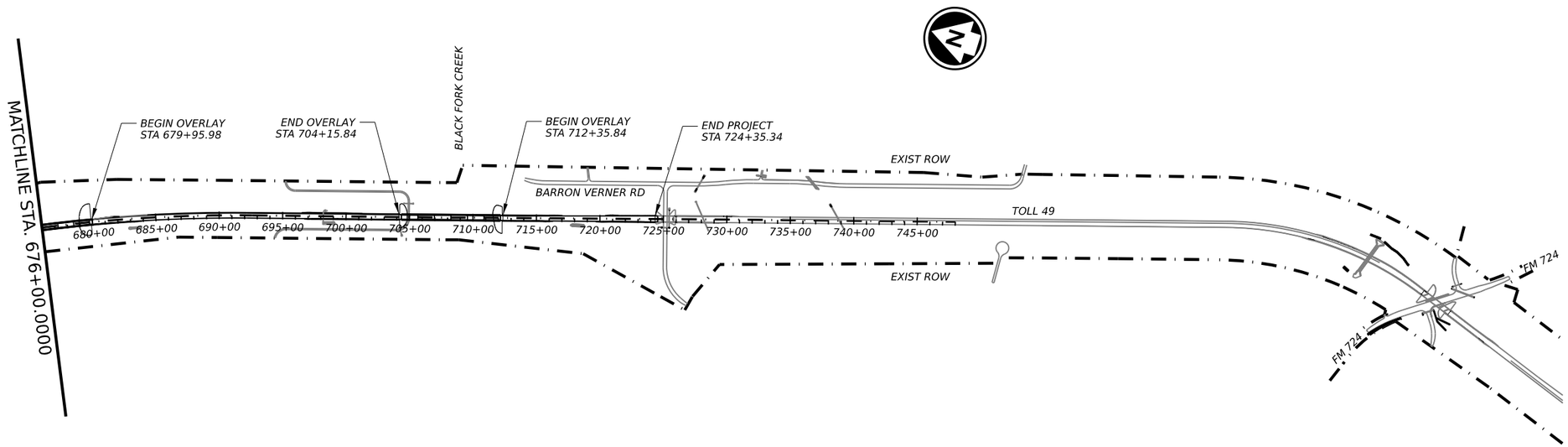

0 200 1000

SCALE IN FEET

HORIZONTAL SCALE: 1" = 1000'

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NTTRMA
North East Texas Regional Mobility Authority

SEGMENT 3B
PROJECT LAYOUT
676+00 TO END

SHEET 2 OF 2

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	4

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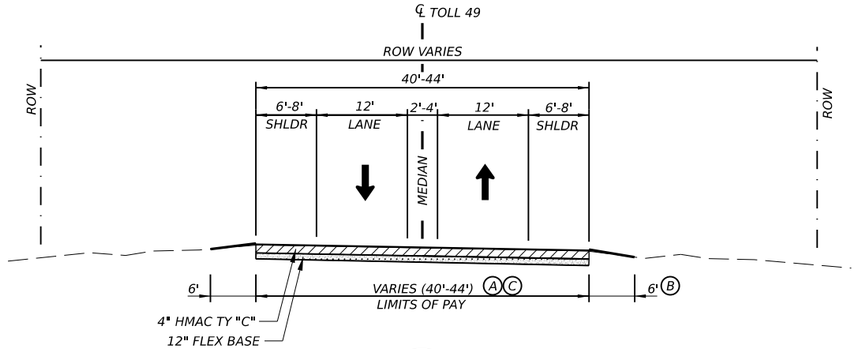
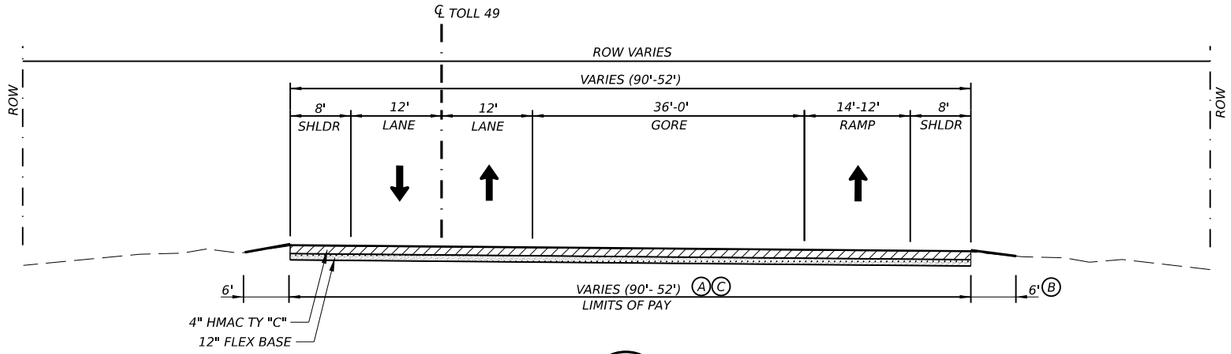


1

TOLL 49 SECTION

STA. 458+12.79 TO STA. 467+14.40
STA. 615+77.88 TO STA. 715+84.26

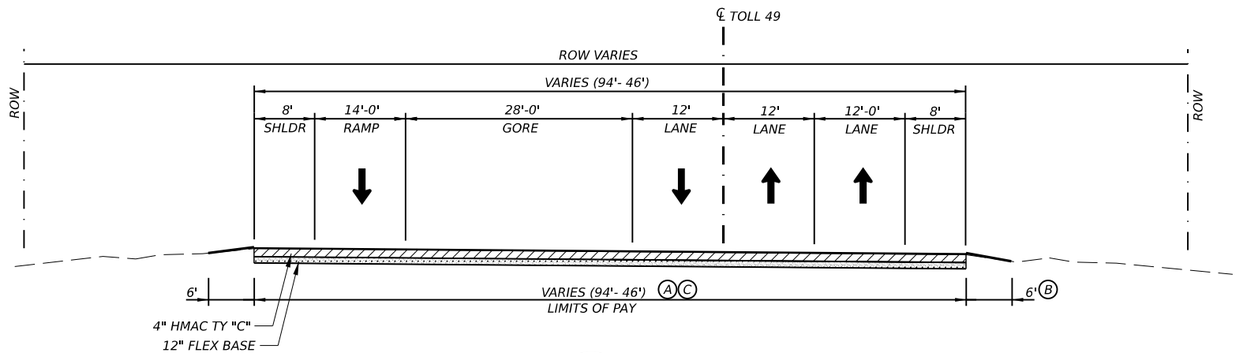
TRANSITION FROM SECTION 1 TO SECTION 5
STA. 715+84.26 TO STA. 724+24.26



2

TOLL 49 SECTION

STA. 467+14.40 TO STA. 474+00.00



3

TOLL 49 SECTION

STA. 474+00.00 TO STA. 484+82.90

LEGEND

- (A) 2.5" OVERLAY (SP-C SAC A PG 76-22)
- (B) BACKFILL EDGES (TY B)
- (C) MEMBRANE UNDERSEAL

NOTES:

1. MATCH EXISTING CROSS SLOPES.
2. ALL OVERLAY CONSTRUCTION JOINTS SHALL BE OUTSIDE WHEEL PATHS AND EDGE LINES.
3. REFER TO LAYOUTS FOR SPECIFIC WIDTHS AND LANE CONFIGURATIONS.
4. SEE JOINT LAYOUT AND STRIPING DETAIL SHEET FOR LOCATION OF PAVEMENT JOINTS AND PAVEMENT MARKING INFORMATION.
5. ALL MBGF REPLACED WITHIN THE PROJECT LIMITS ARE TO BE REPLACED WITH THE SAME LENGTH AS EXISTING CONDITIONS.
6. RUMBLE STRIPS ARE TO BE INSTALLED IN THE CENTERLINE AND EDGE OF SHOULDER.
7. ALL STRIPING NOT IDENTIFIED IN THE JOINT LAYOUT AND STRIPING DETAIL SHEET ARE TO BE PLACED IN THE SAME LOCATION AS THE EXISTING STRIPE.
8. FOR CONTRACTOR INFORMATION ONLY, THE PAVEMENT BACKFILL EDGES ARE ESTIMATED AS 3'.

0 10 20 FT
HORIZONTAL SCALE: 1" = 20"

STATE OF TEXAS
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107396
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 2

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	5

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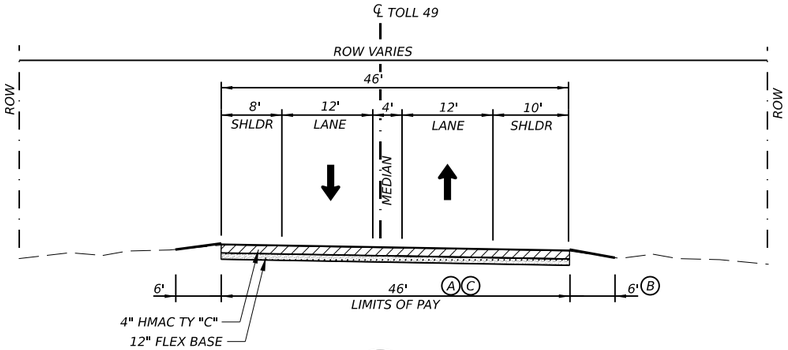
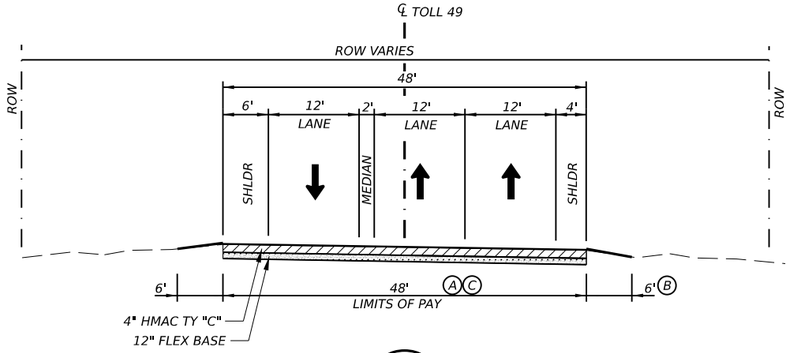


4

TOLL 49 SECTION

STA. 484+82.90 TO STA. 523+27.88
TRANSITION FROM SECTION 4 TO SECTION 5
STA. 523+27.88 TO STA. 527+77.88

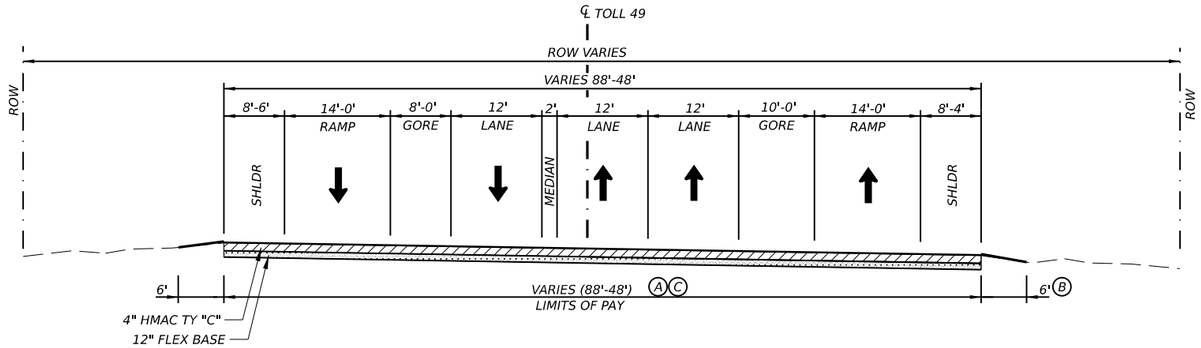


5

TOLL 49 SECTION

STA. 527+77.88 TO STA. 535+96.89
STA. 548+37.68 TO STA. 607+42.88
STA. 724+24.26 TO STA. 724+35.34

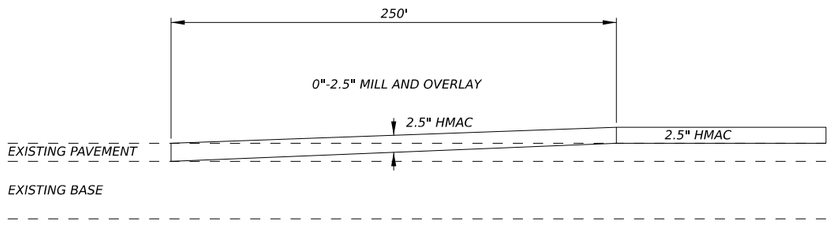
TRANSITION FROM SECTION 5 TO SECTION 1
STA. 607+42.88 TO STA. 615+77.88



6

TOLL 49 SECTION

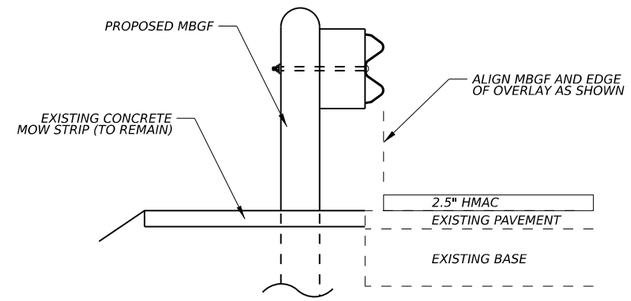
STA. 535+96.89 TO STA. 548+37.68



250' PAVEMENT TRANSITION DETAIL

NTS

SEE ROADWAY PLAN SHEETS FOR LOCATIONS



TYPICAL CROSS SECTION AT MBGF REPLACEMENT

NTS

SEE ROADWAY PLAN SHEETS FOR LOCATIONS

LEGEND

- (A) 2.5" OVERLAY (SP-C SAC A PG 76-22)
- (B) BACKFILL EDGES (TY B)
- (C) MEMBRANE UNDERSEAL

NOTES:

1. MATCH EXISTING CROSS SLOPES.
2. ALL OVERLAY CONSTRUCTION JOINTS SHALL BE OUTSIDE WHEEL PATHS AND EDGE LINES.
3. REFER TO LAYOUTS FOR SPECIFIC WIDTHS AND LANE CONFIGURATIONS.
4. SEE JOINT LAYOUT AND STRIPING DETAIL SHEET FOR LOCATION OF PAVEMENT JOINTS AND PAVEMENT MARKING INFORMATION.
5. ALL MBGF REPLACED WITHIN THE PROJECT LIMITS ARE TO BE REPLACED WITH THE SAME LENGTH AS EXISTING CONDITIONS.
6. RUMBLE STRIPS ARE TO BE INSTALLED IN THE CENTERLINE AND EDGE OF SHOULDER.
7. ALL STRIPING NOT IDENTIFIED IN THE JOINT LAYOUT AND STRIPING DETAIL SHEET ARE TO BE PLACED IN THE SAME LOCATION AS THE EXISTING STRIPE.
8. FOR CONTRACTOR INFORMATION ONLY, THE PAVEMENT BACKFILL EDGES ARE ESTIMATED AS 3'.

0 10 20 FT
HORIZONTAL SCALE: 1" = 20"

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 2

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49
DIST / COUNTY	SHEET NO.
TYL / SMITH	6

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BASIS OF ESTIMATE

	ITEM		DESCRIPTION	RATE	AMOUNT	UNIT	QUANTITY	PAY UNIT
	500	7001	MOBILIZATION			LS	1	LS
	502	7001	BARRICADES, SIGNS AND TRAFFIC HANDLING			MO	2	MO
	344	7030	SP MIXES SP-C SAC-A PG76-22	110 LBS/IN/SY	126,453	SY	17,387	TON
[1]	344	7044	SP MIXES SP-B PG64-22 (BASE REPAIR)	110 LBS/IN/SY	11,572	SY	3,819	TON
	3005	7001	MEMBRANE UNDERSEAL	0.1 GAL/SY	126,453	SY	12,645	GAL

[1] FOR CONTRACTOR INFORMATION, SUBSIDIARY TO ITEM 351. LOCATIONS SHALL BE FINALIZED AT TIME OF CONSTRUCTION.

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TBPE Firm Reg. No. 10488

NTE RMA
North East Texas Regional Mobility Authority

BASIS OF ESTIMATE

SHEET 1 OF 1

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	7

TABULATION OF SURFACE AREAS

LOCATION	FROM	TO	LENGTH	ITEM 344 [1] SUPERPAVE MIXTURES SP-C SAC-A PG76-22 (2.5" SURFACE)		ITEM 344 [1][2] SUPERPAVE MIXTURES SP-B PG 64-22 (6" BASE REPAIR)		ITEM 3005 [1] MEMBRANE UNDERSEAL	
	STA	STA	FT	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)	WIDTH (FT)	AREA (SY)
TOLL 49									
PLAN SHEET 1	*458+12.79*	*460+00.00*	*187.21*	*40*	*832*			*40*	*832*
PLAN SHEET 2	*460+00.00*	*472+00.00*	*1,200.00*	*61*	*8,142*			*61*	*8,142*
PLAN SHEET 3	*472+00.00*	*484+00.00*	*1,200.00*	*61*	*8,164*			*61*	*8,164*
PLAN SHEET 4	*484+00.00*	*496+00.00*	*1,200.00*	*46*	*6,133*	*14.66*	*652*	*46*	*6,133*
PLAN SHEET 5	*496+00.00*	*508+00.00*	*1,200.00*	*46*	*6,133*			*46*	*6,133*
PLAN SHEET 6	*508+00.00*	*520+00.00*	*1,200.00*	*46*	*6,133*			*46*	*6,133*
PLAN SHEET 7	*520+00.00*	*532+00.00*	*1,200.00*	*47*	*6,277*	*13*	*289*	*47*	*6,277*
PLAN SHEET 8	*532+00.00*	*544+00.00*	*1,200.00*	*72*	*9,625*	*14*	*311*	*72*	*9,625*
PLAN SHEET 9	*544+00.00*	*556+00.00*	*1,200.00*	*50*	*6,594*	*39*	*5,061*	*50*	*6,594*
PLAN SHEET 10	*556+00.00*	*568+00.00*	*1,200.00*	*48*	*6,400*	*39*	*1,439*	*48*	*6,400*
PLAN SHEET 11	*568+00.00*	*580+00.00*	*1,200.00*	*48*	*6,400*			*48*	*6,400*
PLAN SHEET 12	*580+00.00*	*592+00.00*	*1,200.00*	*48*	*6,400*	*13*	*1,156*	*48*	*6,400*
PLAN SHEET 13	*592+00.00*	*604+00.00*	*1,200.00*	*48*	*6,400*	*13*	*434*	*48*	*6,400*
PLAN SHEET 14	*604+00.00*	*616+00.00*	*1,200.00*	*45*	*6,011*	*13*	*144*	*45*	*6,011*
PLAN SHEET 15	*616+00.00*	*617+05.02*	*105.02*	*40*	*467*			*40*	*467*
PLAN SHEET 15	*622+06.96*	*628+00.00*	*593.04*	*40*	*2,643*			*40*	*2,643*
PLAN SHEET 16	*628+00.00*	*640+00.00*	*1,200.00*	*44*	*5,866*			*44*	*5,866*
PLAN SHEET 17	*640+00.00*	*652+00.00*	*1,200.00*	*43*	*5,759*	*13*	*144*	*43*	*5,759*
PLAN SHEET 18	*652+00.00*	*663+02.22*	*1,102.22*	*40*	*4,899*	*13*	*144*	*40*	*4,899*
PLAN SHEET 19	*666+00.00*	*678+00.00*	*1,200.00*						
PLAN SHEET 20	*679+95.98*	*688+00.00*	*804.02*	*42*	*3,712*	*14*	*1,798*	*42*	*3,712*
PLAN SHEET 21	*688+00.00*	*700+00.00*	*1,200.00*	*44*	*5,866*			*44*	*5,866*
PLAN SHEET 22	*700+00.00*	*704+15.84*	*415.84*	*41*	*1,884*			*41*	*1,884*
PLAN SHEET 23	*712+85.84*	*724+00.00*	*1,114.16*	*45*	*5,525*			*45*	*5,525*
PLAN SHEET 24	*724+00.00*	*724+35.34*	*35.34*	*48*	*188*			*48*	*188*
			PROJECT TOTALS		***126,453***		***11,572***		***126,453***

[1] QUANTITIES INCLUDED IN BASIS OF ESTIMATE.

[2] FOR CONTRACTOR'S INFORMATION, SUBSIDIARY TO ITEM 351. LOCATIONS SHALL BE FINALIZED AT TIME OF CONSTRUCTION.

Lochner
TBPE Firm Reg. No. 10488

NTE RMA
North East Texas Regional Mobility Authority

QUANTITY SUMMARY

SHEET 1 OF 5

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	8

DATE: 1/23/2025 10:18:19 AM
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SUMMARY OF ROADWAY ITEMS

LOCATION	FROM	TO	LENGTH	ITEM 134	ITEM 164	ITEM 168	ITEM 351	ITEM 354		ITEM 540	ITEM 542	ITEM 544
				7002	7073	7001	7005			7001	7001	7002
				BACKFILL (TY B)	BOND FBR MTRX SEED (PERM) (RURAL) (SAND)	VEGETATIVE WATERING	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	PLANE ASPH CONC PAV (0" TO 2.5")	PLANE ASPH CONC PAV (2.5")	MTL W-BEAM GD FEN (TIM POST)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (MOVE & RESET)
	STA	STA	FT	STA	SY	TGL	SY	SY	SY	LF	LF	EA
TOLL 49												
PLAN SHEET 1	*458+12.79*	*460+00.00*	*187.21*						*832*			
PLAN SHEET 2	*460+00.00*	*472+00.00*	*1,200.00*	*14.3*	*953*	*12*		*2,347*	*334*			
PLAN SHEET 3	*472+00.00*	*484+00.00*	*1,200.00*	*14.0*	*933*	*12*		*539*				
PLAN SHEET 4	*484+00.00*	*496+00.00*	*1,200.00*	*12.0*	*800*	*10*	*652*					
PLAN SHEET 5	*496+00.00*	*508+00.00*	*1,200.00*	*12.0*	*800*	*10*				*227*	*227*	*1*
PLAN SHEET 6	*508+00.00*	*520+00.00*	*1,200.00*	*12.0*	*800*	*10*				*48*	*48*	*1*
PLAN SHEET 7	*520+00.00*	*532+00.00*	*1,200.00*	*10.8*	*720*	*9*	*289*	*2,593*	*620*			
PLAN SHEET 8	*532+00.00*	*544+00.00*	*1,200.00*	*14.5*	*967*	*12*	*311*	*1,335*				
PLAN SHEET 9	*544+00.00*	*556+00.00*	*1,200.00*	*12.0*	*800*	*10*	*5,061*					
PLAN SHEET 10	*556+00.00*	*568+00.00*	*1,200.00*	*12.0*	*800*	*10*	*1,439*					
PLAN SHEET 11	*568+00.00*	*580+00.00*	*1,200.00*	*12.0*	*800*	*10*						
PLAN SHEET 12	*580+00.00*	*592+00.00*	*1,200.00*	*12.0*	*800*	*10*	*1,156*					
PLAN SHEET 13	*592+00.00*	*604+00.00*	*1,200.00*	*12.0*	*800*	*10*	*434*					
PLAN SHEET 14	*604+00.00*	*616+00.00*	*1,200.00*	*8.3*	*553*	*7*	*144*	*1,236*	*1,690*			
PLAN SHEET 15	*616+00.00*	*617+05.02*	*105.02*						*467*			
PLAN SHEET 15	*622+06.96*	*628+00.00*	*593.04*	*1.2*	*80*	*1*		*549*	*2,095*			
PLAN SHEET 16	*628+00.00*	*640+00.00*	*1,200.00*	*12.0*	*800*	*10*		*627*				
PLAN SHEET 17	*640+00.00*	*652+00.00*	*1,200.00*	*12.0*	*800*	*10*	*144*			*404*	*404*	*2*
PLAN SHEET 18	*652+00.00*	*663+02.22*	*1,102.22*	*5.3*	*353*	*4*	*144*	*1,111*	*2,086*	*96*	*96*	*2*
PLAN SHEET 19	*666+00.00*	*678+00.00*	*1,200.00*									
PLAN SHEET 20	*679+95.98*	*688+00.00*	*804.02*	*3.4*	*227*	*3*	*1,798*	*1,210*	*2,064*			
PLAN SHEET 21	*688+00.00*	*700+00.00*	*1,200.00*	*8.5*	*567*	*7*		*1,222*	*1,699*			
PLAN SHEET 22	*700+00.00*	*704+15.84*	*415.84*						*1,885*			
PLAN SHEET 23	*712+85.84*	*724+00.00*	*1,114.16*						*5,525*			
PLAN SHEET 24	*724+00.00*	*724+35.34*	*35.34*						*188*			
			PROJECT TOTALS	*200.3*	*13,353*	*167*	*11,572*	*12,769*	*19,485*	*775*	*775*	*6*

[1] LOCATIONS SHALL BE FINALIZED AT TIME OF CONSTRUCTION

SUMMARY OF PCMS AND TRUCK MOUNTED ATTENUATORS

	ITEM		DESCRIPTION	UNIT	QUANTITY
[1]	503	7001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	572
[2]	503	7002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	3
	505	7001	TMA (STATIONARY)	DAY	60
[3]	505	7003	TMA (MOBILE OPERATION)	DAY	60

[1] - 11 SIGNS FOR 52 DAYS EACH (INCLUDING 7 DAYS PRIOR TO CONSTRUCTION)
[2] - 3 SIGNS (PCMS WILL BECOME NETRMA PROPERTY UPON CONSTRUCTION COMPLETION)
[3] - 2 TMA'S FOR 30 DAYS EACH

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QUANTITY SUMMARY

SHEET 2 OF 5

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	9

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SUMMARY OF PAVEMENT MARKINGS

LOCATION	FROM	TO	ITEM 533		ITEM 662		ITEM 666										
			7001	7002	7115	7116	7009	7024	7030	7036	7060	7171	7213	7270	7405	7408	7423
			MILL RUMBLE STRIPS (ASPHALT) (SHLDR)	MILL RUMBLE STRIPS (ASPHALT) (CENTERLINE)	WK ZN PAV MRK SHT TERM RMV (W)4"	WK ZN PAV MRK SHT TERM RMV (Y)4"	REFL PAV MRK TY I (W) 6"(DOT) (100MIL)	REFL PAV MRK TY I (W) 8"(SLD) (100MIL)	REFL PAV MRK TY I (W) 12"(SLD) (100MIL)	REFL PAV MRK TY I (W) 24"(SLD) (100MIL)	REFL PAV MRK TY I (W) (LNDP ARW) (100MIL)	RE PM TY II (W) 4" SLD	RE PM TY II (Y) 6" SLD	RE PROFILE PM TY I (Y) 6"(SLD) (100MIL)	REFL PAV MRK TY I (W) 4"(SLD) (100MIL)	REFL PAV MRK TY I (W) 6"(BRK) (100MIL)	REFL PAV MRK TY I (Y) 6"(SLD) (100MIL)
	STA	STA	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	LF	LF	LF	LF
TOLL 49																	
PLAN SHEET 1	*448+00.00*	*460+00.00*	*274*	*137*	*567.0*	*85.5*				*39*				*375*	*2,359*	*330*	*1,980*
PLAN SHEET 2	*460+00.00*	*472+00.00*	*2,398*	*1,200*	*972.0*	*540.0*		*973*						*2,400*	*4,329*		*1,926*
PLAN SHEET 3	*472+00.00*	*484+00.00*	*2,400*	*1,200*	*585.0*	*540.0*		*769*	*360*					*2,400*	*2,602*		*201*
PLAN SHEET 4	*484+00.00*	*496+00.00*	*2,400*	*2,390*	*540.0*	*540.0*								*2,400*	*2,400*		
PLAN SHEET 5	*496+00.00*	*508+00.00*	*2,400*	*2,400*	*540.0*	*540.0*								*2,400*	*2,400*		
PLAN SHEET 6	*508+00.00*	*520+00.00*	*2,400*	*2,400*	*540.0*	*540.0*								*2,400*	*2,400*		
PLAN SHEET 7	*520+00.00*	*532+00.00*	*2,400*	*1,918*	*891.0*	*540.0*	*112*			*16*				*2,400*	*3,912*	*110*	*1,510*
PLAN SHEET 8	*532+00.00*	*544+00.00*	*2,015*	*1,200*	*828.0*	*540.0*		*598*	*200*					*2,400*	*3,522*	*300*	*1,120*
PLAN SHEET 9	*544+00.00*	*556+00.00*	*2,400*	*1,200*	*576.0*	*540.0*								*2,400*	*2,400*	*300*	
PLAN SHEET 10	*556+00.00*	*568+00.00*	*2,400*	*1,200*	*576.0*	*540.0*								*2,400*	*2,400*	*300*	
PLAN SHEET 11	*568+00.00*	*580+00.00*	*2,400*	*1,200*	*576.0*	*540.0*								*2,400*	*2,400*	*300*	
PLAN SHEET 12	*580+00.00*	*592+00.00*	*2,400*	*1,200*	*576.0*	*540.0*								*2,400*	*2,400*	*300*	
PLAN SHEET 13	*592+00.00*	*604+00.00*	*2,400*	*1,200*	*553.5*	*540.0*	*168*				*1*			*2,400*	*2,400*	*130*	
PLAN SHEET 14	*604+00.00*	*616+00.00*	*2,400*	*1,364*	*540.0*	*540.0*	*87*							*2,400*	*2,400*		
PLAN SHEET 15	*616+00.00*	*628+00.00*	*1,196*	*1,196*	*540.0*	*540.0*						*1,004*	*1,004*	*2,400*	*2,400*		
PLAN SHEET 16	*628+00.00*	*640+00.00*	*2,400*	*2,400*	*540.0*	*540.0*								*2,400*	*2,400*		
PLAN SHEET 17	*640+00.00*	*652+00.00*	*2,400*	*2,400*	*540.0*	*540.0*								*2,400*	*2,400*		
PLAN SHEET 18	*652+00.00*	*664+00.00*	*2,104*	*2,104*	*540.0*	*540.0*						*196*	*196*	*2,400*	*2,400*		
PLAN SHEET 19	*664+00.00*	*676+00.00*			*540.0*	*540.0*						*2,400*	*2,400*	*2,400*	*2,400*		
PLAN SHEET 20	*676+00.00*	*688+00.00*	*1,508*	*1,508*	*540.0*	*540.0*						*792*	*792*	*2,400*	*2,400*		
PLAN SHEET 21	*688+00.00*	*700+00.00*	*2,400*	*2,400*	*540.0*	*540.0*								*2,400*	*2,400*		
PLAN SHEET 22	*700+00.00*	*712+00.00*	*732*	*732*	*540.0*	*540.0*						*1,568*	*1,568*	*2,400*	*2,400*		
PLAN SHEET 23	*712+00.00*	*724+00.00*	*2,200*	*1,914*	*540.0*	*540.0*						*72*	*72*	*2,400*	*2,400*		
PLAN SHEET 24	*724+00.00*	*736+00.00*			*18.0*	*18.0*								*70*	*70*		
		PROJECT TOTALS	*46,027*	*34,863*	*13,738.5*	*11,983.5*	*367*	*2,340*	*560*	*55*	*1*	*6,032*	*6,032*	*53,245*	*59,994*	*2,070*	*6,737*

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NET RMA
North East Texas Regional Mobility Authority

QUANTITY SUMMARY

SHEET 3 OF 5

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49
DIST / COUNTY	SHEET NO.
TYL / SMITH	10

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SUMMARY OF PAVEMENT MARKINGS (CONT.)

LOCATION	FROM	TO	ITEM 672			ITEM 677		ITEM 678	
			7002	7004	7006	7001	7008	7001	7002
			REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	ELIM EXT PM & MRKS (4")	ELIM EXT PM & MRKS (24")	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (6")
	STA	STA	EA	EA	EA	LF	LF	LF	LF
TOLL 49									
PLAN SHEET 1	*448+00.00*	*460+00.00*	*17*	*118*		*4,294*	*39*		
PLAN SHEET 2	*460+00.00*	*472+00.00*		*216*	*49*	*3,265*			
PLAN SHEET 3	*472+00.00*	*484+00.00*		*130*	*56*				
PLAN SHEET 4	*484+00.00*	*496+00.00*		*120*					
PLAN SHEET 5	*496+00.00*	*508+00.00*		*120*					
PLAN SHEET 6	*508+00.00*	*520+00.00*		*120*					
PLAN SHEET 7	*520+00.00*	*532+00.00*		*196*	*6*	*3,032*	*16*		
PLAN SHEET 8	*532+00.00*	*544+00.00*		*176*	*55*	*1,242*			
PLAN SHEET 9	*544+00.00*	*556+00.00*		*120*	*15*				
PLAN SHEET 10	*556+00.00*	*568+00.00*		*120*	*15*				
PLAN SHEET 11	*568+00.00*	*580+00.00*		*120*	*15*				
PLAN SHEET 12	*580+00.00*	*592+00.00*		*120*	*15*				
PLAN SHEET 13	*592+00.00*	*604+00.00*		*120*	*7*				
PLAN SHEET 14	*604+00.00*	*616+00.00*		*120*					
PLAN SHEET 15	*616+00.00*	*628+00.00*		*120*		*2,008*		*1,004*	*1,004*
PLAN SHEET 16	*628+00.00*	*640+00.00*		*120*					
PLAN SHEET 17	*640+00.00*	*652+00.00*		*120*					
PLAN SHEET 18	*652+00.00*	*664+00.00*		*120*		*392*		*196*	*196*
PLAN SHEET 19	*664+00.00*	*676+00.00*		*120*		*4,800*		*2,400*	*2,400*
PLAN SHEET 20	*676+00.00*	*688+00.00*		*120*		*1,584*		*792*	*792*
PLAN SHEET 21	*688+00.00*	*700+00.00*		*120*					
PLAN SHEET 22	*700+00.00*	*712+00.00*		*120*		*3,136*		*1,568*	*1,568*
PLAN SHEET 23	*712+00.00*	*724+00.00*		*120*		*144*		*72*	*72*
PLAN SHEET 24	*724+00.00*	*736+00.00*		*4*					
		PROJECT TOTALS	*17*	*3,000*	*233*	*23,897*	*55*	*6,032*	*6,032*

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QUANTITY SUMMARY

SHEET 4 OF 5

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	11

SUMMARY OF SIGNING & DELINEATORS

LOCATION	FROM	TO	ITEM 658		
			7019	7078	[1]
			INSTL DEL ASSM (D-SW) SZ1(BRF) GF2(BI)	REMOVE DELIN & OBJECT MARKER ASSMS	INSTL DEL ASSM (D-DY) SZ4(FLX) SRF(BI)
	STA	STA	EA	EA	EA
TOLL 49					
PLAN SHEET 1	*448+00.00*	*460+00.00*			
PLAN SHEET 2	*460+00.00*	*472+00.00*			
PLAN SHEET 3	*472+00.00*	*484+00.00*			
PLAN SHEET 4	*484+00.00*	*496+00.00*			
PLAN SHEET 5	*496+00.00*	*508+00.00*	*4*		
PLAN SHEET 6	*508+00.00*	*520+00.00*	*1*		
PLAN SHEET 7	*520+00.00*	*532+00.00*			
PLAN SHEET 8	*532+00.00*	*544+00.00*			
PLAN SHEET 9	*544+00.00*	*556+00.00*			
PLAN SHEET 10	*556+00.00*	*568+00.00*			
PLAN SHEET 11	*568+00.00*	*580+00.00*			
PLAN SHEET 12	*580+00.00*	*592+00.00*			
PLAN SHEET 13	*592+00.00*	*604+00.00*			
PLAN SHEET 14	*604+00.00*	*616+00.00*			
PLAN SHEET 15	*616+00.00*	*628+00.00*		*15*	*15*
PLAN SHEET 16	*628+00.00*	*640+00.00*		*101*	*101*
PLAN SHEET 17	*640+00.00*	*652+00.00*	*7*	*100*	*100*
PLAN SHEET 18	*652+00.00*	*664+00.00*	*3*	*57*	*57*
PLAN SHEET 19	*664+00.00*	*676+00.00*			
PLAN SHEET 20	*676+00.00*	*688+00.00*			
PLAN SHEET 21	*688+00.00*	*700+00.00*			
PLAN SHEET 22	*700+00.00*	*712+00.00*			
PLAN SHEET 23	*712+00.00*	*724+00.00*			
PLAN SHEET 24	*724+00.00*	*736+00.00*			
		PROJECT TOTAL	*15*	*273*	*273*

[1] - REINSTALL EXISTING DELINEATORS AFTER FINAL STRIPING

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QUANTITY SUMMARY

SHEET 5 OF 5

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	12

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County: Smith

Highway: TOLL 49

GENERAL NOTES

GENERAL

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

Following completion of the overlay through the existing toll gantry (approximately Sta 651+00) the Contractor will cooperate with the Toll Operator "Sice, Inc." so that they can access the site to place the new treadles into the pavement.

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

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

ITEM 8. PROSECUTION AND PROGRESS

Time shall be charged according to TxDOT's 2024 Standard Specifications Article 8.3.1.5, Calendar Day.

Work shall only occur between the hours of 9:00 p.m. and 6:30 a.m. During this time, full closures of Toll 49 are allowed from IH 20 to SH 64. Traffic control operations in preparation for full closures may begin each night at 8:00 p.m., but the full closure cannot go into effect until 9:00 p.m. A grace period exists to remove the full closure between 6:00 a.m. and 6:30 a.m. If the nighttime closure is not completely removed by 6:31 a.m., the contractor will incur a $1,000 late closure removal penalty that increases on $1,000 increments each ½-hour until the closure is completely removed.

Paving must occur such that the interior edge condition within an area remains for only one day. For example, if southbound lanes were paved during the nighttime full closure, the adjacent northbound lanes shall be paved during the next full closure to eliminate the edge condition.

Work can begin no earlier than Tuesday, May 27, 2025. Once work begins, time charges commence using the Calendar Day charging structure. The contractor has 48 calendar days to complete the project. The latest date on which the contractor may begin the project is Monday, August 4, 2025. The contractor may begin the project at anytime between May 27, 2025 and August 4, 2025. The contractor must provide the NETRMA with 2-weeks advanced notice prior to beginning work. Once work begins, time charges will begin and will not stop until completion of the project.

County: Smith

Highway: TOLL 49

Due to the constrained working hours, calendar days accrue between 8 p.m. on the day work begins and 6:30 a.m. the following morning. The project includes a progressively increasing incentive and disincentive structure to promote on-time completion of the project. The time-based incentive and disincentive structure uses the structure in the following tables. The incentive structure is limited to 10-days early and maximizes at $32,500 per day and a cumulative amount of $243,775. No cap exists on the disincentive. The maximum daily disincentive is $32,500 per day with no limit on the number days it can accrue.

Work may be performed on any calendar-day night except those noted below:

- Thursday, July 3, 2025 from 9:00 p.m. to 6:30 a.m.
- Friday, July 4, 2025 from 9:00 p.m. to 6:30 a.m.
- Saturday, July 5, 2025 from 9:00 p.m. to 6:30 a.m.
- Sunday, August 31, 2025 from 9:00 p.m. to 6:30 a.m.
- Monday, September 1, 2025 from 9:00 p.m. to 6:30 a.m.

For contract time determination, the engineers assumed a 48-calendar day schedule between the first closure on the night of Monday, June 2, 2025 and the targeted last full closure on the night of Tuesday, July 15, 2025. For activity duration, the engineers assumed:

- Contractors would not work at least one day per week (6 nonwork days),
- Contractors would not work on July 4th (3 nonwork days),
- And the contractor would lose 5 days to rain on anticipated work days within that span.

Portable changeable message boards (PCMBs) are required 7 calendar days prior to full closures beginning and must remain in place as part of the closure traffic control throughout the closure duration. Once construction begins, PCMBs shall display a message during daytime hours alerting motorists of the upcoming closure. During the nighttime closure, the message shall be modified alerting motorists of the full closure. The PCMB requirements for full closures are:

- 1 PCMB adjacent to Toll 49 southbound, 1-mile north of the IH 20 exit ramp
- 2 PCMB on IH 20, each placed a 1-mile from Toll 49 entrance ramps (east and west respectively),
- 2 PCMB on SH 110, each placed a 1-mile from Toll 49 (east and west respectively),
- 2 PCMB on SH 64, each placed a 1-mile from Toll 49 (east and west respectively),
- 1 PCMB adjacent to Toll 49 northbound, 1-mile south of the SH 64 exit ramp,
- 2 PCMB on SH 31, each placed a 1-mile from Toll 49 (east and west respectively),
- 2 PCMB on SH 155, each placed a 1-mile from Toll 49 (east and west respectively),
- 2 PCMB on US 69, each placed a 1-mile from Toll 49 (north and south respectively)

Payment for the 14 PCMBs described will be paid by the day for 11 PCMBs and by the each for 3 PCMBs. After construction completion, 3 PCMBs will become property of NETRMA.

Prepare the progress schedule as a bar chart. The bar chart schedule must clearly indicate workdays and non-workdays, including weather day estimations. This bar chart schedule must be

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GENERAL NOTES

SHEET 1 OF 8

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	13

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submitted at least 7-calendar days prior to the preconstruction meeting. The preconstruction meeting must be held at least two weeks prior to the first full closure.

Incentive Structure

Calendar Day	Days Early or Late	Daily Incentive / Disincentive	Cumulative Incentive / Disincentive Available
38	-10	$ 32,500	$ 243,775
39	-9	$ 32,500	$ 211,275
40	-8	$ 32,500	$ 178,775
41	-7	$ 32,500	$ 146,275
42	-6	$ 32,500	$ 113,775
43	-5	$ 27,085	$ 81,275
44	-4	$ 21,670	$ 54,190
45	-3	$ 16,255	$ 32,520
46	-2	$ 10,840	$ 16,265
47	-1	$ 5,425	$ 5,425
48	0	$ -	$ -

Disincentive Structure

Calendar Day	Days Early or Late	Daily Incentive / Disincentive	Cumulative Incentive / Disincentive Available
48	0	$ -	$ -
49	1	$ (5,425)	$ (5,425)
50	2	$ (5,425)	$ (10,850)
51	3	$ (5,425)	$ (16,275)
52	4	$ (5,425)	$ (21,700)
53	5	$ (5,425)	$ (27,125)
54	6	$ (10,840)	$ (37,965)
55	7	$ (10,840)	$ (48,805)
56	8	$ (16,255)	$ (65,060)
57	9	$ (16,255)	$ (81,315)
58	10	$ (21,670)	$ (102,985)
59	11	$ (21,670)	$ (124,655)
60	12	$ (27,085)	$ (151,740)
61	13	$ (27,085)	$ (178,825)
62	14	$ (27,085)	$ (205,910)
63	15	$ (32,500)	$ (238,410)

ITEM 9. MEASUREMENT & PAYMENT

In accordance with Article 9.1., "Measurement of Quantities," furnish the tare and maximum gross weights as well as the volume capacity of all vehicles, trucks, truck-tractors, trailers, semi-trailers, or combination of such vehicles used to deliver materials for this Contract. Also, furnish

County: Smith

Highway: TOLL 49

calculations supporting these weights and capacities. Provide all measurements required for pay a minimum of 2 days before the trucks are used.

ITEM 134. BACKFILLING PAVEMENT EDGES

Compact the backfill adjacent to the pavement edge with approved equipment. This compaction will not be paid for directly, but will be subsidiary to Item 134.

After the application of fertilizer, apply an emulsified asphalt treatment, consisting of SS-1 asphalt at a rate of 0.3 gal per sq. yd.

Backfill material can be obtained from ditch line in the project area or from the NETRMA maintenance yard located on the NW corner of Toll 49 and SH 64.

ITEM 164. SEEDING FOR EROSION CONTROL

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

ITEM 310. PRIME COAT

Provide emulsion with a dilution rate of 50%.

ITEM 344. SUPERPAVE MIXTURES

Paving and trucking operations shall be sequenced so that delivery trucks enter the workzone in the direction of paving and exit the workzone in the direction of paving. U-turns within the workzone to reach the paver or return to the plant are not allowed.

Source changes are not allowed without written approval by the Engineer.
Reclaimed Asphalt Pavement (RAP) is not allowed in the surface course. Reclaimed Asphalt Shingles (RAS) are not allowed in any course.

The mainlane surface course requires 100% Surface Aggregate Classification (SAC) Class A aggregate. Blending aggregates to meet Class A requirements is not allowed. Provide Class A coarse aggregate for the surface as listed in the TxDOT's *Bituminous Rate Source Quality Catalog* (BRSQC).

PG76-22 asphalt binder is required in the surface course. Lower performance-grade substitute binders are not permitted in the surface course.

The surface course shall be placed using a spray paver application. This paver must be capable of constructing a spray paver applied tack coat. The tack coat shall be an emulsified membrane placed directly on the existing surface treatment at a residual asphalt rate of between 0.08 gal/SY and 0.10 gal/SY.

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Mineral Filler, Additives, and Compaction Aids require the Engineer's approval before use. The need and benefits of using these materials should be clearly articulated in the bidder's response or during the interview phase.

The surface course must have a minimum asphalt content at 50 gyrations of 5.0%. Certificates of Delivery for asphalt binder must be provided to the engineer to confirm asphalt content.
A Material Transfer Device (MTD) is required for surface paving operations. Windrow operations are not allowed.

The surface course shall be constructed with in-place air voids between 3.0% and 7.0%. Table 20 in TxDOT's 2024 Standard Specifications is modified as shown below:

In-Place Air Voids	Placement Payment Adjustment Factor	In-Place Air Voids	Placement Payment Adjustment Factor	In-Place Air Voids	Placement Payment Adjustment Factor
< 1.0	Remove and Replace	3.8	1.025	6.6	1.015
1.1	0.440	3.9	1.050	6.7	1.010
1.2	0.470	4.0	1.075	6.8	1.050
1.3	0.500	4.1	1.075	6.9	1.000
1.4	0.530	4.2	1.075	7	1.000
1.5	0.560	4.3	1.075	7.1	0.097
1.6	0.590	4.4	1.075	7.2	0.094
1.7	0.620	4.5	1.075	7.3	0.091
1.8	0.650	4.6	1.075	7.4	0.088
1.9	0.680	4.7	1.075	7.5	0.085
2.0	0.710	4.8	1.075	7.6	0.082
2.1	0.740	4.9	1.075	7.7	0.079
2.2	0.770	5.0	1.075	7.8	0.076
2.3	0.800	5.1	1.072	7.9	0.073
2.4	0.830	5.2	1.069	8	0.070
2.5	0.860	5.3	1.066	8.1	0.067
2.6	0.890	5.4	1.063	8.2	0.064
2.7	0.920	5.5	1.060	8.3	0.061
2.8	0.950	5.6	1.057	8.4	0.058
2.9	0.980	5.7	1.054	8.5	0.055
3.0	1.000	5.8	1.051	8.6	0.052
3.1	1.000	5.9	1.048	8.7	0.049
3.2	1.000	6.0	1.045	8.8	0.046
3.3	1.000	6.1	1.040	8.9	0.043
3.4	1.000	6.2	1.035	9	0.040
3.5	1.000	6.3	1.030	>9.0	Remove and Replace
3.6	1.000	6.4	1.025		
3.7	1.000	6.5	1.020		

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

For materials paid for by the ton, provide a summary spreadsheet in accordance with Article 520.2, "Equipment," in TxDOT's 2024 Standard Specifications.

Use an electrical impedance (non-nuclear) measurement gauge to determine mat segregation and joint density for Part V and Part VIII of test procedure tex-207-F.

ITEM 351. FLEXIBLE PAVEMENT STRUCTURE REPAIR

Replace the unstable pavement structure with 6 in. of asphaltic concrete pavement base (SP MIXES SP- B PG64-22, unless otherwise directed. The Project Manager will determine the exact locations and limits of pavement repair in the field prior to beginning this Item of work.

Furnish planing equipment to remove existing material in accordance with Item 354, as directed. The planing equipment will be subsidiary to Item 351.

Before placement of HMAC the limits of the structure repair shall be proof rolled in accordance with Item 216.

Furnish an asphalt paver in accordance with Item 320 unless otherwise directed.

Material removed will be salvaged. Deliver and stockpile salvaged material at the NETRMA maintenance yard located on the NW corner of Toll 49 and SH 64.

ITEM 354. PLANING AND TEXTURING PAVEMENT

Overlay all planed areas by the end of each day unless otherwise approved.

If unsuitable weather or other unexpected conditions do not allow planed areas to be overlaid, provide and maintain warning signs for overnight lane closures in accordance with the traffic control plan sheets until overlay operations are complete.

Any damage to concrete mow strip during planning operations will be repaired at the contractor's expense.

All RAP generated from this project belongs to the NETRMA. Contractor will be required to deliver the RAP to the maintenance yard located on the NW corner of Toll 49 and SH 64. This work will not be paid for directly, but will be subsidiary to this item.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

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sheets; Compliant Work Zone Traffic Control Device List, and Item 502 of the standard specifications.

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

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

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

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

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

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

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

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

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

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

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

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

U-turns on Toll 49 for trucks delivering any type of construction material (e.g., HMA, embankment, backfill) is not allowed.

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

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

ITEM 503. PORTABLE CHANGEABLE MESSAGE SIGN

All Portable Changeable Message Sign (PCMS) will be "SMC 2000 Full Matrix Solar Message Center" or approved equal. The LED display shall have the capability of Full-matrix display that can provide graphic messages and arrows. The controller shall be WIFI compatible with features including secure password protection, calendar day programming and include a minimum of 250 preprogrammed messages and the capability for an additional 100 user-created messages.

After construction completion, 3 PCMS will become property of NETRMA. The Project Manager will approve the 3 PCMS and label them so they are identifiable and cannot be removed from the project without the NETRMAs permission. The communication plan shall be transferable to the NETRMA.

Provide a non-erodible, stable surface to place the PCMS units adjacent to the roadway as directed. Payment for this surface is incidental to Item 503.

ITEM 505. TRUCK-MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)

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

ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

Provide the following Items for the SWP3 for this Contract as directed on a force account basis:

Temporary sediment control fence, seeding for erosion control, earthwork for erosion control, and vegetative watering

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ITEM 533. RUMBLE STRIPS

Provide traffic control for roadways with other lane configurations as directed.

Provide a sweeper that meets the requirements of Section 354.2.3.

One set of centerline rumble strips is required when the median width is between 24 inches and 36 inches. Two sets of centerline rumble strips are required when the median width is between 36 inches and 48 inches.

ITEM 540. METAL BEAM GUARD FENCE

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

Do not paint treated timber posts.

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

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

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

The existing concrete mowstrip shall be re-used. Repair to the concrete mowstrip due to MBGF removal and replacement operations will not be paid for directly by will be subsidiary to Item 540.

ITEM 542. REMOVING METAL BEAM GUARD FENCE

All metal beam guard fence and associated hardware will be salvaged and delivered to the NETRMA maintenance yard located on the NW corner of Toll 49 and SH 64.

ITEM 585. RIDE QUALITY FOR PAVEMENT SURFACES

Unless otherwise noted below, TxDOT Item 585, “Ride Quality for Pavement Surfaces,” from the 2024 Standard Specifications applies.

Preconstruction ride quality data were collected on November 6, 2024.

provides the lane descriptions for the data collection. *Table 2, Table 3*, and *Table 4* provide the preconstruction IRI values averaged on 0.1-mi increments. These tables also provide notes on

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leave-outs.

Bridges shall not be overlaid and will be considered leave-outs in the post-construction ride quality analysis. 100 ft. lead-in and lead-out lengths are permissible on all bridge ends. These areas shall be tested using a 10 ft. straight-edge as outlined in Test Type A of Item 585. 100 ft. lead-in and lead-out lengths are permissible at each end of the project. These areas shall be tested using a 10 ft. straight-edge as outlined in Test Type A of Item 585. Preconstruction .pro files are available upon request.

Table 1. Toll 49 Segment 3B Ride Quality Lane Descriptions

SB Outside Lane:	K2	Includes right (slow) lane in Super 2 locations
SB Mainlane:	K1	Includes single lane and left (passing) lane in Super 2 locations
NB Mainlane:	K6	Includes single lane

Table 2. Lane K2 Preconstruction Ride Quality

Toll 49 Segment 3B North (K2) Southbound Outside Lane

Distance	Begin	End	IRI(L)	IRI(R)	Avg IRI
0.1	527+34	532+62	54.55	70.56	63
0.2	532+62	537+90	69.96	61.2	66
0.3	537+90	543+18	53.44	46.97	50
0.4	543+18	548+46	68.83	61.32	65
0.5	548+46	553+74	124.74	124.51	125
0.6	553+74	559+02	90.5	89.69	90
0.7	559+02	564+30	108.66	103.51	106
0.8	564+30	569+58	73.23	79.79	77
0.9	569+58	574+86	58.23	52.23	55
1	574+86	580+14	65.27	73.76	70
1.1	580+14	585+42	59.74	74.4	67
1.2	585+42	590+70	64.33	64.66	64
1.3	590+70	595+98	51.22	46.93	49
1.4	595+98	601+26	57.51	73.51	66
1.5	601+26	606+54	90.58	94.54	93

Table 3. Lane K1 Preconstruction Ride Quality Data

Toll 49 Segment 3B North (K1) Southbound Mainlane and Passing Lane

Distance	Begin	End	IRI(L)	IRI(R)	Avg IRI
0.1	458+78	464+06	38	41.57	40
0.2	464+06	469+34	67.37	67.17	67
0.3	469+34	474+62	50.48	53.52	52
0.4	474+62	479+90	47.58	42.97	45
0.5	479+90	485+18	62.26	83.21	73
0.6	485+18	490+46	67.92	80.73	74
0.7	490+46	495+74	49.27	58.61	54
0.8	495+74	501+02	50.02	52.6	51
0.9	501+02	506+30	69.25	70.27	70
1	506+30	511+58	73.06	79.54	76

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1.1	511+58	516+86	52.23	53.05	53
1.2	516+86	522+14	54.46	57.15	56
1.3	522+14	527+42	69.12	74.06	72
1.4	527+42	532+70	60.75	67.8	64
1.5	532+70	537+98	59.62	65.64	63
1.6	537+98	543+26	44.59	41.23	43
1.7	543+26	548+54	61.02	59.54	60
1.8	548+54	553+82	104.88	123.37	114
1.9	553+82	559+10	108.33	98.08	103
2	559+10	564+38	121.93	125.69	124
2.1	564+38	569+66	89.82	98.52	94
2.2	569+66	574+94	63.35	79.59	71
2.3	574+94	580+22	70.64	71.25	71
2.4	580+22	585+50	78.1	72.85	75
2.5	585+50	590+78	108.29	97.6	103
2.6	590+78	596+06	68	73.67	71
2.7	596+06	601+34	67.29	68.1	68
2.8	601+34	606+62	77.33	75.45	76
2.9	606+62	611+90	64.57	64.96	65
2.9713	611+90	615+66.5	115.54	102.59	109
3.0972	615+66.5	622+31.3	Caney Creek Bridge Leave-out (664.8 ft)		
3.1	622+31.3	622+46	131.97	109	120
3.2	622+46	627+74	101.56	79.79	91
3.3	627+74	633+02	65.15	63.89	65
3.4	633+02	638+30	84.96	68.2	77
3.5	638+30	643+58	52.77	57.04	55
3.6	643+58	648+86	61.29	80.76	71
3.7	648+86	654+14	109.39	117.77	114
3.8	654+14	659+42	65.42	66.89	66
3.8506	659+42	662+09.2	79.75	93.86	87
4.2041	662+09.2	680+75.3	Prairie Creek Bridge Leave-out (1,866.1 ft)		
4.3	680+75.3	685+81.7	80.47	94.49	87
4.4	685+81.7	691+09.7	82.83	77.95	80
4.5	691+09.7	696+37.7	83.81	78.44	81
4.6	696+37.7	701+65.7	64.13	80.23	72
4.6319	701+65.7	703+34.1	85.51	92.75	89
4.8107	703+34.1	712+78.2	Black Fork Creek Bridge Leave-out (944.1 ft)		
4.9	712+78.2	717+49.7	76.93	79.18	78
5	717+49.7	722+77.7	65.01	61.61	63
5.0143	722+77.7	723+53.2	69.04	63.83	66

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Table 4. Lane K6 Preconstruction Ride Quality Data

Toll 49 Segment 3B North (K6) *North*bound Mainlane

Distance	Begin	End	IRI(L)	IRI(R)	Avg IRI
0.1	724+08.	718+80.	84.89	80.73	83
0.2	718+80.	713+52.	87.12	84.74	86
0.201	713+52.	713+46.7	-	-	-
0.3795	713+46.7	704+04.4	Black Fork Creek Bridge Leave-out (942.3 ft)		
0.4	704+04.4	702+96.2	119.57	85.29	102
0.5	702+96.2	697+68.2	88.48	75.81	82
0.6	697+68.2	692+40.2	66.28	78.56	72
0.7	692+40.2	687+12.2	57.95	50.36	54
0.8	687+12.2	681+84.2	92.44	149.06	121
0.8179	681+84.2	680+89.7	80.79	137.61	109
1.1658	680+89.7	662+52.5	Prairie Creek Bridge Leave-out (1,837.2 ft)		
1.2	662+52.5	660+71.9	155.96	127.61	142
1.3	660+71.9	655+43.9	77.33	73.82	76
1.4	655+43.9	650+15.9	122.44	102.61	113
1.5	650+15.9	644+87.9	78.94	52.91	66
1.6	644+87.9	639+59.9	60.7	63.45	62
1.7	639+59.9	634+31.9	103.32	86.08	95
1.8	634+31.9	629+03.9	56.84	63.28	60
1.9	629+03.9	623+75.9	100.33	93.09	97
1.9158	623+75.9	622+92.5	102.09	92	97
2.0316	622+92.5	616+80.8	Caney Creek Bridge Leave-out (611.7 ft)		
2.1	616+80.8	613+19.6	81.46	84.34	83
2.2	613+19.6	607+91.6	72.16	74.07	73
2.3	607+91.6	602+63.6	95.29	101.03	98
2.4	602+63.6	597+35.6	63.66	70.83	67
2.5	597+35.6	592+07.6	60.94	61.24	61
2.6	592+07.6	586+79.6	82.82	94.79	89
2.7	586+79.6	581+51.6	88.46	78.54	83
2.8	581+51.6	576+23.6	61.92	74.69	68
2.9	576+23.6	570+95.6	57.05	62.31	60
3	570+95.6	565+67.6	72.34	80.91	77
3.1	565+67.6	560+39.6	95.75	105.22	100
3.2	560+39.6	555+11.6	102.25	131.99	117
3.3	555+11.6	549+83.6	85.39	104.89	95
3.4	549+83.6	544+55.6	55.79	67.69	62
3.5	544+55.6	539+27.6	45.78	55.75	51
3.6	539+27.6	533+99.6	49.73	49.31	50
3.7	533+99.6	528+71.6	61.19	79.63	70
3.8	528+71.6	523+43.6	72.07	68.09	70
3.9	523+43.6	518+15.6	63.19	59.72	61

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4	518+15.6	512+87.6	80.27	74.28	77
4.1	512+87.6	507+59.6	77.3	77.08	77
4.2	507+59.6	502+31.6	95.55	90.31	93
4.3	502+31.6	497+03.6	65.93	62.52	64
4.4	497+03.6	491+75.6	50.63	51.78	51
4.5	491+75.6	486+47.6	95.39	67.9	82
4.6	486+47.6	481+19.6	104.85	92.77	99
4.7	481+19.6	475+91.6	61.77	66	64
4.8	475+91.6	470+63.6	50.8	53.93	52
4.9	470+63.6	465+35.6	79.09	67	73
5	465+35.6	460+07.6	56.81	52.02	54
5.0122	460+07.6	459+43.2	54.15	48.09	51

Use Surface Test TY B to evaluate the smoothness of all travel lanes.

