DESIGN	FED.RD. DIV.NO.	STATE PROJECT NO.			
KA	6	C 172-4-50, ETC			
GRAPHICS	STATE	CONT	SECT	JOB	HIGHWAY NO.
KA	TEXAS	0172	04	050, ETC.	287
CHECK	CHECK	DIST	COUNTY		SHEET NO.
VM	JP	DAL	ELLIS		1

FINAL PLANS

NAME OF CONTRACTOR: ______________________

DATE OF LETTING: ______________________

DATE WORK BEGAN: ______________________

DATE WORK COMPLETED: ______________________

DATE WORK ACCEPTED: ______________________

SUMMARY OF CHANGE ORDERS:

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
C 172-4-50, ETC.
CSJ: 0172-04-050, ETC.

US 287

ELLIS COUNTY

FUNCTIONAL CLASS: PRINCIPAL ARTERIAL (URBAN)

DESIGN SPEEDS = 65 MPH

ADT (2022) = 45,546
ADT (2042) = 76,583 (CSJ:0172-04-050)

ADT (2022) = 63,007
ADT (2042) = 92,220 (CSJ:0172-13-010)

NOTE:

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000-005)

CCSJ: 0172-04-050
LIMITS: FROM JOHNSON COUNTY LINE TO NEWTON BRANCH CREEK

TOTAL PROJECT LENGTH =
ROADWAY = 23,781.00 FT. = 4.504 MI.
BRIDGE = 1,829.00 FT. = 0.346 MI.
TOTAL = 25,610.00 FT. = 4.850 MI.

CSJ: 0172-13-010
LIMITS: FROM NEWTON BRANCH CREEK TO BS 287Q

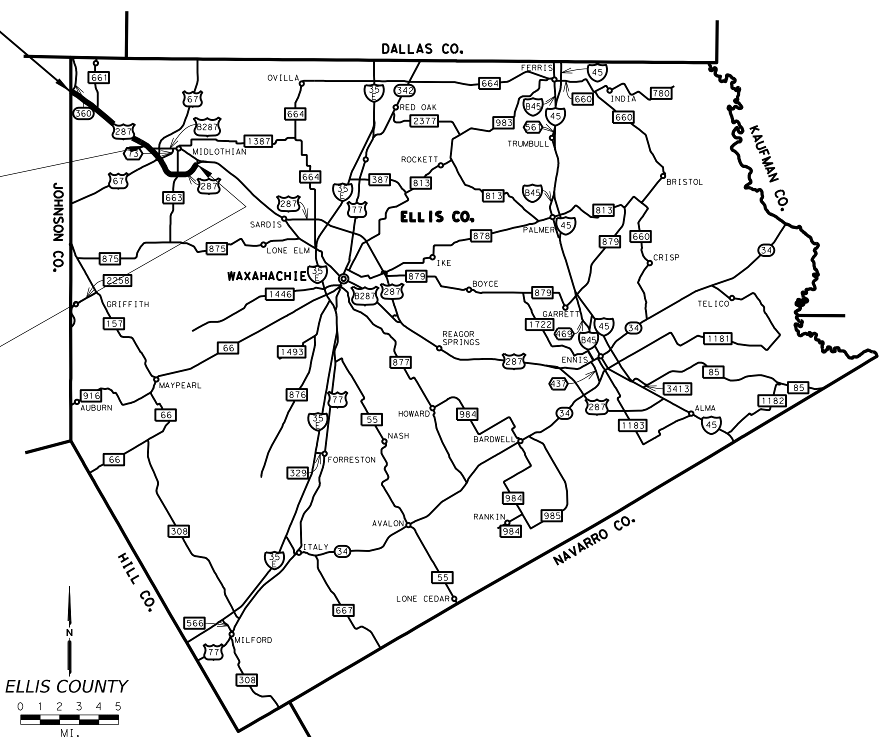
TOTAL PROJECT LENGTH =
ROADWAY = 16,786.00 FT. = 3.173 MI.
BRIDGE = 1,834.00 FT. = 0.347 MI.
TOTAL = 18,620.00 FT. = 3.527 MI.

FOR THE CONSTRUCTION OF REHABILITATE EXISTING ROADWAY
CONSISTING OF MILL AND INLAY

BEGIN PROJECT
CSJ 0172-04-050
STA 9+90.00
TRM 480+2.23

END CSJ 0172-04-050
BEGIN CSJ 0172-13-010
STA 266+00.00
TRM 488+0.596

END PROJECT
CSJ 0172-13-010
STA 452+20.00
TRM 488+4.142



ELLIS COUNTY
DALLAS DISTRICT

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: BNSFRR STA. 318+95.00
: UPRR STA. 478+70.00

WORK WAS COMPLETED ACCORDING
TO THE PLANS AND CONTRACT.

______________________, P.E.
Signature of Registrant & Date

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 7/30/2024
DocuSigned by: Kepha Abongo, P.E.
91F876B638A6407...
DESIGN ENGINEER

RECOMMENDED FOR LETTING: 7/30/2024
DocuSigned by: James P. Campbell, P.E.
9867TC109B6A4C1...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING: 7/30/2024
DocuSigned by: Juan A. Paredes, P.E., P.E.
4A97FFA3D5848C...
AREA ENGINEER

APPROVED FOR LETTING: 7/30/2024
DocuSigned by: Ceason Clemens, P.E.
A879E0D1CD0B464...
DISTRICT ENGINEER

DATE: ____________

INDEX OF SHEETS

I. GENERAL

SHEET	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS
3 - 4	PROJECT LAYOUT
5 - 11	EXISTING TYPICAL SECTIONS
12 - 18	PROPOSED TYPICAL SECTIONS
19, 19A-19D	GENERAL NOTES
20-20A	ESTIMATE AND QUANTITY SHEET
21	SUMMARY SHEET

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35	*TCP(1-1)-18
36	*TCP(1-5)-18
37	*TCP(2-1)-18
38	*TCP(2-6)-18
39	*TCP(3-2)-13
40	*TCP(3-3)-14
41	*TCP(3-4)-13
42	*TCP(5-1)-18
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48	*TCP(6-8)-14
49	*WZ(BRK)-13
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85	SLOPE REPAIR TOPOMAP AND EXISTING SHORING
86	SLOPE REPAIR LAYOUT
87	SLOPE REPAIR EXISTING AND PROPOSED TYPICAL SECTIONS
88	SLOPE REPAIR PROPOSED DETAILS
89-91	SLOPE REPAIR CROSS SECTION
	RETAINING WALL STANDARDS
92	**CRR

V. DRAINAGE DETAILS

NONE

VI. UTILITIES

NONE

VII. BRIDGES

NONE

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95	*D&OM(2)-20
96	*D&OM(6)-20
97	*FPM(1)-22
98	*FPM(2)-22
99	*FPM(3)-22
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101	*PM(1)-22
102	*PM(2)-22
103	*PM(3)-22
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	ENVIRONMENTAL STANDARDS
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X. MISCELLANEOUS ITEMS

SHEET	DESCRIPTION
114-115	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS
116-118	RAILROAD SCOPE OF WORK

STATE OF TEXAS
NICASIO LOZANO
99964
LICENSED
PROFESSIONAL ENGINEER

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

Docusigned by:
Nicasio Lozano , P.E. 7/31/2024
Signature of Registrant & Date

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

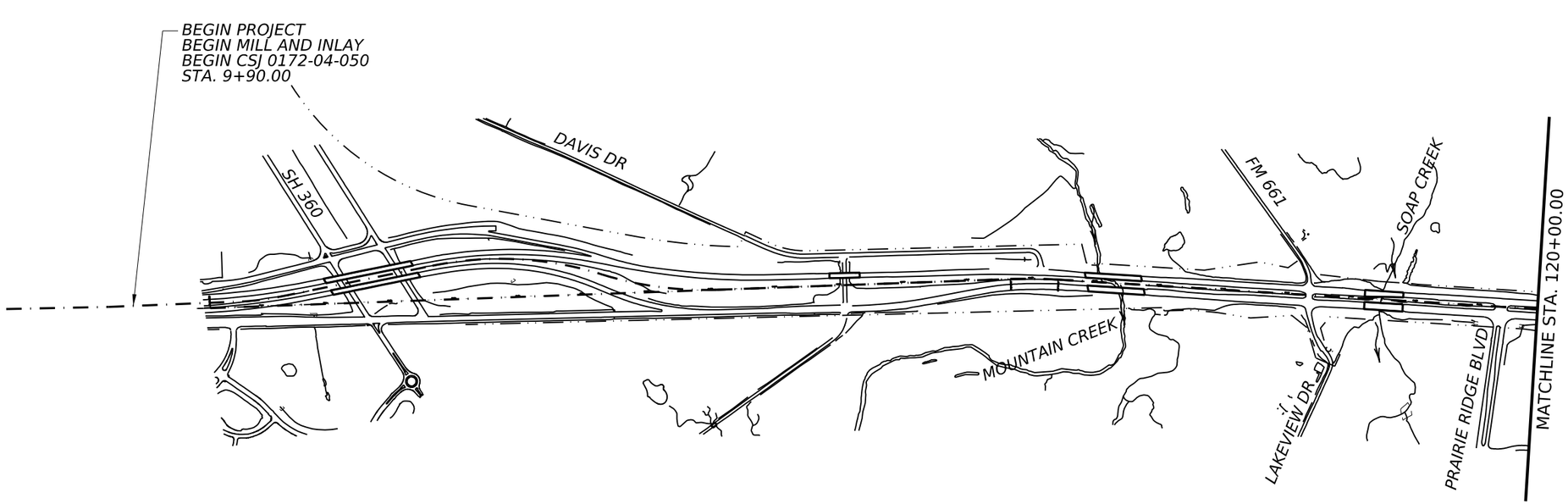
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH "*" HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

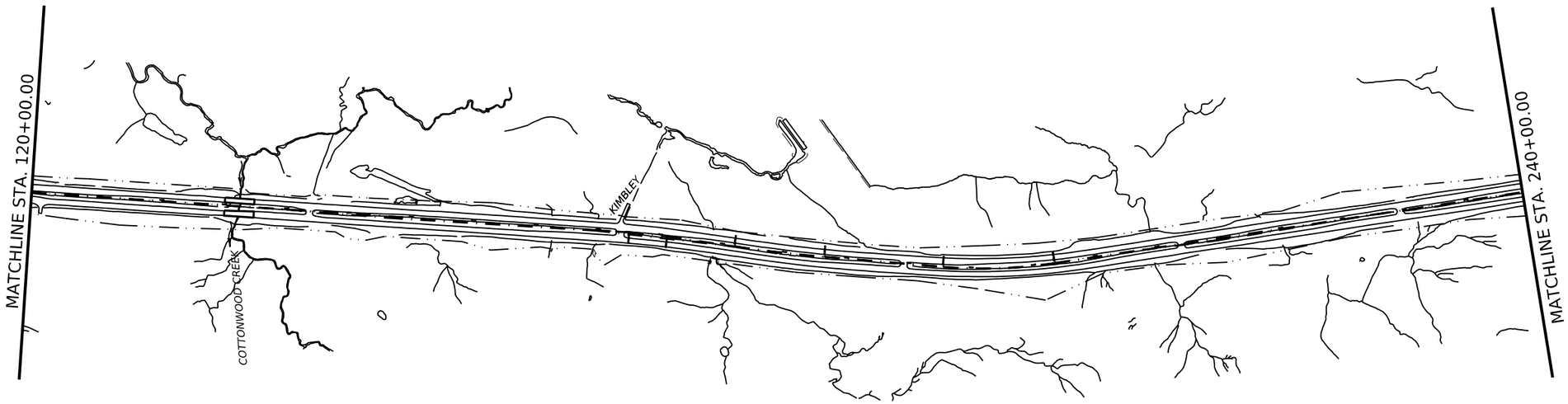
Docusigned by:
Kepha Abongo , P.E. 7/31/2024
Signature of Registrant & Date

Texas Department of Transportation

INDEX OF SHEETS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
KA	6	SEE TITLE SHEET		287
GRAPHICS KA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MF	TEXAS	DALLAS	ELLIS	2
CHECK VM	CONTROL	SECTION	JOB	
	0172	04	050, ETC.	





0 200 1000

SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
139792
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo

8/1/24

Texas Department of Transportation

US 287

PROJECT LAYOUT

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		3

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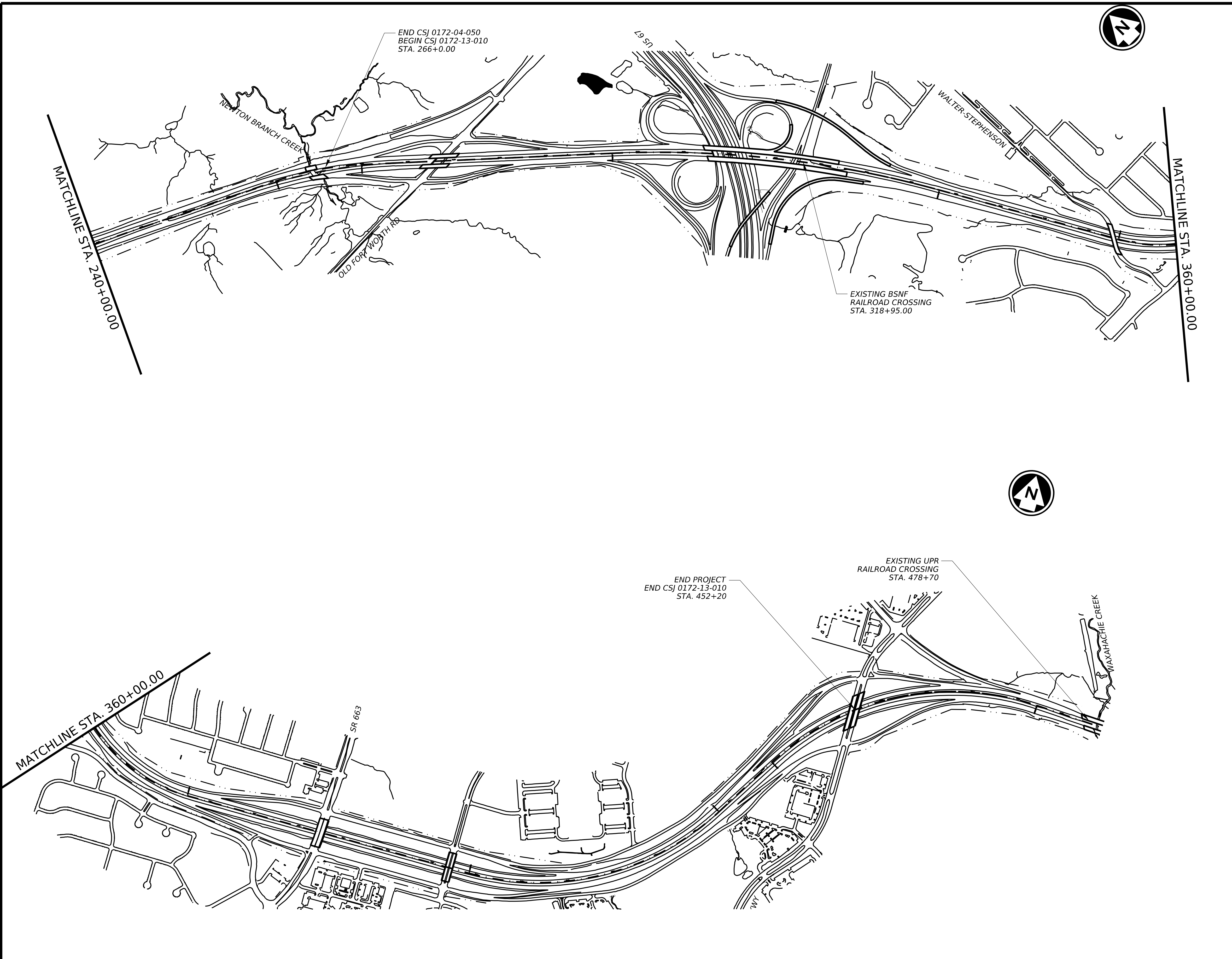

7/30/24

Texas Department of Transportation

US 287

PROJECT LAYOUT

©TxDOT

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		4

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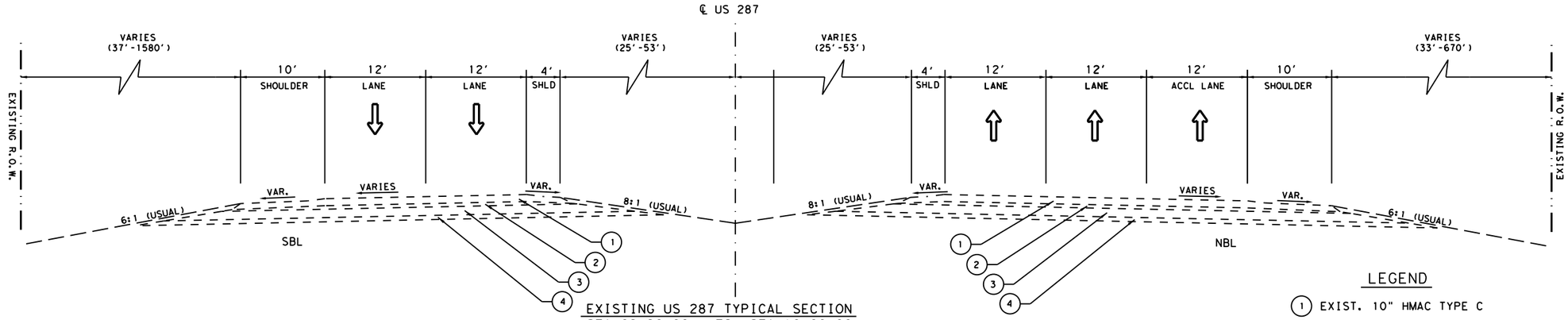
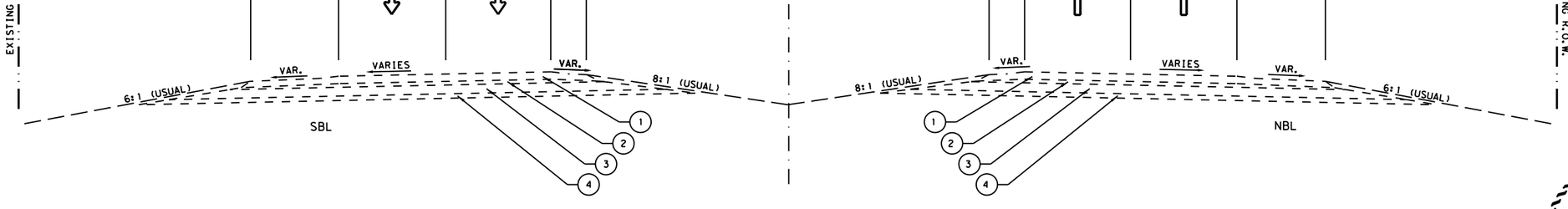


EXISTING US 287 TYPICAL SECTION
STA. 09+90.00 TO STA. 10+00.00
STA. 267+50.00 TO STA. 268+50.00

LEGEND

(1) EXIST. 10" HMAC TYPE C
(2) EXIST. 5" ASPHALT STABILIZED BASE
(3) EXIST. 12" FOUNDATION COURSE
(4) EXIST. 6" LIME TREATED SUBGRADE



EXISTING US 287 TYPICAL SECTION

STA. 10+00.00	TO	STA. 24+70.00
STA. 55+10.00	TO	STA. 60+20.00
STA. 66+30.00	TO	STA. 77+00.00
STA. 89+30.00	TO	STA. 95+50.00
STA. 109+80.00	TO	STA. 112+00.00
STA. 124+00.00	TO	STA. 135+40.00
STA. 138+00.00	TO	STA. 139+30.00
STA. 146+00.00	TO	STA. 162+00.00
STA. 173+50.00	TO	STA. 186+00.00
STA. 195+10.00	TO	STA. 207+00.00
STA. 217+00.00	TO	STA. 225+00.00
STA. 235+10.00	TO	STA. 243+20.00
STA. 253+60.00	TO	STA. 264+10.00
STA. 268+50.00	TO	STA. 277+00.00
STA. 280+70.00	TO	STA. 287+00.00
STA. 295+20.00	TO	STA. 306+40.00
STA. 323+50.00	TO	STA. 326+10.00
STA. 336+10.00	TO	STA. 370+20.00
STA. 419+00.00	TO	STA. 433+00.00
STA. 433+70.00	TO	STA. 452+20.00

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 7/30/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		5

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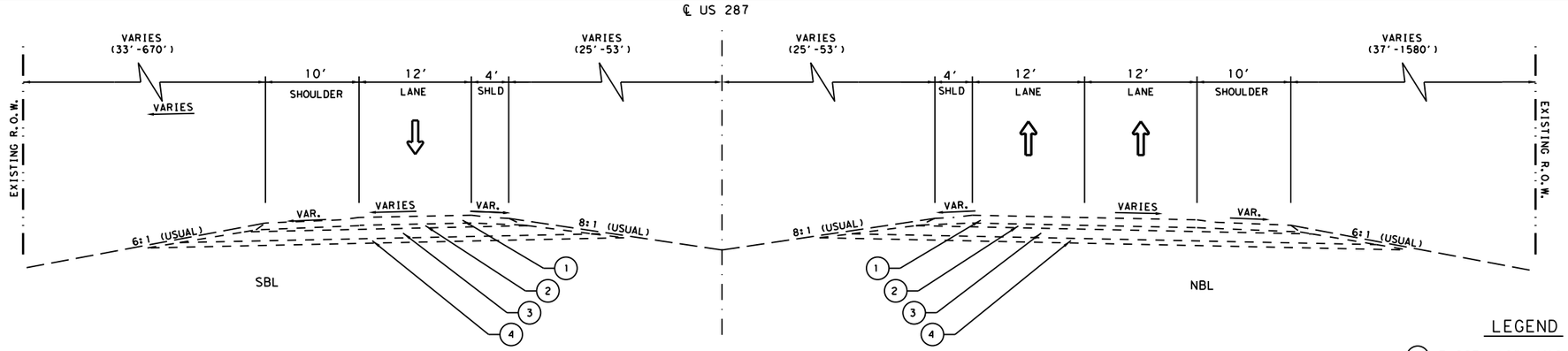
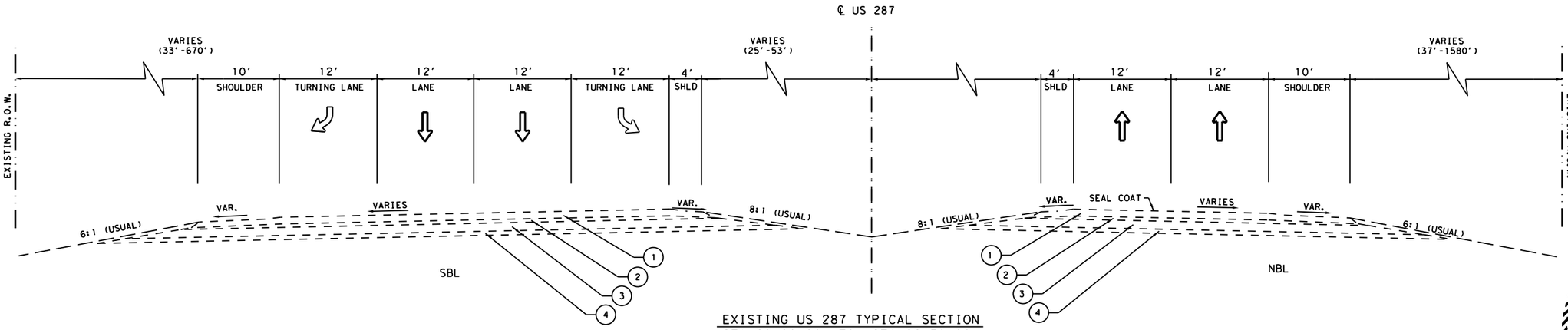


EXISTING US 287 TYPICAL SECTION
STA. 32+40.00 TO STA. 55+10.00

LEGEND

1. EXIST. 10" HMAC TYPE C
2. EXIST. 5" ASPHALT STABILIZED BASE
3. EXIST. 12" FOUNDATION COURSE
4. EXIST. 6" LIME TREATED SUBGRADE



EXISTING US 287 TYPICAL SECTION
STA. 60+20.00 TO STA. 66+30.00

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

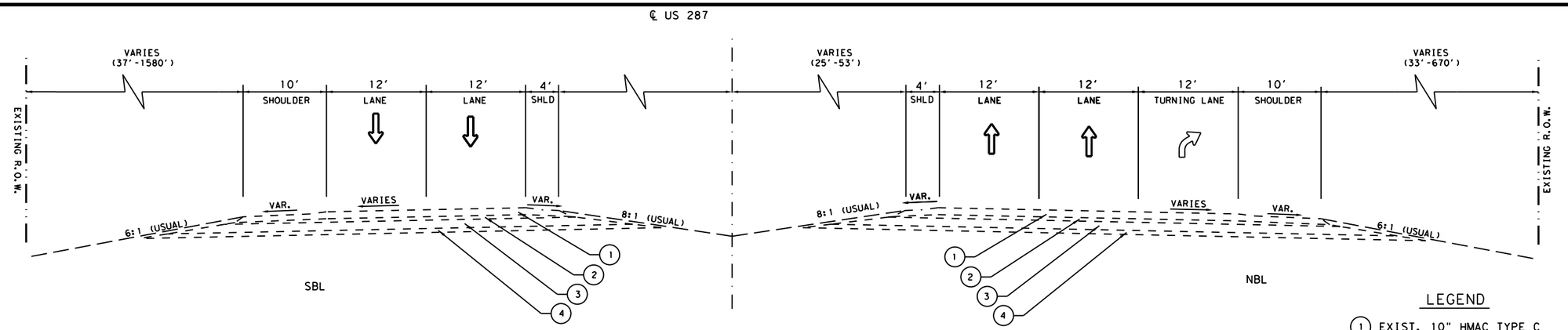
Kepha Abongo , P.E. 7/30/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

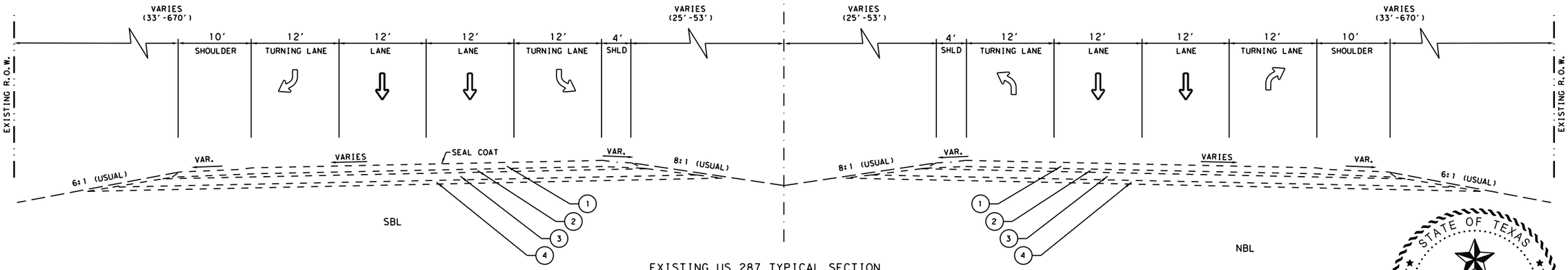
CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		6



EXISTING US 287 TYPICAL SECTION
STA. 77+00.00 TO STA. 83+80.00

LEGEND

1. EXIST. 10" HMAC TYPE C
2. EXIST. 5" ASPHALT STABILIZED BASE
3. EXIST. 12" FOUNDATION COURSE
4. EXIST. 6" LIME TREATED SUBGRADE



EXISTING US 287 TYPICAL SECTION
STA. 95+50.00 TO STA. 106+30.00

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 7/30/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		7

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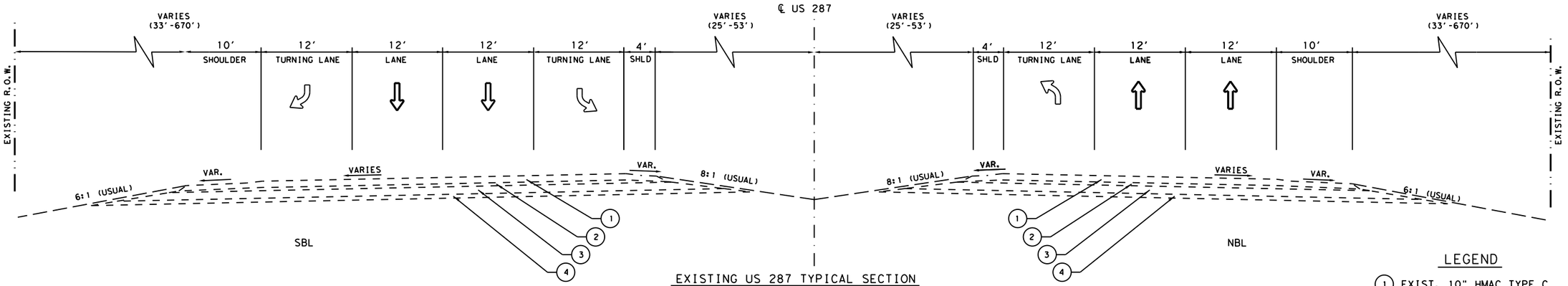
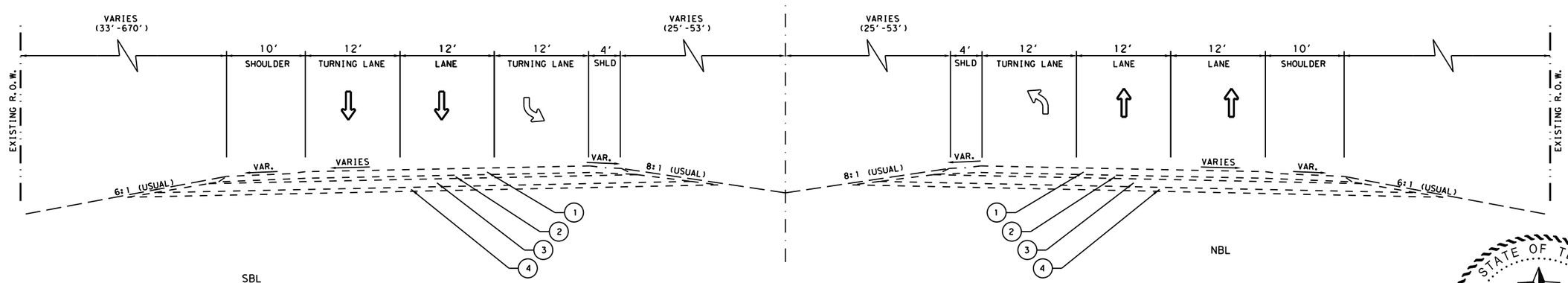


EXISTING US 287 TYPICAL SECTION
STA. 106+30.00 TO STA. 124+00.00

LEGEND

1. EXIST. 10" HMAC TYPE C
2. EXIST. 5" ASPHALT STABILIZED BASE
3. EXIST. 12" FOUNDATION COURSE
4. EXIST. 6" LIME TREATED SUBGRADE



EXISTING US 287 TYPICAL SECTION

STA. 139+50.00	TO	STA. 146+00.00
STA. 186+00.00	TO	STA. 195+10.00
STA. 207+00.00	TO	STA. 217+00.00
STA. 243+20.00	TO	STA. 253+60.00

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 7/30/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		8

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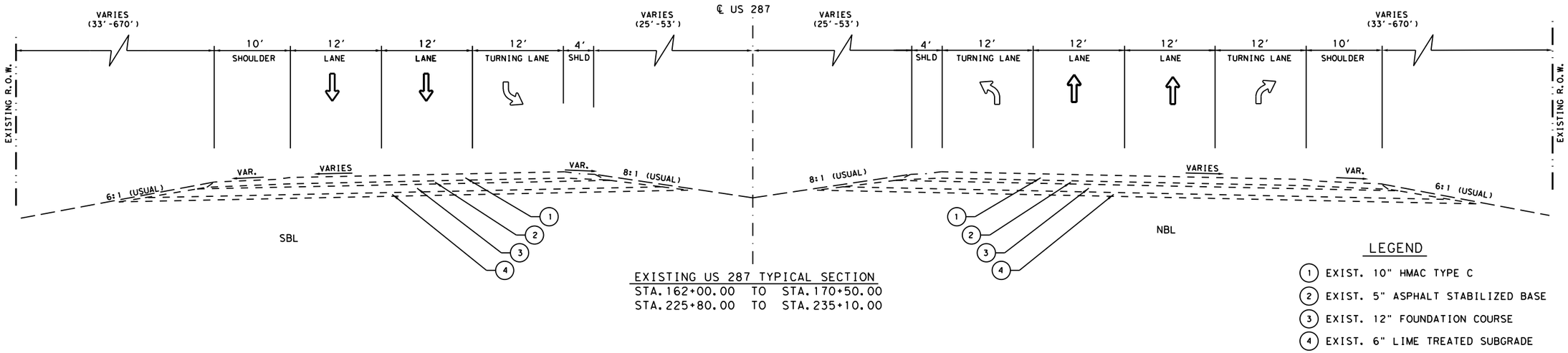
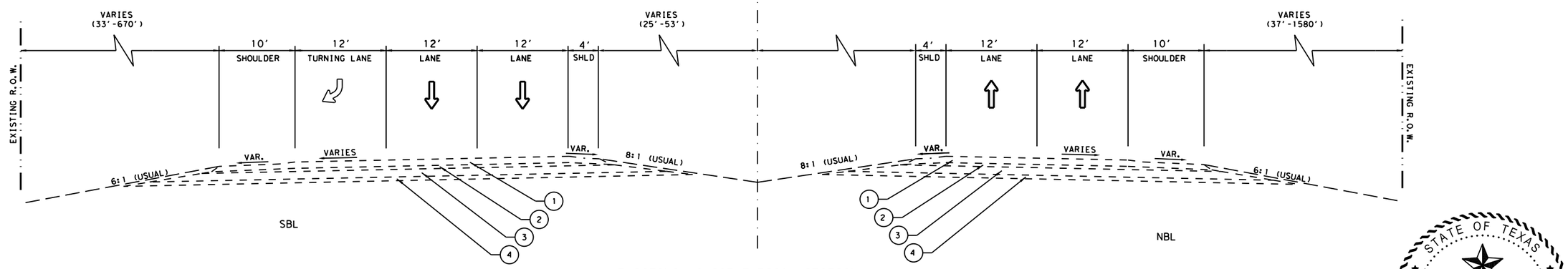


EXISTING US 287 TYPICAL SECTION
STA. 162+00.00 TO STA. 170+50.00
STA. 225+80.00 TO STA. 235+10.00

LEGEND

1. EXIST. 10" HMAC TYPE C
2. EXIST. 5" ASPHALT STABILIZED BASE
3. EXIST. 12" FOUNDATION COURSE
4. EXIST. 6" LIME TREATED SUBGRADE



EXISTING US 287 TYPICAL SECTION
STA. 267+20.00 TO STA. 267+80.00
STA. 294+00.00 TO STA. 295+20.00

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 7/30/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		9

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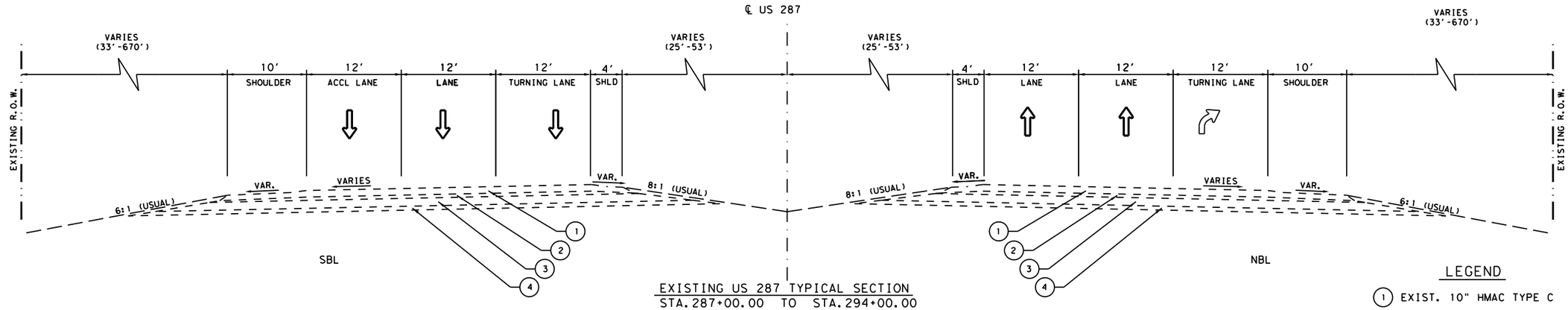
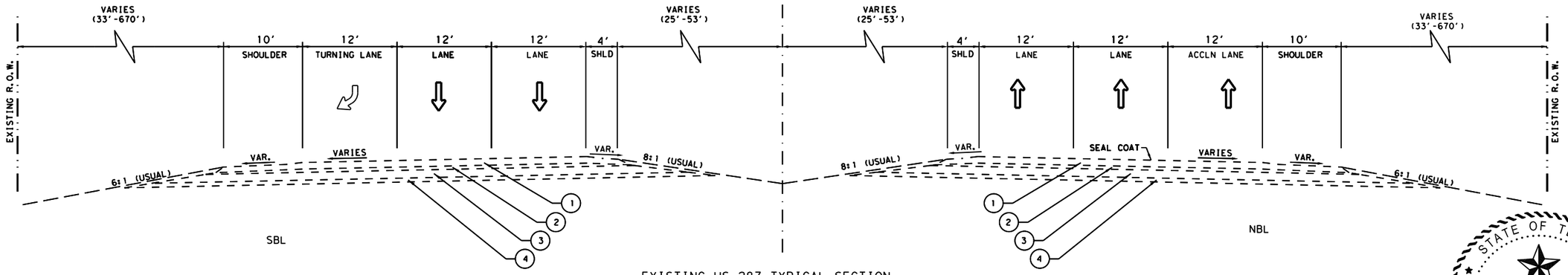


EXISTING US 287 TYPICAL SECTION

STA. 287+00.00	TO	STA. 294+00.00
STA. 306+40.00	TO	STA. 307+20.00
STA. 327+20.00	TO	STA. 336+00.00
STA. 417+00.00	TO	STA. 419+00.00

LEGEND

1. EXIST. 10" HMAC TYPE C
2. EXIST. 5" ASPHALT STABILIZED BASE
3. EXIST. 12" FOUNDATION COURSE
4. EXIST. 6" LIME TREATED SUBGRADE



EXISTING US 287 TYPICAL SECTION

STA. 320+20.00	TO	STA. 373+00.00
STA. 433+00.00	TO	STA. 433+75.00

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 7/30/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		10

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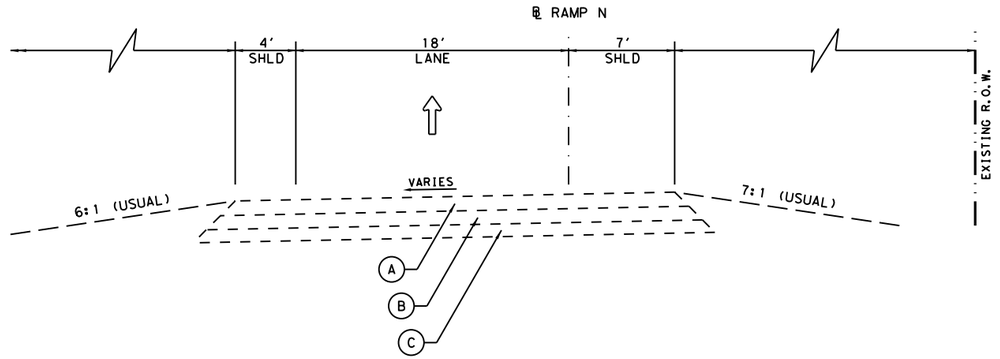

EXISTING US 287 RAMP N TYPICAL SECTION
STA. 2000+00.00 TO STA. 2007+70.00

LEGEND

(A) EXIST. 9.5" HMAC
(B) EXIST. 11" FLEXIBLE BASE
(C) EXIST. 10" LIME TREATED SUBGRADE

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 7/18/2024
Signature of Registrant & Date

Texas Department of Transportation

US 287

EXISTING
TYPICAL SECTIONS

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		11

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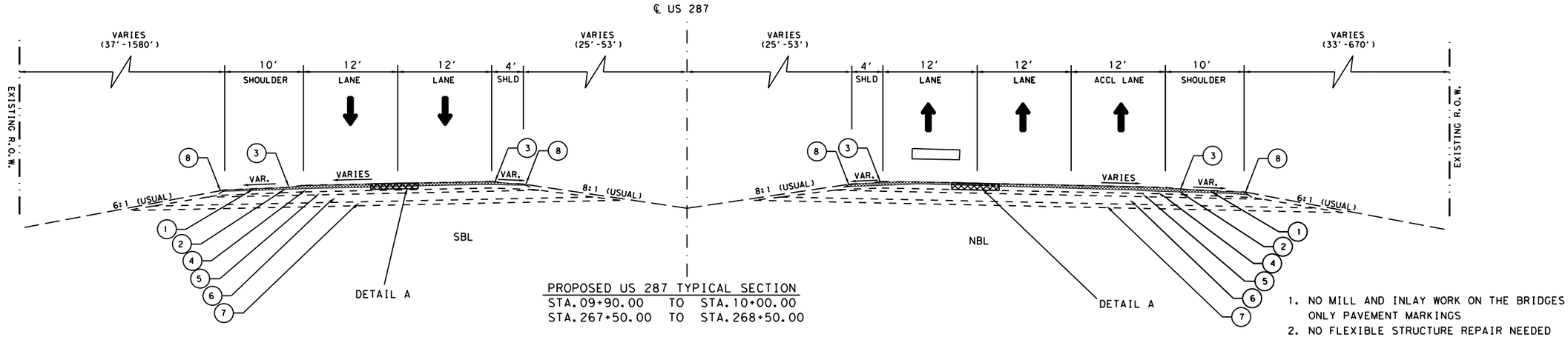
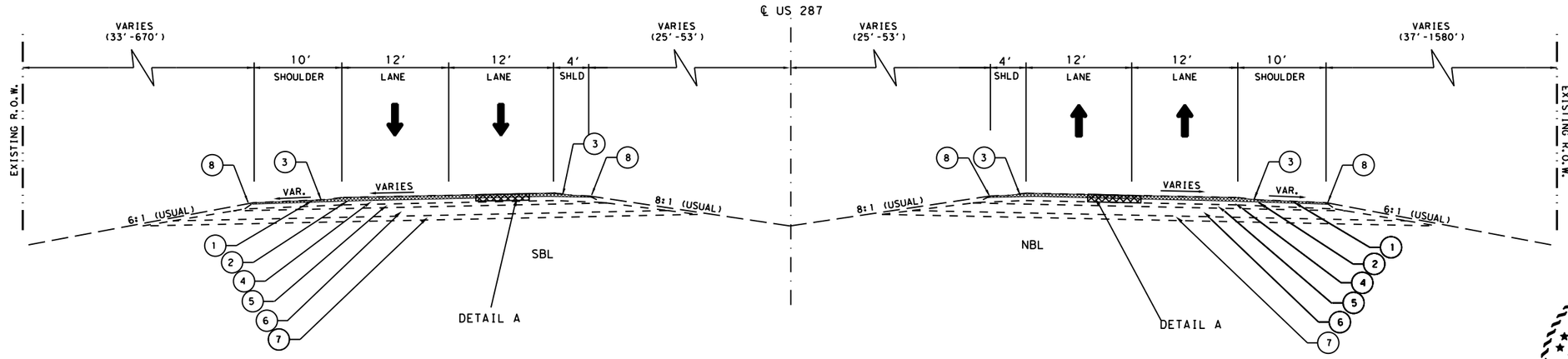


PROPOSED US 287 TYPICAL SECTION
STA. 09+90.00 TO STA. 10+00.00
STA. 267+50.00 TO STA. 268+50.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS



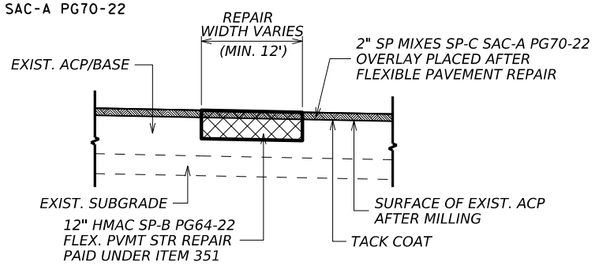
1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

PROPOSED US 287 TYPICAL SECTION

STA. 10+00.00	TO	STA. 24+70.00
STA. 55+10.00	TO	STA. 60+20.00
STA. 66+30.00	TO	STA. 77+00.00
STA. 89+30.00	TO	STA. 95+50.00
STA. 109+80.00	TO	STA. 112+00.00
STA. 124+00.00	TO	STA. 135+40.00
STA. 138+00.00	TO	STA. 139+30.00
STA. 146+00.00	TO	STA. 162+00.00
STA. 173+50.00	TO	STA. 186+00.00
STA. 195+10.00	TO	STA. 207+00.00
STA. 217+00.00	TO	STA. 225+00.00
STA. 235+10.00	TO	STA. 243+20.00
STA. 253+60.00	TO	STA. 264+10.00
STA. 268+50.00	TO	STA. 277+00.00
STA. 280+70.00	TO	STA. 287+00.00
STA. 295+20.00	TO	STA. 306+40.00
STA. 323+50.00	TO	STA. 326+10.00
STA. 336+10.00	TO	STA. 370+20.00
STA. 419+00.00	TO	STA. 433+00.00
STA. 433+70.00	TO	STA. 452+80.00

LEGEND

1. PROP 2" MILL AND 2" SP MIXES SP-C SAC-A PG70-22
2. PROP TACK COAT
3. PROP MILLED RUMBLE STRIP
4. EXIST 8" HMAC
5. EXIST 5" ASHALT STABIIZED BASE
6. EXIST. 12" FOUNDATION COURSE
7. EXIST 6" LIME STABILIZED BASE
8. BACKFILL TYPE A



DETAIL A
FLEXIBLE PAVEMENT REPAIR

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 9/9/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		12

DATE: 9/9/2024 6:01:07 PM
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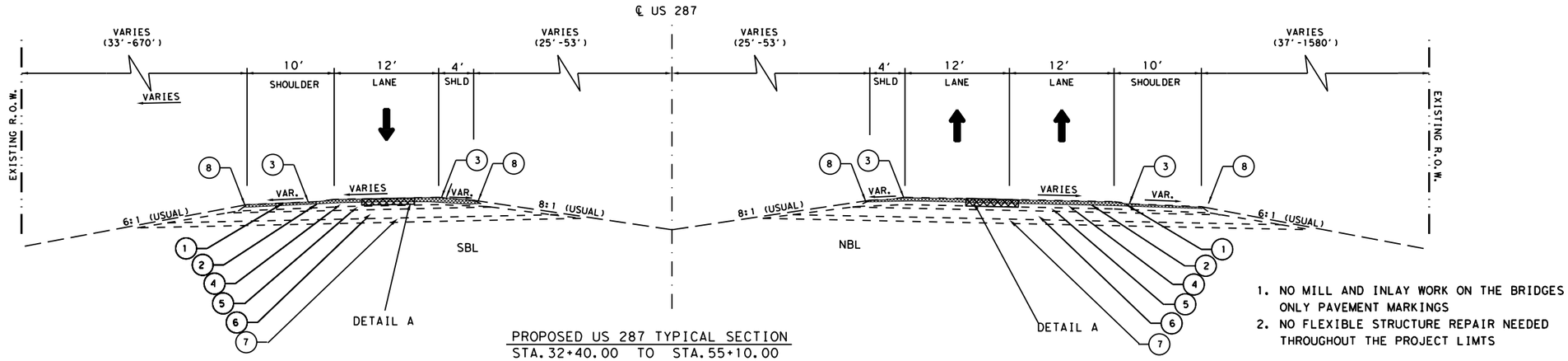
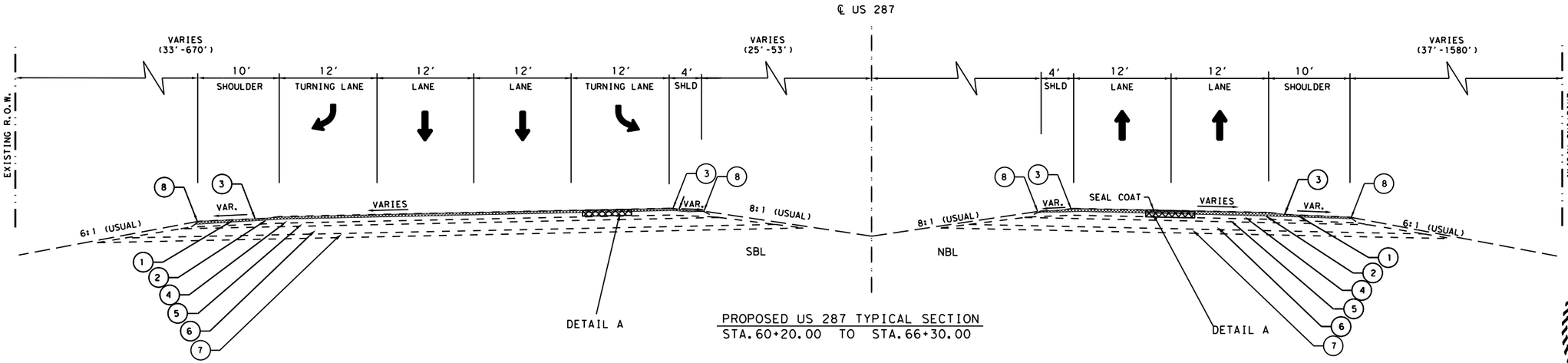


PROPOSED US 287 TYPICAL SECTION
STA. 32+40.00 TO STA. 55+10.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS



PROPOSED US 287 TYPICAL SECTION
STA. 60+20.00 TO STA. 66+30.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

LEGEND

1. PROP 2" MILL AND 2" SP MIXES SP-C SAC-A PG70-22
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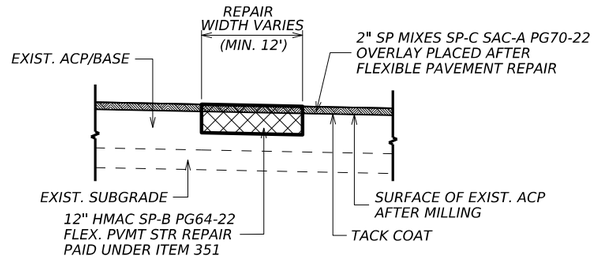
5. EXIST 5" ASHALT STABIIZED BASE
6. EXIST. 12" FOUNDATION COURSE
7. EXIST 6" LIME STABILIZED BASE
8. BACKFILL TYPE A



DETAIL A
FLEXIBLE PAVEMENT REPAIR

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 9/9/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		13

DATE: 9/9/2024 6:01:09 PM
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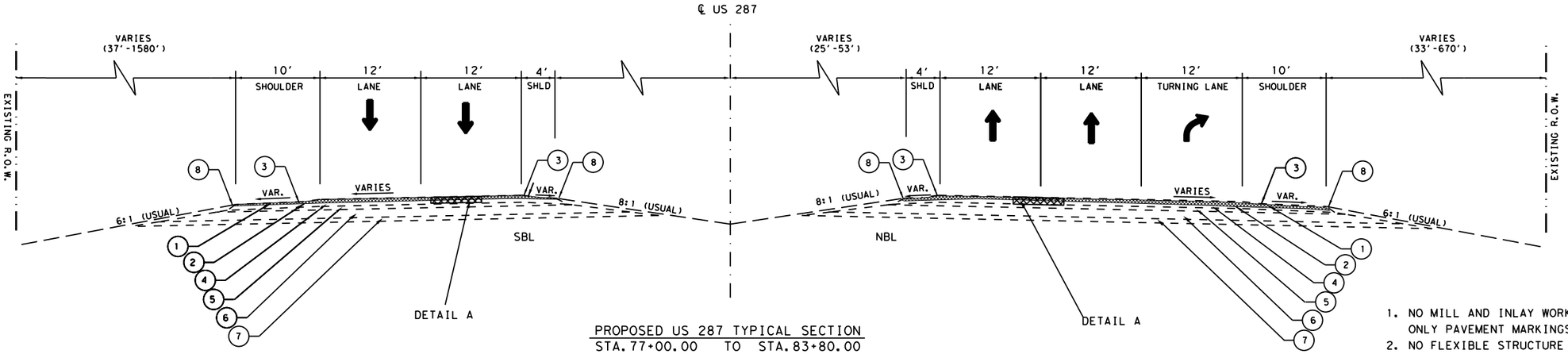
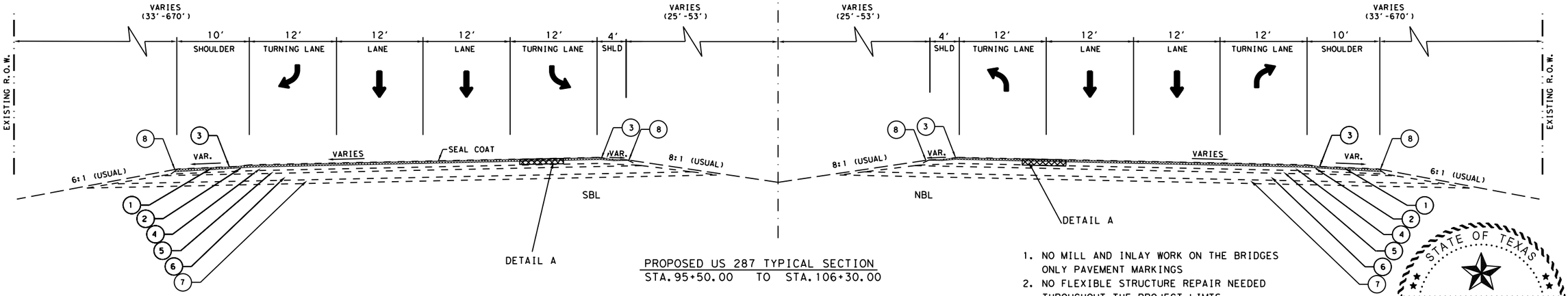


PROPOSED US 287 TYPICAL SECTION
STA. 77+00.00 TO STA. 83+80.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS



PROPOSED US 287 TYPICAL SECTION
STA. 95+50.00 TO STA. 106+30.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

LEGEND

1. PROP 2" MILL AND 2" SP MIXES SP-C SAC-A PG70-22
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5. EXIST 5" ASHALT STABIIZED BASE
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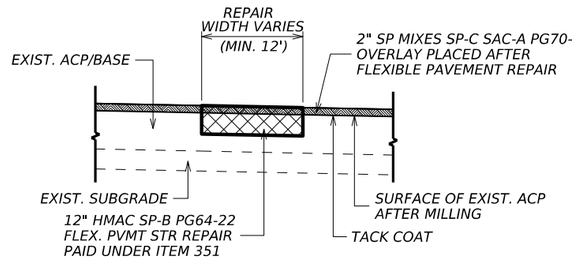
7. EXIST 6" LIME STABILIZED BASE
8. BACKFILL TYPE A



DETAIL A
FLEXIBLE PAVEMENT REPAIR

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 9/9/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

PROPOSED
TYPICAL SECTIONS

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		14

DATE: 9/9/2024 6:01:09 PM
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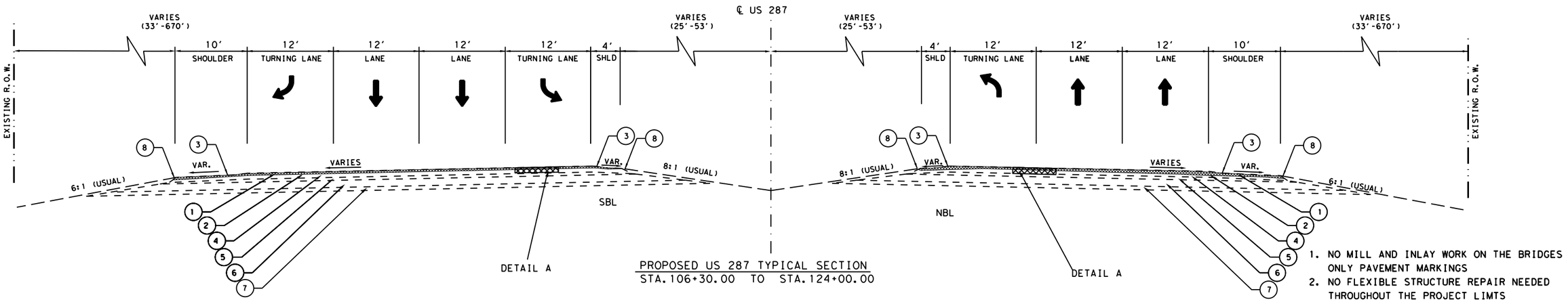
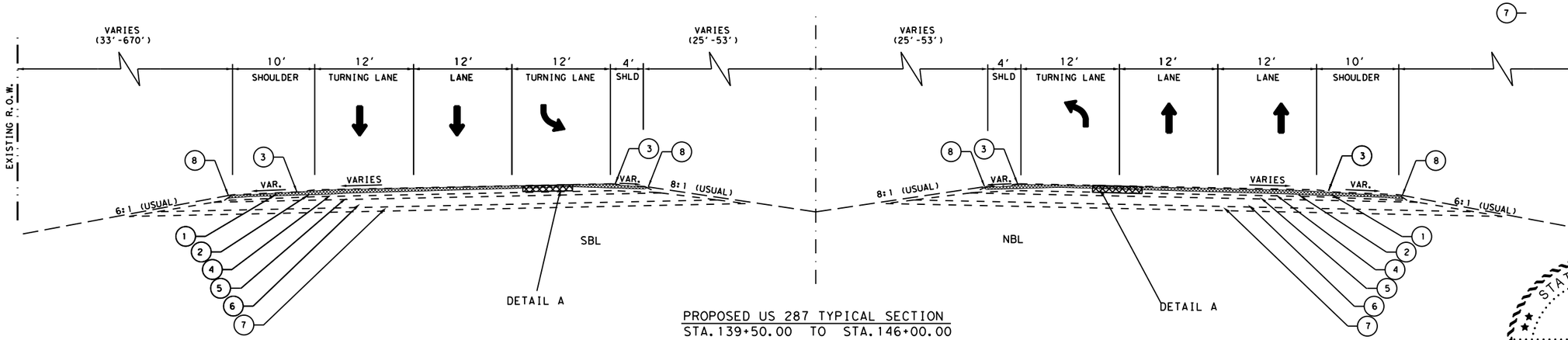


PROPOSED US 287 TYPICAL SECTION
STA.106+30.00 TO STA.124+00.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS



PROPOSED US 287 TYPICAL SECTION

STA.139+50.00	TO	STA.146+00.00
STA.186+00.00	TO	STA.195+10.00
STA.207+00.00	TO	STA.217+00.00
STA.243+20.00	TO	STA.253+60.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

LEGEND

1. PROP 2" MILL AND 2" SP MIXES SP-C SAC-A PG70-22
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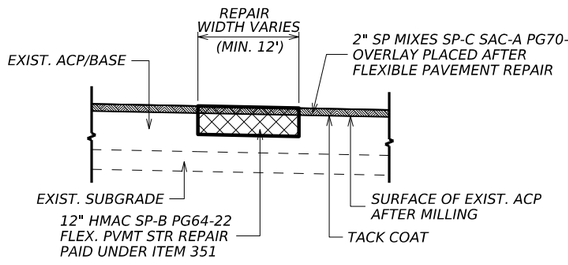
3. PROP MILLED RUMBLE STRIP
4. EXIST 8" HMAC
5. EXIST 5" ASHALT STABIIZED BASE
6. EXIST. 12" FOUNDATION COURSE
7. EXIST 6" LIME STABILIZED BASE
8. BACKFILL TYPE A



DETAIL A
FLEXIBLE PAVEMENT REPAIR

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 9/9/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

PROPOSED TYPICAL SECTIONS

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		15

DATE: 9/9/2024 6:01:10 PM
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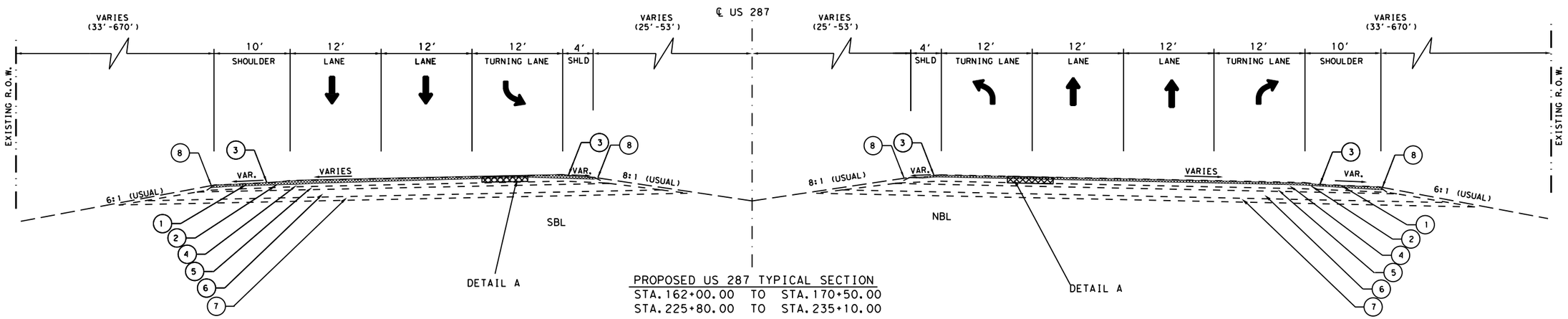
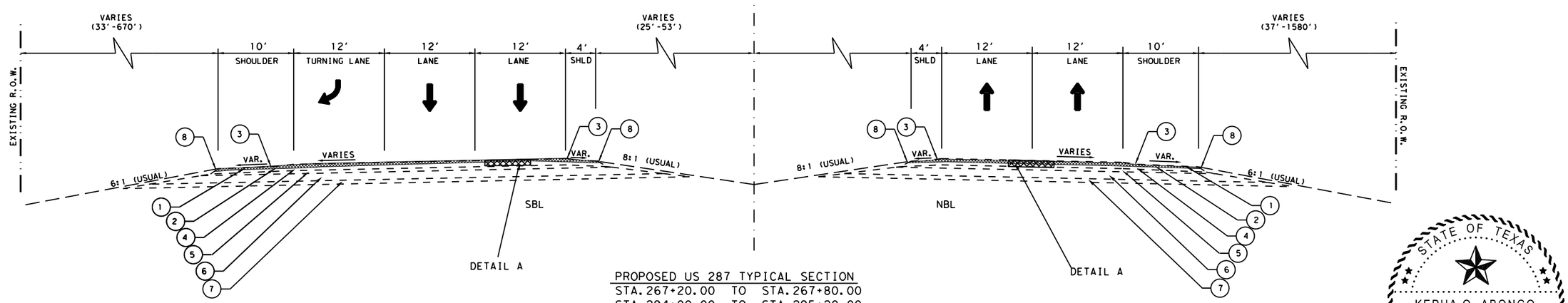


PROPOSED US 287 TYPICAL SECTION
STA. 162+00.00 TO STA. 170+50.00
STA. 225+80.00 TO STA. 235+10.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

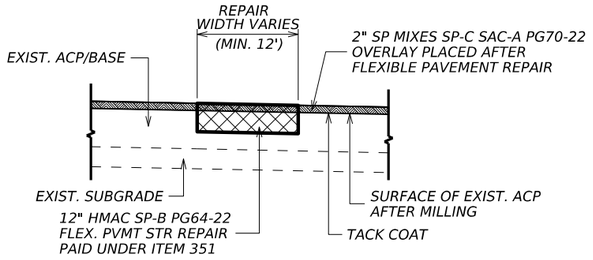


PROPOSED US 287 TYPICAL SECTION
STA. 267+20.00 TO STA. 267+80.00
STA. 294+00.00 TO STA. 295+20.00

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

LEGEND

1. PROP 2" MILL AND 2" SP MIXES SP-C SAC-A PG70-22
2. PROP TACK COAT
3. PROP MILLED RUMBLE STRIP
4. EXIST 8" HMAC
5. EXIST 5" ASHALT STABIIZED BASE
6. EXIST. 12" FOUNDATION COURSE
7. EXIST 6" LIME STABILIZED BASE
8. BACKFILL TYPE A



DETAIL A
FLEXIBLE PAVEMENT REPAIR

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 9/9/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

PROPOSED TYPICAL SECTIONS

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		16

DATE: 9/9/2024 6:01:10 PM
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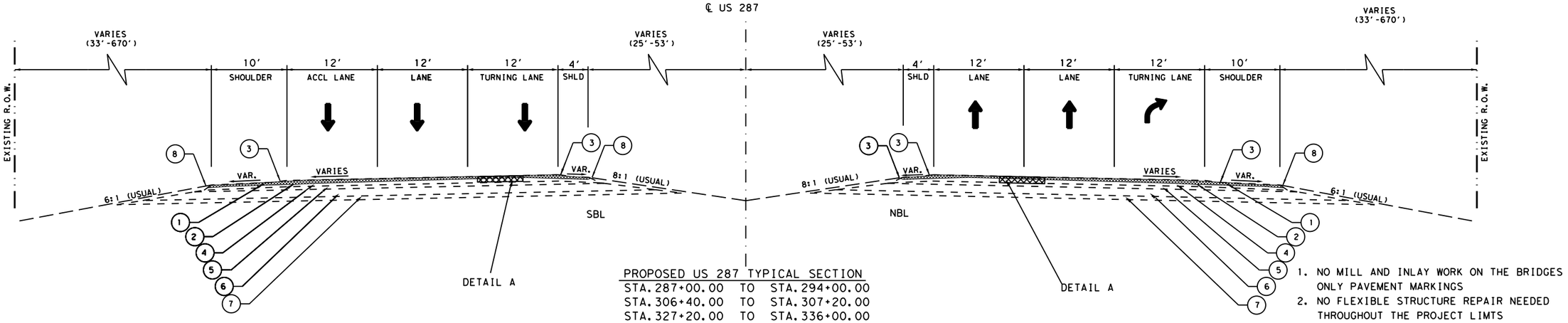
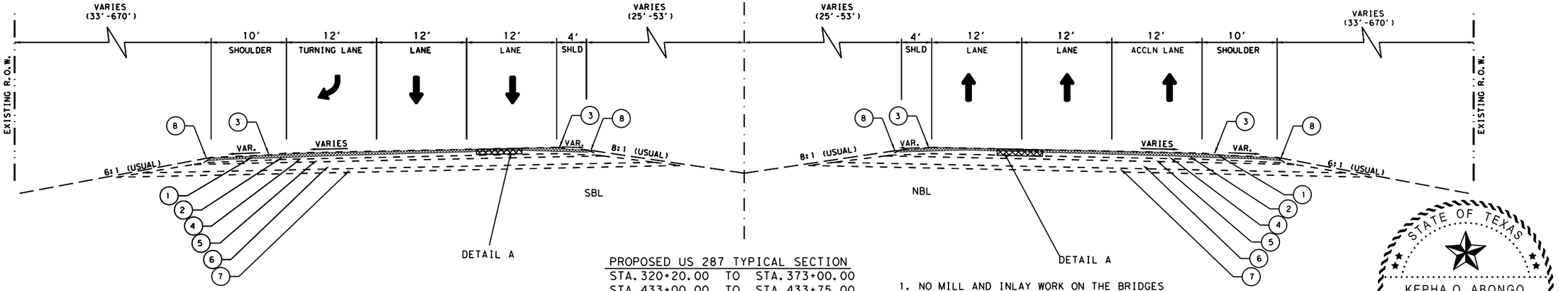


PROPOSED US 287 TYPICAL SECTION

STA. 287+00.00	TO	STA. 294+00.00	
STA. 306+40.00	TO	STA. 307+20.00	
STA. 327+20.00	TO	STA. 336+00.00	
STA. 417+00.00	TO	STA. 419+00.00	

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS



PROPOSED US 287 TYPICAL SECTION

STA. 320+20.00	TO	STA. 373+00.00	
STA. 433+00.00	TO	STA. 433+75.00	

1. NO MILL AND INLAY WORK ON THE BRIDGES ONLY PAVEMENT MARKINGS
2. NO FLEXIBLE STRUCTURE REPAIR NEEDED THROUGHOUT THE PROJECT LIMTS

LEGEND

1. PROP 2" MILL AND 2" SP MIXES SP-C SAC-A PG70-22
2. PROP TACK COAT
3. PROP MILLED RUMBLE STRIP
4. EXIST 8" HMAC
5. EXIST 5" ASHALT STABIIZED BASE
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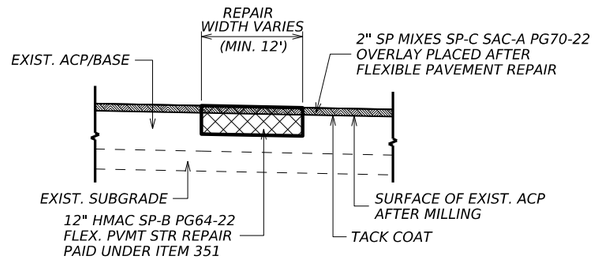
7. EXIST 6" LIME STABILIZED BASE
8. BACKFILL TYPE A



DETAIL A
FLEXIBLE PAVEMENT REPAIR

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 9/9/24
Signature of Registrant & Date

Texas Department of Transportation

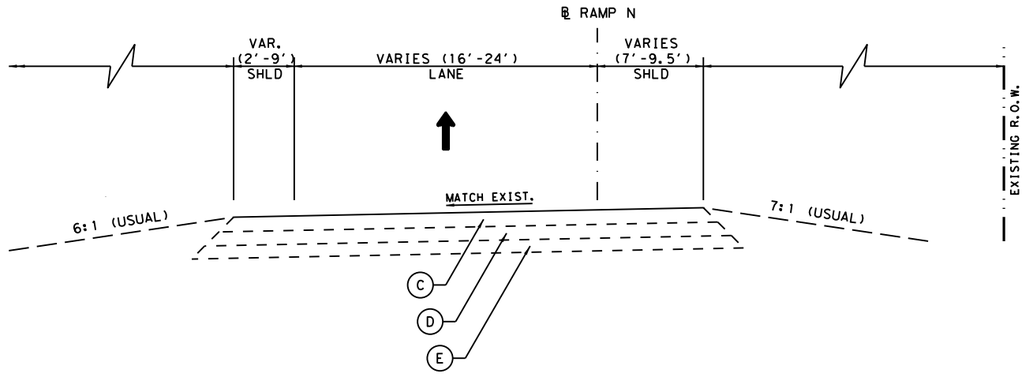
US 287

PROPOSED TYPICAL SECTIONS

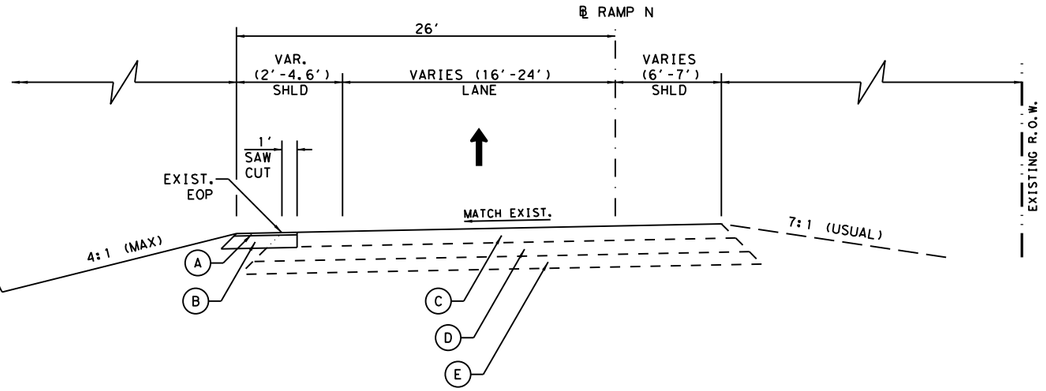
SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		17

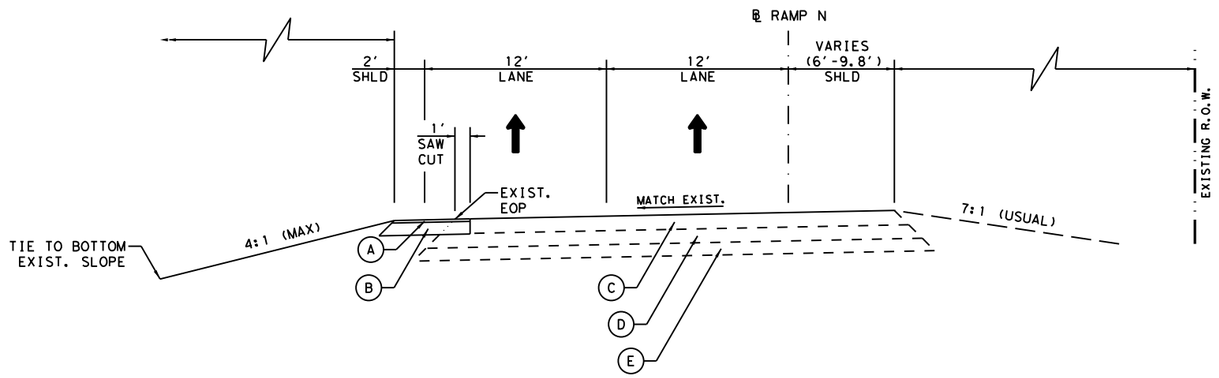
DATE: 9/9/2024 6:01:11 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/1. General/US287 Proposed Sections



PROPOSED US 287 RAMP N TYPICAL SECTION
STA. 2000+00.00 TO STA. 2000+81.50



PROPOSED US 287 RAMP N TYPICAL SECTION
STA. 2000+81.50 TO STA. 2001+83.75



PROPOSED US 287 RAMP N TYPICAL SECTION
STA. 2001+83.75 TO STA. 2007+70.00

LEGEND

- (A) 2" SP MIXES SP-C SAC-A PG70-22
- (B) 10" SP MIXES SP-B PG64-22
- (C) EXIST. 9.5" HMAC
- (D) EXIST. 11" FLEXIBLE BASE
- (E) EXIST. 10" LIME TREATED SUBGRADE

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P. E. 2024-08-01
Signature of Registrant & Date

Texas Department of Transportation

US 287

PROPOSED
TYPICAL SECTIONS

 SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		18

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FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/1. General/Ramp N Proposed Typical.dgn

CK: DW: CK: DW:

SPECIFICATION DATA

Table 1: Basis of Estimate for Permanent Construction					
Item	Description	Thickness	Rate		Quantity
162	Roll Sod	N/A	See Specifications		1560 SY
166 *	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	Ton
168	Vegetative Watering (Warm)**	N/A	12	TGL/Ac/Day	179 TGL
344	SP MIXES	See Plans	110	Lbs./SY/In	63703Ton
344	Tack Coat (Undiluted Application/Spray Rate)	New HMA	0.06	Gal/SY	63390Gal
		Milled HMA	0.11		
Note: (1) Base material weight based on 1.50 Ton/CY (dry- compacted) (2) Asphalt weight based on 110 Lbs./SY/In					

GENERAL

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

The disturbed area for this project, as shown on the plans is ___0.70_____acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project required __no consultation or permitting_with environmental resources agencies. There is a high probability that an environmentally sensitive area could be encountered on the

CSJ:0172-04-050, ETC. Sheet 19

County: Ellis

Highway: US 287

contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 “Project-Specific Locations”, provides a listing of regulatory agencies that may need to be contacted regarding this project.

Install traffic marking signs prior to sealcoat application and remove within three days after placement of traffic markings.

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

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors
or Contractor questions on this project are to be addressed to the following individual(s):

Juan A. Paredes Juan.Paredes@txdot.gov
Elecia Moore Elecia.Moore@txdot.gov

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

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page. The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

Item 5:
Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (214-320-6205) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor’s negligence including, but not limited to, repair or replacement at the Contractor’s expense.
For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Place construction stakes/station markings at intervals of no more than 100 feet or as directed by the Engineer. Place stakes and markings so as not to interfere with normal construction operations.

Submit all shop drawings, working drawings, or other documents which require review sufficiently in advance of scheduled construction to allow no less than thirty (30) calendar days for review and response.

Item 7:
Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Perform all electrical work in accordance with the National Electrical Code and Texas Department of Transportation Specifications.

Consult with appropriate electric company representatives according to their respective area to coordinate electrical services installations.

Holiday restrictions – The Engineer may decide that no lane closures or construction operations shall be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year's Eve and Day (5 am on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (5 am on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (5 am on Friday thru 10:00pm Monday)
- Independence Day (5 am on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (5 am on Friday thru 10:00 pm Monday)
- Thanksgiving Holiday (5 am on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (5 am on December 23 thru 10:00 pm December 26)

No significant traffic generator events identified.

Item 8:
This Project will be a Standard Workweek in accordance with Article 8.3.1.4

Nighttime work is required in accordance with Article 8.3.3.2.1.

Meet weekly with the engineer to notify him or her of planned work for the upcoming week.

Provide the engineer with a daily work schedule of planned work.

Critical Path Method (CPM) schedule in P6 format will be required for this project. Submit baseline schedule and obtain approval prior to beginning construction. The Estimate will be held if monthly schedule update is not submitted.

This project contains a 60 day convinient delay per Item 8 special provisions for Contractor Mobilization.

Per Item 8 special provisions, this project contains Lane Assessment Fees, see table (s) under Item 502.

CSJ:0172-04-050, ETC. **Sheet 19A**

County: Ellis

Highway: US 287

Item 104:
In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planing or grinding is considered an acceptable method at these locations. Measurement and payment is in accordance with this item.

Sawing of concrete is not paid for directly, but is considered subsidiary to this item.

Items 105.:
Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

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

Properly dispose of unsalvageable material at your own expense.

Item 110:
Excavated shale is not an acceptable material for embankment.

Items 110 and 132:
Scarify and loosen the excavated areas, unpaved surface areas, except rock, to a depth of at least 8 inches and compact in accordance with the specifications.

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

Item 132:
Furnish materials per item 132 TY C2 that conforms to the requirements of selected backfill per Item 423.2.4.2 TY AS.

Item 134:
Start backfilling pavement edges as soon as possible after the surface course is started.

Backfill and compact the pavement edges to produce a smooth surface adjacent to the pavement with no vertical edges.

Use Type "A" material to backfill pavement edges as shown in plans. Type "A" material shall consist of suitable material that when compacted will support the pavement edge. Rap is considered suitable Type "A" material.
Emulsion rate=0.15 Gal/SY residual. This work, materials and equipment shall be subsidiary to Item 134.

Item 160:
Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than six inches below natural grade as topsoil.

Item 161:
Provide tickets representing quantity of compost delivered to site.

Item 301:
Provide liquid antistripping agents unless otherwise directed. Add the minimum dosage determined by the manufacturer or higher dosage determined by design requirement and try subsequent trials at 0.25% increments.

Item 320:
Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV's remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

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

Item 344:
Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class A.

Items 354:
Stockpile the asphalt pavement at TxDOT yard located at the corner of Business 287 and US 287 near Mueller Inc. in Waxahachie, TX (32.361065 N, 96.804316 W). Place the asphalt pavement material in a stockpile that meets the dimensions and requirements designated by the engineer.

Stockpile materials in uniform piles up to 15 feet in height unless otherwise instructed. Furnish adequate equipment at the stockpile to keep and leave the materials in a neat and orderly manner.

Slope longitudinal faces greater than 1 ¼" to a minimum of 1:1 slope at the end of the work period if traffic is able to traverse the joint. Slope transverse tapers to a minimum of 36:1 at the end of the workday. Remove the taper prior to continuing the milling.

For open shoulder sections, plane the asphalt so the flow of water is not impeded at the shoulder edge or across the surface. Added planing up to three feet in width outside the lines and grades of the plans, necessary to provide proper drainage, will be subsidiary to the bid item.

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

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

CSJ:0172-04-050, ETC. **Sheet 19B**

County: Ellis

Highway: US 287

Item 502:
The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

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

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

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

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

Provide rectangular shape (CW12-2a) Temporary Clearance Signs on all bridges where the existing vertical clearance has changed. Install Signs to the satisfaction of the Engineer prior to opening to traffic. Plywood sign blanks will have minimum dimensions of 84" X 24". Work performed and materials are subsidiary to this item.

Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the engineer.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

As approved by the Engineer, provide uniformed off duty police officers that are licensed peace officers in the State of Texas during lane or ramp closures, night time work or other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement. Complete the weekly tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided. Reimbursement will not be made for coordination fees charged by any party.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate permanently affixed red and blue flashing lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Red and Blue flashing lights will be high intensity and visible from all angles.

The Contractor may begin closing 1 Lane of the *NBML/SBML's* at 9:00 PM open by 6:00 AM. Full Freeway closures are not allowed.

The lane closure assessment fee is shown on the following table. The fee applies to the Contractor for closures that are outside the times specified above for each hour, regardless of the length of the lane closure or obstruction.

Lane Closure Assessment Fees

*No. of ML's Closed	**Cost Deduction/Hr
1	$ 5,000.00

*Main Lanes include all Thru lanes and turn lanes including HOV/Managed Lanes

**Deducted costs will be prorated by rounding up to the nearest 15-minute increment

Item 505:
The total number of truck mounted attenuators (TMAs) or trailer attenuators (TAs) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario	Required TMA/TA
(1-1)-18		1
(1-5)-18		1

TCP 2 Series	Scenario	Required TMA/TA
(2-1)-18 / (2-6)-18	All	1

TCP 3 Series	Scenario			Required TMA/TA
(3-2)-13	All			3
(3-3)-14	A	B	D	2
	C			3
(3-4)-13	All			1, unless working inside a twltl, then 2.

TCP 5 Series	Scenario		Required TMA/TA
(5-1)-18	A	B	1

CSJ:0172-04-050, ETC. **Sheet 19C**

County: Ellis

Highway: US 287

TCP 6 Series	Scenario		Required TMA/TA	
(6-1)-12	A	B	1	2
(6-2)-12 / (6-3)-12	All		1	
(6-4)-12	A	B	1	2
(6-5)-12	A	B	1	2
(6-8)-14	All		1	

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

Stationary TMA's/TA's will be only paid for by the operations classified in theTCP sheets as short term, short term stationary, intermediate term stationary and long term stationary. Mobile TMA's/TA's will only be paid for by the operations classified in the TCP standards as mobile operations. TMA's/TA's used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

Item 506:
Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

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

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

Item 556:
The unit price bid per linear foot of "pipe underdrain" shall include the cost of making connections to storm sewer lines.

Place bell and spigot type pipe with an open joint of approximately ¾ inch.

In the event that Type 5 Underdrain Pipe is bid, make the connection as shown in the plans. The cost of making the connection will be considered subsidiary to this item.

The requirements for decantation of filter material are deleted for this project.

Item 585:
Use Surface Test Type B pay adjustment schedule _3__ on the travel lanes.

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

Use Surface Test Type B on the ramps.

Item 658:
Provide a flat mount delineator for guard fence attachment meeting the following requirements. 33 in. in length and be flattened and sealed on each end enabling mounting height to be consistent without the use of a tape measure. Post will be a minimum of 2-3/8 in. outside diameter composed of recycled tire rubber and post-consumer materials. Post will be permanently sealed at the top and be a minimum of 3 in. wide and capable of displaying a 3-in. wide by 12 in. long piece of reflective sheeting.

Surface Mount posts shall be the three-piece Flexible Delineator Post System, utilizing a 2-3/8” round post with a square to round flexible joint. The Base shall have 6 mounting holes to accommodate for mounting on narrow headwalls as well as all surfaces. The Posts shall be permanently sealed at the top and have a 3-1/2” wide x 13" flattened surface to accommodate up to a 3" x 12" reflective sheet on both sides.

Items 662 and 672:
Black adhesive will be used on asphalt pavements and white adhesive will be used on concrete pavements.

Place all pavement markers in proper alignment with the guides. The maximum deviation rate in alignment is 1 in. per 200 ft. of roadway. The maximum deviation is to not exceed 2 in. or be abrupt.

Removal of old existing adhesive material, bituminous or epoxy is required on concrete surfaces.

Removal is subsidiary to this Item.

Removed Raised Pavement Markers and adhesives are property of the Contractor and will be disposed of at a State approved site off Department property.

CSJ:0172-04-050, ETC. Sheet 19D

County: Ellis

Highway: US 287

Bituminous adhesive will not be allowed on concrete pavement.

Item 677:
A water blasting method approved by the Engineer will be the only method allowed for the removal of permanent and temporary pavement markings except on a sealcoat surface. A 2 foot wide sealcoat will be required on sealcoat surfaces to eliminate permanent and temporary pavement markings.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0172-04-050 **DISTRICT** Dallas **COUNTY** Ellis
HIGHWAY US 287

			CONTROL SECTION JOB		**0172-04-050**		**0172-13-010**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00196244**		**A00196242**			
			COUNTY		**Ellis**		**Ellis**			
			HIGHWAY		**US 287**		**US 287**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	104-7006	REMOV CONC (RIPRAP)		SY	1,560.000				1,560.000	
	105-7040	RMV (20") TRT/UNTRT BASE & ASPH PAV		SY			77.000		77.000	
	110-7001	EXCAV (ROADWAY)		CY	5,290.000		145.000		5,435.000	
	132-7010	EMBANK (FNL)(DC)(TY C2)		CY	5,290.000				5,290.000	
	134-7001	BACKFILL (TY A)		STA	238.000		168.000		406.000	
	161-7002	COMPOST MANUF TOPSOIL (4")		SY			1,200.000		1,200.000	
	162-7008	ROLL SODDING		SY			1,200.000		1,200.000	
	168-7001	VEGETATIVE WATERING		TGL			179.000		179.000	
	344-7001	SP MIXES SP-B PG64-22		TON			264.000		264.000	
	344-7020	SP MIXES SP-C SAC-A PG70-22		TON	31,522.000		31,917.000		63,439.000	
	344-7077	TACK COAT		GAL	31,522.000		31,868.000		63,390.000	
	351-7011	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")		SY	5,000.000				5,000.000	
	354-7051	PLANE ASPH CONC PAV(2")		SY	286,562.000		289,701.000		576,263.000	
	432-7007	RIPRAP (CONC) (CL B) (4 IN)		CY	188.000				188.000	
	500-7001	MOBILIZATION		LS	0.580		0.420		1.000	
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	7.000		5.000		12.000	
	503-7002	PORTABLE CHANGEABLE MESSAGE SIGN		EA	2.000				2.000	
	505-7001	TMA (STATIONARY)		DAY	132.000		95.000		227.000	
	505-7002	TMA (MOBILE OPERATION)		HR	93.000		67.000		160.000	
	506-7039	TEMP SEDMT CONT FENCE (INSTALL)		LF	150.000		150.000		300.000	
	506-7041	TEMP SEDMT CONT FENCE (REMOVE)		LF	150.000		150.000		300.000	
	506-7044	BIODEG EROSN CONT LOGS (INSTL) (12")		LF	500.000		500.000		1,000.000	
	506-7046	BIODEG EROSN CONT LOGS (REMOVE)		LF	500.000		500.000		1,000.000	
	533-7001	MILL RUMBLE STRIPS (ASPHALT) (SHLDR)		LF	95,124.000		67,144.000		162,268.000	
	556-7008	PIPE UNDERDRAINS (TY 8) (6")		LF	440.000				440.000	
	644-7065	RELOCATE SM RD SN SUP&AM TY 10BWG		EA			2.000		2.000	
	647-7002	RELOCATE LRSA		EA			1.000		1.000	
	658-7012	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB		EA	38.000		38.000		76.000	
	658-7031	INSTL DEL ASSM (D-SY)SZ 1(BRF)CTB		EA	38.000		38.000		76.000	
	662-7112	WK ZN PAV MRK SHT TERM (TAB)TY W		EA	9,671.000		5,796.000		15,467.000	
	662-7113	WK ZN PAV MRK SHT TERM (TAB)TY Y		EA	3,828.000		2,475.000		6,303.000	
	666-7018	REFL PAV MRK TY I (W)8"(DOT)(100MIL)		LF	3,240.000		1,440.000		4,680.000	
	666-7024	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF	7,647.000		7,953.000		15,600.000	
	666-7036	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF	235.000		205.000		440.000	
	666-7042	REFL PAV MRK TY I (W)(ARROW)(100MIL)		EA	18.000		8.000		26.000	
	666-7066	REFL PAV MRK TY I (W)(WORD)(100MIL)		EA	18.000		8.000		26.000	
	666-7087	REF PAV MRK TY I(W)18"(YLD TRI)(100MIL)		EA	150.000				150.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0172-04-050 **DISTRICT** Dallas **COUNTY** Ellis
HIGHWAY US 287

			CONTROL SECTION JOB		**0172-04-050**		**0172-13-010**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00196244**		**A00196242**			
			COUNTY		**Ellis**		**Ellis**			
			HIGHWAY		**US 287**		**US 287**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	666-7347	PAVEMENT SLER 6"		LF	8,230.000		8,253.000		16,483.000	
	666-7408	REFL PAV MRK TY I (W)6"(BRK)(100MIL)		LF	18,169.000		24,033.000		42,202.000	
	666-7411	REFL PAV MRK TY I (W)6"(SLD)(100MIL)		LF	59,902.000		60,508.000		120,410.000	
	666-7423	REFL PAV MRK TY I (Y)6"(SLD)(100MIL)		LF	72,919.000		47,146.000		120,065.000	
	672-7006	REFL PAV MRKR TY II-C-R		EA	921.000		315.000		1,236.000	
	677-7001	ELIM EXT PM & MRKS (4")		LF	8,230.000		8,253.000		16,483.000	
	678-7002	PAV SURF PREP FOR MRK (6")		LF	8,230.000		9,909.000		18,139.000	
	678-7004	PAV SURF PREP FOR MRK (8")		LF			172.000		172.000	
	678-7008	PAV SURF PREP FOR MRK (24")		LF			24.000		24.000	
	5000-7001	GEOGRID REINFORCE EMBANKMENTS (TY A)		SY	2,870.000				2,870.000	
	08	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (NON-PART)		LS	1.000				1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (NON-PART)		LS	1.000				1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (NON-PART)		LS	1.000				1.000	
		CONTRACTOR FORCE ACCOUNT WORK (NON-PART)		LS	1.000				1.000	

SUMMARY SHEET

CSJ	0104-7006	0105-7040	0110 -7001	0132 -7010	134-7001	0161-7002	0162-7008	0168-7001	0344-7001	344-7020
	REMOVING CON (RIPRAP)	RMV (20") TRT/UNTRT BASE & ASPH PAV	EXCAVATION (ROADWAY)	EMBANKMENT (FNL)(DC)(TY C2)	BACKFILL (TY A)	COMPOST MANUF TOPSOIL (4")	ROLL SODDING	VEGETATIVE WATERING	SP MIXES SP-B PG64-22	SP MIXES SP-C SAC-A PG70-22
	SY	SY	CY		STA	SY	SY	TGL	TON	TON
0172-04-050	1,560.000		5,290.000	5,290.000	238.000					31,522.000
0172-13-010		77.000	145.000		168.000	1,200.000	1,200.000	179.000	264.000	31,917.000
TOTAL	**1,560.000**	**77.000**	**5,435.000**	**5,290.000**	**406.000**	**1,200.000**	**1,200.000**	**179.000**	**264.000**	**63,439.000**

CSJ	344-7077	351-7011	354-7051	0432- 7007	500-7001	502-7001	503-7002	505-7001	505-7002	506-7039
	TACK COAT	FLEXIBLE PAVEMENT STRUCTIRE REPAIR (12")	PLANE ASPH CONC PAV(2")	RIPRAP (CONC)(CL B)(4IN)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)	TEMP SEDMT CONT FENCE (INSTALL)
	GAL	SY	SY	CY	LS	MO	EA	DAY	HR	LF
0172-04-050	31,522.000	5,000.000	286,562.000	188.000	0.580	7.000	2.000	132.000	93.000	150.000
0172-13-010	31,868.000		289,701.000		0.420	5.000		95.000	67.000	150.000
TOTAL	**63,390.000**	**5,000.000**	**576,263.000**	**188.000**	**1.000**	**12.000**	**2.000**	**227.000**	**160.000**	**300.000**

CSJ	506-7041	506-7044	506-7046	533-7001	0556 -7008	0644-7065	0647-7002	658-7012	658-7031
	TEMP SEDMT CONT FENCE (REMOVE)	BIOG EROSION CONTROL LOGS (INSTALL)	BIOG EROSION CONTROL LOGS (REMOVE)	MILL RUMBLE STRIPS (ASPHALT) (SHLDR)	PIPE UNDERDRAINS (TY 8)(6")	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE LRSA	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB	INSTL DEL ASSM (D-SY)SZ 1(BRF)CTB
	LF	LF	LF	LF	LF	EA	EA	EA	EA
0172-04-050	150.000	500.000	500.000	95,124.000	440.000			38.000	38.000
0172-13-010	150.000	500.000	500.000	67,144.000		2.000	1.000	38.000	38.000
TOTAL	**300.000**	**1,000.000**	**1,000.000**	**162,268.000**	**440.000**	**2.000**	**1.000**	**76.000**	**76.000**

CSJ	662-7112	662-7113	666-7018	666-7024	666-7036	666-7042	666-7066	666-7087	666-7347
	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	REFL PAV MRK TY I (W)(ARROW)(100MIL)	REFL PAV MRK TY I (W)(WORD)(100MIL)	REF PAV MRK TY I(W)18"(YLD TRI)(100MIL)	PAVEMENT SLER 6"
	EA	EA	LF	LF	LF	EA	EA	EA	LF
0172-04-050	9,671.000	3,828.000	3,240.000	7,647.000	235.000	18.000	18.000	150.000	8,230.000
0172-13-010	5,796.000	2,475.000	1,440.000	7,953.000	205.000	8.000	8.000		8,253.000
TOTAL	**15,467.000**	**6,303.000**	**4,680.000**	**15,600.000**	**440.000**	**26.000**	**26.000**	**150.000**	**16,483.000**

CSJ	666-7408	666-7411	666-7423	672-7006	677-7001	678-7002	678-7004	678-7004	5000- 7001
	REFL PAV MRK TY I (W)6"(BRK)(100MIL)	REFL PAV MRK TY I (W)6"(SLD)(100MIL)	REFL PAV MRK TY I (Y)6"(SLD)(100MIL)	REFL PAV MRKR TY II-C-R	ELIM EXT PM & MRKS (4")	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (8")	GEOGRID REINFORCE EMBANKMENTS (TY A)
	LF	LF	LF	EA	LF	LF	LF	LF	SY
0172-04-050	18,169.000	59,902.000	72,919.000	921.000	8,230.000	8,230.000			2,870.000
0172-13-010	24,033.000	60,508.000	47,146.000	315.000	8,253.000	9,909.000	172.000	172.000	
TOTAL	**42,202.000**	**120,410.000**	**120,065.000**	**1,236.000**	**16,483.000**	**18,139.000**	**172.000**	**172.000**	**2,870.000**

Texas Department of Transportation

US 287

SUMMARY SHEET

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		21

DATE: 9/9/2024 5:28:17 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/1. General/US287_Summary_Sheet.dgn

THE FOLLOWING SEQUENCE OF WORK IS THE SUGGESTED METHOD OF PROSECUTION OF THE CONSTRUCTION ACTIVITIES OF THIS PROJECT. THIS SEQUENCE OF WORK MAY BE REVISED WITH THE APPROVAL OF THE ENGINEER.

GENERAL

1. THE CONTRACTOR MAY BEGIN CLSOING 1 LANE OF THE NBML/SBML's AT T 9:00 PM AND OPEN BY 6:00 AM. FULL FREEWAY CLOSURES ARE NOT ALLOWED

2. ALL PAVEMENT EDGE DROP-OFFS SHALL BE BACK FILLED BY A SUITABLE MATERIAL AT THE END OF EACH WORKDAY. EDGE CONDITIONS SHALL BE RESTORED IN ACCORDANCE WITH THE EDGE CONDITION SHEET.

3. ALL ACCESS SHALL BE MAINTAINED AT ALL TIMES AND CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

4. TRAFFIC CONTROL AND LANE CLOSURES WILL BE IN ACCORDANCE WITH THE PLANS, BC, TCP, AND WZ STANDARDS AND AS DIRECTED BY THE ENGINEER. OVERNIGHT LANE CLOSURES WILL BE PERMITTED, AS APPROVED BY THE ENGINEER. LIMIT LANE CLOSURES TO 1-MILE IN LENGTH.

5. CONTRACTOR IS RESPONSIBLE TO PROVIDE SAFE SIDEWALK DIVERSION/ DETOUR/ CLOSURE TO MONITOR AND MAINTAIN PEDESTRIAN TRAFFIC AS PER TMUTCD.

6. TEMPORARY STORM WATER POLLUTION PREVENTION PLAN (SW3P) CONTROL MEASURES SHALL BE INSTALLED ONLY IN LOCATIONS WHERE CONSTRUCTION ACTIVITIES ARE EXPECTED TO OCCUR WITHIN TWO WEEKS.

7. TEMPORARY SW3P CONTROL MEASURES ARE TO BE REMOVED WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT IN THEIR CONTROL AREA, AS APPROVED BY THE ENGINEER.

PHASE 1

1. SET BARRICADES AND ADVANCE WARNING SIGNS.

PHASE 2

1. THE CONTRACTOR SHALL ENSURE AND MAINTAIN MINIMUM 12" WIDTH TRAVEL LANE FOR TRAFFIC DURING LANE CLOSURE/SHOULDER CLOSURE.

2. PERFORM 2" MILLING. SIZE OF WORK ZONE SHALL BE SUCH THAT MILL AREA SHALL NOT BE EXPOSED FOR TRAFFIC BEFORE OVERLAY OR AS DIRECTED BY THE ENGINEER.

3. INLAY THE MILLED SECTION.

4. APPLY AND MAINTAIN TABS FOR LANES AND EDGES.

5. OPEN LANES FOR TRAFFIC

PHASE 3

1. INSTALL PERMANENT PAVEMENT MARKINGS IN MILL AND INLAY AREAS. SHORT TERM PAVEMENT MARKINGS SHALL BE REPLACED BY PERMANENT MARKINGS NO LATER THAN 14 CALENDAR DAYS FOLLOWING PLACEMENT OF THE SURFACE. RESTRIPE PAVEMENT MARKINGS FOR THE ENTIRE PROJECT LIMITS IN AREAS OUTSIDE OF MILL AND OVERLAY OPERATIONS.