Ride quality bonus/penalty payment for all travel lanes shall use the formulas shown in *Table 4*.

Table 4. Travel Lane Ride Quality Bonus/Penalty Structure

Average IRI Range for 0.1-mi. section (in./mi.)	Pay Adjustment ($/0.1-mi Section)
IRI < 25	3000
25 ≤ IRI < 35	-250*(IRI)+9250
35 ≤ IRI < 45	-50*(IRI)+2250
45 ≤ IRI < 55	0
55 ≤ IRI < 65	-50*(IRI)+2700
65 ≤ IRI < 80	-160*(IRI)+9740
80 ≤ IRI	*Deficient

*All deficient sections require corrective work to bring the average IRI value below the deficient threshold (i.e., 80 in./mi.) unless the engineer decides to impose a $6,000 per deficient section penalty. After performing corrective work, deficient sections shall be reprofiled to ensure ride quality is no longer deficient. Each adjacent 0.1-mi section must also be reprofiled to ensure corrective work did not impact the ride quality of adjacent sections. If the ride quality changes by more than +6 in./mi in the adjacent sections, the new ride quality will be used or corrective work required if indicated by the new measurements. The appropriate bonus/penalty shall be applied to the corrected surface. Corrective work shall be done at night and the appropriate liquidated damages shall be applied if the contract time has been exhausted.

ITEM 658. DELINEATOR AND OBJECT MARKER ASSEMBLIES

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

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ITEM 662. WORK ZONE PAVEMENT MARKINGS

Furnish and place work zone pavement markings (short term)(tape) on center lines and lane lines in accordance with WZ(STPM), and provide warning signs in accordance with TCP (7-1). Place tape within 1 in. of the proper alignment as established by the Contractor and approved by the Engineer. Remove tape after placement of permanent markings. Tape removal will be subsidiary to Item 662. Tabs are not allowed.

Multiple Move-ins will be required to maintain adequate striping.

ITEM 666. RETROREFLECTORIZED PAVEMENT MARKINGS

Place Type II Pavement Markings as a sealer for Type I Pavement Markings on bridge and concrete surfaces only. Place Type I Markings a minimum of seven (7) calendar days after placing Type II Markings.

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

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

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

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

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

ITEM 672. RAISED PAVEMENT MARKERS

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

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ITEM 677. ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

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

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

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

Multiple Move-ins will be required to maintain adequate striping.

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North East Texas Regional Mobility Authority

GENERAL NOTES

SHEET 8 OF 8

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	20

TRAFFIC CONTROL PLAN NARRATIVE

GENERAL

1. MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL MEASURES IMPLEMENTED DURING CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND THE LATEST TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) BC, WZ, AND TCP STANDARD DRAWINGS OF THE TRAFFIC ENGINEERING STANDARD SHEETS.

2. THE CONTRACTOR SHALL ENSURE THAT ALL IMPLEMENTED TRAFFIC CONTROL MEASURES ARE MAINTAINED IN A CLEAN AND FUNCTIONAL CONDITION AT ALL TIMES, INCLUDING MAINTENANCE DUE TO ACTS OF VANDALISM OR ACCIDENT. THE CONTRACTOR SHALL HAVE ADEQUATE REPLACEMENT TRAFFIC CONTROL DEVICES AVAILABLE AT ALL TIMES IN ORDER TO REPLACE THOSE DAMAGED WITHIN 24 HOURS OF NOTIFICATION.

3. ADVANCE WARNING SIGNS SHALL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL ADJUST LOCATION OF SIGNS IN ACCORDANCE WITH APPLICABLE BC STANDARDS AND THE LATEST TMUTCD OR AS DIRECTED BY THE ENGINEER.

4. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTABILITY & VISIBILITY. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.

5. THE CONTRACTOR SHALL COVER OR OTHERWISE REMOVE FROM VIEW OF THE TRAVELING PUBLIC EXISTING TRAFFIC SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL SIGNS OR THE INTENT OF THE TRAFFIC CONTROL PLANS. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.

6. THE TRAFFIC CONTROL PLAN NARRATIVE AND TRAFFIC CONTROL LAYOUTS SERVE AS A GUIDE FOR SEQUENCING CONSTRUCTION AND THE SAFE HANDLING OF TRAFFIC DURING CONSTRICTION OF THE PROPOSED IMPROVEMENTS AND DO NOT ATTEMPT TO ADDRESS EVERY ASPECT OF CONSTRUCTION THAT IS REQUIRED OR COULD BE ENCOUNTERED DURING EACH PHASE OF CONSTRUCTION. THE CONTRACTOR HAS SOLE RESPONSIBILITY OF CONSTRUCTING THE PROPOSED IMPROVEMENTS AND PROVIDING FOR THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION.

TRAFFIC CONTROL PLAN

1. WORK SHALL OCCUR BETWEEN THE HOURS OF 9:00 P.M. AND 6:00 A.M. DURING THIS TIME, FULL CLOSURES OF TOLL 49 ARE ALLOWED FROM IH 20 TO SH 64. TRAFFIC CONTROL OPERATIONS IN PREPARATION FOR FULL CLOSURES MAY BEGIN EACH NIGHT AT 8:00 P.M., BUT THE FULL CLOSURE CANNOT GO INTO EFFECT UNTIL 9:00 P.M. A GRACE PERIOD EXISTS TO REMOVE THE FULL CLOSURE BETWEEN 6:00 A.M. AND 6:30 A.M. IF THE NIGHTTIME CLOSURE IS NOT COMPLETELY REMOVED BY 6:31 A.M., THE CONTRACTOR WILL INCUR A $1,000 LATE CLOSURE REMOVAL PENALTY THAT INCREASES ON $1,000 INCREMENTS EACH ½-HOUR UNTIL THE CLOSURE IS COMPLETELY REMOVED.

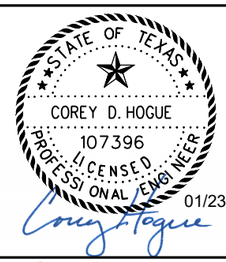
2. BASE REPAIR LOCATIONS SHALL BE FINALIZED AT TIME OF CONSTRUCTION AND REPAIRED BEFORE MILLING OR OVERLAY OPERATIONS. IN AREAS OF BASE REPAIR THAT INCLUDE MILLING (I.E., SOUTH APPROACH OF THE PRAIRIE CREEK BRIDGE), IT IS UNDERSTOOD THAT THE MILLING OPERATION WILL REMOVE UP TO 2.5" OF THE BASE REPAIR.

3. PAVING EDGE CONDITIONS MUST BE IN ACCORDANCE WITH "TREATMENT FOR VARIOUS EDGE CONDITIONS." PAVING MUST OCCUR SUCH THAT THE INTERIOR EDGE CONDITION WITHIN AN AREA REMAINS FOR ONLY ONE DAY. FOR EXAMPLE, IF SOUTHBOUND LANES WERE PAVED DURING THE NIGHTTIME FULL CLOSURE, THE ADJACENT NORTHBOUND LANES SHALL BE PAVED DURING THE NEXT FULL CLOSURE TO ELIMINATE THE EDGE CONDITION.

4. THE HMA SURFACE LAYDOWN OPERATION SHOULD BE SUCH THAT LONGITUDINAL JOINTS DO NOT FALL WITHIN THE WHEELPATHS OR THE MIDDLE OF THE LANES. WHEELPATHS SHALL BE DEFINED AS BEGINNING 1 FT. FROM THE THE TRAVEL SIDE OF THE PERMANENT PAVEMENT MARKINGS AND PROCEEDING FOR 3 FT. INTO THE TRAVELED AREA. TO ACHIEVE THIS, 8 FT. WIDE MAT CONSTRUCTION ON SHOULDERS WILL BE REQUIRED IN SOME AREAS. SEE TYPICAL JOINT LAYOUT AND STRIPING DETAIL SHEET FIGURE 1 FOR JOINT AND STRIPING CONFIGURATION WHEN TOLL 49 HAS ONE LANE IN EACH DIRECTION. IN THESE AREAS, 8 FT. MAT WIDTHS ARE REQUIRED FOR SHOULDER CONSTRUCTION. WHEN TOLL 49 HAS A SUPER 2 CONFIGURATION, SEE TYPICAL JOINT LAYOUT AND STRIPING DETAIL SHEET FIGURE 2.

5. 4 IN. WORK ZONE PAVEMENT MARKINGS (TAPE SHALL BE USED, TABS ARE NOT ALLOWED) ARE REQUIRED EACH NIGHT BEFORE OPENING THE ROADWAY TO TRAFFIC. THE TAPE MUST BE COMPLETELY REMOVED PRIOR TO PLACEMENT OF THE PERMANENT PAVEMENT MARKINGS. TEMPORARY MARKINGS SHALL NOT REMAIN IN PLACE LONGER THAN 14-DAYS. TEMPORARY EDGELINE MARKINGS ARE NOT REQUIRED.

6. EACH BRIDGE END WITHIN THE PROJECT REQUIRES A 2.5 IN. MILL AND FILL THROUGH THE CONCRETE MOWSTRIP LENGTH. BEYOND THIS LENGTH, A 250 FT. TAPER MILL IS REQUIRED TO RETURN TO THE EXISTING SURFACE. TIE-IN LOCATIONS AT LOCATIONS WITHOUT MOWSTRIP ONLY REQUIRE THE TAPER MILL FROM 2.5 IN. TO 0 IN. MILLED AREAS ON MAINLANES SHALL BE PAVED BACK FLUSH WITHTHE EXISTING SURFACE EACH NIGHT BEFORE OPENING THE ROADWAY TO TRAFFIC. MILLED SHOULDERS DO NOT HAVE TO BE PAVED PRIOR TO OPENING THE ROADWAY IF SHOULDER CLOSURES ARE IN-PLACE AND MAINTAINED.



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TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	21

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

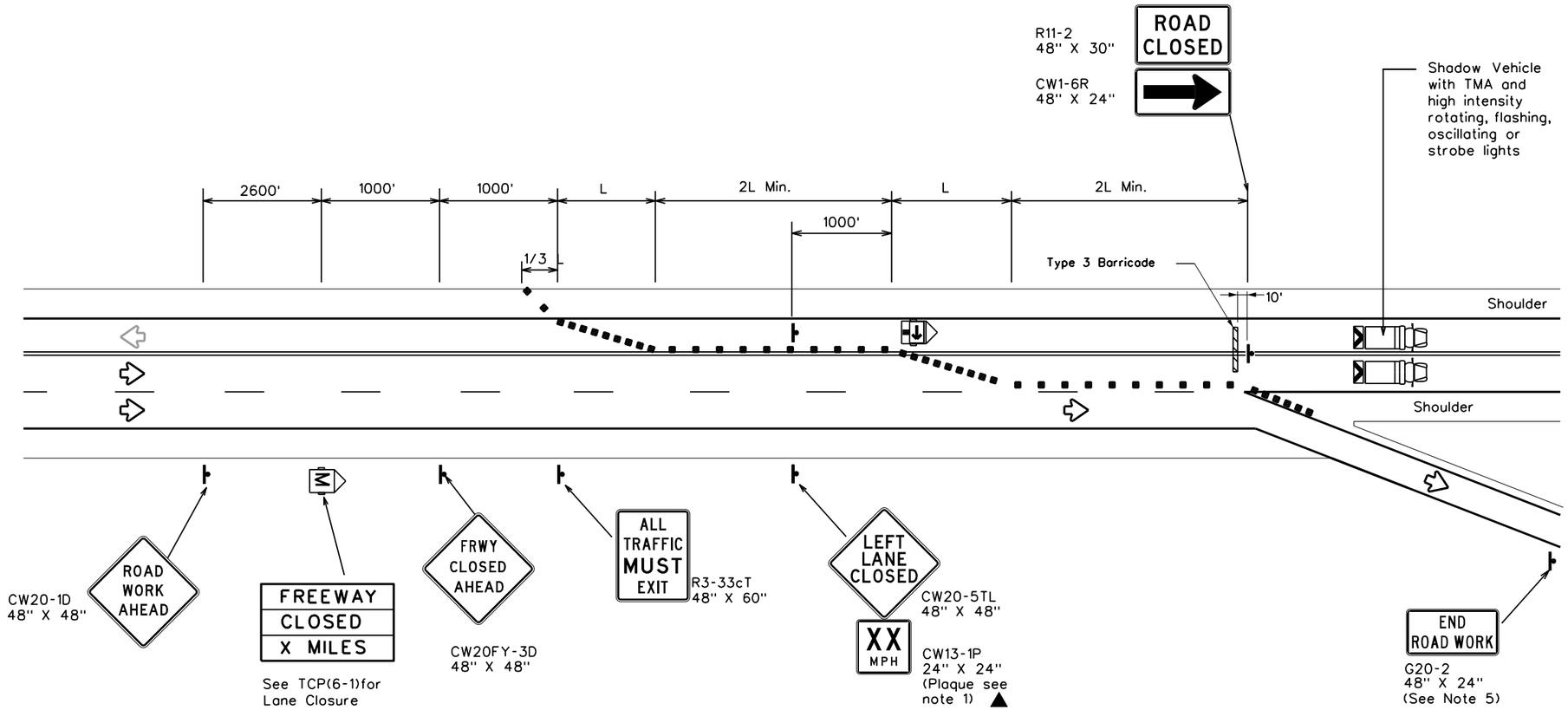
TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

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

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

GENERAL NOTES

1. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. Truck mounted attenuator is required.
4. See TCP(6-3)-12 for additional information and signage to allow traffic the option of exiting earlier, at the direction of the Engineer.



COMPLETE TOLL 49 CLOSURE

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

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TRAFFIC CONTROL PLAN COMPLETE TOLL 49 CLOSURE

SHEET 1 OF 1

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	22

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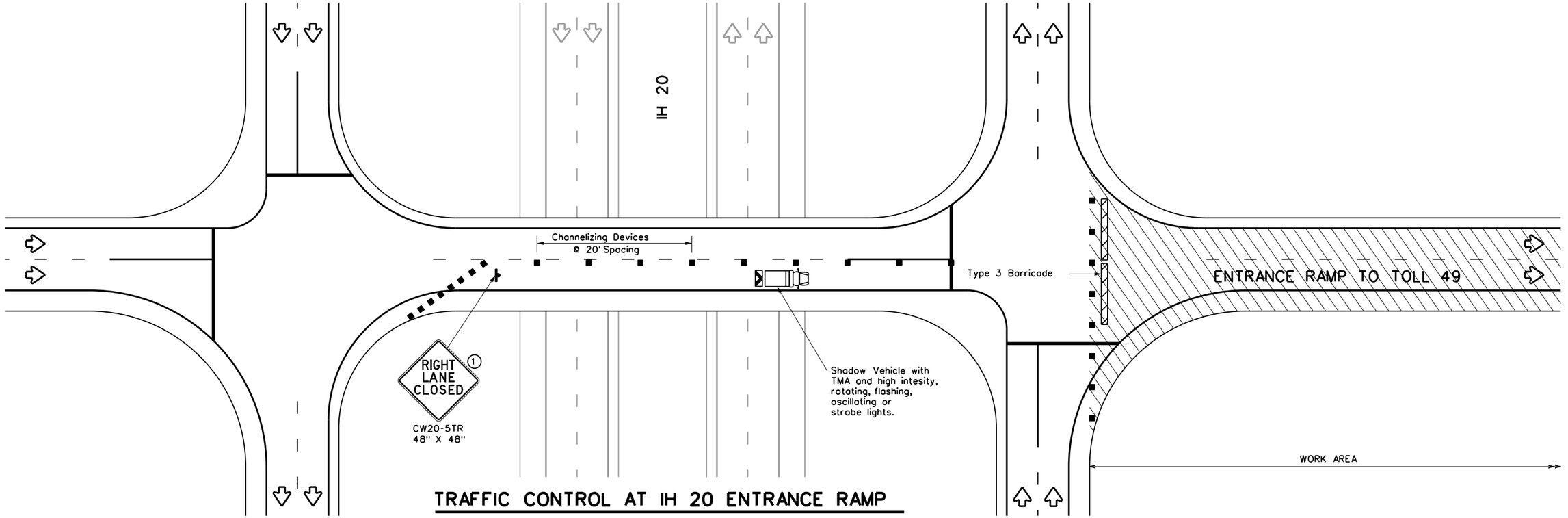
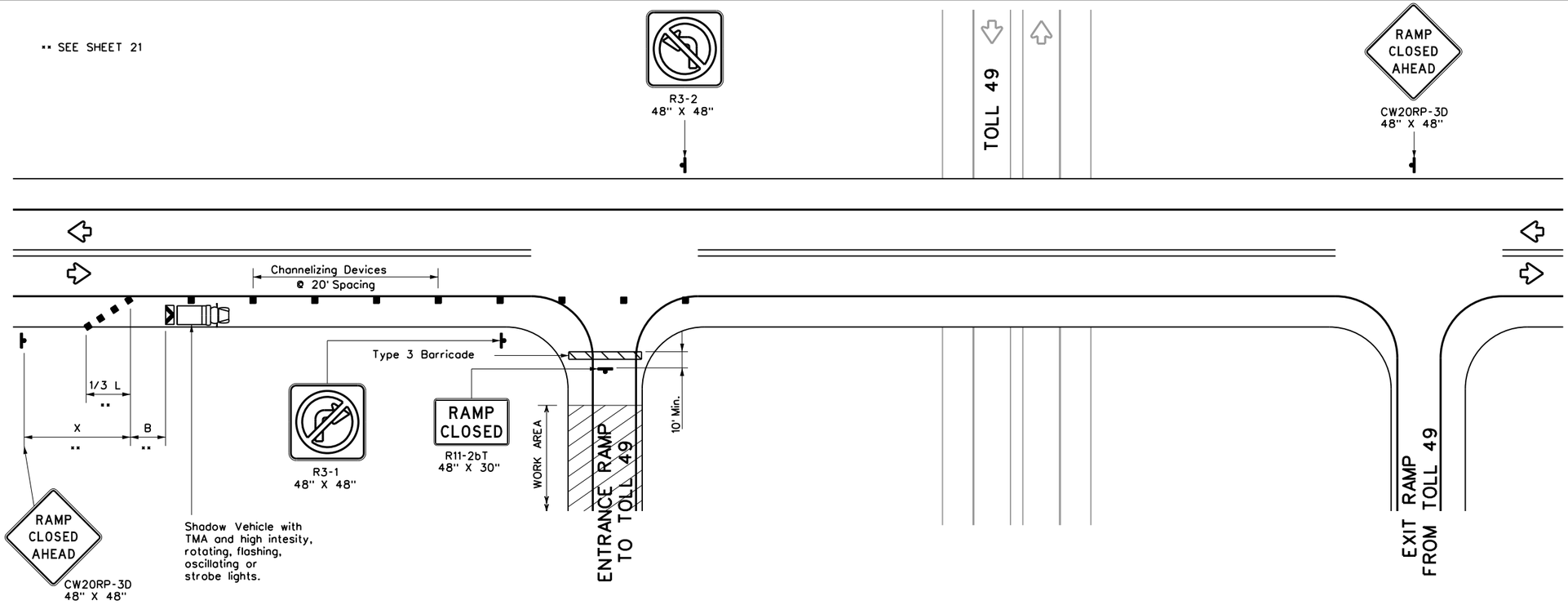


TRAFFIC CONTROL AT IH 20 ENTRANCE RAMP



TRAFFIC CONTROL AT SH 110 ENTRANCE RAMP

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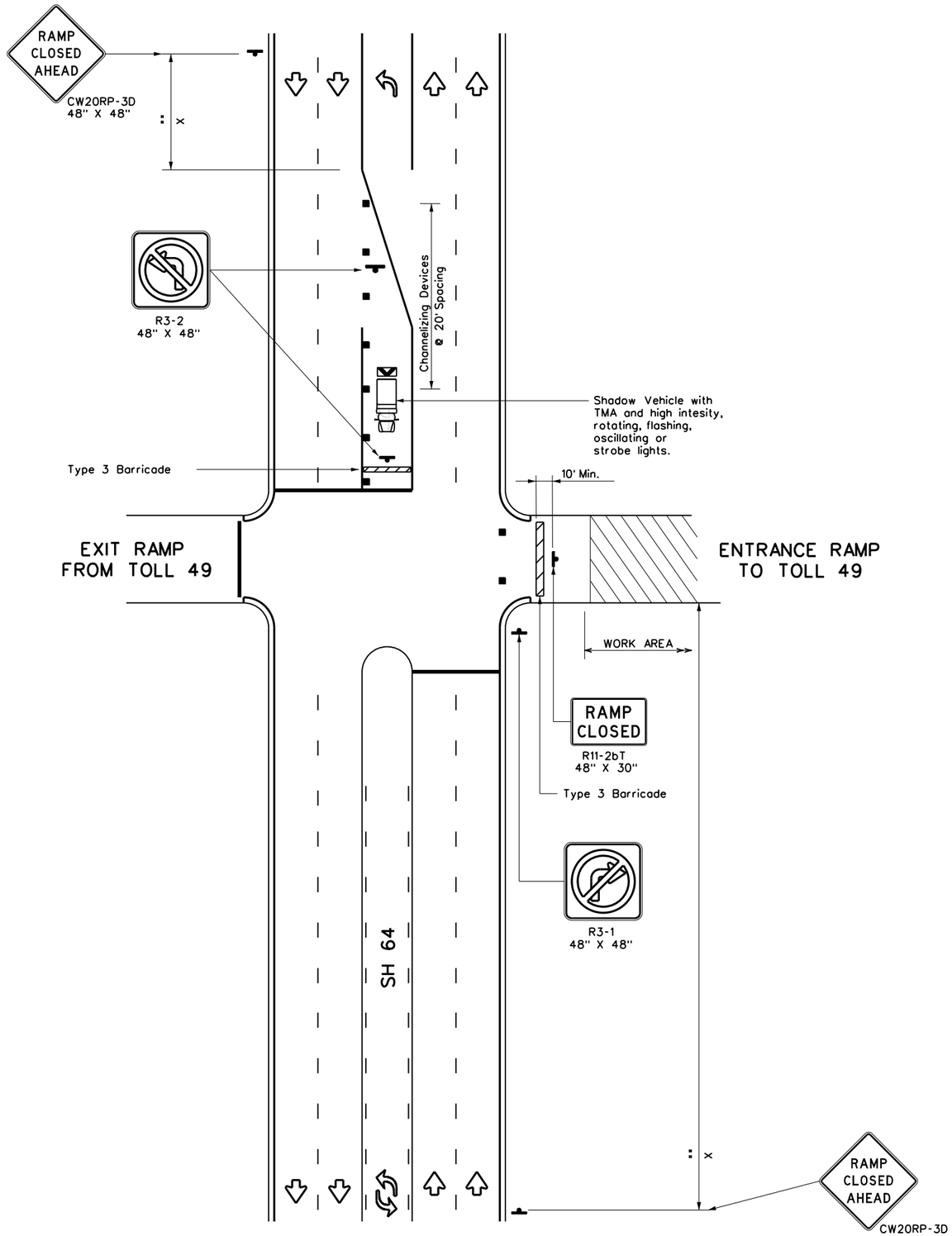
TRAFFIC CONTROL PLAN AT IH 20/SH 110 ENTRANCE RAMP

SHEET 1 OF 1

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	23

** SEE SHEET 21



TRAFFIC CONTROL AT SH 64 ENTRANCE RAMP

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TRAFFIC CONTROL PLAN AT SH 64 ENTRANCE RAMP

SHEET 1 OF 1

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	24

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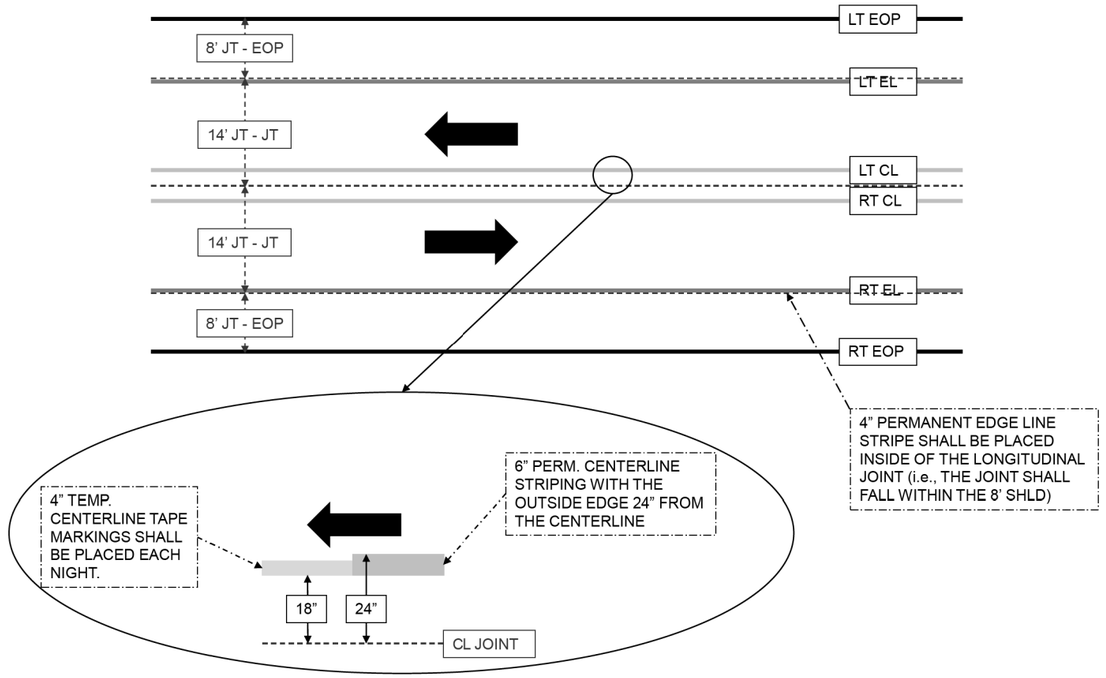

FIGURE 1 - TYPICAL JOINT-PAVEMENT MARKING CONFIGURATION

NTS

LEGEND

EOP	*- EDGE OF PAVEMENT*
LT	*- LEFT*
RT	*- RIGHT*
JT	*- JOINT*
CL	*- CENTERLINE*
EL	*- EDGE LINE*
SKIPS	*- DASHED PAVEMENT MARKING*
	PAVEMENT JOINT
	LANE LINE

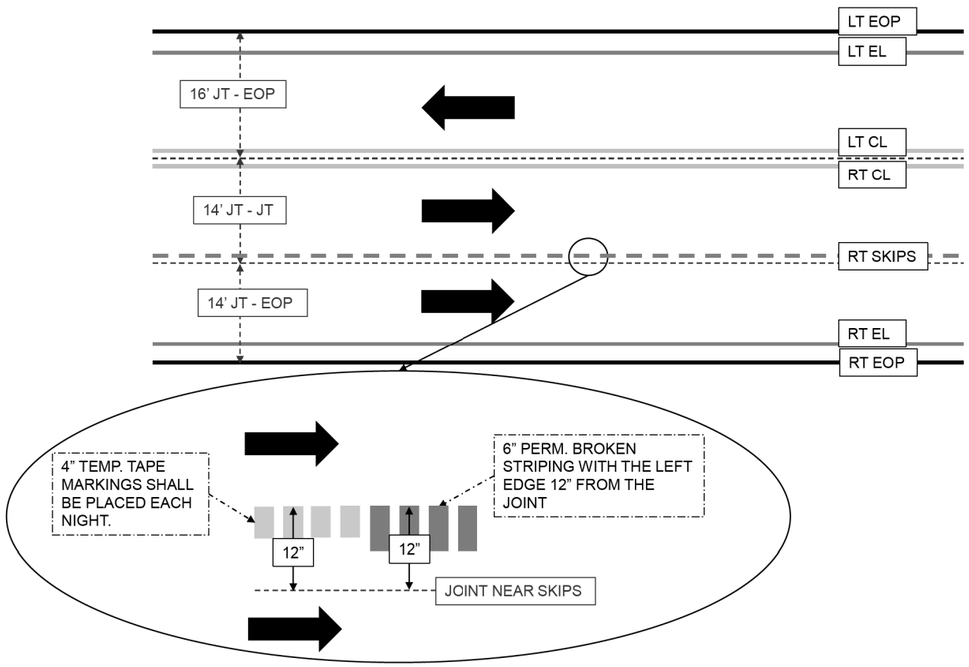

FIGURE 2 - JOINT-PAVEMENT MARKING CONFIGURATION FOR SUPER 2

NTS

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JOINT LAYOUT AND STRIPING DETAIL

SHEET 1 OF 1

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	25

DATE: 1/23/2025 10:18:41 AM
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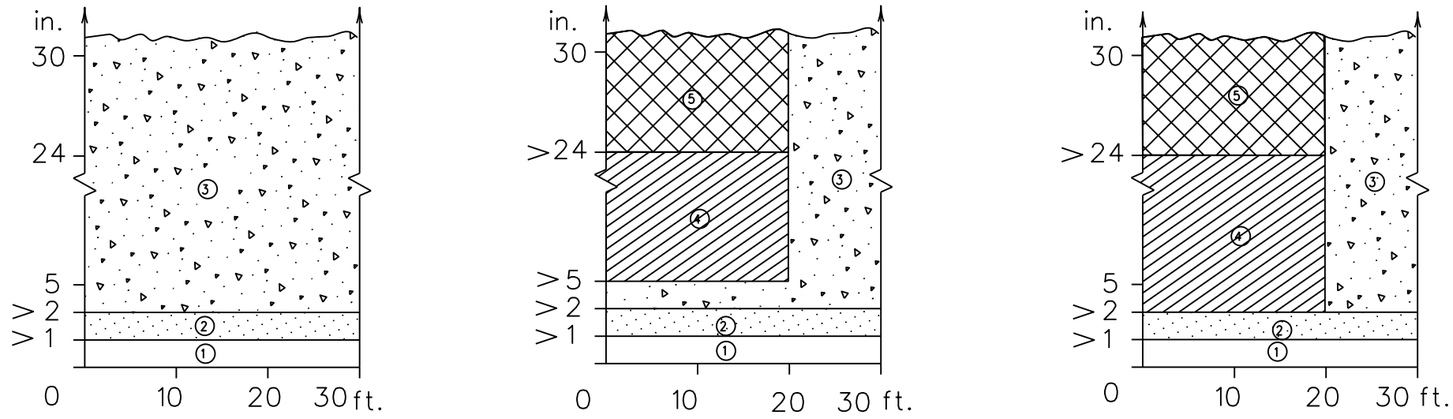
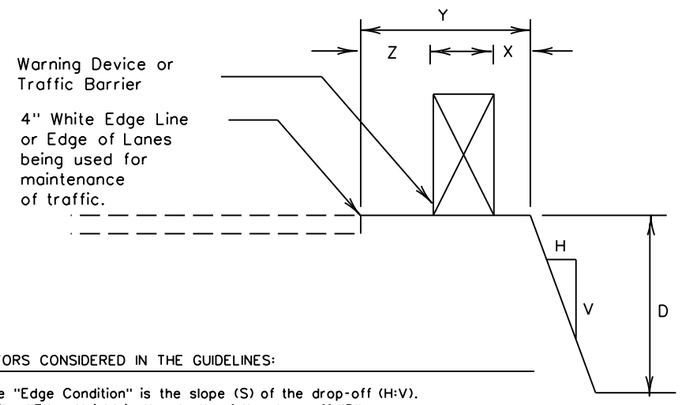
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

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

Edge Condition Notes:

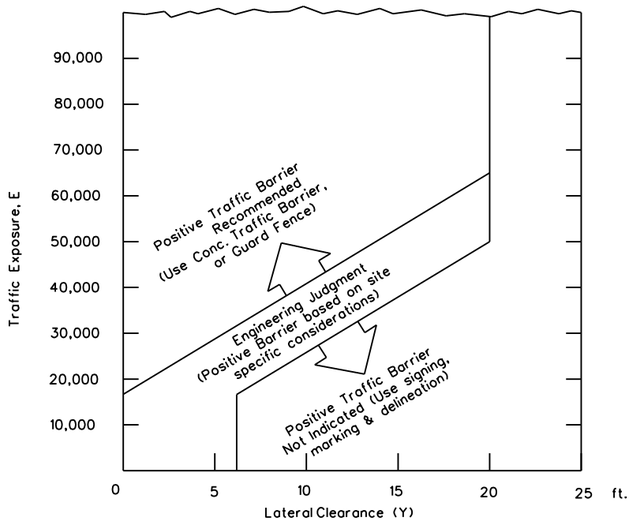
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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

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

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

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



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

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

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

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

STATE OF TEXAS
COREY D. HOGUE
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LICENSED
PROFESSIONAL ENGINEER

Date 01/23/2025

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
03-01				TOLL 49
08-01 correct typos	DIST	COUNTY		SHEET NO.
	TYL	SMITH		26

DATE: 1/23/2025
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

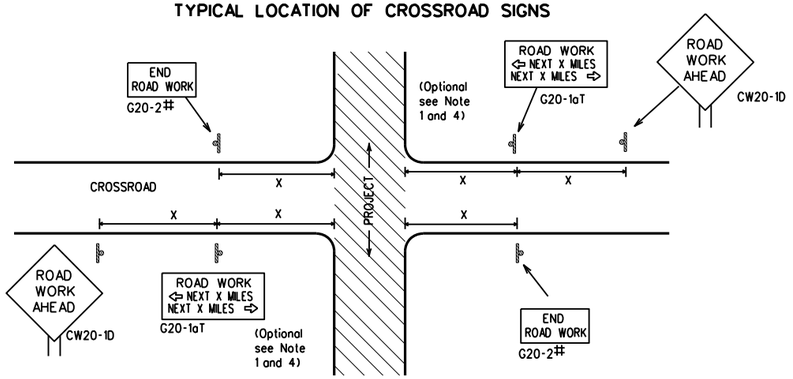
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	TYL	SMITH		27
5-10 5-21				

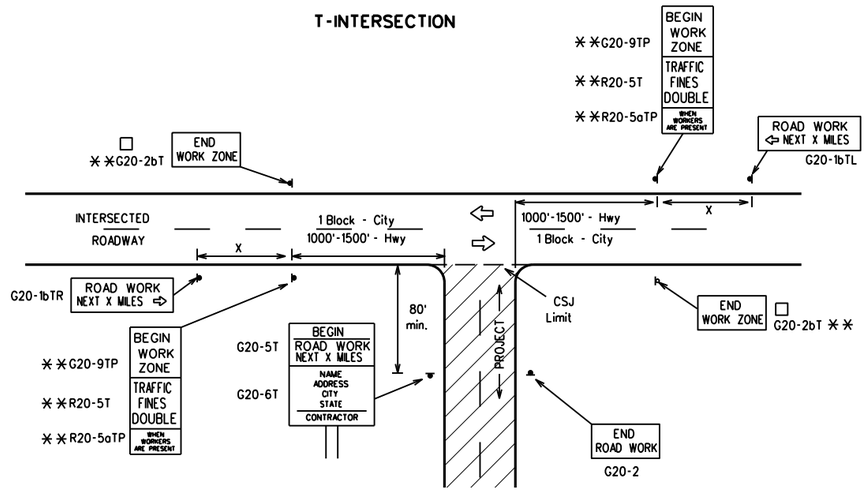
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

1,5,6

SIZE

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

SPACING

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

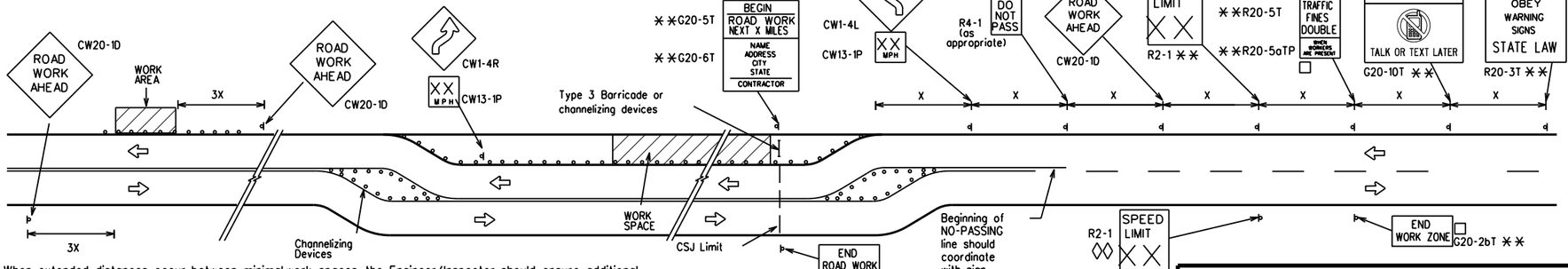
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

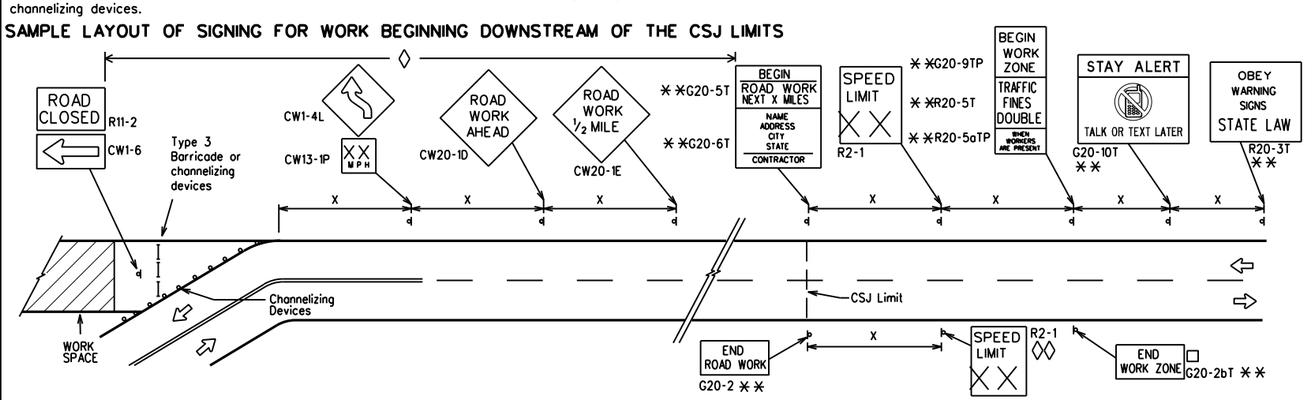
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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REVISIONS				TOLL 49
9-07 8-14	DIST	COUNTY		SHEET NO.
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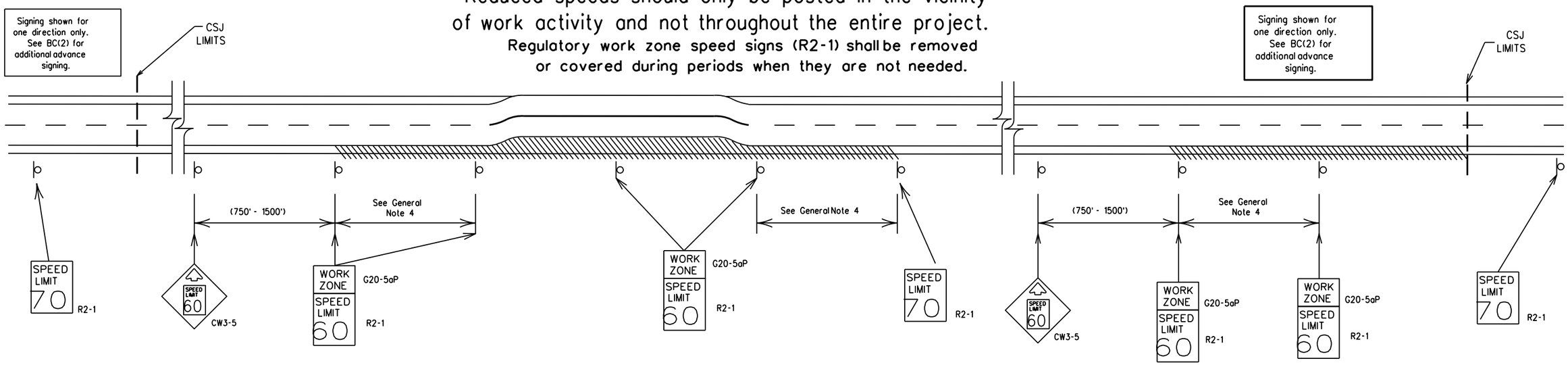
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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. Low 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

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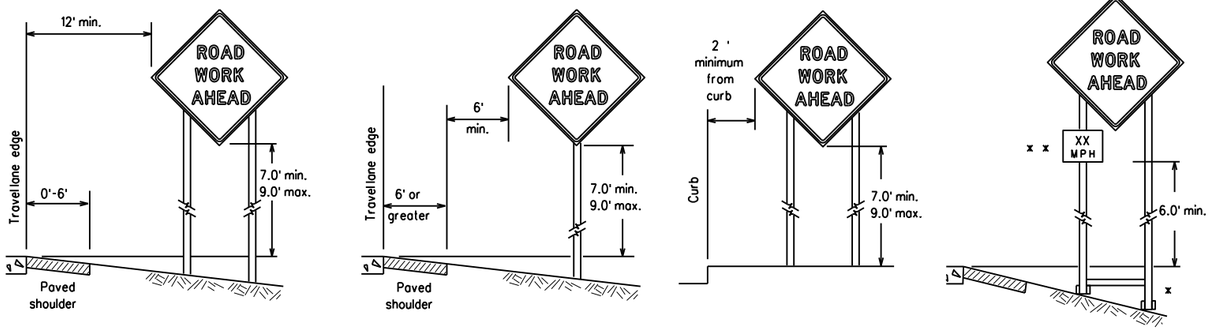
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		29

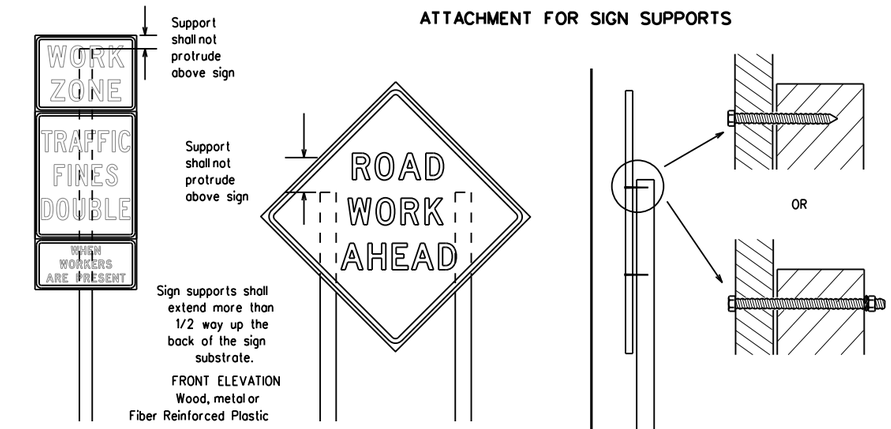
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



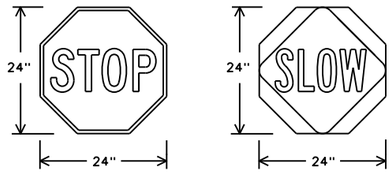
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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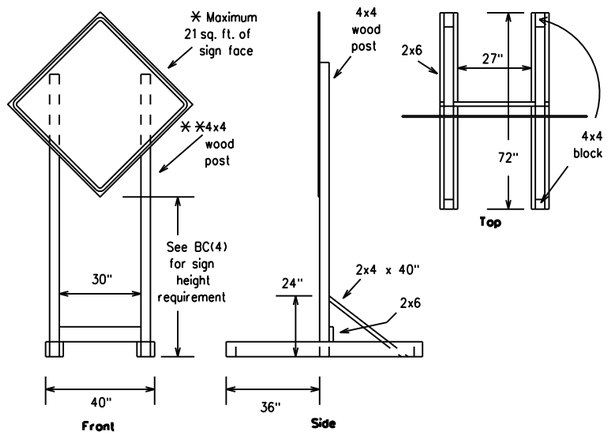
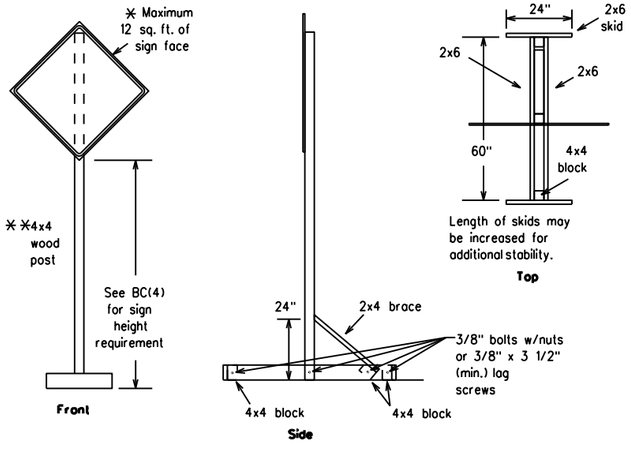
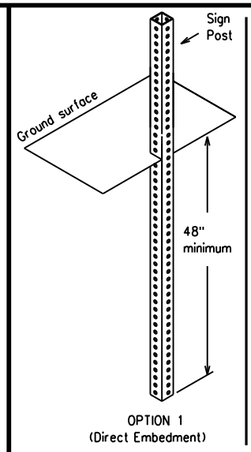
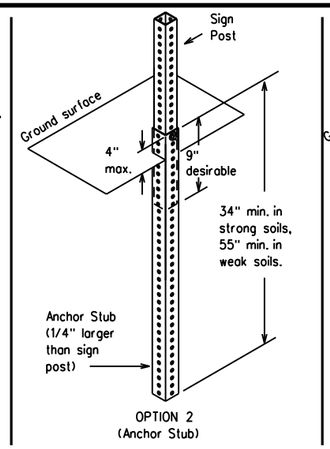


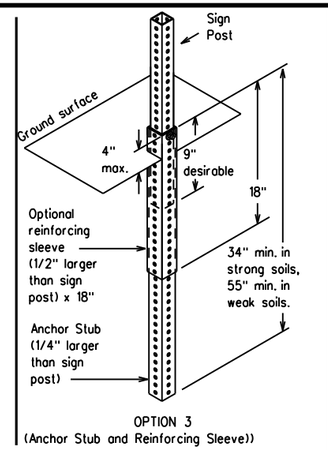


SKID MOUNTED WOOD SIGN SUPPORTS

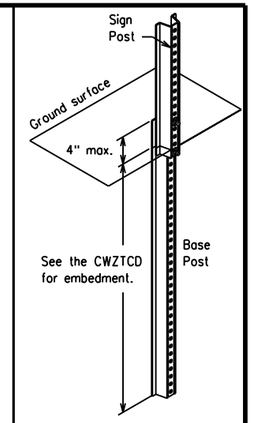
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







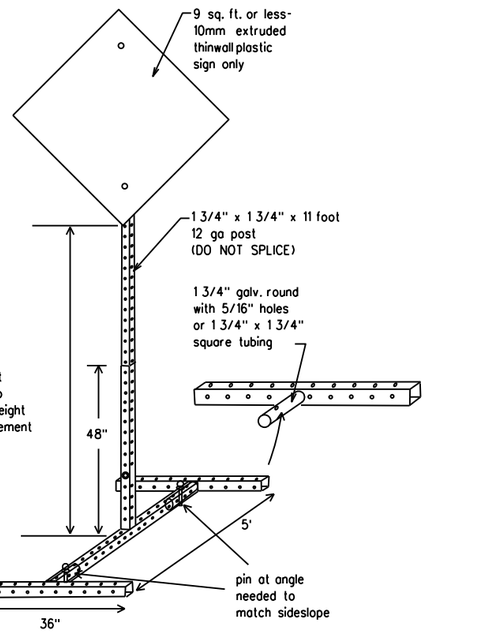
PERFORATED SQUARE METAL TUBING

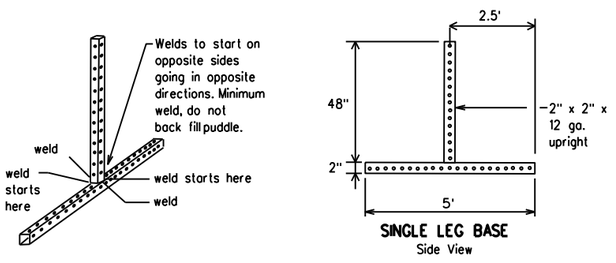


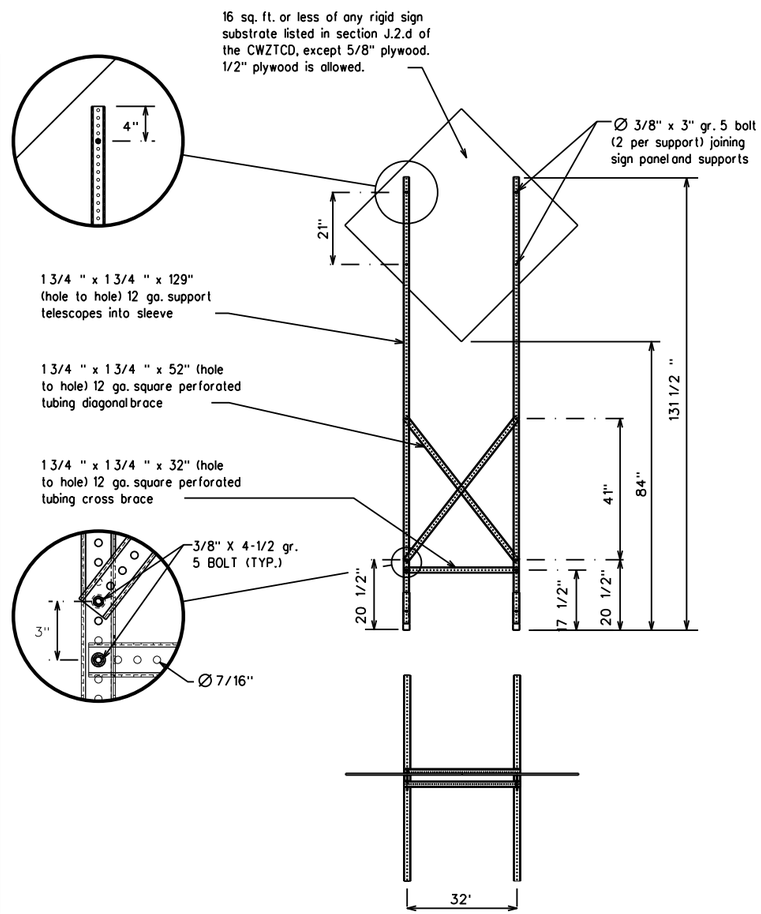
WING CHANNEL
Lap-splice/base bolted anchor

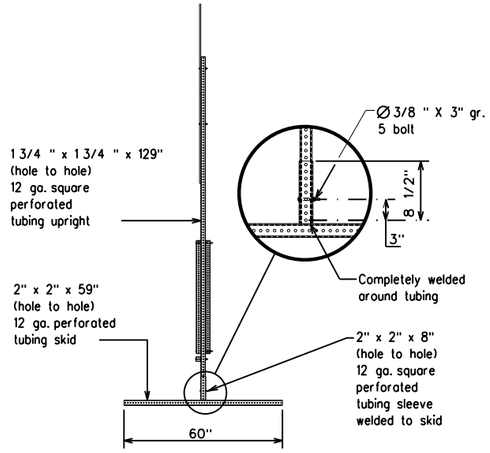
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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7-13 5-21	TYL	SMITH		31

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

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

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

x 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 x	

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

x x 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

x x 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

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		32

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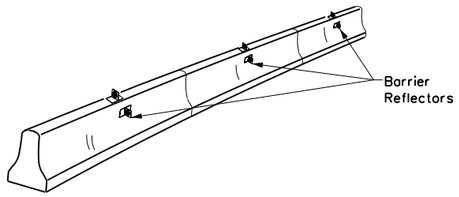
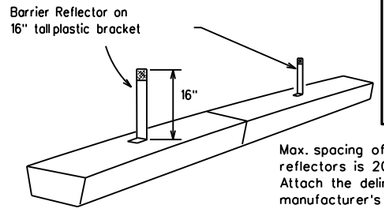
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



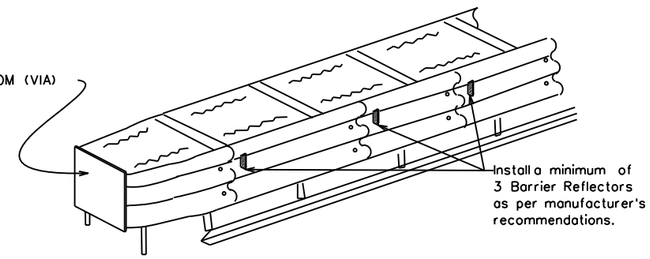
CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

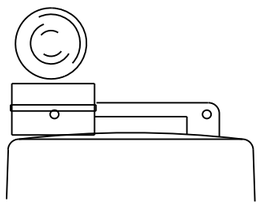
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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.