2. FINAL CLEAN UP.

3. REMOVE BARRICADES AND WARNING SIGNS.

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo, P.E. 7/18/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

TCP NARRATIVE

SHEET 1 OF 1

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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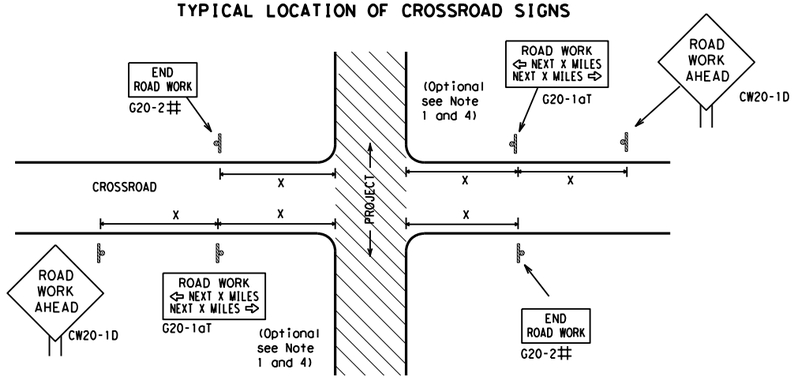
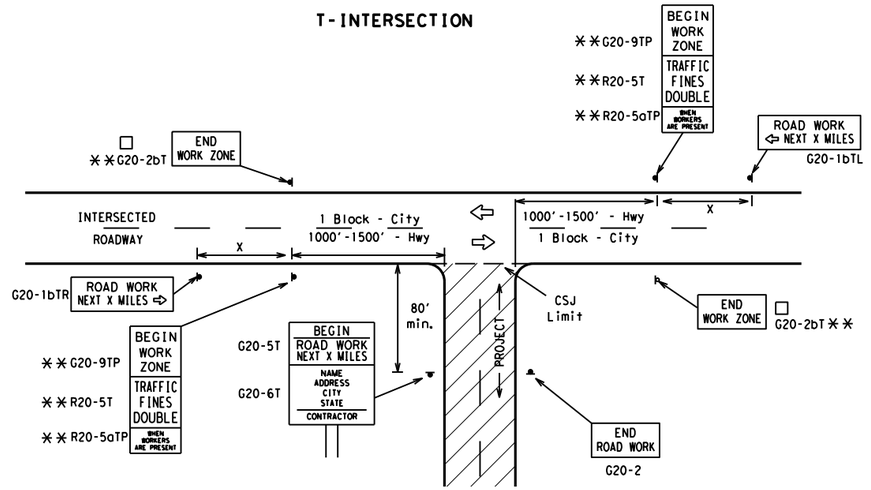
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

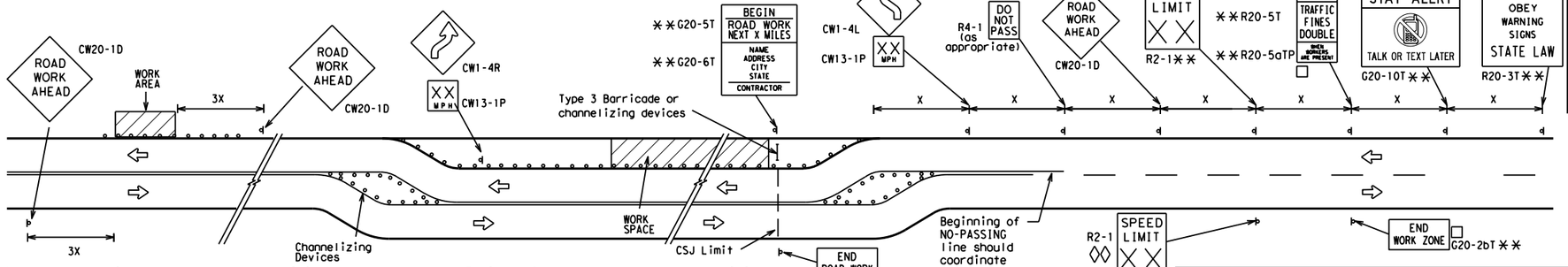
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

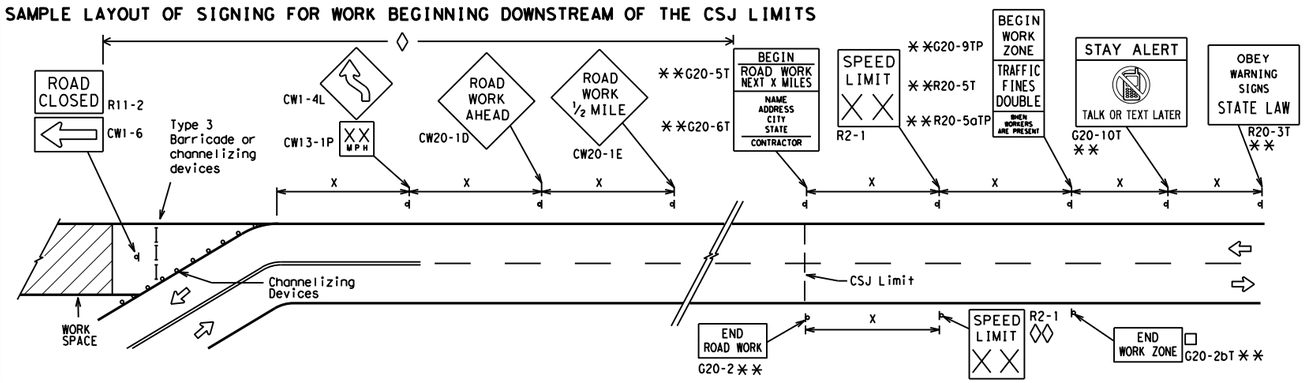
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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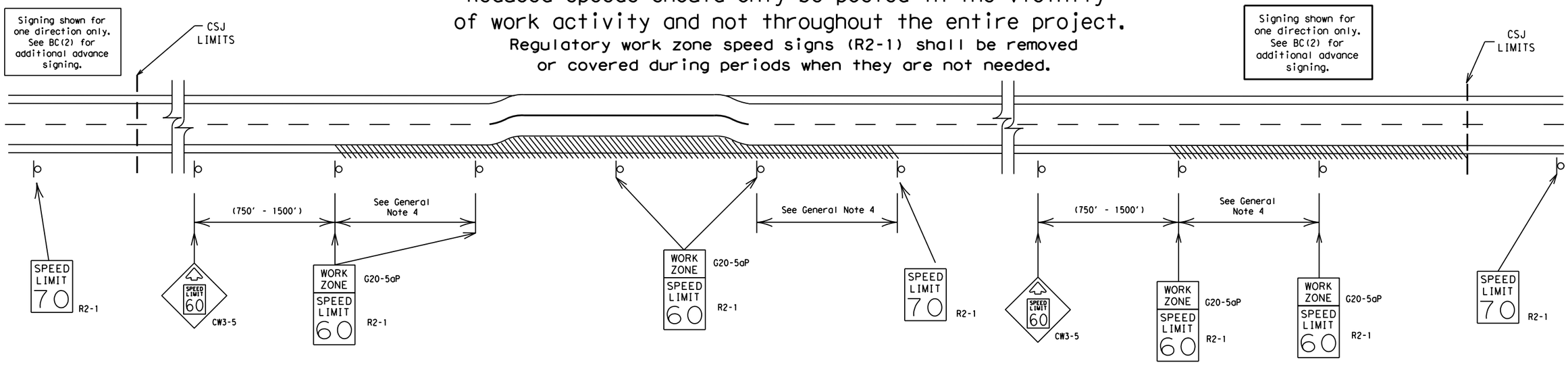
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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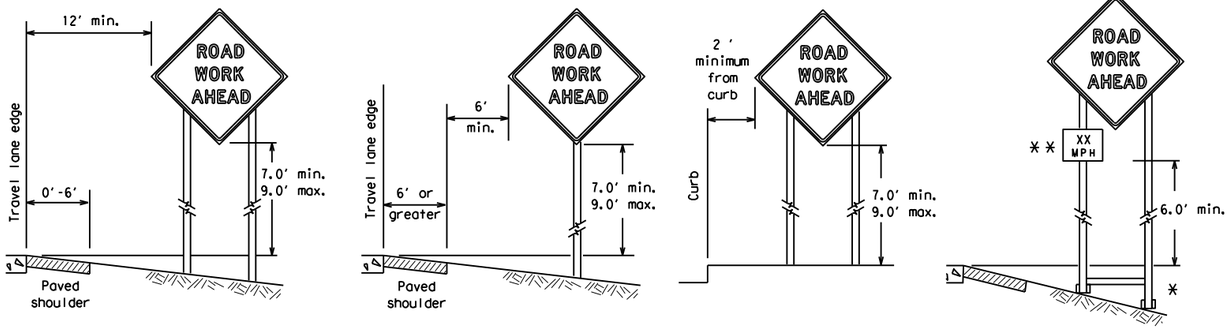
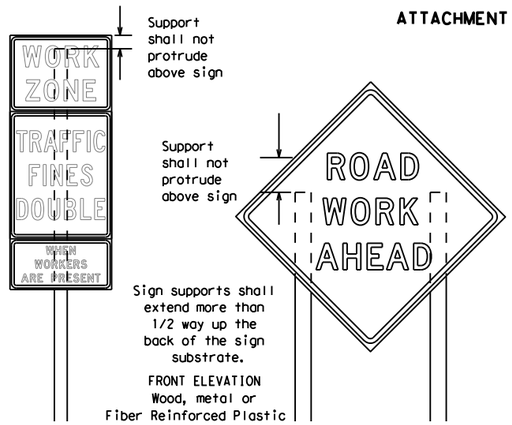
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

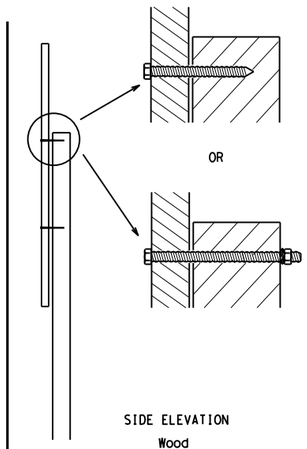


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





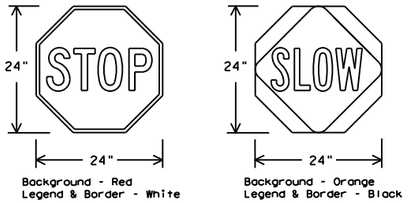
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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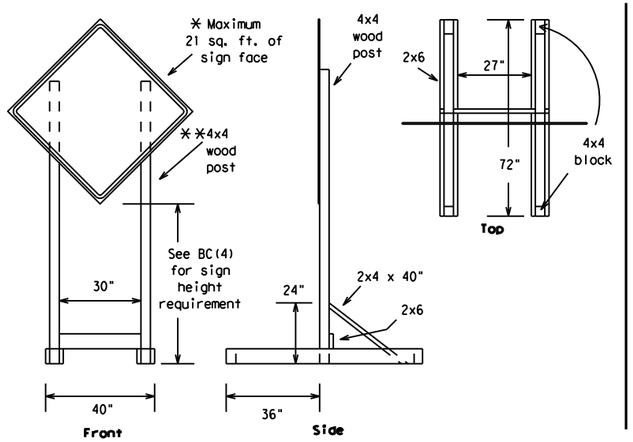
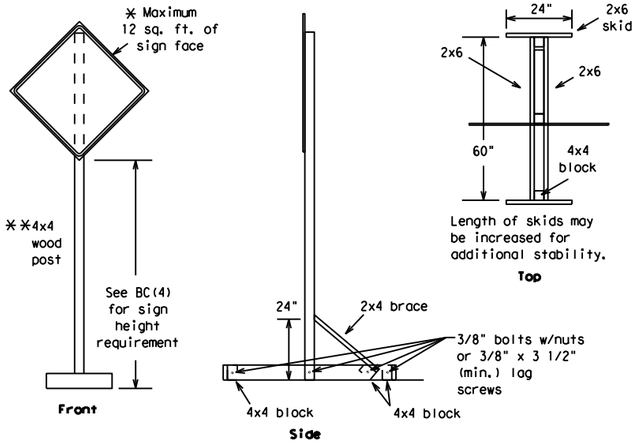
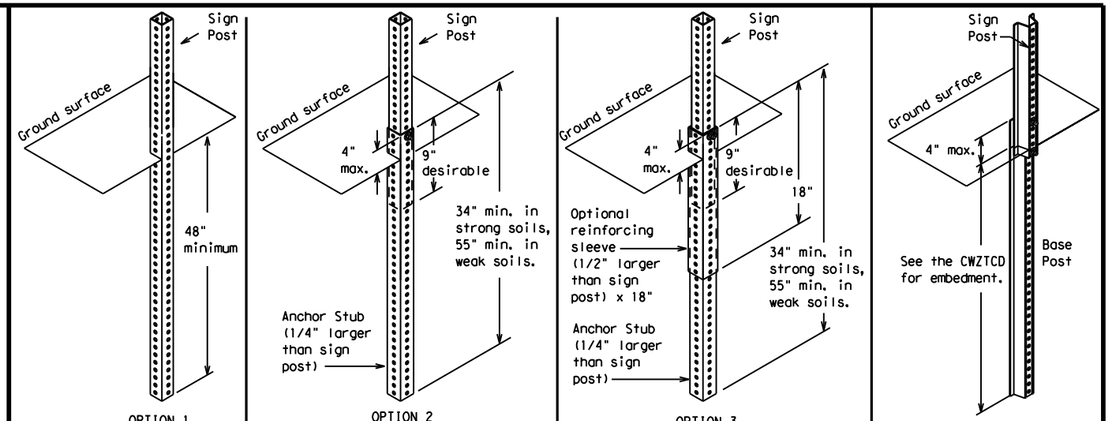




SKID MOUNTED WOOD SIGN SUPPORTS

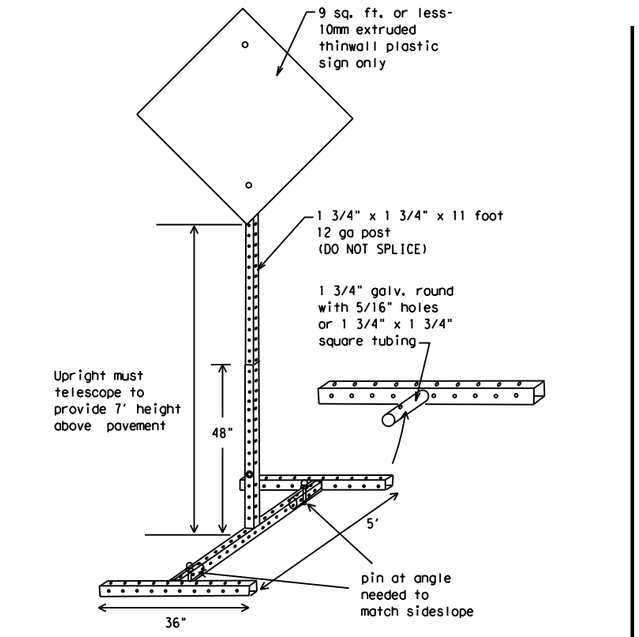
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

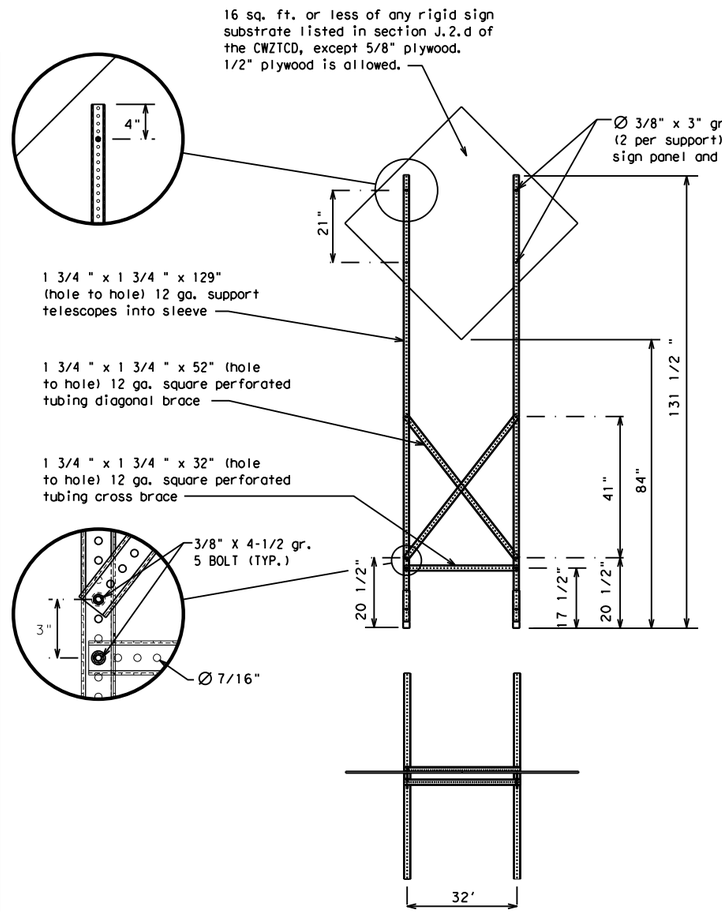


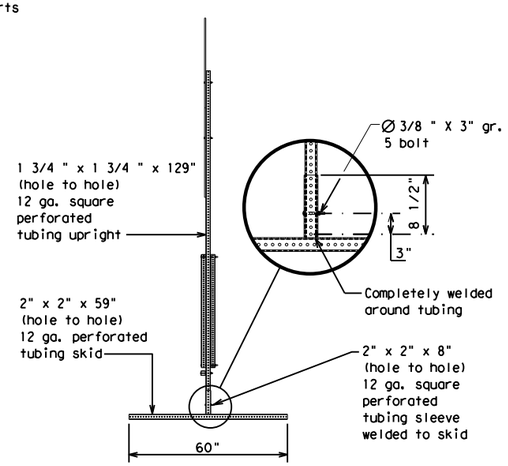
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

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

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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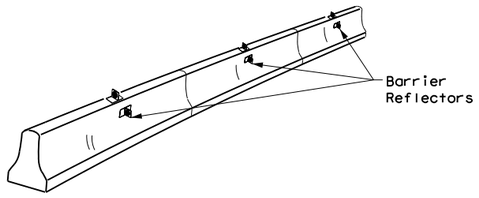
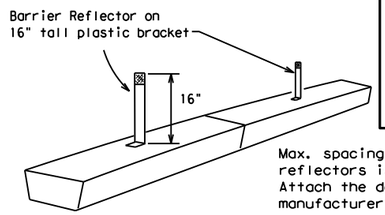
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



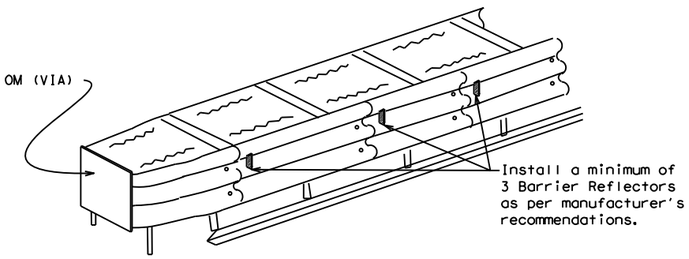
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

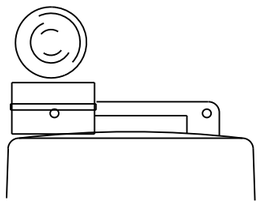
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

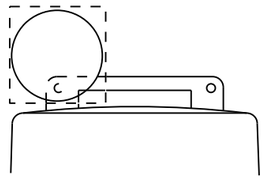
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

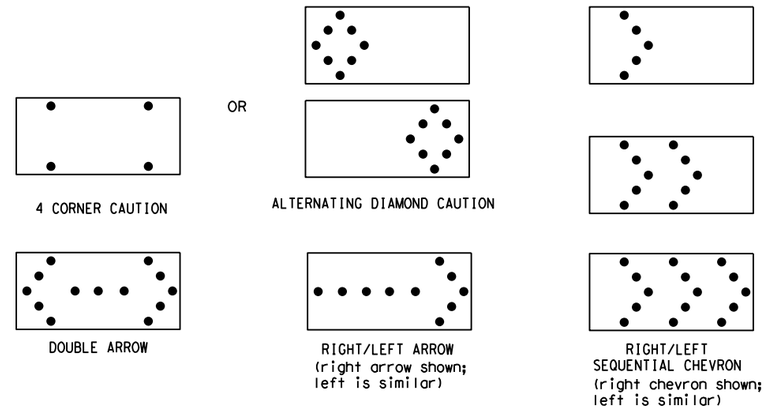
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0172	04	050, ETC	US 287
9-07 8-14	DIST	COUNTY		SHEET NO.
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

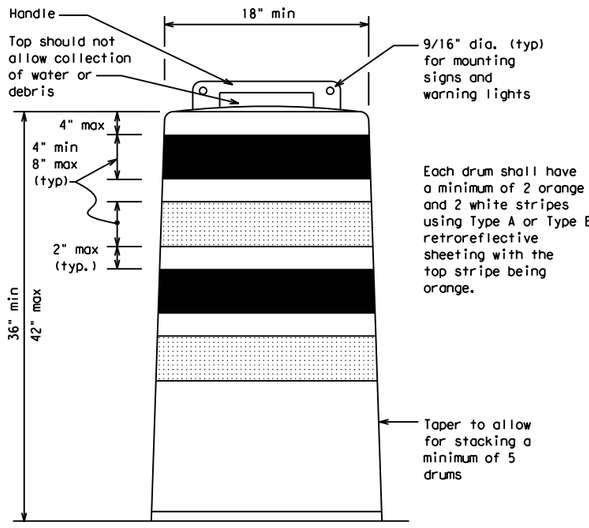
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

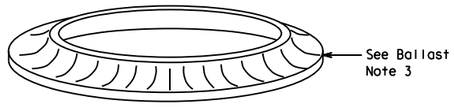
RETROREFLECTIVE SHEETING

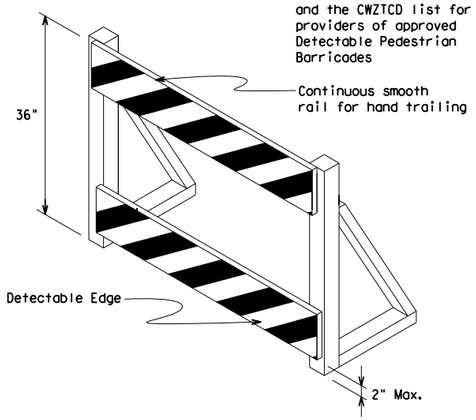
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

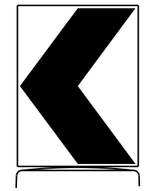




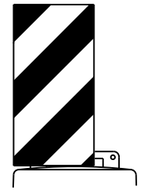


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0172	04	050, ETC	US 287
4-03 8-14	DIST	COUNTY		SHEET NO.
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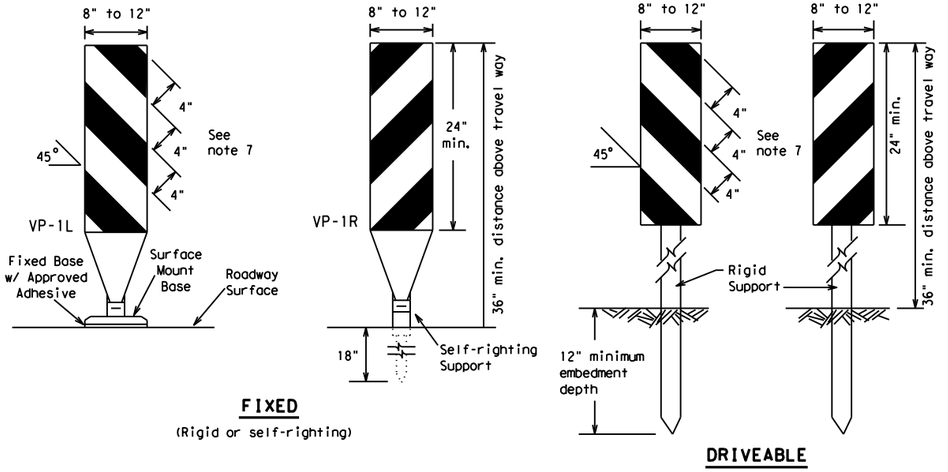
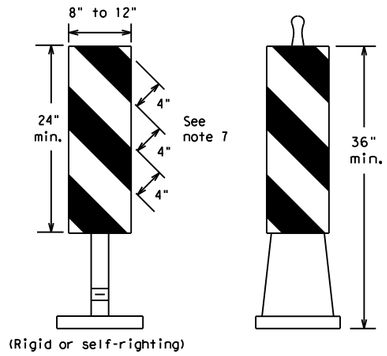


FIXED
(Rigid or self-righting)

DRIVEABLE

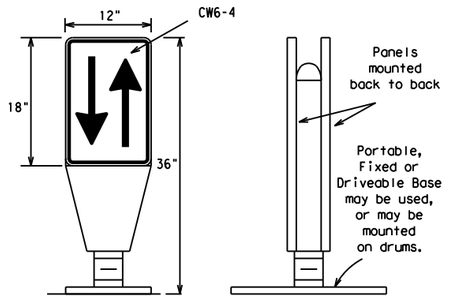


(Rigid or self-righting)

PORTABLE

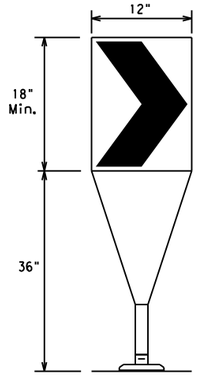
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

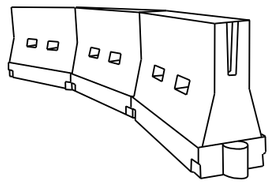
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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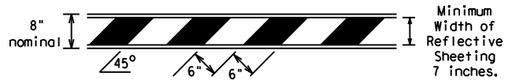
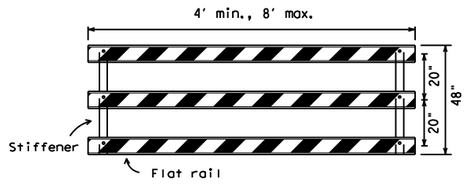
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



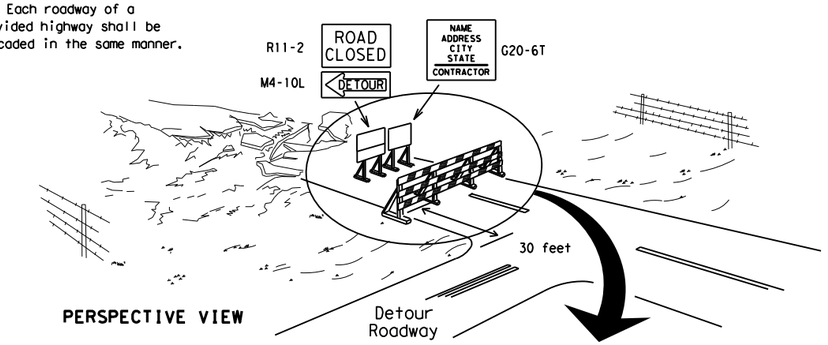
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

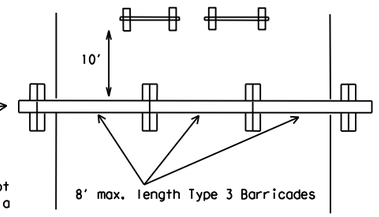
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

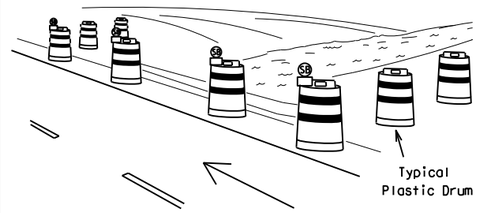
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

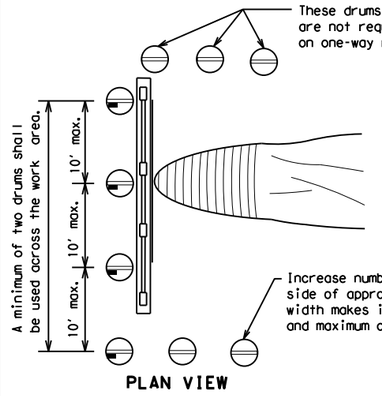
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

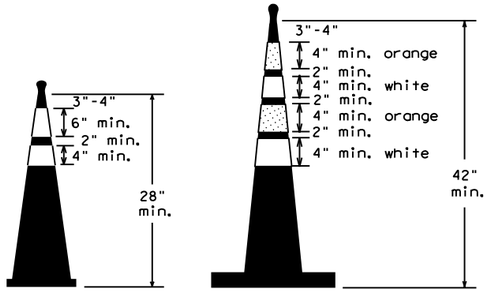
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

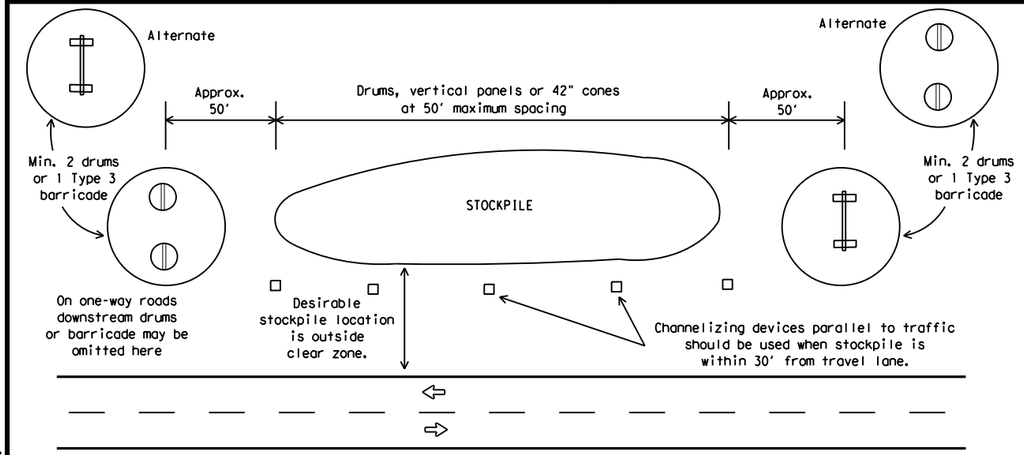
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

DATE:
FILE:

SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	ELLIS		32

104

DATE:
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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.

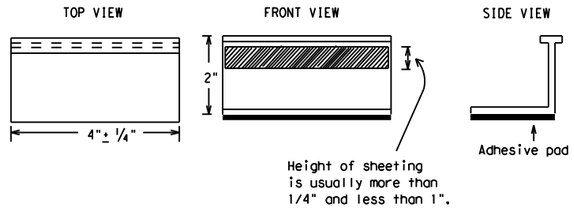
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

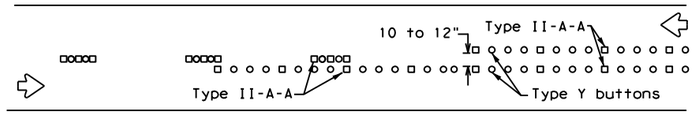
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	DAL	ELLIS		33
11-02 8-14				

105

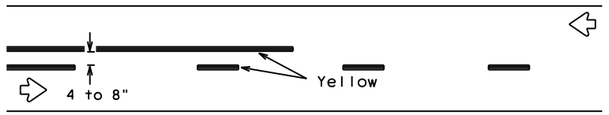
DATE:
FILE:

PAVEMENT MARKING PATTERNS

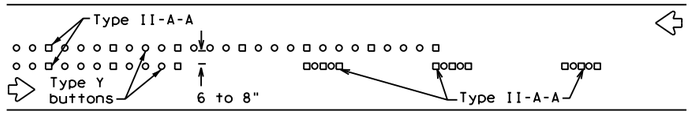
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



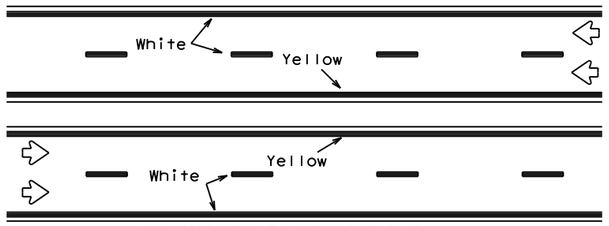
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



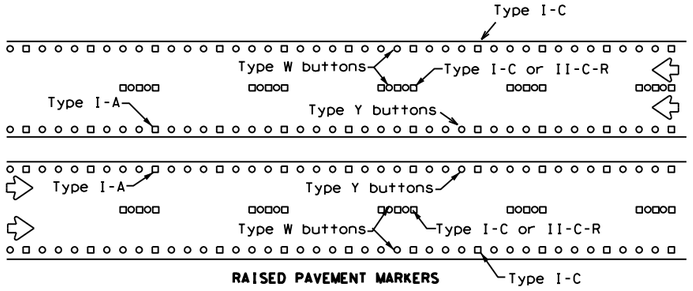
RAISED PAVEMENT MARKERS - PATTERN B

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



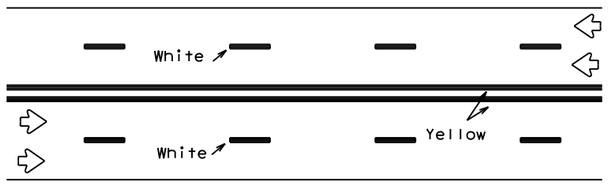
REFLECTORIZED PAVEMENT MARKINGS



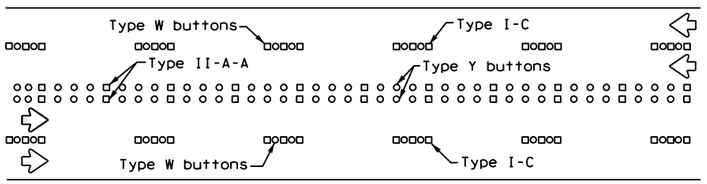
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



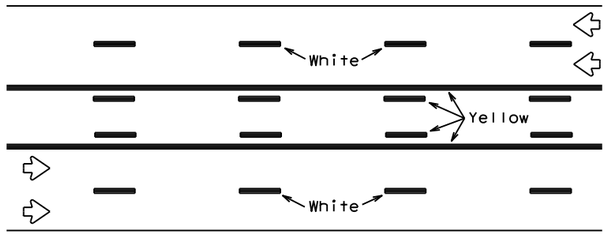
REFLECTORIZED PAVEMENT MARKINGS



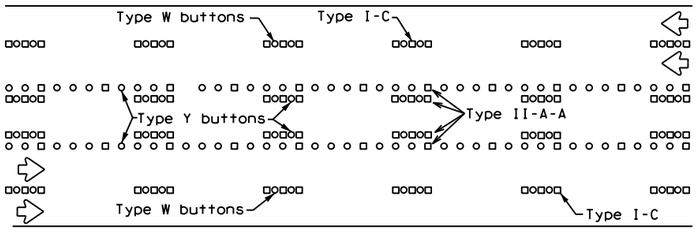
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

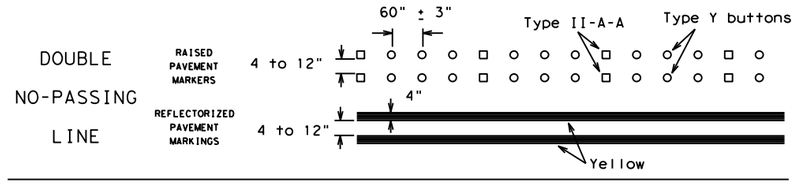
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

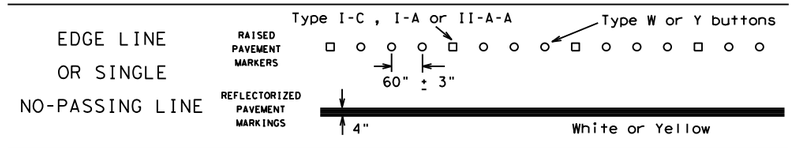
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

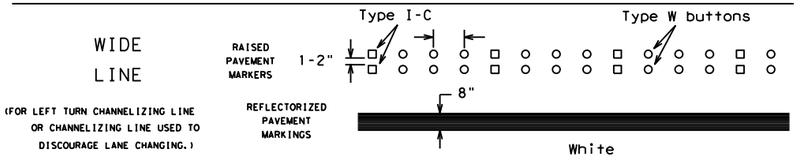


EDGE LINE OR SINGLE NO-PASSING LINE



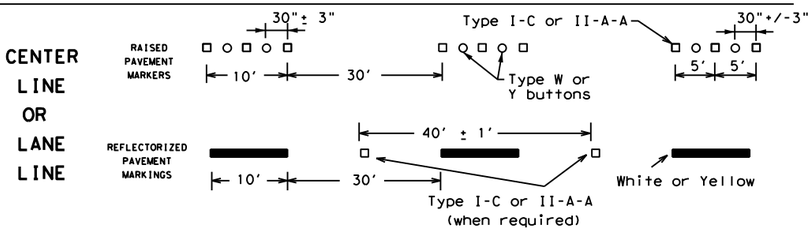
WIDE LINE

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

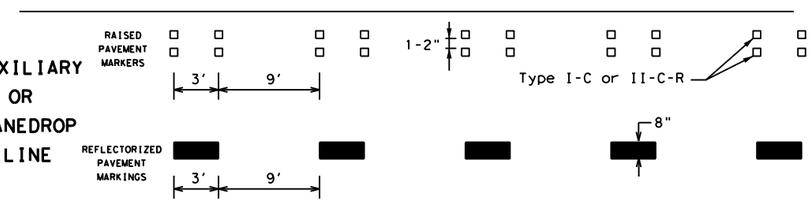


BROKEN LINES

CENTER LINE OR LANE LINE

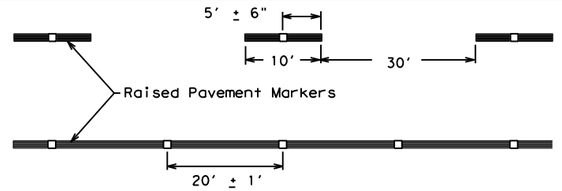


AUXILIARY OR LANEDROP LINE



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	0172	04	050, ETC	US 287
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	DAL	ELLIS		34

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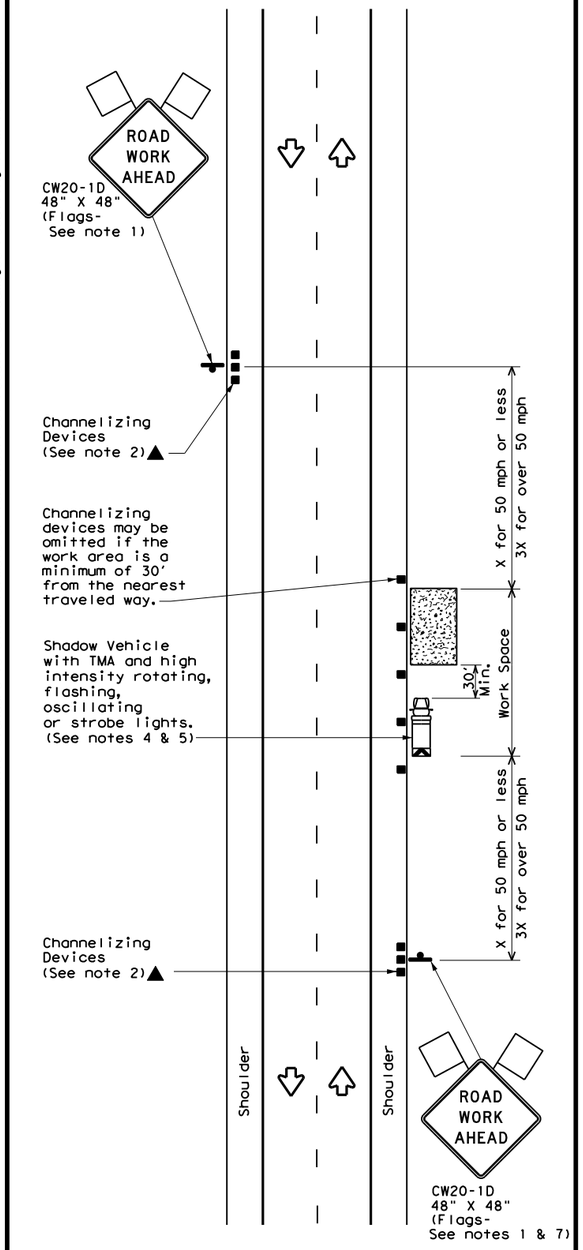
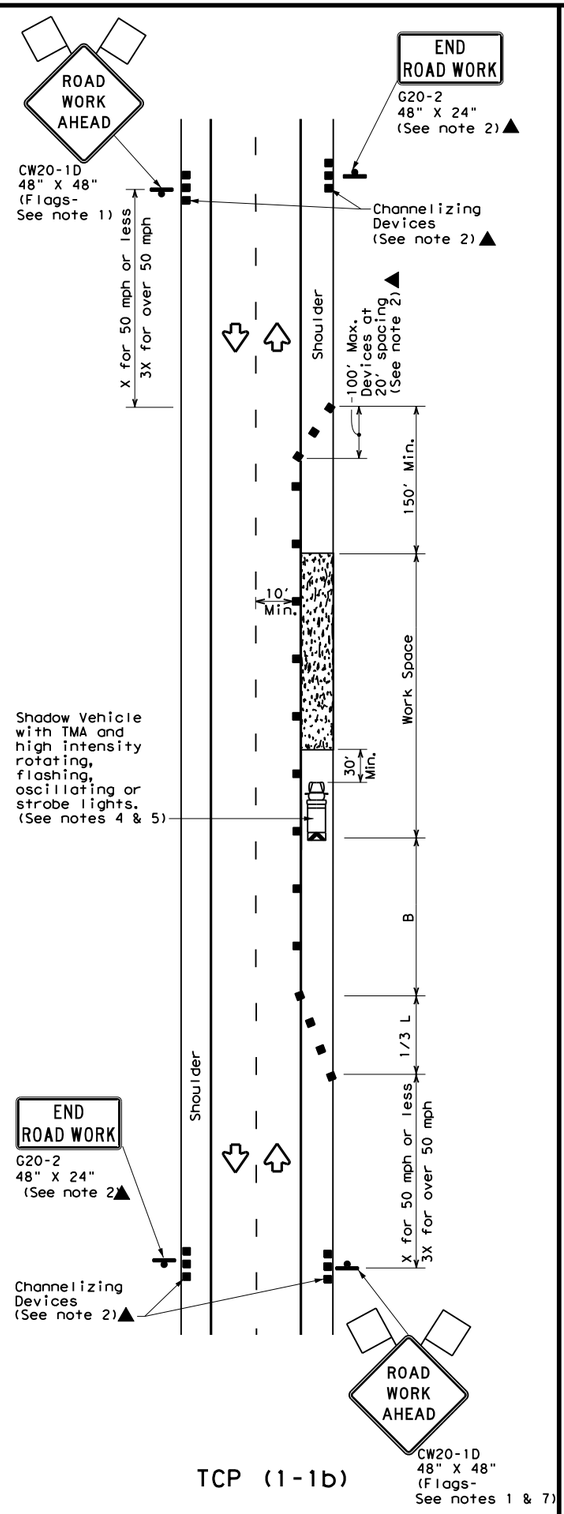


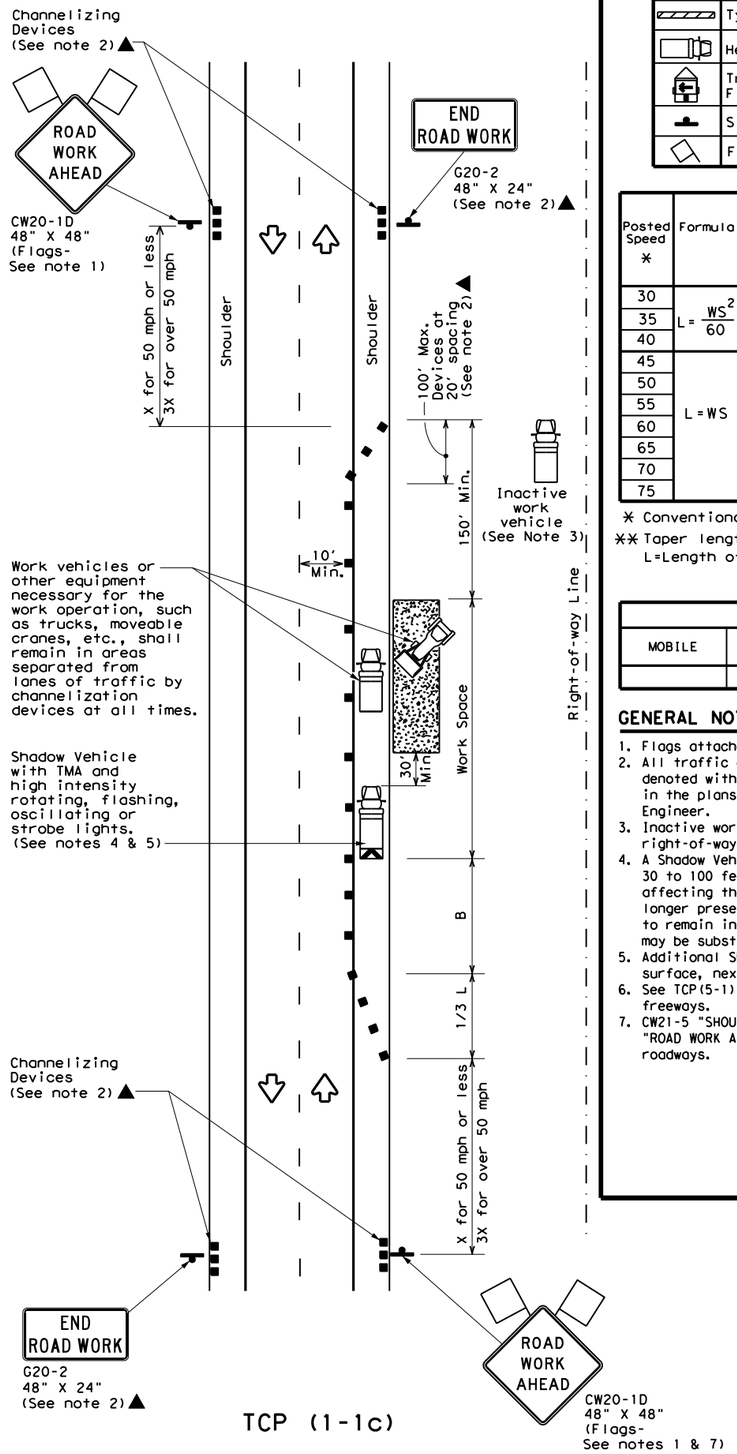
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	0172	04	050, ETC	US 287
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	DAL	ELLIS		35

DATE:
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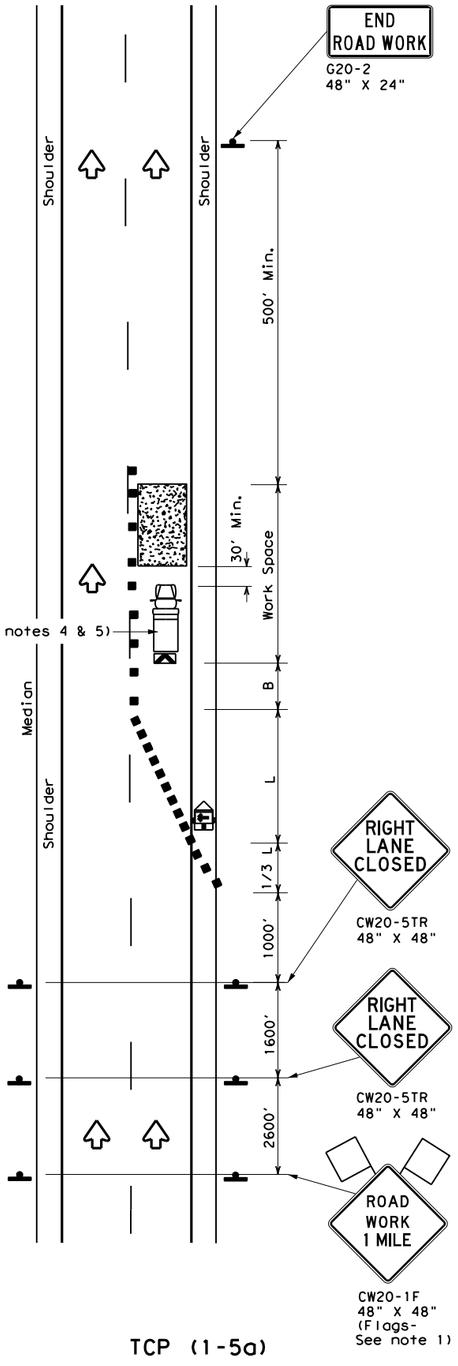
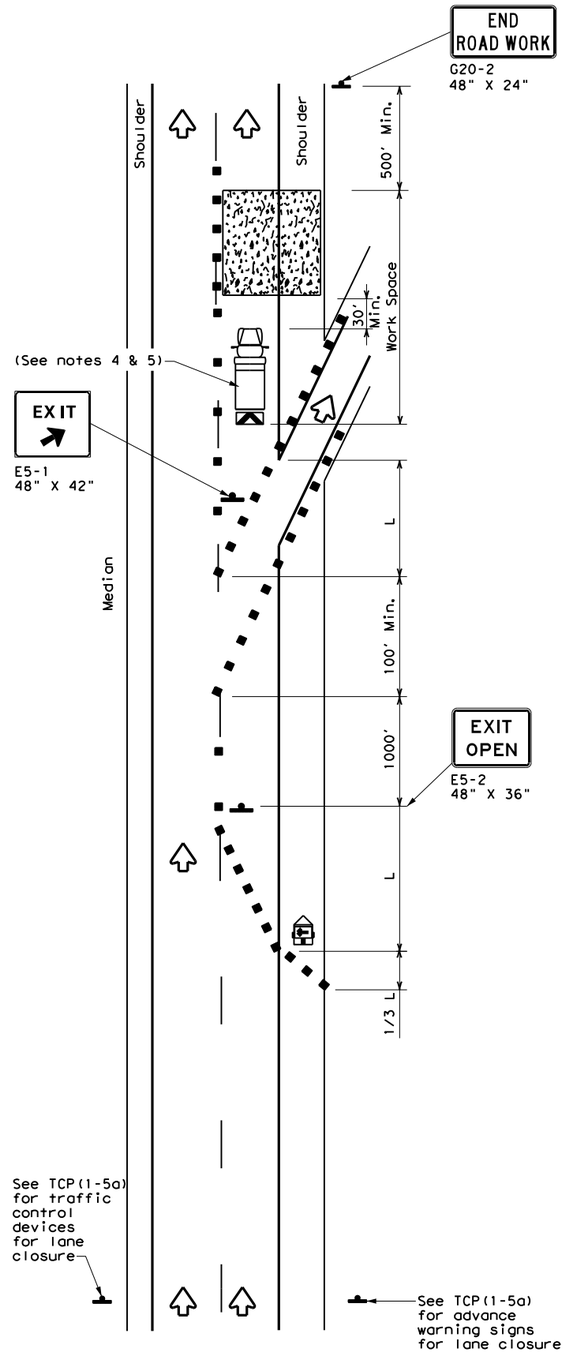


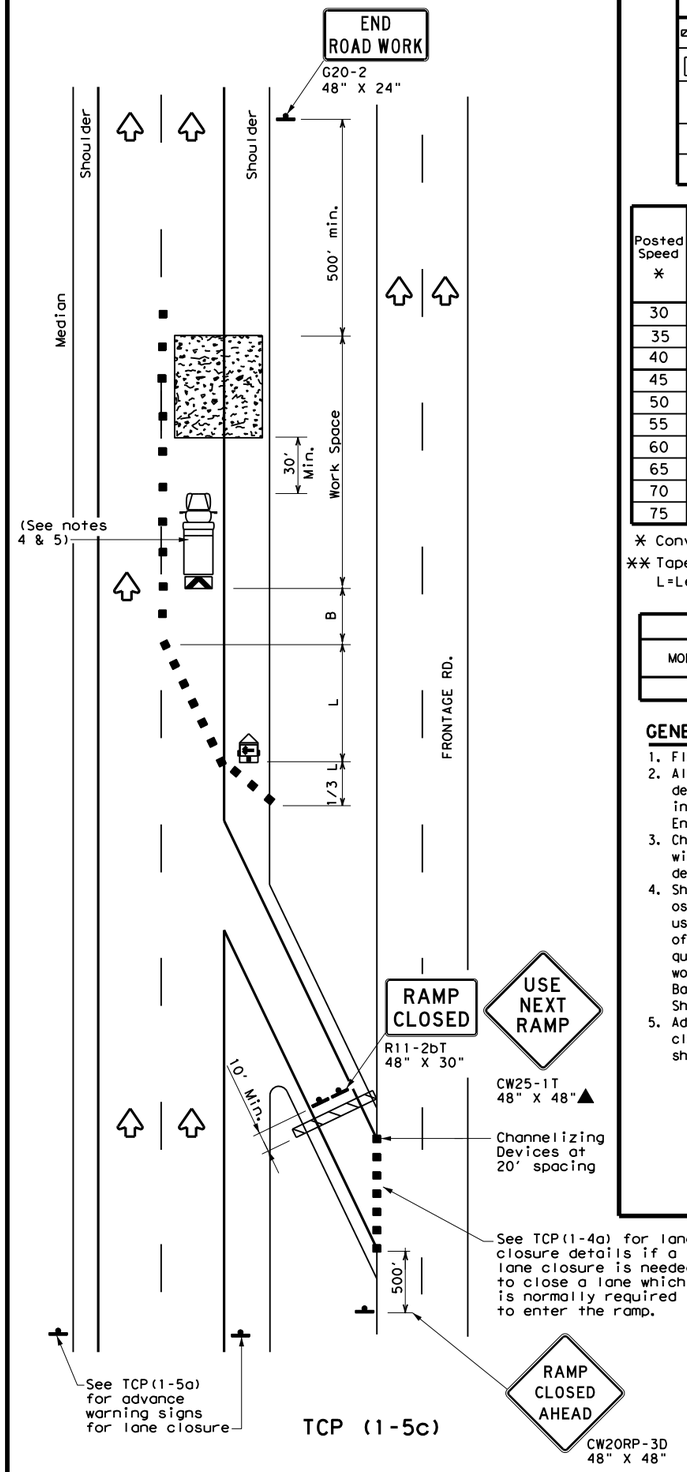
TCP (1-5a)

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
REVISIONS 2-18	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		36

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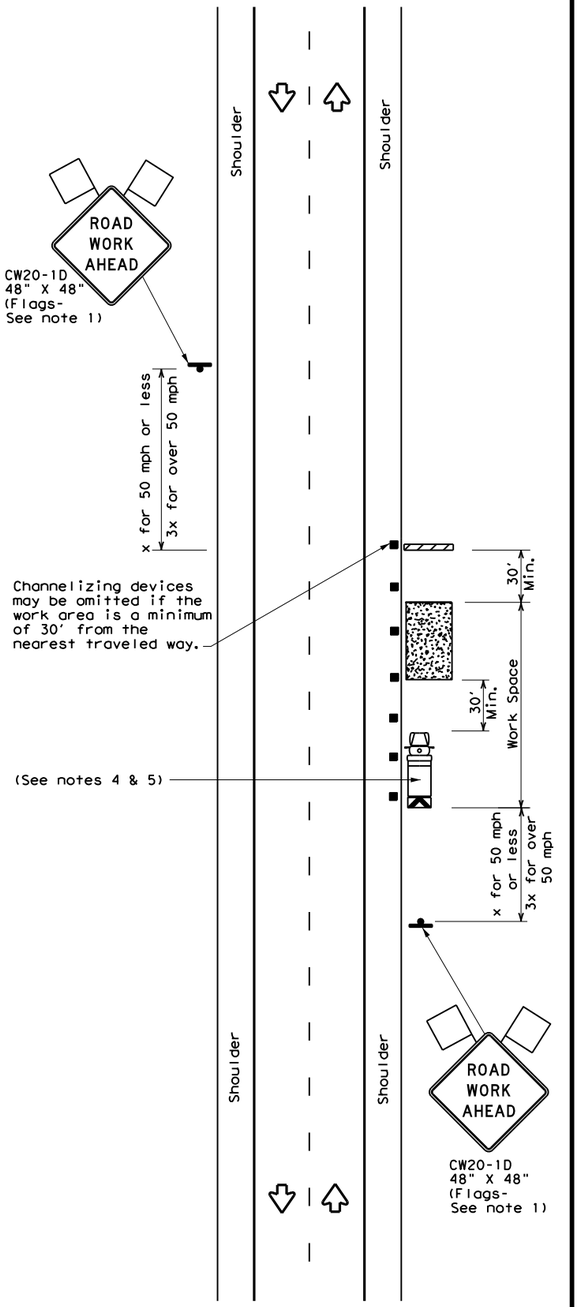
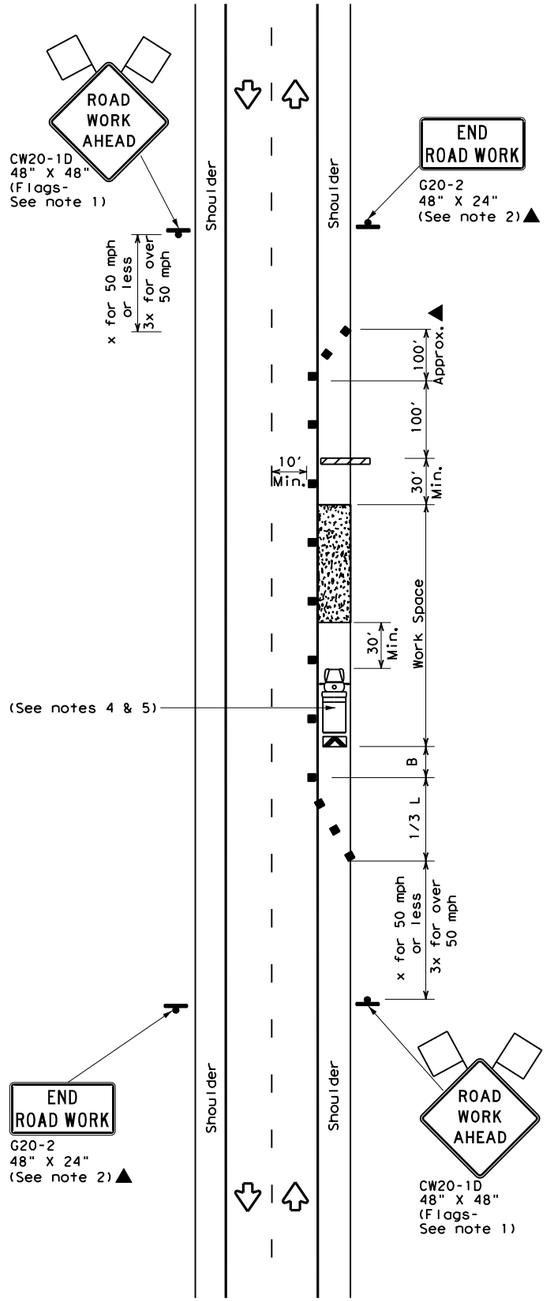


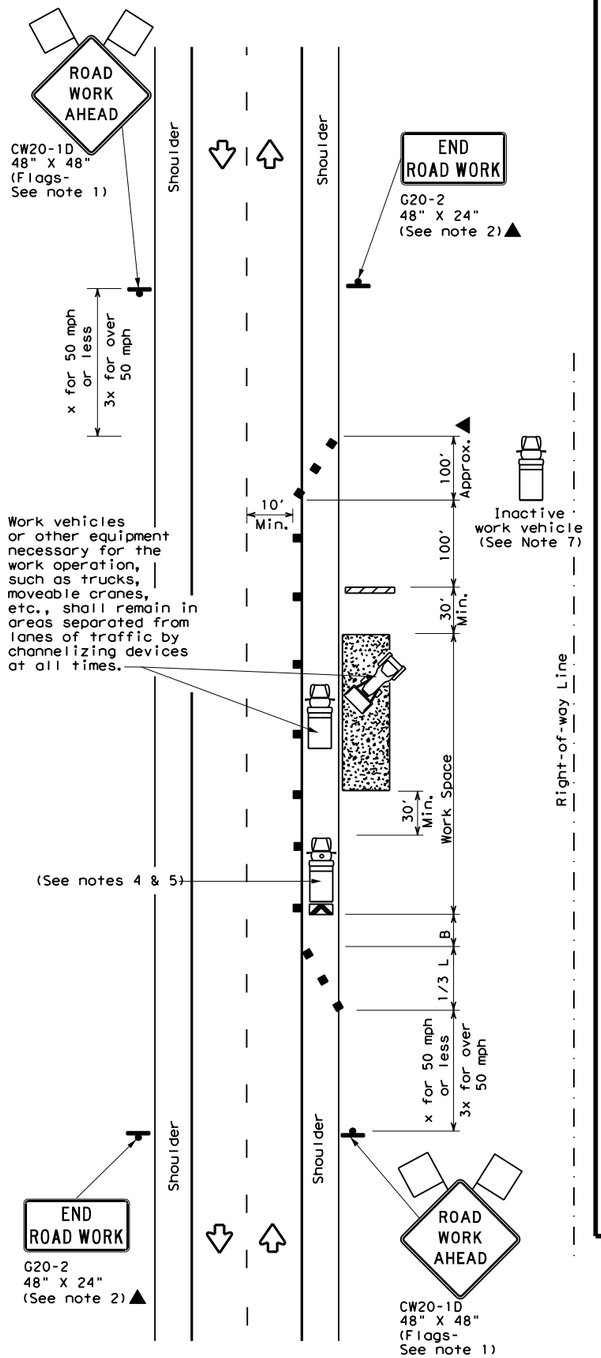
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	DAL	ELLIS		37
1-97 2-18				

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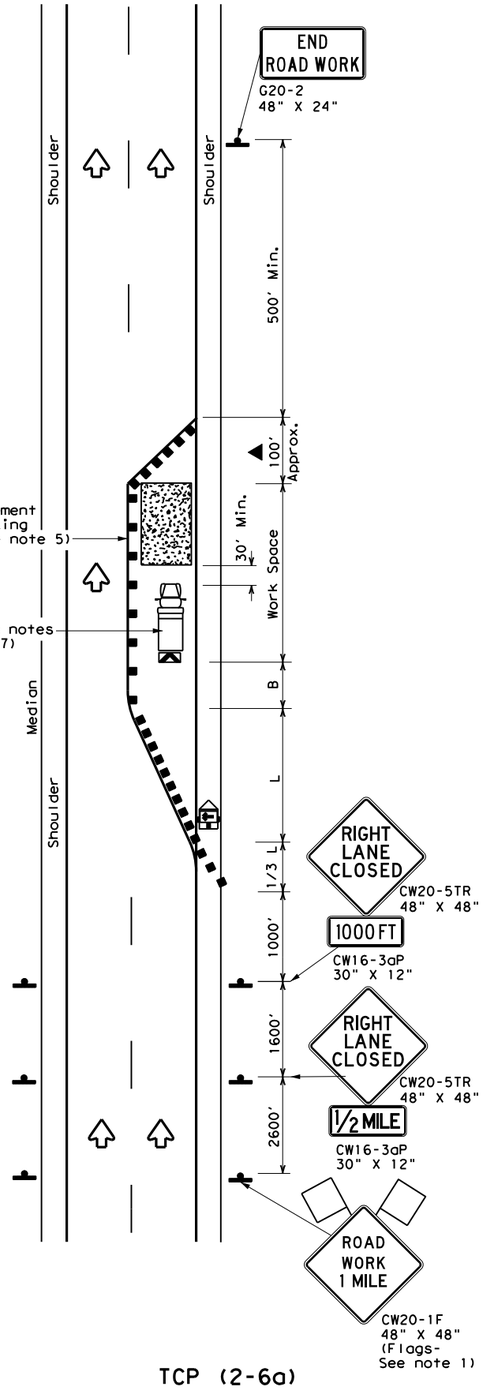
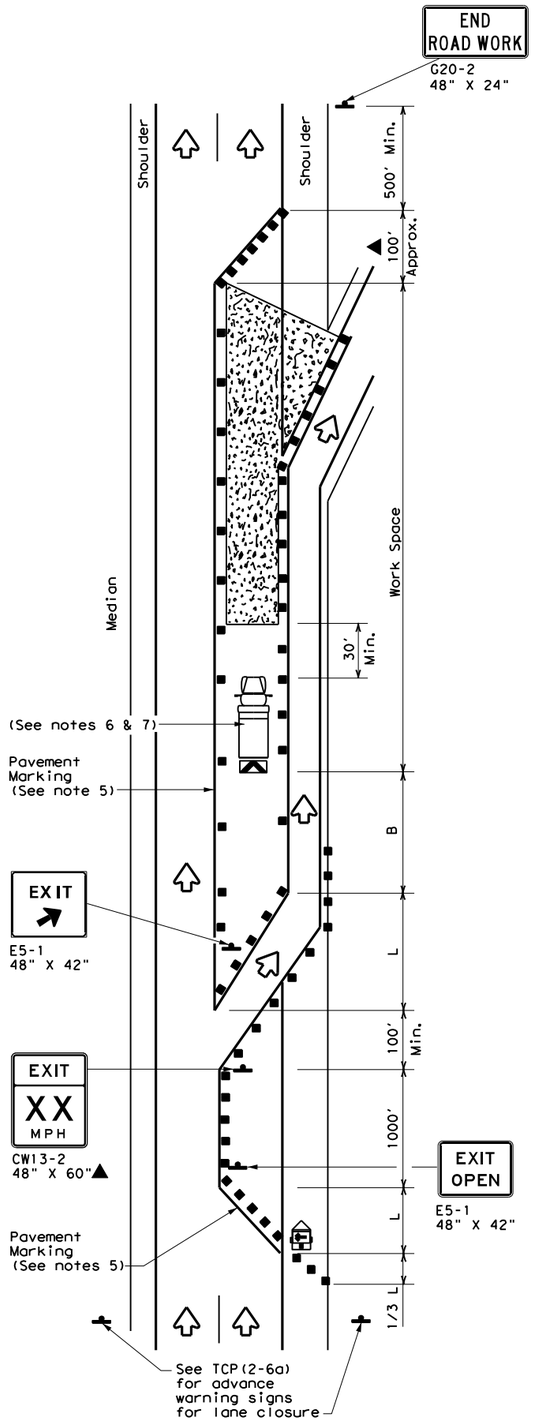
FILE:



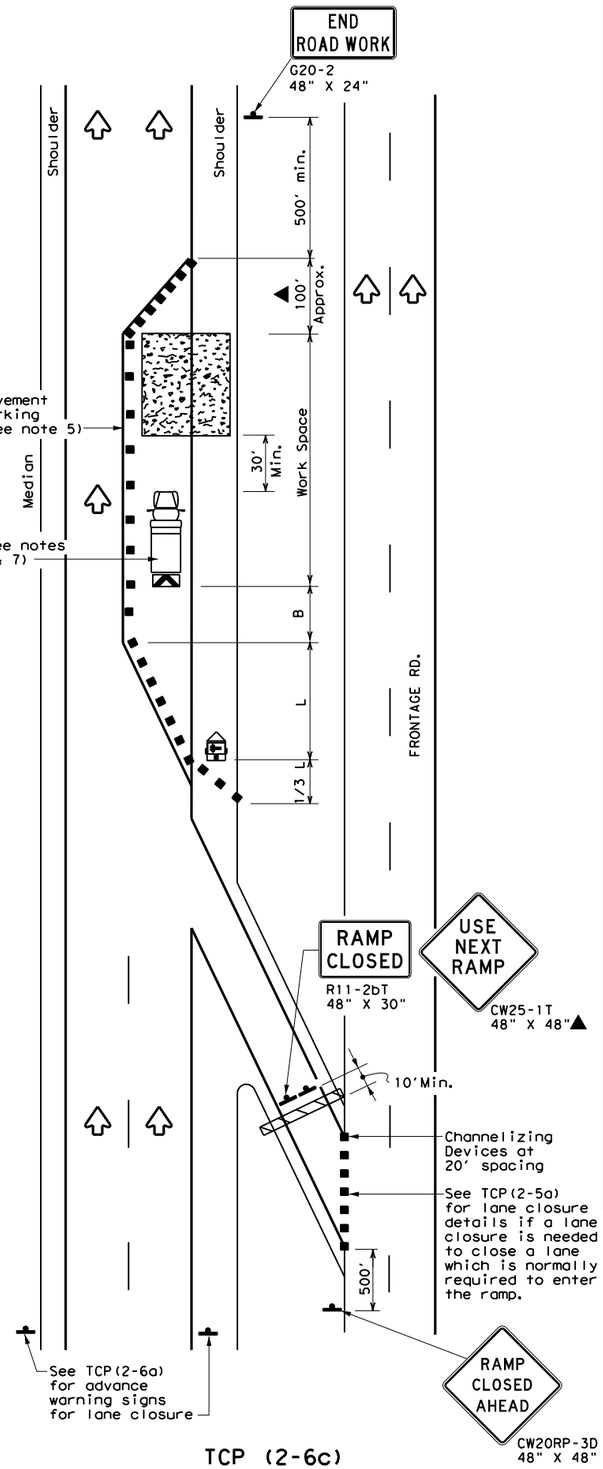
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

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. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

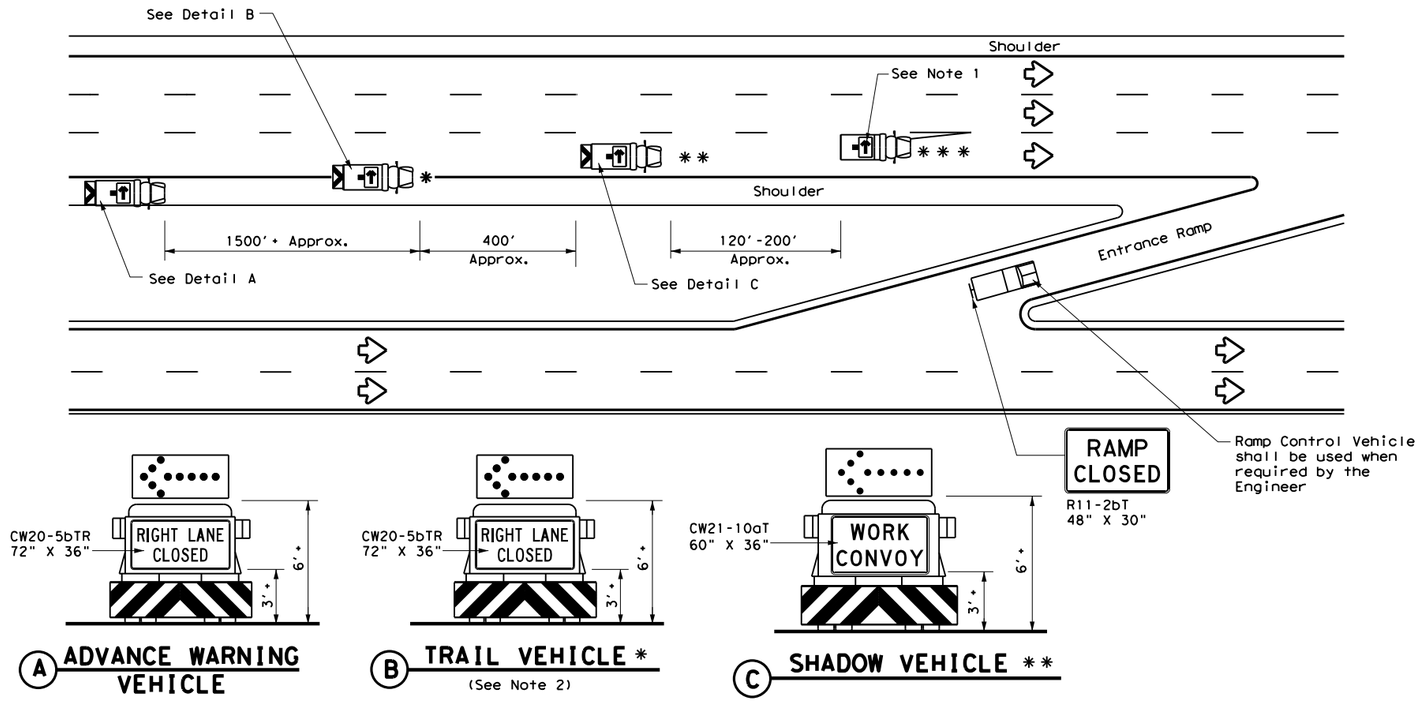
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

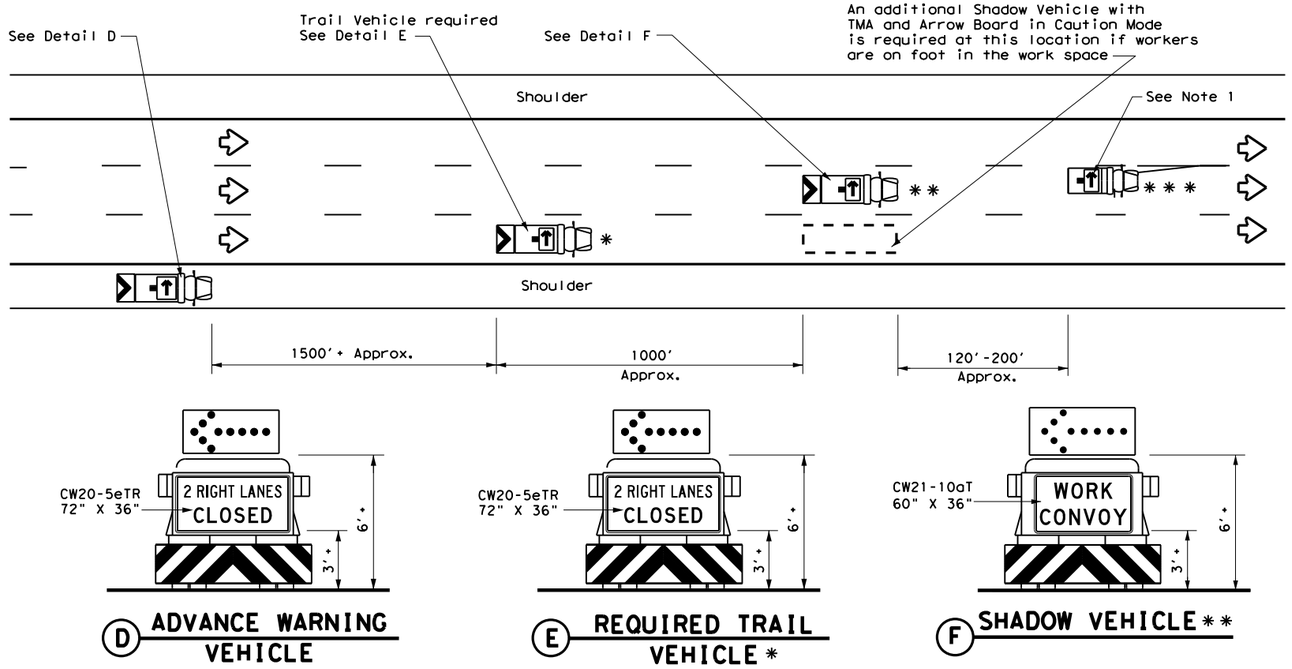
TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		38

DATE:
FILE:



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



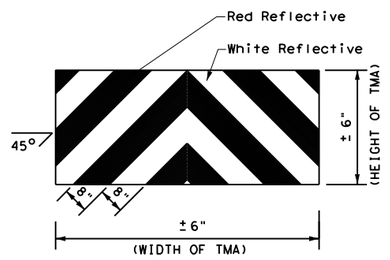
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0172	04	050, ETC	US 287
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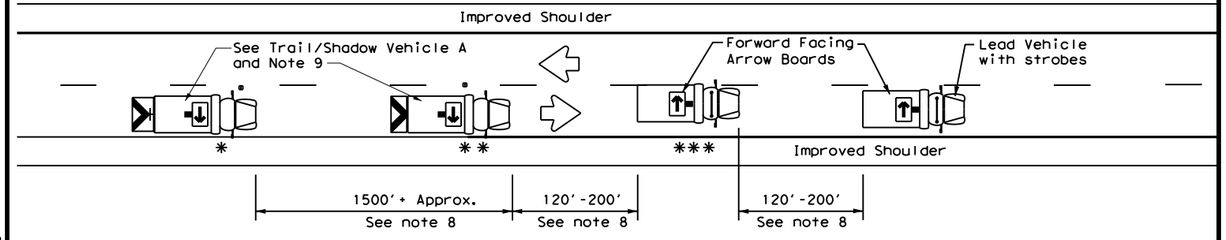
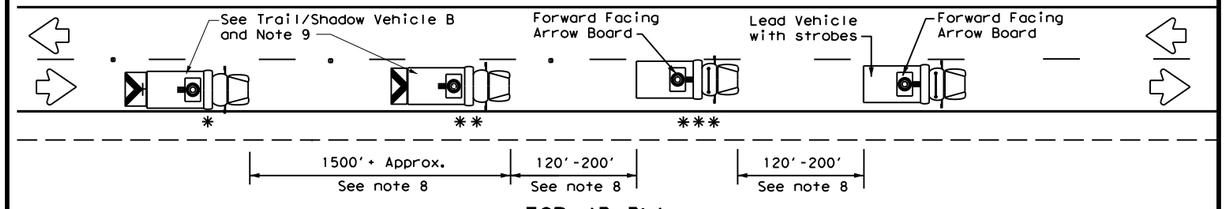
	DAL	ELLIS		39

176



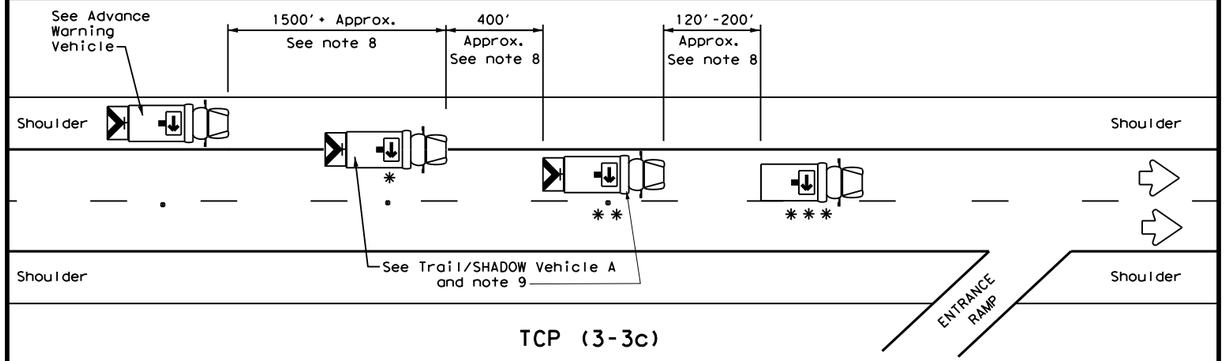
TCP (3-3a)

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



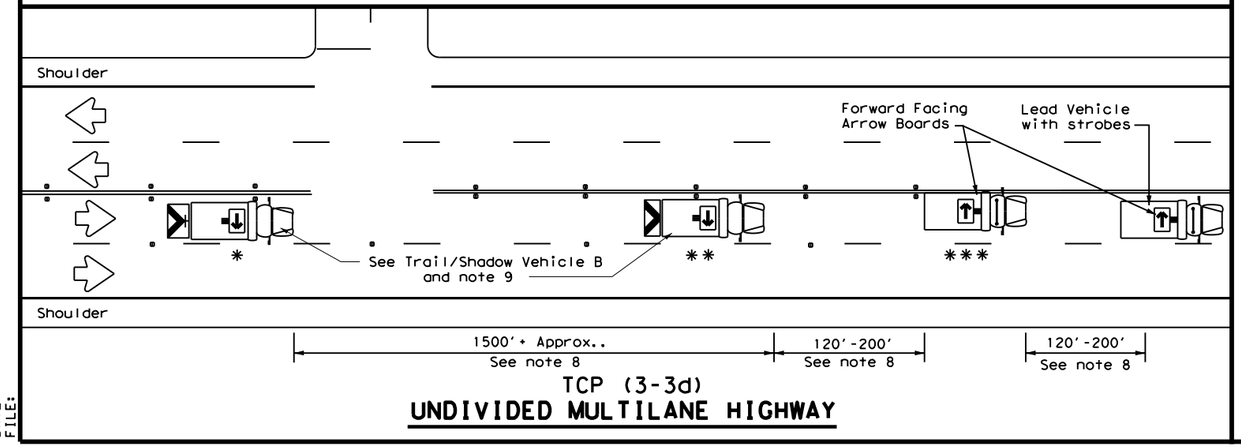
TCP (3-3b)

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



TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY

DATE:
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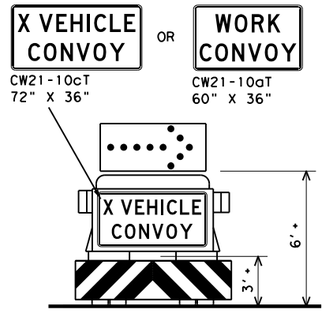
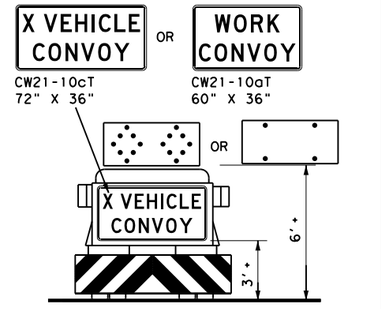


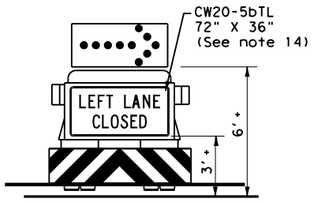
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

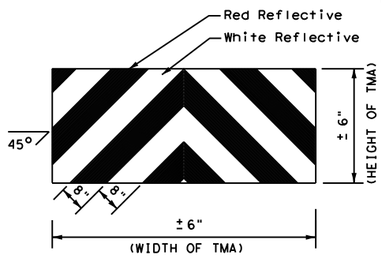


TRAIL/SHADOW VEHICLE B

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
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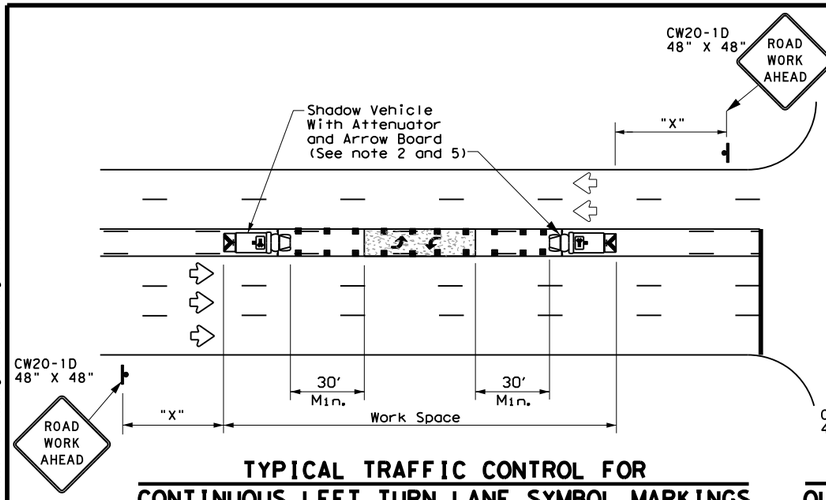
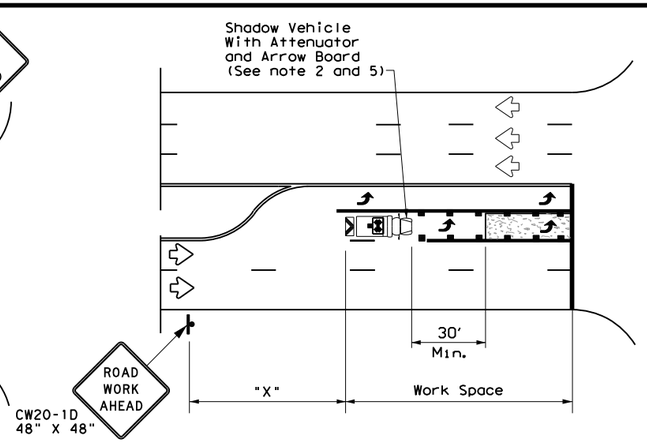
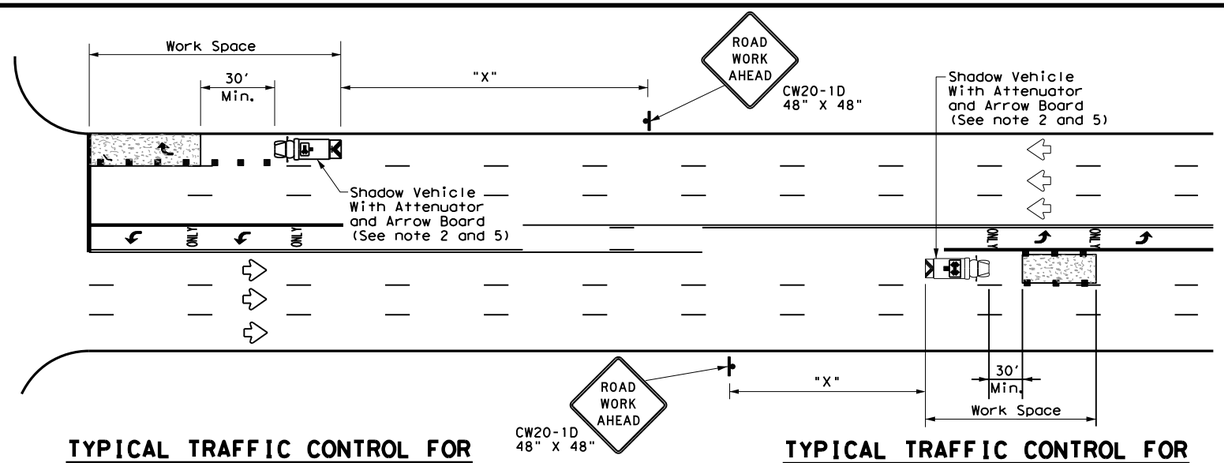
8-95 7-13				
1-97 7-14	DAL	ELLIS		40



TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

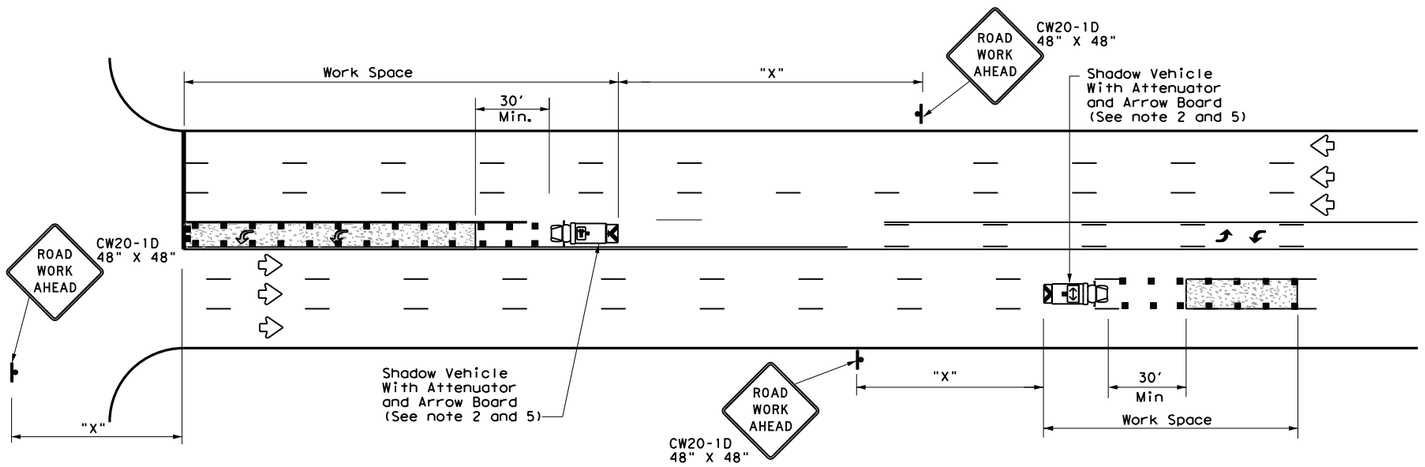


TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR CENTER LANE MARKINGS

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	■ ■ ■	Channelizing Devices

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'

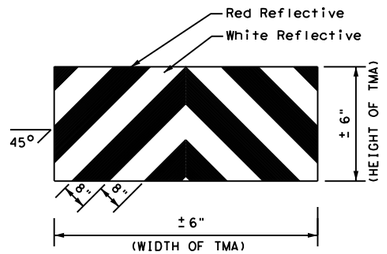
✱ Conventional Roads Only

✱✱ 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. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

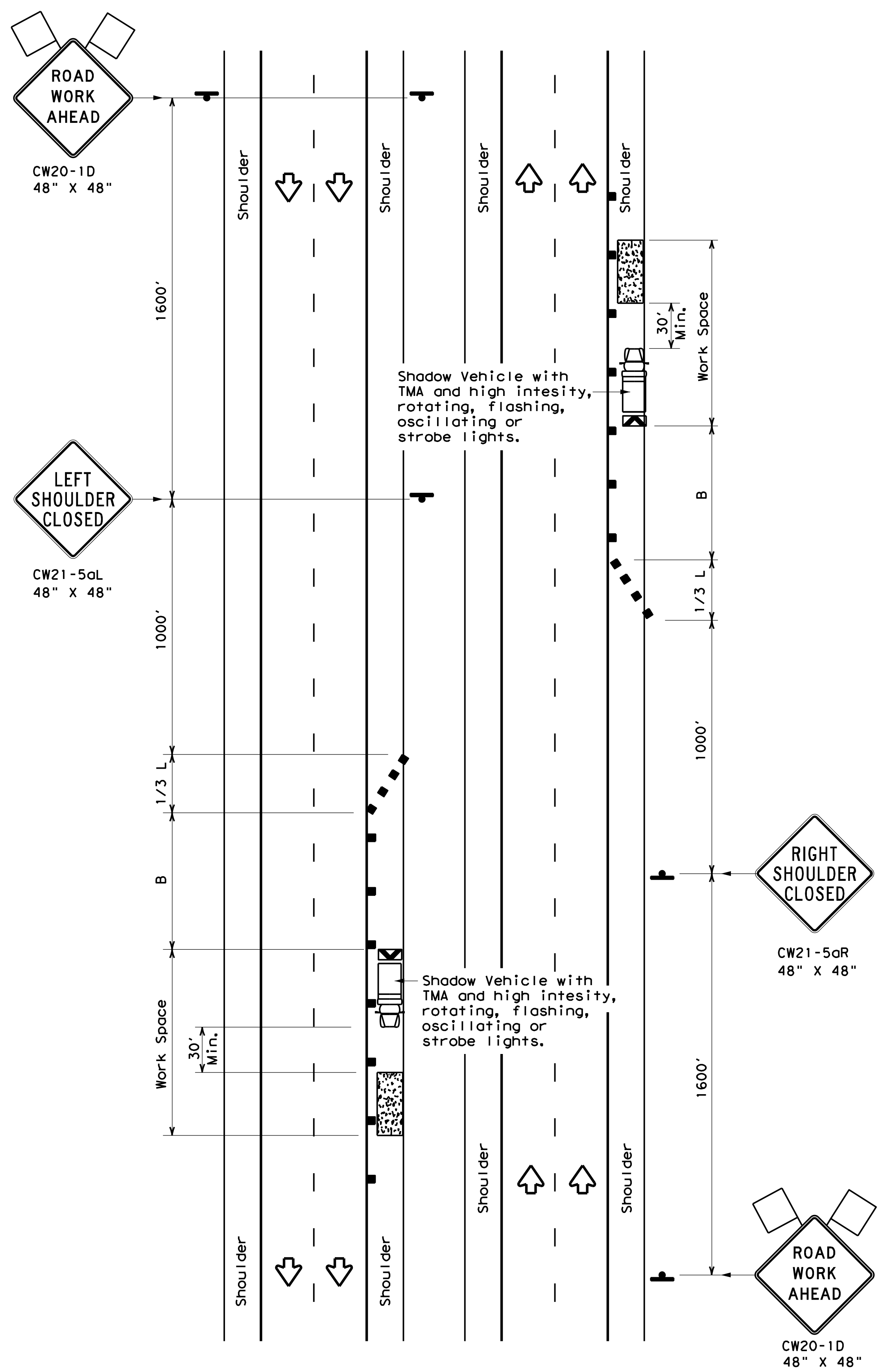
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

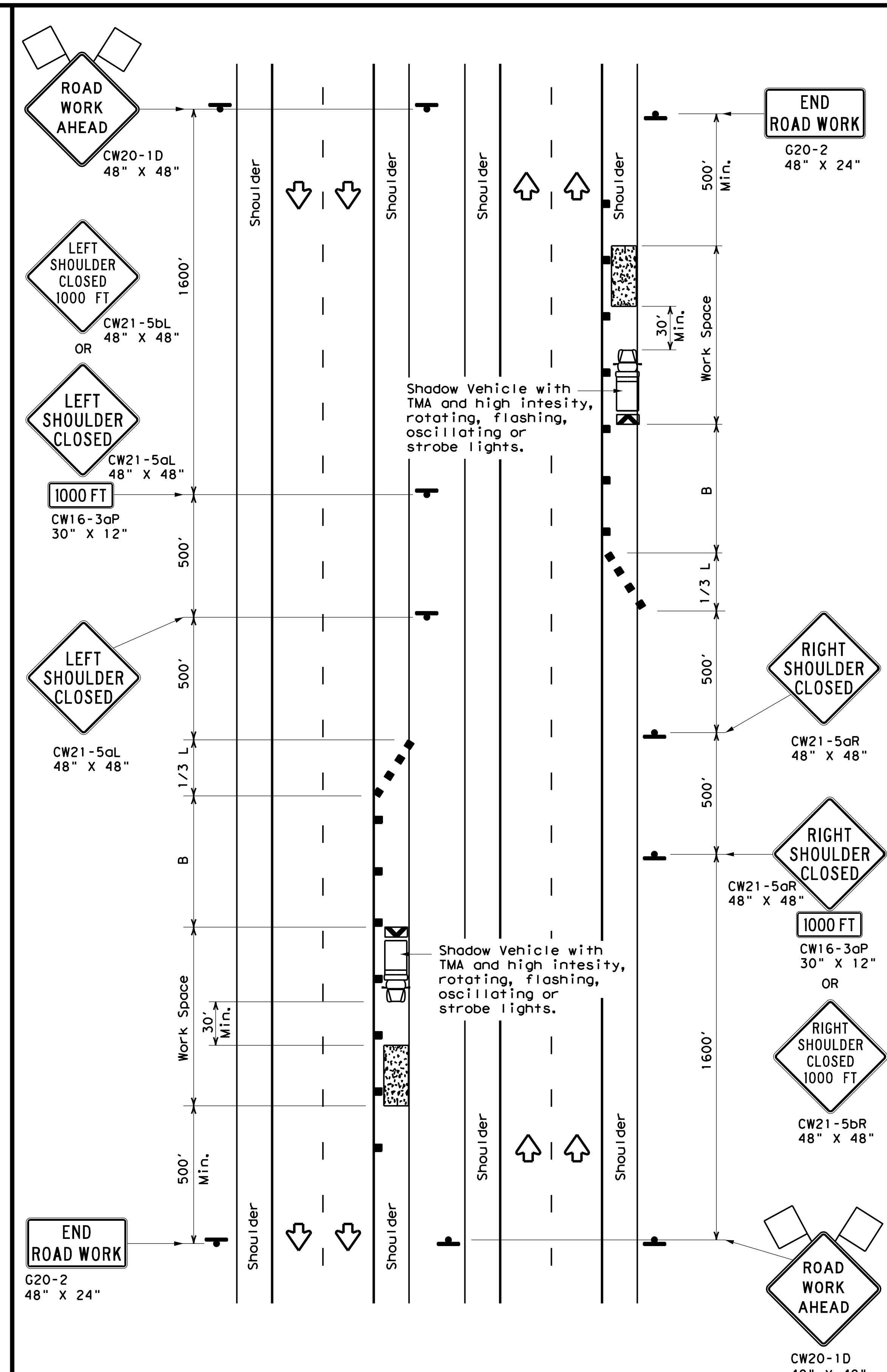
FILE:	tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	July, 2013	CONT	SECT	JOB	HIGHWAY
	REVISIONS	0172	04	050, ETC	US 287
		DIST	COUNTY		SHEET NO.
		DAL	ELLIS		41

DATE:
FILE:



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	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 2-18	0172	04	050, ETC	US 287
	DIST		COUNTY	SHEET NO.
	DAL		ELLIS	42

190

DATE: 7/30/2024 1:48:10 PM
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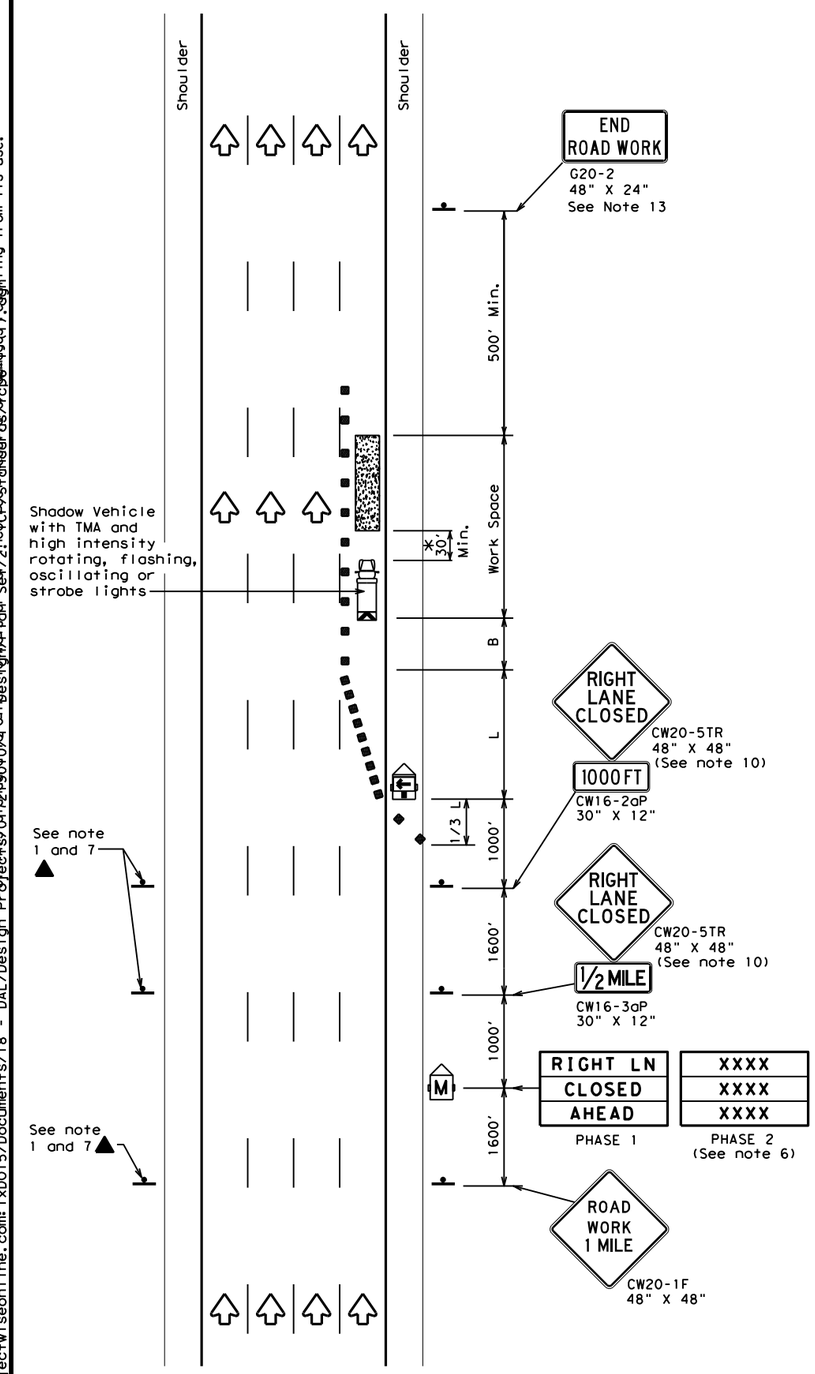
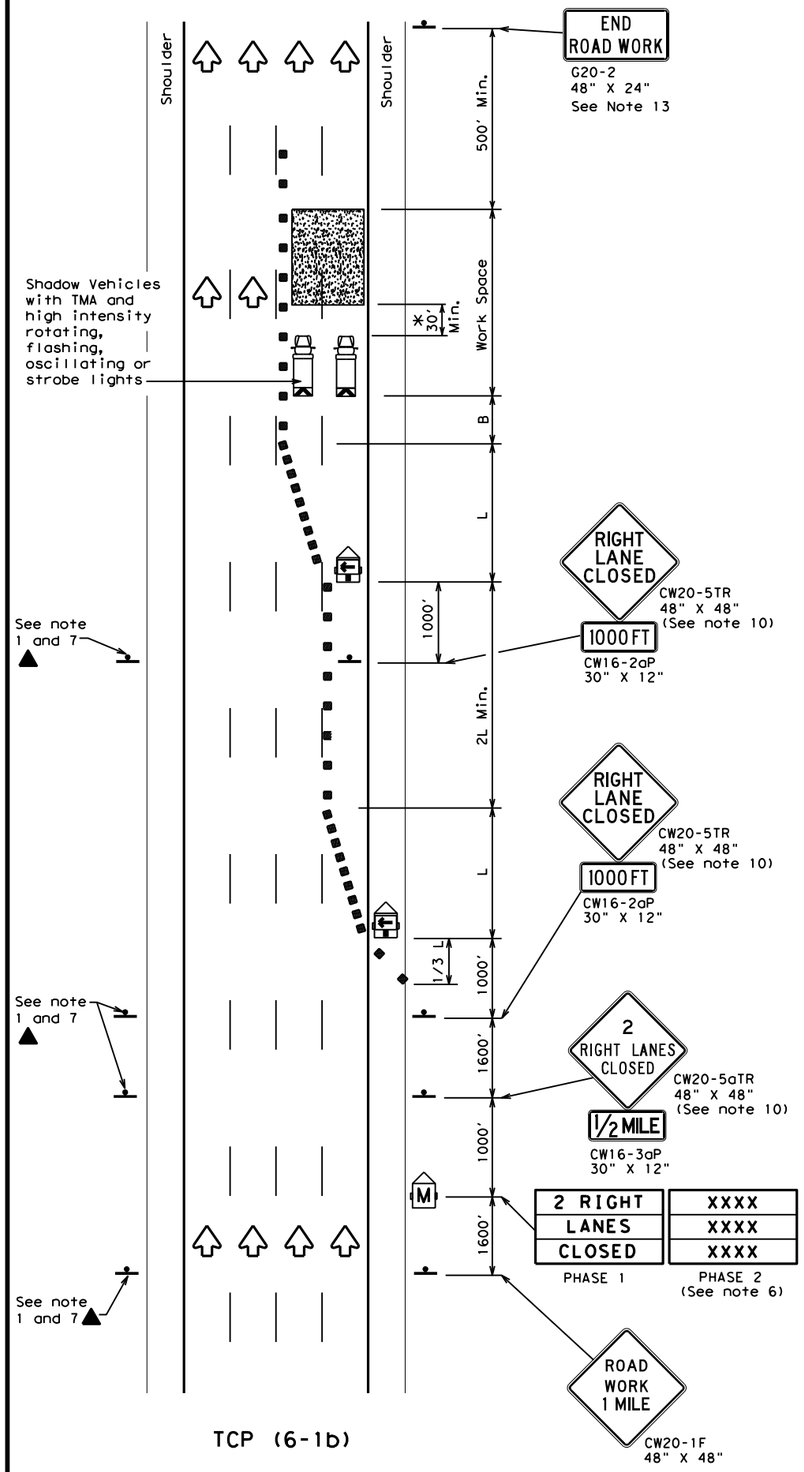


TCP (6-1a)

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.