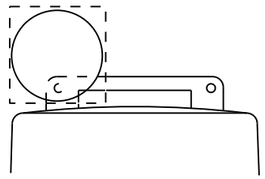
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

BARRIER 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 or C Sheeting, meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

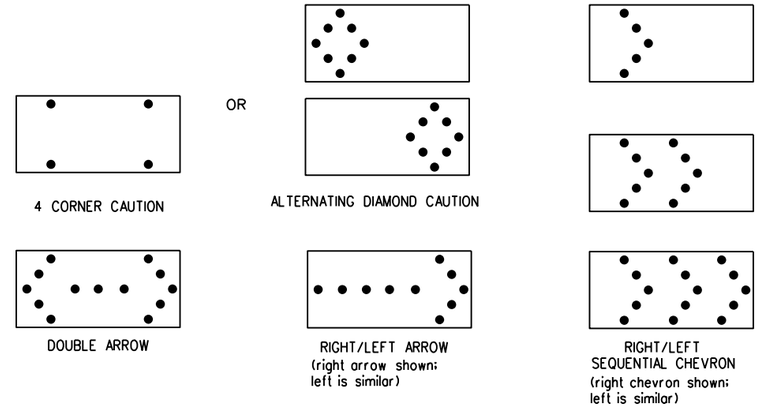
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

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

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



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

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

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		33

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

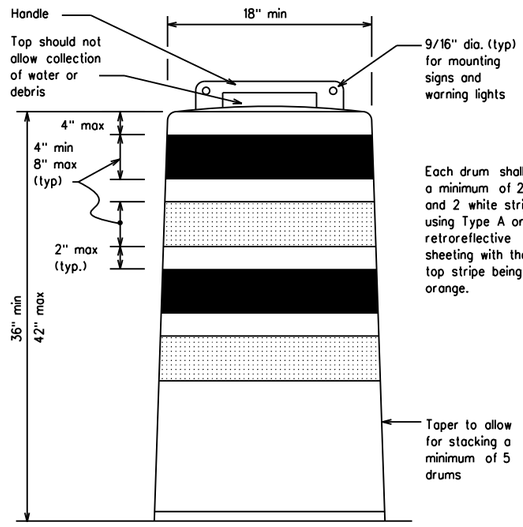
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

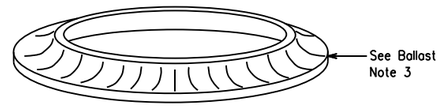
RETROREFLECTIVE SHEETING

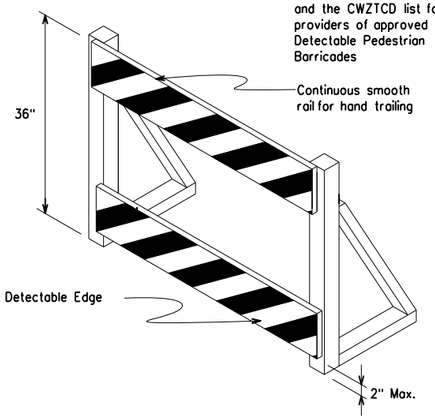
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

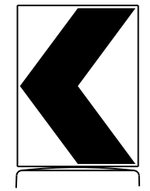




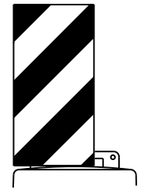


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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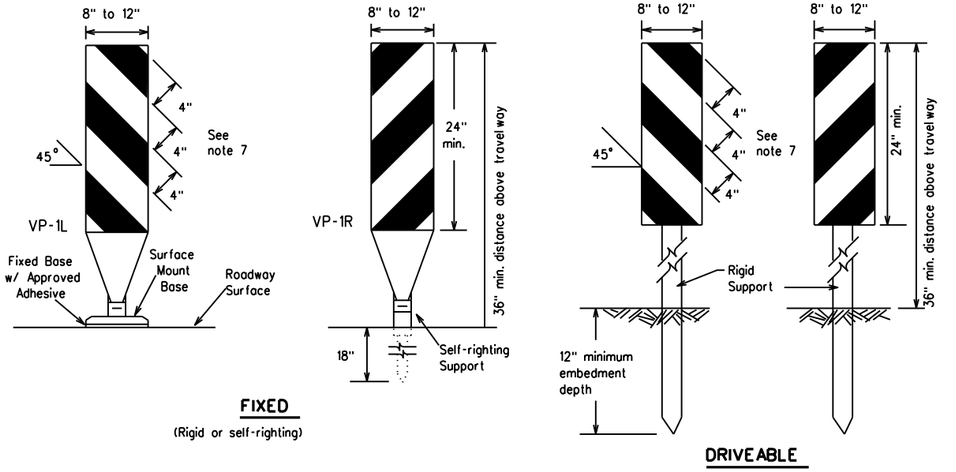
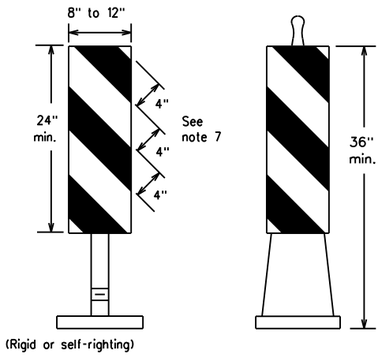
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	TYL	SMITH		34
7-13				



FIXED
(Rigid or self-righting)

DRIVEABLE

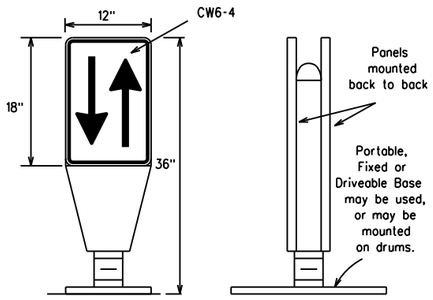


(Rigid or self-righting)

PORTABLE

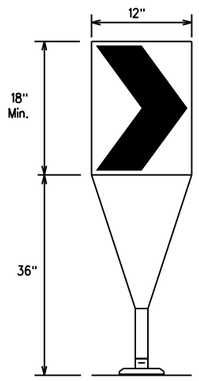
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



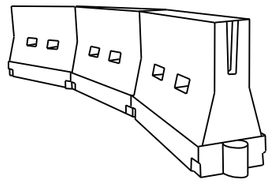
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	$L=WS$	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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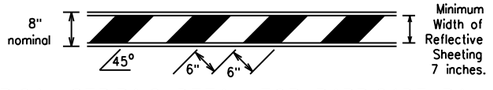
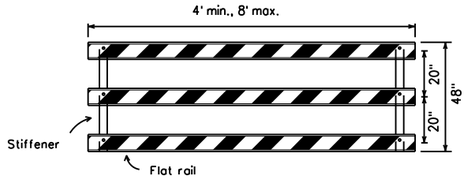
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



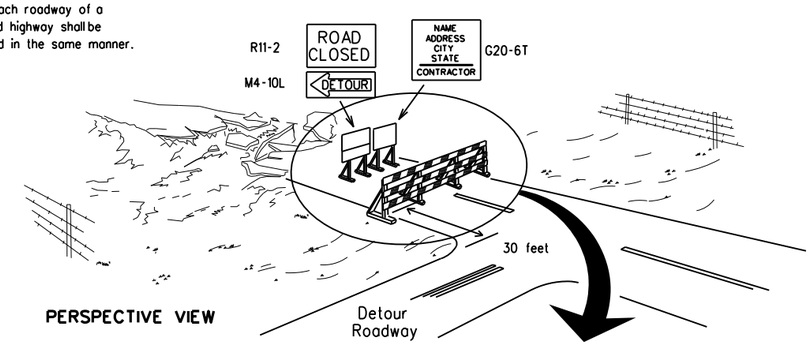
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

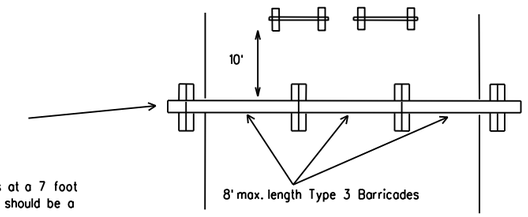
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

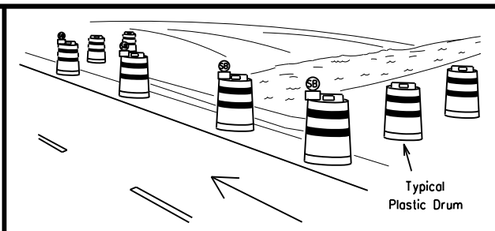
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

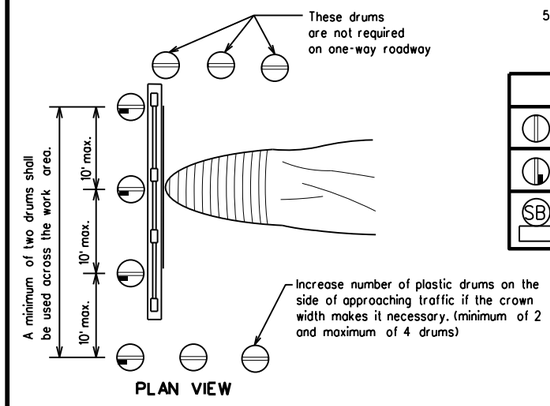
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

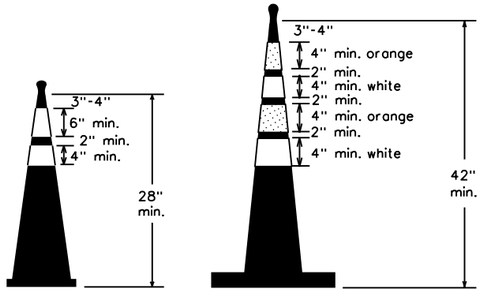
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



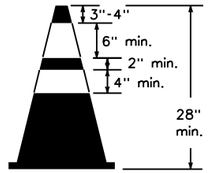
PLAN VIEW

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

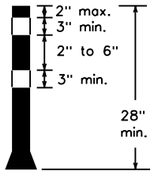
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

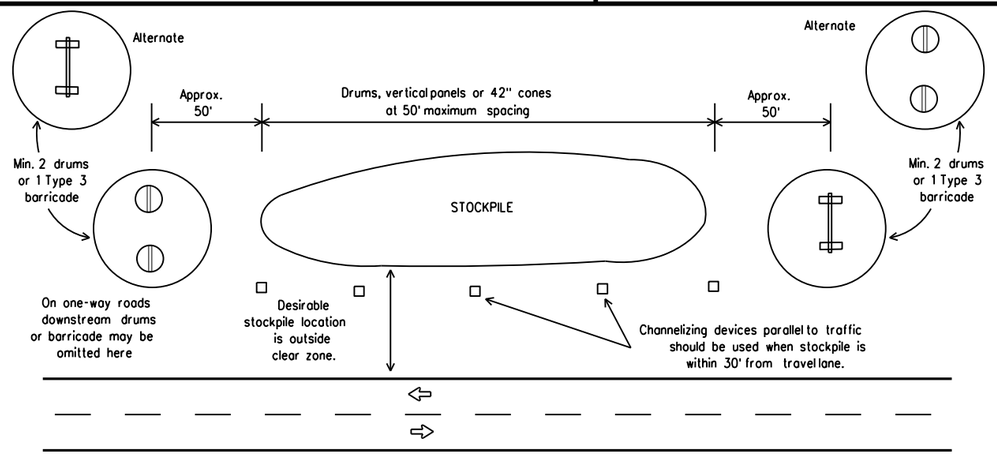


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

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

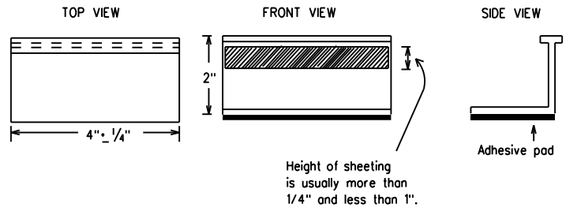
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	TYL	SMITH		37
11-02 8-14				

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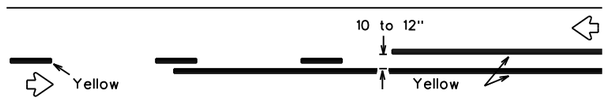
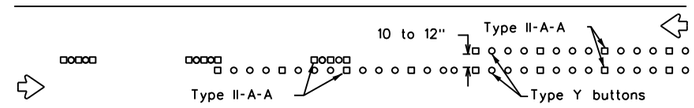
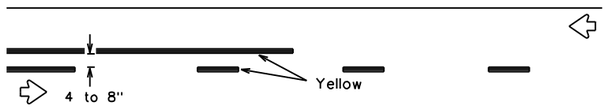
PAVEMENT MARKING PATTERNS



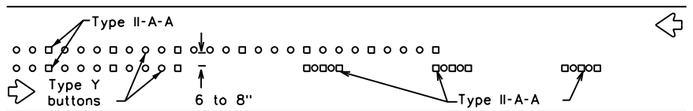
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



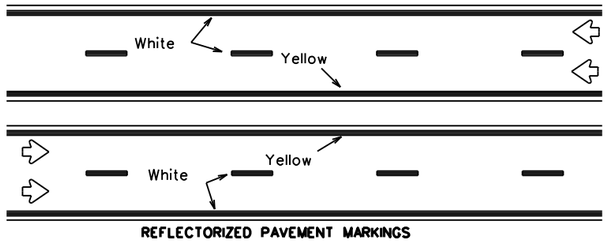
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



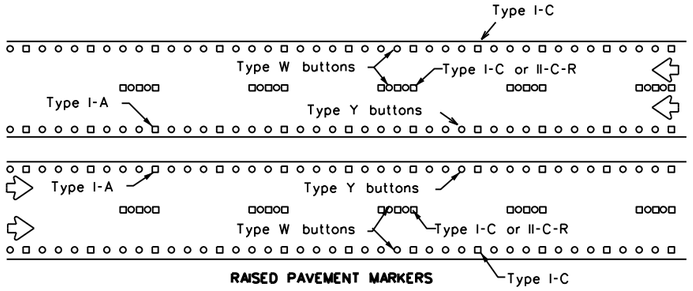
RAISED PAVEMENT MARKERS - PATTERN B

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



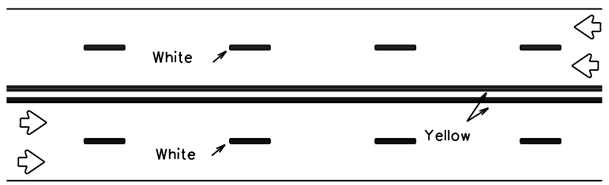
REFLECTORIZED PAVEMENT MARKINGS



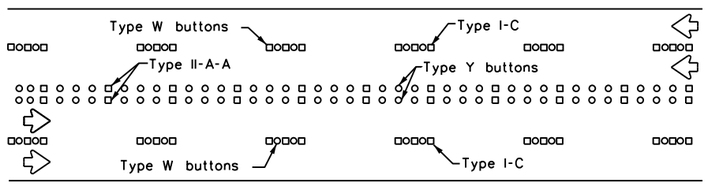
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



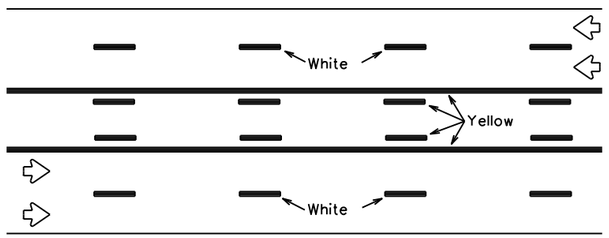
REFLECTORIZED PAVEMENT MARKINGS



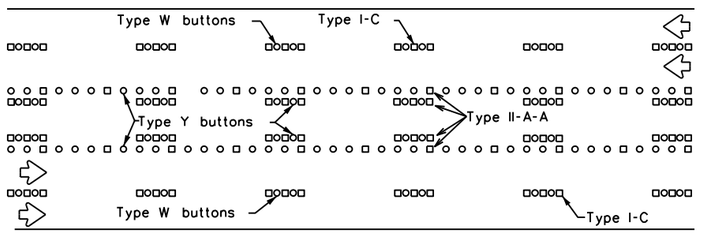
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

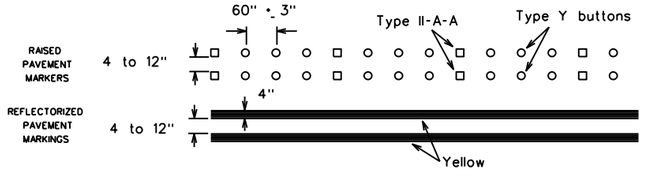
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

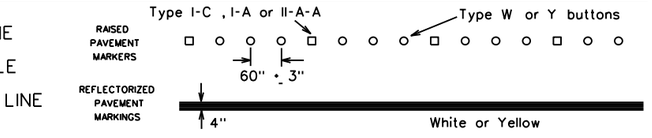
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

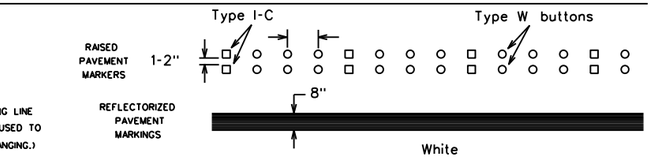


EDGE LINE OR SINGLE NO-PASSING LINE



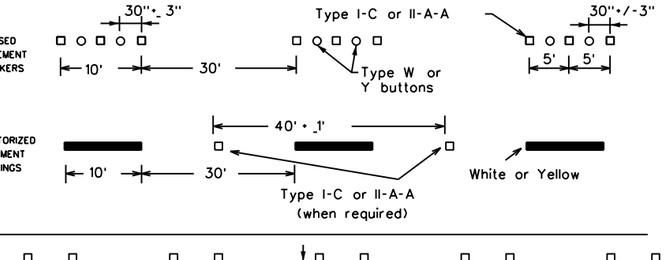
WIDE LINE

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

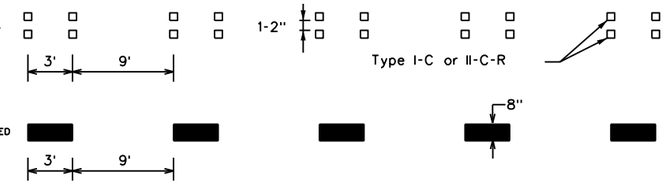


BROKEN LINES

CENTER LINE OR LANE LINE

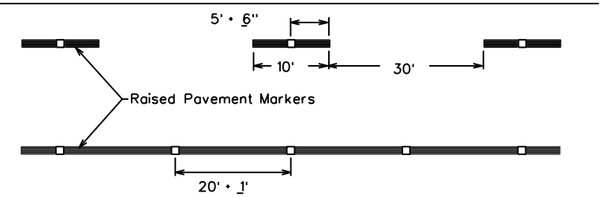


AUXILIARY OR LANEDROP LINE



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

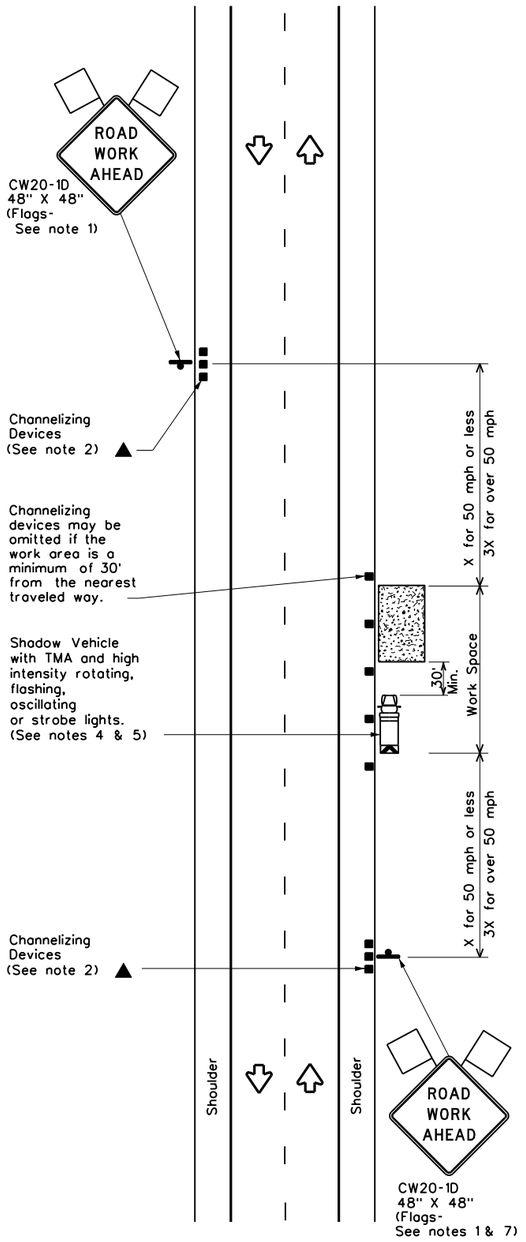
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

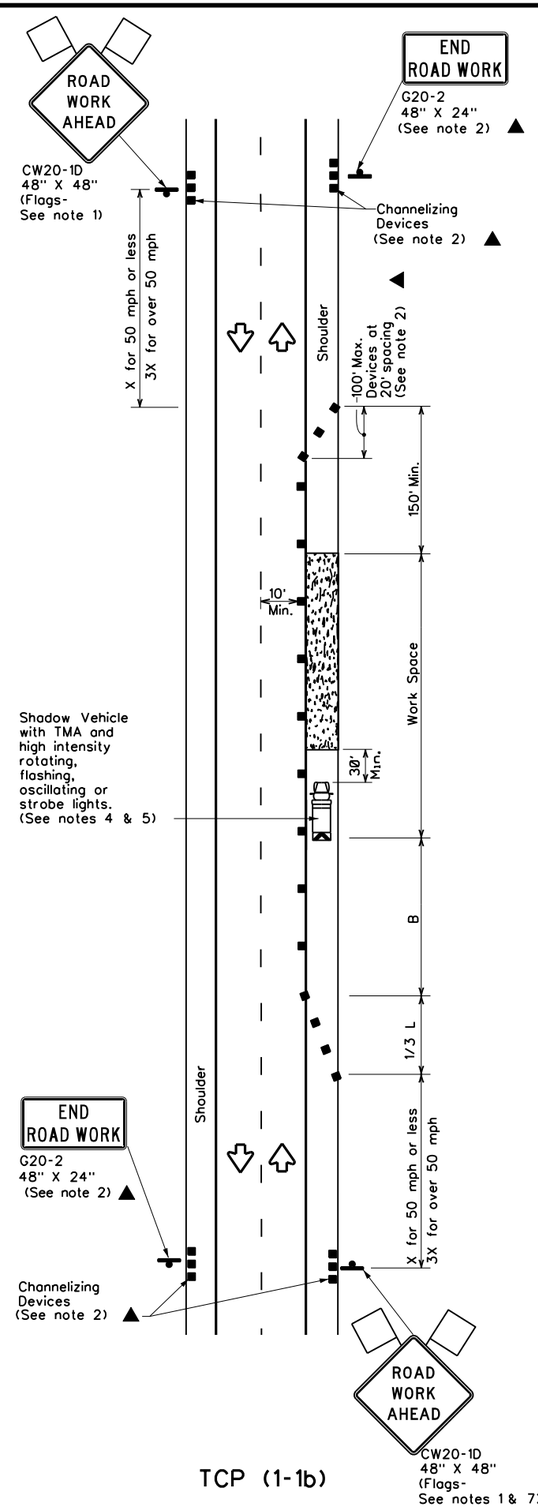
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14				TOLL 49
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		38

106



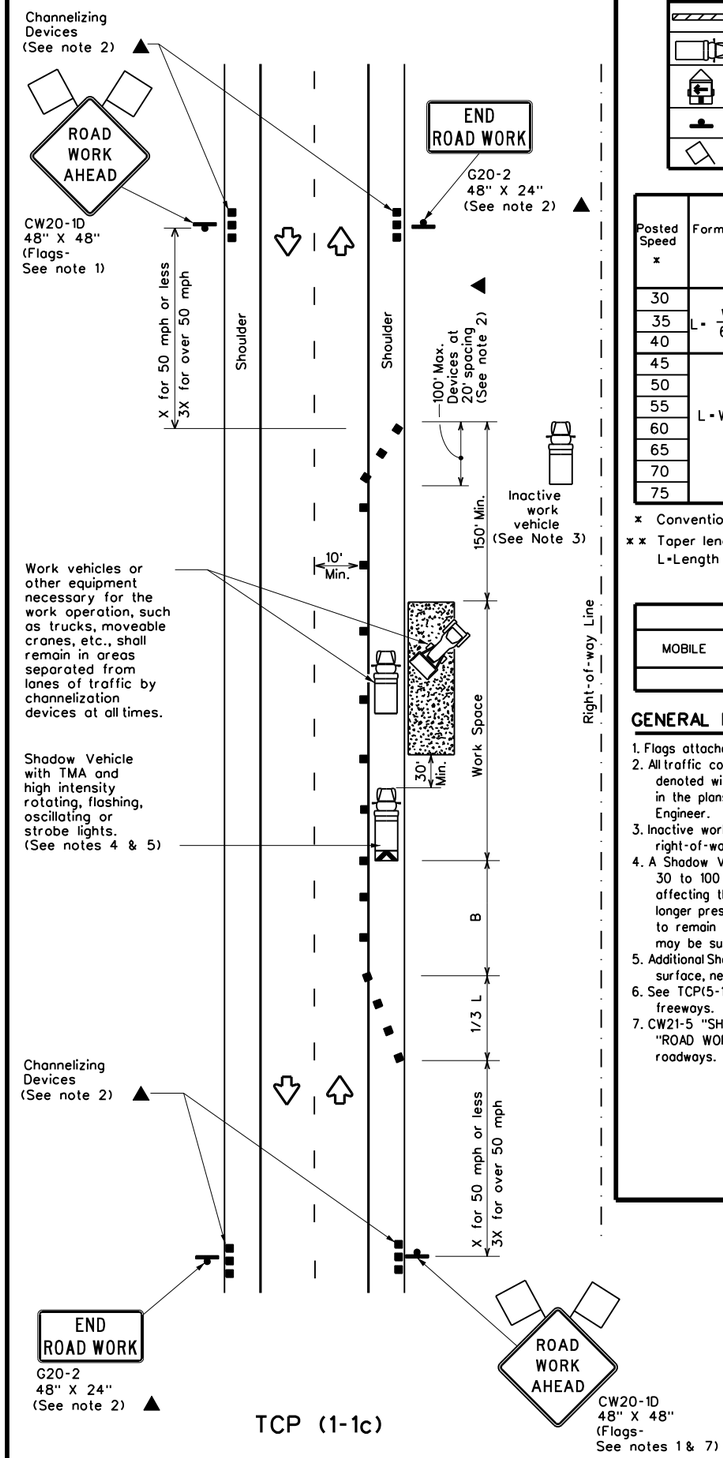
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	SMITH		39
1-97 2-18				

151

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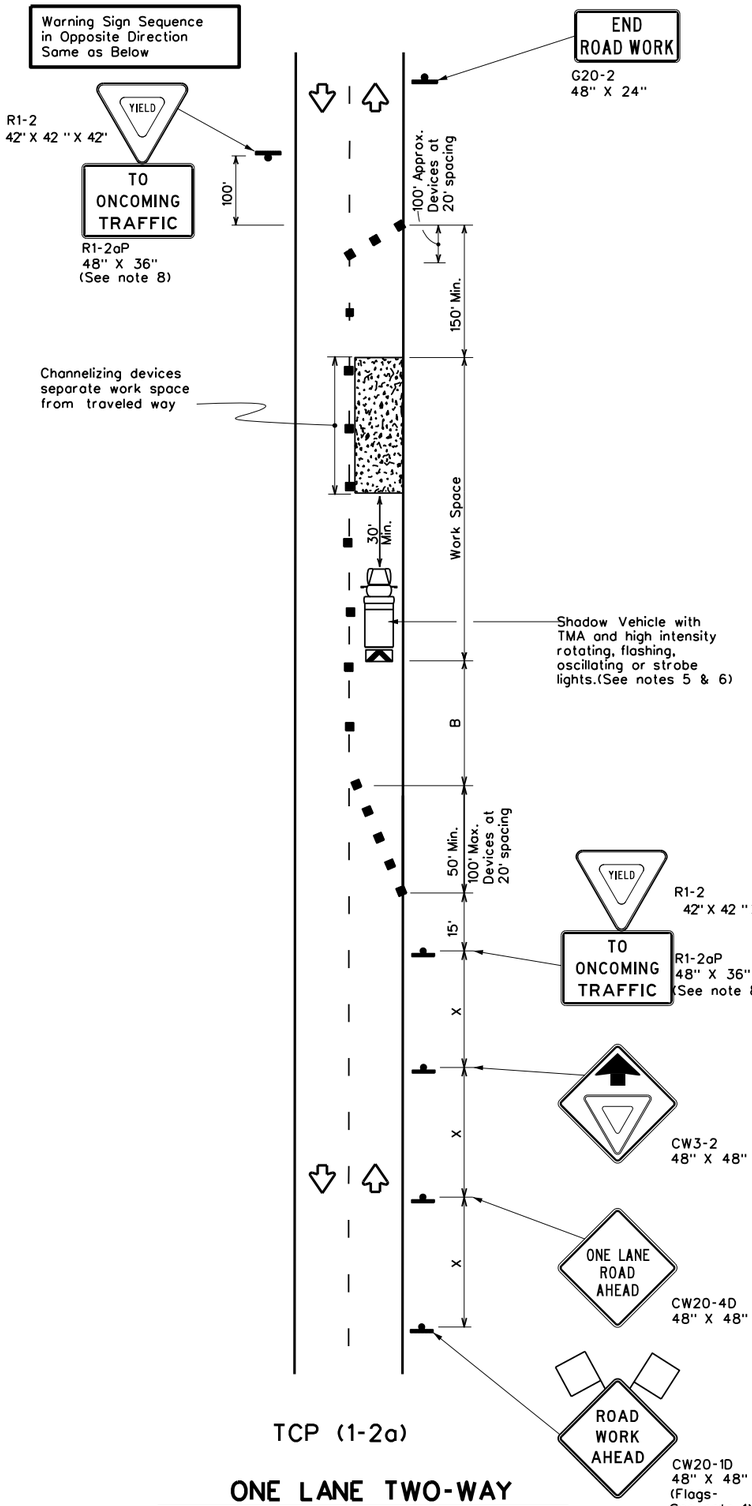
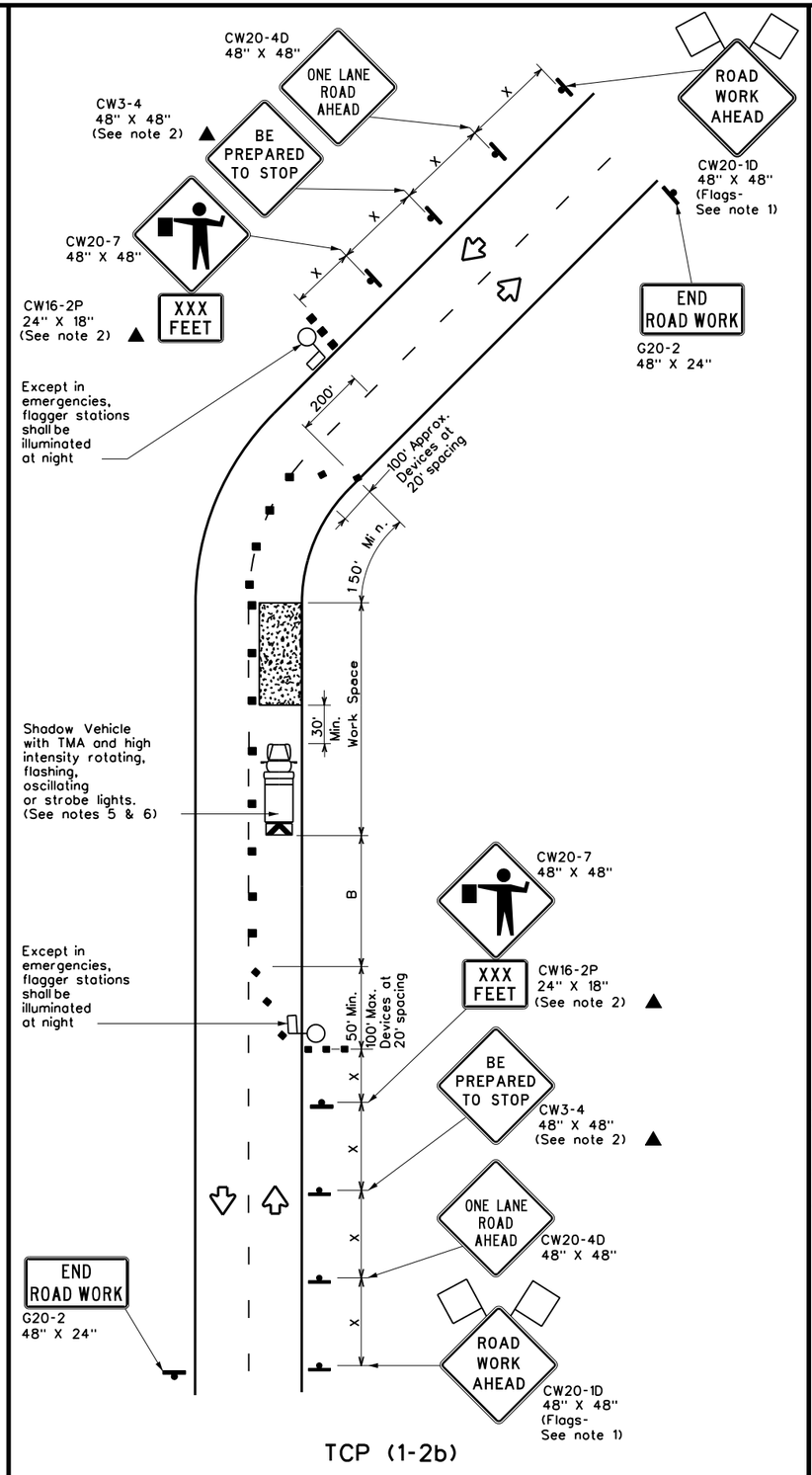


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12	TYL	SMITH		40
1-97 2-18				

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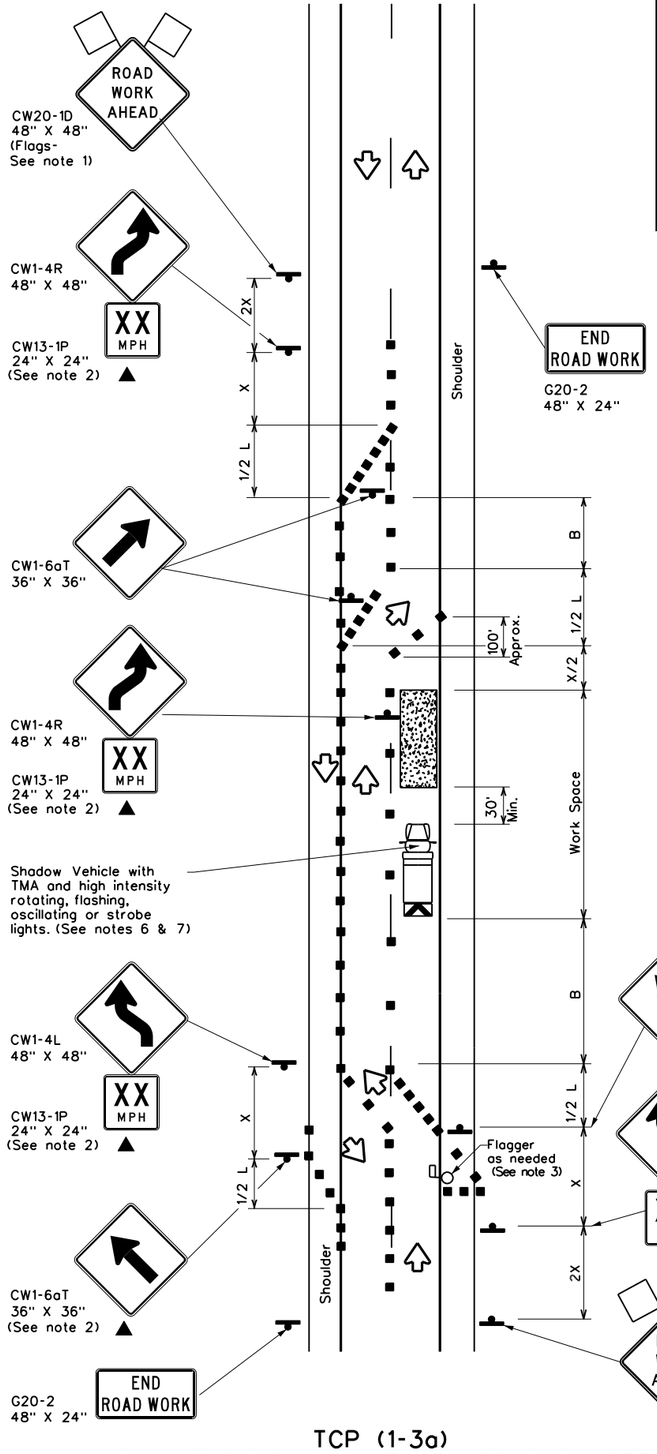
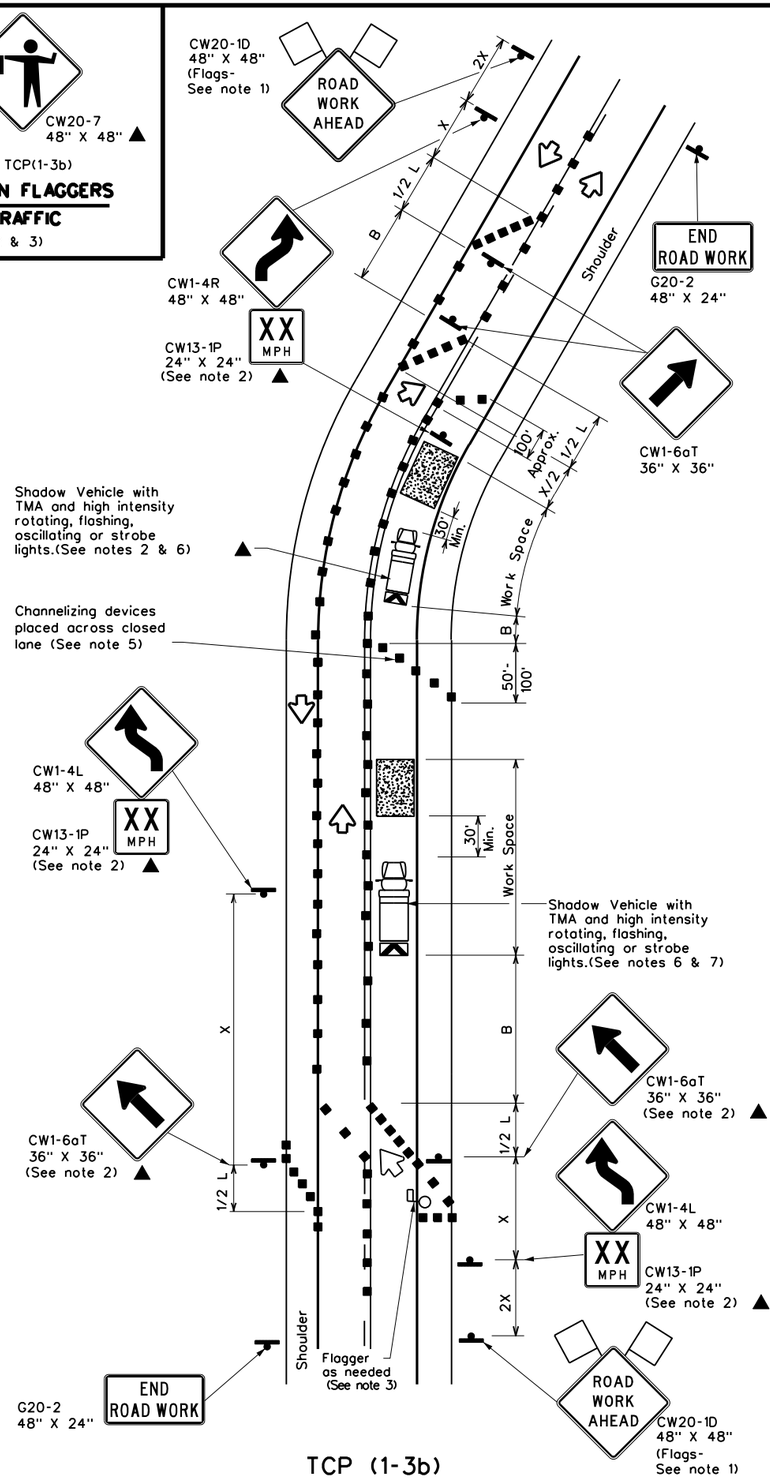


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
CW3-4 48" X 48"
CW20-7 48" X 48"
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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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8-95 2-12	TYL	SMITH		41
1-97 2-18				

153

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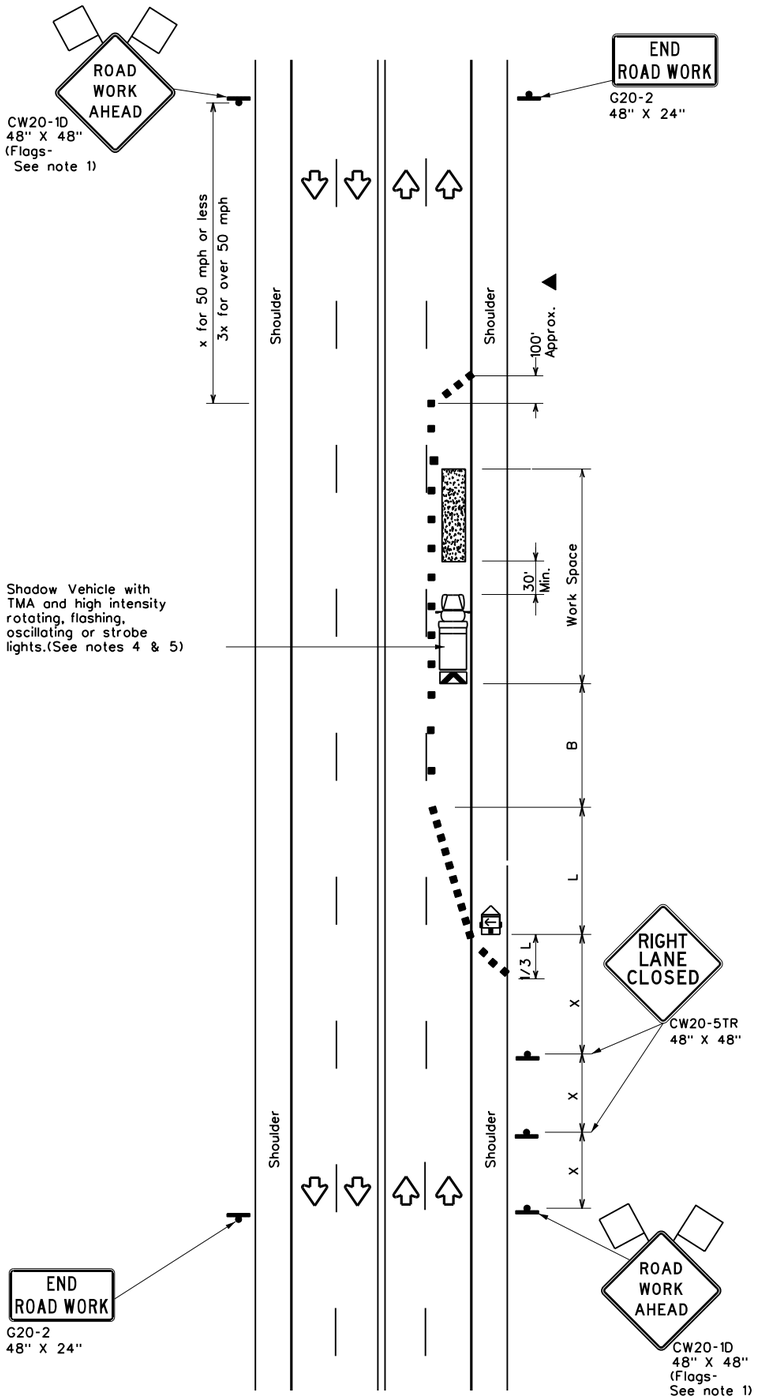
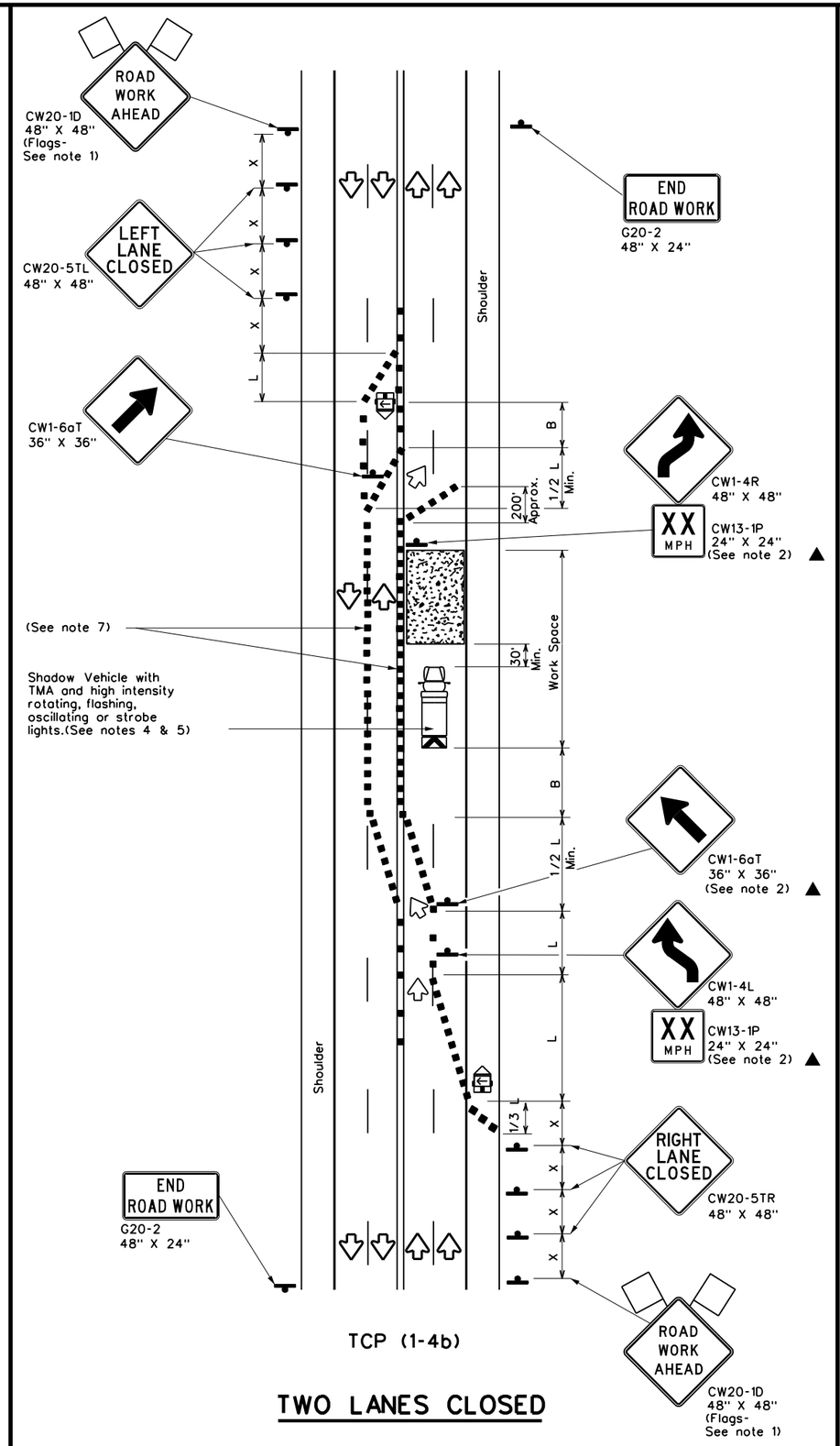


TCP (1-4a)

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

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	SMITH		42
1-97 2-18				

DATE: 1/23/2025 10:18:49 AM
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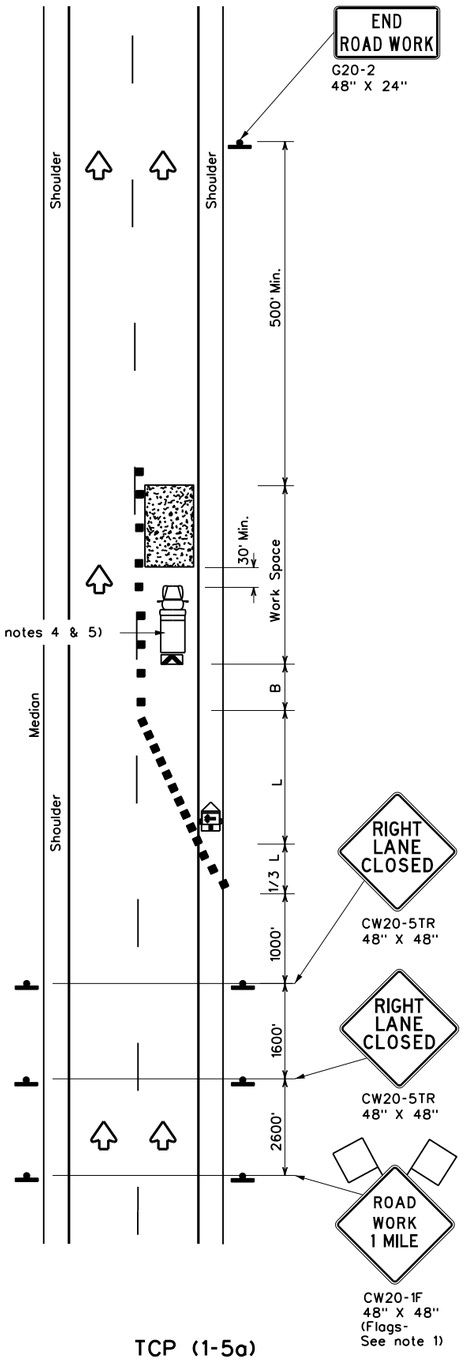
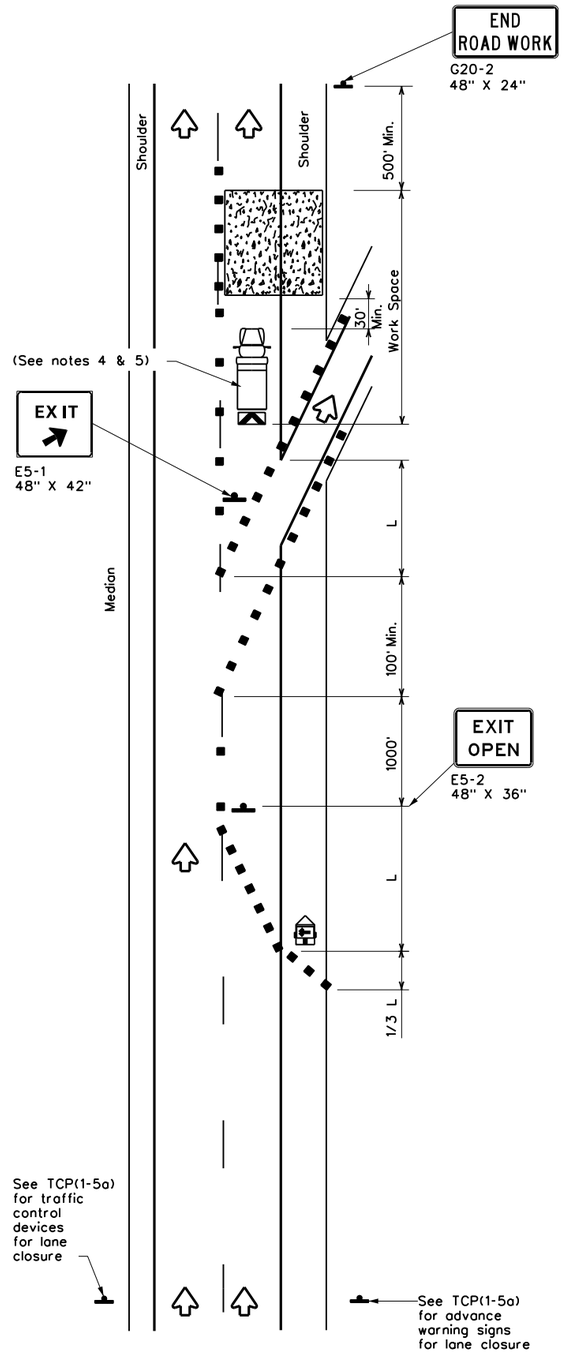


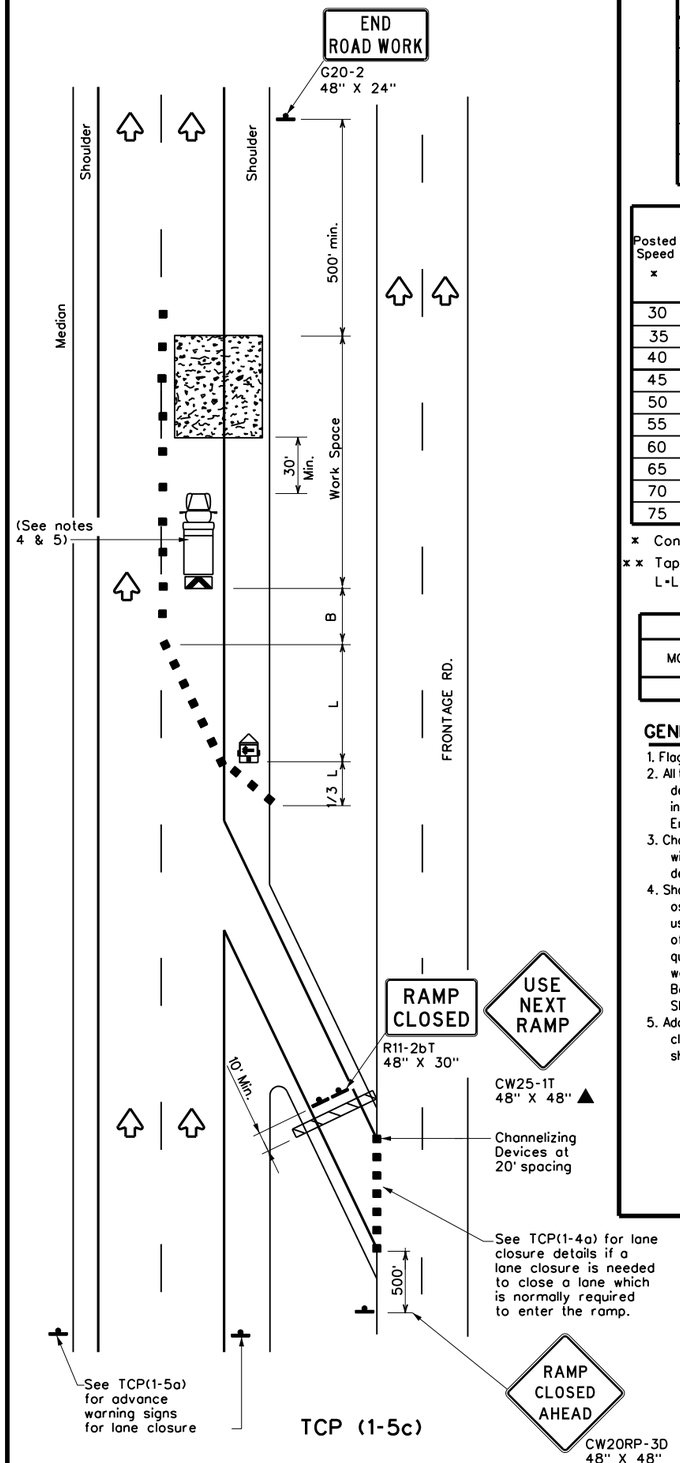
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND

	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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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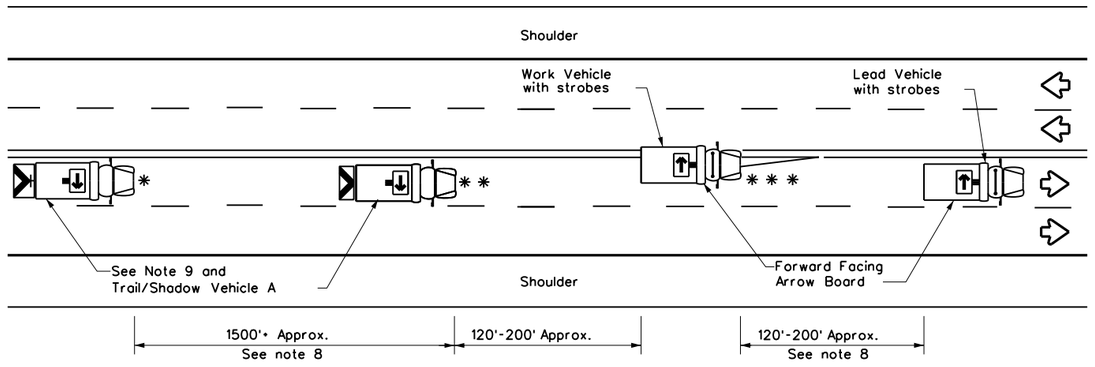
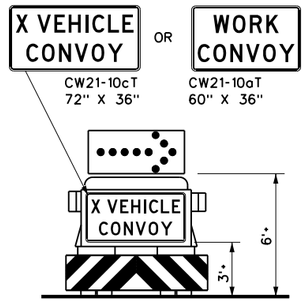
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		43