* 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

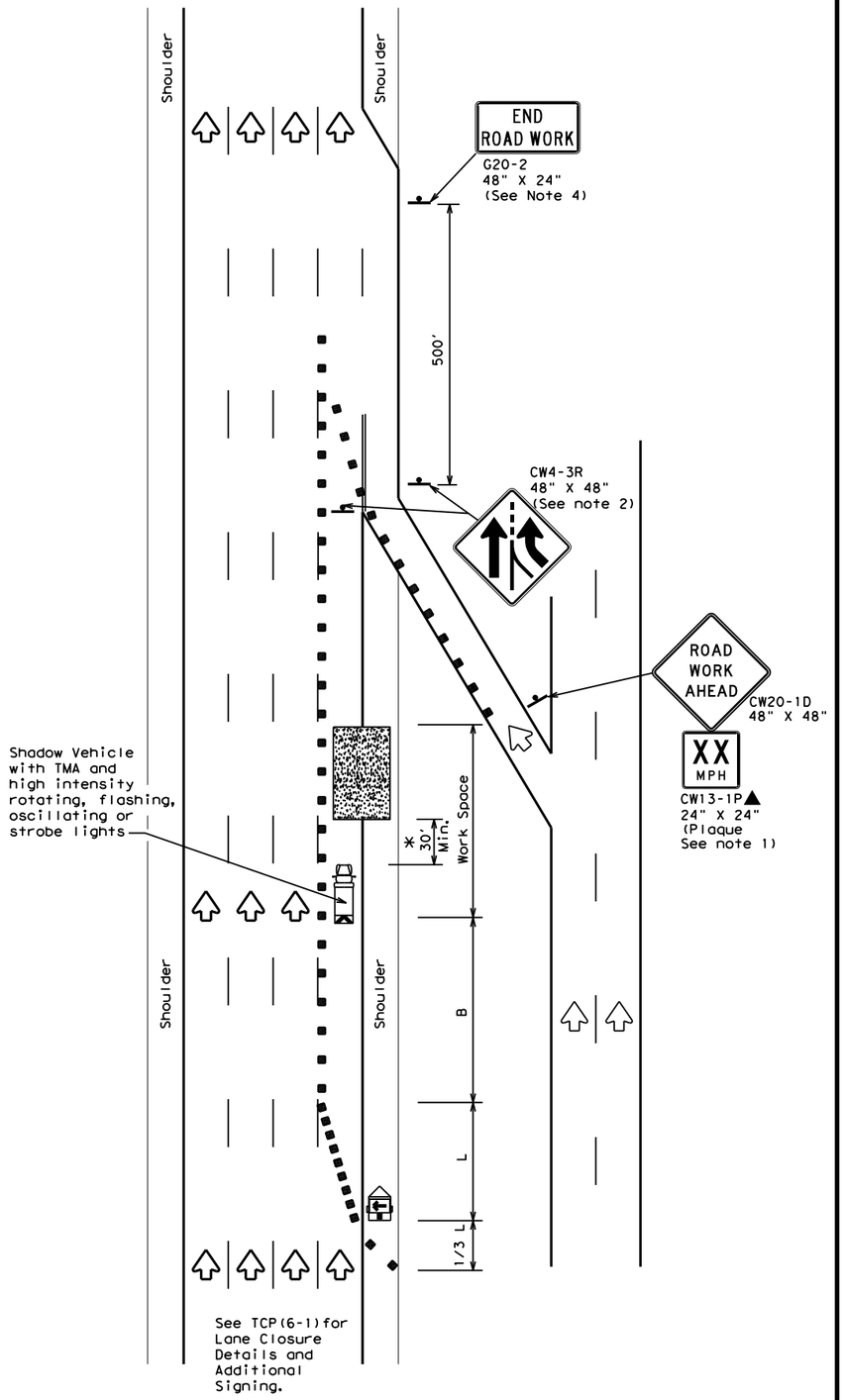
TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

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	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		43

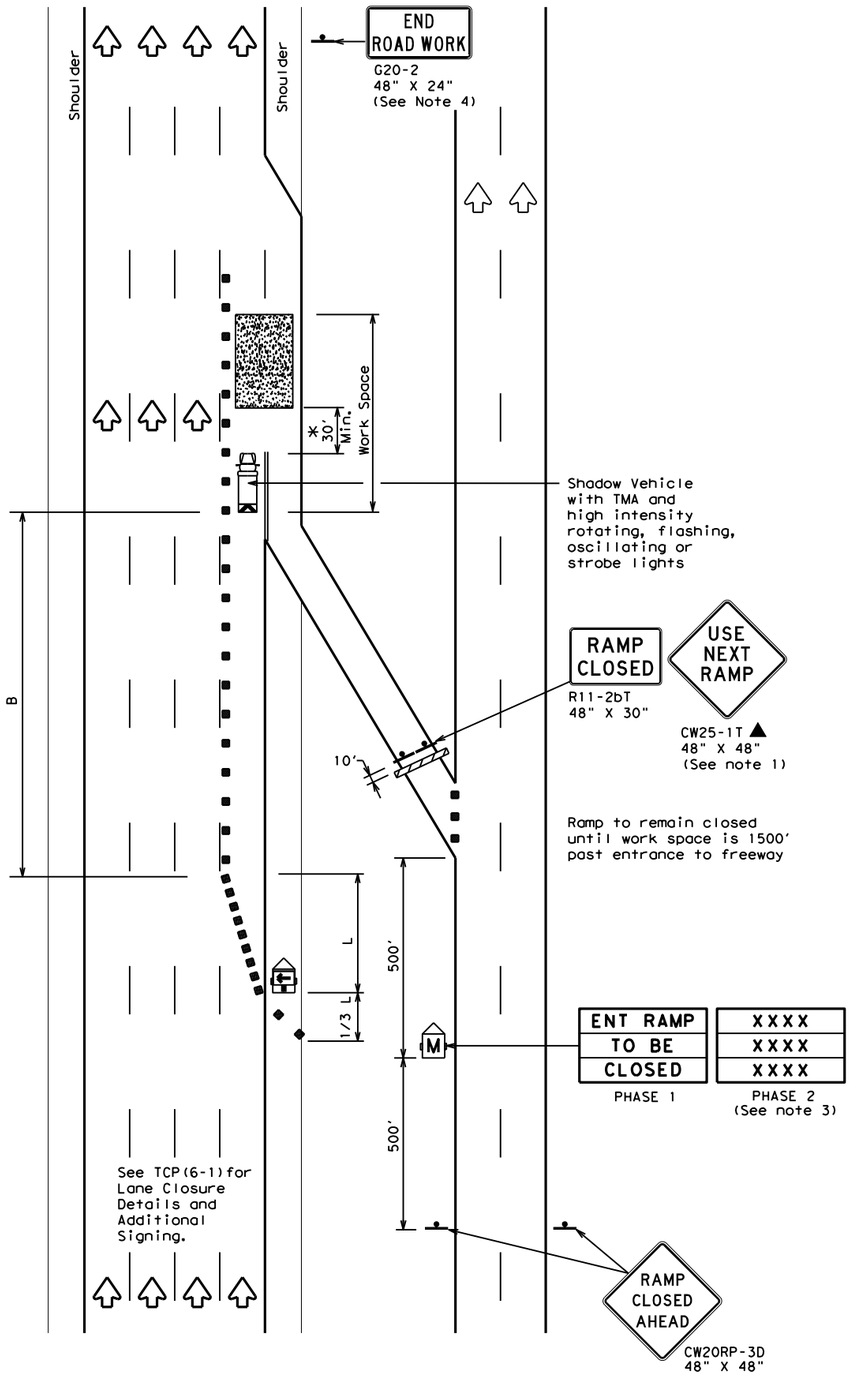
201

DATE:
FILE:



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP 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 "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. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. 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.

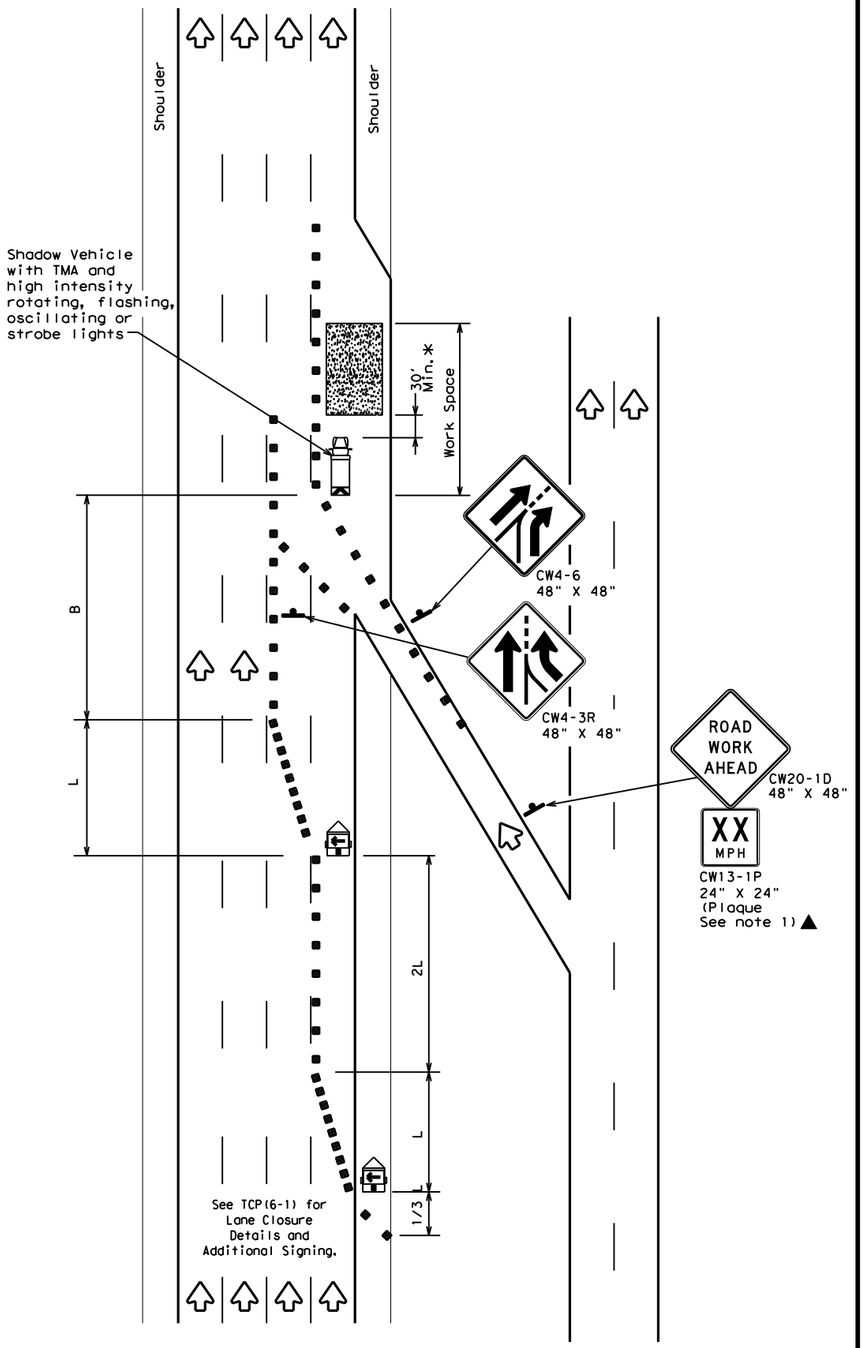
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

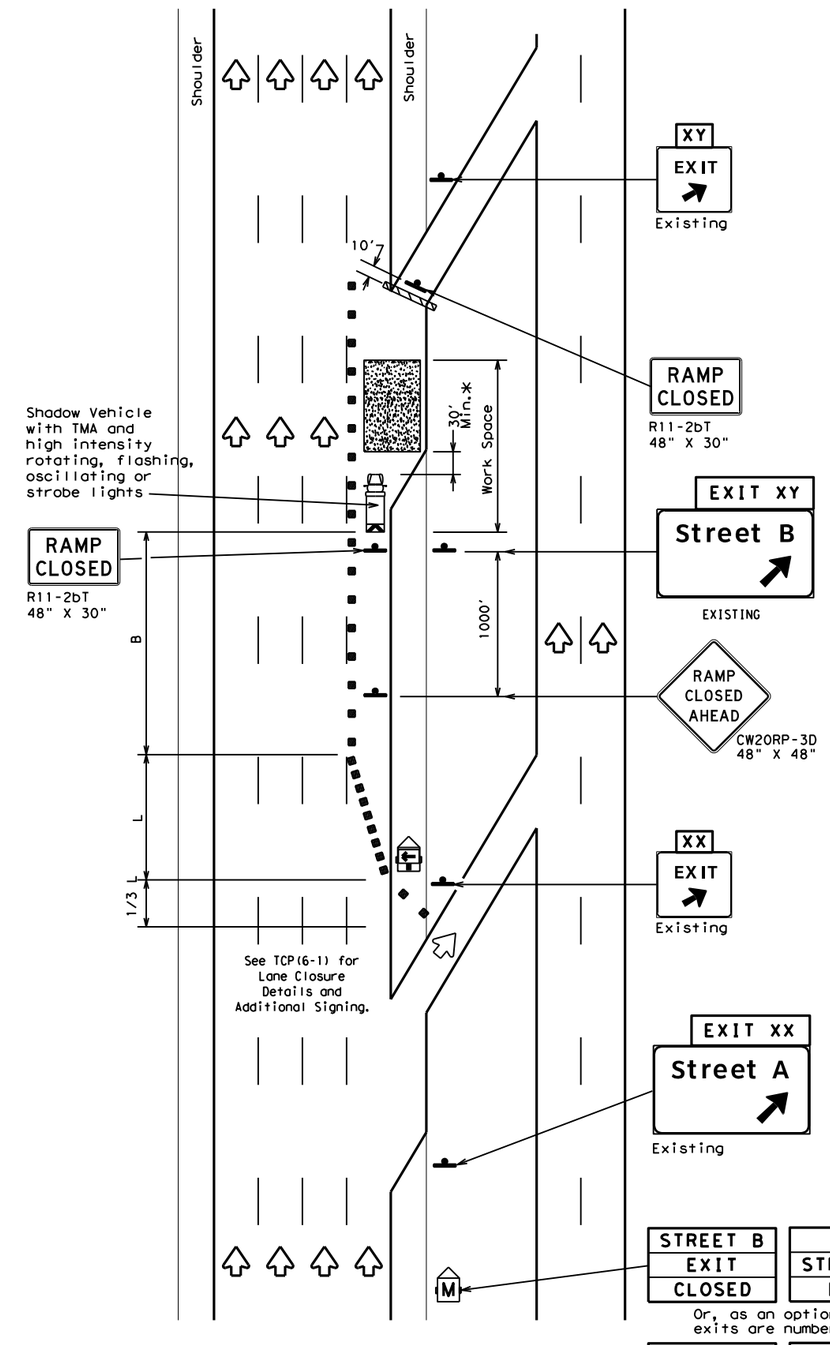
TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	ELLIS		44



TCP (6-3a)

ENTRANCE RAMP OPEN



STREET B EXIT CLOSED	USE STREET A EXIT

Or, as an option when exits are numbered

EXIT XY CLOSED	USE EXIT XX

Place 1 mile (approx.) in advance of Street A exit.

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" ** 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.

*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

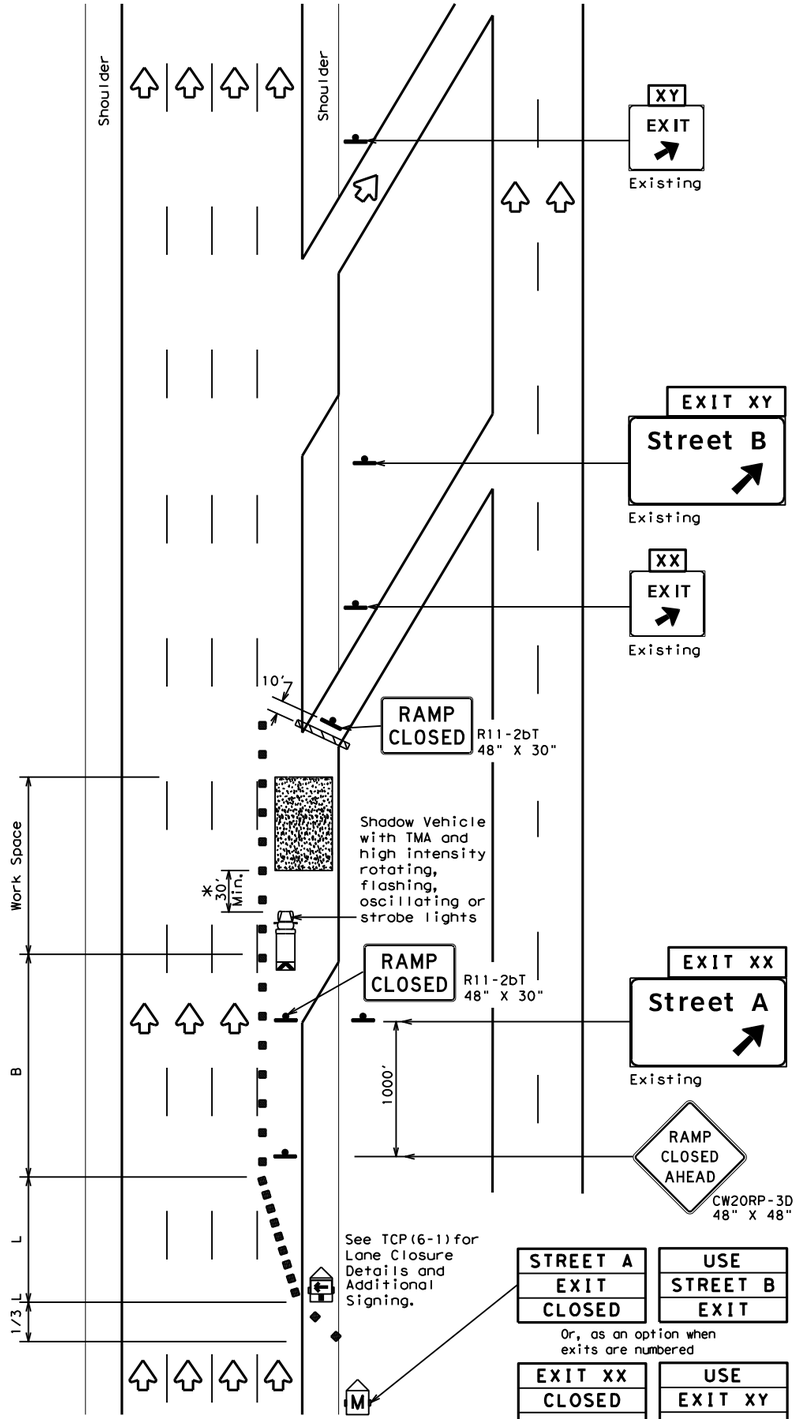
TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
©TxDOT February 1994	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0172	04	050, ETC		US 287	
1-97 8-98	DIST	COUNTY			SHEET NO.	
4-98 8-12	DAL	ELLIS			45	

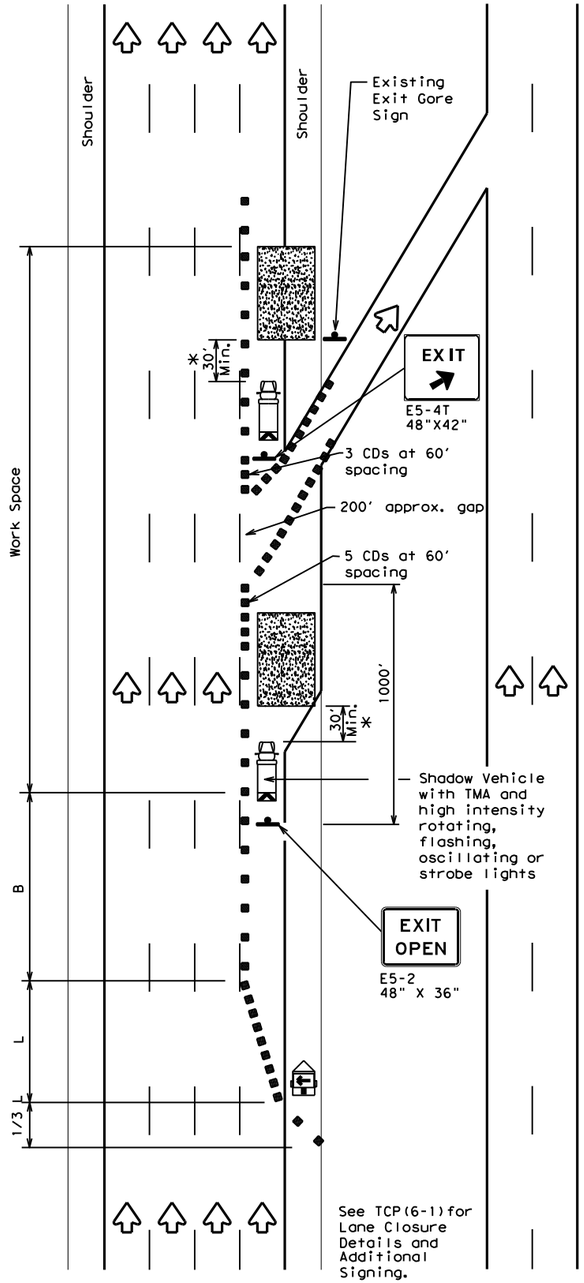
DATE:
FILE:

DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

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

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. See BC Standards for sign details.

*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.

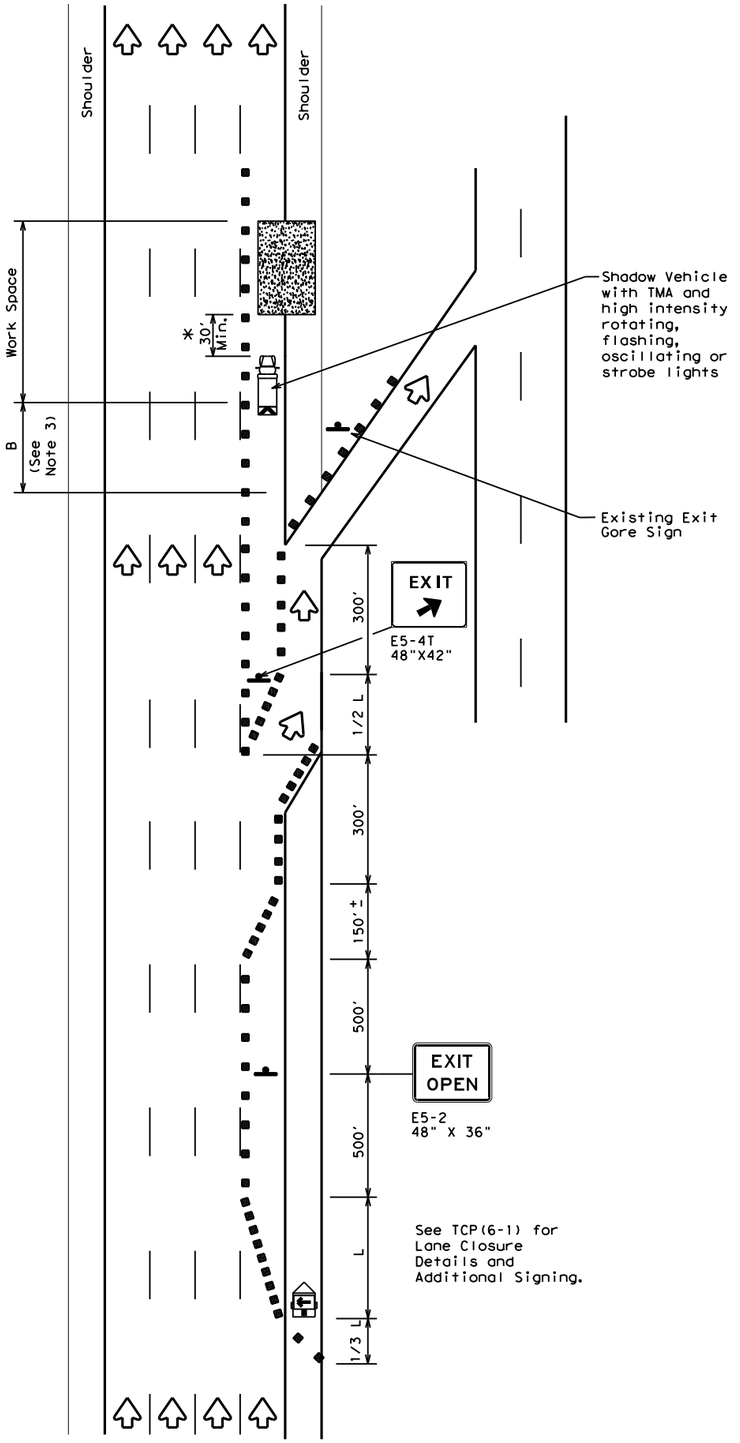
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

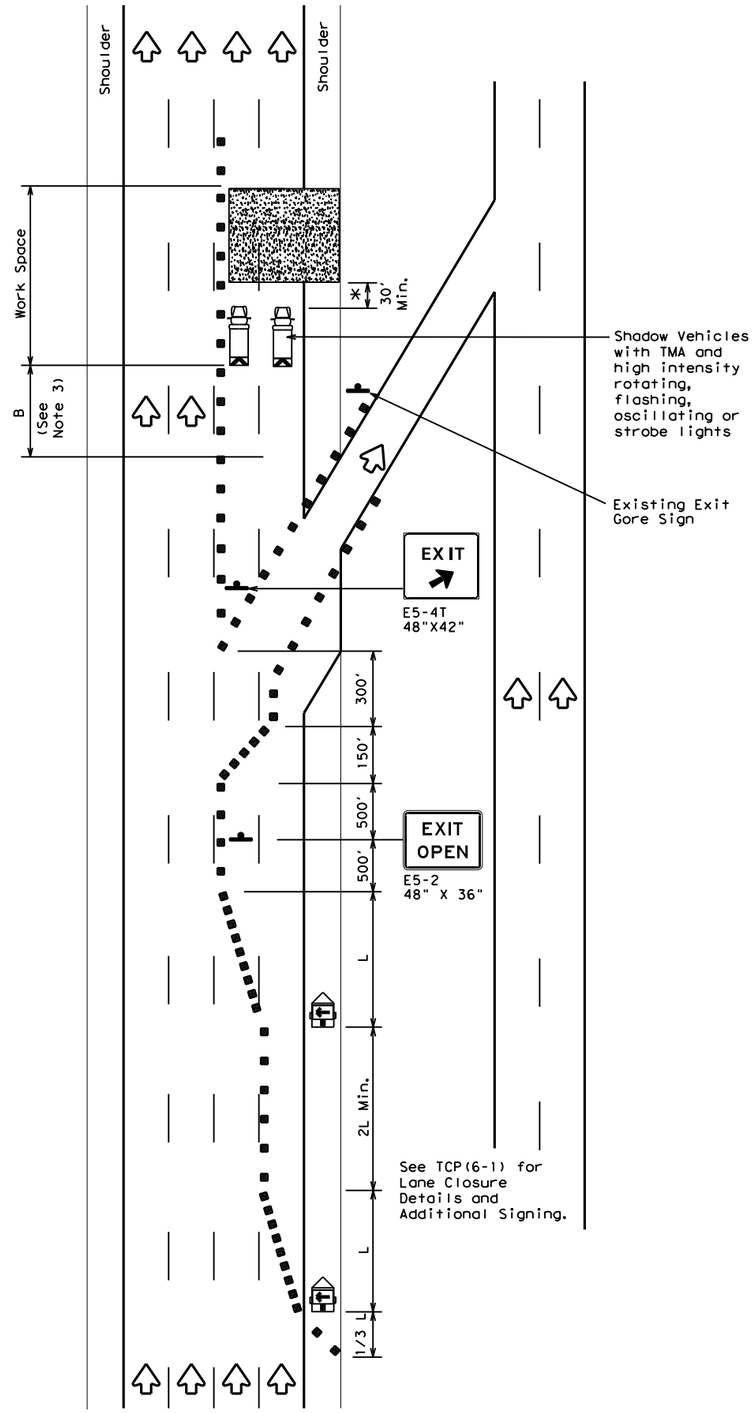
FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	ELLIS		46

DATE:
FILE:



TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

EXIT RAMP OPEN
TWO LANE CLOSURE WITHIN 1500' PAST EXIT 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" ** 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. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

* 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 EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
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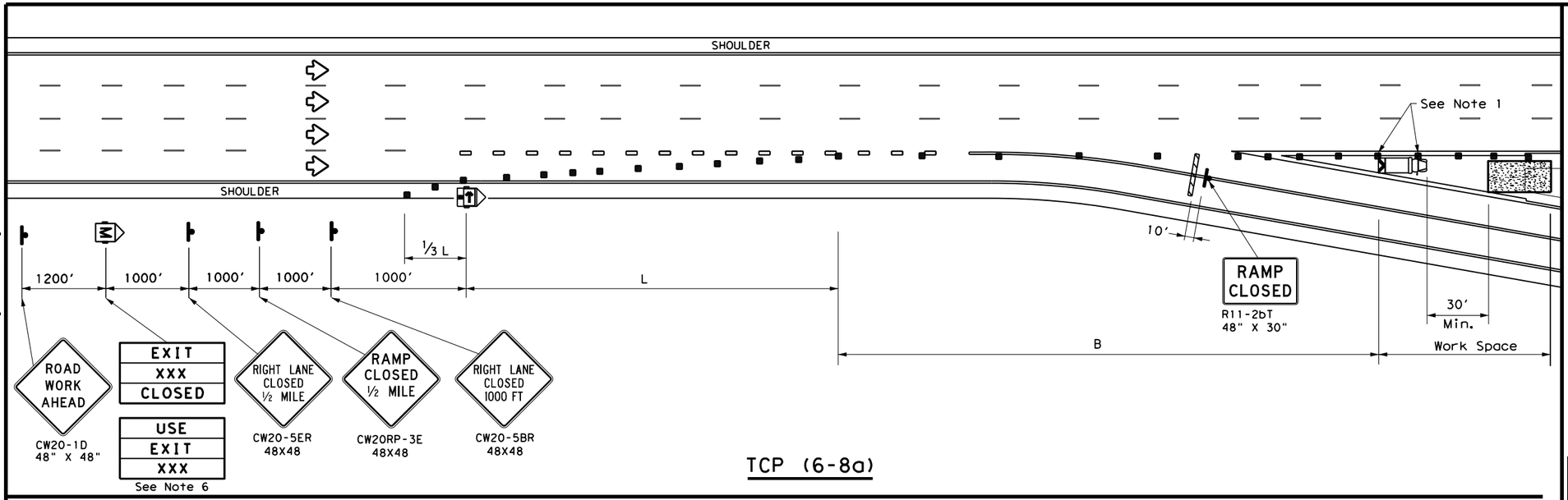
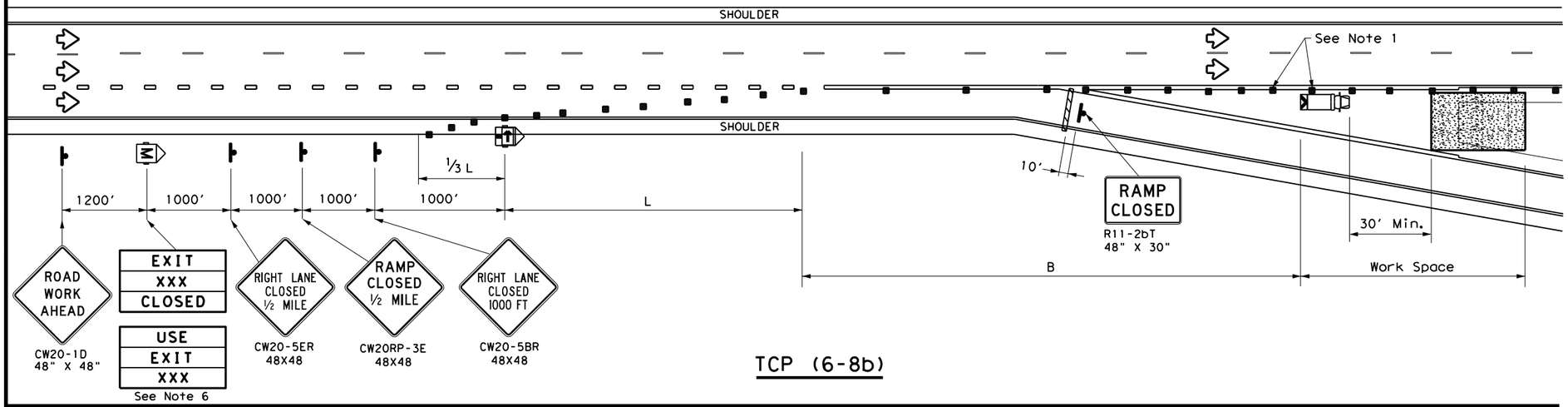
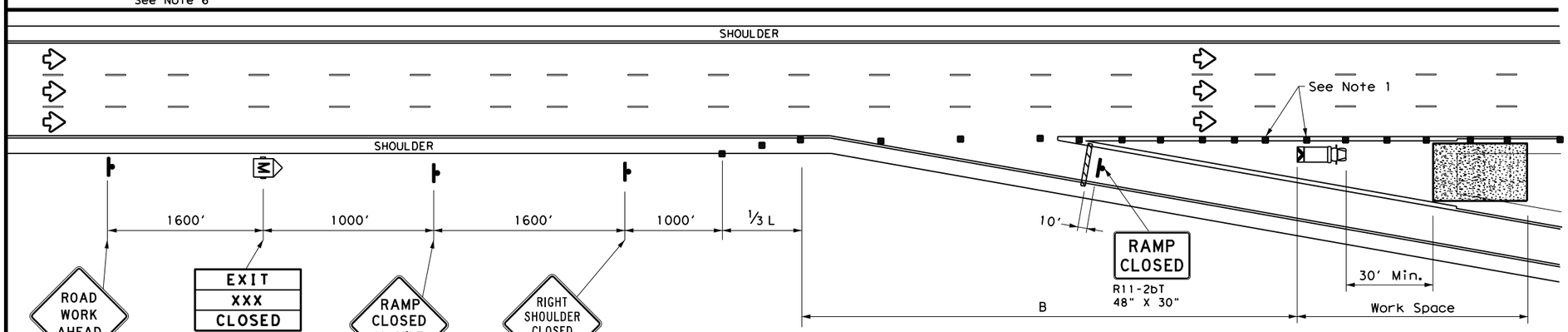
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	ELLIS		47



TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

DATE:
FILE:

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

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. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

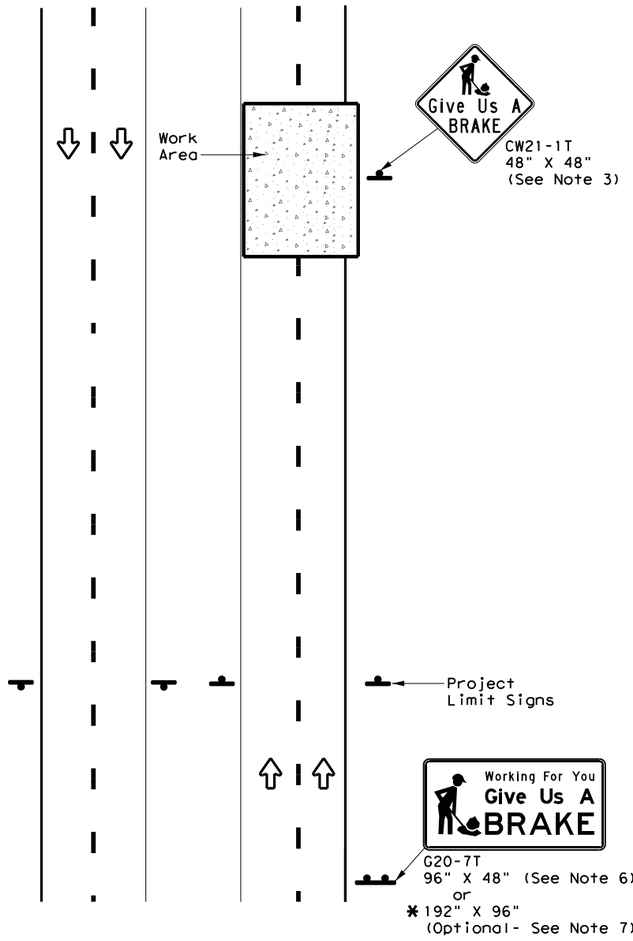
Texas Department of Transportation

Traffic Operations Division Standard

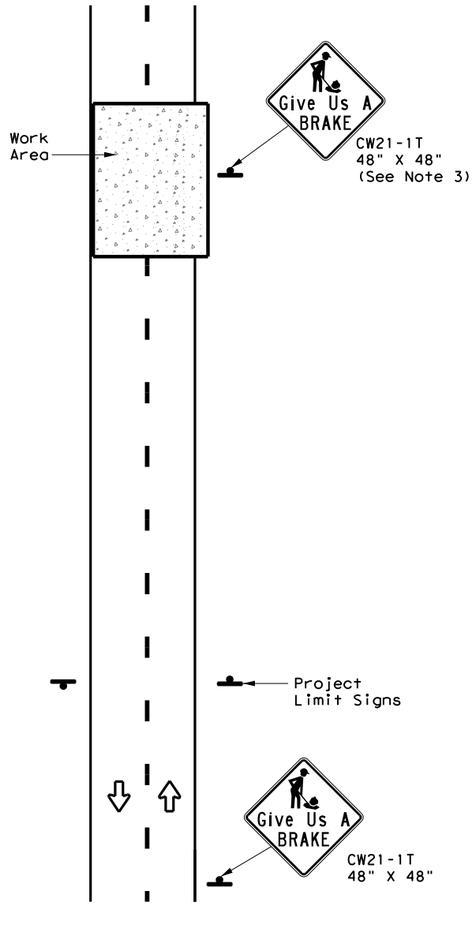
WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

FILE: tcp6-8.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		48



DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

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SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

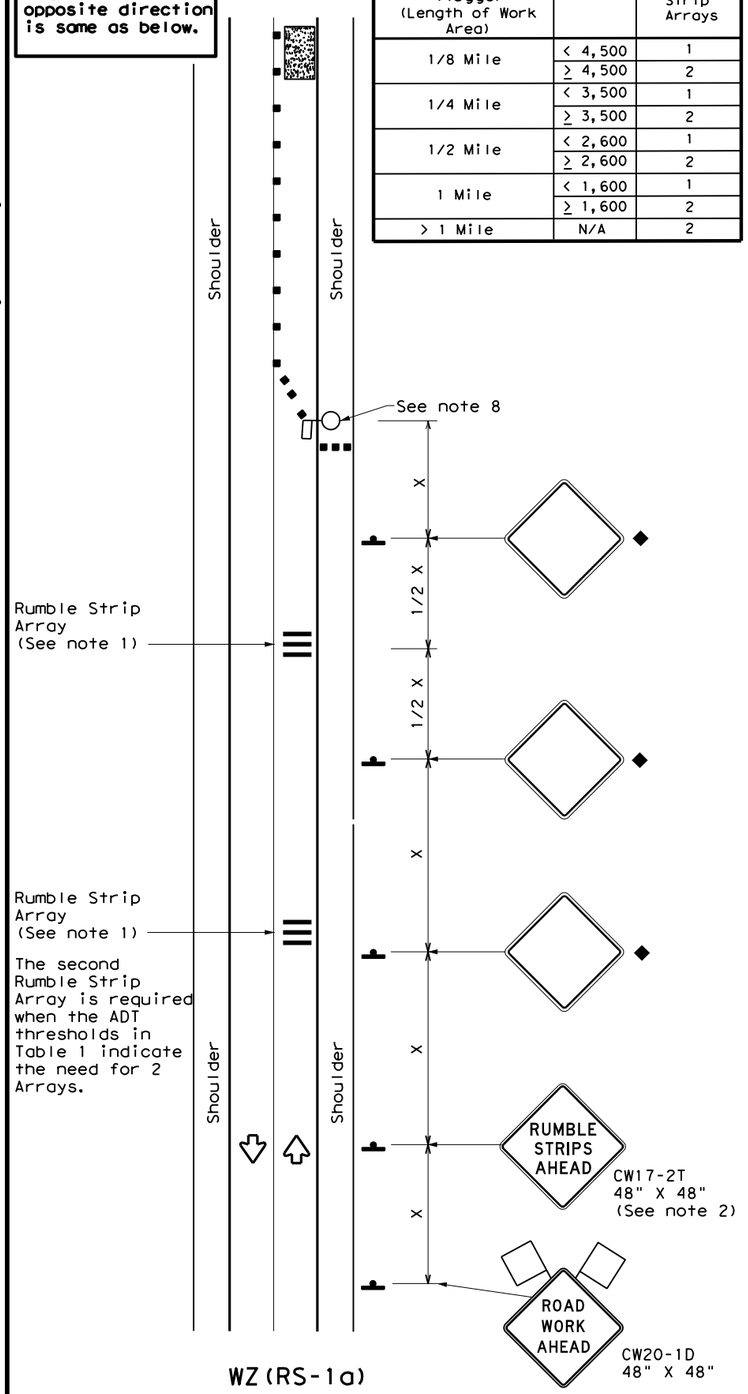
FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	DAL	ELLIS		49

116

DATE:
FILE:

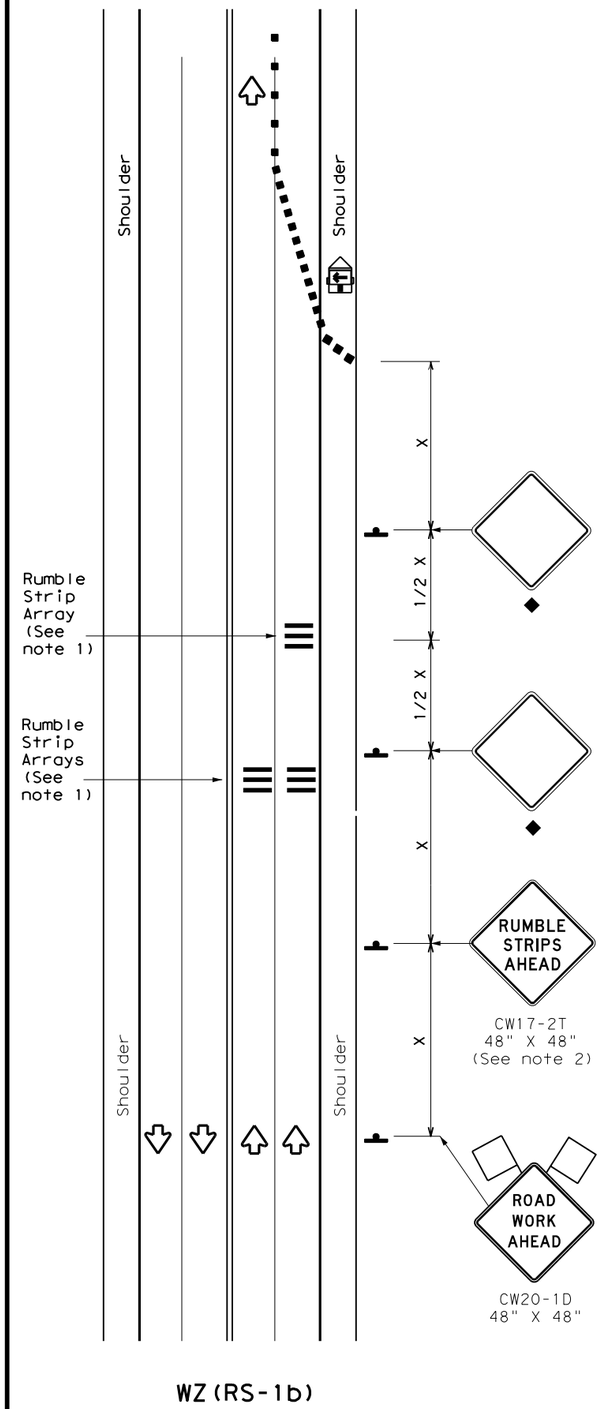
Warning sign and rumble strip sequence in opposite direction is same as below.

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	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		50

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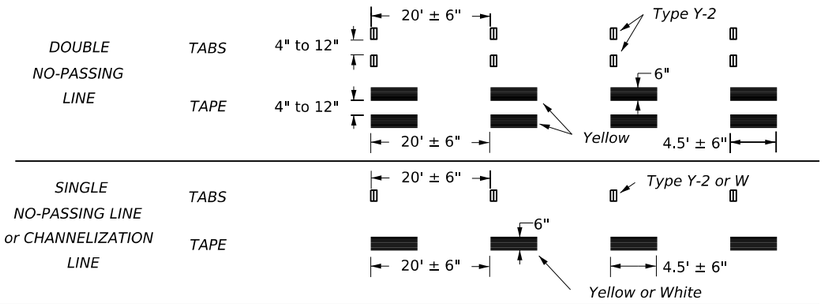
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



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.