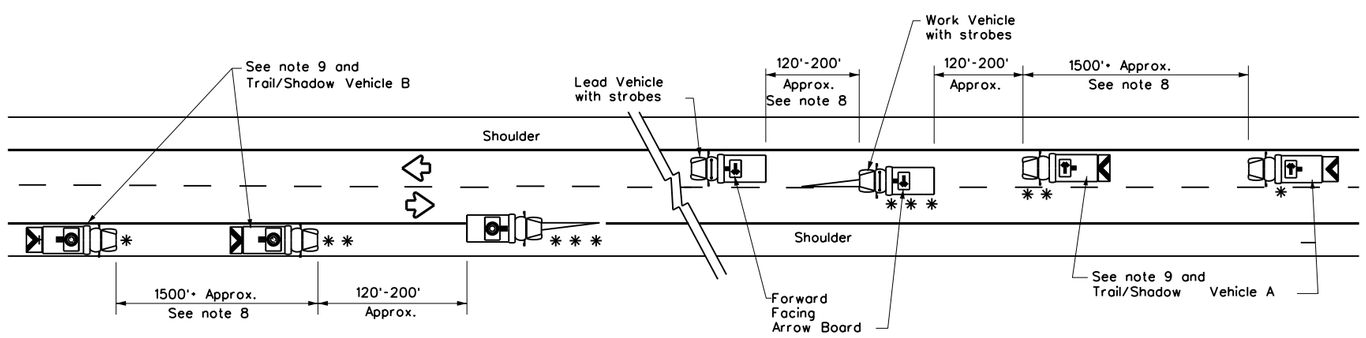
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

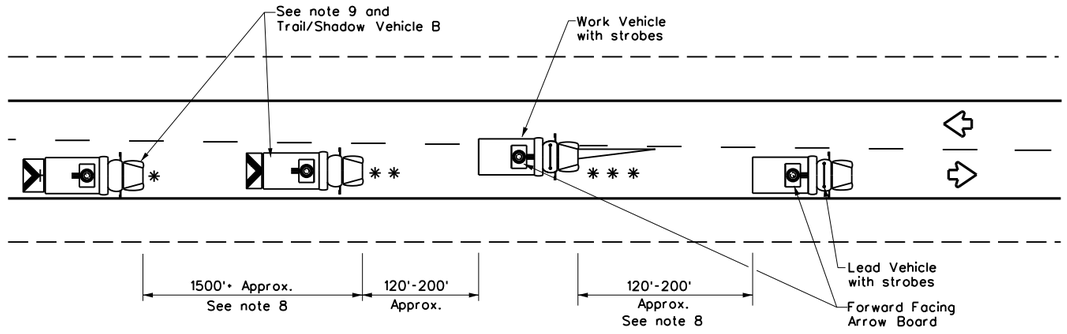


WORK ON SHOULDER

WORK ON TRAVEL LANE

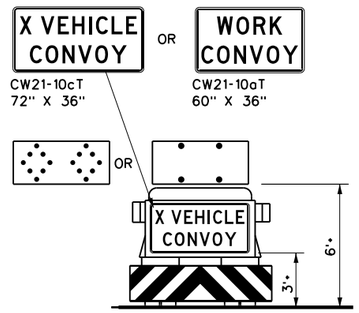
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

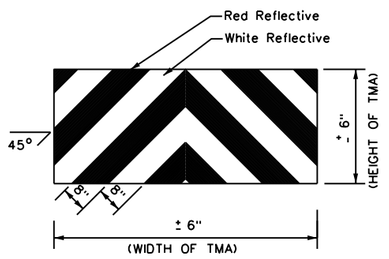
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
2-94 4-98 8-95 7-13 1-97	DIST	COUNTY		SHEET NO.
	TYL	SMITH		44

DATE: 1/23/2025 10:18:50 AM
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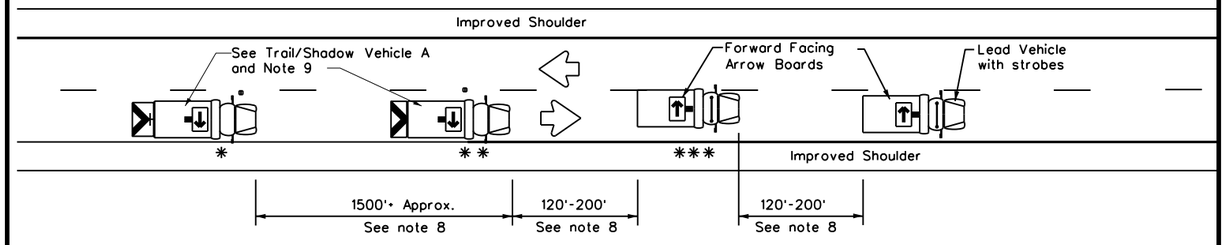
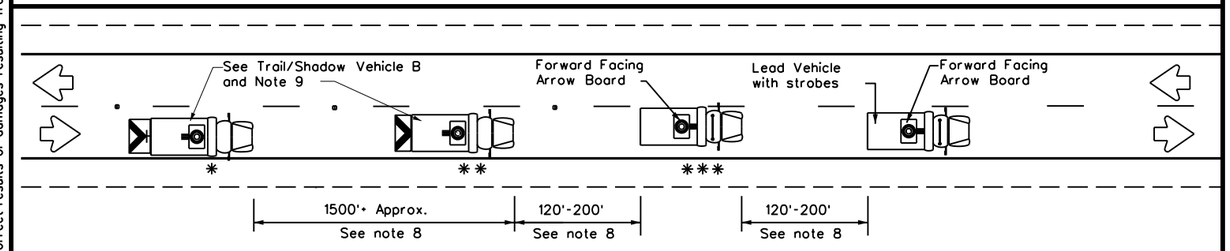


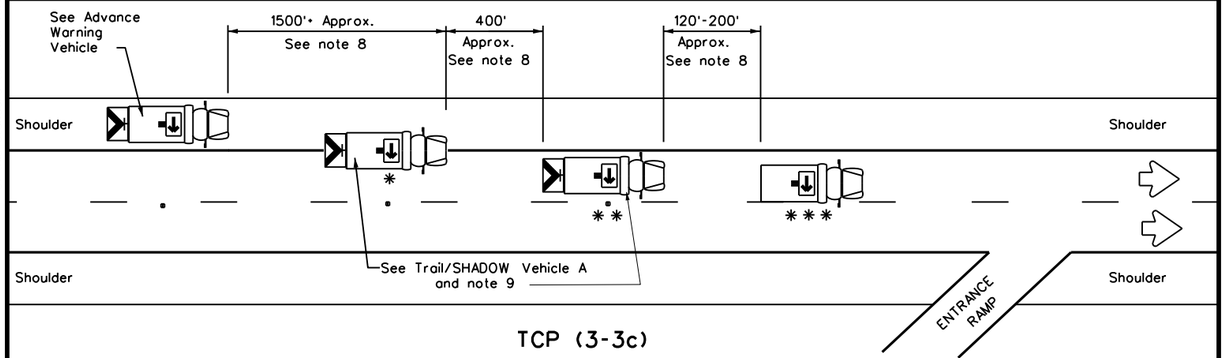
TCP (3-3a)

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



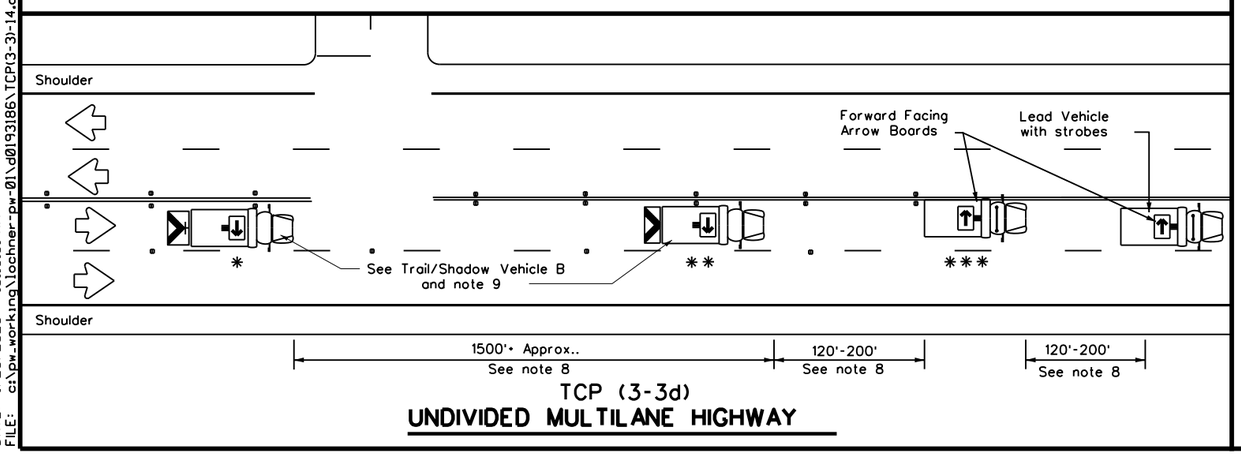
TCP (3-3b)

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



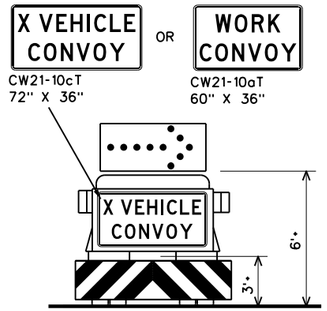
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



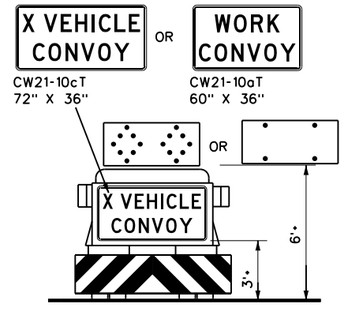
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



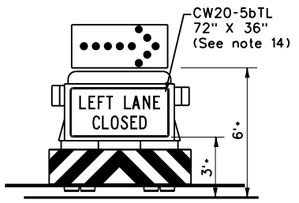
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

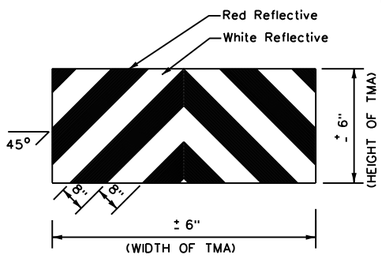


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	TYL	SMITH		45
1-97 7-14				

177

DATE: 1/23/2025 10:18:51 AM
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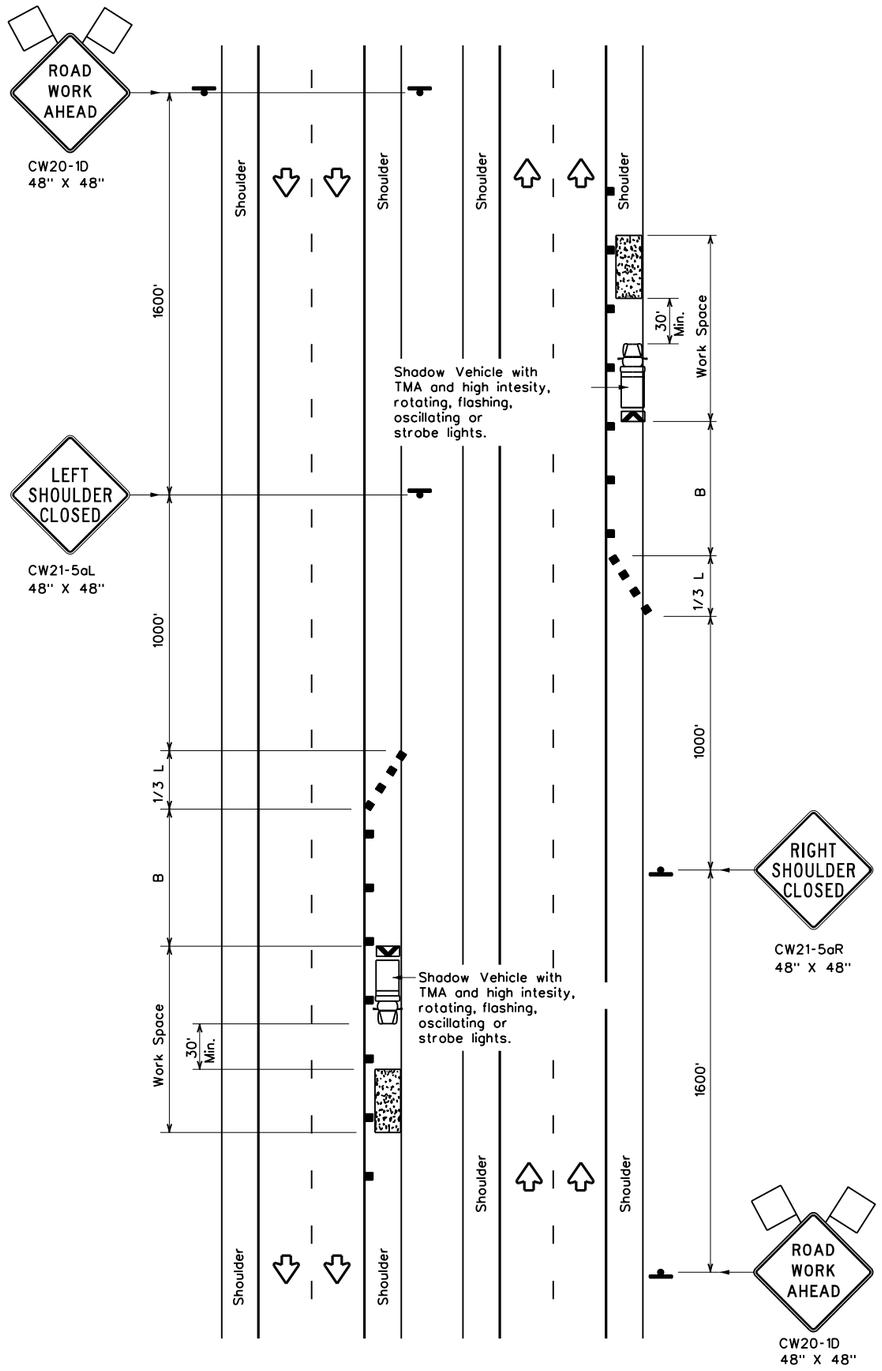
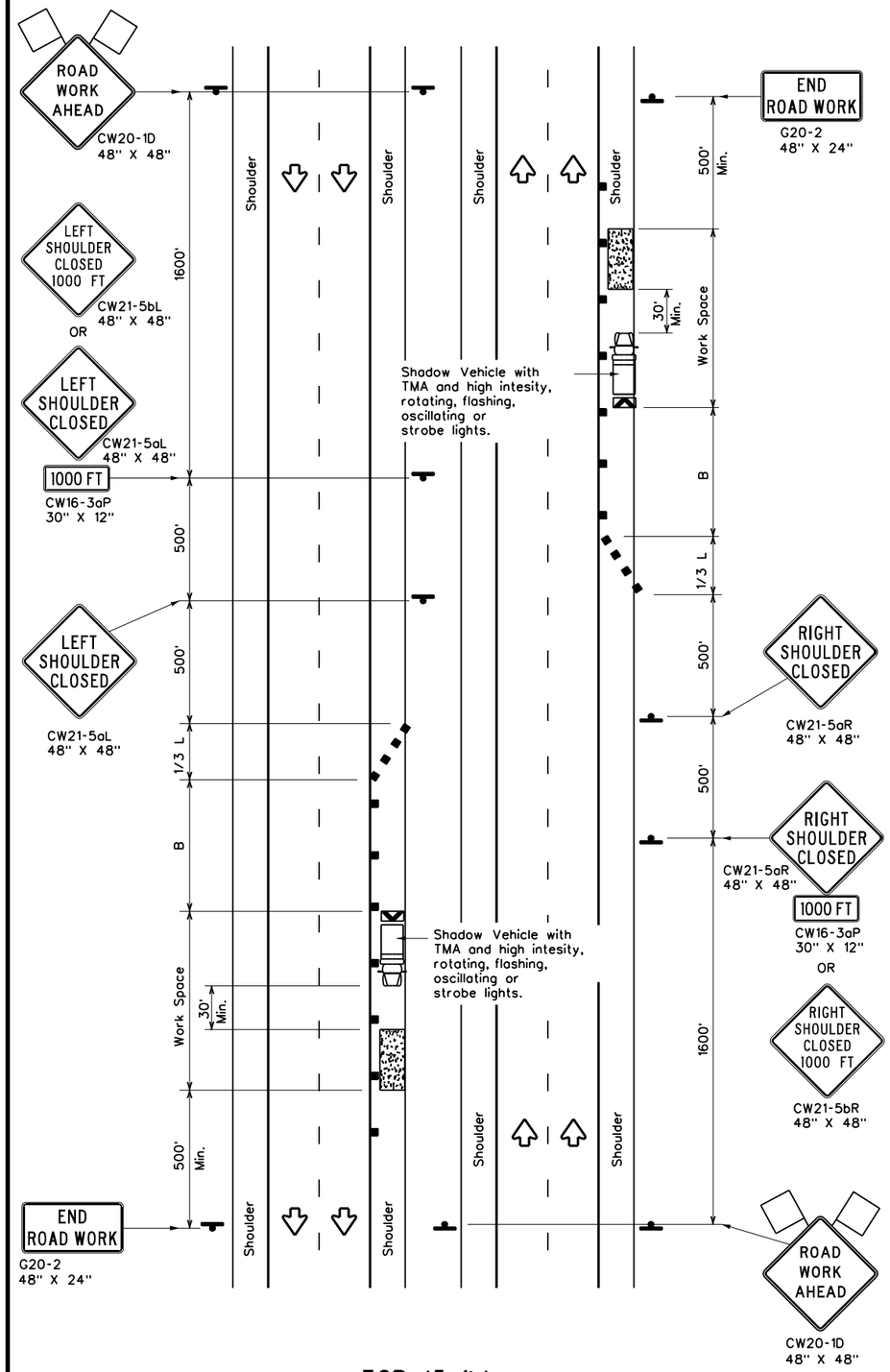


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

* 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(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
2-18	DIST	COUNTY		SHEET NO.
	TYL	SMITH		46

DATE: 1/23/2025 10:18:52 AM
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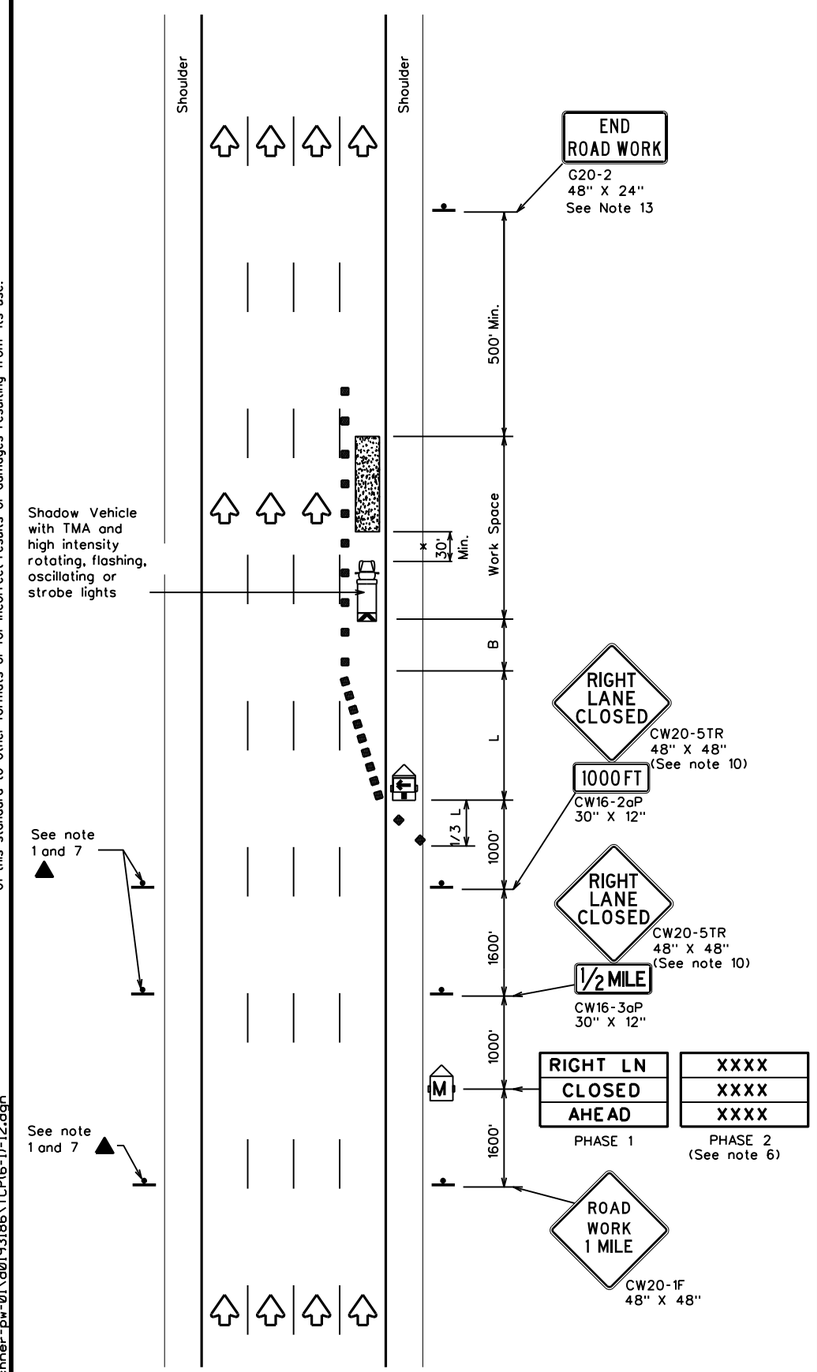
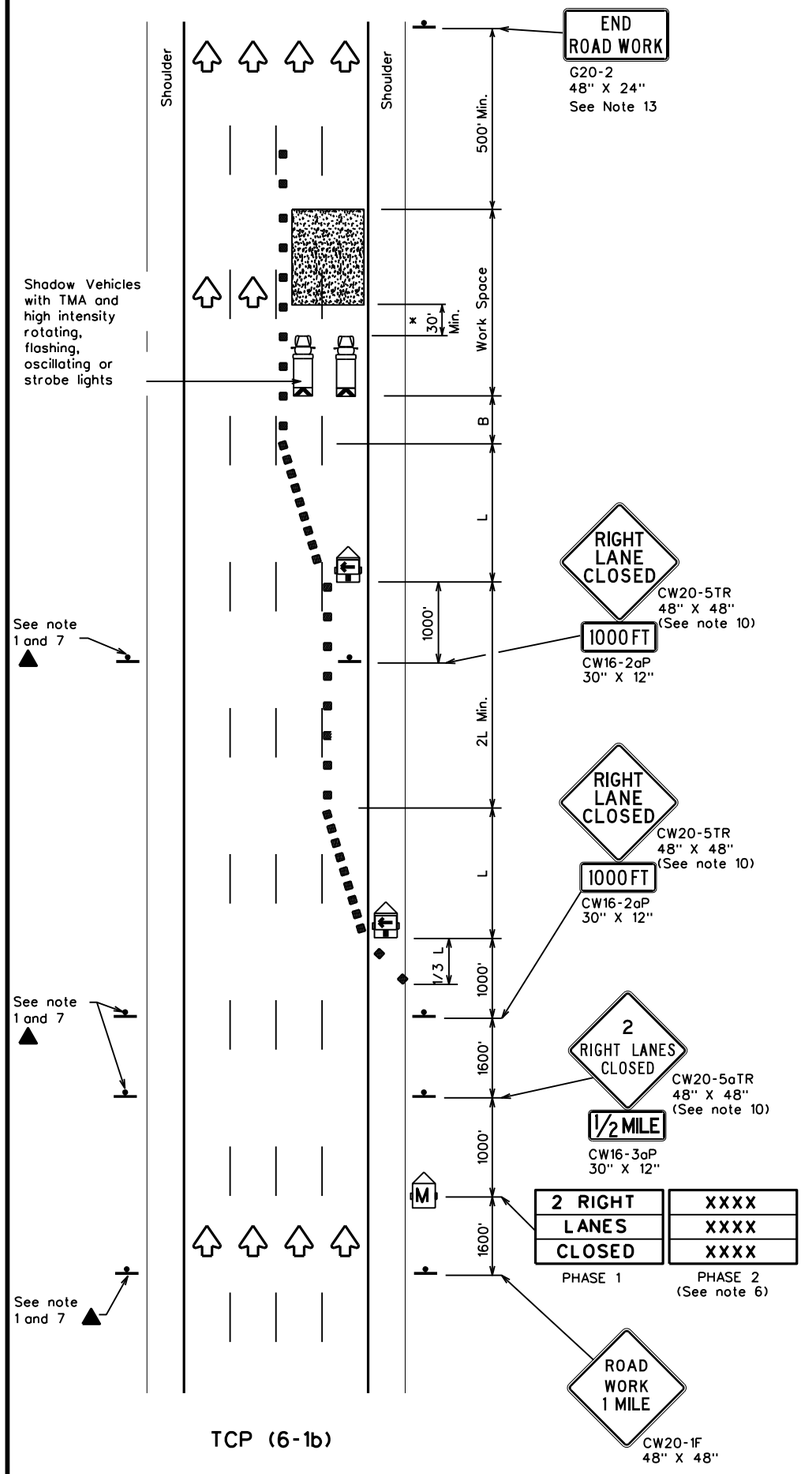


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12				TOLL 49
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		47

201

DATE: 1/23/2025 10:18:52 AM
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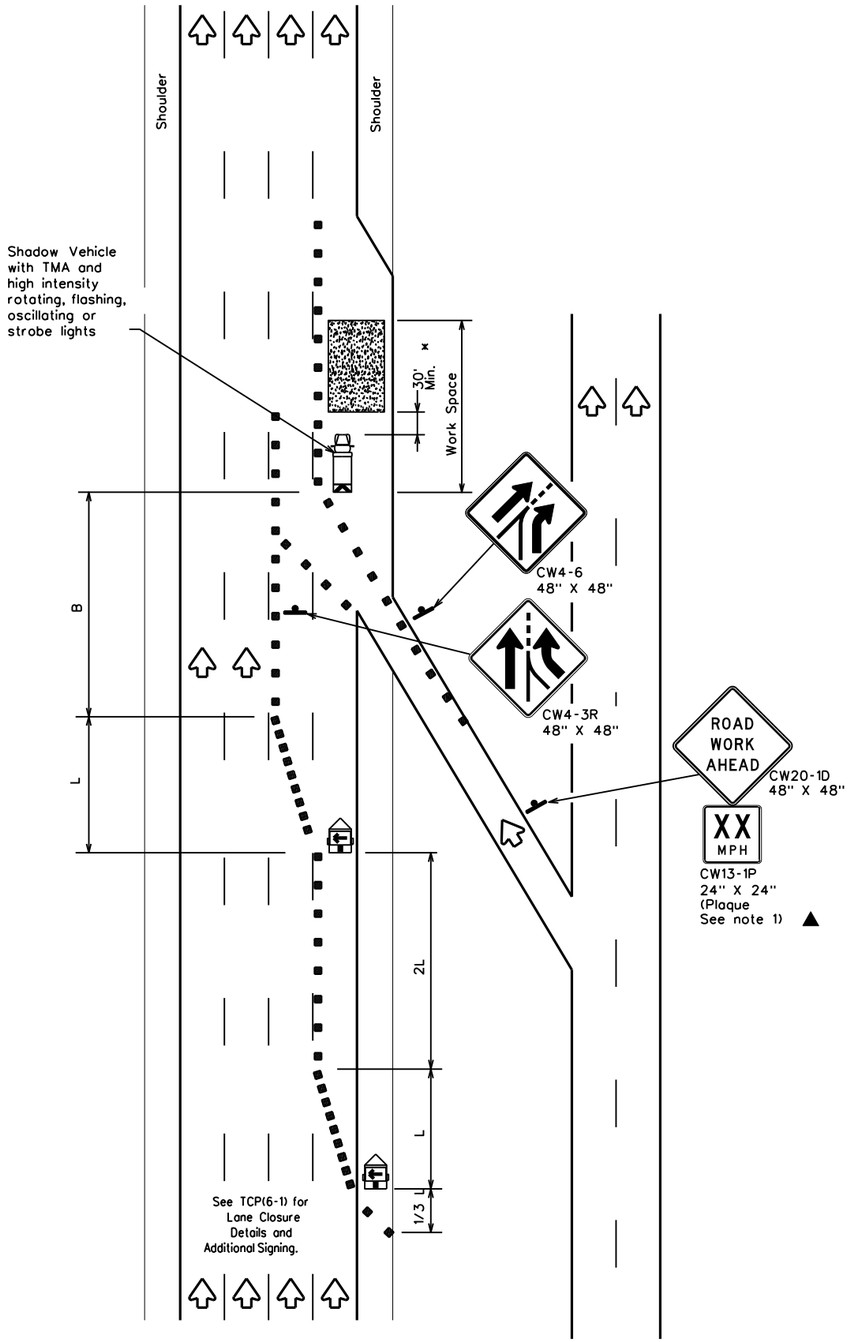
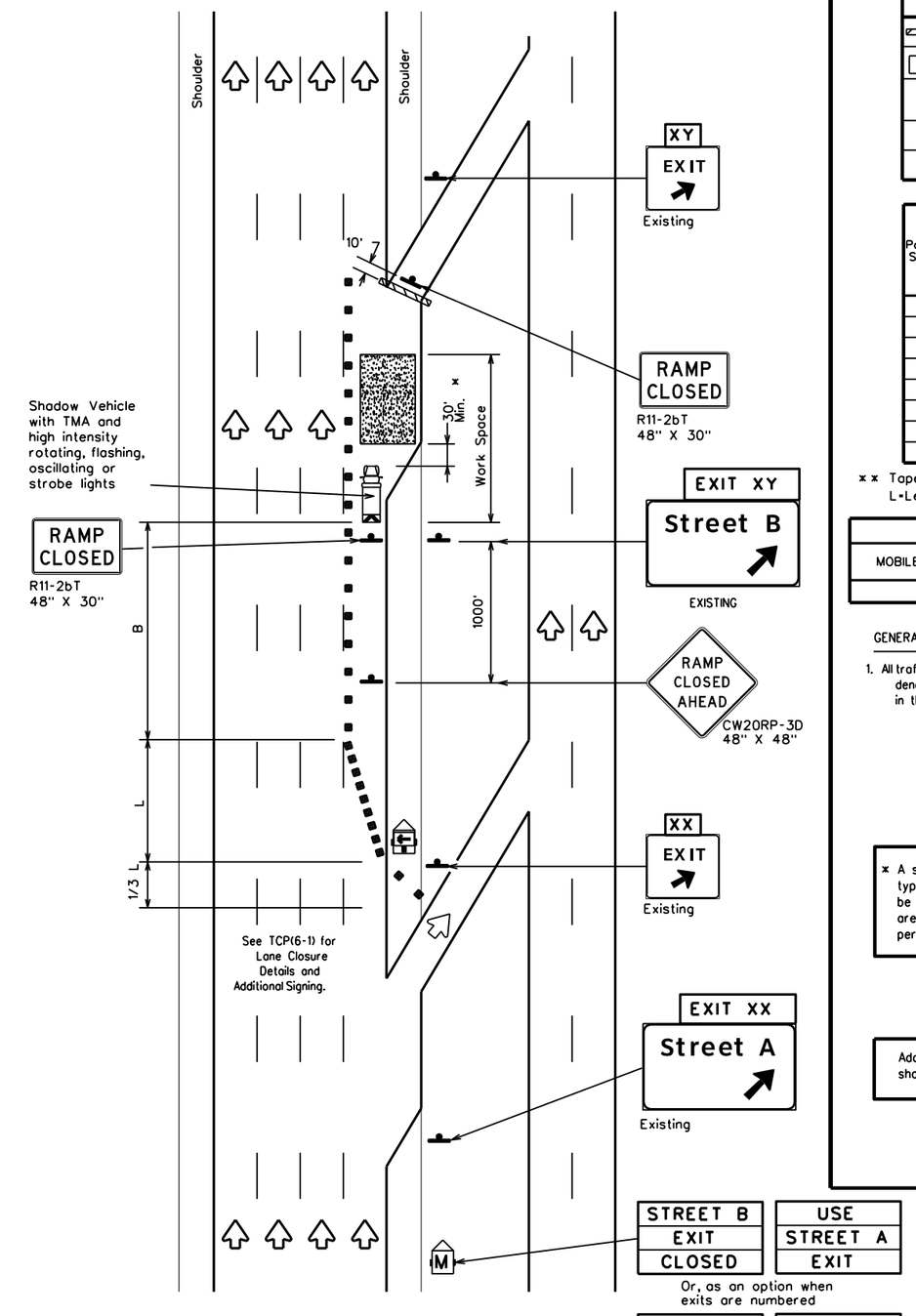


TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

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

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

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

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

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	TYL	SMITH		48

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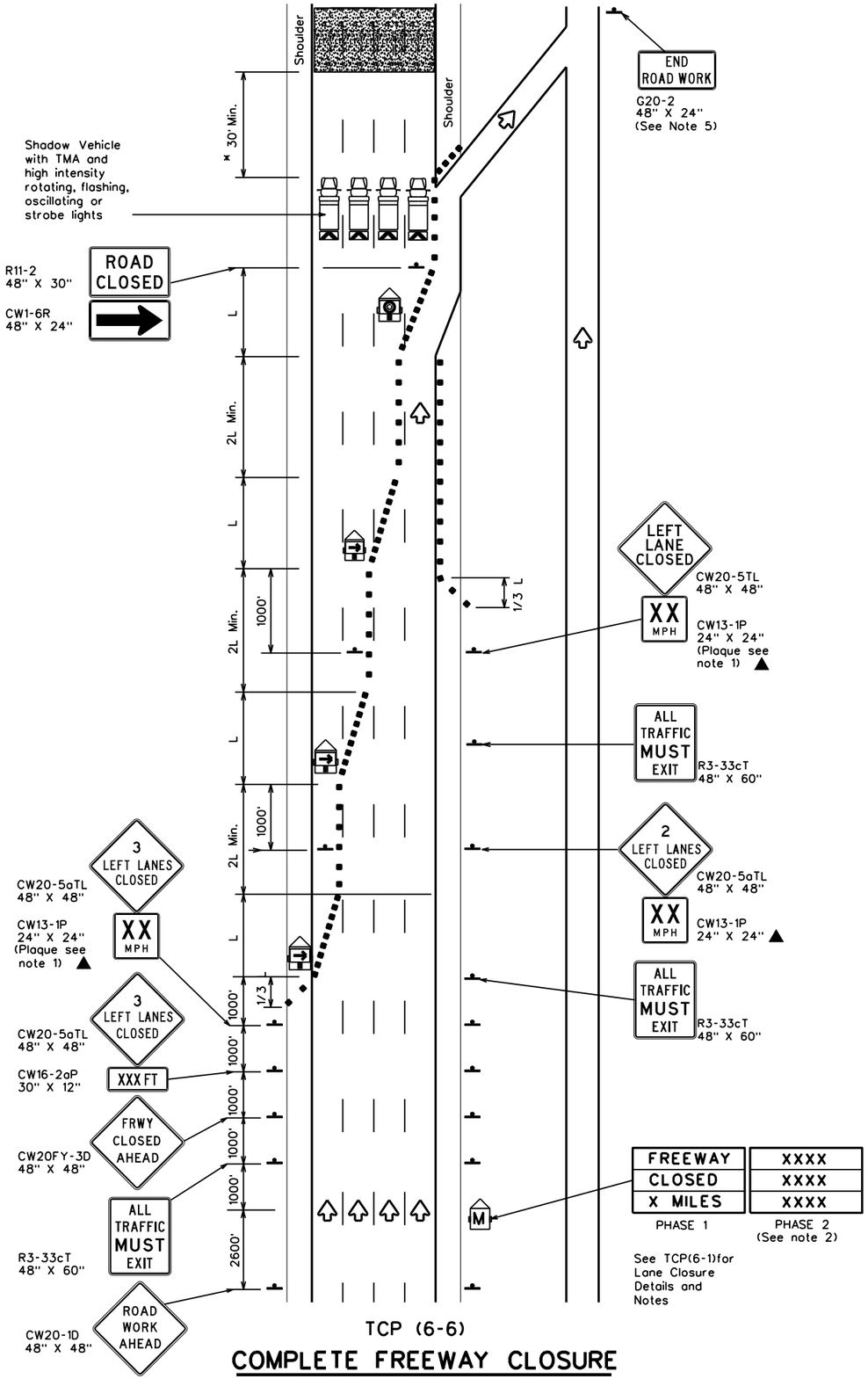


TCP (6-6)

COMPLETE FREEWAY CLOSURE

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE RIGHT," recommended speed, delay, exit information, or other specific warnings.
3. Where queuing is anticipated beyond signing shown, additional PCMS signs, other warning signs, devices or Law Enforcement Officers should be available to warn approaching high speed traffic of the end of the queue, as directed by the Engineer.
4. Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
5. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

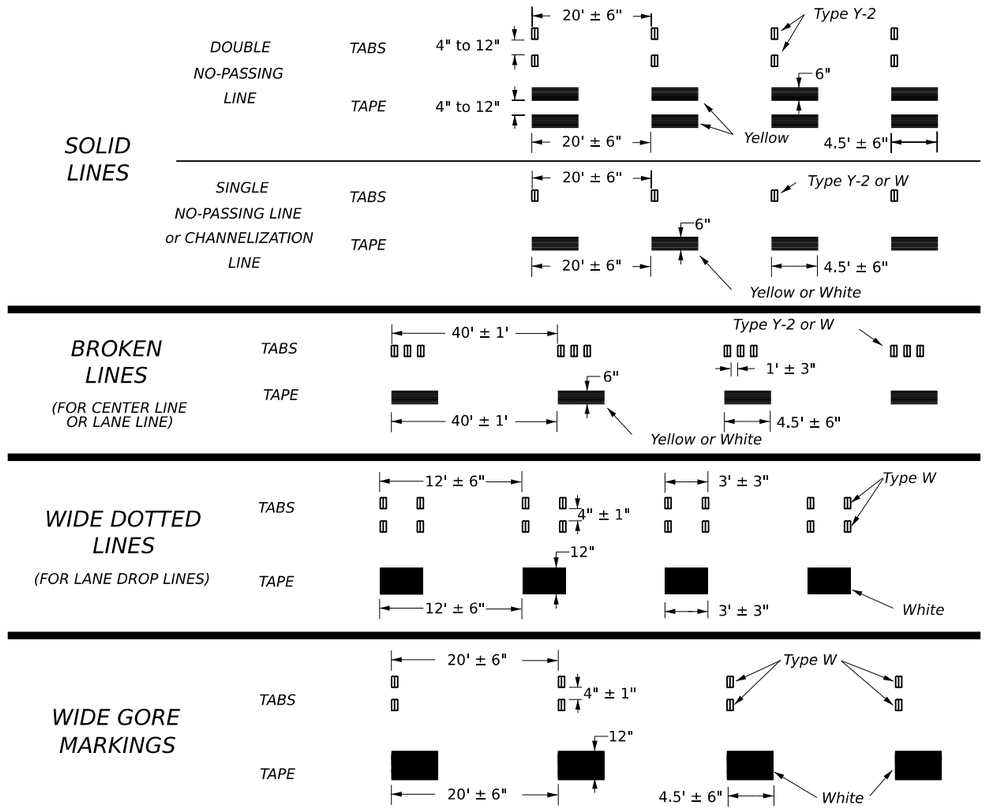
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY CLOSURE

TCP(6-6)-12

FILE: tcp6-6.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
1-97 8-98 4-98 8-12	DIST	COUNTY		SHEET NO.
	TYL	SMITH		49

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



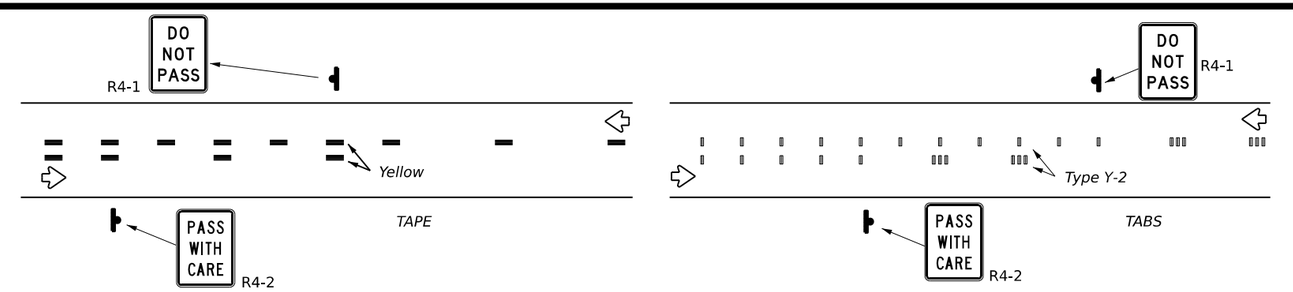
NOTES:

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.

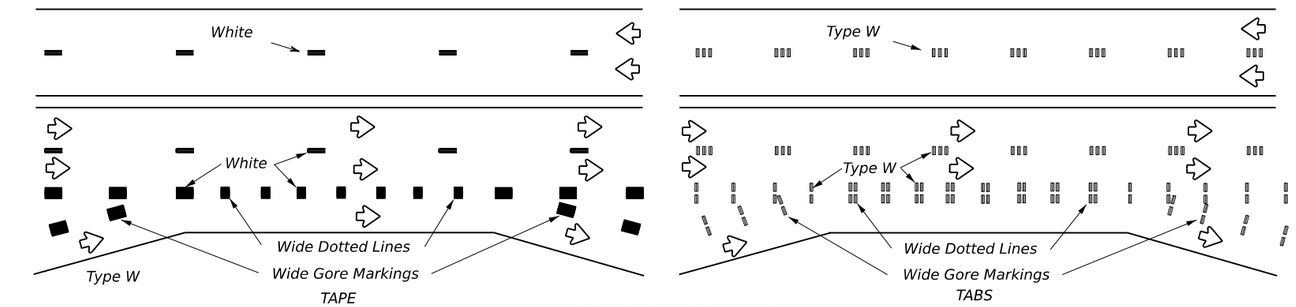
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

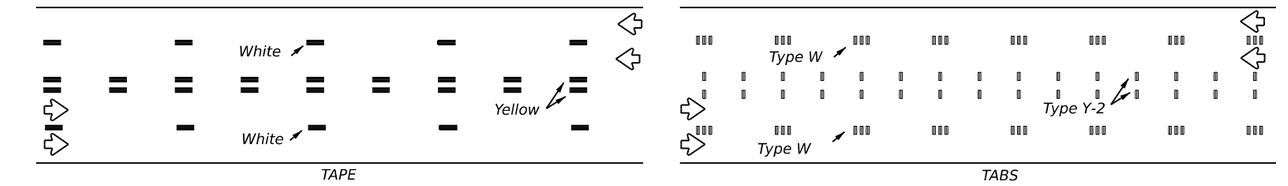
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



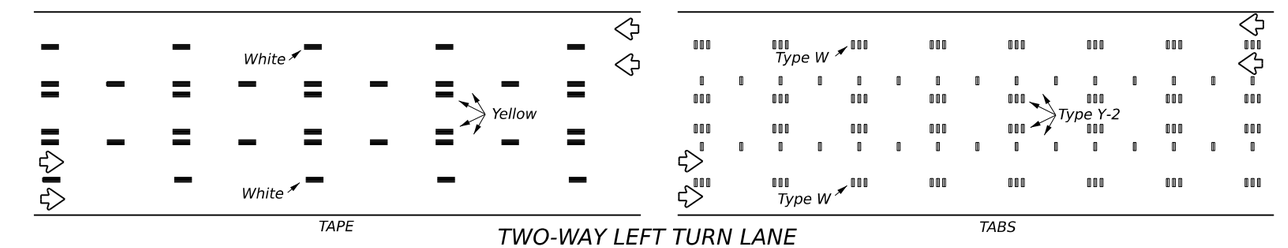
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



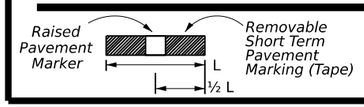
LANE LINES FOR DIVIDED HIGHWAY



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

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©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	TYL	SMITH		50
3-03				

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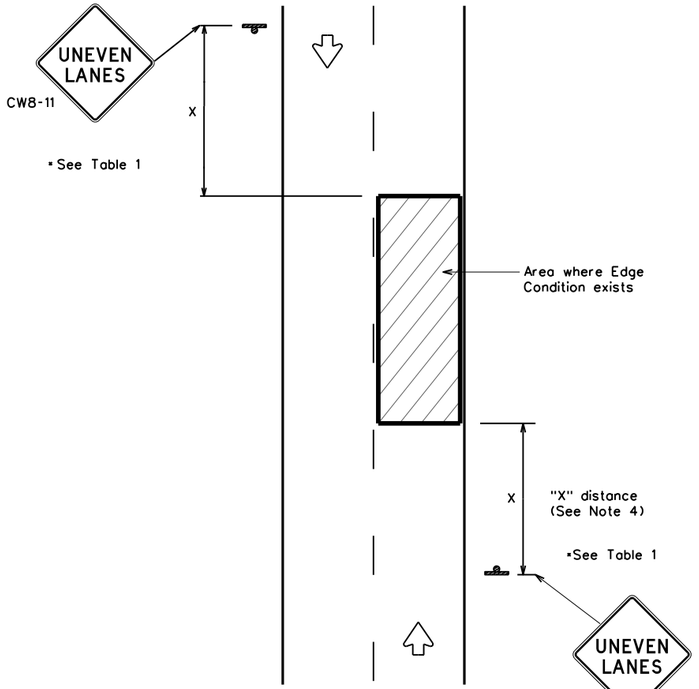
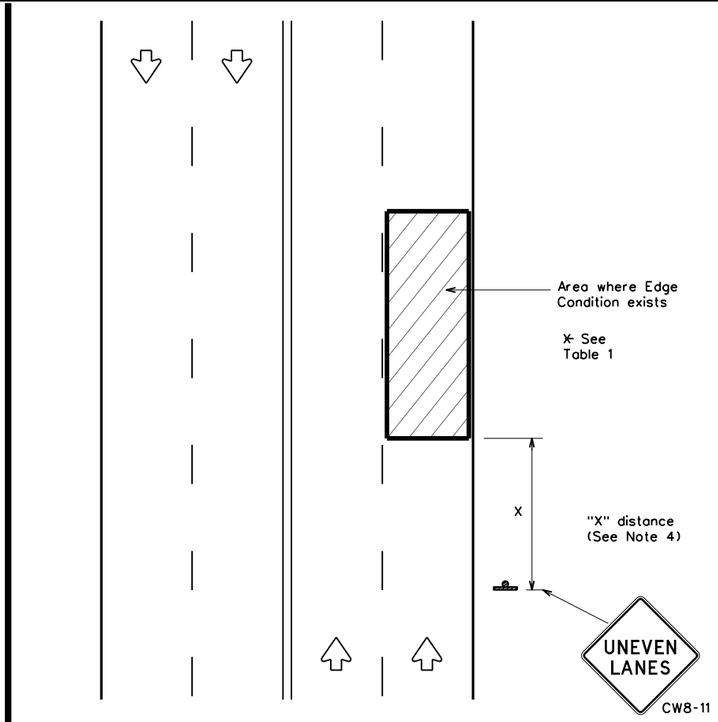
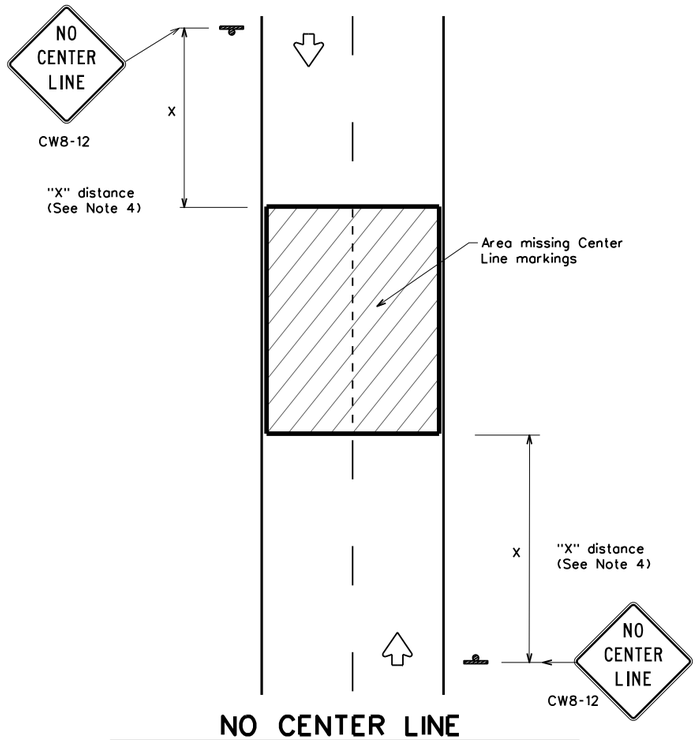


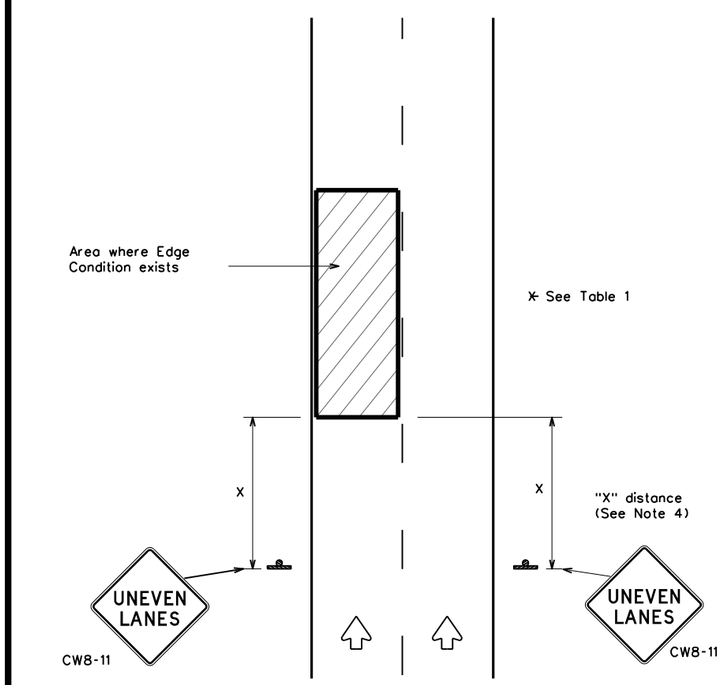
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

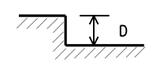
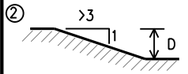
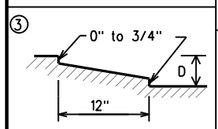
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	TYL	SMITH		51

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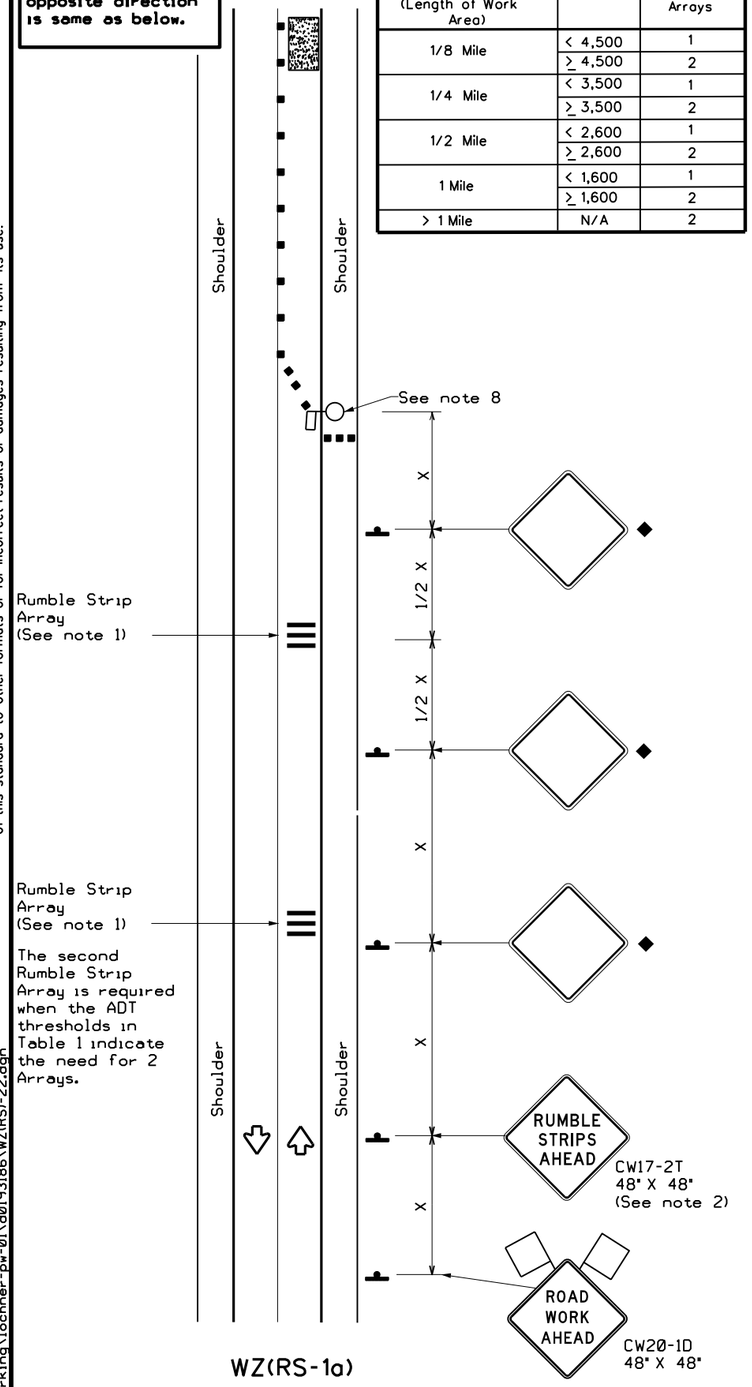
DATE: 1/23/2025 10:18:56 AM
FILE: c:\pw_working\lochner-pw-01\d0193186\WZ(RS)-22.dgn

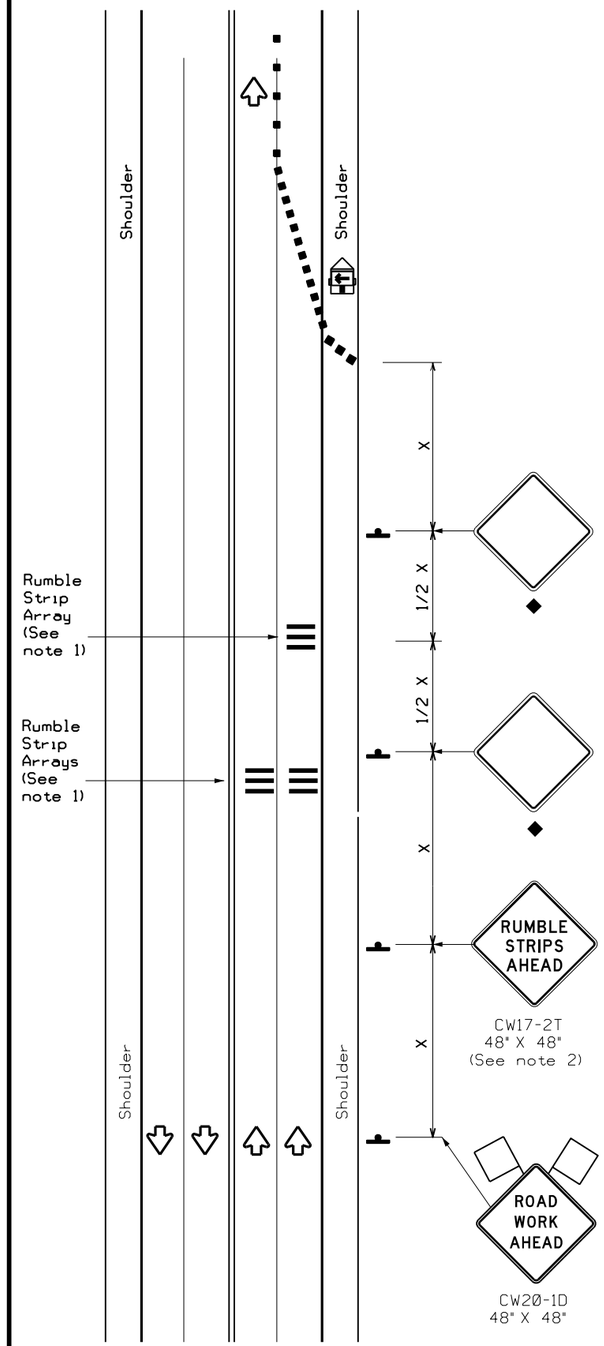
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



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				TOLL 49
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		52