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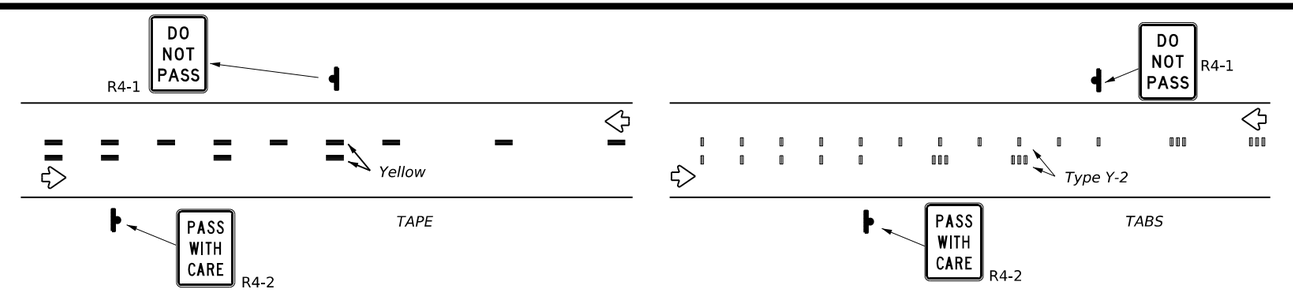
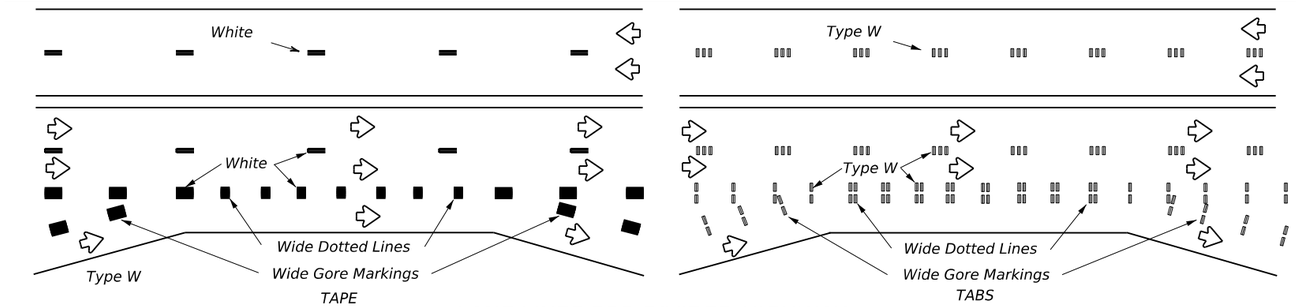
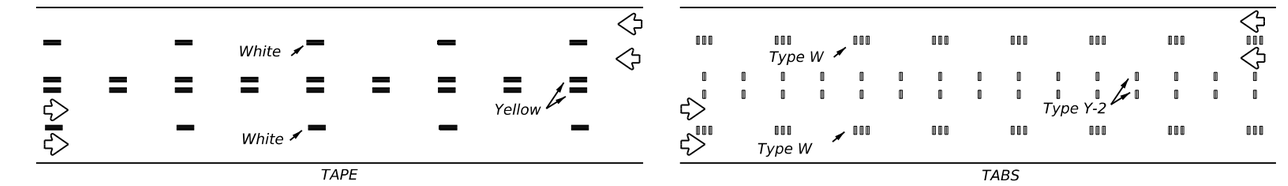
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



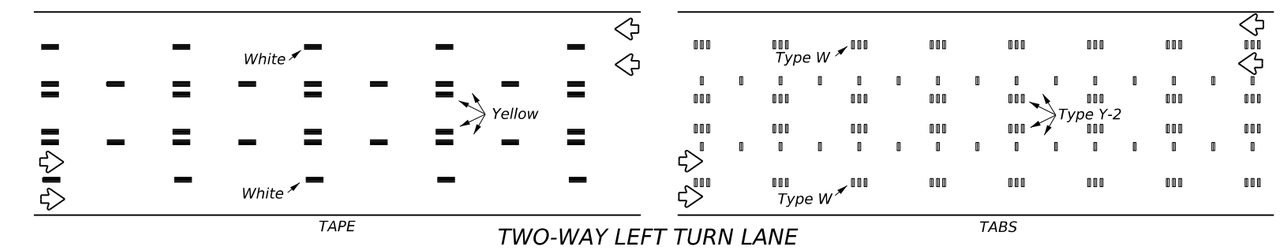
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



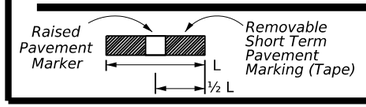
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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1-97 2-23	DAL	ELLIS		51
3-03				

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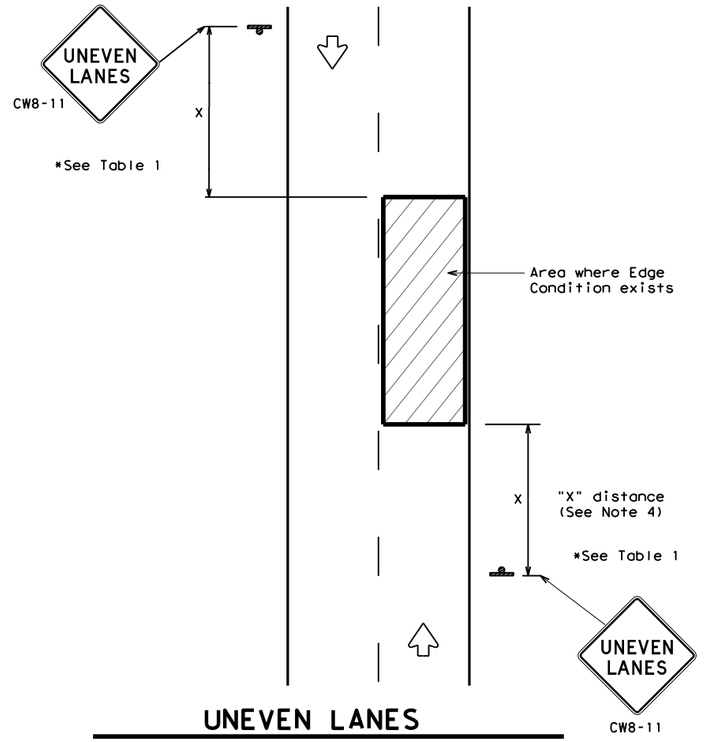
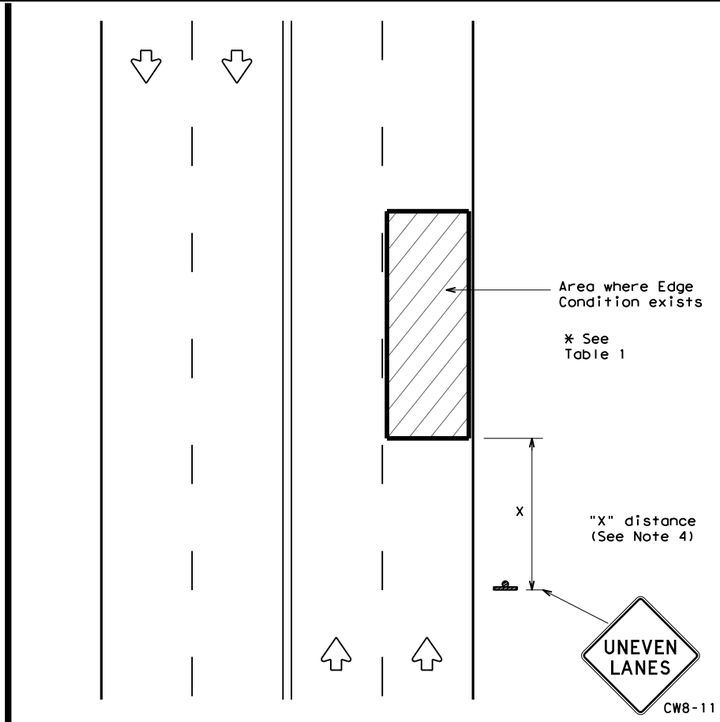
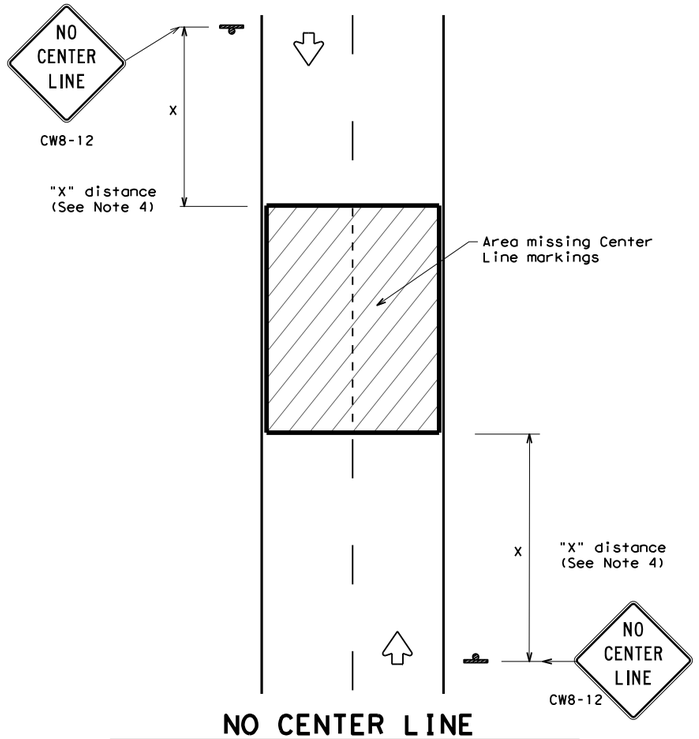


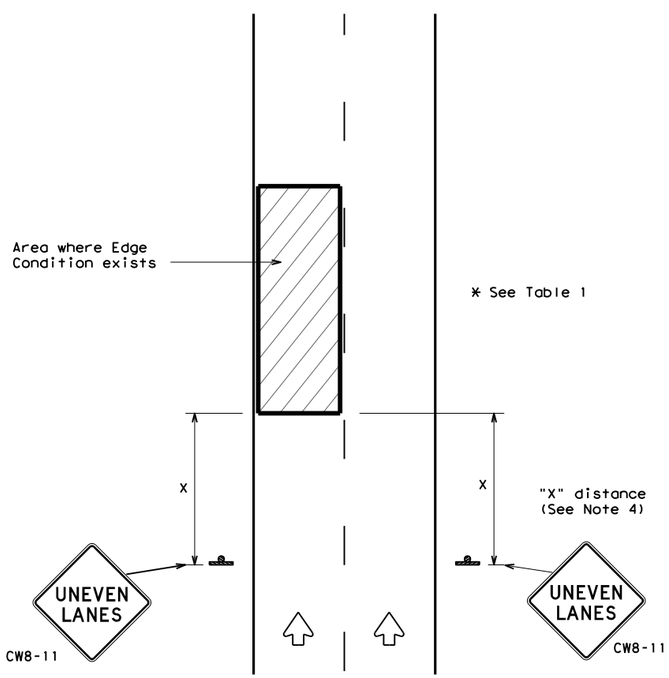
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

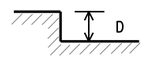
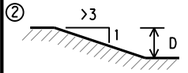
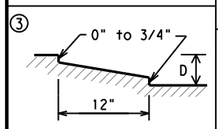
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

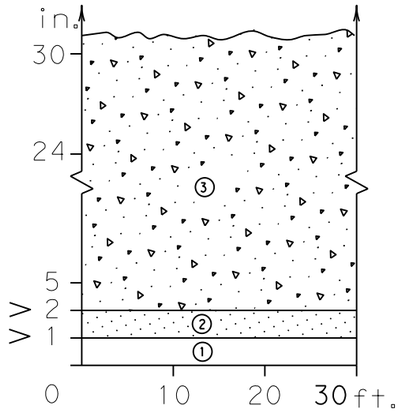
SIGNING FOR UNEVEN LANES

WZ(UL)-13

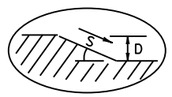
FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	DAL	ELLIS		52

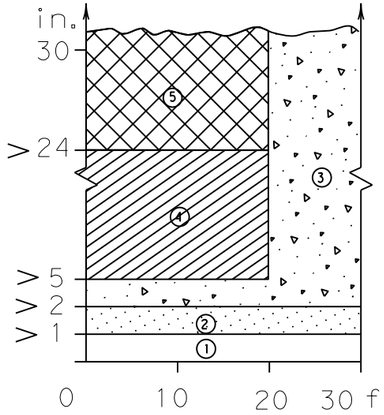
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

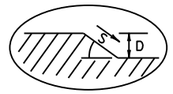


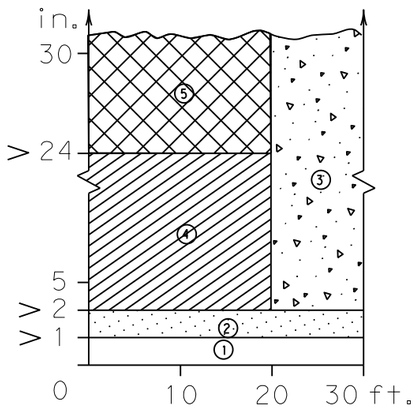
Edge Condition I
S = (3:1) (or flatter)



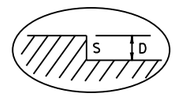


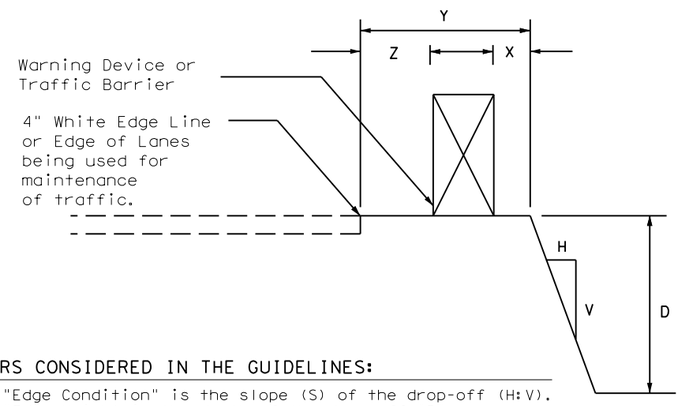
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

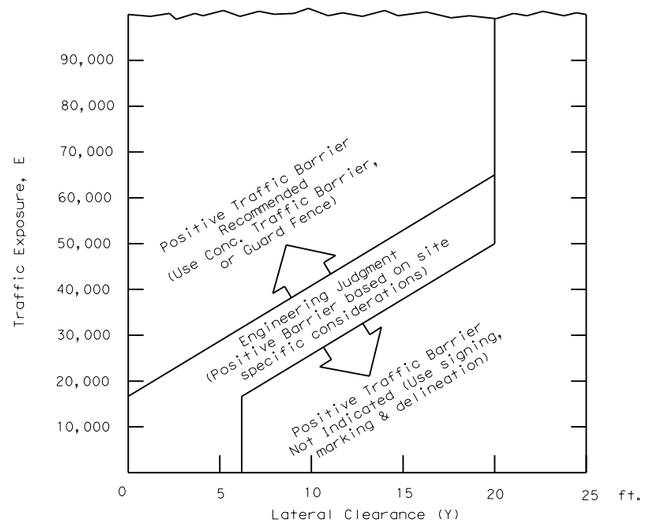
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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

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

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

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



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

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

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

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

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 7/18/24
Signature of Registrant & Date

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		53

DATE:
FILE:

		Station	Northing	Easting
Element: Linear				
POT	( )	0.000 R1	6878035.5	2403053.1
PI	( )	800.000 R1	6877581.6	2403711.9
Tangential Direction:		S55.432°E		
Tangential Length:		800		
Element: Linear				
PI	( )	800.000 R1	6877581.6	2403711.9
PC	( )	1857.060 R1	6876999.1	2404593.9
Tangential Direction:		S56.559°E		
Tangential Length:		1057.06		
Element: Circular				
PC	( )	1857.060 R1	6876999.1	2404593.9
PI	( )	1996.288 R1	6876924.7	2404711.7
CC	( )		6878690.2	2405661.6
PT	( )	2135.067 R1	6876867.4	2404838.6
Radius:		2000		
Delta:		7.964°	Left	
Degree of Curvature (Arc):		2.865°		
Length:		278.007		
Tangent:		139.228		
Chord:		277.783		
Middle Ordinate:		4.829		
External:		4.84		
Back Tangent Direction:		S57.734°E		
Back Radial Direction:		S32.266°W		
Chord Direction:		S61.716°E		
Ahead Radial Direction:		S24.302°W		
Ahead Tangent Direction:		S65.698°E		
Element: Linear				
PT	( )	2135.067 R1	6876867.4	2404838.6
PC	( )	3350.103 R1	6876367.4	2405945.9
Tangential Direction:		S65.698°E		
Tangential Length:		1215.037		
Element: Circular				
PC	( )	3350.103 R1	6876367.4	2405945.9
PI	( )	4025.274 R1	6876089.5	2406561.3
CC	( )		6873952.2	2404855.4
PT	( )	4672.314 R1	6875551.1	2406968.7
Radius:		2650		
Delta:		28.588°	Right	
Degree of Curvature (Arc):		2.162°		
Length:		1322.21		
Tangent:		675.171		
Chord:		1308.538		
Middle Ordinate:		82.037		
External:		84.658		
Back Tangent Direction:		S65.698°E		
Back Radial Direction:		S24.302°W		
Chord Direction:		S51.405°E		
Ahead Radial Direction:		S52.889°W		
Ahead Tangent Direction:		S37.111°E		

		Station	Northing	Easting
Element: Linear				
PT	( )	4672.314 R1	6875551.154	2406968.704
PC	( )	4692.314 R1	6875535.204	2406980.771
Tangential Direction:		S37.111°E		
Tangential Length:		20		
Element: Circular				
PC	( )	4692.314 R1	6875535.204	2406980.771
PI	( )	5148.430 R1	6875171.466	2407255.973
CC	( )		6877164.273	2409133.94
PT	( )	5596.014 R1	6874918.312	2407635.387
Radius:		2700		
Delta:		19.177°	Left	
Degree of Curvature (Arc):		2.122°		
Length:		903.7		
Tangent:		456.116		
Chord:		899.487		
Middle Ordinate:		37.721		
External:		38.255		
Back Tangent Direction:		S37.111°E		
Back Radial Direction:		S52.889°W		
Chord Direction:		S46.699°E		
Ahead Radial Direction:		S33.712°W		
Ahead Tangent Direction:		S56.288°E		
Element: Linear				
PT	( )	5596.014 R1	6874918.312	2407635.387
PC	( )	7883.397 R1	6873648.77	2409538.118
Tangential Direction:		S56.288°E		
Tangential Length:		2287.383		
Element: Circular				
PC	( )	7883.397 R1	6873648.77	2409538.118
PI	( )	8069.832 R1	6873545.294	2409693.201
CC	( )		6870471.153	2407417.944
PT	( )	8255.972 R1	6873427.209	2409837.471
Radius:		3819.997		
Delta:		5.588°	Right	
Degree of Curvature (Arc):		1.500°		
Length:		372.574		
Tangent:		186.435		
Chord:		372.427		
Middle Ordinate:		4.541		
External:		4.547		
Back Tangent Direction:		S56.288°E		
Back Radial Direction:		S33.712°W		
Chord Direction:		S53.494°E		
Ahead Radial Direction:		S39.300°W		
Ahead Tangent Direction:		S50.700°E		
Element: Linear				
PT	( )	8255.972 R1	6873427.209	2409837.471
PI	( )	14044.977 R1	6869760.542	2414317.219
Tangential Direction:		S50.700°E		
Tangential Length:		5789.006		

ALIGNMENT DATA PROVIDED FOR CONTACTOR'S INFORMATION ONLY. CONSTRUCT ACCORDING TO EXISATING ROADWAY ALIGNMENT AND VERTICAL OFFSET AS NOTED IN TYPICAL SECTIONS AND PLAN SHEETS.

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 8/1/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

ALIGNMENT DATA SHEETS

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		54

DATE: 8/1/2024 1:31:52 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/US287 Alignment Data Sheet

		Station	Northing	Easting
Element: Linear				
PI	( )	14044.977 R1	6869760.542	2414317.219
PI	( )	14857.324 R1	6869236.039	2414937.545
Tangential Direction:		S49.785°E		
Tangential Length:		812.347		
Element: Linear				
PI	( )	14857.324 R1	6869236.039	2414937.545
PI	( )	16518.354 R1	6868191.462	2416229.009
Tangential Direction:		S51.033°E		
Tangential Length:		1661.03		
Element: Linear				
PI	( )	16518.354 R1	6868191.462	2416229.009
PC	( )	17644.014 R1	6867438.031	2417065.342
Tangential Direction:		S47.985°E		
Tangential Length:		1125.66		
Element: Circular				
PC	( )	17644.014 R1	6867438.031	2417065.342
PI	( )	18006.331 R1	6867186.751	2417326.362
CC	( )		6875694.035	2425013.286
PT	( )	18368.406 R1	6866952.461	2417602.733
Radius:		11459.992		
Delta:		3.622°	Left	
Degree of Curvature (Arc):		0.500°		
Length:		724.391		
Tangent:		362.316		
Chord:		724.271		
Middle Ordinate:		5.723		
External:		5.726		
Back Tangent Direction:		S46.089°E		
Back Radial Direction:		S43.911°W		
Chord Direction:		S47.900°E		
Ahead Radial Direction:		S40.289°W		
Ahead Tangent Direction:		S49.711°E		
Element: Linear				
PT	( )	18368.406 R1	6866952.461	2417602.733
PC	( )	19320.564 R1	6866336.752	2418329.031
Tangential Direction:		S49.711°E		
Tangential Length:		952.158		
Element: Circular				
PC	( )	19320.564 R1	6866336.752	2418329.031
PI	( )	19770.926 R1	6866045.527	2418672.563
CC	( )		6869250.61	2420799.215
PT	( )	20217.150 R1	6865842.179	2419074.403
Radius:		3819.997		
Delta:		13.448°	Left	
Degree of Curvature (Arc):		1.500°		
Length:		896.586		
Tangent:		450.362		
Chord:		894.529		
Middle Ordinate:		26.274		
External:		26.456		
Back Tangent Direction:		S49.711°E		
Back Radial Direction:		S40.289°W		
Chord Direction:		S56.435°E		
Ahead Radial Direction:		S26.841°W		
Ahead Tangent Direction:		S63.159°E		

		Station	Northing	Easting
Element: Linear				
PT	( )	20217.150 R1	6865842.17	2419074.40
PI	( )	20922.025 R1	6865523.91	2419703.33
Tangential Direction:		S63.159°E		
Tangential Length:		704.875		
Element: Linear				
PI	( )	20922.025 R1	6865523.91	2419703.33
PI	( )	21507.652 R1	6865246.91	2420219.31
Tangential Direction:		S61.772°E		
Tangential Length:		585.627		
Element: Linear				
PI	( )	21507.652 R1	6865246.91	2420219.31
PI	( )	22764.893 R1	6864693.94	2421348.41
Tangential Direction:		S63.907°E		
Tangential Length:		1257.241		
Element: Linear				
PI	( )	22764.893 R1	6864693.94	2421348.41
PI	( )	23291.383 R1	6864444.50	2421812.06
Tangential Direction:		S61.721°E		
Tangential Length:		526.49		
Element: Linear				
PI	( )	23291.383 R1	6864444.50	2421812.06
PI	( )	24557.646 R1	6863884.65	2422947.84
Tangential Direction:		S63.760°E		
Tangential Length:		1266.263		
Element: Linear				
PI	( )	24557.646 R1	6863884.65	2422947.84
PI	( )	24991.681 R1	6863678.65	2423329.87
Tangential Direction:		S61.664°E		
Tangential Length:		434.035		
Element: Linear				
PI	( )	24991.681 R1	6863678.65	2423329.87
PC	( )	25740.820 R1	6863344.77	2424000.50
Tangential Direction:		S63.534°E		
Tangential Length:		749.139		
Element: Circular				
PC	( )	25740.820 R1	6863344.77	2424000.50
PI	( )	26561.694 R1	6862978.93	2424735.34
CC	( )		6858421.20	2421549.29
PT	( )	27370.538 R1	6862414.46	2425331.33
Radius:		5500		
Delta:		16.977°	Right	
Degree of Curvature (Arc):		1.042°		
Length:		1629.718		
Tangent:		820.874		
Chord:		1623.763		
Middle Ordinate:		60.253		
External:		60.92		
Back Tangent Direction:		S63.534°E		
Back Radial Direction:		S26.466°W		
Chord Direction:		S55.045°E		
Ahead Radial Direction:		S43.444°W		
Ahead Tangent Direction:		S46.556°E		

ALIGNMENT DATA PROVIDED FOR CONTACTOR'S INFORMATION ONLY. CONSTRUCT ACCORDING TO EXISATING ROADWAY ALIGNMENT AND VERTICAL OFFSET AS NOTED IN TYPICAL SECTIONS AND PLAN SHEETS.

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 8/1/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

ALIGNMENT DATA SHEET

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		55

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		Station	Northing	Easting
Element: Linear				
PT	( )	27370.538 R1	6862414.46	2425331.33
PC	( )	29757.520 R1	6860773.07	2427064.40
Tangential Direction:		S46.556°E		
Tangential Length:		2386.981		
Element: Circular				
PC	( )	29757.520 R1	6860773.07	2427064.40
PI	( )	31567.783 R1	6859528.25	2428378.741
CC	( )		6852452.56	2419184.00
PT	( )	33348.376 R1	6857938.92	2429245.38
Radius:		11459.992		
Delta:		17.953°	Right	
Degree of Curvature (Arc):		0.500°		
Length:		3590.856		
Tangent:		1810.263		
Chord:		3576.184		
Middle Ordinate:		140.357		
External:		142.097		
Back Tangent Direction:		S46.556°E		
Back Radial Direction:		S43.444°W		
Chord Direction:		S37.580°E		
Ahead Radial Direction:		S61.397°W		
Ahead Tangent Direction:		S28.603°E		
Element: Linear				
PT	( )	33348.376 R1	6857938.92	2429245.38
PC	( )	35370.956 R1	6856163.18	2430213.67
Tangential Direction:		S28.603°E		
Tangential Length:		2022.58		
Element: Circular				
PC	( )	35370.956 R1	6856163.18	2430213.67
PI	( )	36433.047 R1	6855230.71	2430722.14
CC	( )		6857007.24	2431761.58
PT	( )	37282.794 R1	6855244.311	2431784.14
Radius:		1763.076		
Delta:		62.130°	Left	
Degree of Curvature (Arc):		3.250°		
Length:		1911.838		
Tangent:		1062.091		
Chord:		1819.535		
Middle Ordinate:		252.858		
External:		295.194		
Back Tangent Direction:		S28.603°E		
Back Radial Direction:		S61.397°W		
Chord Direction:		S59.668°E		
Ahead Radial Direction:		S0.733°E		
Ahead Tangent Direction:		N89.267°E		
Element: Linear				
PT	( )	37282.794 R1	6855244.311	2431784.14
PC	( )	40454.660 R1	6855284.90	2434955.75
Tangential Direction:		N89.267°E		
Tangential Length:		3171.866		

		Station	Northing	Easting
Element: Circular				
PC	( )	40454.660 R1	6855284.907	2434955.752
PI	( )	42056.262 R1	6855305.406	2436557.223
CC	( )		6858149.671	2434919.083
PT	( )	43375.496 R1	6856680.342	2437378.613
Radius:		2864.998		
Delta:		58.412°	Left	
Degree of Curvature (Arc):		2.000°		
Length:		2920.836		
Tangent:		1601.602		
Chord:		2795.977		
Middle Ordinate:		364.23		
External:		417.279		
Back Tangent Direction:		N89.267°E		
Back Radial Direction:		S0.733°E		
Chord Direction:		N60.060°E		
Ahead Radial Direction:		S59.146°E		
Ahead Tangent Direction:		N30.854°E		
Element: Linear				
PT	( )	43375.496 R1	6856680.342	2437378.613
PC	( )	44157.824 R1	6857351.951	2437779.834
Tangential Direction:		N30.854°E		
Tangential Length:		782.328		
Element: Circular				
PC	( )	44157.824 R1	6857351.951	2437779.834
PI	( )	45873.354 R1	6858824.691	2438659.653
CC	( )		6855882.621	2440239.364
PT	( )	47249.322 R1	6858744.487	2440373.307
Radius:		2864.998		
Delta:		61.825°	Right	
Degree of Curvature (Arc):		2.000°		
Length:		3091.498		
Tangent:		1715.53		
Chord:		2943.681		
Middle Ordinate:		406.971		
External:		474.352		
Back Tangent Direction:		N30.854°E		
Back Radial Direction:		S59.146°E		
Chord Direction:		N61.767°E		
Ahead Radial Direction:		S2.680°W		
Ahead Tangent Direction:		S87.320°E		
Element: Linear				
PT	( )	47249.322 R1	6858744.487	2440373.307
PC	( )	49772.377 R1	6858626.53	2442893.604
Tangential Direction:		S87.320°E		
Tangential Length:		2523.056		

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STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo , P.E. 8/1/24
Signature of Registrant & Date

Texas Department of Transportation

US 287

ALIGNMENT DATA SHEETS

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		56

DATE: 8/1/2024 1:31:53 PM
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CK: DW: CK: DW:

HORIZONTAL ALIGNMENT DATA
RAMP N ℄

	STATION	NORTHING	EASTING
Element: Circular			
PC( )	2000+00.00 R1	6862666.586	2424880.586
PI( )	2000+16.98 R1	6862654.158	2424892.151
CC( )		6862325.952	2424514.568
PT( )	2000+33.94 R1	6862640.975	2424902.847
Radius:	500.000		
Delta:	3.889° Right		
Degree of Curvature(Arc):	11.459°		
Length:	33.940		
Tangent:	16.976		
Chord:	33.933		
Middle Ordinate:	0.288		
External:	0.288		
Tangent Back Direction:	S42°56'33.85"E		
Tangent Ahead Direction:	S39°03'12.62"E		
Element: Linear			
PT( )	2000+33.94 R1	6862640.975	2424902.847
PC( )	2001+44.67 R1	6862554.986	2424972.612
Tangential Direction:	S39°03'12.62"E		
Tangential Length:	110.731		
Element: Circular			
PC( )	2001+44.67 R1	6862554.986	2424972.612
PI( )	2001+89.73 R1	6862519.993	2425001.004
CC( )		6861213.765	2423319.501
PT( )	2002+34.78 R1	6862483.829	2425027.889
Radius:	2128.767		
Delta:	2.425° Right		
Degree of Curvature(Arc):	2.692°		
Length:	90.111		
Tangent:	45.062		
Chord:	90.104		
Middle Ordinate:	0.477		
External:	0.477		
Tangent Back Direction:	S39°03'12.62"E		
Tangent Ahead Direction:	S36°37'41.39"E		
Element: Linear			
PT( )	2002+34.78 R1	6862483.829	2425027.889
PC( )	2003+92.11 R1	6862357.570	2425121.753
Tangential Direction:	S36°37'41.39"E		
Tangential Length:	157.327		
Element: Circular			
PC( )	2003+92.11 R1	6862357.570	2425121.753
PI( )	2004+64.05 R1	6862299.837	2425164.673
CC( )		6862969.702	2425945.143
PT( )	2005+35.75 R1	6862248.659	2425215.230
Radius:	1026.000		
Delta:	8.022° Left		
Degree of Curvature(Arc):	5.584°		
Length:	143.643		
Tangent:	71.939		
Chord:	143.526		
Middle Ordinate:	2.513		
External:	2.519		
Tangent Back Direction:	S36°37'41.39"E		
Tangent Ahead Direction:	S44°38'59.05"E		
Element: Linear			
PT( )	2005+35.75 R1	6862248.659	2425215.230
POT( )	2007+71.32 R1	6862081.069	2425380.783
Tangential Direction:	S44°38'59.05"E		
Tangential Length:	235.572		

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall , P.E. 2024-08-01
Signature of Registrant & Date

Texas Department of Transportation

US 287

ALIGNMENT
DATA SHEETS

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		57

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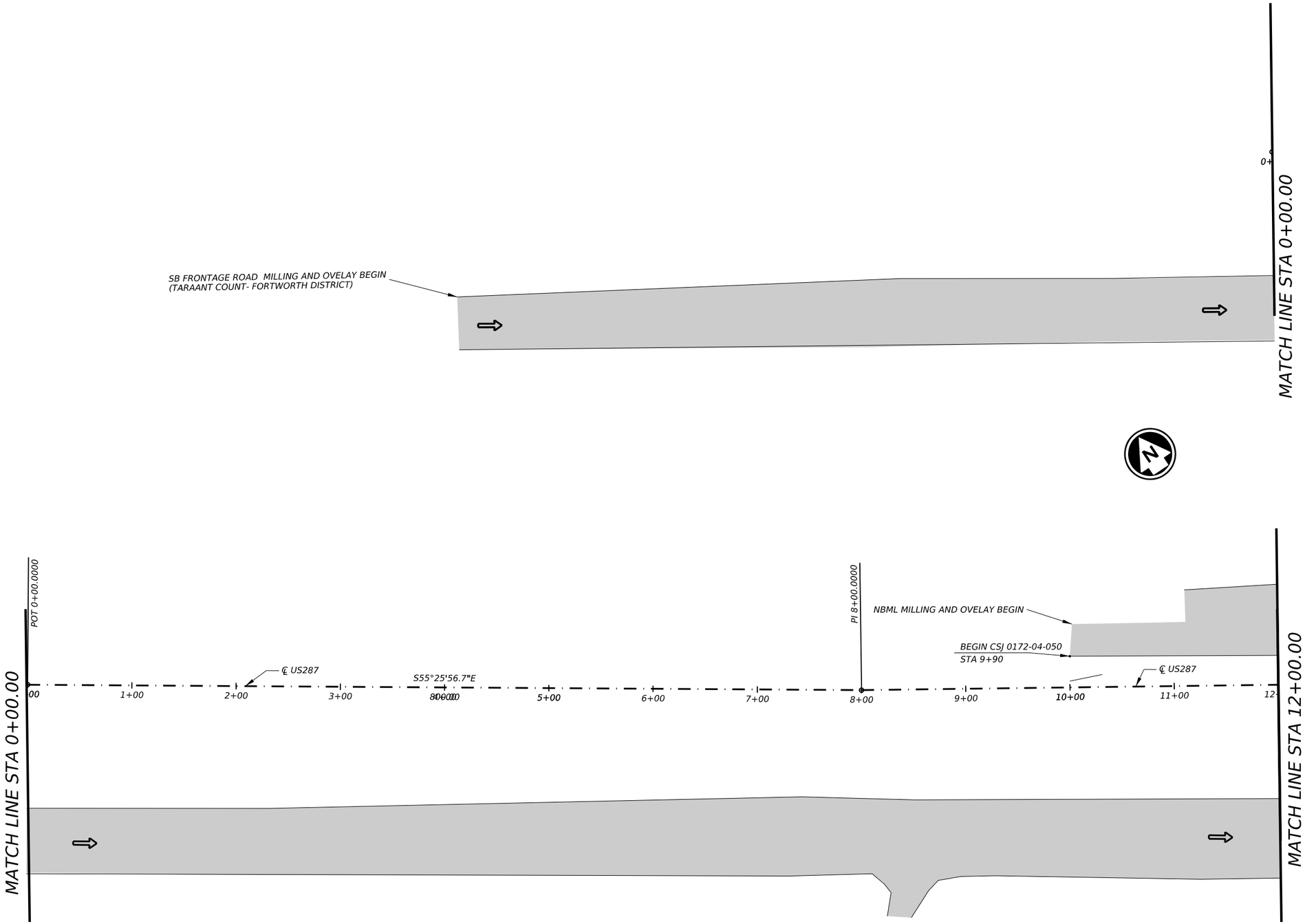
CK:
DW:
CK:
DW:

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

1. ALL STATIONING AND OFFSETS REFFER TO US287 ℄ UNLESS NOTED OTHERWISE.
2. REFER TO "HORIZONTAL DATA SHEET" FOR ADDITIONAL INFORMATION.
3. NO MILLING AND OVERLAY ON BRIDGE UNLESS NOTED OTHERWISE.
4. PAVEMENT MARKINGS ON BRIDGE SHALL BE UPDATED AS PER LATEST PAVEMENT MARKING STANDARDS.
5. MINIMIZE DISTURBANCE OF SOIL AND VEGETATION TO THE EXTENT POSSIBLE, AND PROTECT AREA STREAMS AND THEIR VEGETATATIVE BUFFERS.



0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
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LICENSED
PROFESSIONAL ENGINEER
Kepha Abongo

7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 1 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		58

DATE: 7/30/2024 4:03:39 PM
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LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

1. ALL STATIONING AND OFFSETS REFFER TO US287 ℄ UNLESS NOTED OTHERWISE.
2. REFER TO "HORIZONTAL DATA SHEET" FOR ADDITIONAL INFORMATION.
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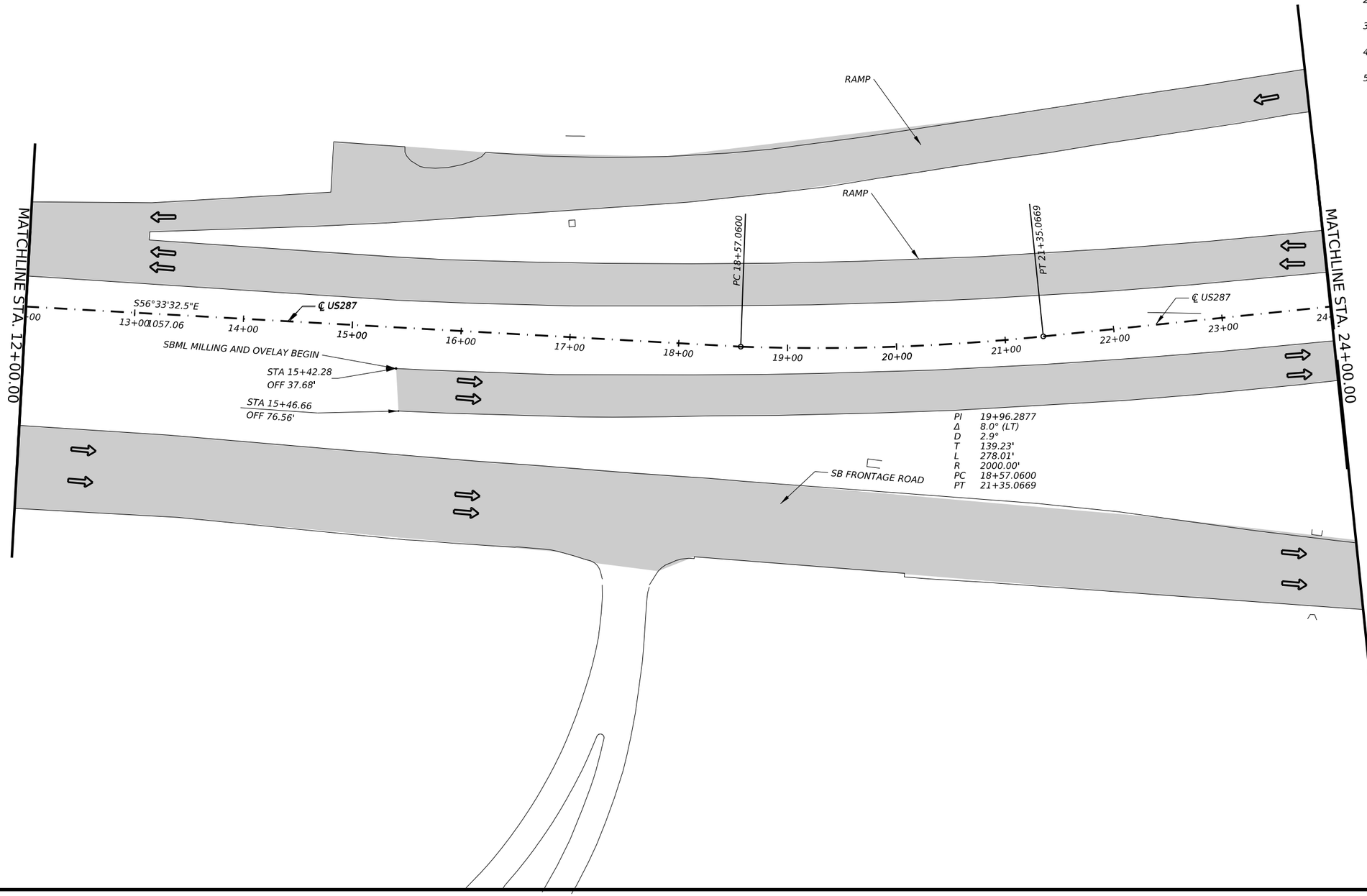

0 50 100
SCALE IN FEET

STATE OF TEXAS
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Kepha Abongo

7/30/24

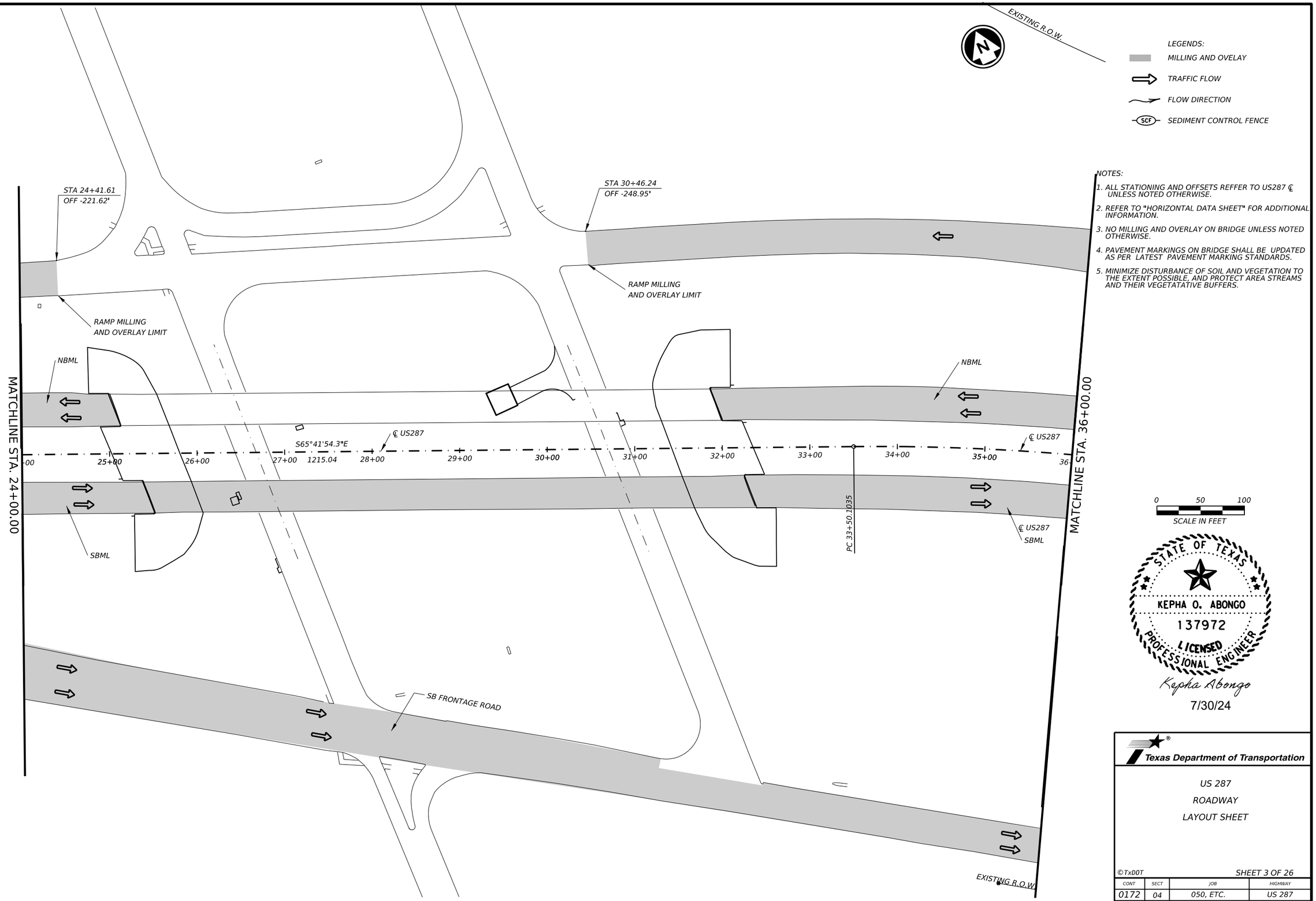
Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 2 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		59

DATE: 7/30/2024 4:03:54 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 03 .dgn



NOTES:

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SCALE IN FEET

STATE OF TEXAS
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7/30/24

Texas Department of Transportation

US 287

ROADWAY

LAYOUT SHEET

SHEET 3 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		60

DATE: 7/30/2024 4:04:09 PM
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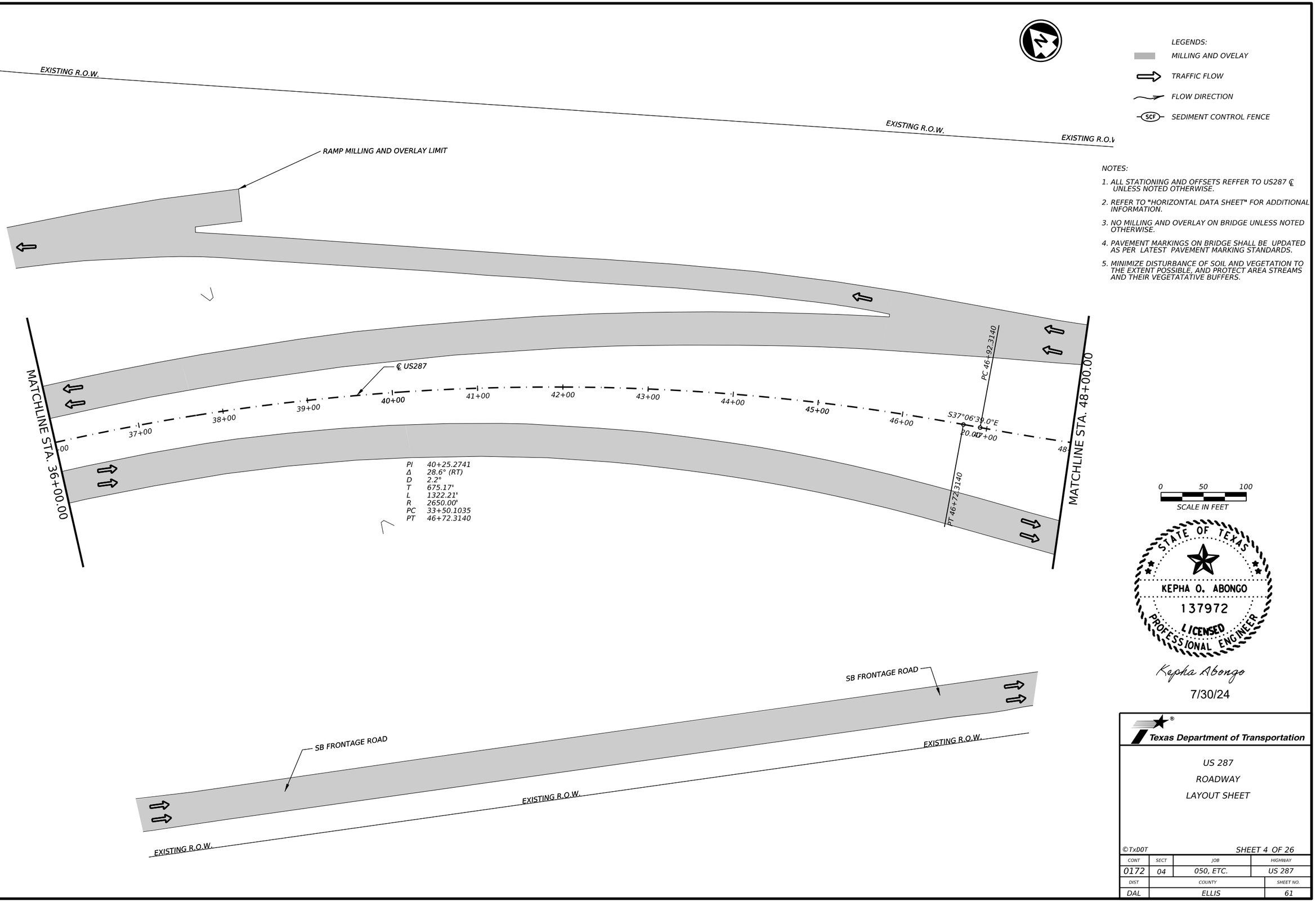

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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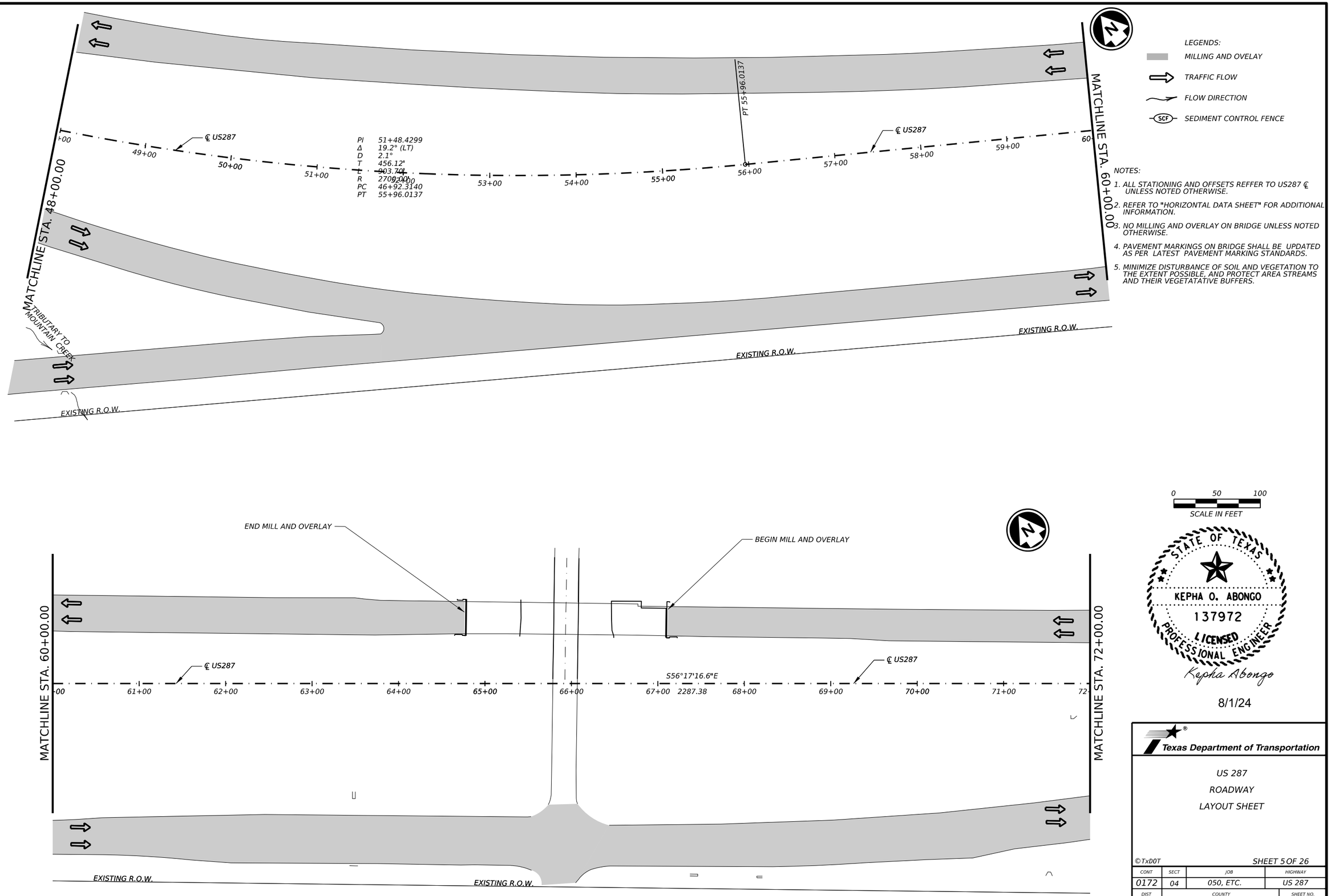
Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 4 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		61