117

℄ TOLL 49

Alignment Name:	℄ TOLL 49
Alignment Description:	Segment 3B North
Alignment Style:	Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	(POT)	436+00.000 R1	6869296.639	2913384.572
PC	(PC)	452+17.207 R1	6867679.875	2913422.453
Tangential Direction:		S01°20'31.903"E		
Tangential Length:		1617.207		
Element: Circular				
PC	(PC)	452+17.207 R1	6867679.875	2913422.453
PI	(PI)	455+23.368 R1	6867373.799	2913429.625
CC	(CC)		6868010.570	2927536.580
PT	(PT)	458+29.433 R1	6867068.320	2913450.058
Radius:		14118.000		
Delta:		02°29'04.655" Left		
Degree of Curvature (Arc):		00°24'21.006"		
Length:		612.226		
Tangent:		306.161		
Chord:		612.178		
Middle Ordinate:		3.319		
External:		3.319		
Back Tangent Direction:		S01°20'31.903"E		
Back Radial Direction:		S88°39'28.097"W		
Chord Direction:		S02°35'04.230"E		
Ahead Radial Direction:		S86°10'23.442"W		
Ahead Tangent Direction:		S03°49'36.558"E		
Element: Linear				
PT	(PT)	458+29.433 R1	6867068.320	2913450.058
PC	(PC)	460+91.967 R1	6866806.372	2913467.580
Tangential Direction:		S03°49'36.558"E		
Tangential Length:		262.534		
Element: Circular				
PC	(PC)	460+91.967 R1	6866806.372	2913467.580
PI	(PI)	463+77.743 R1	6866521.233	2913486.653
CC	(CC)		6865864.523	2899387.045
PT	(PT)	466+63.441 R1	6866235.556	2913494.166
Radius:		14112.000		
Delta:		02°19'12.821" Right		
Degree of Curvature (Arc):		00°24'21.627"		
Length:		571.474		
Tangent:		285.776		
Chord:		571.435		
Middle Ordinate:		2.893		
External:		2.893		
Back Tangent Direction:		S03°49'36.558"E		
Back Radial Direction:		S86°10'23.442"W		
Chord Direction:		S02°40'00.148"E		
Ahead Radial Direction:		S88°29'36.263"W		
Ahead Tangent Direction:		S01°30'23.737"E		
Element: Linear				
PT	(PT)	466+63.441 R1	6866235.556	2913494.166
PI	(PI)	524+27.880 R1	6860473.109	2913645.725
Tangential Direction:		S01°30'23.737"E		
Tangential Length:		5764.439		

℄ TOLL 49 (CONTINUED)

Alignment Name:	℄ TOLL 49
Alignment Description:	Segment 3B North
Alignment Style:	Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
PI	(PI)	524+27.880 R1	6860473.109	2913645.725
PI	(PI)	535+96.890 R1	6859304.386	2913671.595
Tangential Direction:		S01°16'04.911"E		
Tangential Length:		1169.009		
Element: Linear				
PI	(PI)	535+96.890 R1	6859304.386	2913671.595
PC	(PC)	567+80.341 R1	6856122.012	2913754.407
Tangential Direction:		S01°29'26.222"E		
Tangential Length:		3183.451		
Element: Circular				
PC	(PC)	567+80.341 R1	6856122.012	2913754.407
PI	(PI)	575+41.649 R1	6855360.961	2913774.211
CC	(CC)		6856719.597	2936718.953
PRC	(PRC)	583+02.401 R1	6854602.891	2913844.359
Radius:		22972.320		
Delta:		03°47'46.336" Left		
Degree of Curvature (Arc):		00°14'57.884"		
Length:		1522.060		
Tangent:		761.309		
Chord:		1521.782		
Middle Ordinate:		12.605		
External:		12.612		
Back Tangent Direction:		S01°29'26.222"E		
Back Radial Direction:		S88°30'33.778"W		
Chord Direction:		S03°23'19.390"E		
Ahead Radial Direction:		S84°42'47.442"W		
Ahead Tangent Direction:		S05°17'12.558"E		
Element: Circular				
PRC	(PRC)	583+02.401 R1	6854602.892	2913844.359
PI	(PI)	590+38.077 R1	6853870.345	2913912.145
CC	(CC)		6852506.462	2891188.879
PT	(PT)	597+73.241 R1	6853134.949	2913932.467
Radius:		22752.270		
Delta:		03°42'14.169" Right		
Degree of Curvature (Arc):		00°15'06.568"		
Length:		1470.840		
Tangent:		735.676		
Chord:		1470.584		
Middle Ordinate:		11.884		
External:		11.891		
Back Tangent Direction:		S05°17'12.558"E		
Back Radial Direction:		S84°42'47.442"W		
Chord Direction:		S03°26'05.473"E		
Ahead Radial Direction:		S88°25'01.611"W		
Ahead Tangent Direction:		S01°34'58.389"E		
Element: Linear				
PT	(PT)	597+73.241 R1	6853134.949	2913932.467
PC	(PC)	624+33.543 R1	6850475.662	2914005.952
Tangential Direction:		S01°34'58.389"E		
Tangential Length:		2660.302		

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 2

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	53

DATE: 1/23/2025 10:18:57 AM
FILE: c:\pw_working\lochner-pw-01\d0193187\ALIGNMENT.dgn

℄ TOLL 49 (CONTINUED)

Alignment Name:	℄ TOLL 49
Alignment Description:	Segment 3B North
Alignment Style:	Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	(PC)	624+33.543 R1	6850475.662	2914005.952
PI	(PI)	635+58.367 R1	6849351.267	2914037.024
CC	(CC)		6850689.879	2921757.993
PT	(PT)	646+67.612 R1	6848282.035	2914386.269
Radius:		7755.000		
Delta:		16°30'20.987" Left		
Degree of Curvature (Arc):		00°44'19.765"		
Length:		2234.069		
Tangent:		1124.824		
Chord:		2226.351		
Middle Ordinate:		80.310		
External:		81.151		
Back Tangent Direction:		S01°34'58.389"E		
Back Radial Direction:		S88°25'01.611"W		
Chord Direction:		S09°50'08.883"E		
Ahead Radial Direction:		S71°54'40.624"W		
Ahead Tangent Direction:		S18°05'19.376"E		
Element: Linear				
PT	(PT)	646+67.612 R1	6848282.035	2914386.269
PC	(PC)	655+05.729 R1	6847485.340	2914646.496
Tangential Direction:		S18°05'19.376"E		
Tangential Length:		838.117		
Element: Circular				
PC	(PC)	655+05.729 R1	6847485.340	2914646.496
PI	(PI)	657+75.241 R1	6847229.148	2914730.176
CC	(CC)		6848378.307	2917380.355
PT	(PT)	660+43.184 R1	6846992.963	2914859.998
Radius:		2876.000		
Delta:		10°42'25.923" Left		
Degree of Curvature (Arc):		01°59'31.933"		
Length:		537.455		
Tangent:		269.512		
Chord:		536.673		
Middle Ordinate:		12.546		
External:		12.601		
Back Tangent Direction:		S18°05'19.376"E		
Back Radial Direction:		S71°54'40.624"W		
Chord Direction:		S23°26'32.338"E		
Ahead Radial Direction:		S61°12'14.701"W		
Ahead Tangent Direction:		S28°47'45.299"E		
Element: Linear				
PT	(PT)	660+43.184 R1	6846992.963	2914859.998
PC	(PC)	667+44.900 R1	6846378.021	2915198.009
Tangential Direction:		S28°47'45.299"E		
Tangential Length:		701.716		

℄ TOLL 49 (CONTINUED)

Alignment Name:	℄ TOLL 49
Alignment Description:	Segment 3B North
Alignment Style:	Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	(PC)	667+44.900 R1	6846378.021	2915198.009
PI	(PI)	680+07.537 R1	6845271.520	2915806.210
CC	(CC)		6840525.473	2904550.465
PT	(PT)	692+61.142 R1	6844063.605	2916173.895
Radius:		12150.000		
Delta:		11°51'57.054" Right		
Degree of Curvature (Arc):		00°28'17.653"		
Length:		2516.242		
Tangent:		1262.637		
Chord:		2511.748		
Middle Ordinate:		65.080		
External:		65.431		
Back Tangent Direction:		S28°47'45.299"E		
Back Radial Direction:		S61°12'14.701"W		
Chord Direction:		S22°51'46.773"E		
Ahead Radial Direction:		S73°04'11.754"W		
Ahead Tangent Direction:		S16°55'48.246"E		
Element: Linear				
PT	(PT)	692+61.142 R1	6844063.605	2916173.895
PI	(PI)	707+85.836 R1	6842604.989	2916617.893
Tangential Direction:		S16°55'48.246"E		
Tangential Length:		1524.694		
Element: Linear				
PI	(PI)	707+85.836 R1	6842604.989	2916617.893
PI	(PI)	730+85.840 R1	6840406.709	2917294.337
Tangential Direction:		S17°06'14.176"E		
Tangential Length:		2300.003		
Element: Linear				
PI	(PI)	730+85.840 R1	6840406.709	2917294.337
POT	(POT)	748+00.000 R1	6838767.487	2917795.632
Tangential Direction:		S17°00'15.450"E		
Tangential Length:		1714.160		

STATE OF TEXAS
COREY D. HOGUE
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HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 2

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	54

DATE: 1/23/2025 10:18:57 AM
FILE: c:\pw_working\lochner-pw-01\d0193187\ALIGNMENT.dgn

CK
DW
CK
DW

EXISTING ROW

TOLL 49 EXIT RAMP

STA 449+93.76
BEGIN (A)(D)(C)(O)
BEGIN REMOVAL OF EXIST
PAVEMENT MARKINGS

PC 452+17.11

(C)(O) - 80' C-C

A

D

STA 458+12.79
BEGIN 2.5" OVERLAY
BEGIN (A)
BEGIN (B)(P)

PT 458+29.43

LIMITS OF MBGF MOWSTRIP
262' MILL AND OVERLAY 2.5"

MATCHLINE STA. 460+00.00

℄ TOLL 49

450+00

455+00

460

IH 20 EBFR

STA 458+62.79
BEGIN (R) AND (S)

D

TOLL 49 ENTRANCE RAMP

A

STA 450+27.37
BEGIN (A)(D)(C)(O)
BEGIN REMOVAL OF EXIST
PAVEMENT MARKINGS

(C)(O) - 80' C-C

EXISTING ROW

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

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North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 448+00 TO STA 460+00

SHEET 1 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	55

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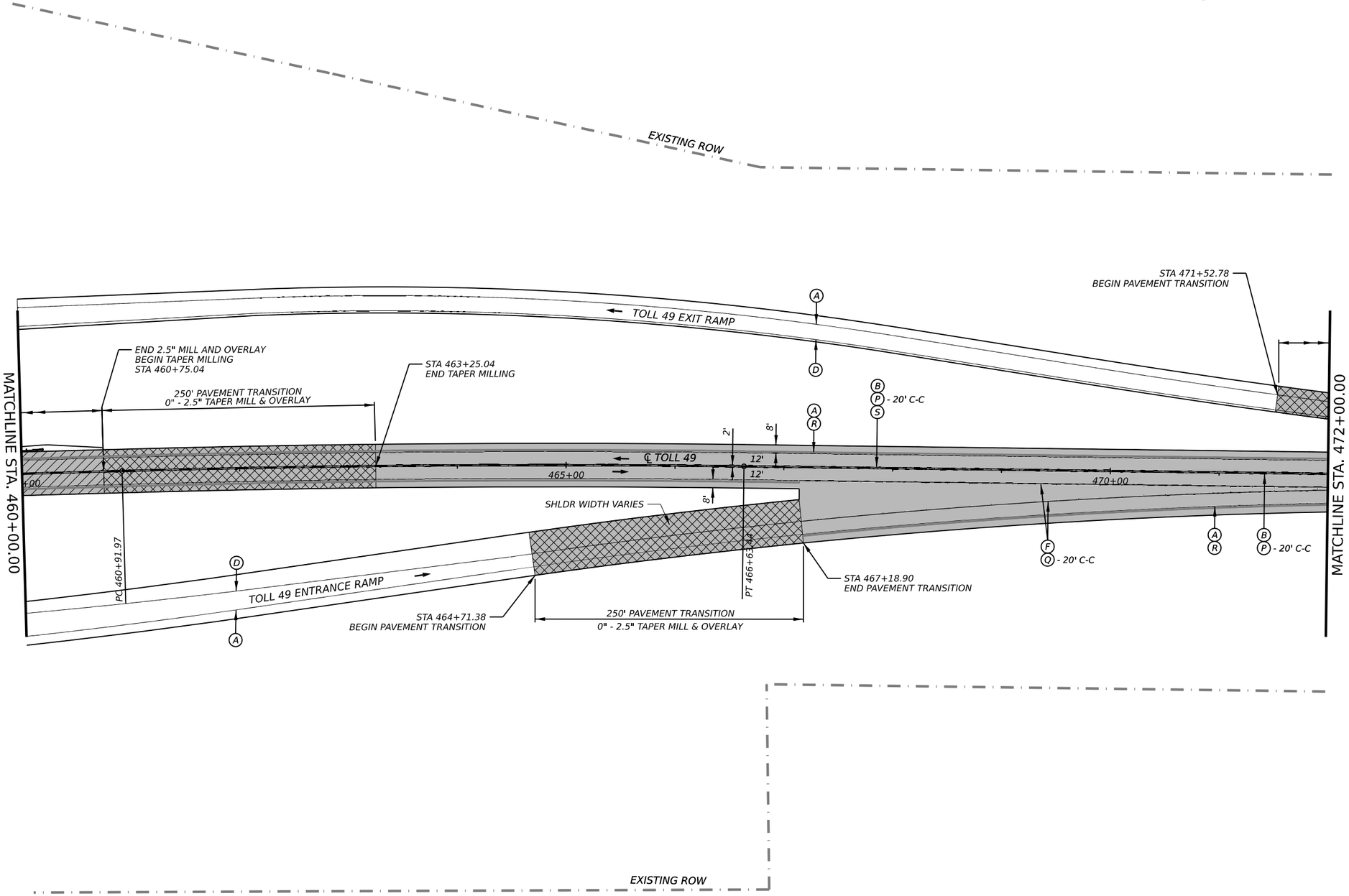

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

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North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

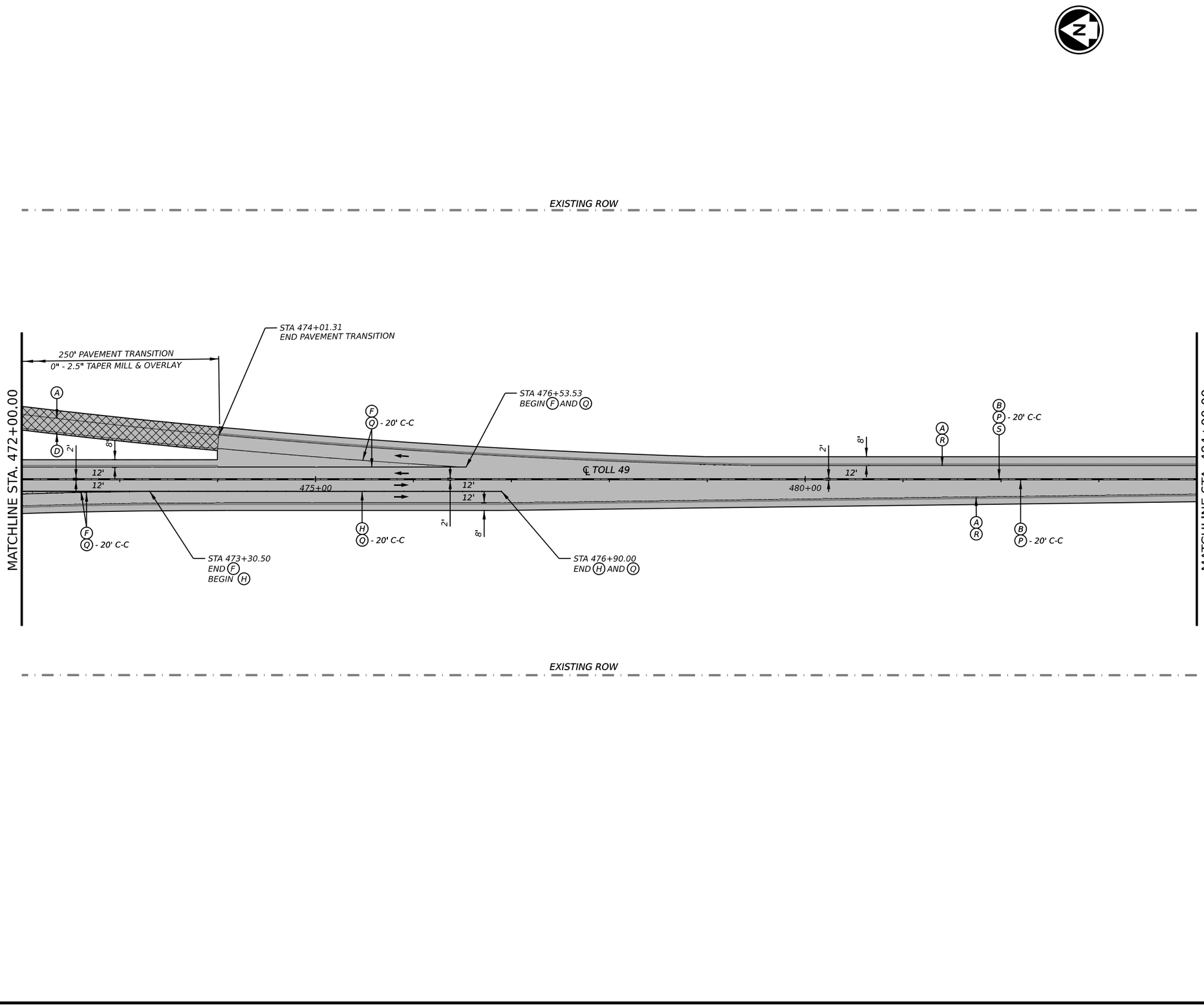
STA 460+00 TO STA 472+00

SHEET 2 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	56

DATE: 12/17/2024 10:19:01 AM
FILE: c:\pw\workingdir\lochner-pw-01\d0193187\PAVING & STRIPING 02.dgn



LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
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01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NTE RMA
North East Texas Regional Mobility Authority

TOLL 49

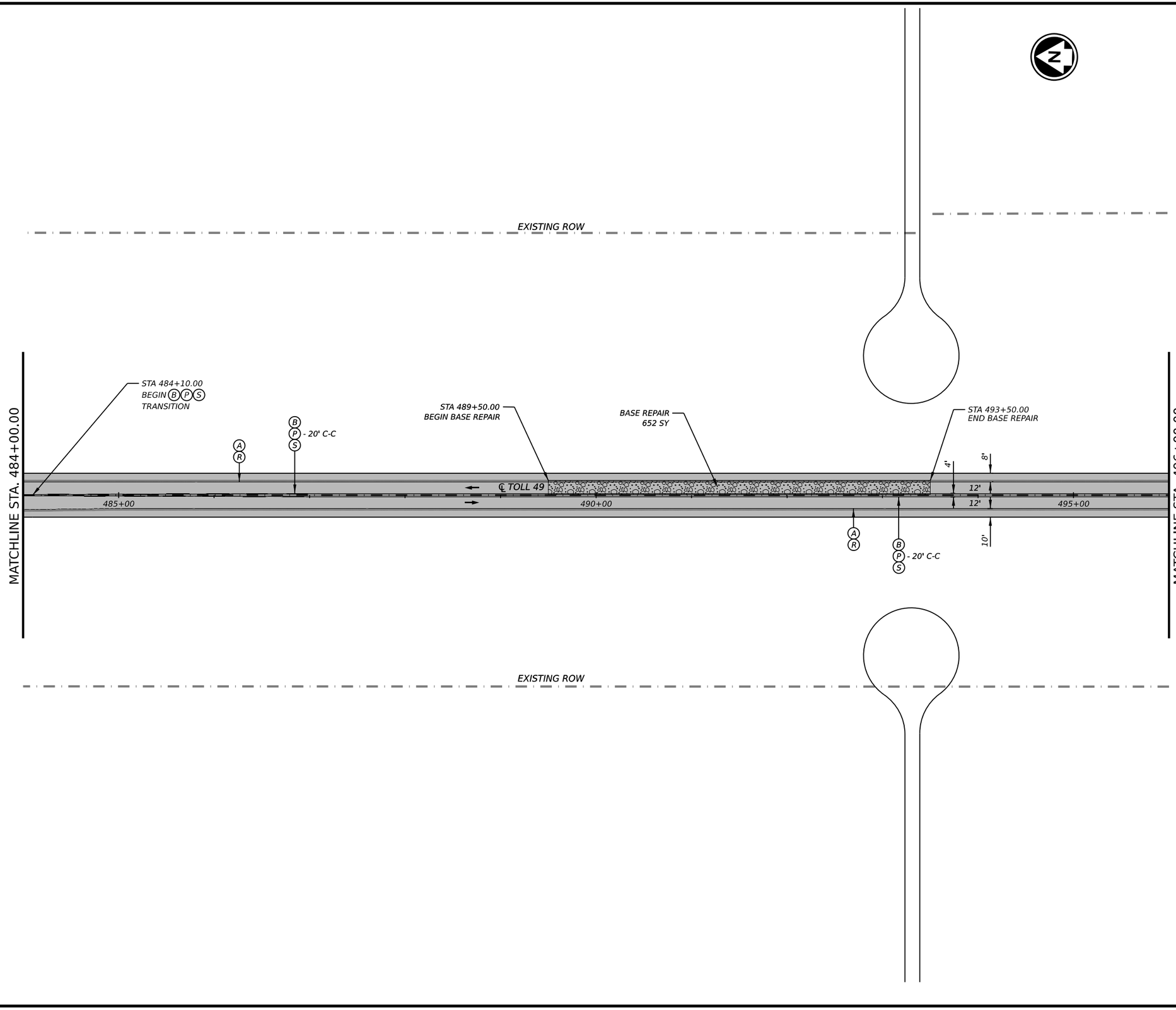
SEGMENT 3B NORTH PAVING & STRIPING

STA 472+00 TO STA 484+00

SHEET 3 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49
DIST / COUNTY	SHEET NO.
TYL / SMITH	57

DATE: 1/23/2025 10:19:02 AM
FILE: c:\pw_working\lochner-pw-01\d0193187\PAVING & STRIPING 03.dgn



LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)

DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 484+00 TO STA 496+00

SHEET 4 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	58

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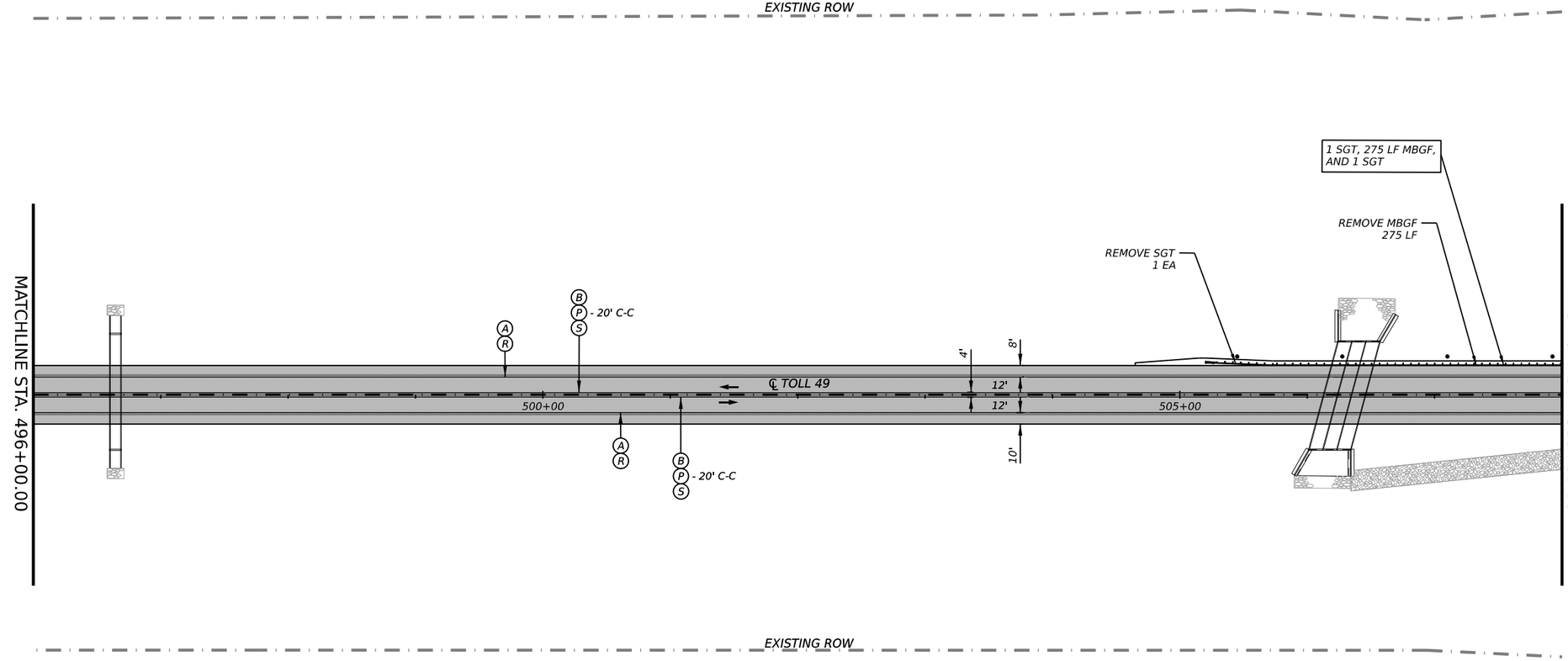

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 496+00 TO STA 508+00

SHEET 5 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	59

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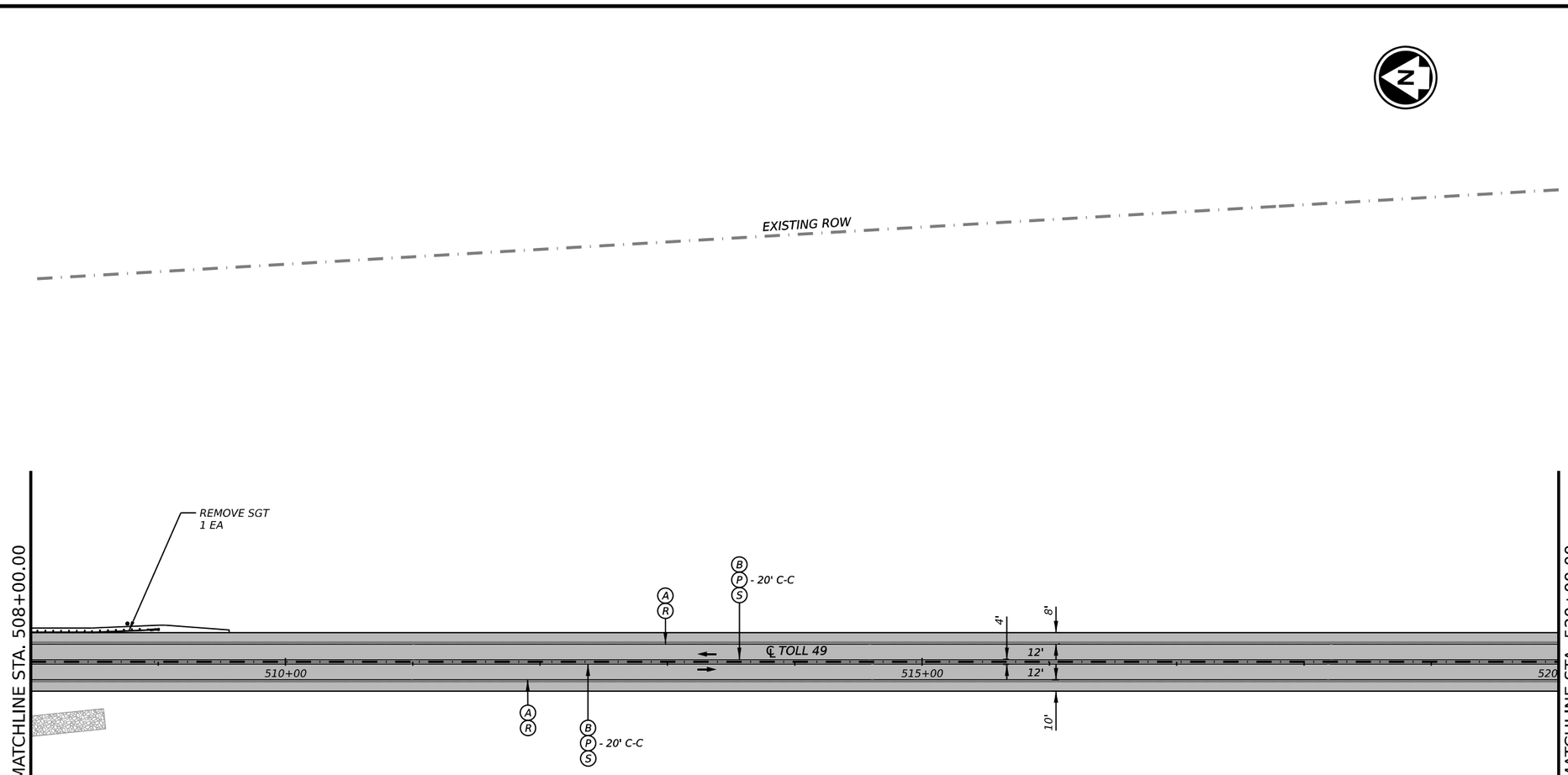

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NTE RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 508+00 TO STA 520+00

SHEET 6 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	60

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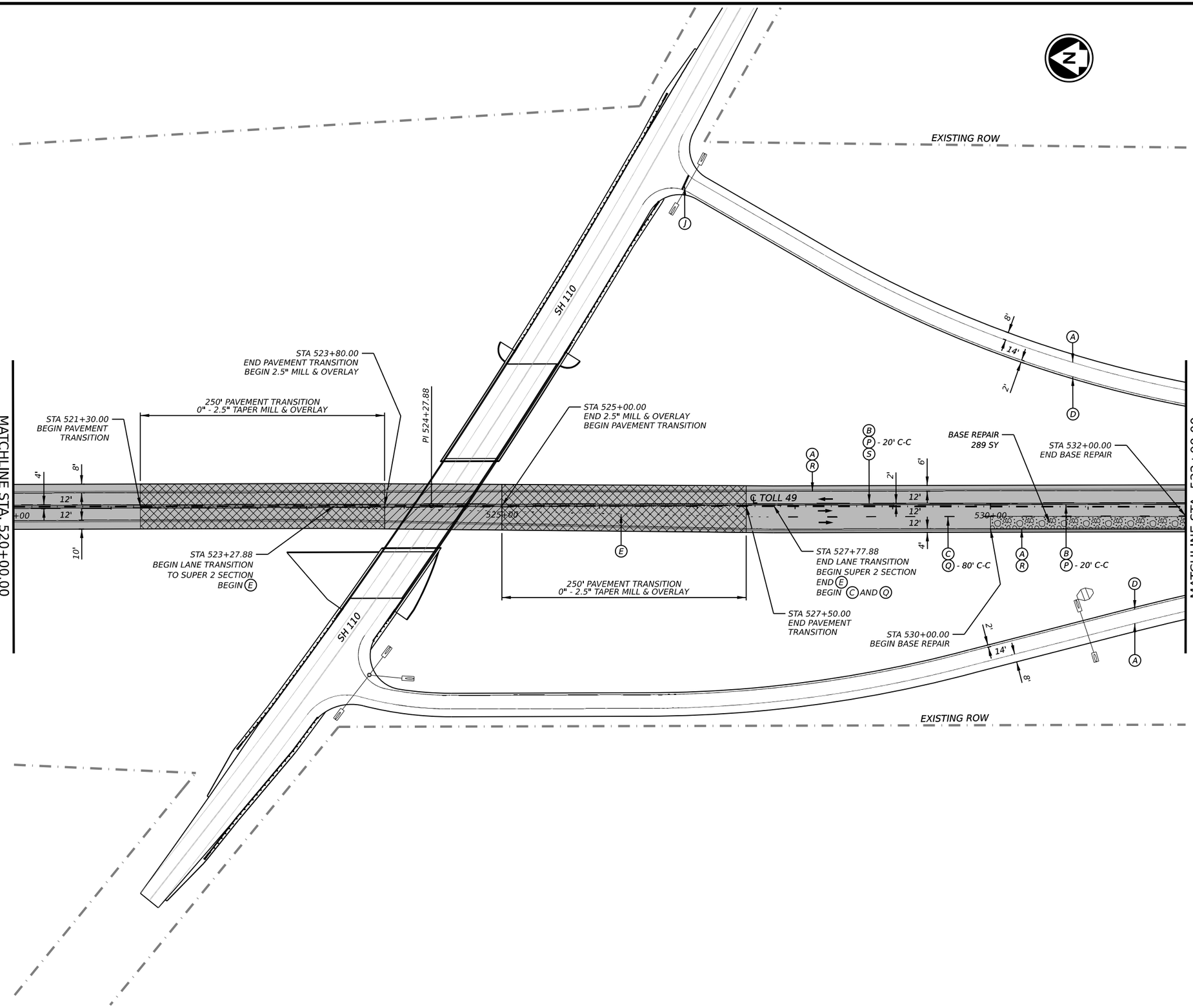

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 520+00 TO STA 532+00

SHEET 7 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	61

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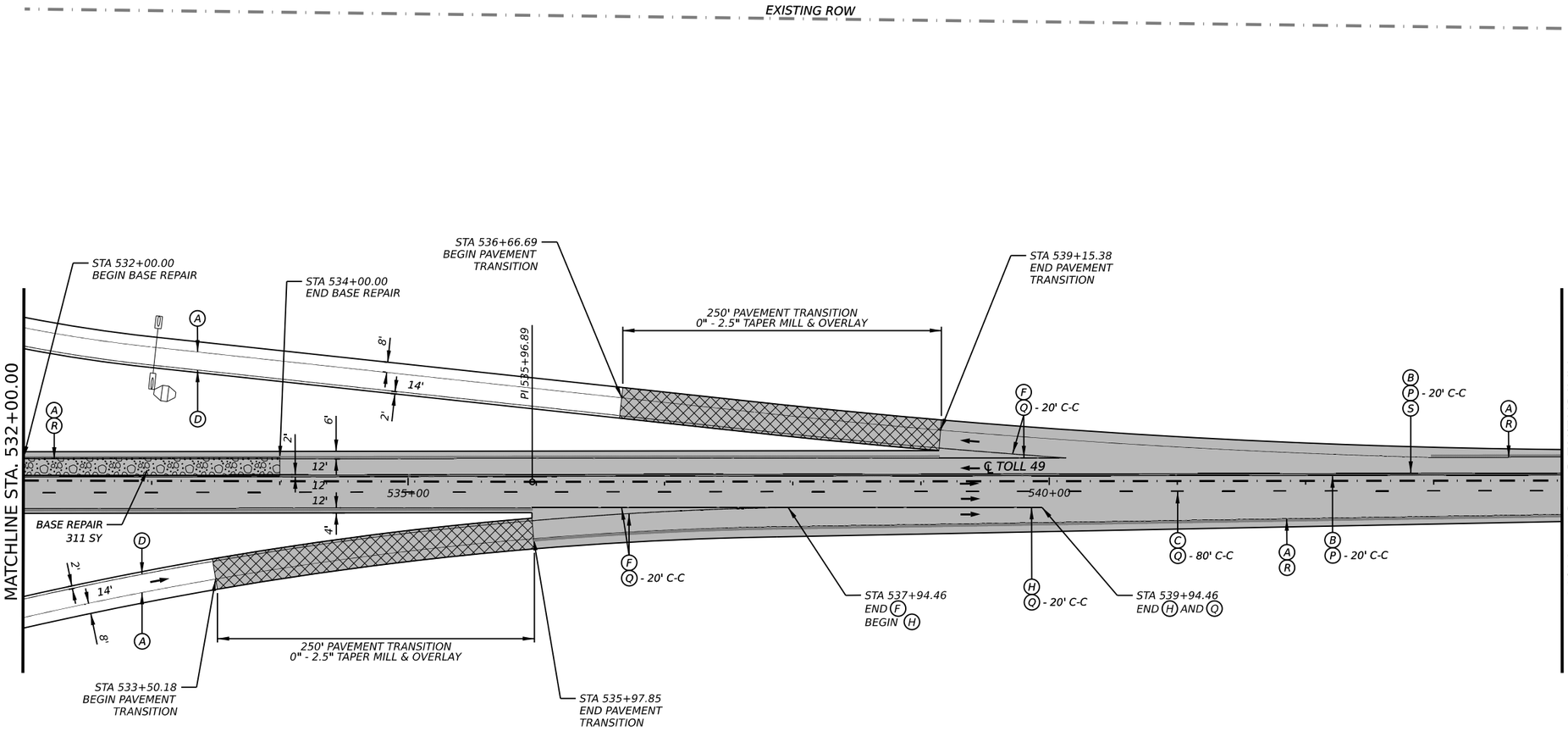

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 532+00 TO STA 544+00

SHEET 8 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	62

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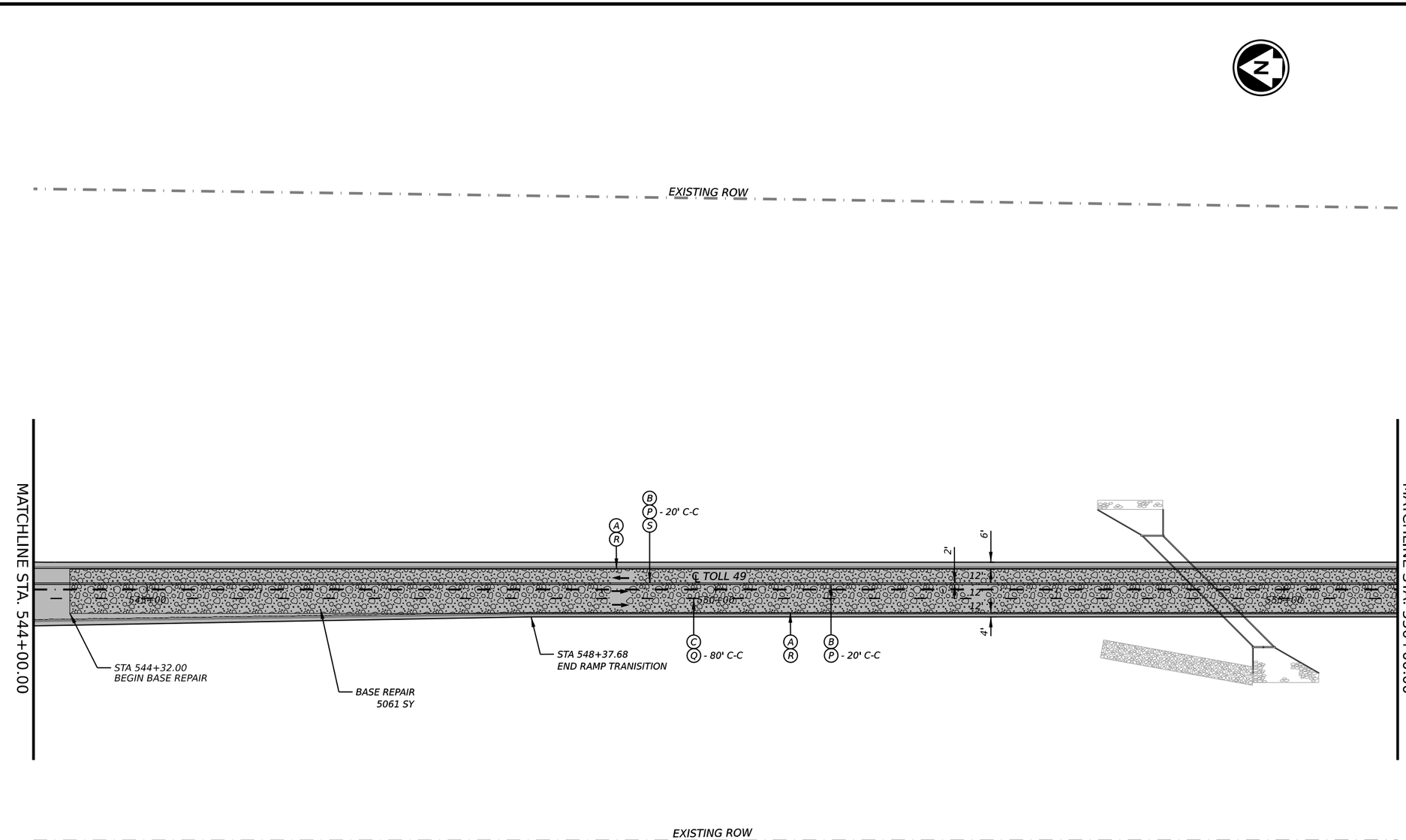

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 544+00 TO STA 556+00

SHEET 9 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	63

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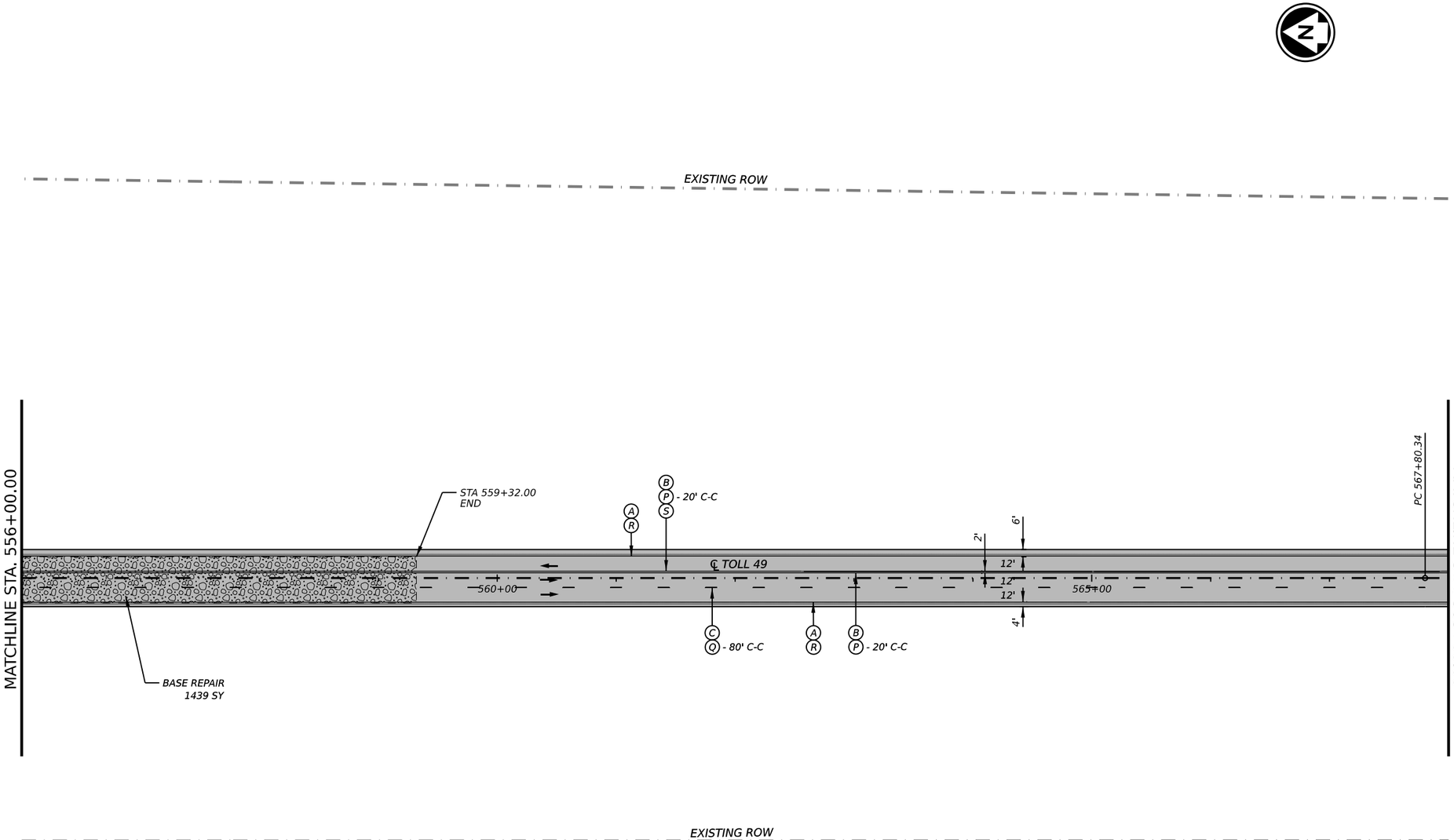

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 556+00 TO STA 568+00

SHEET 10 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	64

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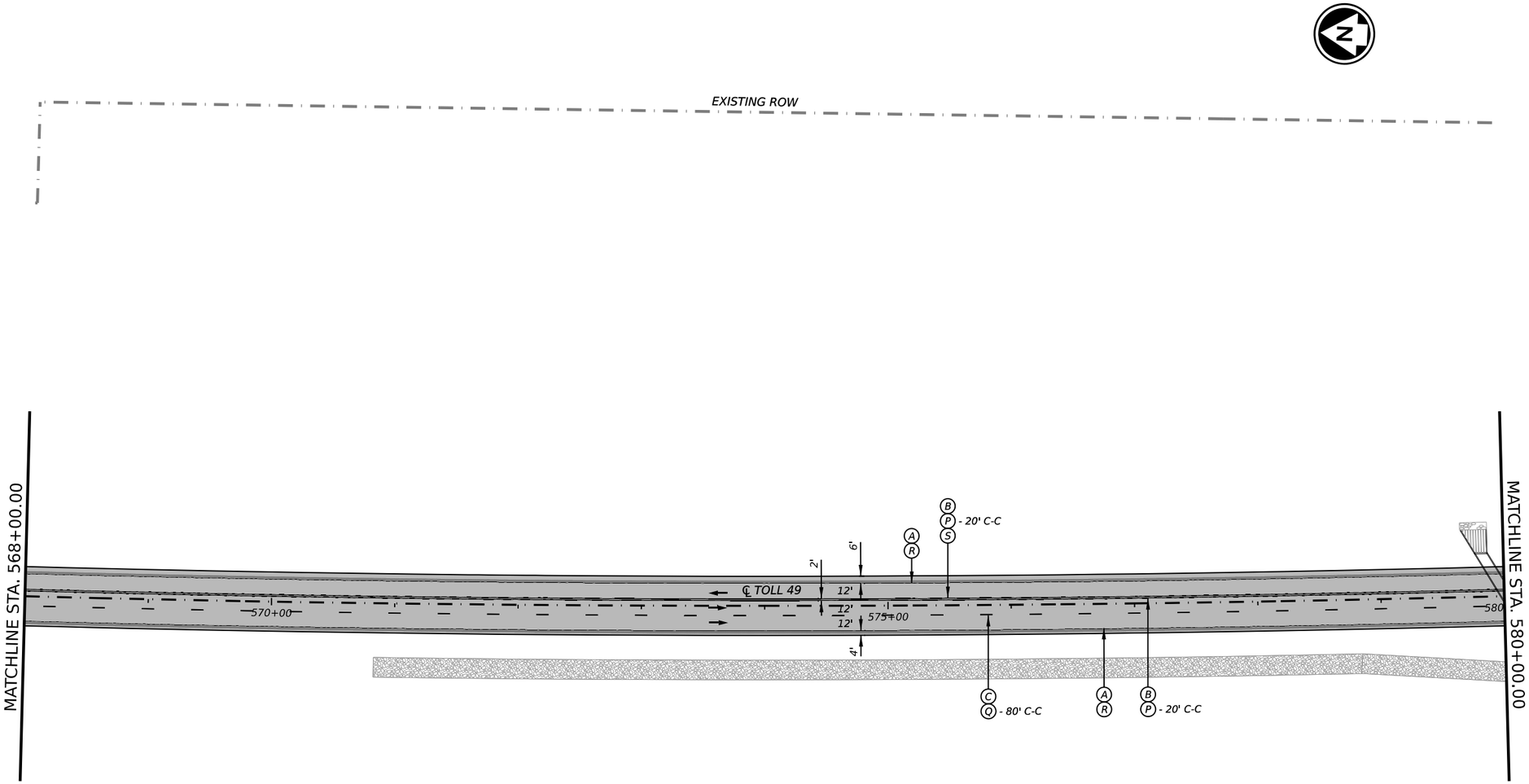

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
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(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 568+00 TO STA 580+00

SHEET 11 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	65

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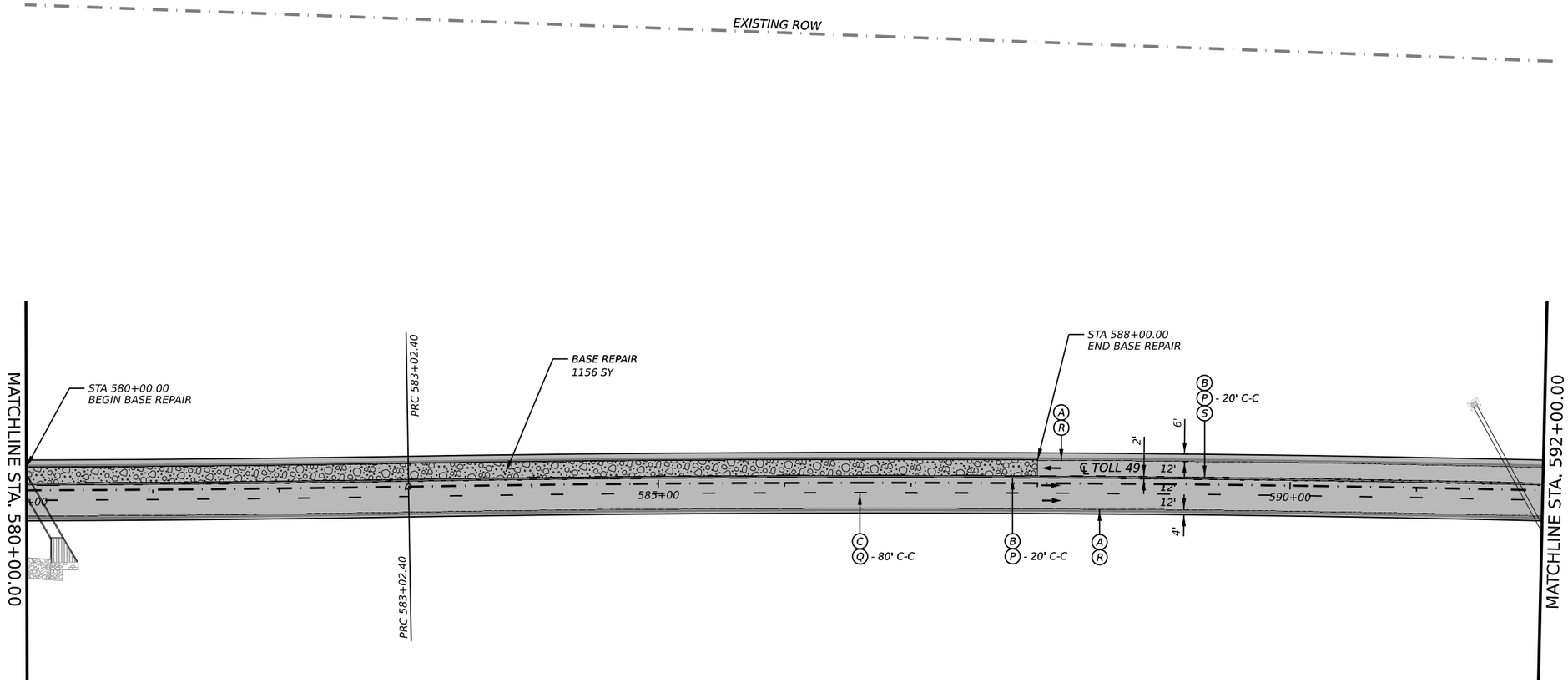

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 580+00 TO STA 592+00

SHEET 12 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	66

DATE: 1/23/2025 10:19:15 AM
FILE: c:\pw working\lochner-pw-01\d0193187\PAVING & STRIPING 12.dgn

EXISTING ROW

MATCHLINE STA. 592+00.00

595+00

600+00

STA 601+00.00
BEGIN BASE REPAIR

BASE REPAIR
434 SY

℄ TOLL 49

B P S - 20' C-C

A R

2'

6"

12'

12'

12'

4'

C Q - 80' C-C

STA 597+30.38
END C AND Q
BEGIN E

M

PT 597+73.24

A R

B P - 20' C-C

E

MATCHLINE STA. 604+00.00

EXISTING ROW

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NTE RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 592+00 TO STA 604+00

SHEET 13 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	67

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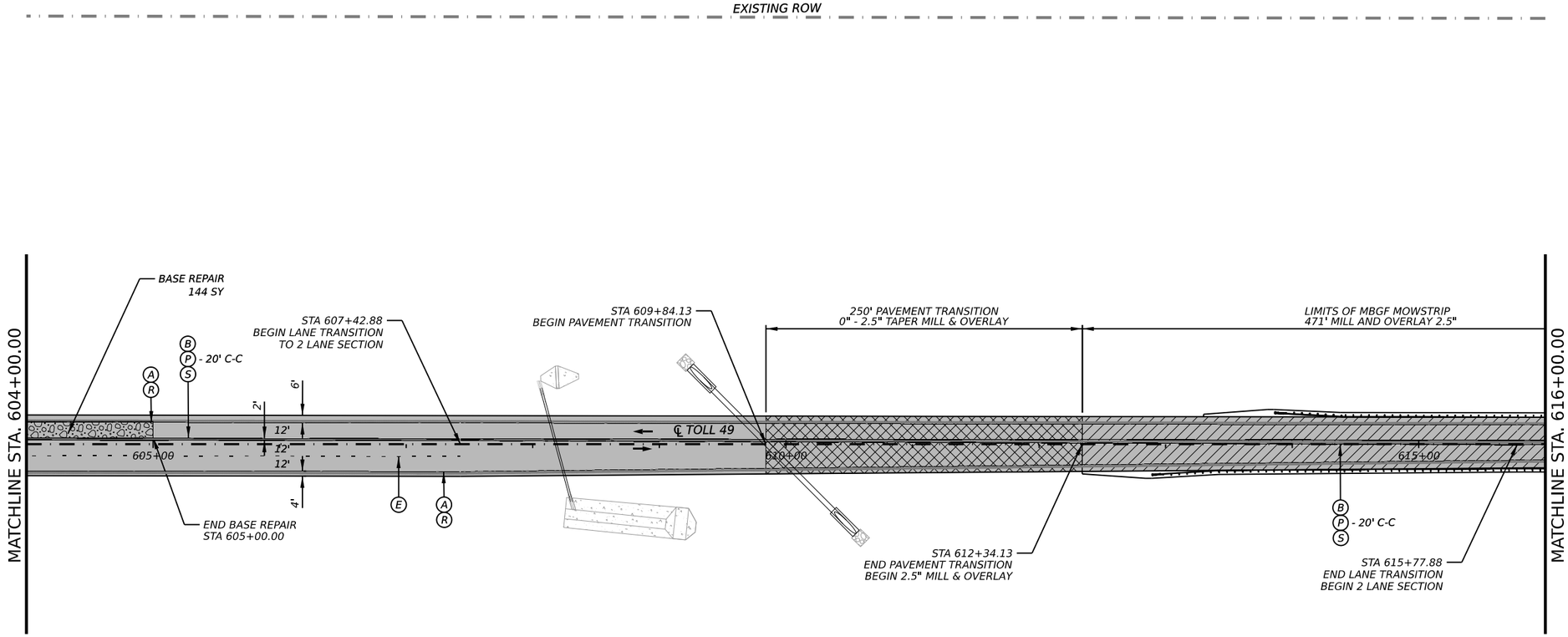

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 604+00 TO STA 616+00

SHEET 14 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	68

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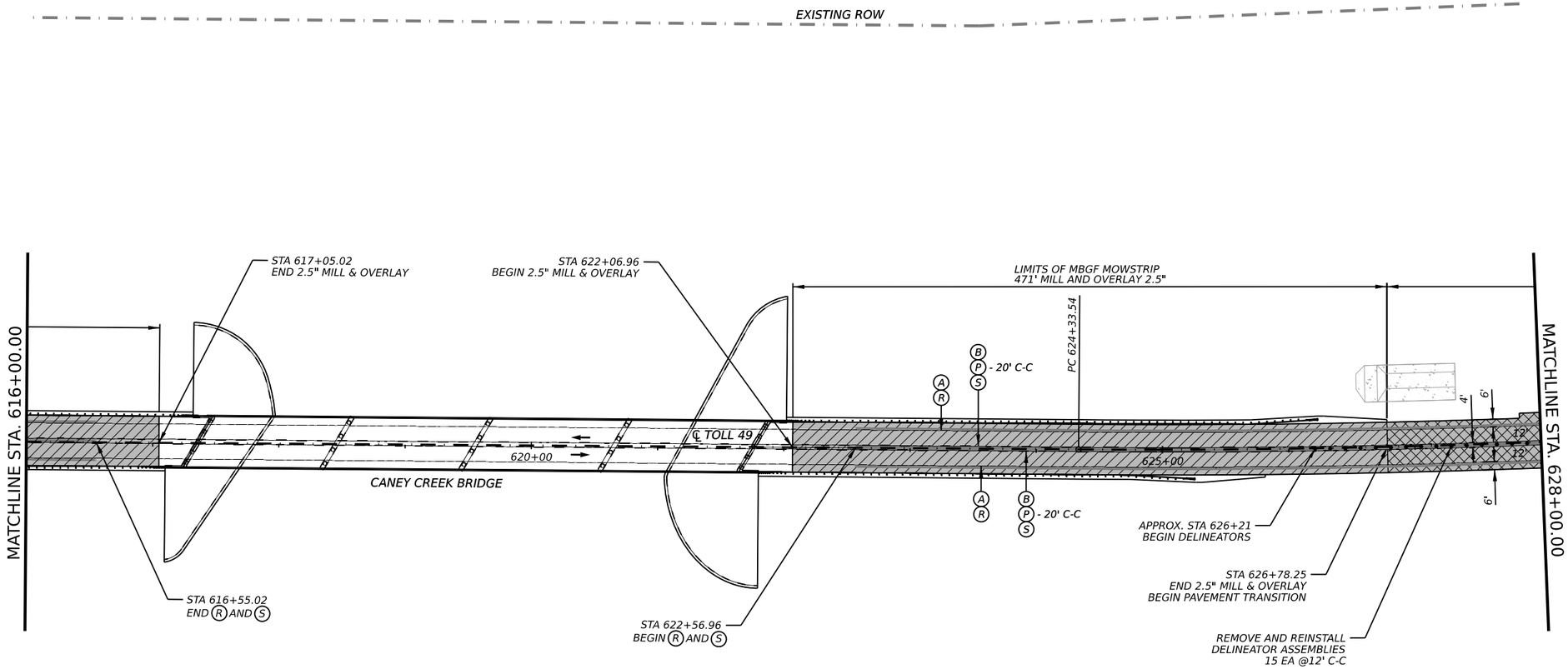

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 616+00 TO STA 628+00

SHEET 15 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	69

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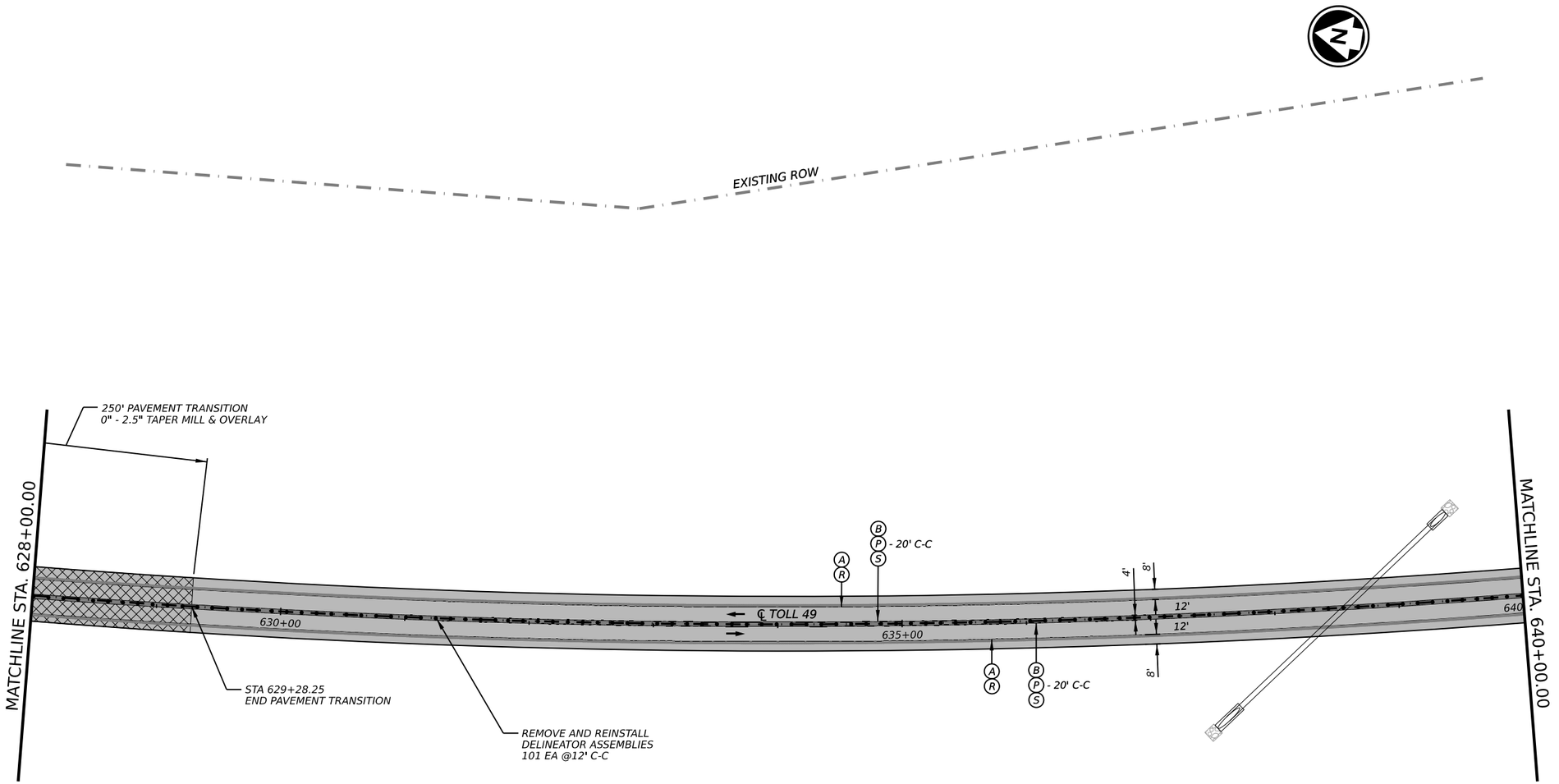

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 628+00 TO STA 640+00

SHEET 16 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	70

DATE: 1/23/2025 10:19:20 AM
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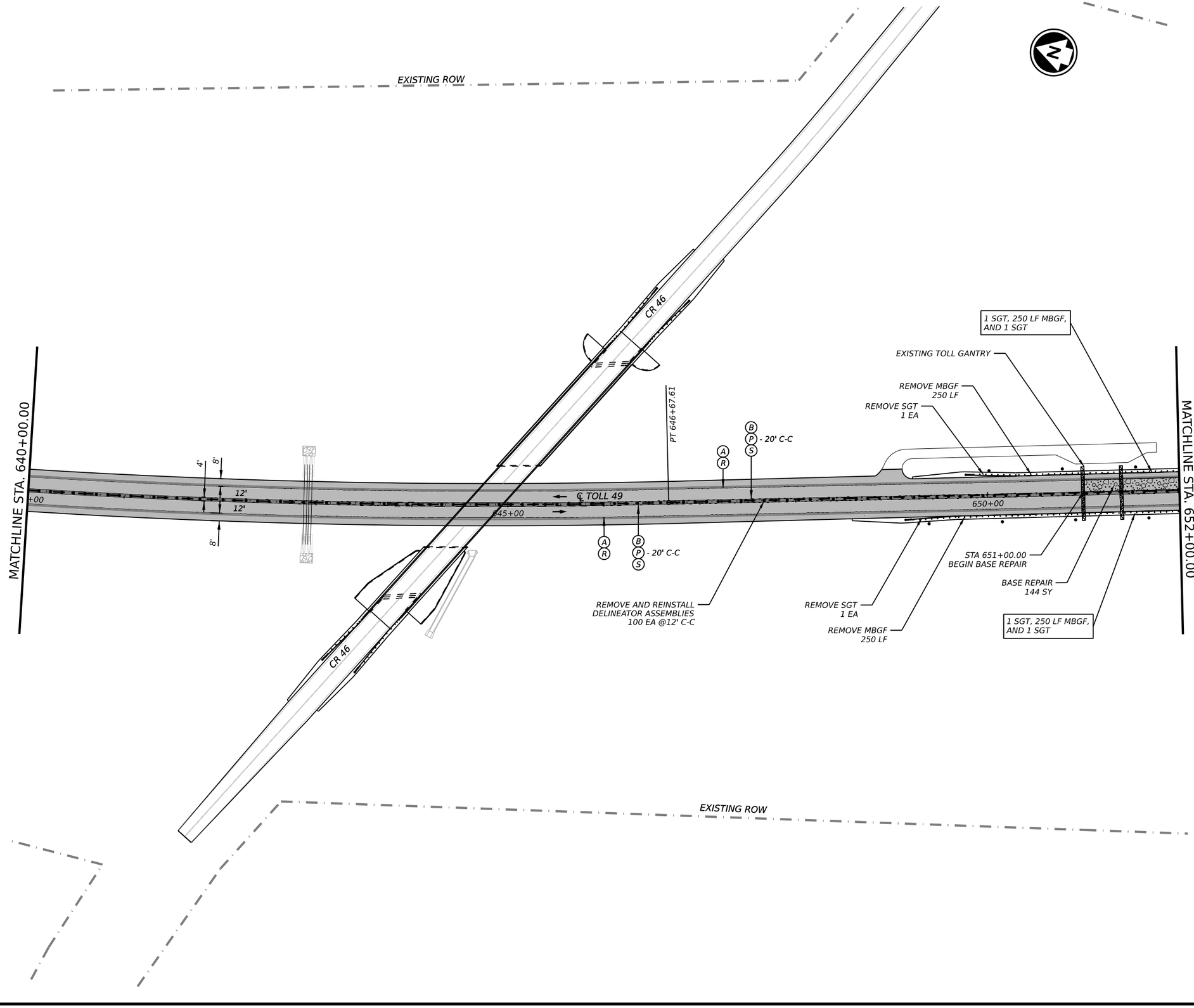

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 640+00 TO STA 652+00

SHEET 17 OF 24

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	71

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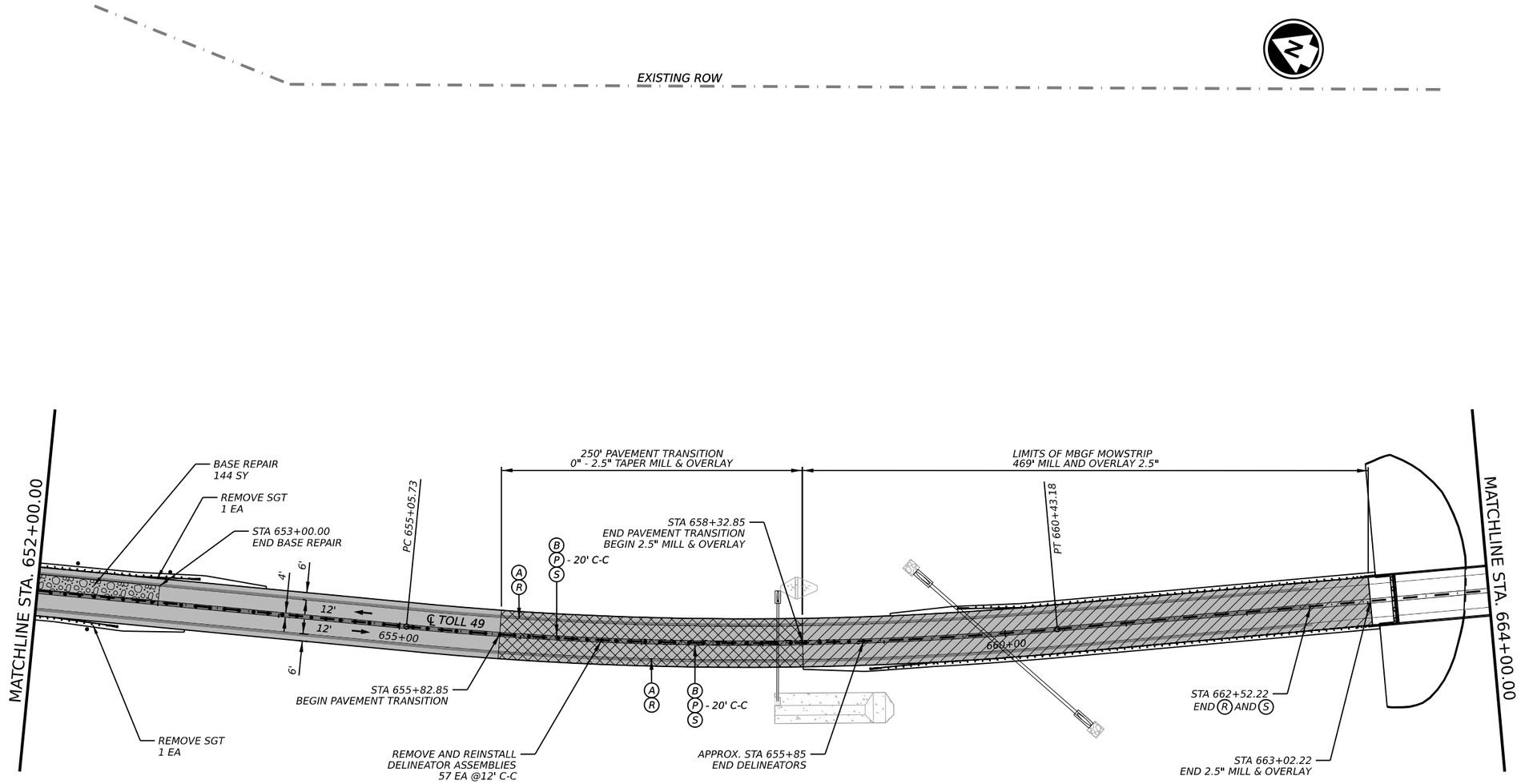

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 652+00 TO STA 664+00

SHEET 18 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	72

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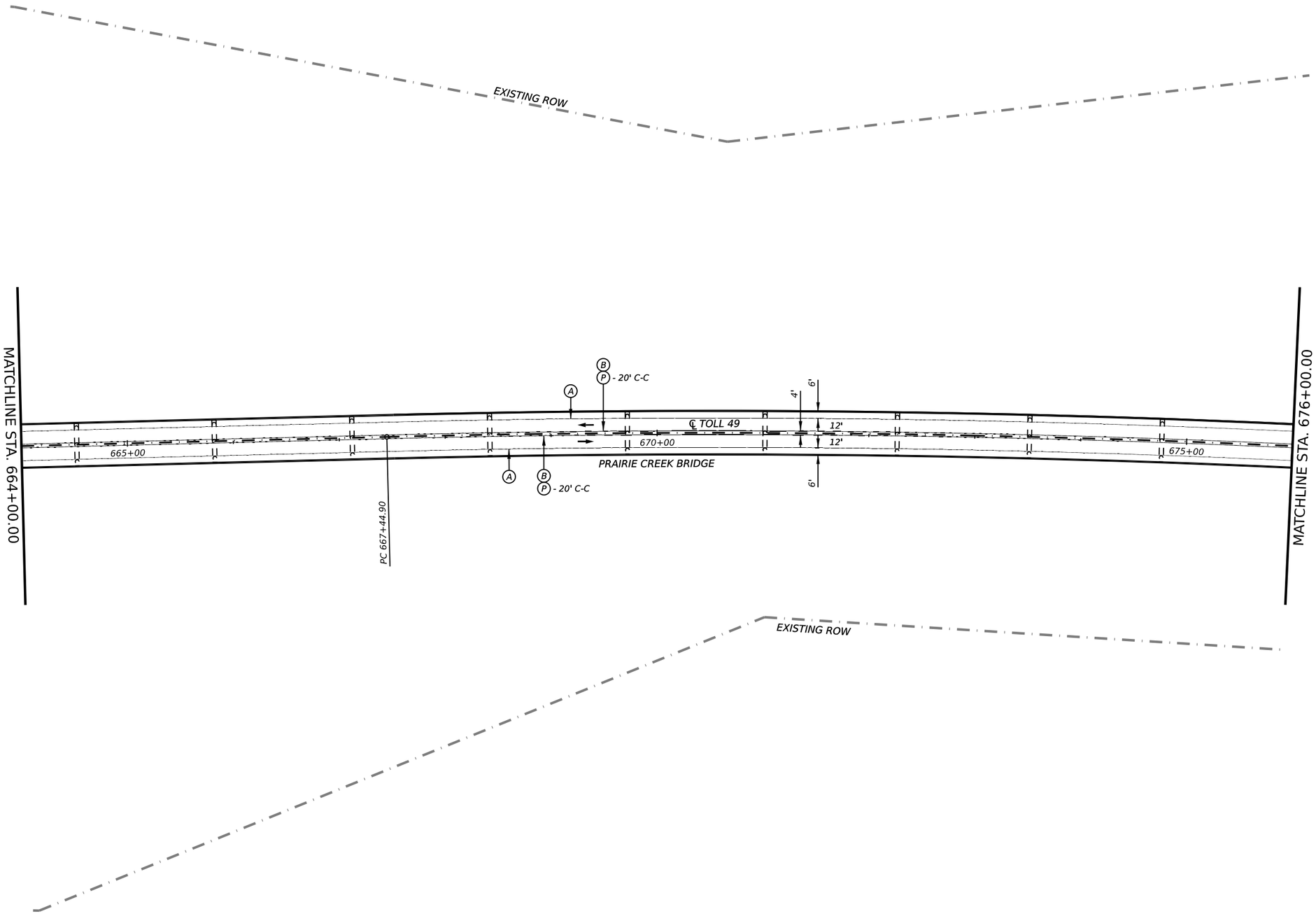

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)

DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 664+00 TO STA 676+00

SHEET 19 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	73

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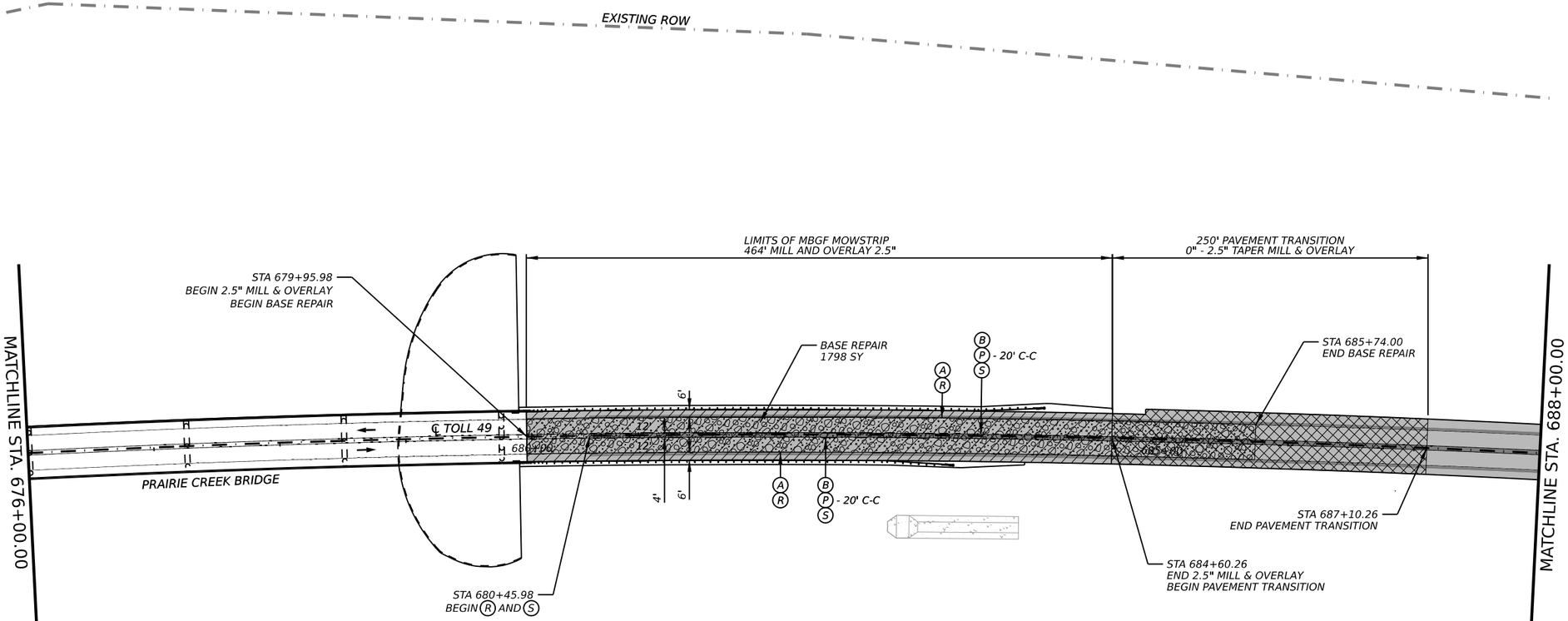

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 676+00 TO STA 688+00

SHEET 20 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	74

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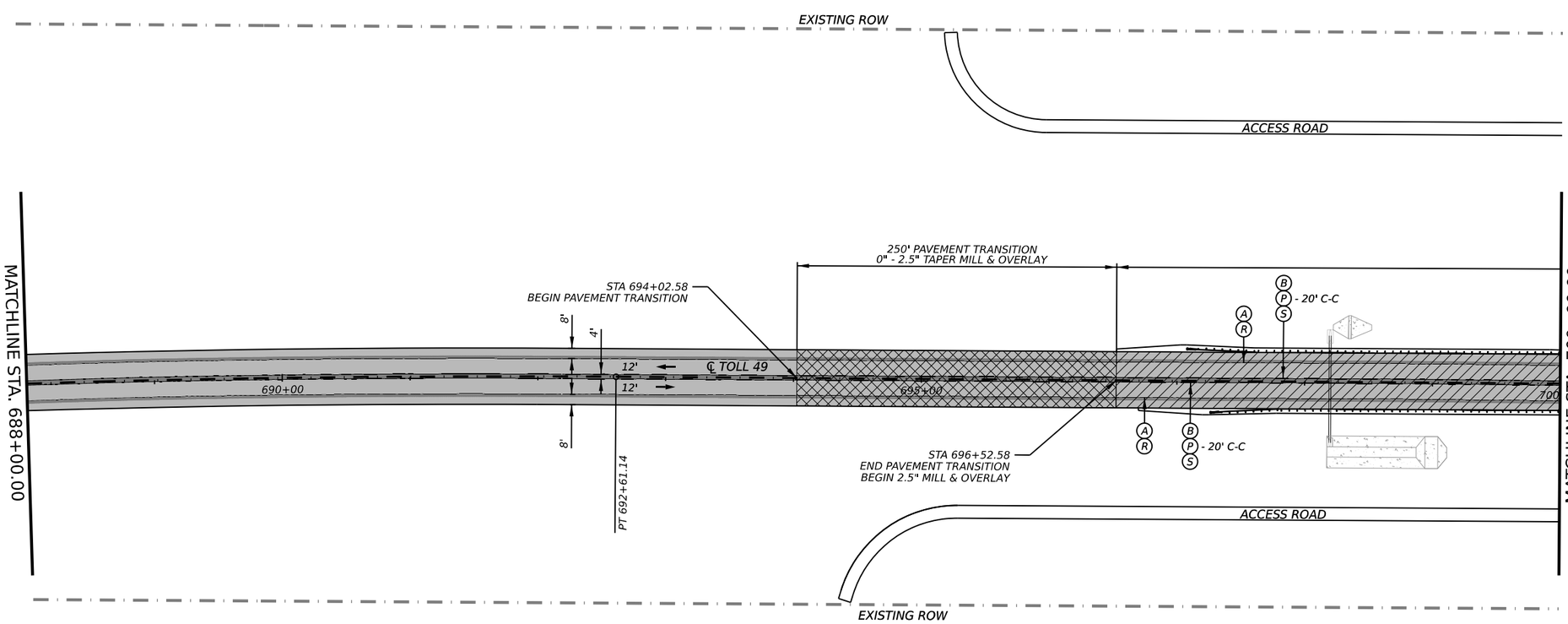

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)

DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 688+00 TO STA 700+00

SHEET 21 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	75

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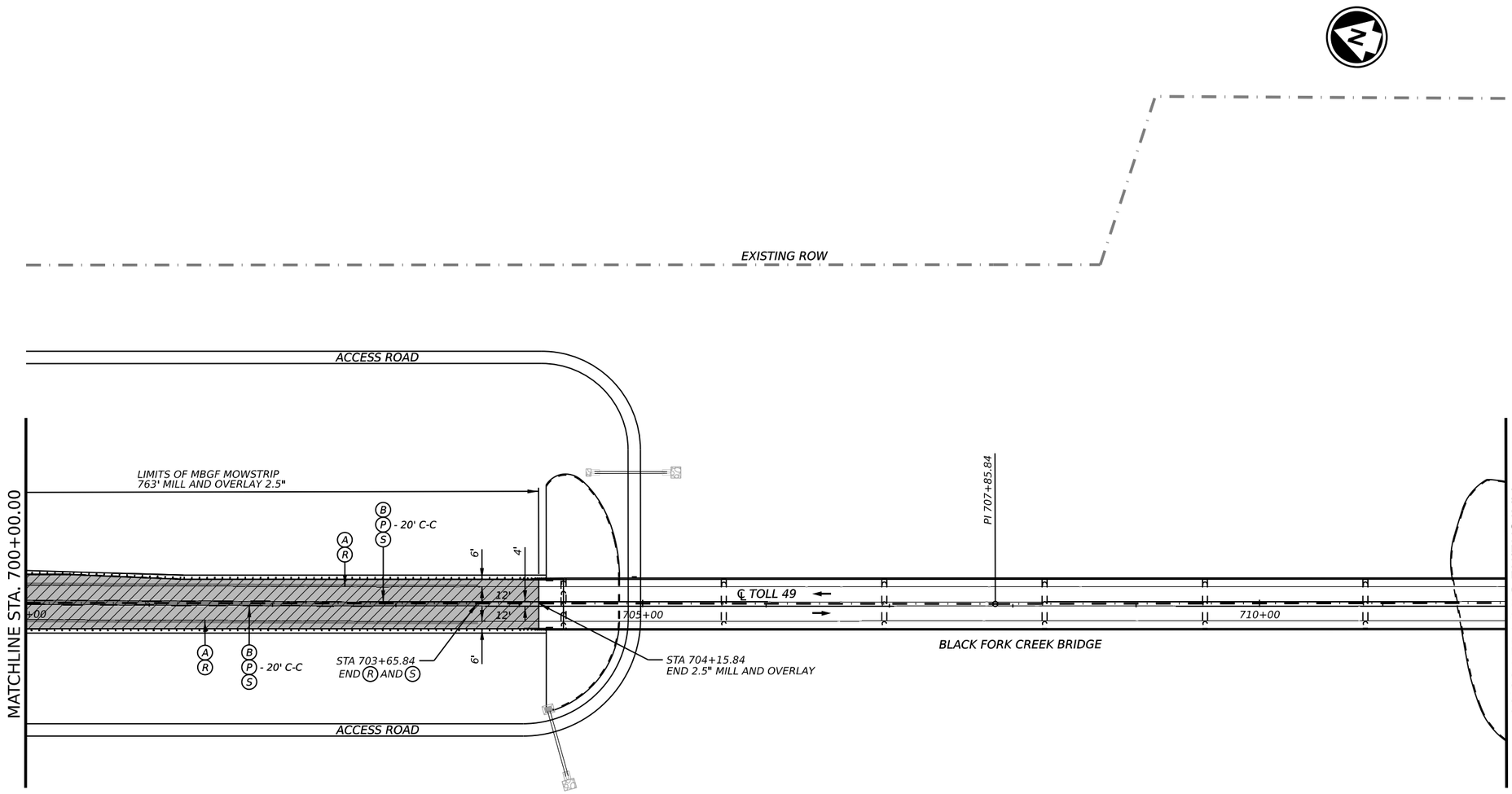

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NETRMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 700+00 TO STA 712+00

SHEET 22 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	76

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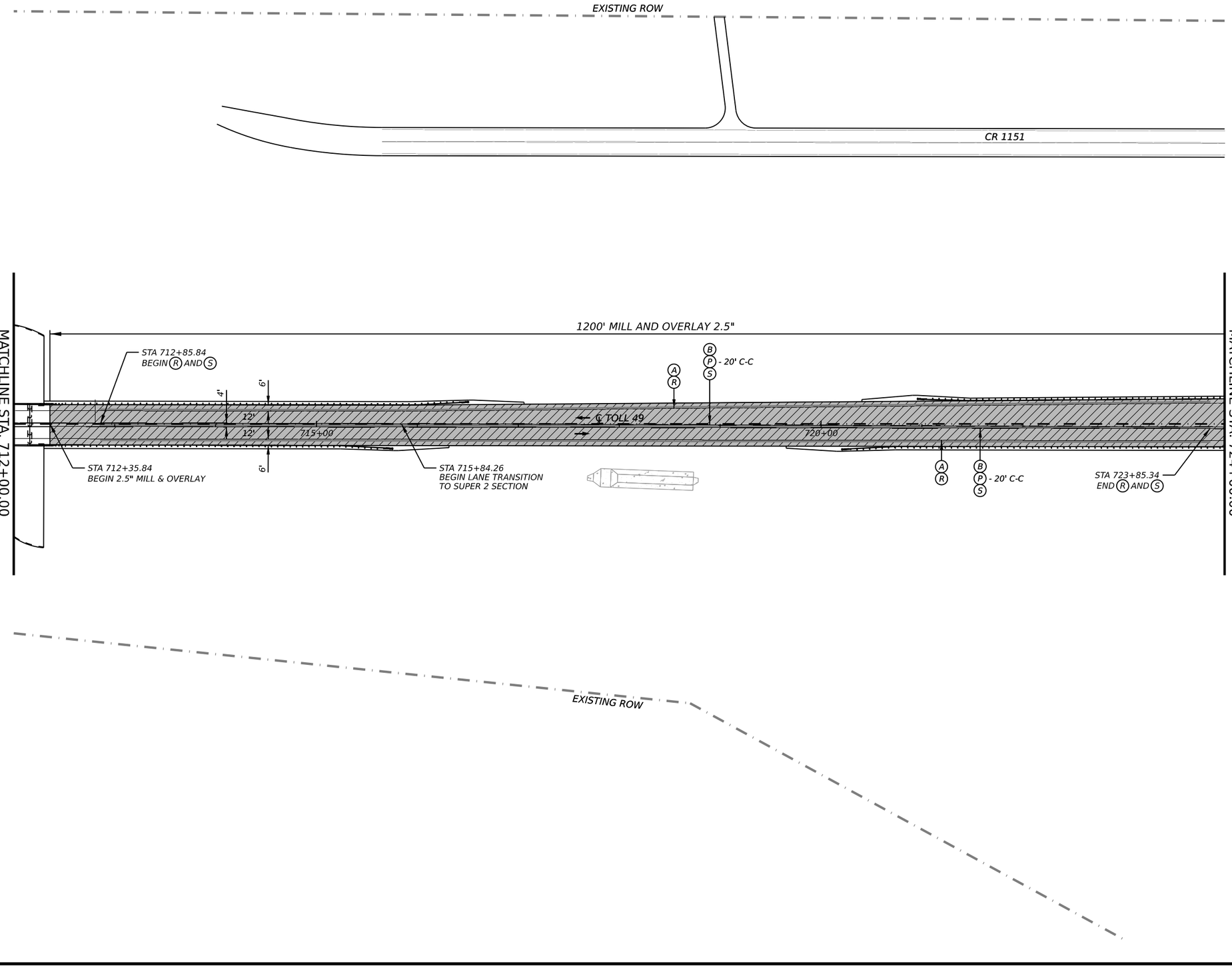

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
- (H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
- (J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
- (L) PREFAB PAV MRK TY C (W)(ARROW)
- (M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
- (N) PREFAB PAV MRK TY C (W)(WORD)
- (O) REFL PAV MRKR TY I-C
- (P) REFL PAV MRKR TY II-A-A
- (Q) REFL PAV MRK TY II-C-R
- (R) RUMBLE STRIPS (SHOULDER)
- (S) RUMBLE STRIPS (CENTERLINE)
- DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 712+00 TO STA 724+00

SHEET 23 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49

DIST	COUNTY	SHEET NO.
TYL	SMITH	77

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CK
DW
CK
DW

EXISTING ROW

STA 724+35.34
END PROJECT
END 2.5" MILL & OVERLAY
AND PAVEMENT MARKINGS
MATCH EXISTING

EXISTING PAVEMENT MARKINGS

PI 730+85.84

MATCHLINE STA. 724+00.00

A B P

4"
2"
6"
12'
12'
12'

℄ TOLL 49

725+00
730+00
735+00

CR 1150

STA 724+24.26
END LANE TRANSITION
BEGIN SUPER 2 SECTION

EXISTING ROW

LEGEND

- 2.5" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.5"
- TAPER MILL (SEE DETAILS)
- BASE REPAIR (SEE DETAILS)
- PAVEMENT MARKINGS ONLY

(A) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
(B) RE PROFILE PM TY I (Y)6"(SLD)(100MIL)
(C) RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)
(D) RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)
(E) REFL PAV MRK TY I (W)6" (DOT)(100 MIL)
(F) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
(G) REFL PAV MRK TY I (W)8"(DOT)(100MIL)
(H) REFL PAV MRK TY I (W)12"(SLD)(100MIL)
(I) REFL PAV MRK TY I (Y)12"(SLD)(100MIL)
(J) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
(K) PREFAB PAV MRK TY C (W)36"(YLD TRI)
(L) PREFAB PAV MRK TY C (W)(ARROW)
(M) PREFAB PAV MRK TY C (W)(LNDP ARROW)
(N) PREFAB PAV MRK TY C (W)(WORD)
(O) REFL PAV MRKR TY I-C
(P) REFL PAV MRKR TY II-A-A
(Q) REFL PAV MRK TY II-C-R
(R) RUMBLE STRIPS (SHOULDER)
(S) RUMBLE STRIPS (CENTERLINE)
DEL ASSM (D-DY)SZ 2(FLX)SRF(BI)
TRAFFIC FLOW ARROW
EXISTING LIGHT POLE

0 50 100
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NET RMA
North East Texas Regional Mobility Authority

TOLL 49

SEGMENT 3B NORTH PAVING & STRIPING

STA 724+00 TO STA 736+00

SHEET 24 OF 24

SEGMENT	HIGHWAY
SEGMENT 3B NORTH	TOLL 49
DIST / COUNTY	SHEET NO.
TYL / SMITH	78

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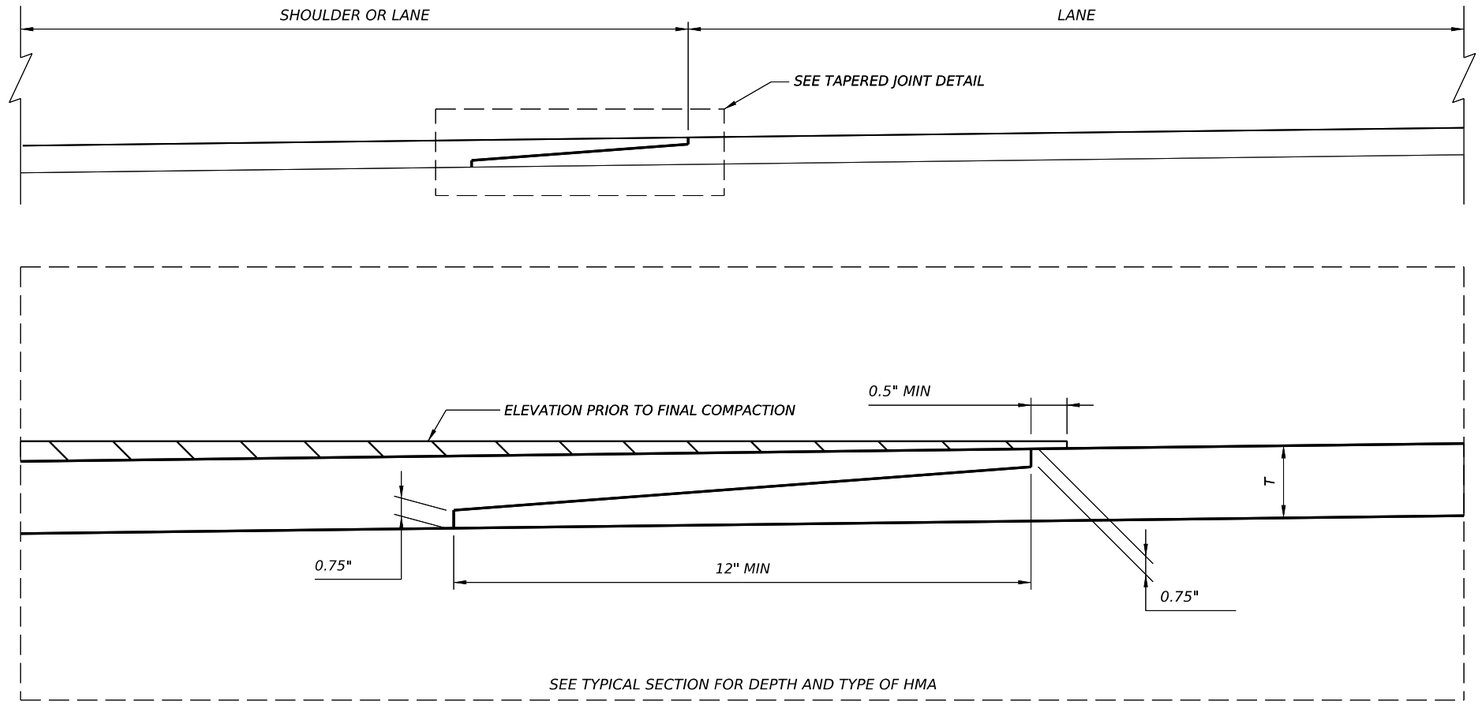

TAPERED JOINT DETAIL

0 10 20 FT

HORIZONTAL SCALE: 1" = 20"

NOTES:
EXTEND THE TAPERED PORTION OF THE MAT BEYOND THE NORMAL LANE WIDTH.

CONSTRUCT THE TAPERED PORTION OF THE MAT USING AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED.

APPLY TACK COAT TO THE IN-PLACE TAPER BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL NOT CHANGE.

COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED TO BE AS NEAR TO FINAL DENSITY AS POSSIBLE.

USE A SMALL STATIC ROLLER (APPROXIMATELY 200 LBS) LOCATED IMMEDIATELY BEHIND THE PAVER FOR PRE-COMPACTION OF THE NOTCHED WEDGE JOINT.

STATE OF TEXAS
COREY D. HOGUE
107396
LICENSED
PROFESSIONAL ENGINEER
01/23/2025

Lochner
TBPE Firm Reg. No. 10488

NTE RMA
North East Texas Regional Mobility Authority

ROADWAY DETAILS

SHEET 1 OF 1

SEGMENT		HIGHWAY
SEGMENT 3B NORTH		TOLL 49
DIST	COUNTY	SHEET NO.
TYL	SMITH	79

DATE: 1/23/2025 10:20:13 AM
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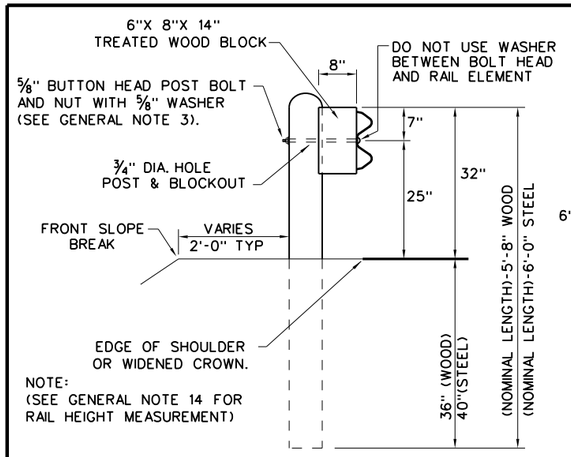
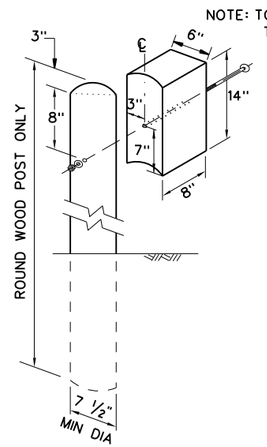
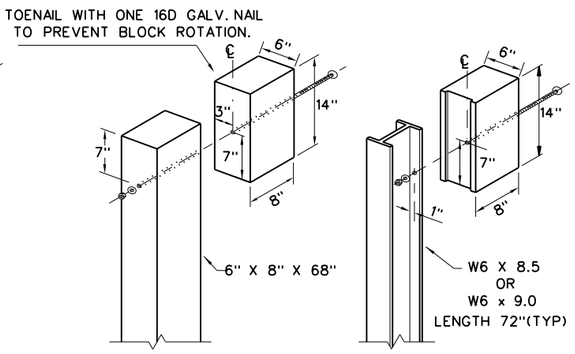


TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST

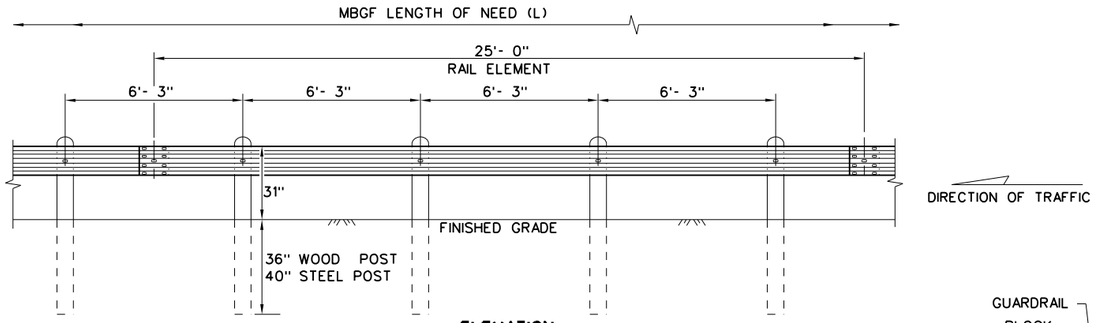
NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.



WOOD BLOCK TO RECTANGULAR WOOD POST

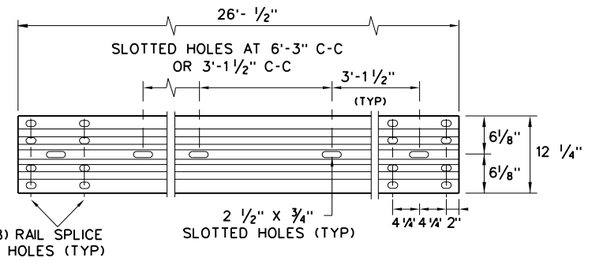
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



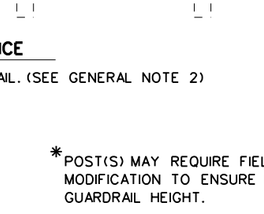
ELEVATION MID-SPAN RAIL SPLICE

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

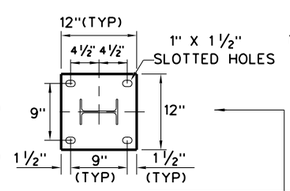


ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

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



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



W6 X 9 OR W6 X 8.5 STEEL POST

5/16"

12"x 12"x 7/8" (ASTM A572 GR 50)TOP PLATE

1" DIA. HOLES FORMED OR CORED IN CONCRETE

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

12" X 12" X 1/4"(ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

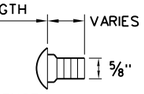
LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 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.

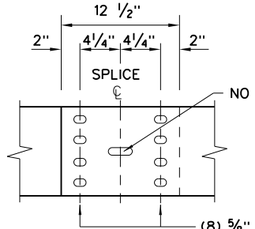
NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

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



BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 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.

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

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS				TOLL 49	
	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		80	

DATE: 1/23/2025
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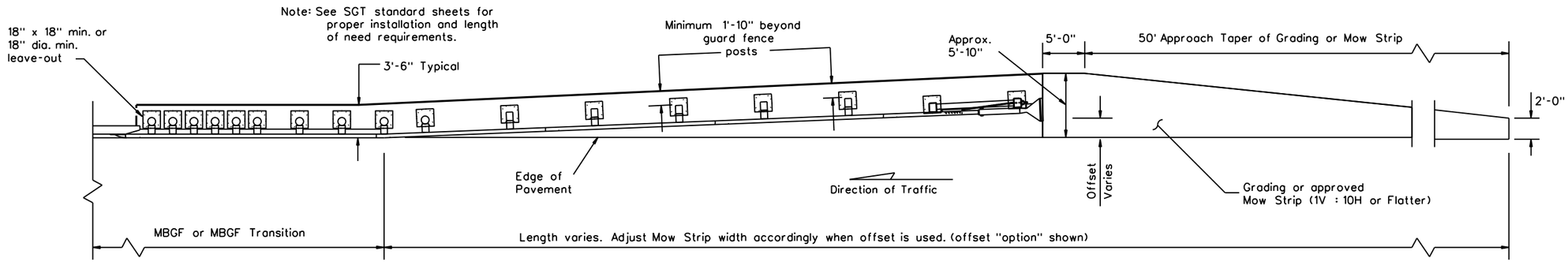
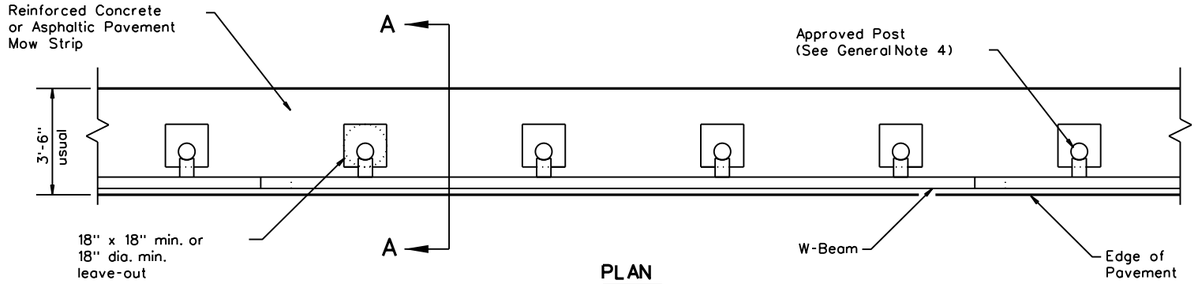
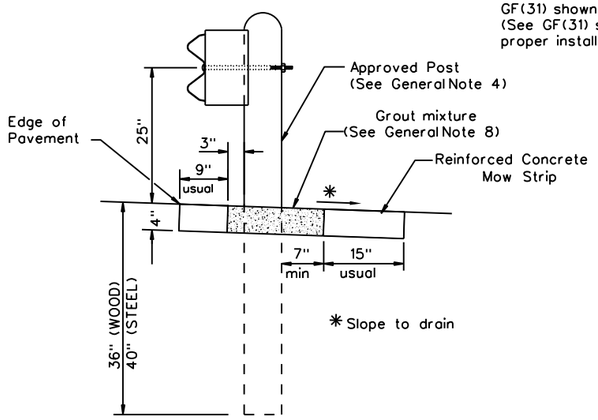


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



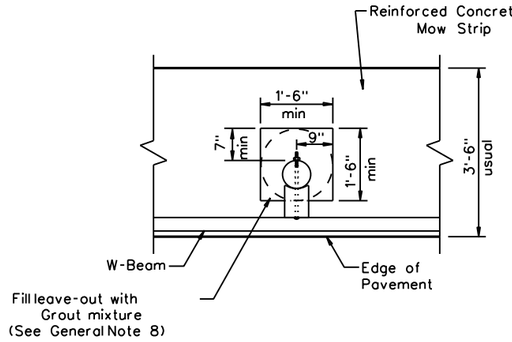
PLAN

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



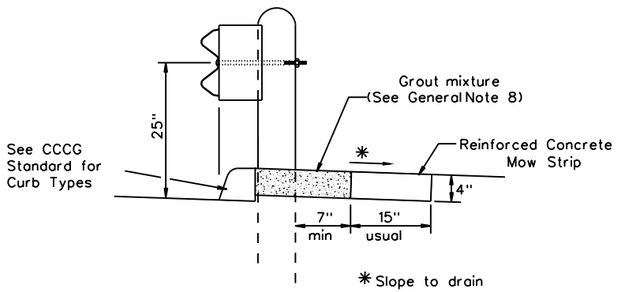
SECTION A-A

Typical



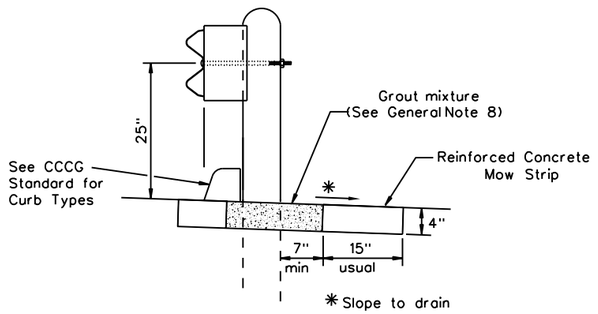
MOW STRIP DETAIL

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



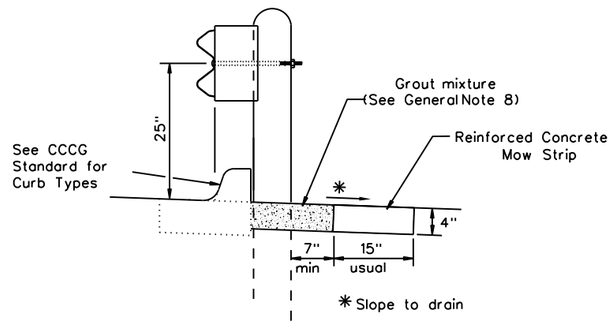
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type I 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

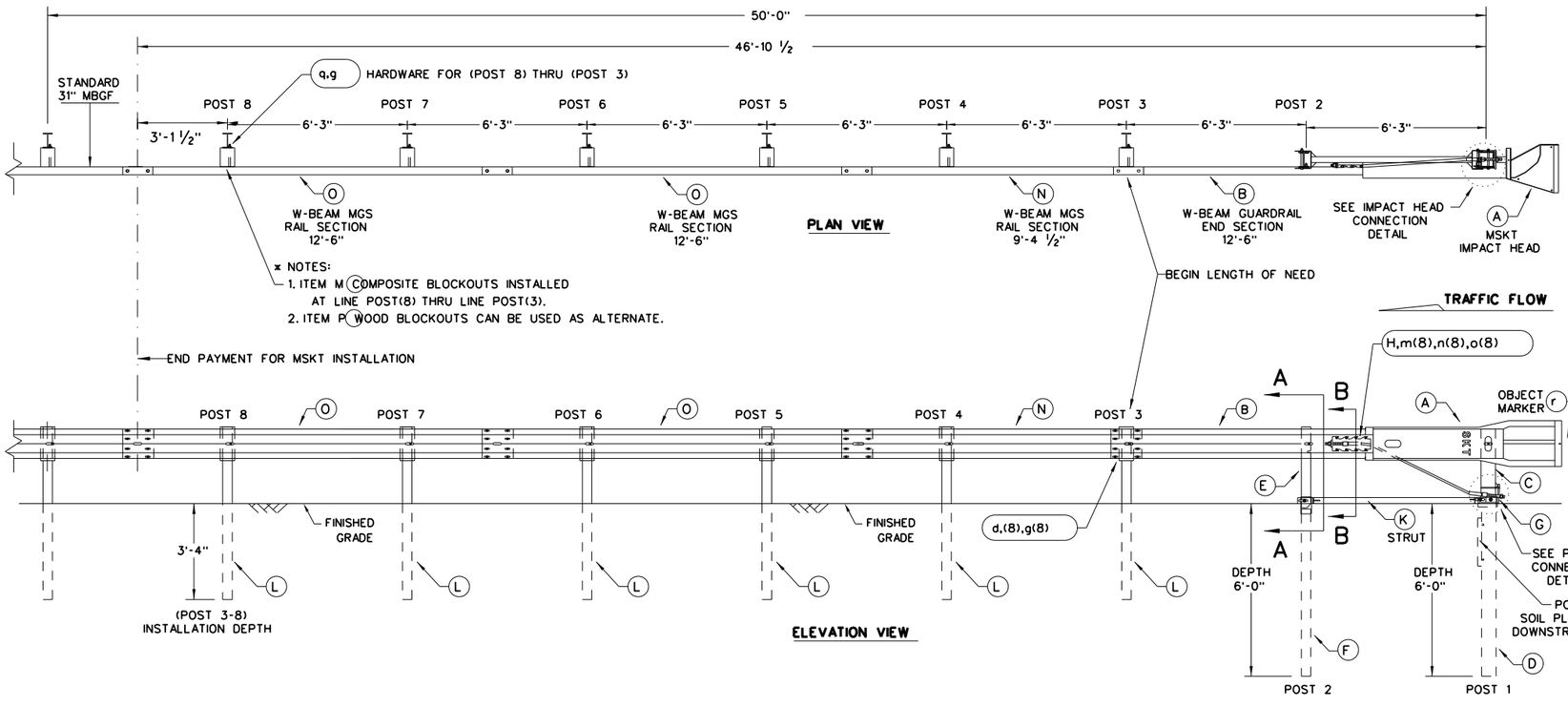
Design Division Standard

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

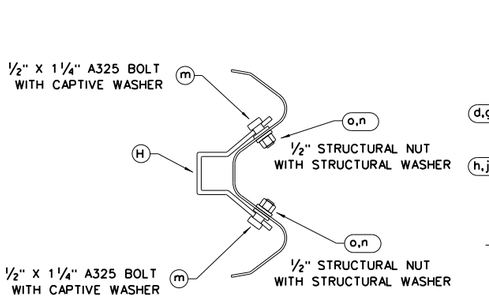
GF(31)MS-19

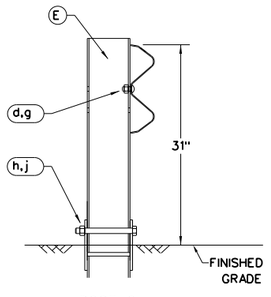
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		81

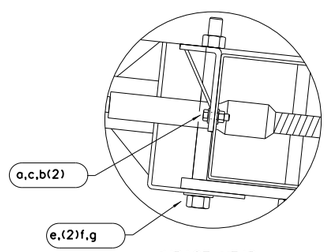
DATE: 1/23/2025
FILE: c:\pw_working\lochner-pw-01\d0193187\SGT(12S)31-18.dgn

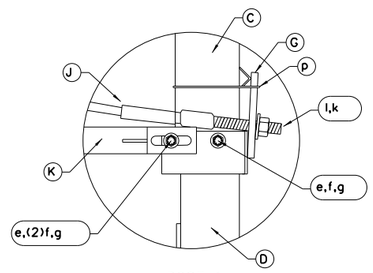


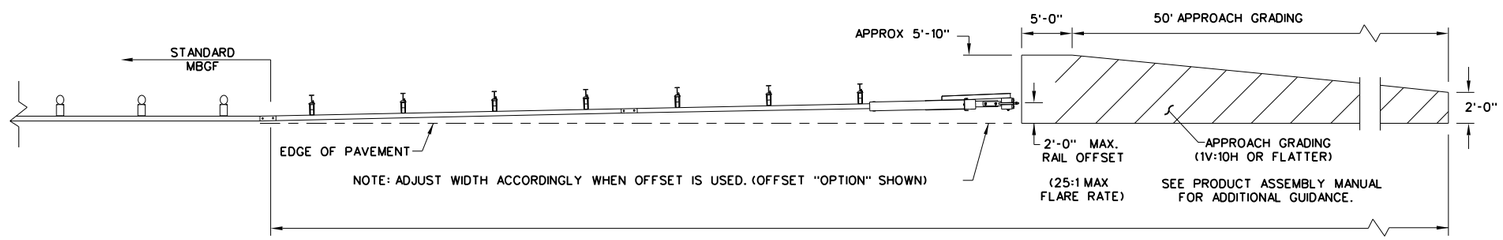
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.











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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

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 1¼" 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 1¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 3/16" 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

SEE NOTES: *

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

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	
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	DIST	COUNTY		SHEET NO.	
	TYL	SMITH		82	

DATE: 1/23/2025
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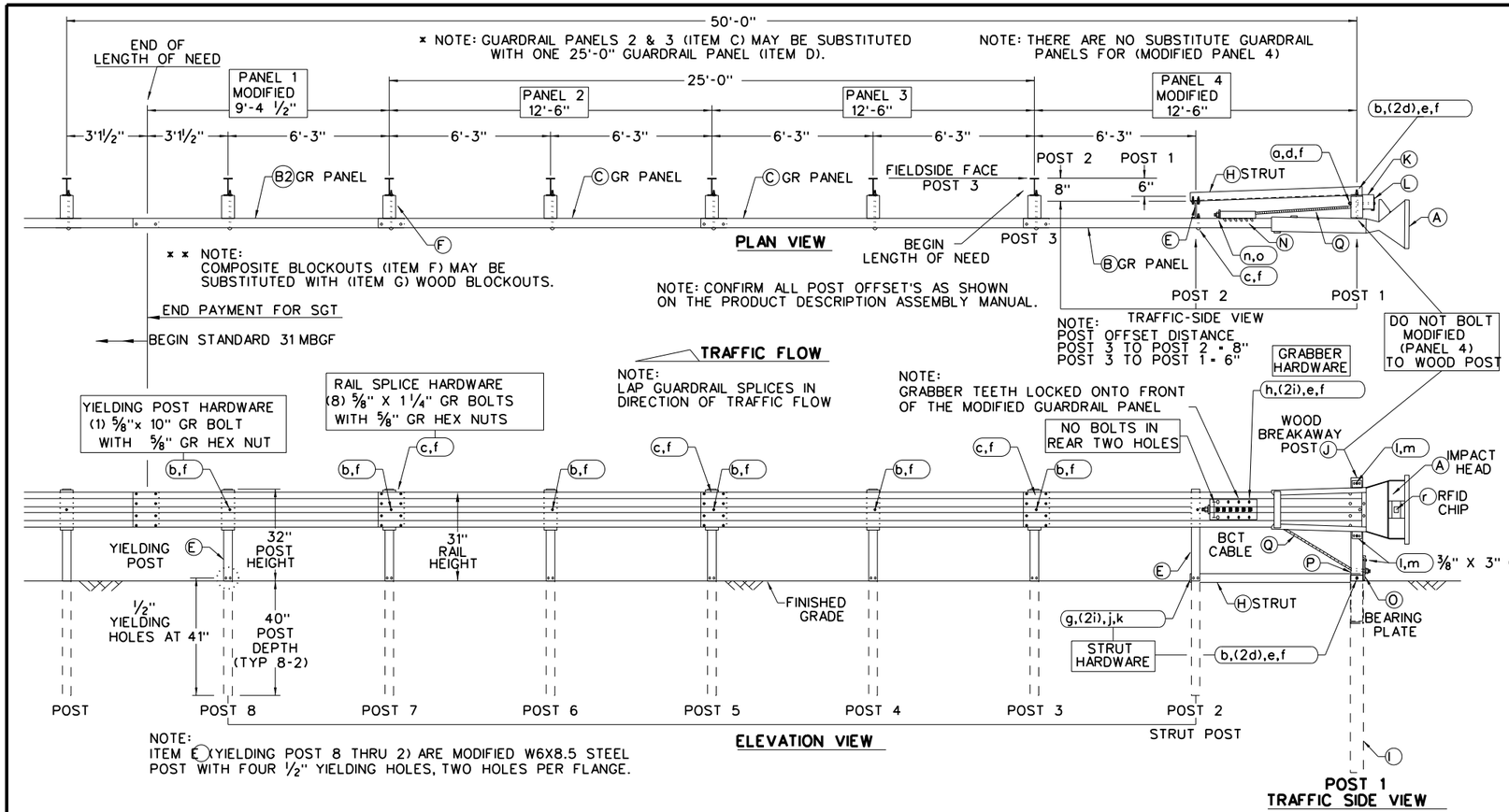
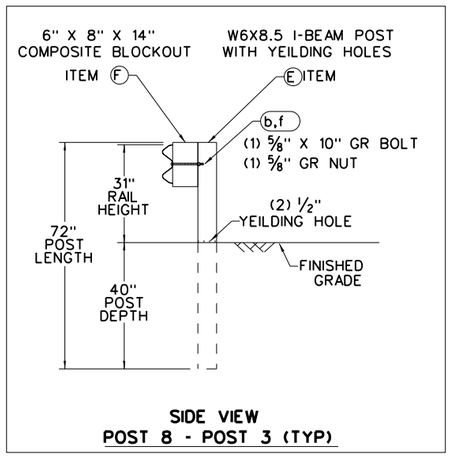


GENERAL NOTES

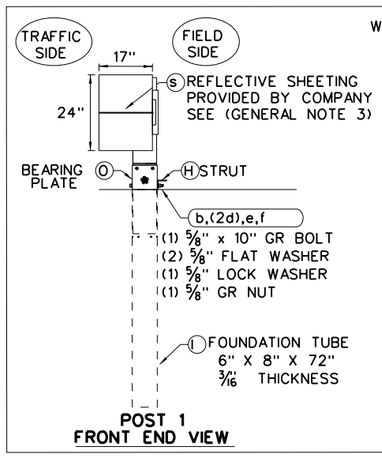
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

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

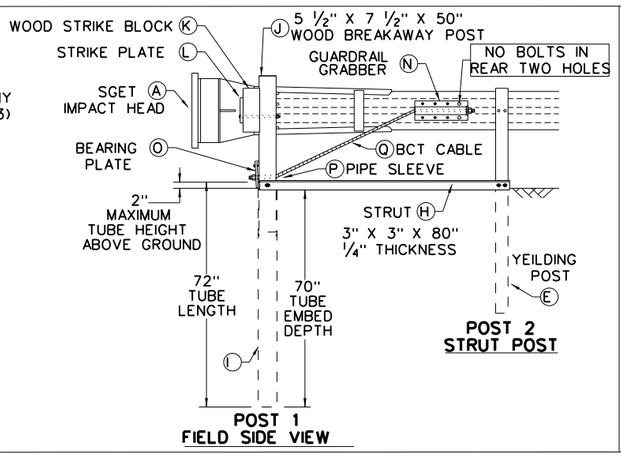
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW



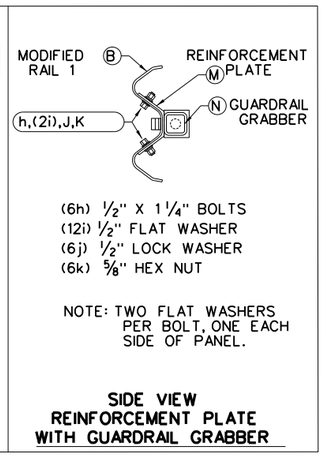
SIDE VIEW
POST 8 - POST 3 (TYP)



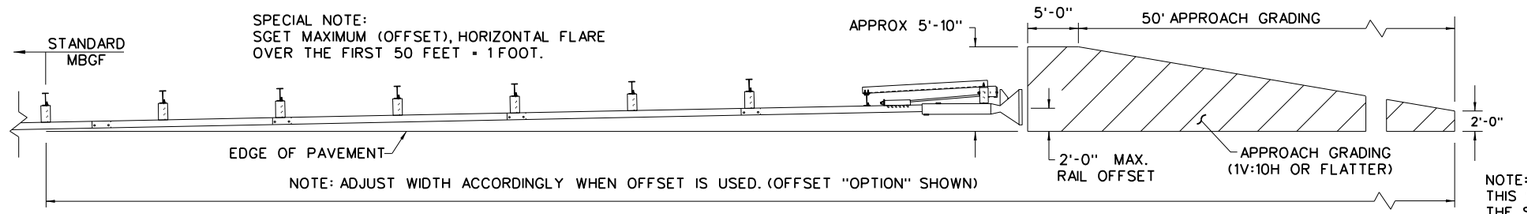
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW



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: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
	DIST	COUNTY		SHEET NO.
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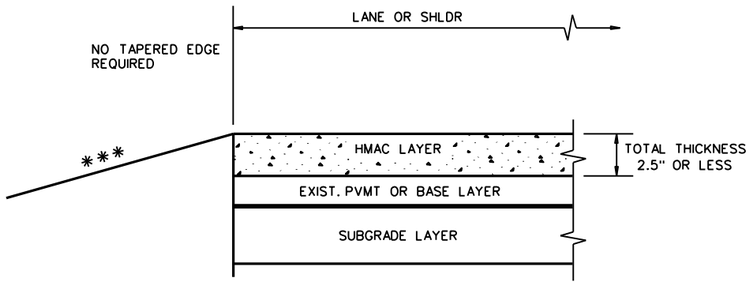
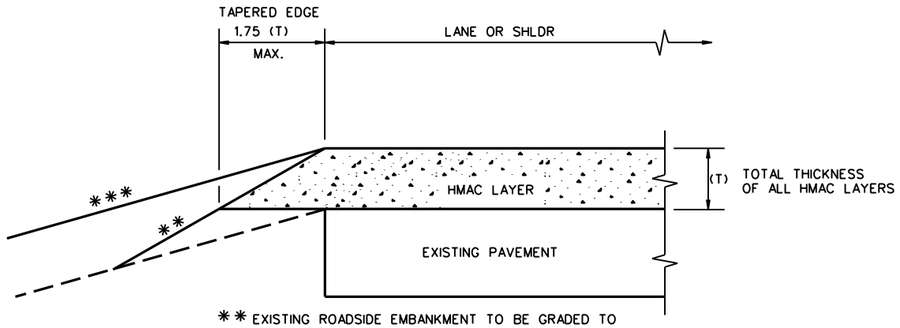


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

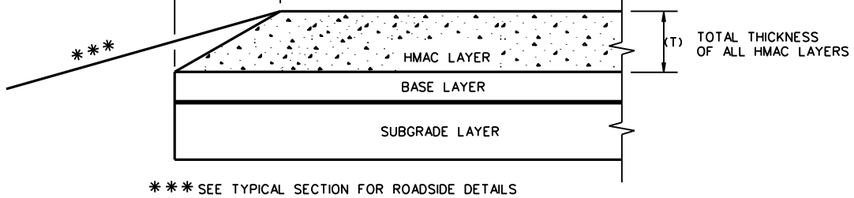
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

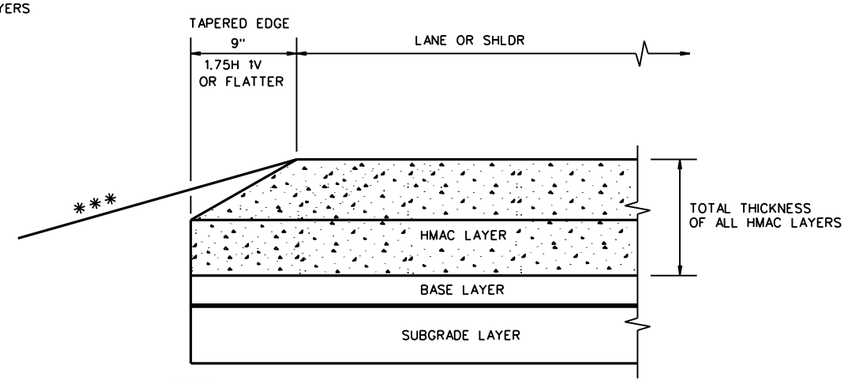
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H 1V: OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
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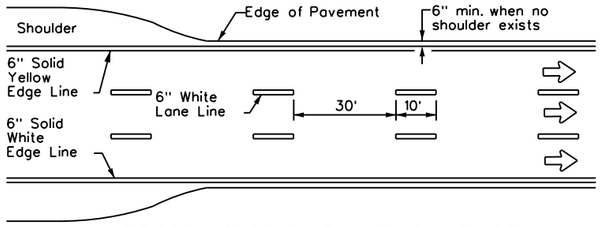
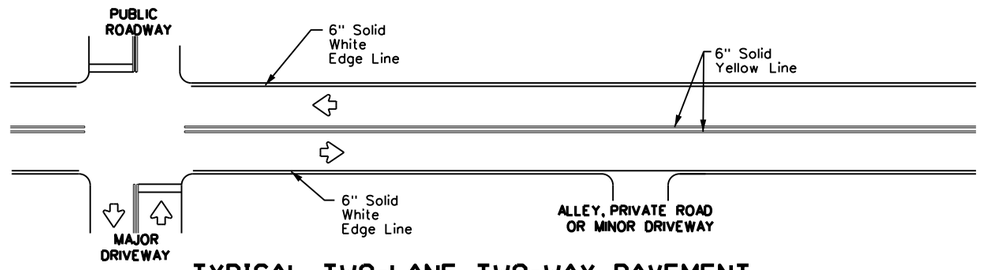
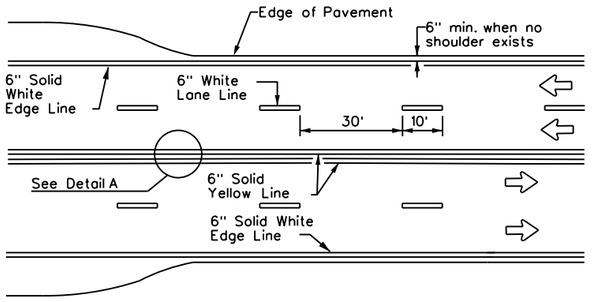
	TYL	SMITH		84

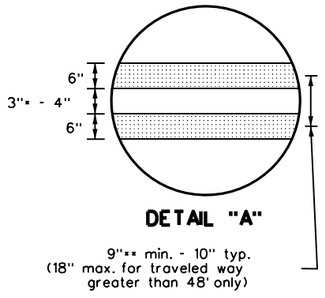


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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

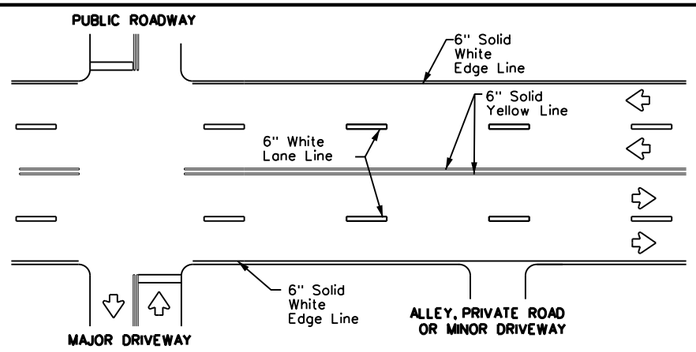




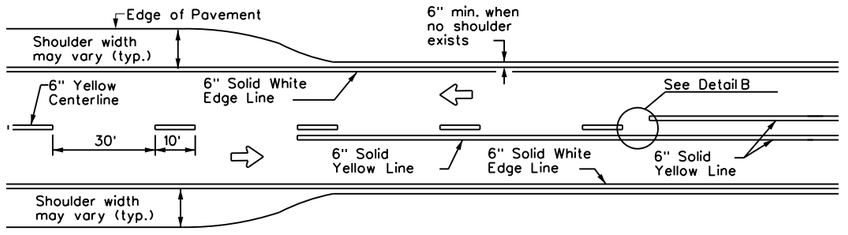
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

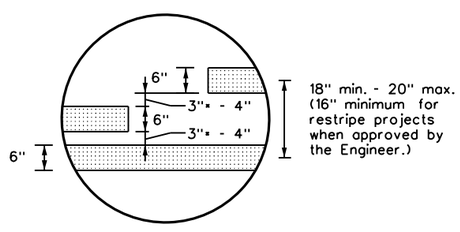
** 8" minimum for restripe projects when approved by the Engineer.



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

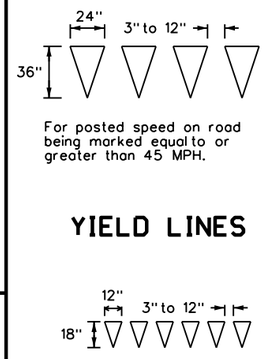


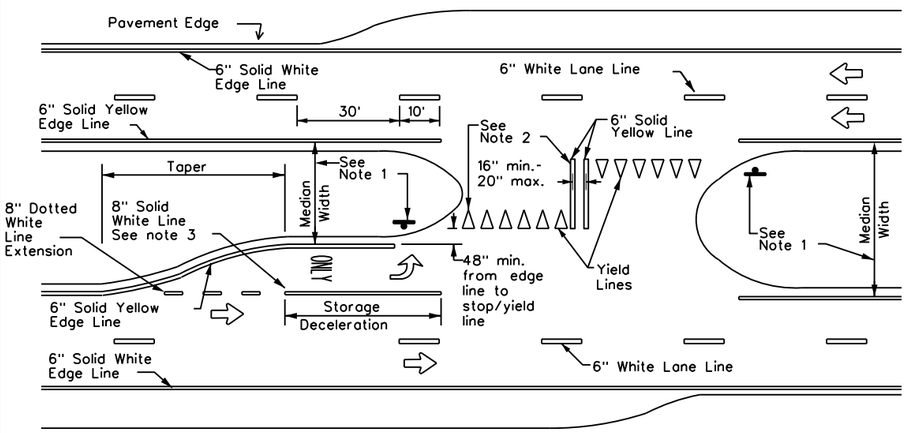
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.





FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

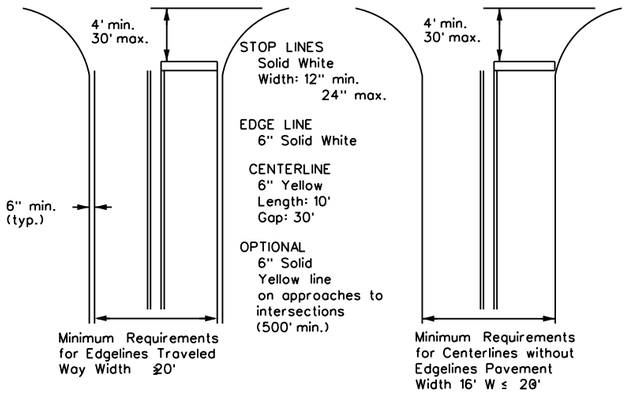
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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
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11-78 8-00 6-20				
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	TYL	SMITH		85

22A

DATE: 1/23/2025 10:20:41 AM
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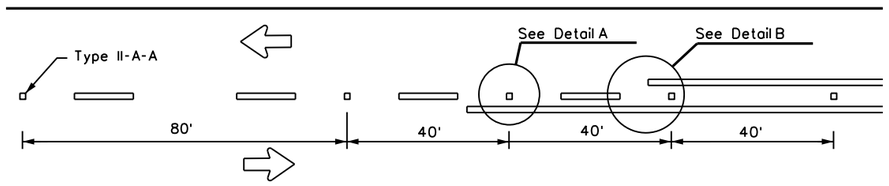
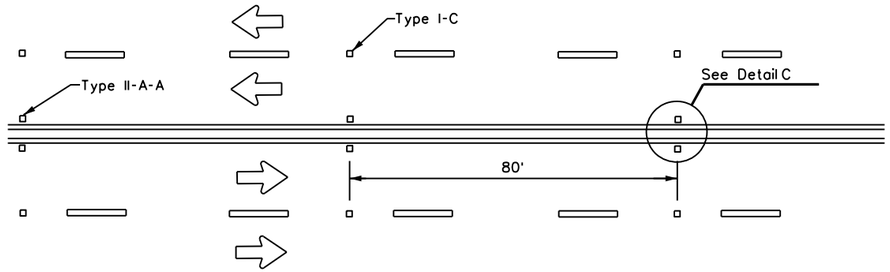
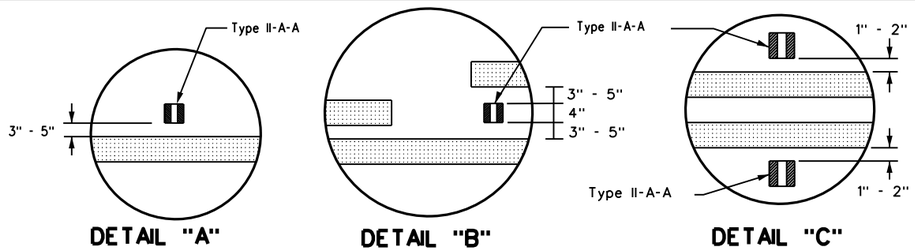
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

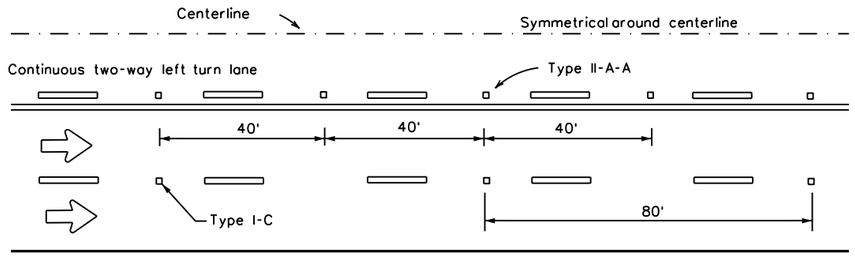


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

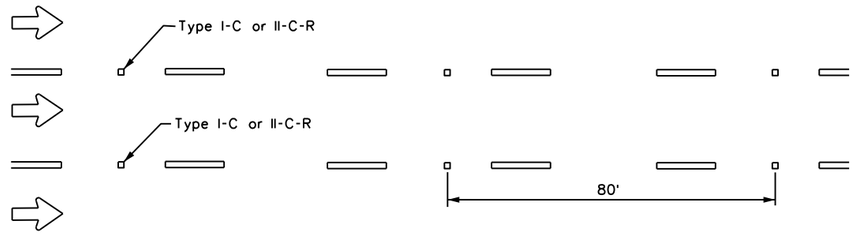


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



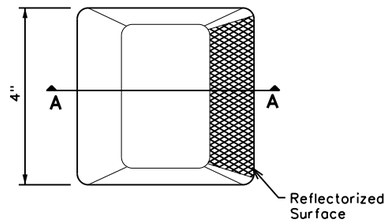
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

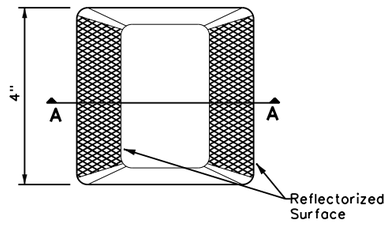
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

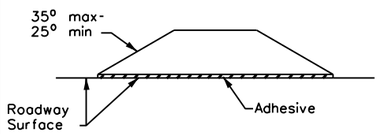
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

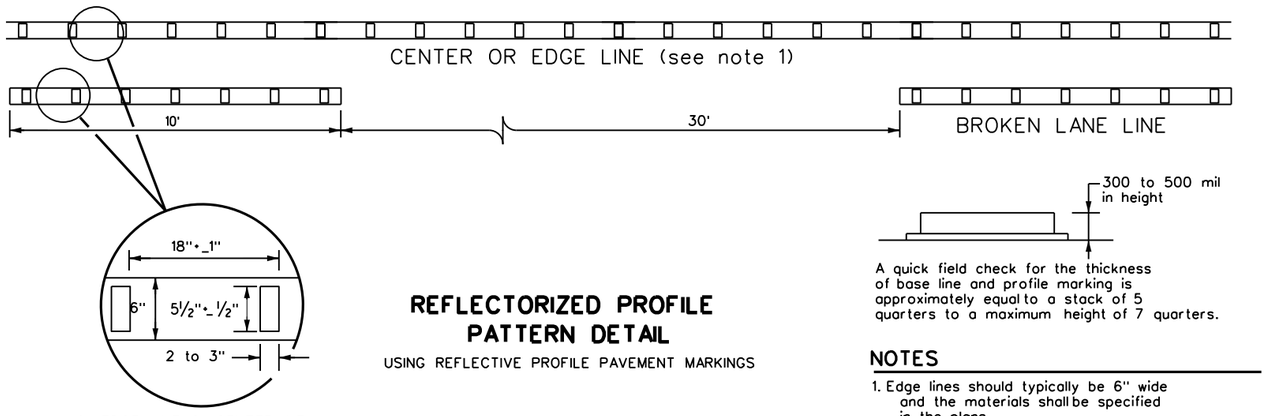


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	TYL	SMITH		86
5-00 2-12				

22B

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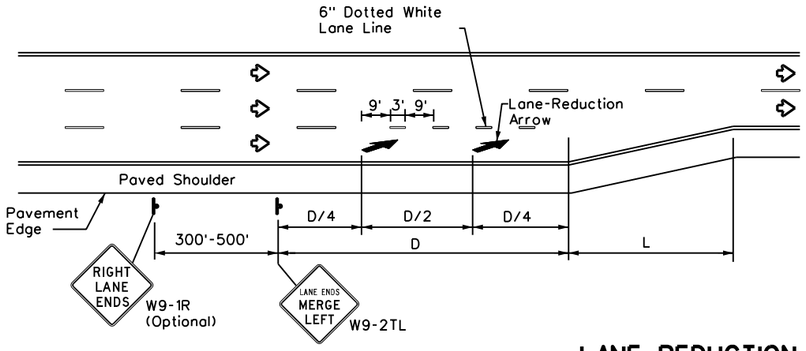


LANE REDUCTION

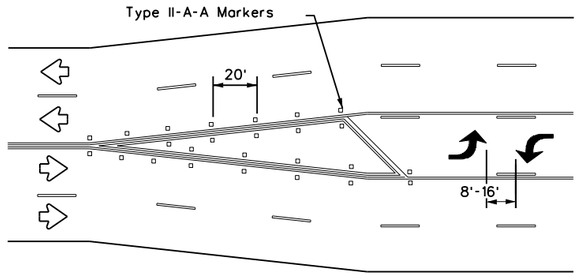
NOTES

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	

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.

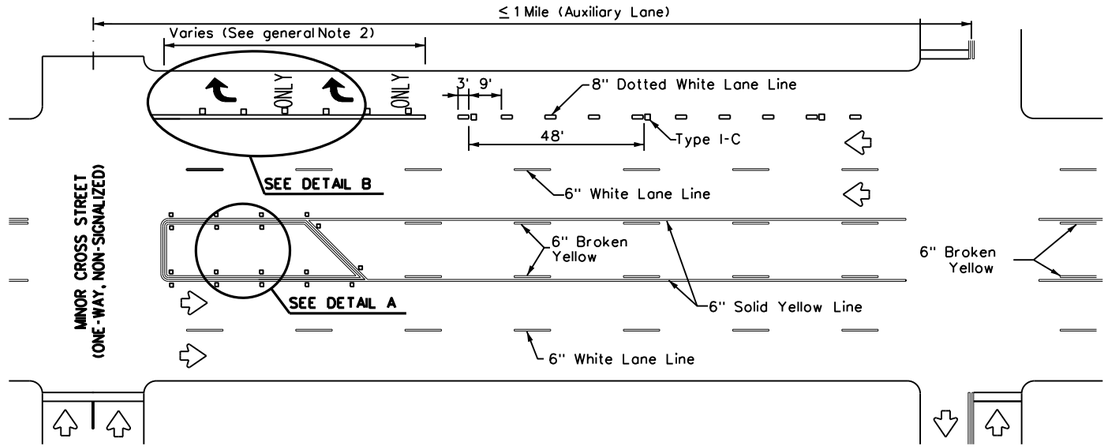


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

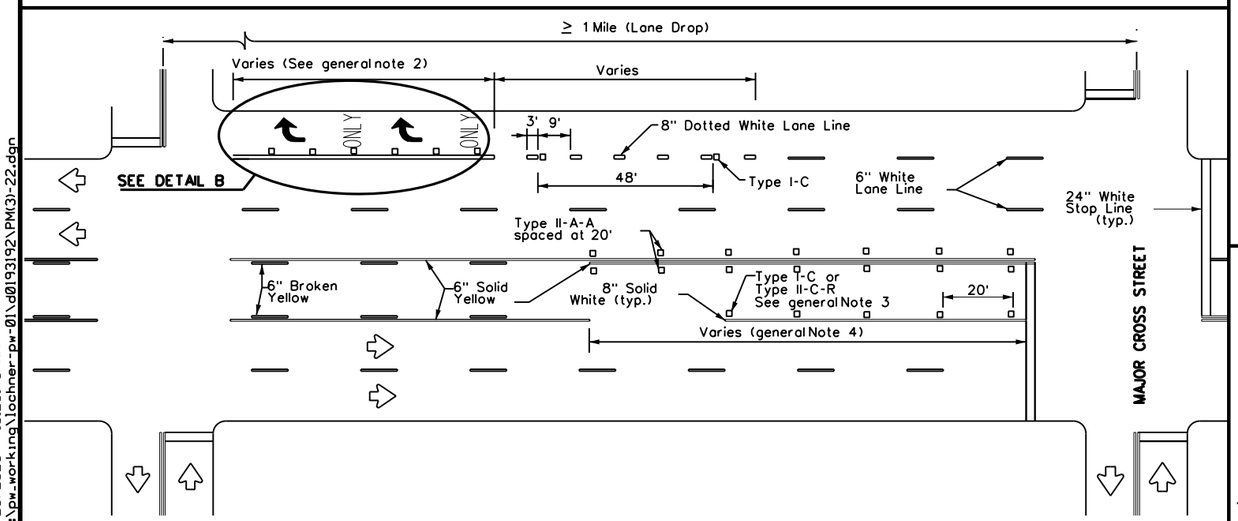
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

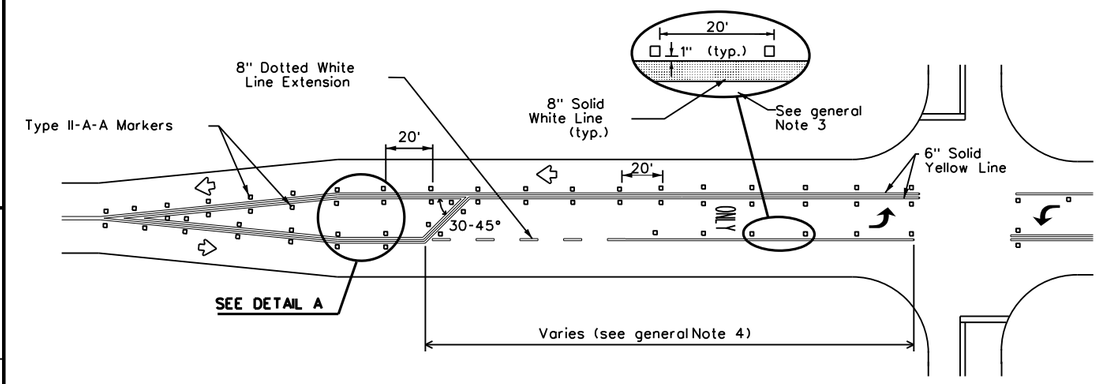
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



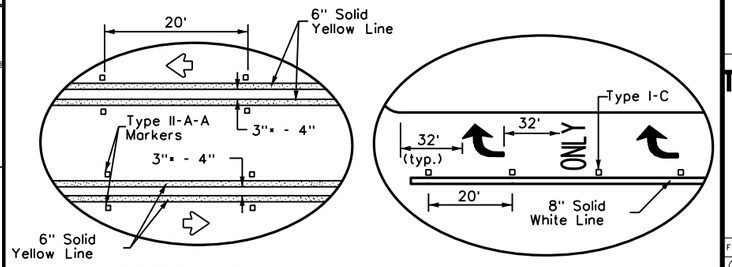
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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

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© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	TYL	SMITH		87

22C

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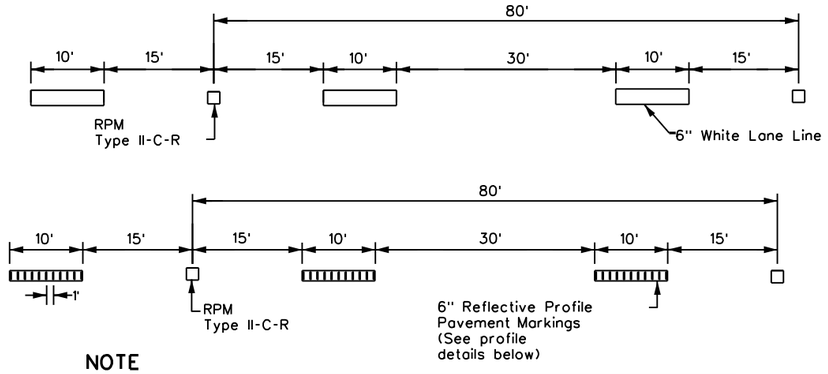
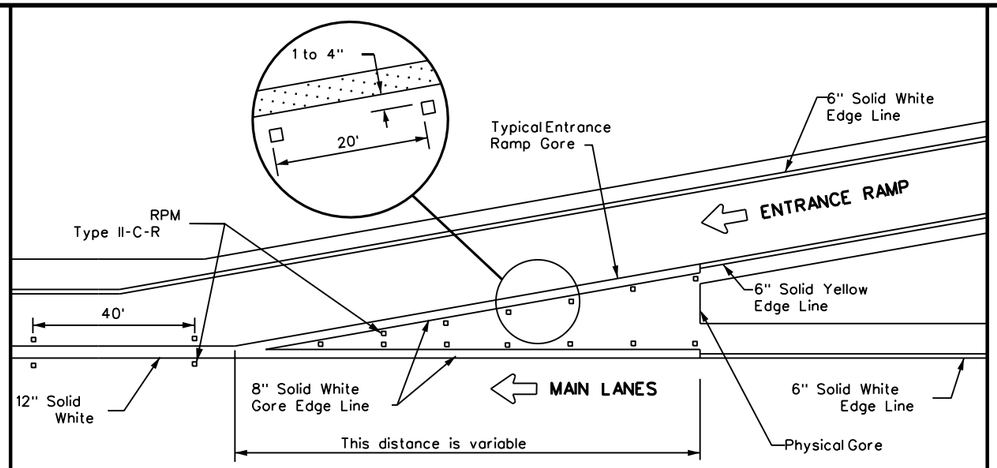


NOTE

Reflectorized raised pavement markers Type II-C-R shall be spaced on 80'centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

TRAFFIC LANE LINES PAVEMENT MARKING



TYPICAL ENTRANCE RAMP GORE MARKING

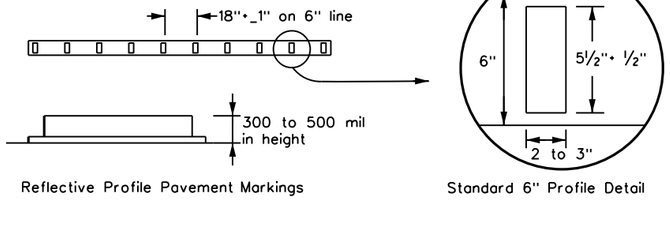
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R

GENERAL NOTE

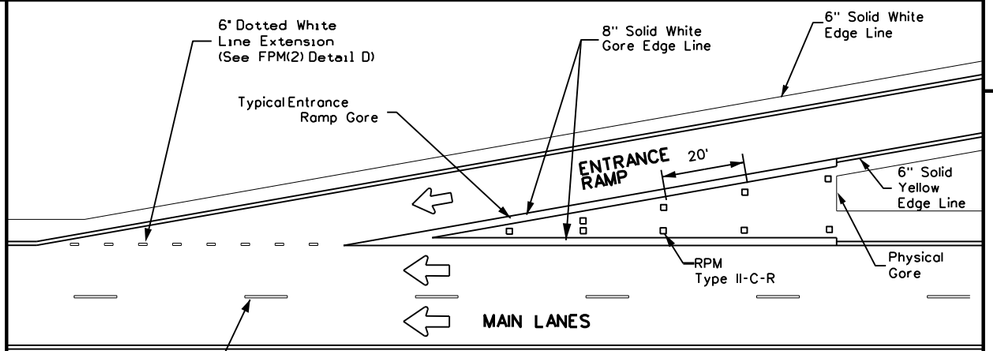
On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.



NOTE

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

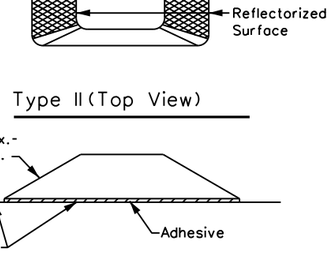
EDGE LINE PAVEMENT MARKINGS



NOTE

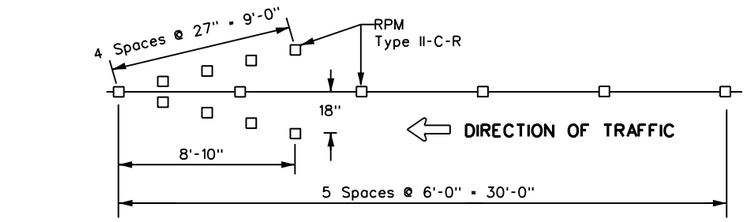
See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

TAPERED ACCELERATION LANE



SECTION A

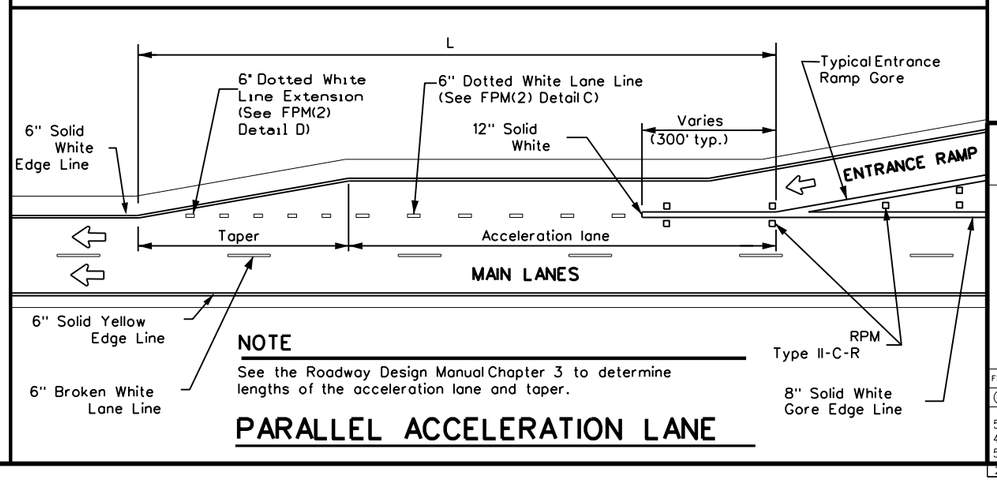
REFLECTORIZED RAISED PAVEMENT MARKER (RPM)



NOTES

1. Reflectorized raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectorized wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

WRONG WAY ARROW



NOTE

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

PARALLEL ACCELERATION LANE

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-22

FILE: fpm(1)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
5-74 8-00 2-12	DIST	COUNTY		SHEET NO.
4-92 2-08 10-22	TYL	SMITH		88
5-00 2-10				

23A

DATE: 1/23/2025 10:20:43 AM
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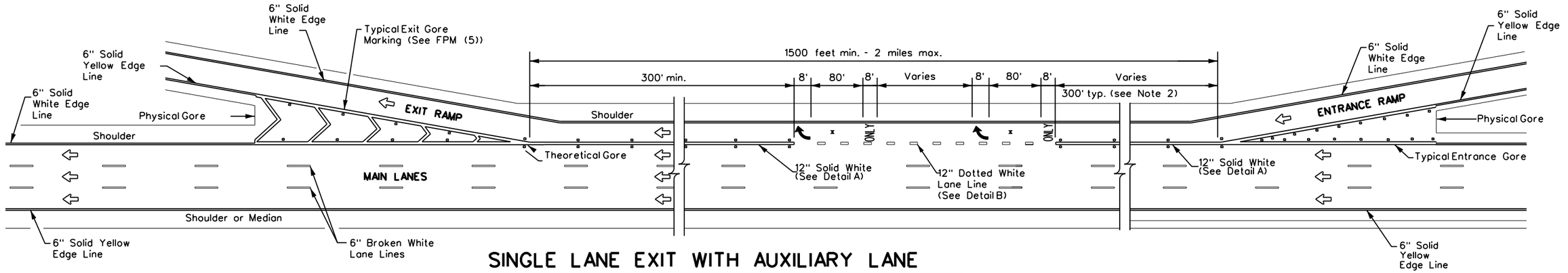
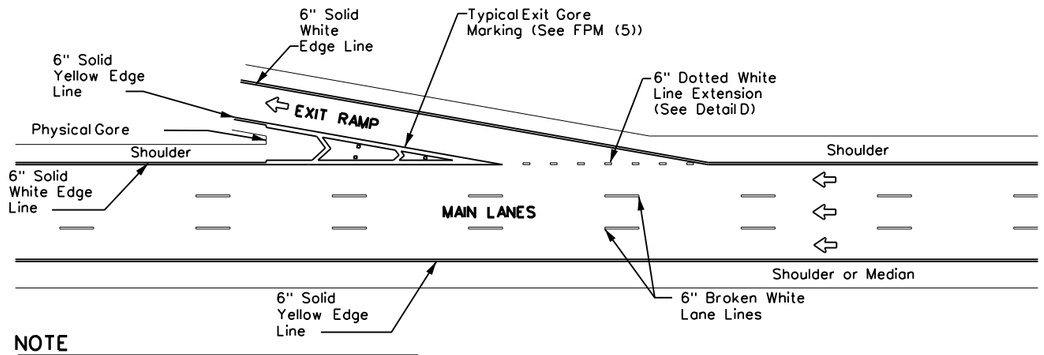


SINGLE LANE EXIT WITH AUXILIARY LANE

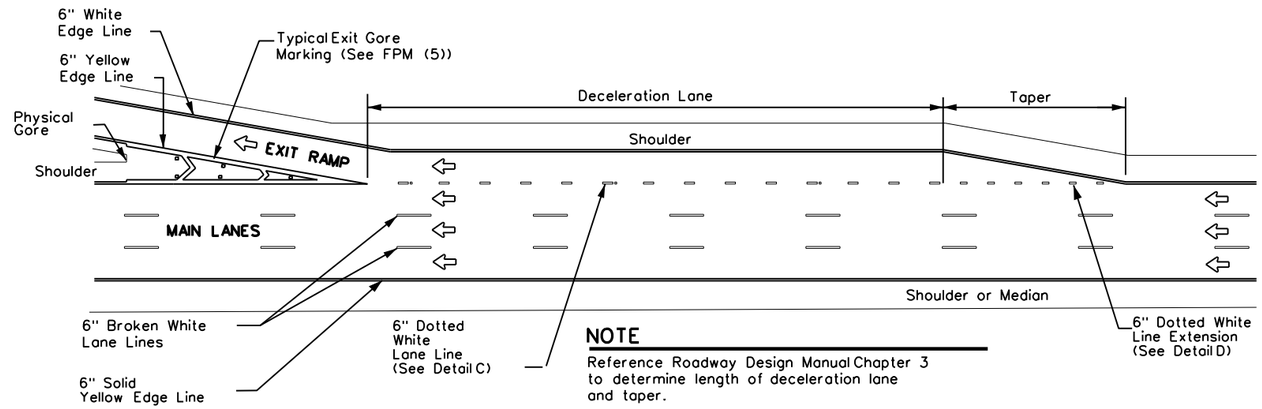
(See Note 2)



NOTE

Reference Roadway Design Manual Chapter 3 to determine if tapered deceleration lane may be used.

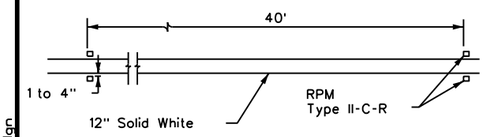
TAPERED DECELERATION LANE



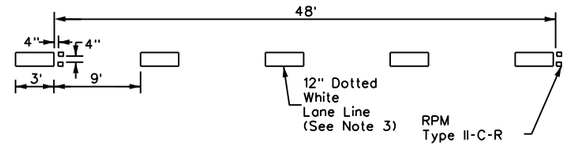
NOTE

Reference Roadway Design Manual Chapter 3 to determine length of deceleration lane and taper.

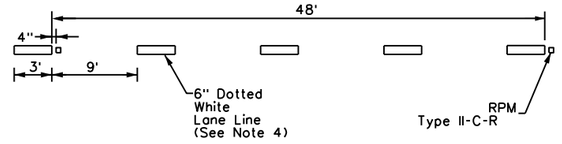
PARALLEL DECELERATION LANE



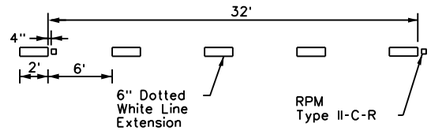
DETAIL A



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				TOLL 49
2-77 5-00 2-12	DIST	COUNTY		SHEET NO.
4-92 8-00 10-22	TYL	SMITH		89
8-95 2-10				

23B

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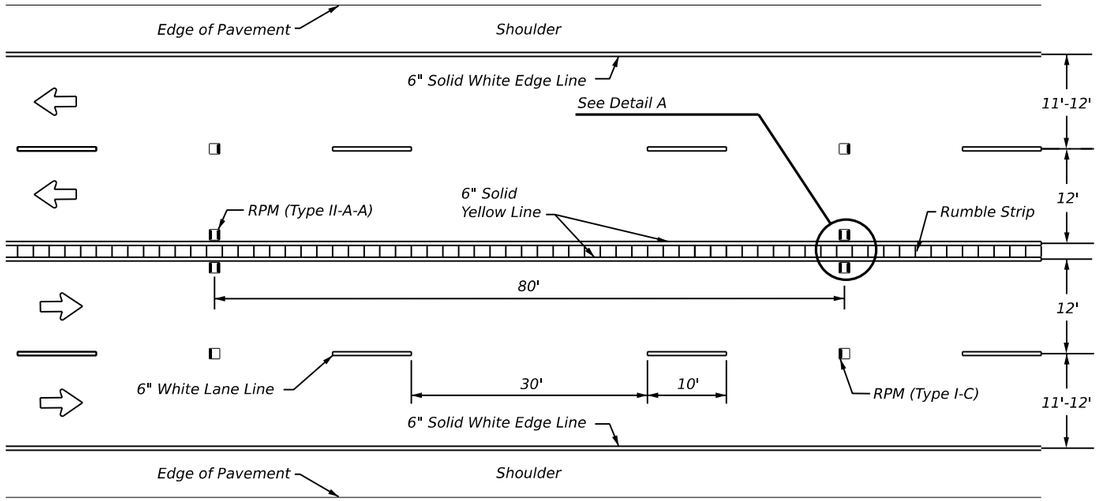
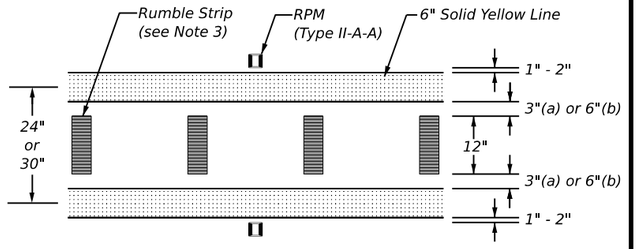


CENTERLINE BUFFER FOR MULTI-LANE UNDIVIDED ROADWAYS

FOR BUFFER WIDTHS OF 24 INCHES(a) OR 30 INCHES(b)



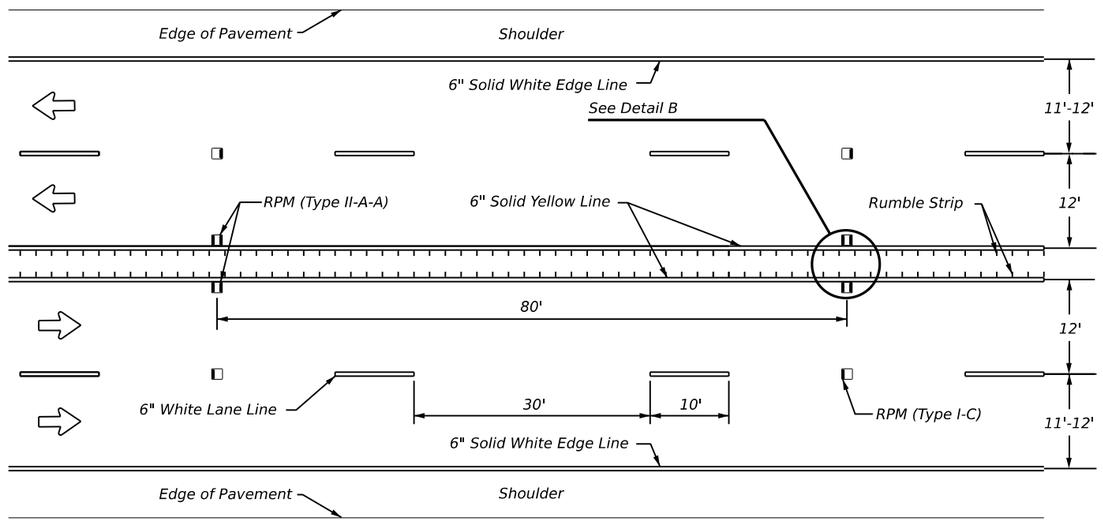
DETAIL "A"

GENERAL NOTES:

1. A buffer shall not be implemented if it will require reducing the width of inside travel lanes to be less than 12 feet.
2. See standard sheet PM(2) for additional details regarding retroreflectorized raised pavement markers (RPMs).
3. This sheet shows the application of milled rumble strips, though other types may be used. See the Rumble Strips (RS) standard for installation details.
4. Dimension notations (a) through (e) correspond to the following buffer widths: a = 24 inches; b = 30 inches; c = 36 inches; d = 42 inches; and e = 48 inches.
5. The Engineer must consider bicycle accomodation during the planning and implementation of all construction and rehabilitation projects. See standard sheet RS(6) and the TxDOT Roadway Design Manual (RDM) Bicycle Facilities section for applicable policies, references and guidance.

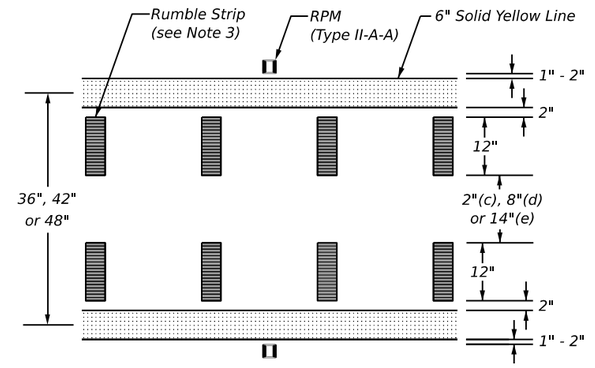
MATERIAL SPECIFICATIONS	
Pavement Markers (Reflectorized)	DMS-4200
Epoxies and Adhesives	DMS-6100
Bituminous Adhesive for Pavement Markers	DMS-6130
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications.



WIDE CENTERLINE BUFFER FOR MULTI-LANE UNDIVIDED ROADWAYS

FOR BUFFER WIDTHS OF 36 INCHES(c), 42 INCHES(d) OR 48 INCHES(e)



DETAIL "B"

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE BUFFER MULTI-LANE ROADWAYS

CLB(1)-23

FILE: clb1-23.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		90

DATE: 1/23/2025 10:20:46 AM
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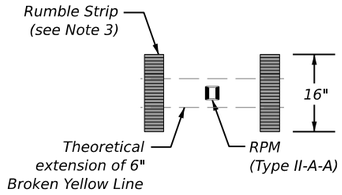
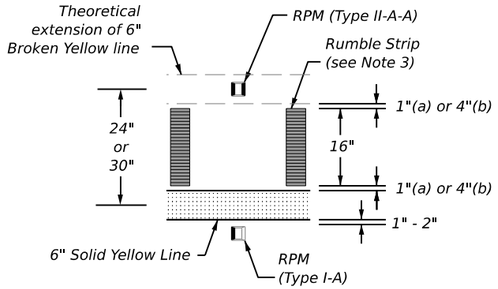


DETAIL "A"



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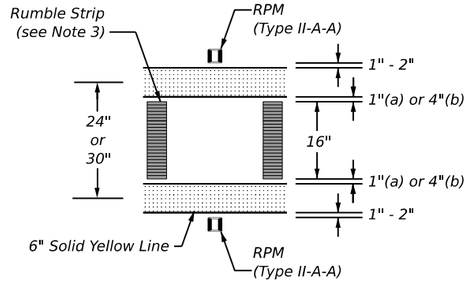
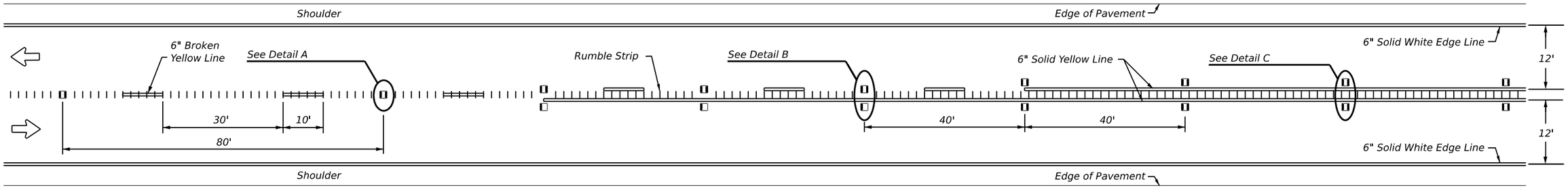


DETAIL "C"

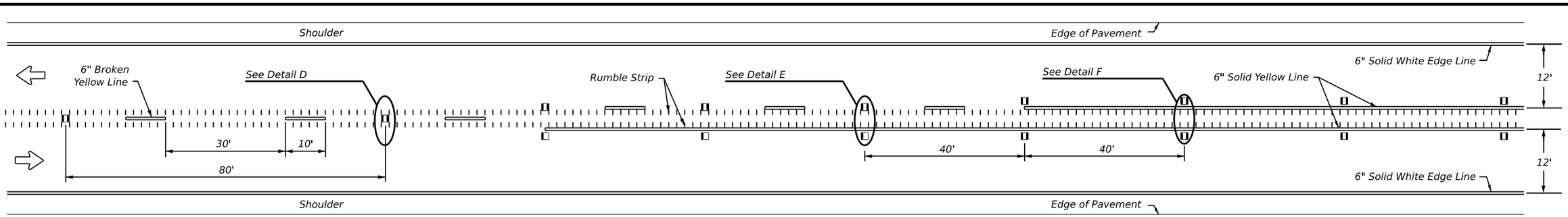
GENERAL NOTES:

1. A buffer shall not be implemented if it will require the width of travel lanes to be less than 12 feet.
2. See standard sheet PM(2) for additional details regarding retroreflectorized raised pavement markers (RPMs).
3. This sheet shows the application of milled rumble strips, though other types may be used. See the Rumble Strips (RS) standard for installation details.
4. Dimension notations (a) through (e) correspond to the following buffer widths: a = 24 inches; b = 30 inches; c = 36 inches; d = 42 inches; and e = 48 inches.
5. The Engineer must consider bicycle accomodation during the planning and implementation of all construction and rehabilitation projects. See standard sheet RS(6) and the TxDOT Roadway Design Manual (RDM) Bicycle Facilities section for applicable policies, references and guidance.



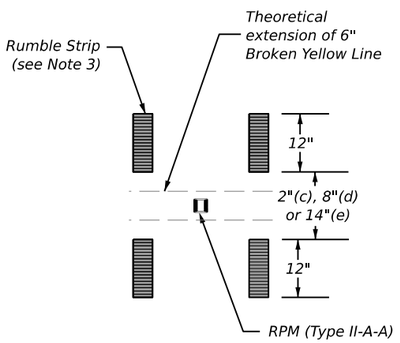
CENTERLINE BUFFER FOR TWO-LANE UNDIVIDED ROADWAYS

FOR BUFFER WIDTHS OF 24 INCHES(a) or 30 INCHES(b)

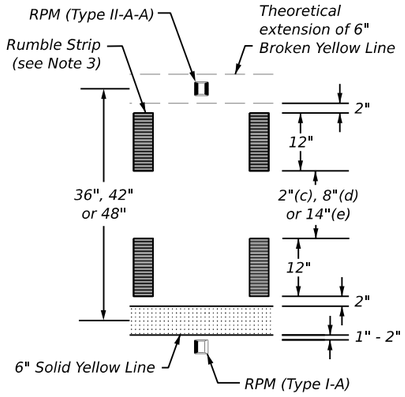


WIDE CENTERLINE BUFFER FOR TWO-LANE UNDIVIDED ROADWAYS

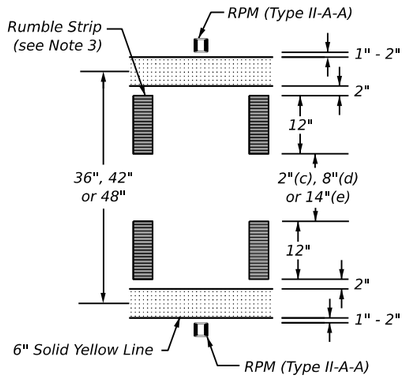
FOR BUFFER WIDTHS OF 36 INCHES(c), 42 INCHES(d) OR 48 INCHES(e)



DETAIL "D"



DETAIL "E"



DETAIL "F"

MATERIAL SPECIFICATIONS	
Pavement Markers (Reflectorized)	DMS-4200
Epoxies 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.

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE BUFFER TWO-LANE ROADWAYS

CLB(2)-23

FILE: clb2-23.dgn	DN:	CK:	DW:	CK:
©TxDOT September 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
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	TYL	SMITH		91

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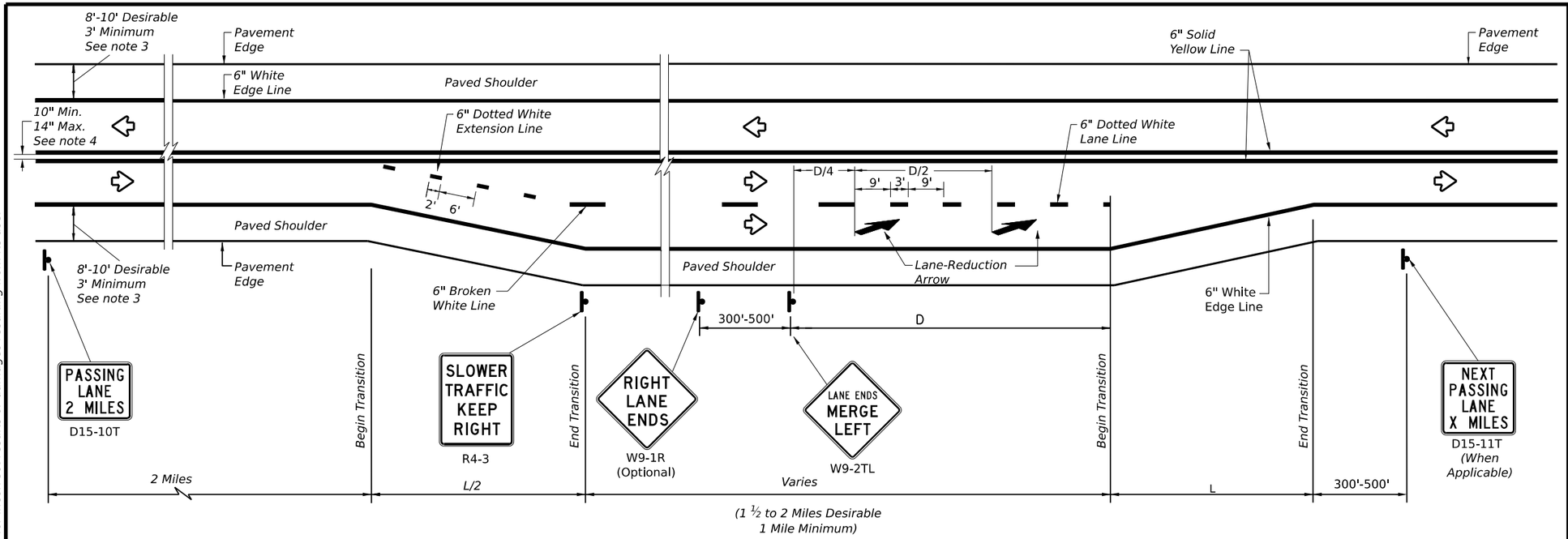

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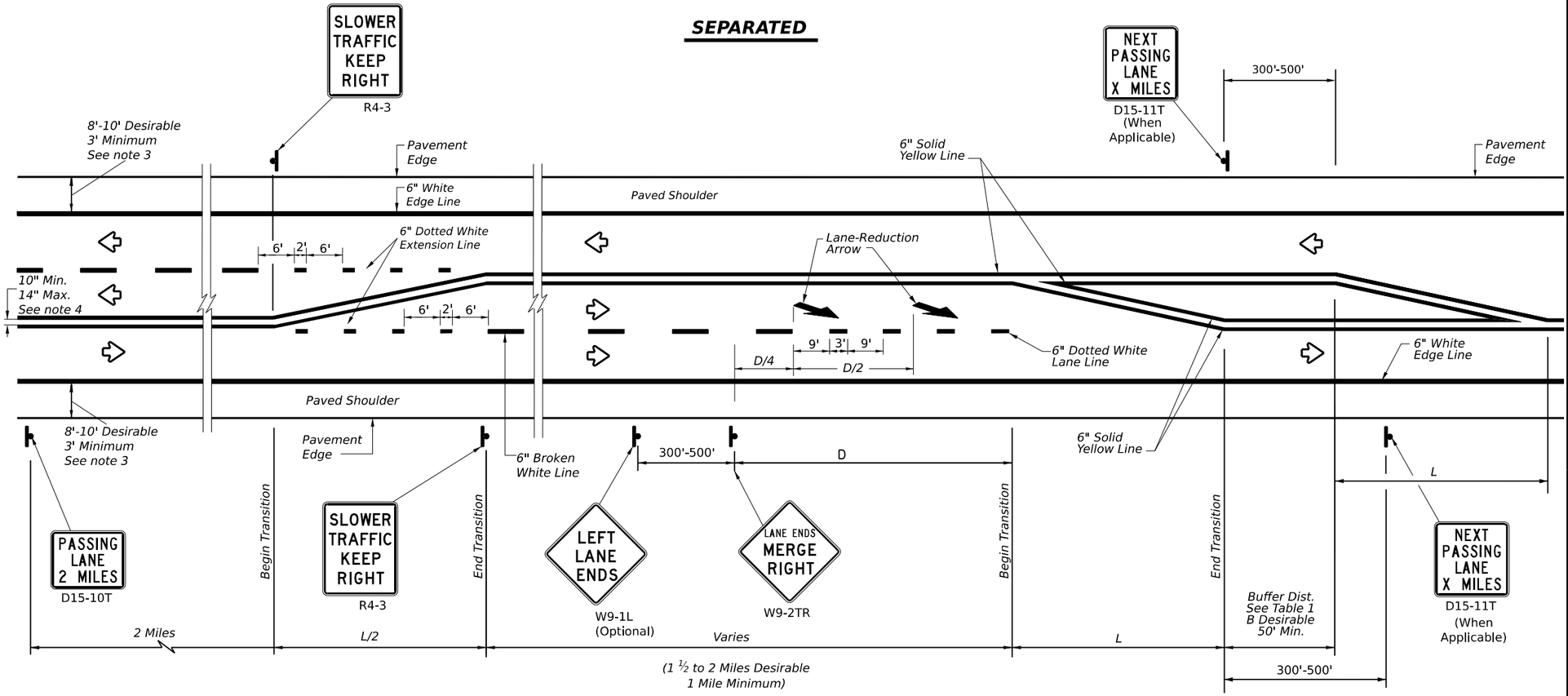

ALTERNATING

LEGEND

	Sign
	Traffic Flow

TYPICAL TAPER LENGTH (L)

Formula ×	L = WS

× *Transition length should be rounded up to nearest 5 foot increment.*

L=Length of Transition (FT)
W=Width of Offset (FT)
S=Posted Speed (MPH)

EXAMPLE

A 12 foot lane is added on a 70 mph roadway. The length of the transition should be:

L=12x70=840 ft

TABLE 1
ADVANCE WARNING SIGN DISTANCE (D) AND BUFFER DISTANCE (B)

Posted Speed	D (FT)	B (FT)
40	670	305
45	775	360
50	885	425
55	990	495
60	1100	570
65	1200	645
70	1250	730
75	1350	820

GENERAL NOTES

1. *For minimum and desirable design details, see the Roadway Design Manual, Chapter 4, Section 6, Super 2 Highways.*
2. *For Raised Pavement Markers (RPM) details, see Pavement Markings Standard sheet, PM(2) - Centerline for All Two Lane Two-Way Roadways. Note that RPMs are not recommended on the 6" dotted white extension lines.*
3. *For rumble strip options available for the designed shoulder width, see Rumble Strip Standard sheet RS(2).*
4. *For pavement marking details, see Pavement Marking Standard sheet PM(1).*

Texas Department of Transportation

Traffic Safety Division Standard

TEXAS SUPER 2 PASSING LANES

TS2(PL-1)-23

FILE: ts2-1-23.dgn	DN:	CK:	DW:	CK:	
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY	
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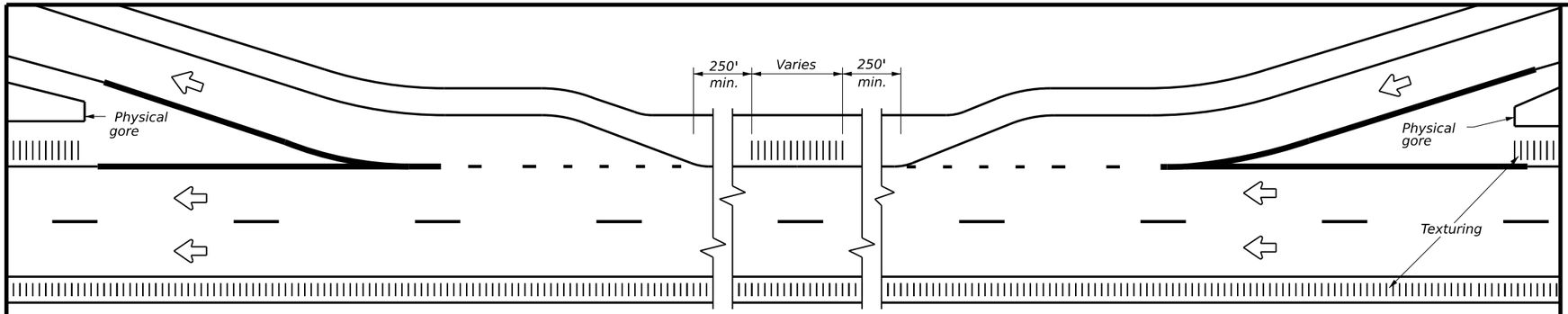
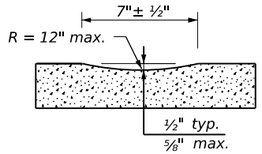
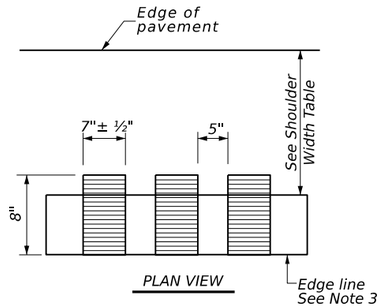


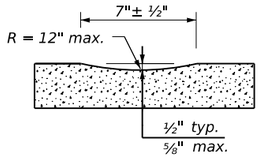
TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



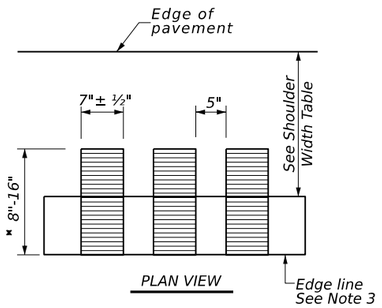
PROFILE VIEW
OPTION 1



CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

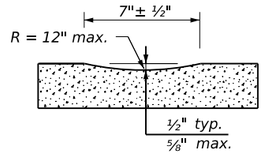


PROFILE VIEW
OPTION 2

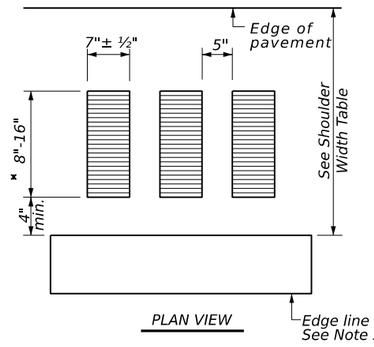


* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

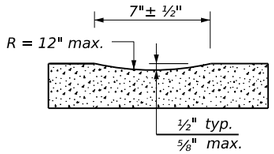


PROFILE VIEW
OPTION 3

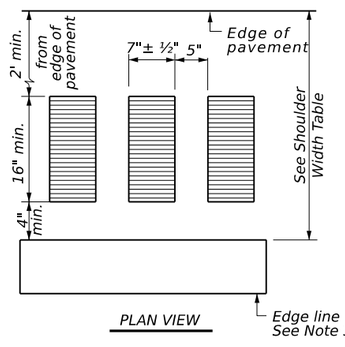


* This distance may vary based on width of shoulder

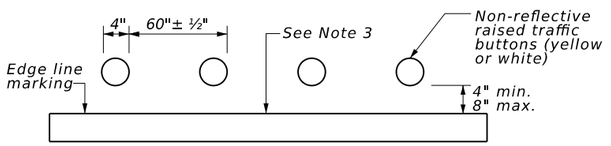
CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PROFILE VIEW
OPTION 4

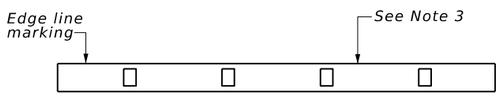


CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGE LINE
(Rumble Strips)



PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS
(Rumble Strips)

SHOULDER WIDTH TABLE

EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, or 6	Option 1, 2, 3, 5, or 6	Option 2, 4, 5, or 6

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use standard sheets PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edge line rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble stripe.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS RS(1)-23

FILE:	rs(1)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS					TOLL 49
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2-10		TYL	SMITH		93
10-13					

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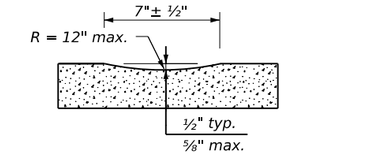
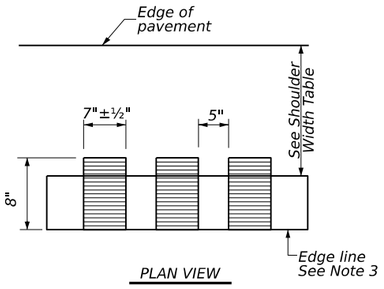
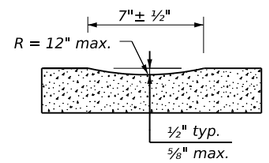


PROFILE VIEW
OPTION 1

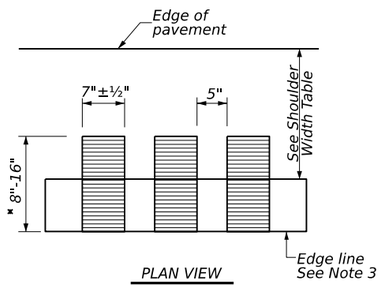


PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



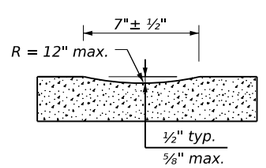
PROFILE VIEW
OPTION 2



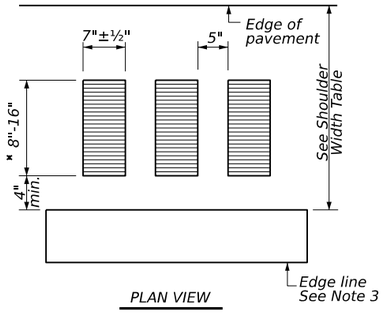
PLAN VIEW

* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



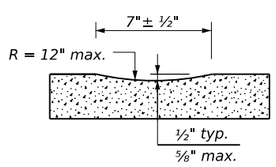
PROFILE VIEW
OPTION 3



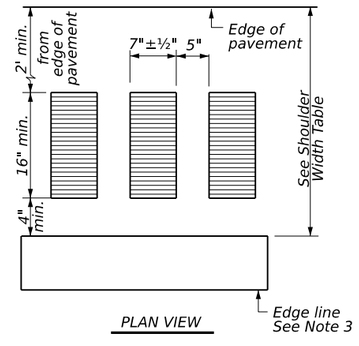
PLAN VIEW

* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

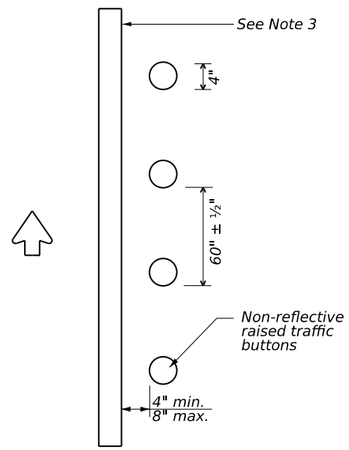


PROFILE VIEW
OPTION 4



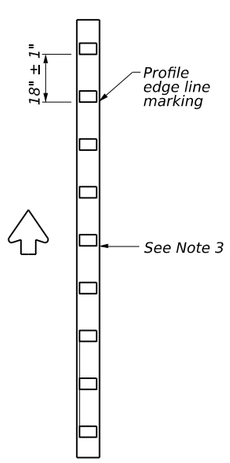
PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



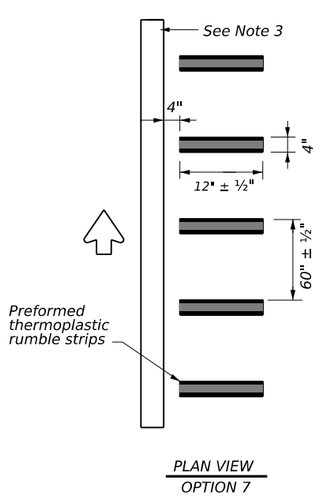
PLAN VIEW
OPTION 5

RAISED EDGE LINE (Rumble Strips)



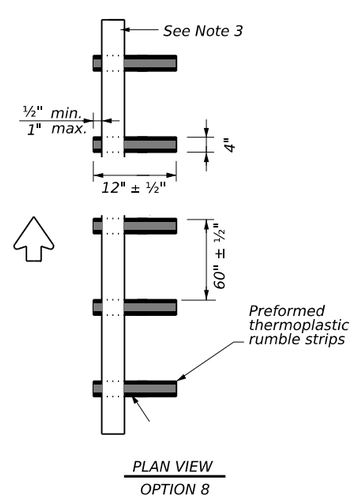
PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS (Rumble Strips)



PLAN VIEW
OPTION 7

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



PLAN VIEW
OPTION 8

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 6 or 8	Option 1, 2, 3 5, 6 or 7	Option 2, 4, 5 6 or 7

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edgeline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble strip.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS

RS(2)-23

FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	TYL	SMITH		94

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DATE: 1/23/2025 10:20:49 AM
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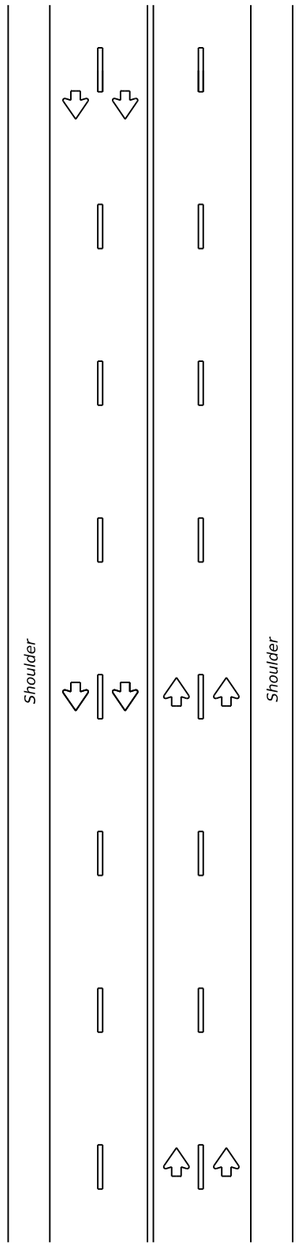
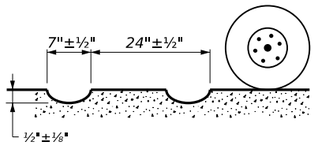
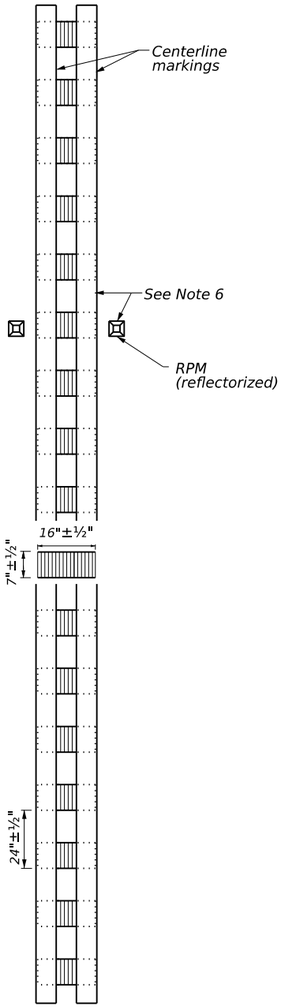
CENTERLINE RUMBLE STRIPS



MULTILANE UNDIVIDED HIGHWAY WITH SHOULDER

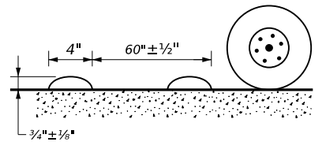


PROFILE VIEW

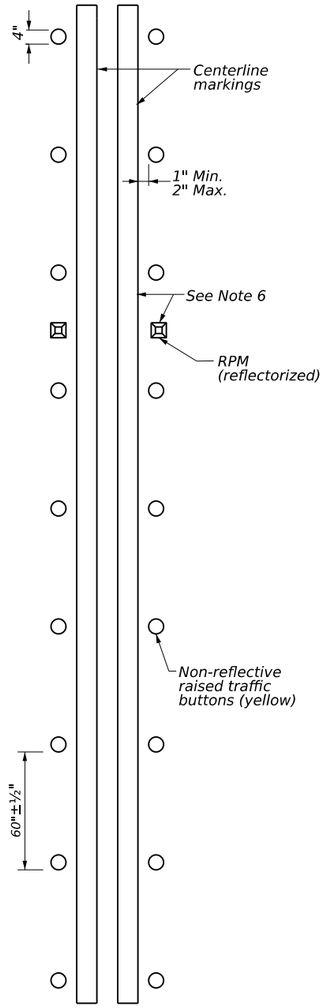


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

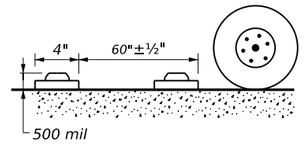


PROFILE VIEW

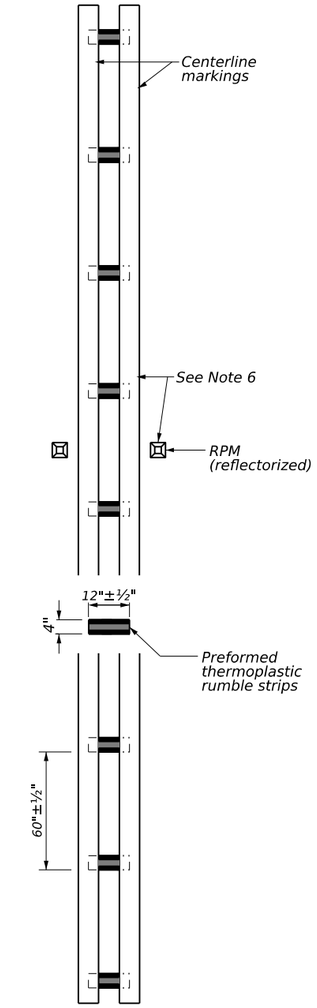


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

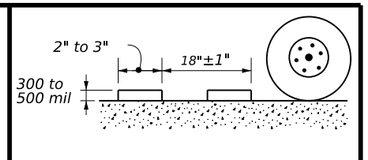


PROFILE VIEW

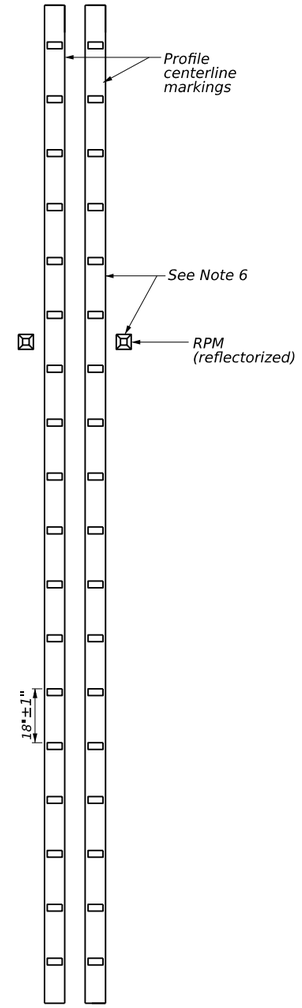


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on multilane undivided highways.
2. Centerline and edge line rumble strips or profile markings shall not be placedon roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may beused if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and nomore than 150 feet in advance of bridges, railroad crossing, intersections ordriveways with high usage of large trucks.
6. Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips for normal centerline spacing. For wider medians, specify in the plans the exact placement of the rumble strips. Place the rumble strips under each centerline marking or centered in the middle of the median.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The color of the button should be yellow for a continuous no passing roadway. The button will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(2).

Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON MULTILANE UNDIVIDED HIGHWAYS RS(3)-23

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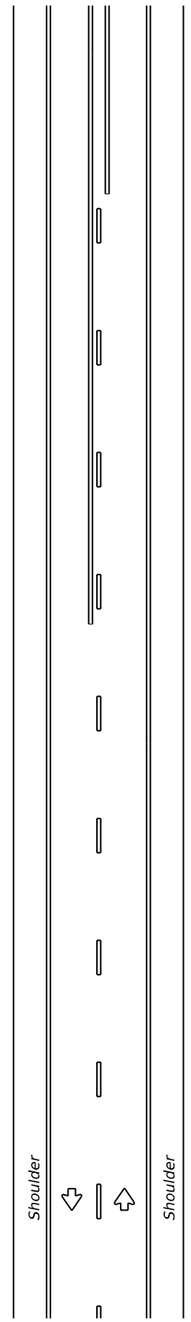
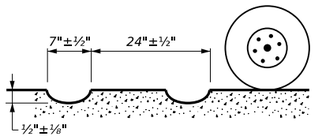
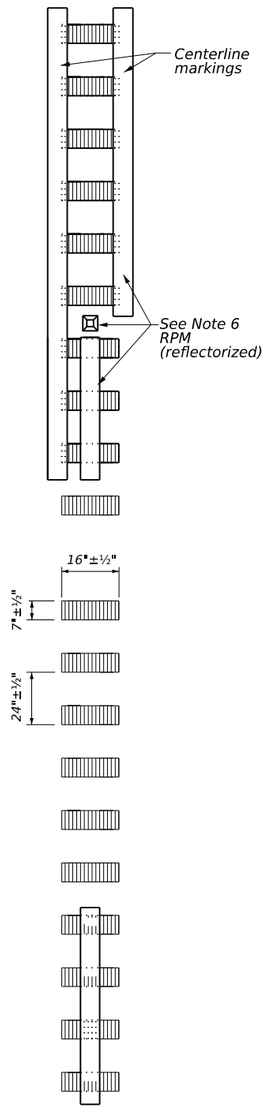
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

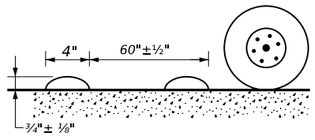


PROFILE VIEW

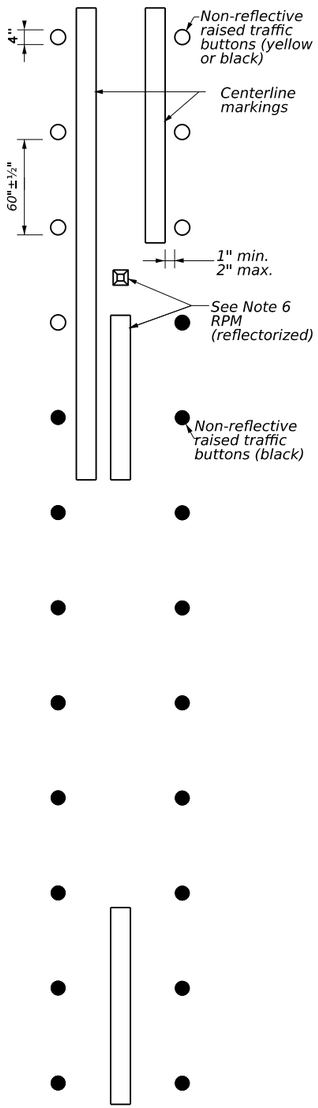


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

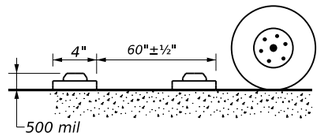


PROFILE VIEW

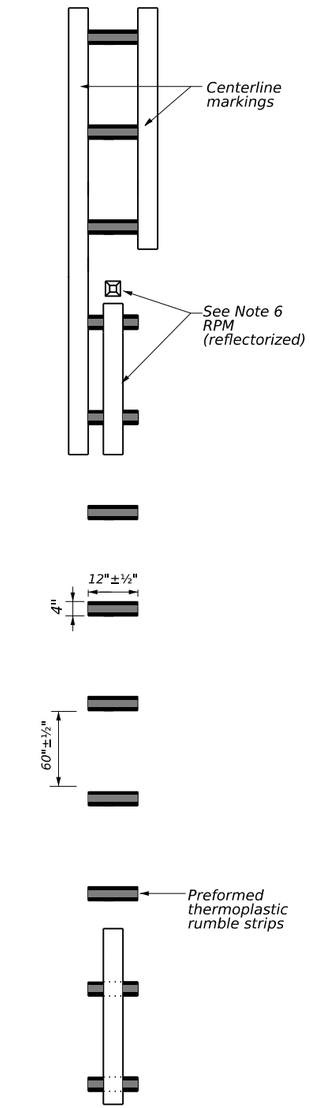


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

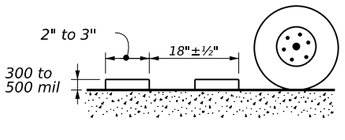


PROFILE VIEW

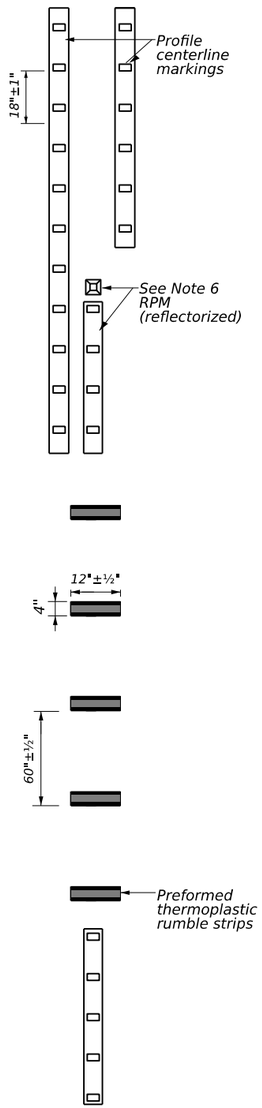


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC RUMBLE STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edge line rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections or driveways with high usage of large trucks.
6. Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
12. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

13. See standard sheet RS(2).

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Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS RS(4)-23

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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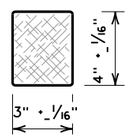
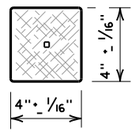
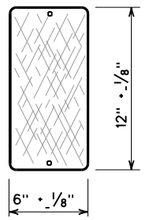
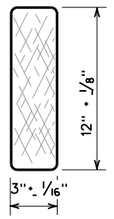
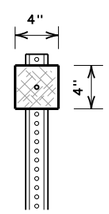
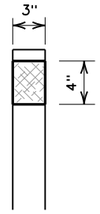
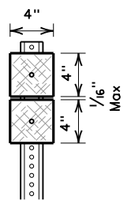
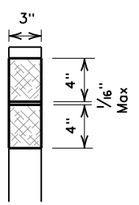
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

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

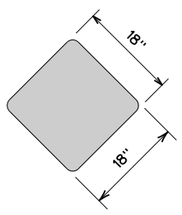
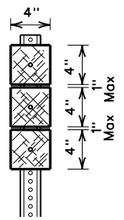
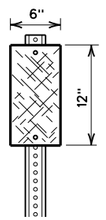
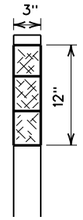
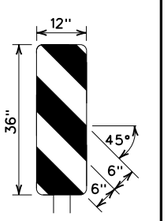
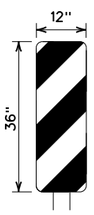
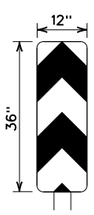
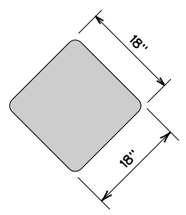
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

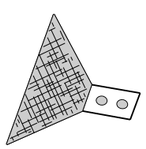
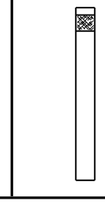
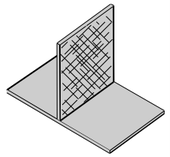
OBJECT MARKERS

	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 or C Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B or C Sheeting			Red -Type B or C Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

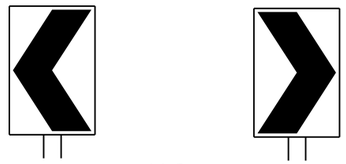
BARRIER REFLECTORS (BRF)

	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

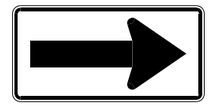
DEVICE: 

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"	

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				TOLL 49
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	SMITH		97

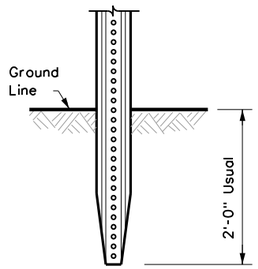
20A

DATE: 1/23/2025 10:20:51 AM
FILE: c:\pw_working\lochner-pw-01\d0193192\D & OM(1)-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

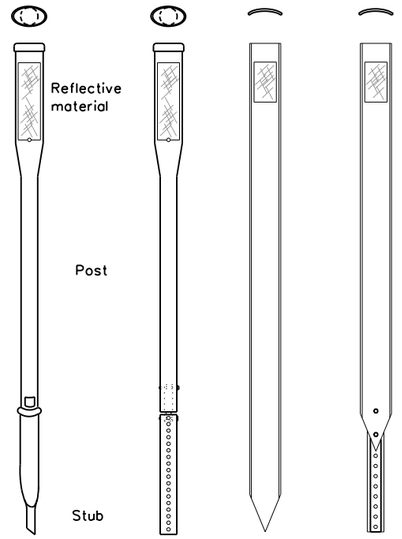
WING CHANNEL (WC)

GND

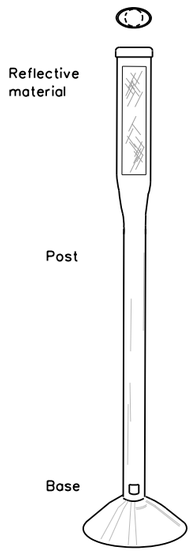


FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF



EMBEDDED

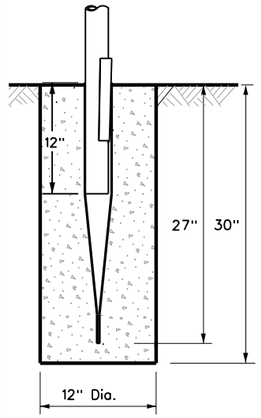
SURFACE MOUNT

NOTES

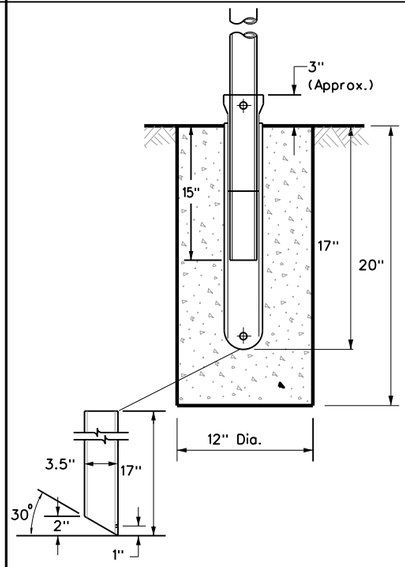
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL

PLASTIC

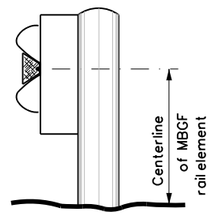
NOTE

1. Install per manufacturer's recommendations.

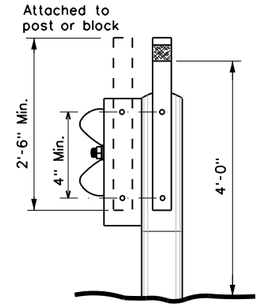
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

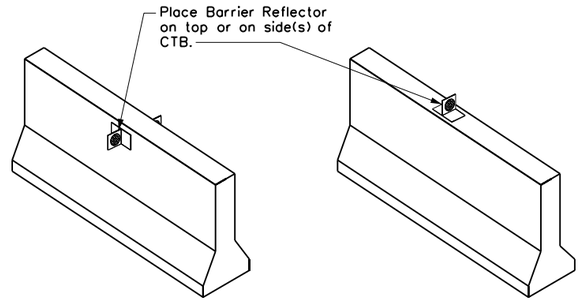
GF1



GF2



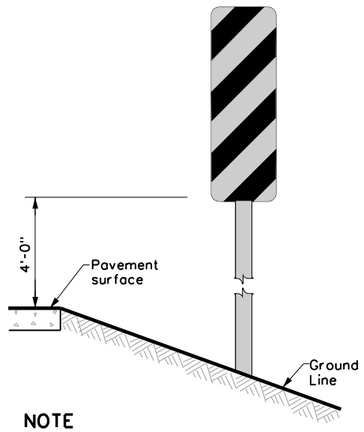
CONCRETE TRAFFIC BARRIER (CTB)



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.

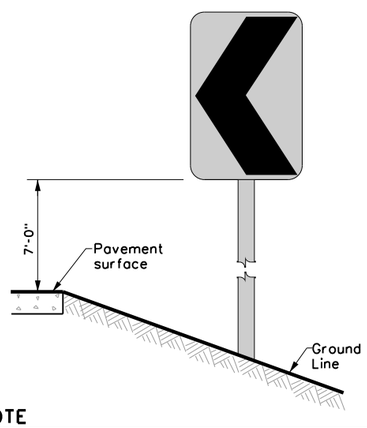
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

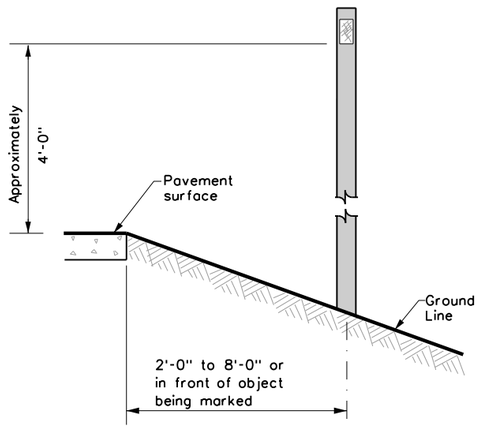
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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				TOLL 49
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	SMITH		98

208

DATE: 1/23/2025 10:20:52 AM
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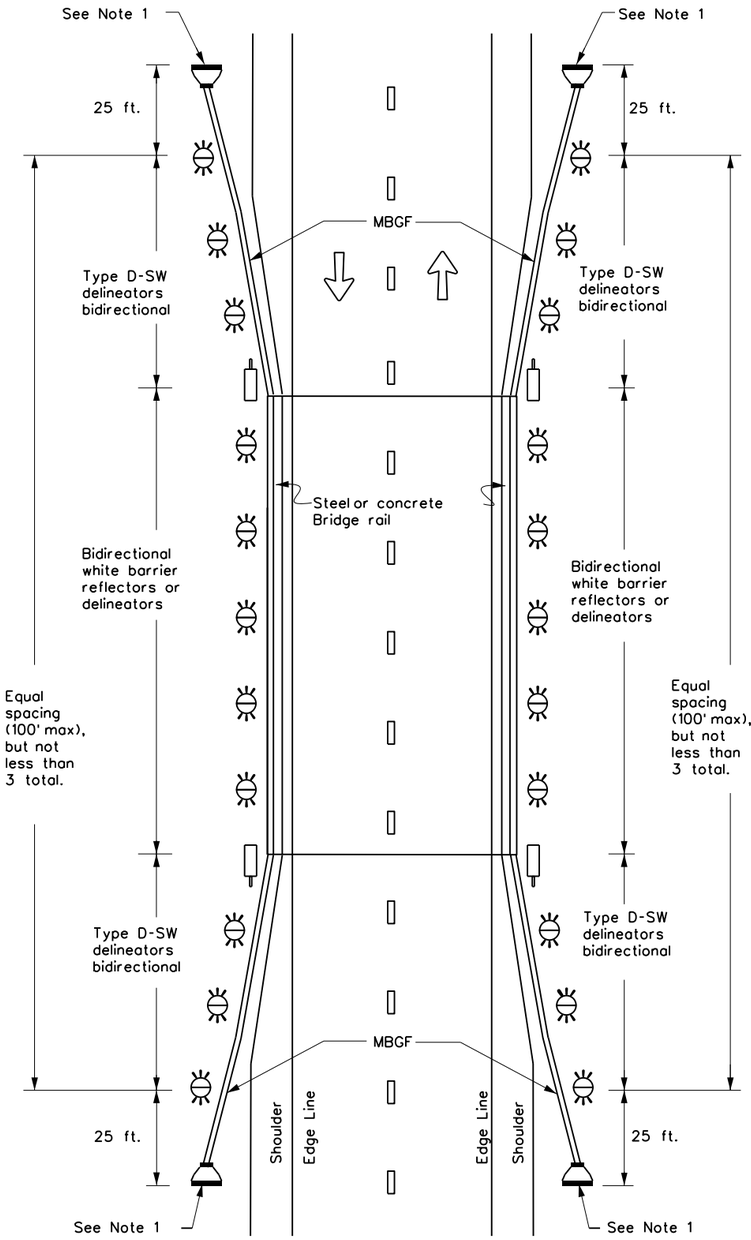
DATE: 1/23/2025 10:20:53 AM
FILE: c:\pw_working\lochner_pw-01\d0193192\D & OM(5)-20.dgn

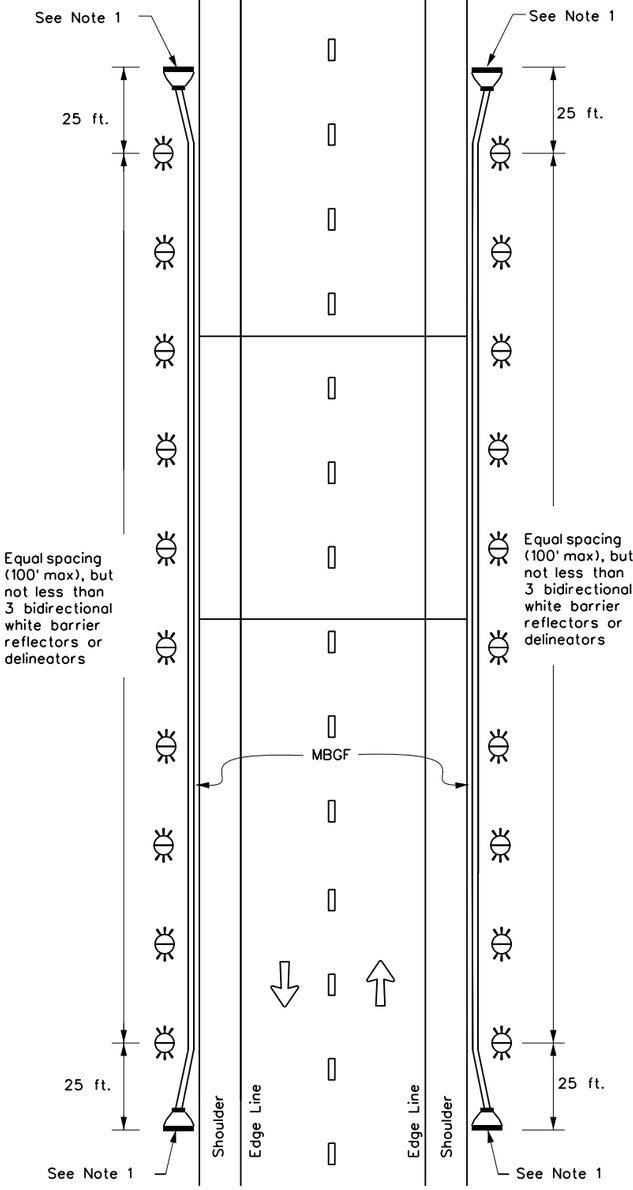
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

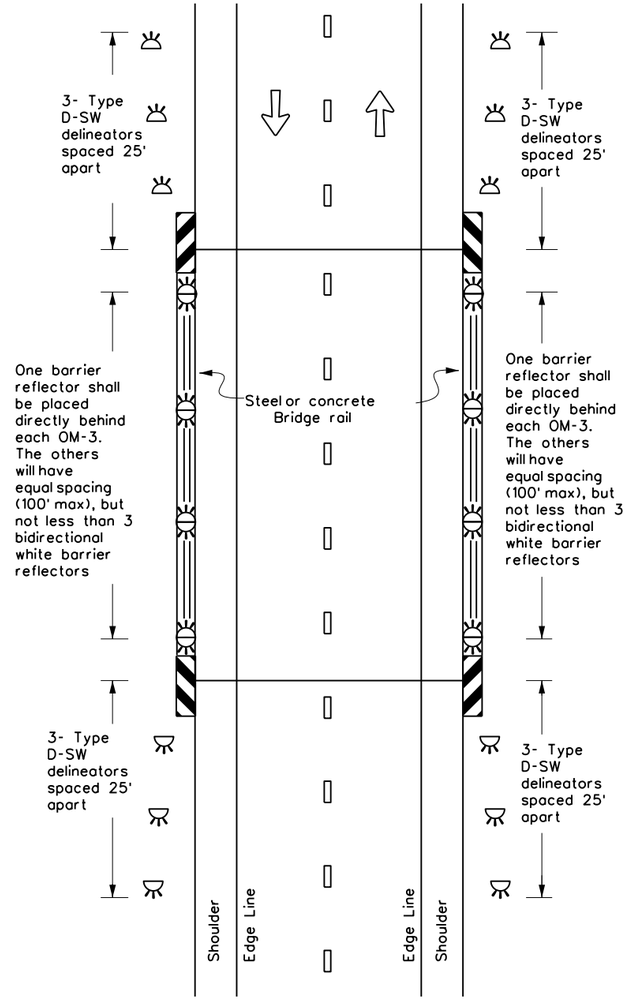
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

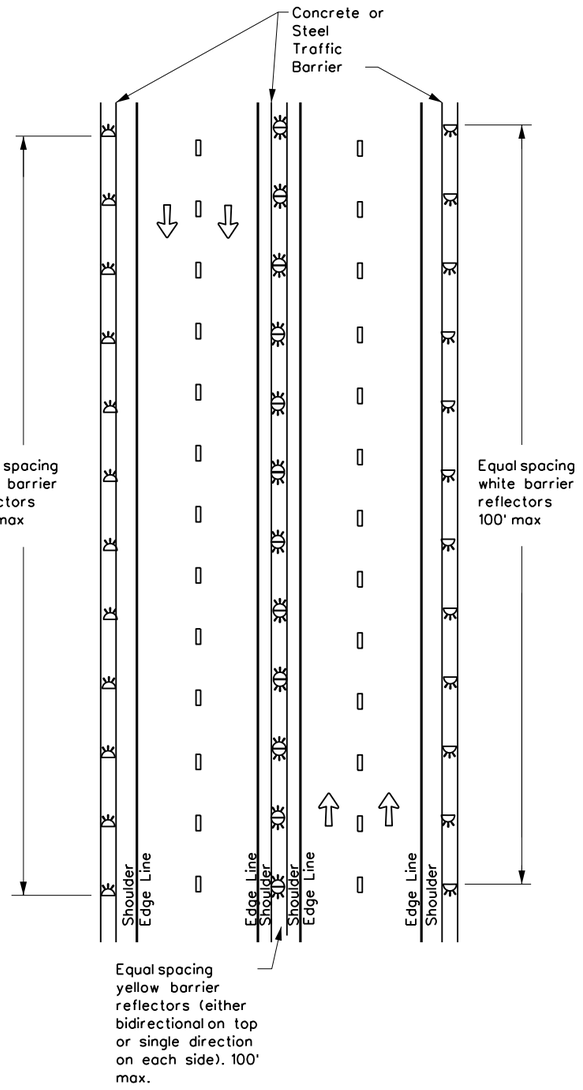
D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
7-20	DIST	COUNTY		SHEET NO.
	TYL	SMITH		99

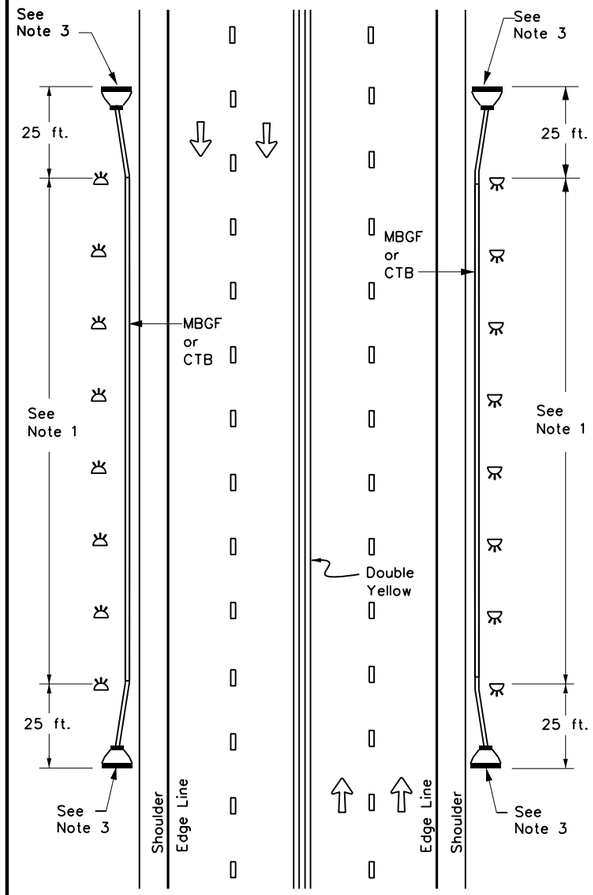
20E

DATE: 1/23/2025 10:20:54 AM
FILE: c:\pw_working\lochner-pw-01\d0193192\D & OM(6)-20.dgn

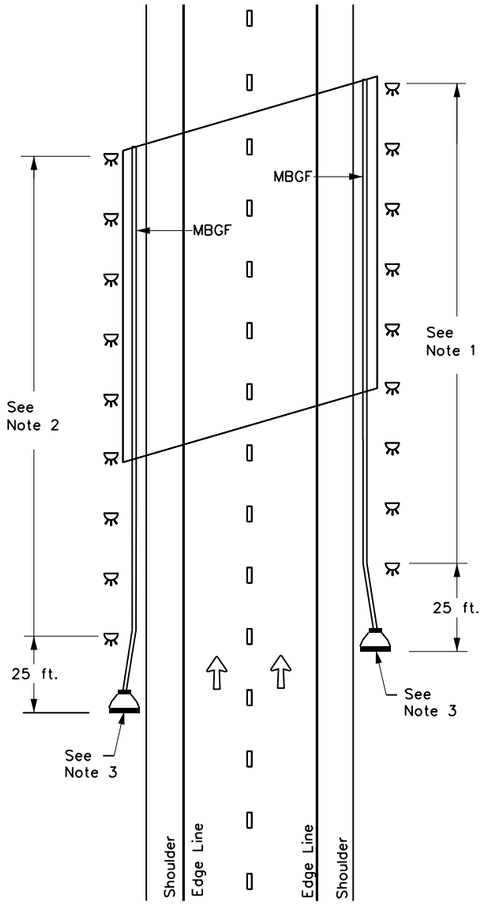
CONTINUOUS CONCRETE OR STEEL BARRIER



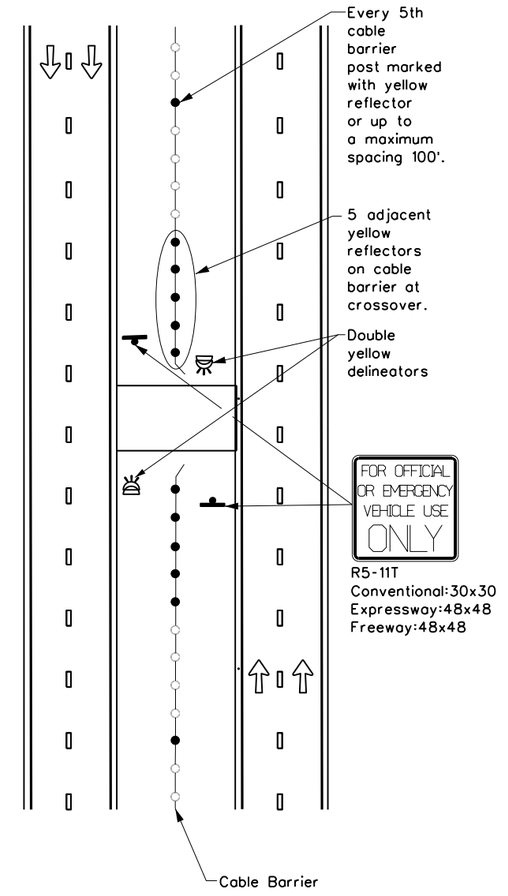
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

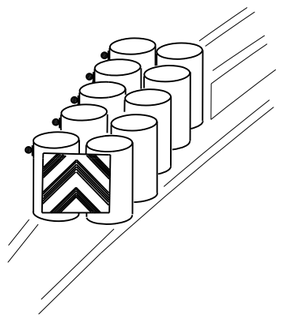
Traffic Safety Division Standard

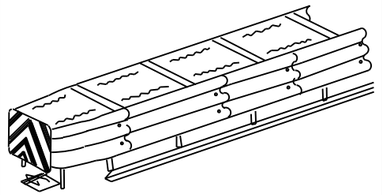
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

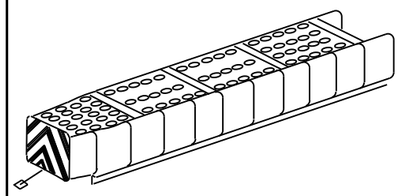
D & OM(6)-20

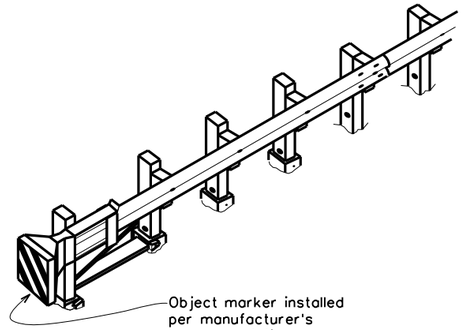
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
7-20	DIST	COUNTY		SHEET NO.
	TYL	SMITH		100

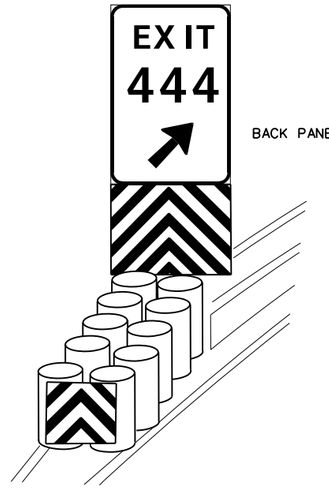
20F

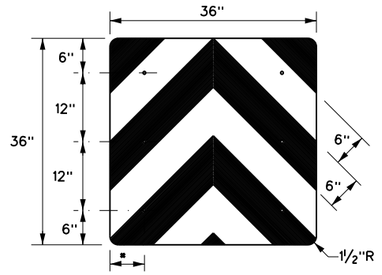


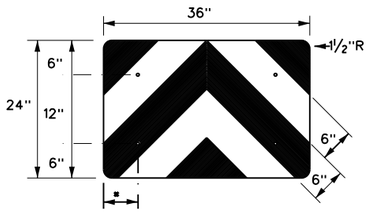




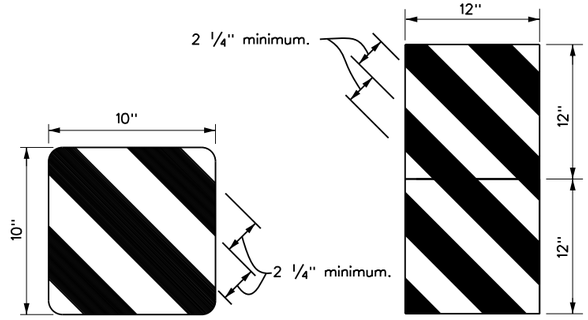




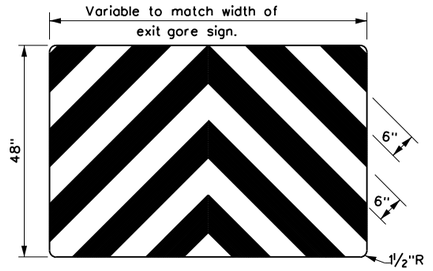


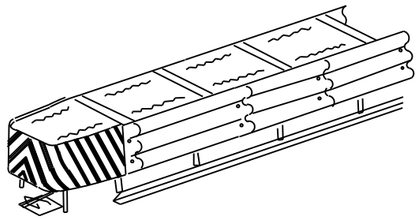


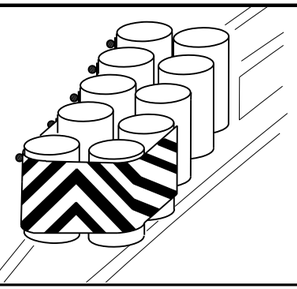
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

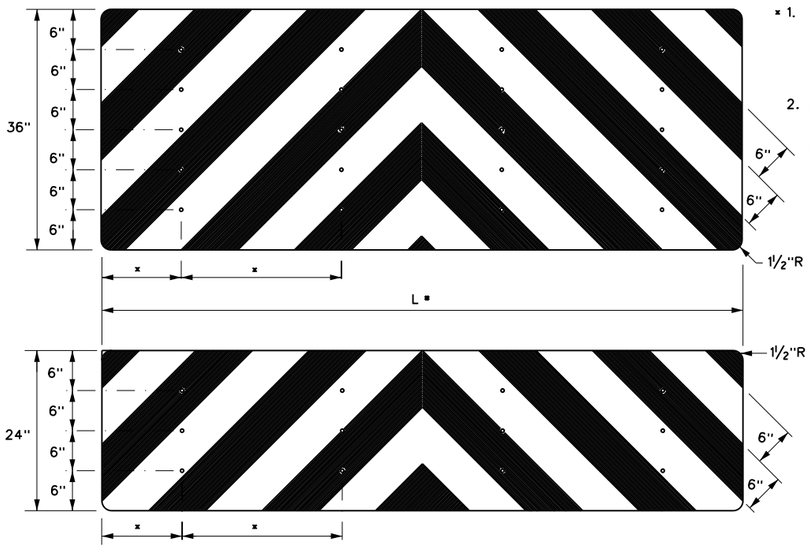


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

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

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

NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	TYL	SMITH		101
4-98 7-20				

20G

DATE: 1/23/2025 10:20:54 AM
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