DATE: 7/30/2024 4:04:25 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 05 .dgn



NOTES:

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US 287
ROADWAY
LAYOUT SHEET

SHEET 5 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		62

DATE: 8/1/2024 12:16:19 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 06.dgn

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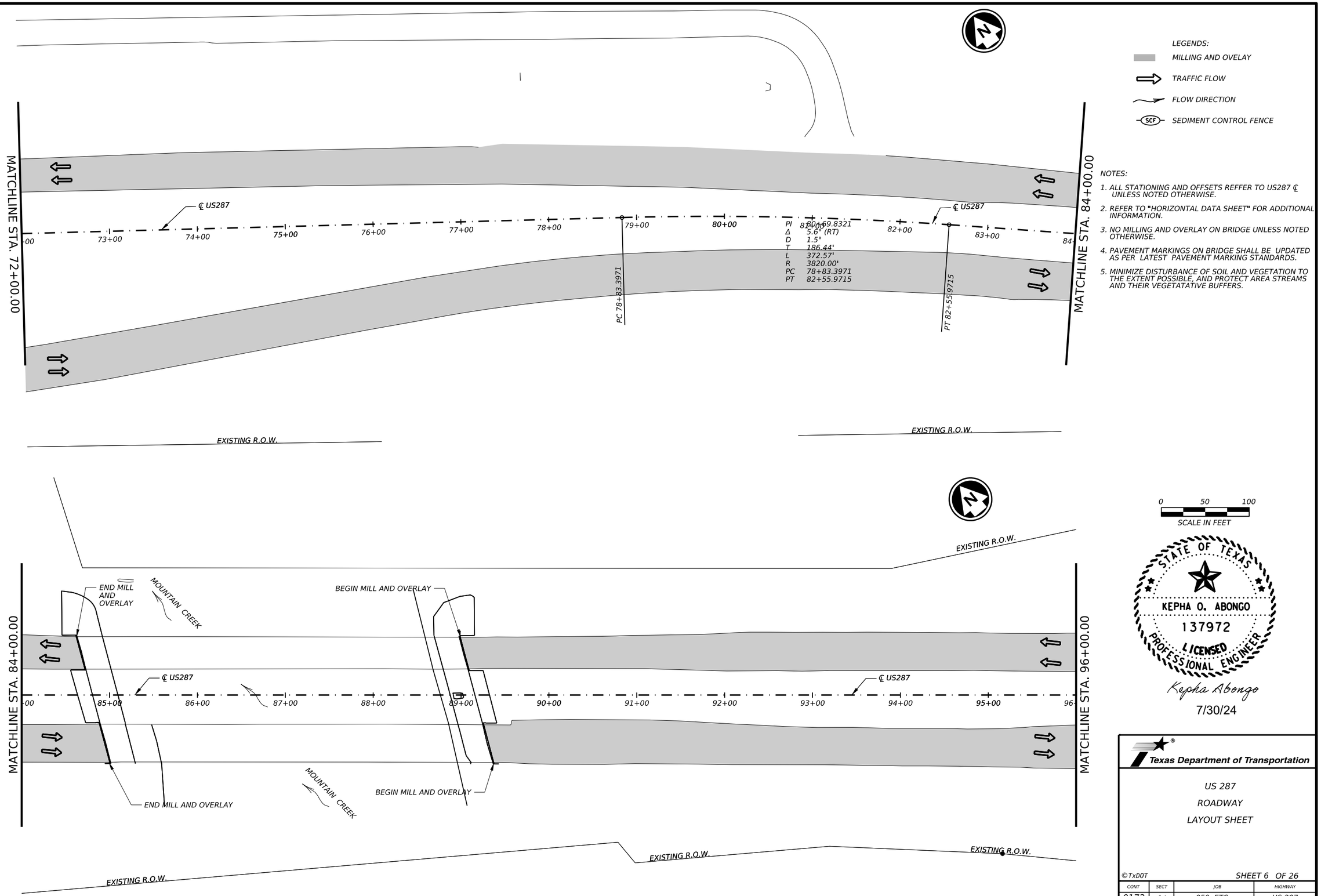

NOTES:

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0 50 100
SCALE IN FEET

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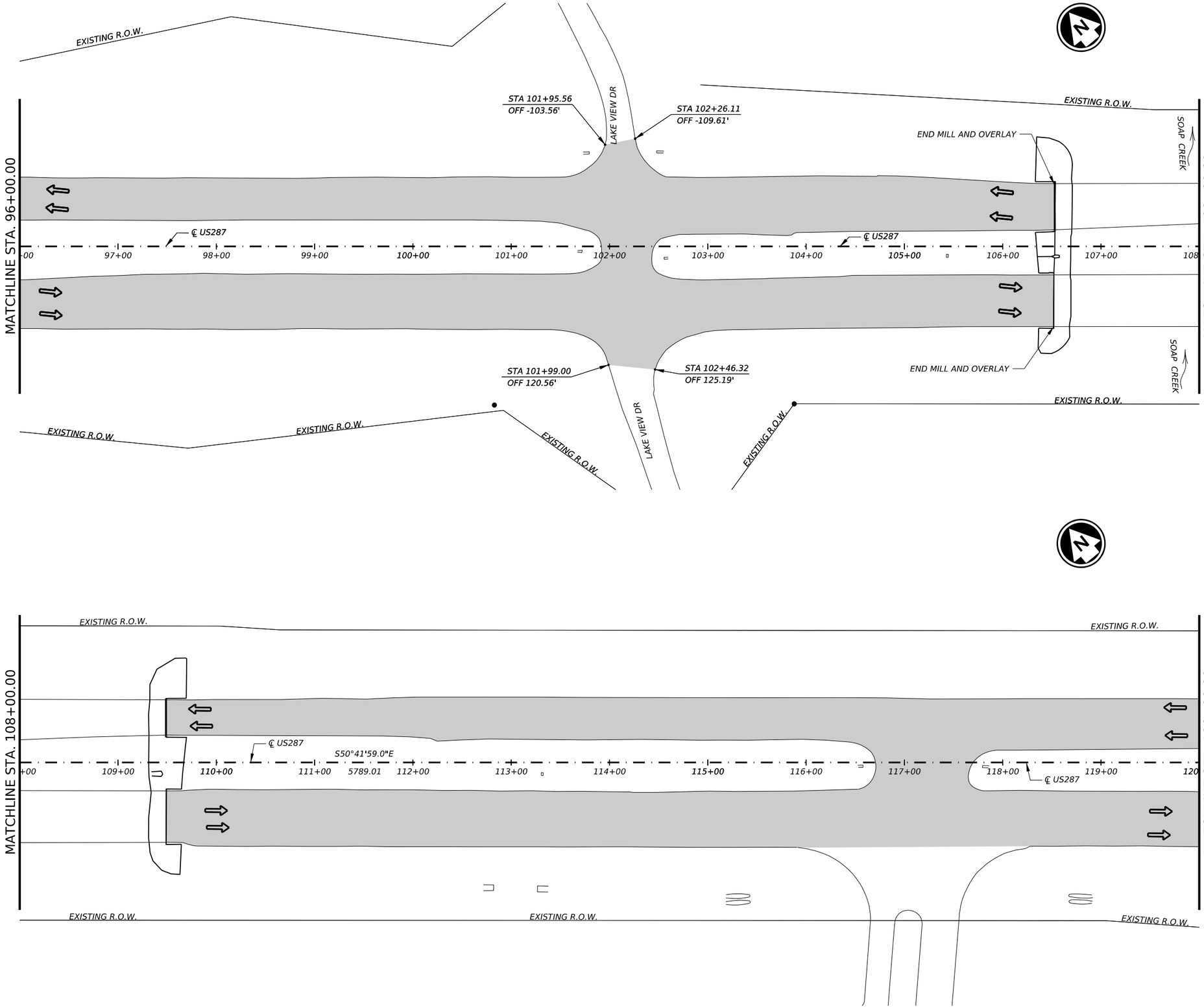
US 287
ROADWAY
LAYOUT SHEET

SHEET 6 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		63

DATE: 7/30/2024 4:05:01 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 08.dgn



LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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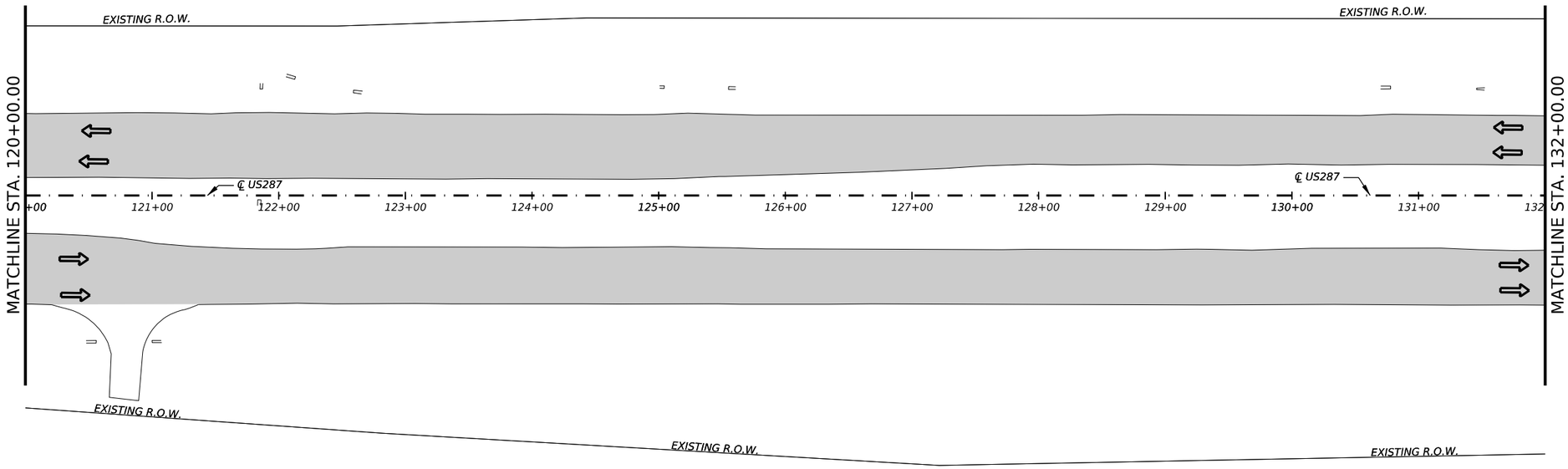
US 287
ROADWAY
LAYOUT SHEET

SHEET 7 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		64

DATE: 7/30/2024 4:05:16 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 10.dgn



LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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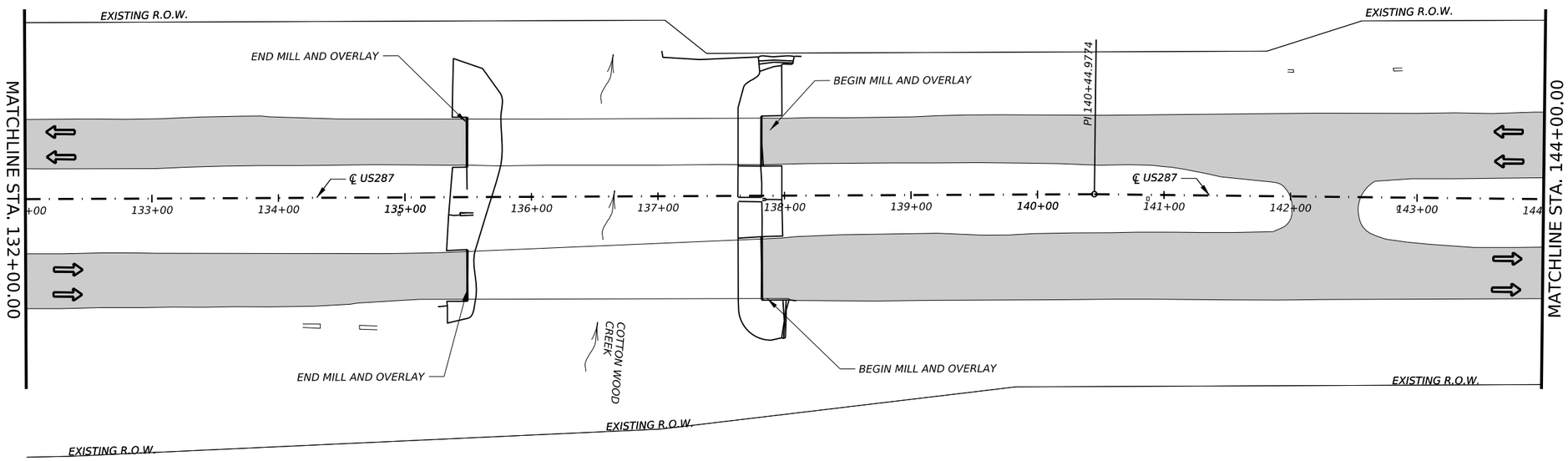

0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
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Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 8 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		65

DATE: 7/30/2024 4:05:30 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 12.dgn

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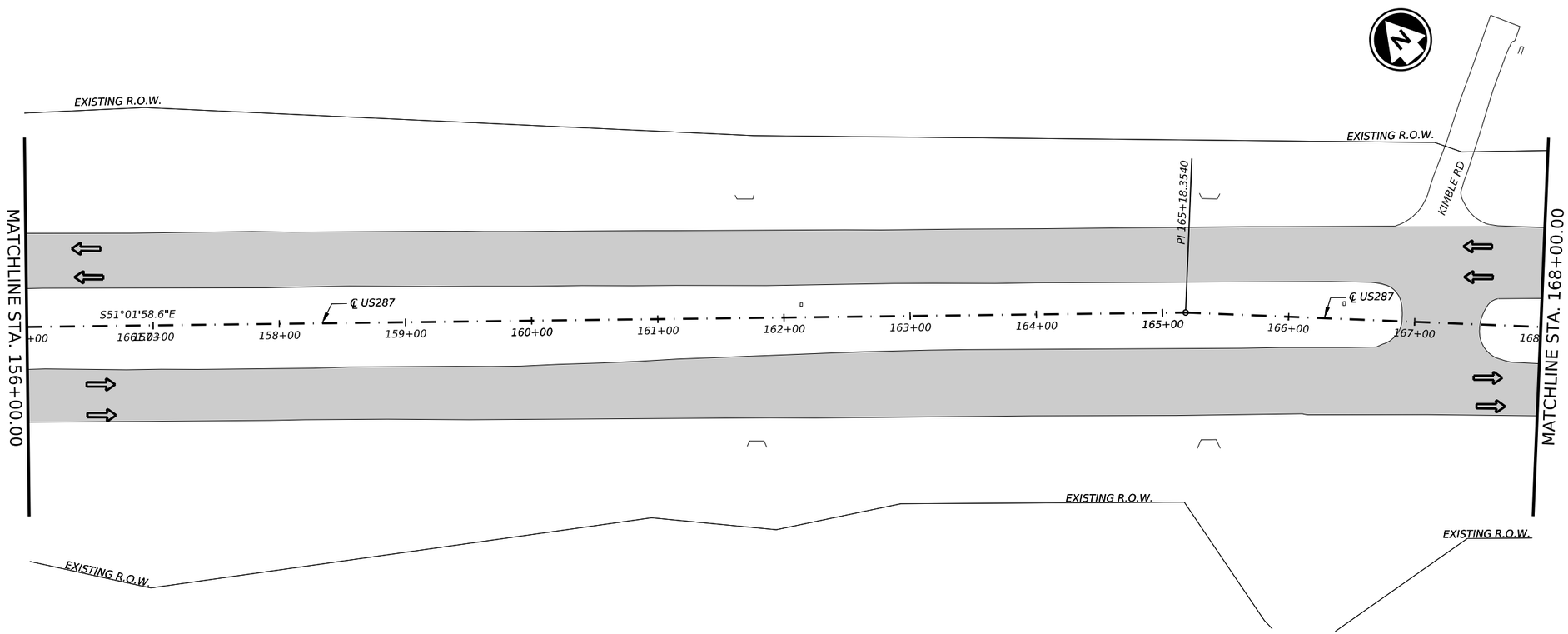

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
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7/30/24

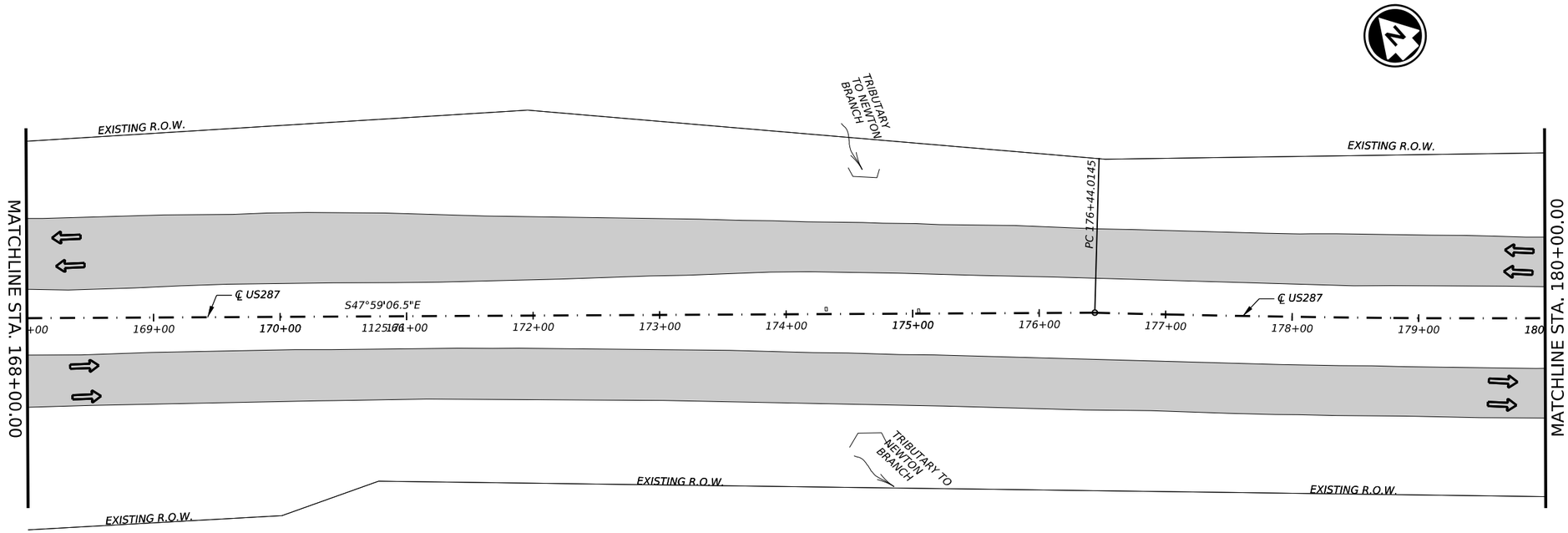
Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 9 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		66

DATE: 7/30/2024 4:05:43 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 14.dgn



LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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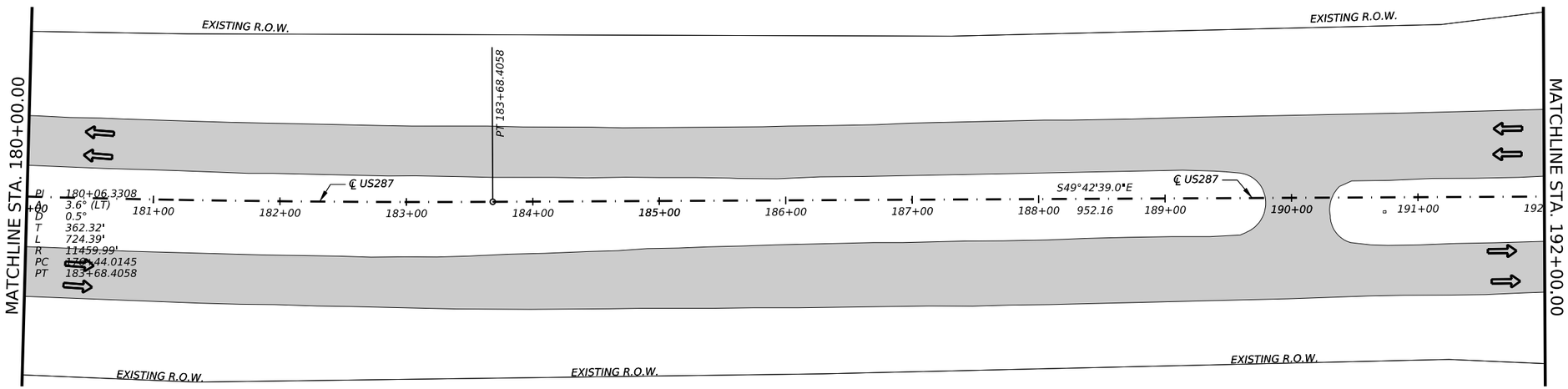

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Δ 3.6° (LT)
D 0.5°
T 362.32'
L 724.39'
R 11459.99'
PC 176+44.0145
PT 183+68.4058

0 50 100
SCALE IN FEET

STATE OF TEXAS
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Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 10 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		67

DATE: 7/30/2024 4:06:01 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 16.dgn

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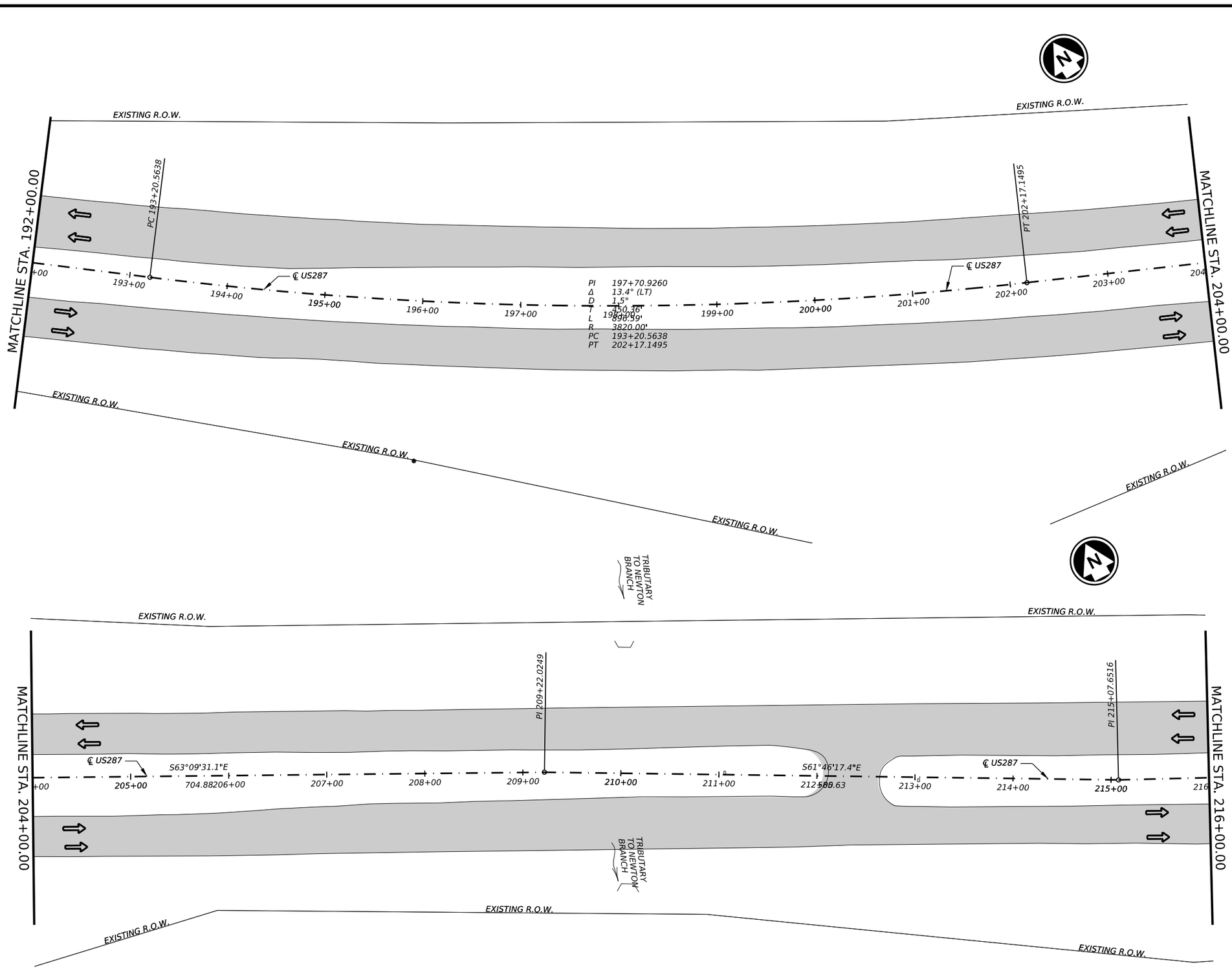

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
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7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 11 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		68

DATE: 7/30/2024 4:06:15 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 18.dgn

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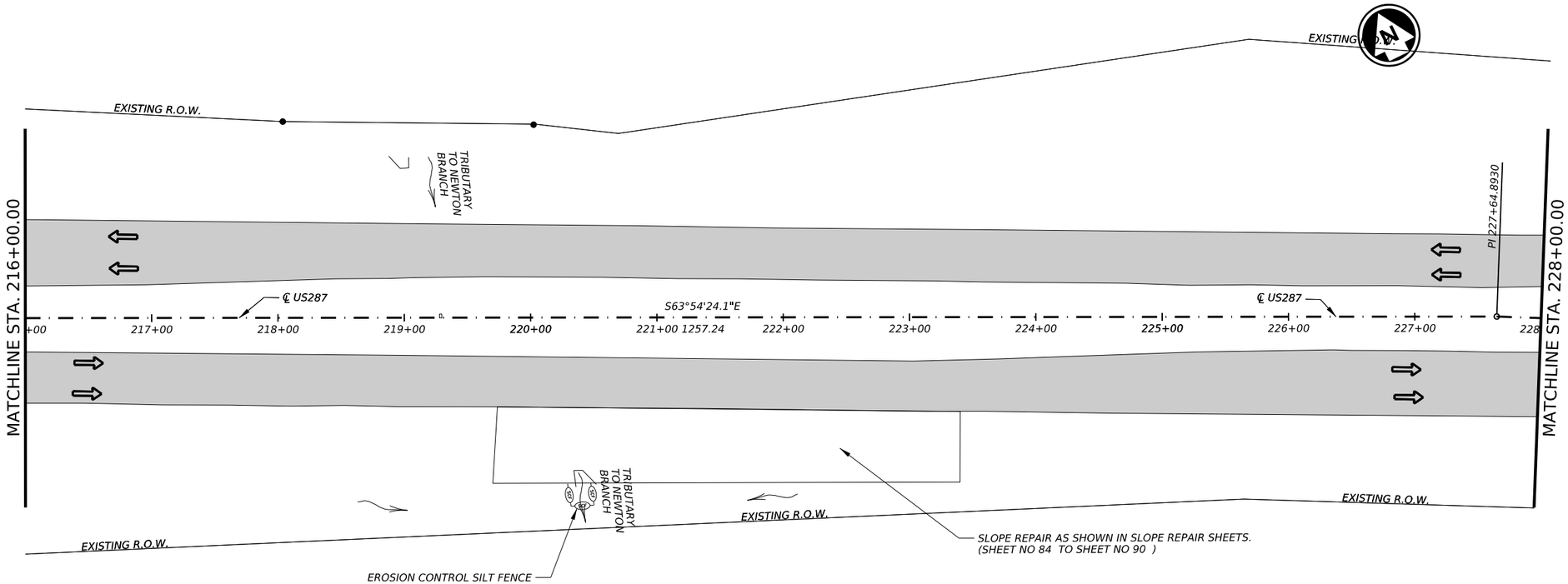

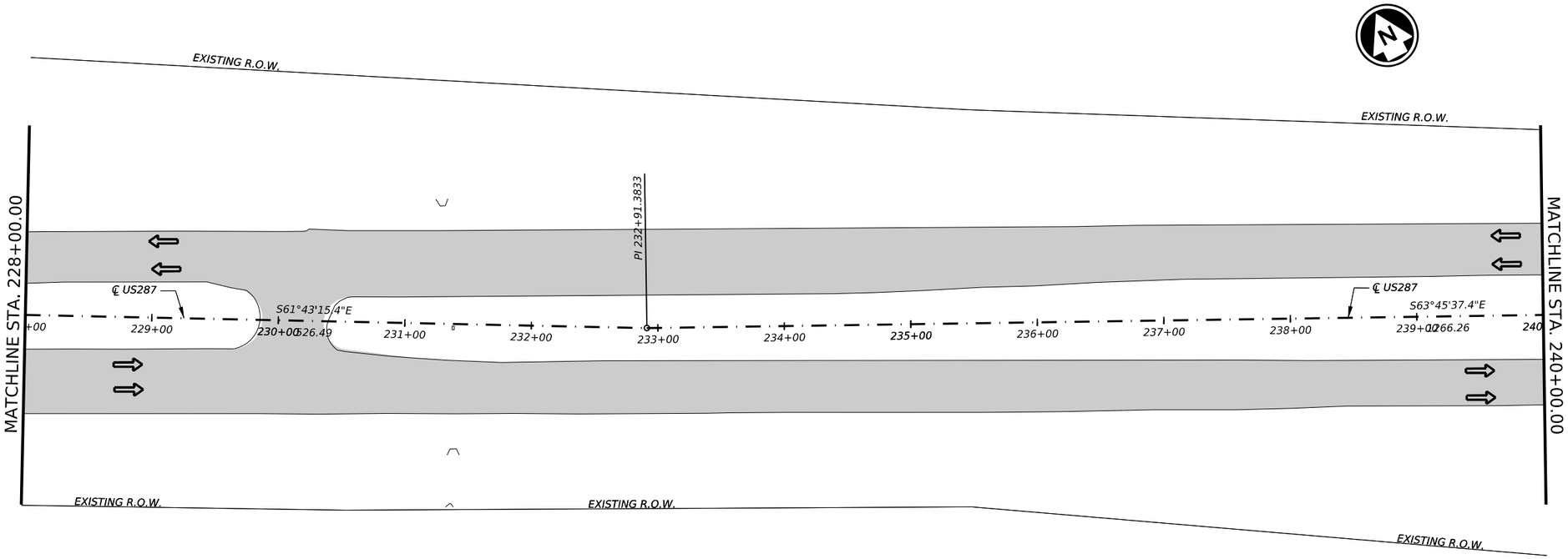

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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SCALE IN FEET

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7/30/24

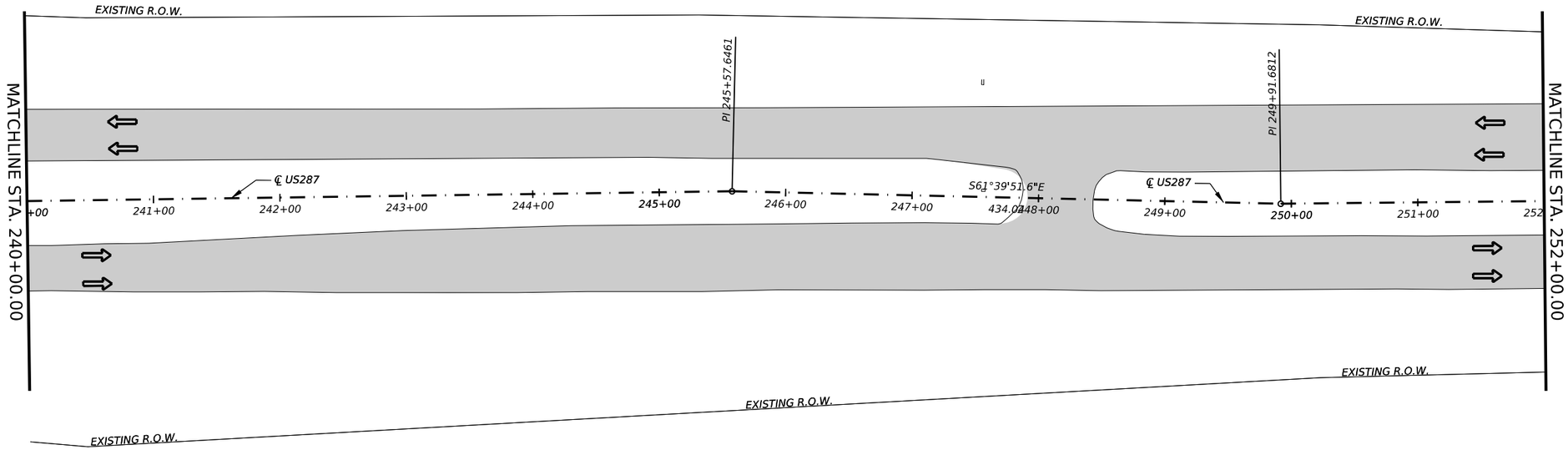
Texas Department of Transportation

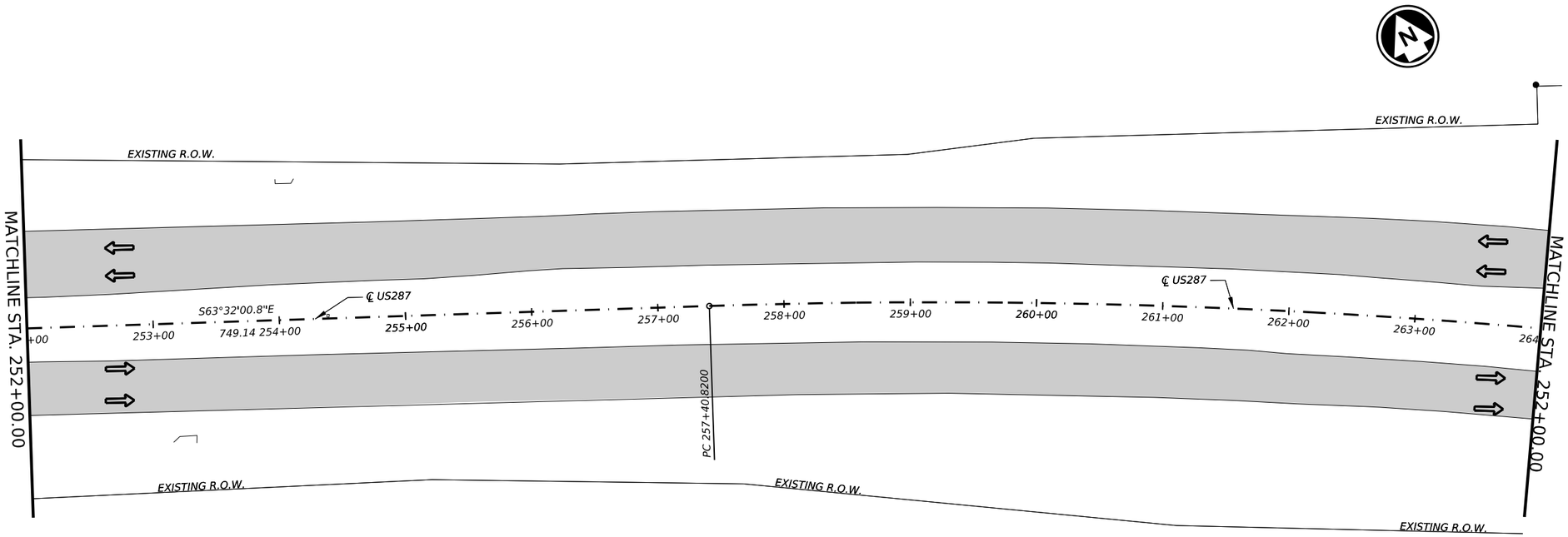
US 287
ROADWAY
LAYOUT SHEET

SHEET 12OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		69

DATE: 7/30/2024 4:06:28 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 20.dgn





LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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US 287
ROADWAY
LAYOUT SHEET

SHEET 13 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		70

DATE: 7/30/2024 4:06:43 PM
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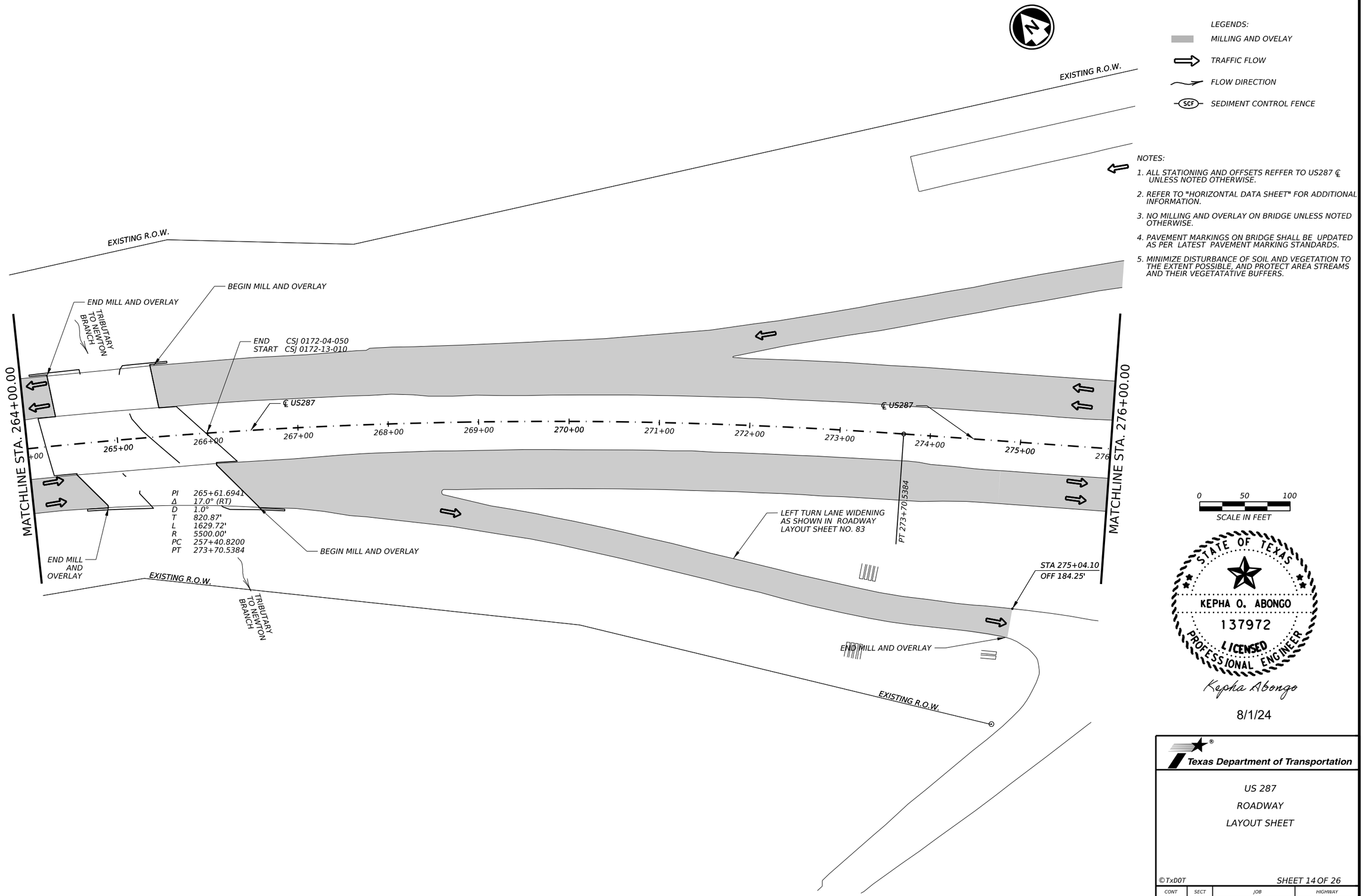

STATE OF TEXAS
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8/1/24

Texas Department of Transportation

US 287

ROADWAY

LAYOUT SHEET

SHEET 14 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		71

DATE: 8/1/2024 1:48:17 PM
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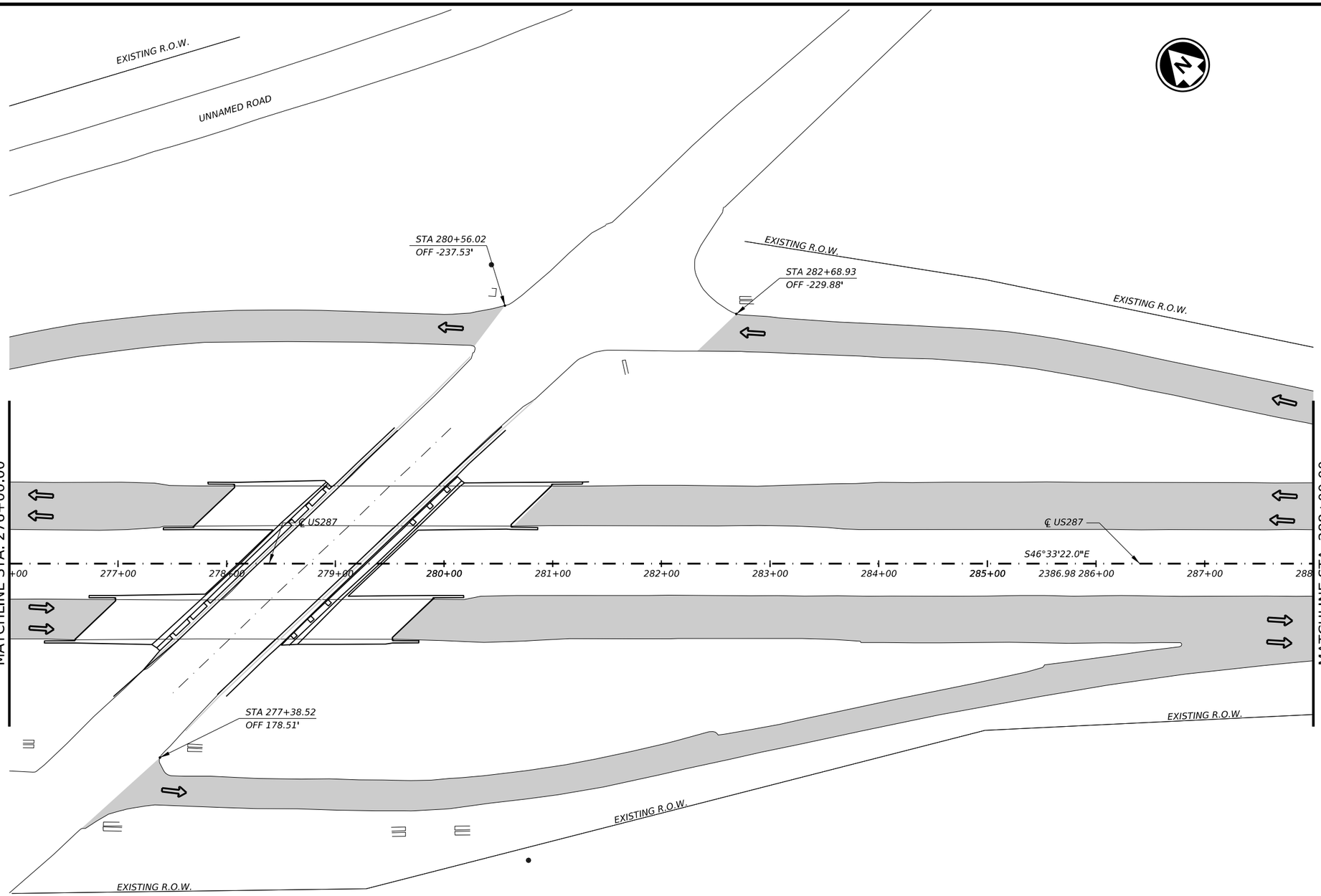

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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5. MINIMIZE DISTURBANCE OF SOIL AND VEGETATION TO THE EXTENT POSSIBLE, AND PROTECT AREA STREAMS AND THEIR VEGETATATIVE BUFFERS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo
8/1/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 15 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		72

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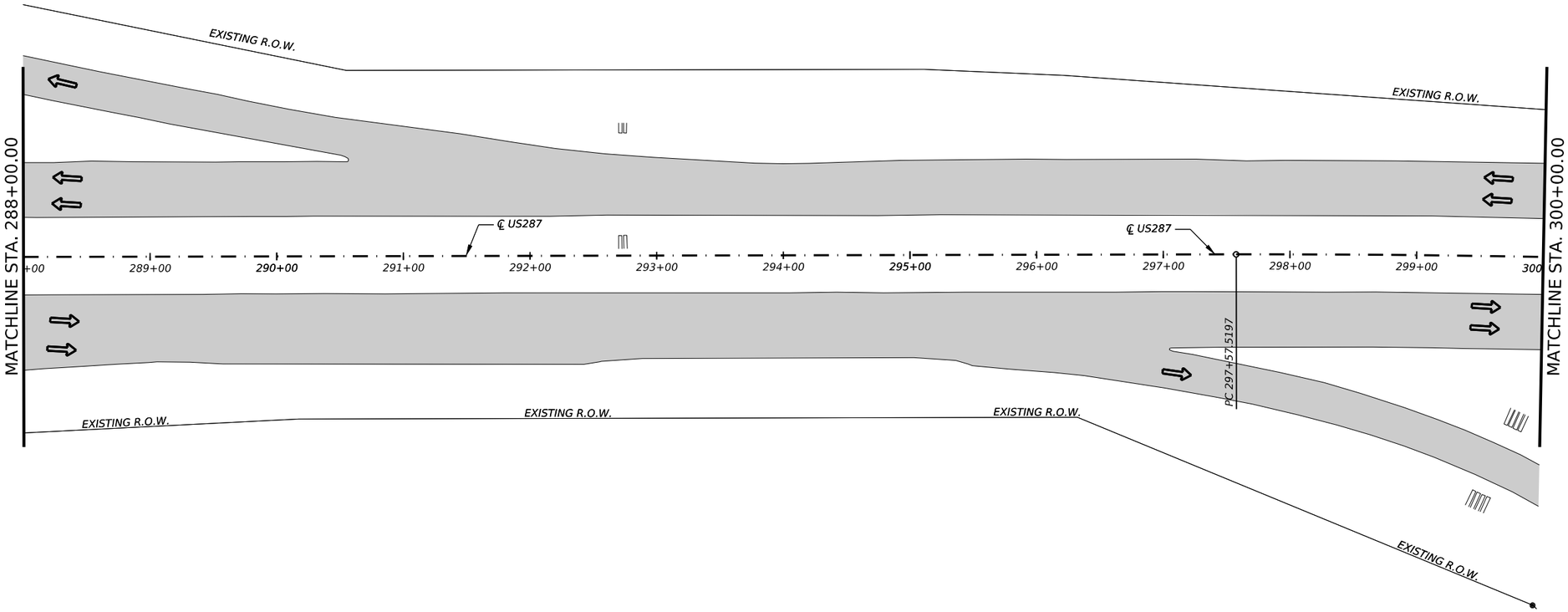

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100

SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo

7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 16 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		73

DATE: 7/30/2024 4:07:31 PM
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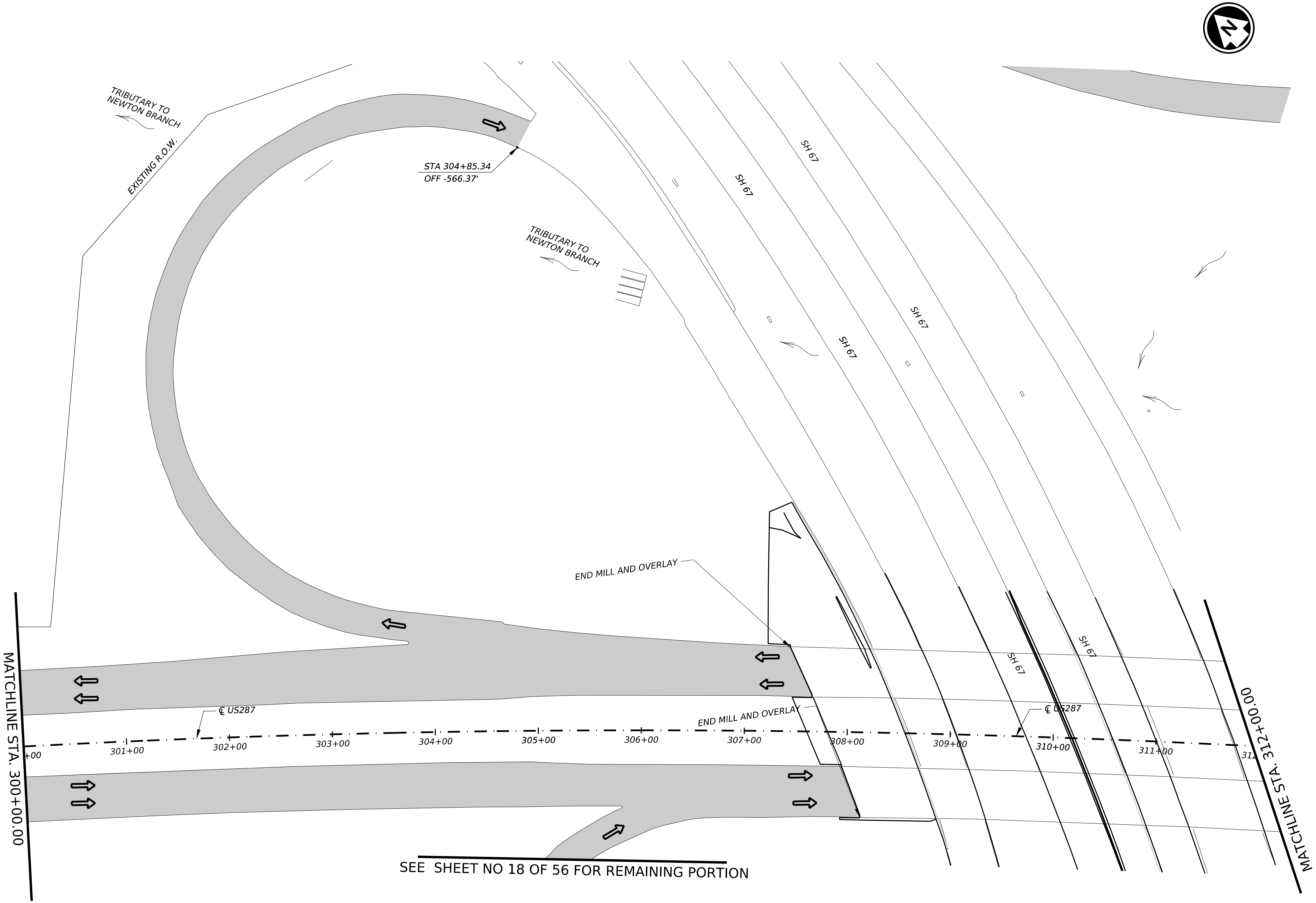

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF SEDIMENT CONTROL FENCE

NOTES:

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STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST		COUNTY	SHEET NO.
DAL		ELLIS	74

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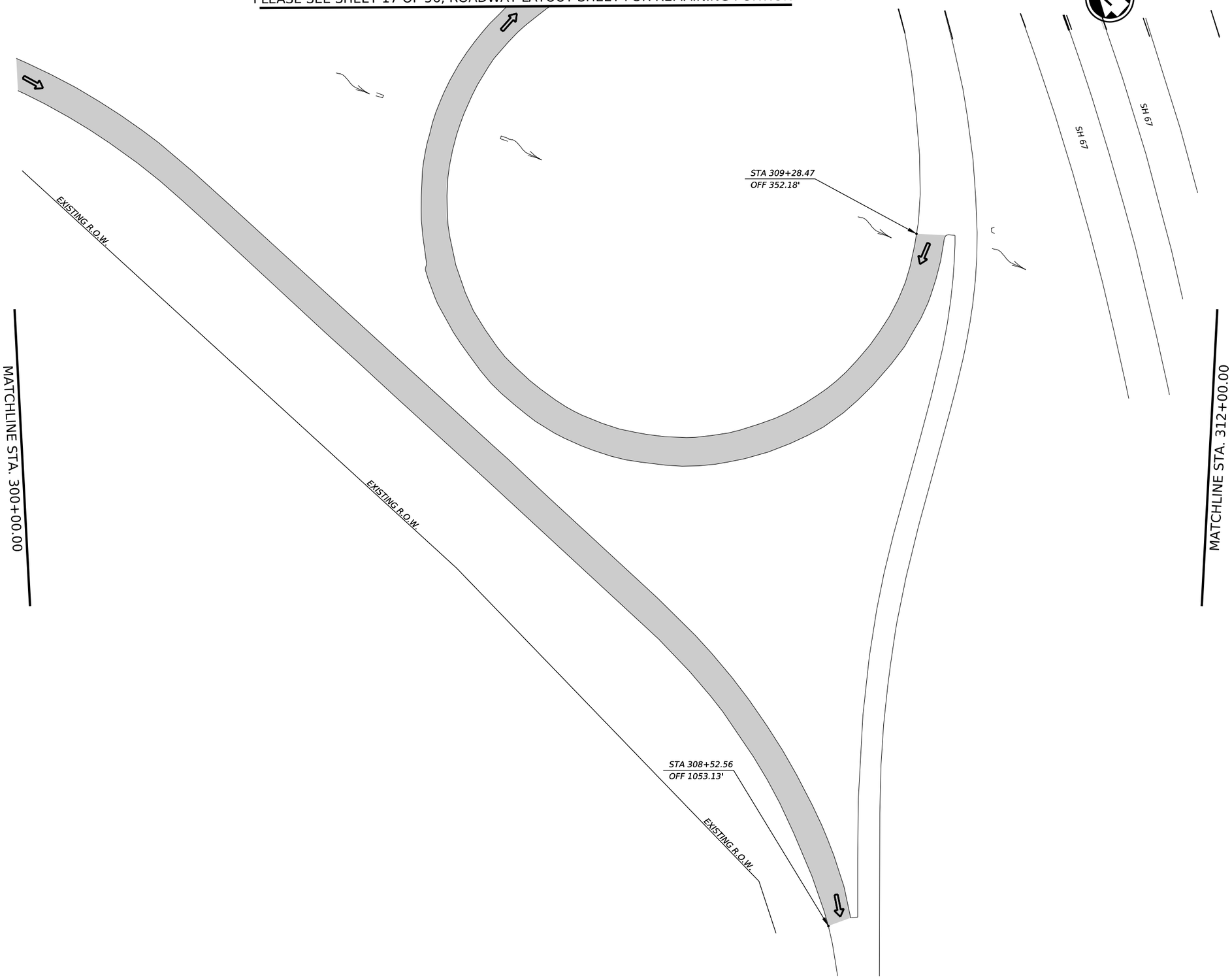
PLEASE SEE SHEET 17 OF 56, ROADWAY LAYOUT SHEET FOR REMAINING PORTION.



LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER
Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 18 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		75

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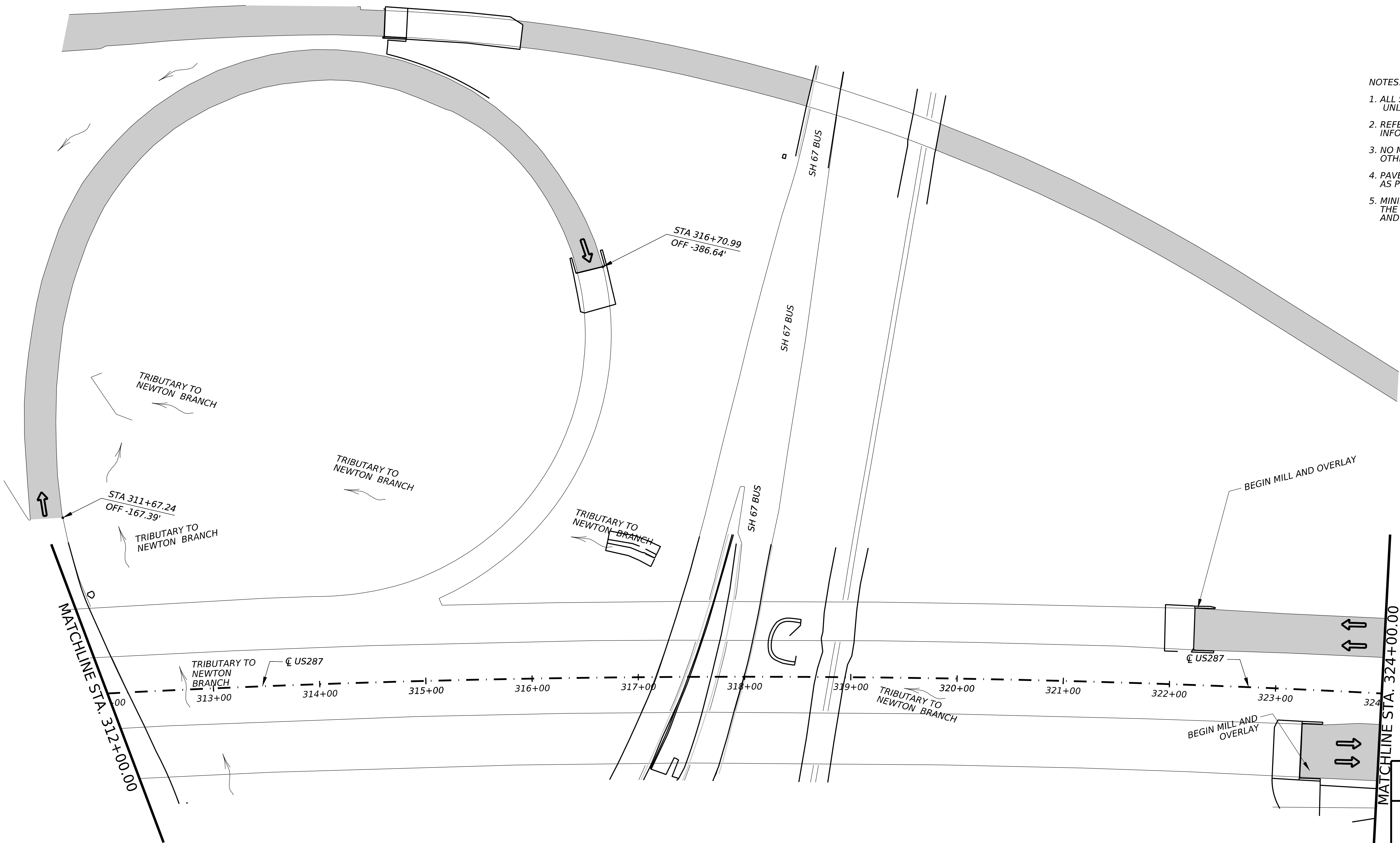

LEGENDS:

MILLING AND OVELAY

TRAFFIC FLOW

FLOW DIRECTION

SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo
8/1/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 19 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		76

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LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

1. ALL STATIONING AND OFFSETS REFFER TO US287 ℄ UNLESS NOTED OTHERWISE.
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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER
Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 20 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		77

DATE: 7/30/2024 4:08:29 PM
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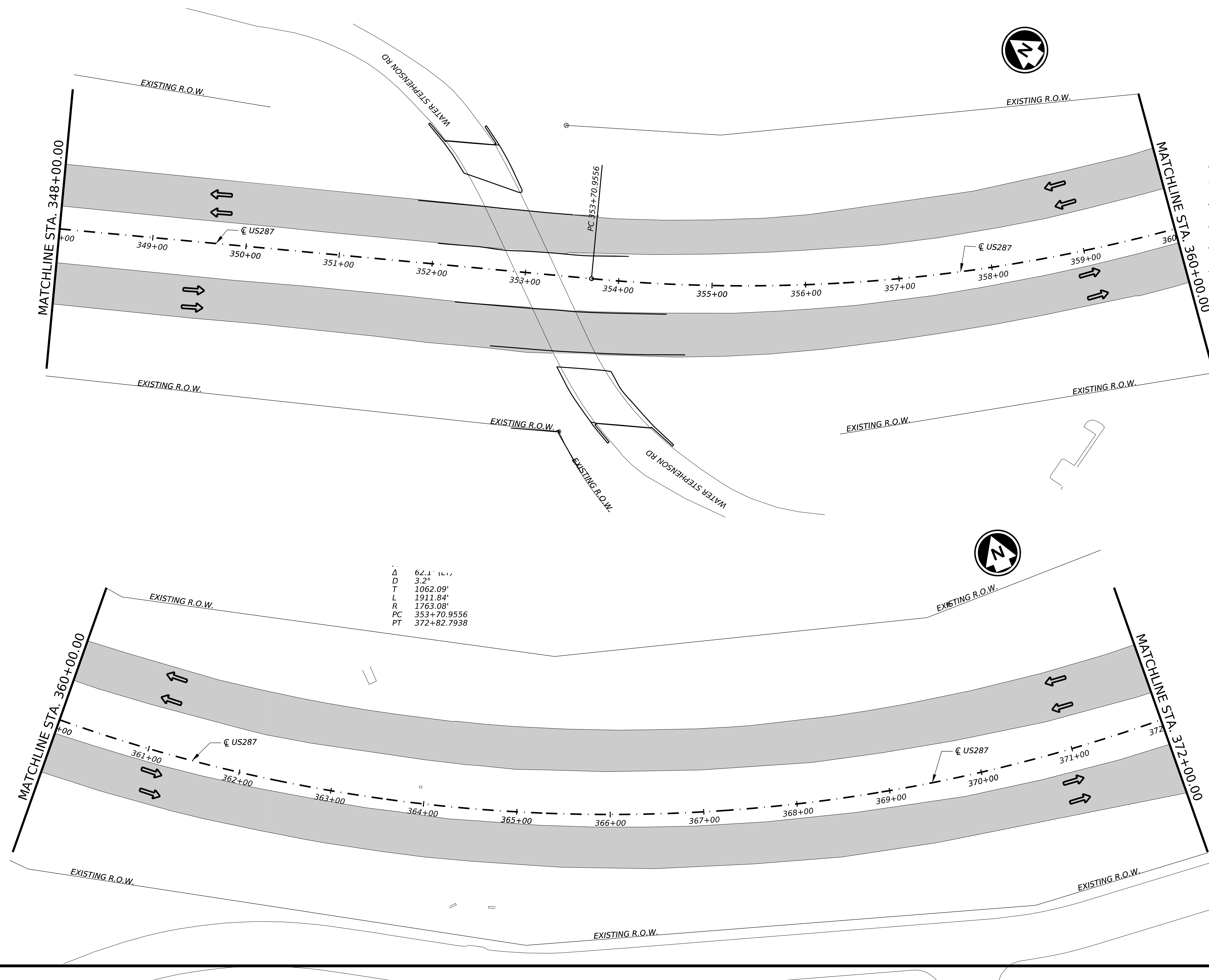

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 21 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST		COUNTY	SHEET NO.
DAL		ELLIS	78

DATE: 7/31/2024 11:26:11 AM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/017213010/4 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 31.dgn

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DW:

DATE: 7/31/2024 11:26:27 AM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/US287 - Plan 33.dgn

EXISTING R.O.W.

MATCHLINE STA. 372+00.00

PT 372+82.7938

℄ US287

372+00 373+00 374+00 375+00 376+00 377+00 378+00 379+00 380+00 381+00 382+00 383+00 384

℄ US287

MATCHLINE STA. 384+00.00

EXISTING R.O.W.

EXISTING R.O.W.

EXISTING R.O.W.

EXISTING R.O.W.

STA 387+28.85
OFF -273.46'

STA 388+38.20
OFF -266.72'

FM 663

END MILL AND OVERLAY

BEGIN MILL AND OVERLAY

MATCHLINE STA. 384+00.00

℄ US287

N89°16'00.0"E
3171.87'

℄ US287

384+00 385+00 386+00 387+00 388+00 389+00 390+00 391+00 392+00 393+00 394+00 395+00 396

MATCHLINE STA. 396+00.00

END MILL AND OVERLAY

FM 663

STA 388+08.00
OFF 194.39'

BEGINMILL AND OVERLAY

STA 387+08.39
OFF 201.92'

STA 386+79.61
OFF 269.37'

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo

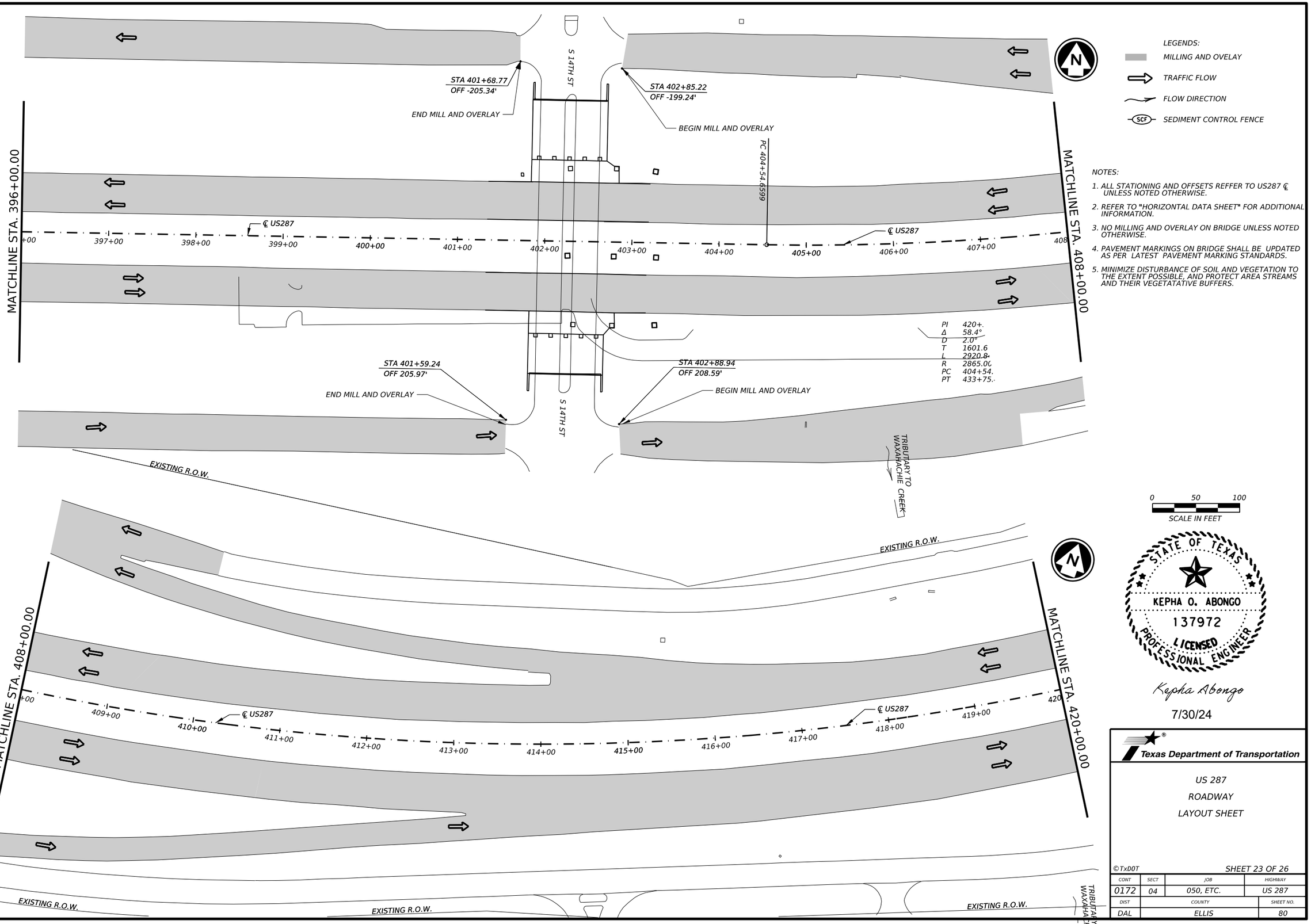
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 22 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		79



LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100
SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 23 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		80

DATE: 7/31/2024 11:26:44 AM
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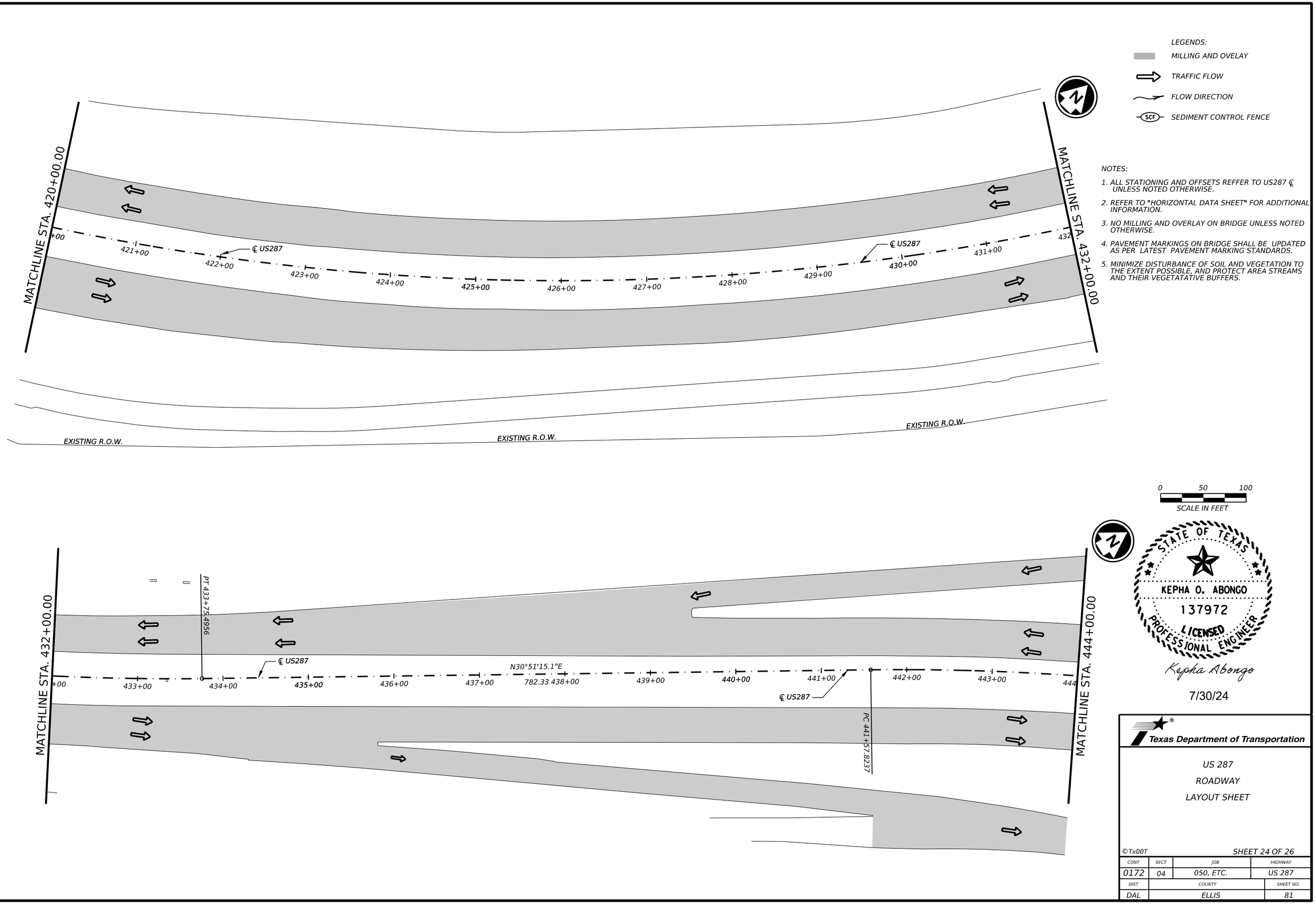

NOTES:

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STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo

7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 24 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		81

DATE: 7/30/2024 4:09:33 PM
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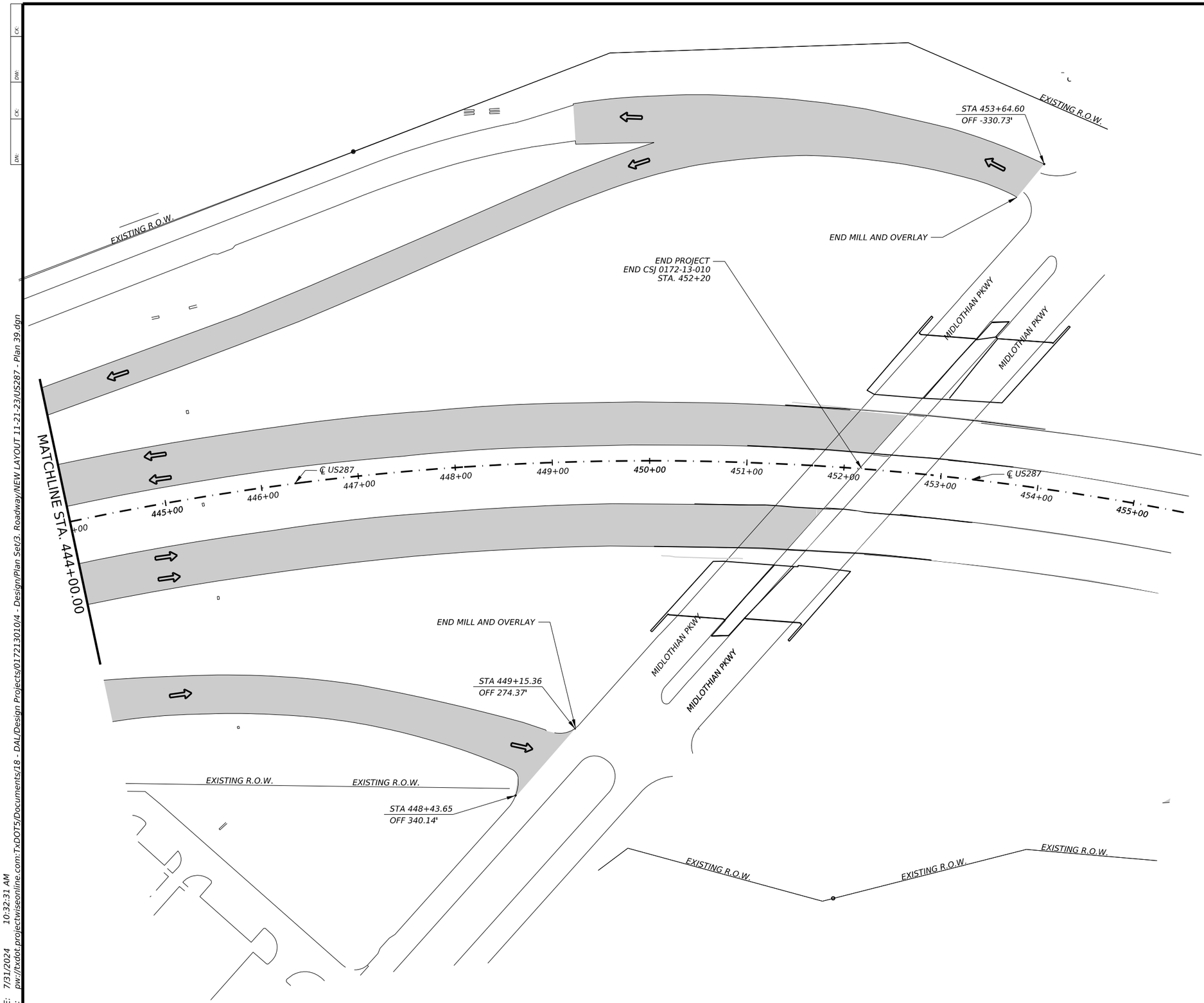

LEGENDS:

- MILLING AND OVELAY
- TRAFFIC FLOW
- FLOW DIRECTION
- SCF — SEDIMENT CONTROL FENCE

NOTES:

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0 50 100

SCALE IN FEET

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo
7/30/24

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 25 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		82

DATE: 7/31/2024 10:32:31 AM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway\NEW LAYOUT 11-21-23/US287 - Plan 39.dgn

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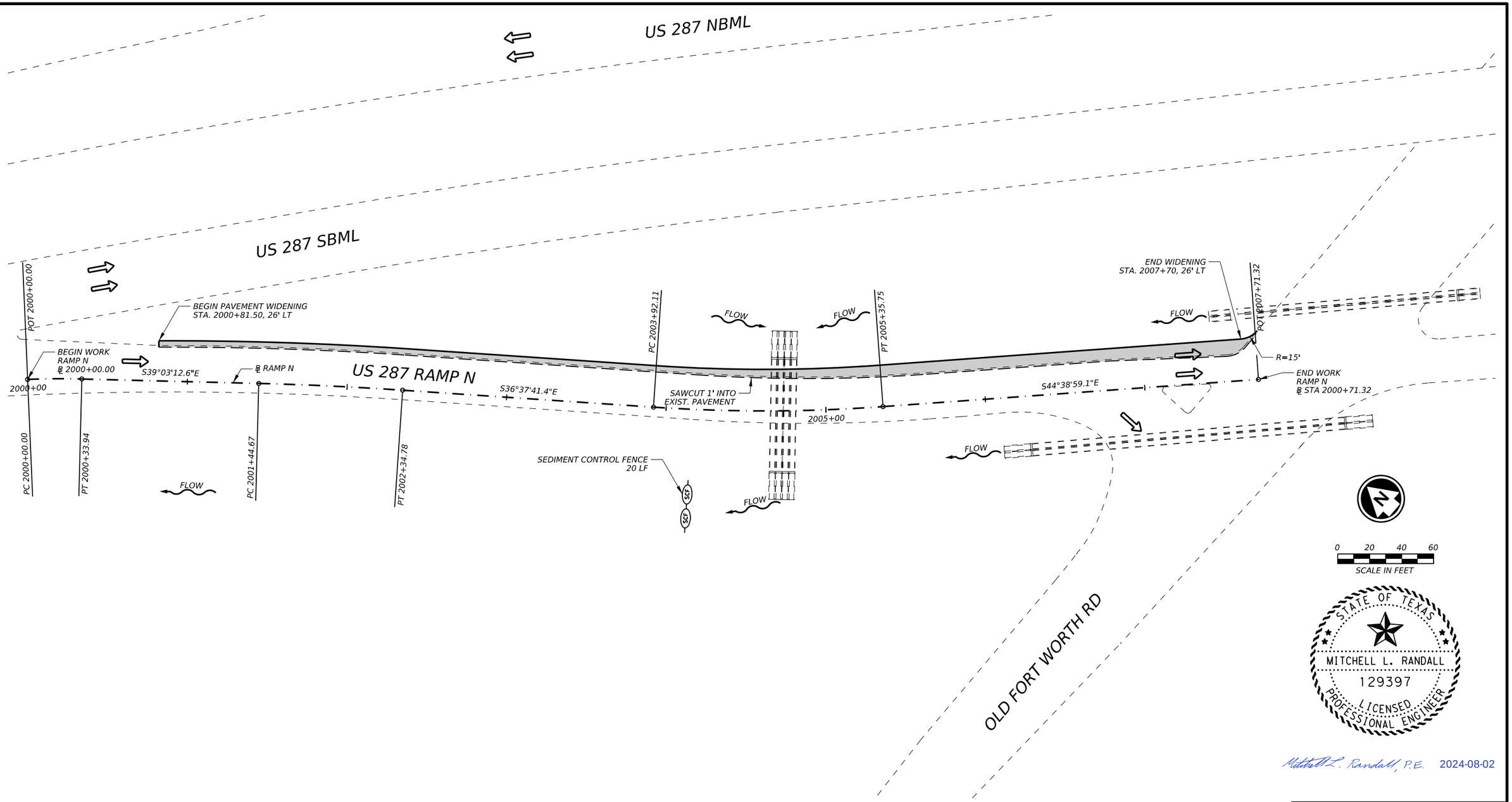


STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2024-08-02

LEGEND:
- PROPOSED WIDENING
- TRAFFIC FLOW
- SCF — SEDIMENT CONTROL FENCE

RAMP N WIDENING

LEFT TURN LANE AT OLD FORT WORTH RD

NOTES:
1. ALL STATIONING AND OFFSETS REFFER TO RAMP N ℄ UNLESS NOTED OTHERWISE.
2. REFER TO "HORIZONTAL DATA SHEET" FOR ADDITIONAL INFORMATION.

Texas Department of Transportation

US 287
ROADWAY
LAYOUT SHEET

SHEET 26 OF 26

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		83

DATE: 7/25/2024 6:44:32 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT5/Documents/18 - DAL/Design Projects/0172130104 - Design/Plan Set/3. Roadway/NEW LAYOUT 11-21-23/Ramp N Widening Plan

SUMMARY OF QUANTITIES FOR SLOPE REPAIR **			
ITEM	DESCRIPTION	UNIT	QUANTITY
0104 7006	REMOVING CONC (RIPRAP)	SY	1560
0110 7001	EXCAVATION (ROADWAY)	CY	5290
0132 7010	*EMBANKMENT (FNL)(DC)(TY C2)	CY	5290
0432 7007	RIPRAP (CONC)(CL B)(4 IN)	CY	188
0556 7008	PIPE UNDERDRAINS (TY 8)(6")	LF	440
5000 7001	GEOGRID REINFORCE EMBANKMENTS (TY A)	SY	2870

*See Note 5 for material requirements.
**Quantities shown here are also shown in project summary sheet.

GENERAL NOTES

1. Locate the corners of the existing soil nail temporary shoring along the shoulder of the roadway. (Stations 219+80.00 and 223+20.00).

2. **At stations 219+80 and 233+20 saw cut the existing concrete riprap from the top to the bottom of the slope (toe of concrete riprap). Remove the existing concrete riprap between the above indicated stations.**

3. Excavate and remove the existing soil down to 17 feet along the face of the existing shoring or to uncover the existing underdrain. The existing underdrain shall remain intact. The top of the existing underdrain will form part of the top bench. The top bench will have a width of 25 feet parallel to the roadway and 5 feet perpendicular to the roadway. The slope of the benches will be 2% toward the toe of the embankment. The lower bench shall be 1' below the top bench with awidth of 20'. The bottom of the excavation should star 1' below the lower bench. The slope for the bottom of the excavation shall have a minimum of 2% slope (See plan view layout and typical sections A - A, B - B and C -C).

4. Once the removal of existing soil is complete, place the underdrain along the toe of the top and lower benches.

5. Once the underdrains are placed, rebuild the slope with select backfill soil TYPE C2 with soil characteristics per item 423 TYPE AS as indicated on the typical sections. When the backfill gradation results in 85% or more material retained on the No. 4 sieve, the entire backfill and from all sides shall be enveloped with filter fabric Type 1 per DMS 6200 . The filter fabric will be subsidiary to various items.

6. When backfilling reaches to the elevation ot the top bench, place a layer of geogrid Type A and add 2 more layers every 5 feet.

7. Once the proposed slope has been rebuilt with select backfill, place the 4 inch concrete riprap as shown in the typical sections. The concrete riprap shall have steel reinforcement indicated in our CRR standard. Also the riprap shall have at least two intermediate toe walls evenly spaced from the top to bottom of the slope.

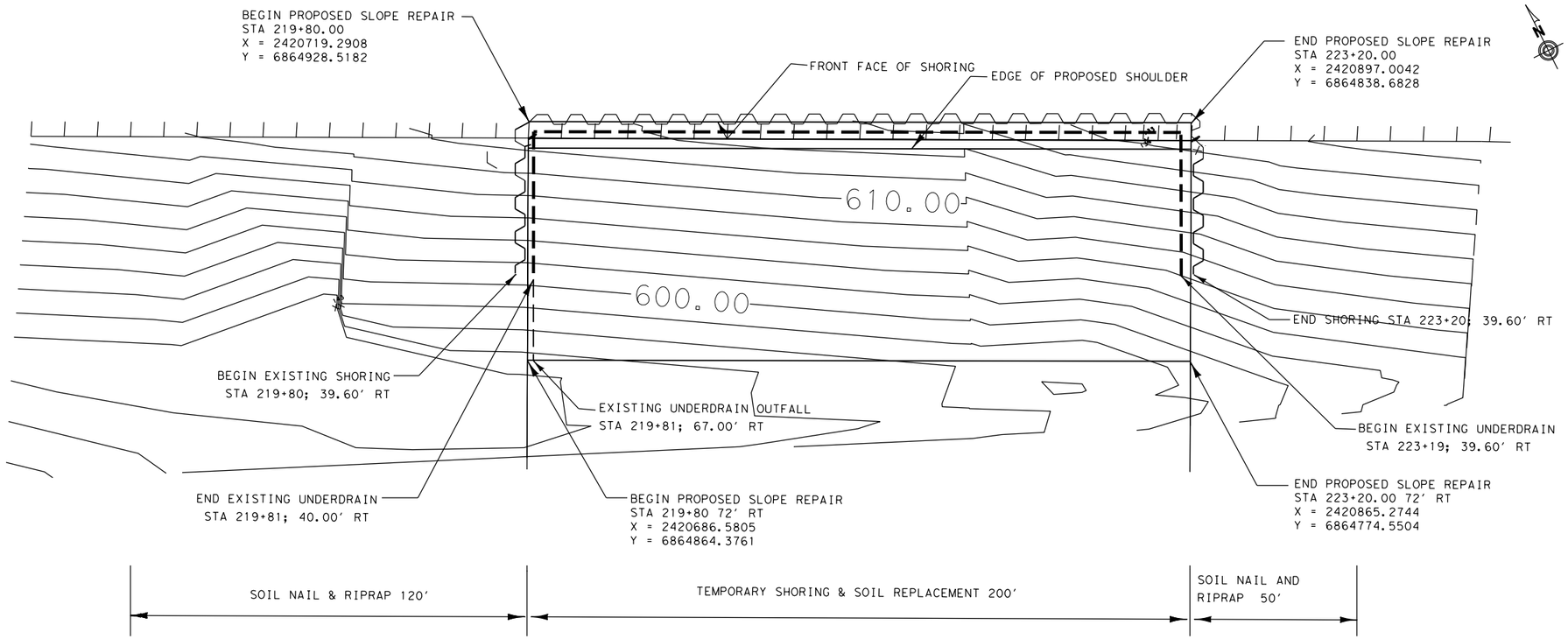
STATE OF TEXAS
NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER
Nicasio Lozano
8/1/2024

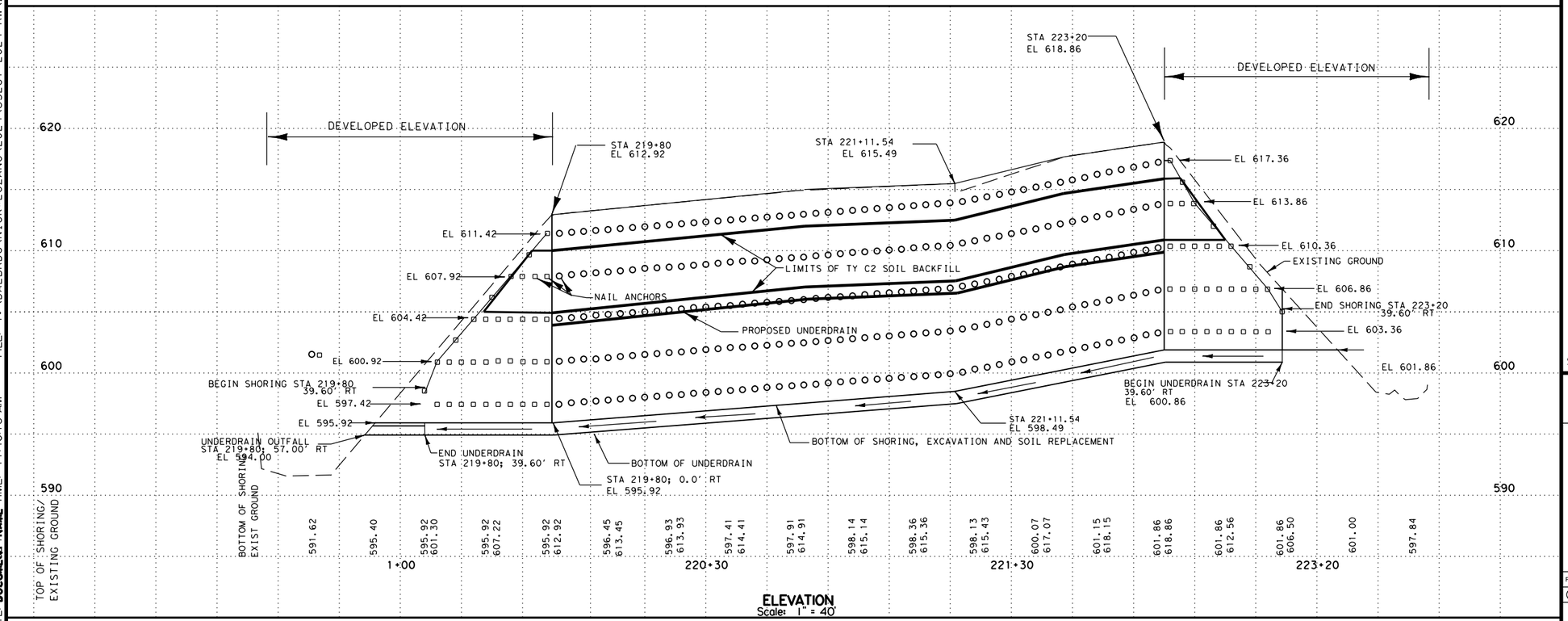
Sheet 1 of 8 Sheets

Texas Department of Transportation
Dallas District Bridge

US 287 SB
SLOPE REPAIR
ESTIMATED QUANTITIES AND GENERAL NOTES

FILE: SEE PATH	DN: NL	CK: NL	DW: NI	CK: NL
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		84





ELEVATION
Scale: 1" = 40'

Nicasio Lozano

7/29/2024

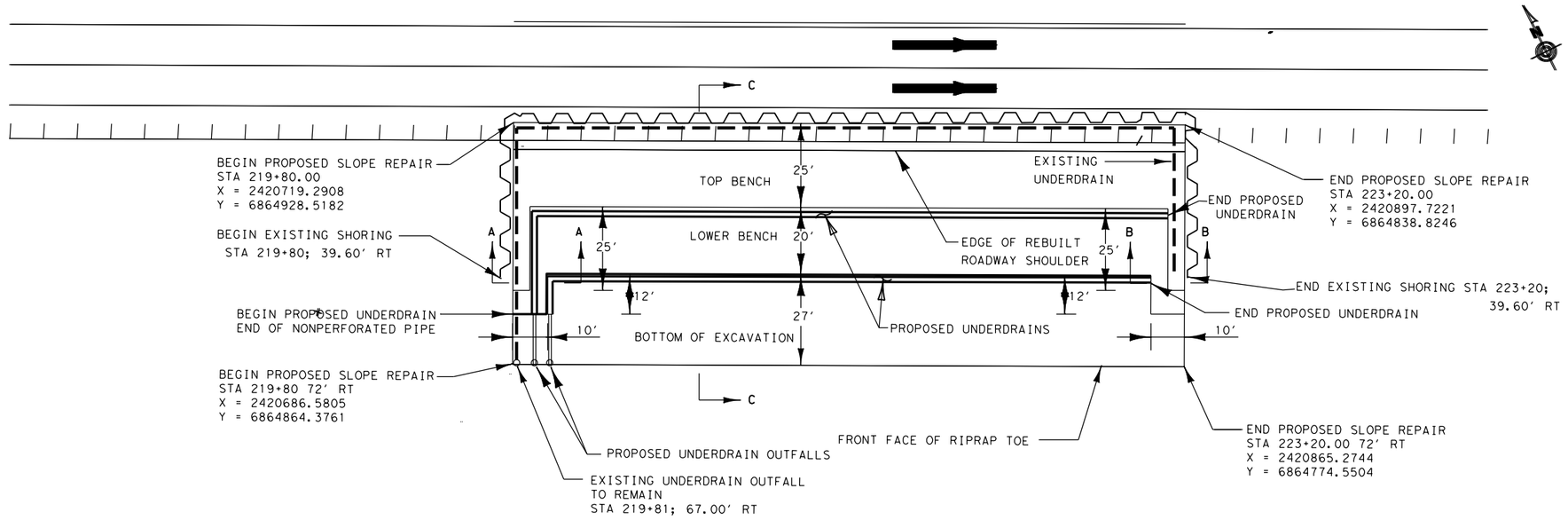
Sheet 2 of 8 Sheets

Texas Department of Transportation

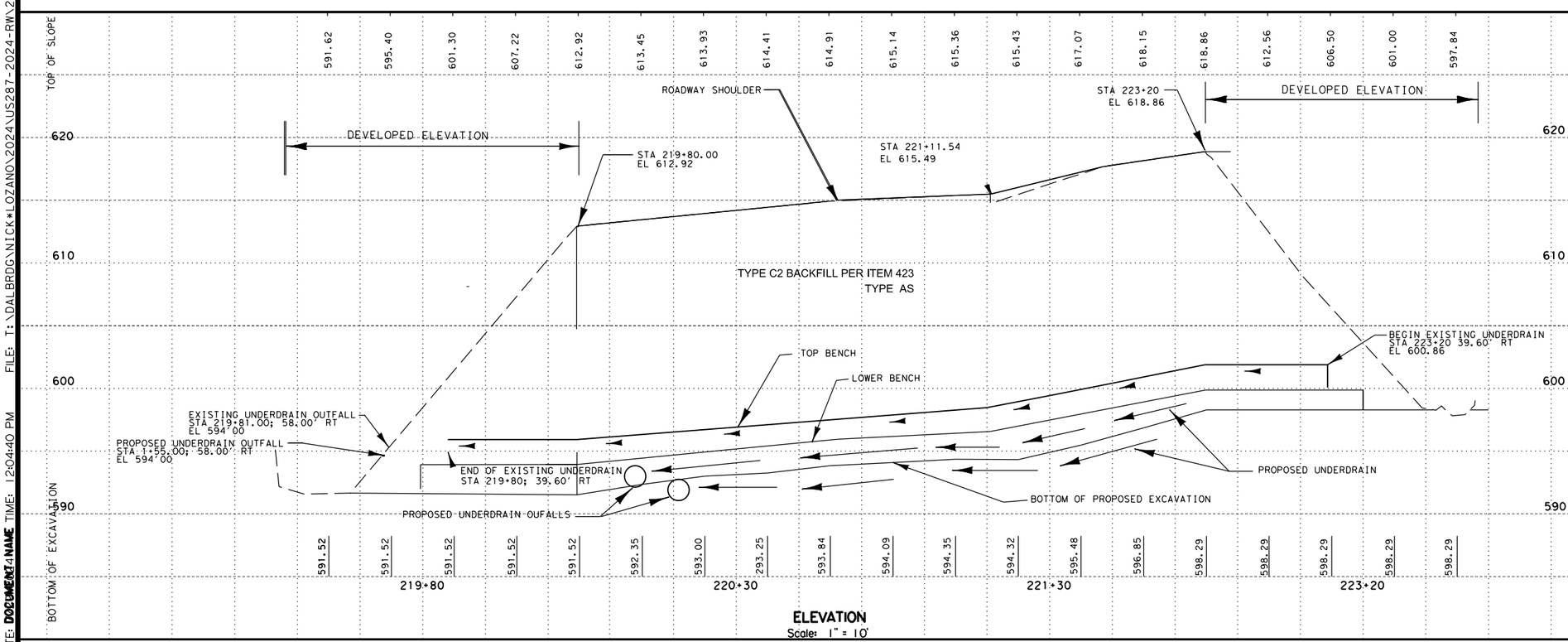
Dallas District Bridge

US 287 SB
SLOPE REPAIR TOPOMAP AND EXISTING SHORING
STA 219+80 TO STA 223+20

FILE: SEE PATH	DN: NL	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		85



PLAN
Scale: 1" = 40'



ELEVATION
Scale: 1" = 10'

NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Nicasio Lozano
7/29/2024

Sheet 3 of 8 Sheets

Texas Department of Transportation

Dallas District Bridge

US 287 SB

SLOPE REPAIR LAYOUT

STA 219+80 TO STA 223+20

FILE: SEE PATH	DN: NL	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		86

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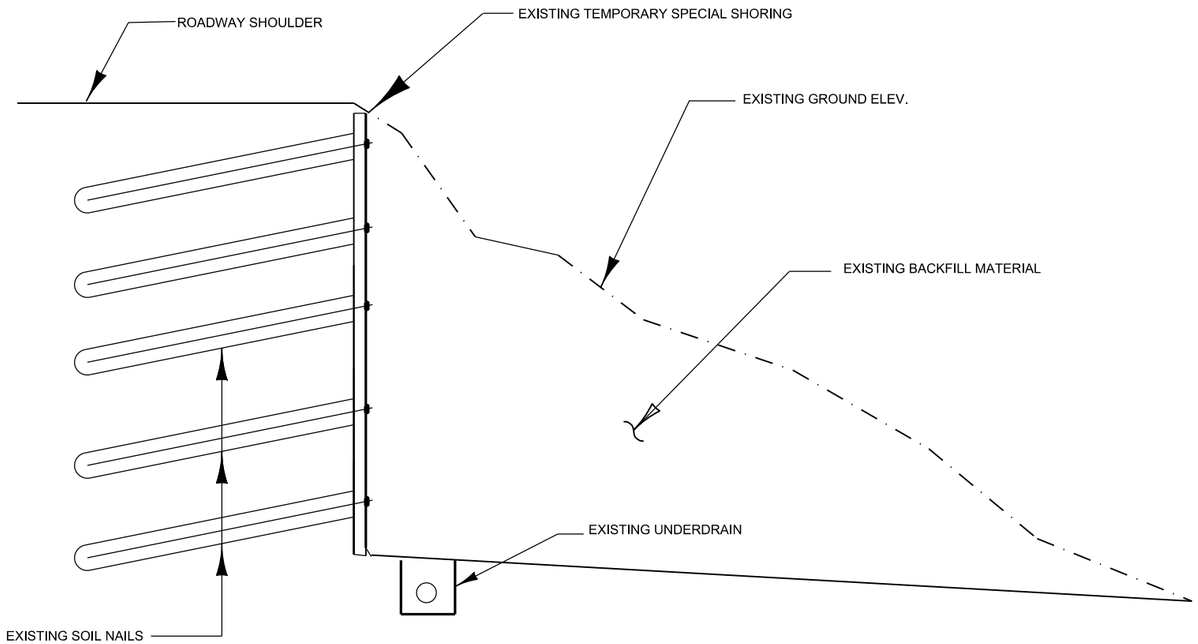
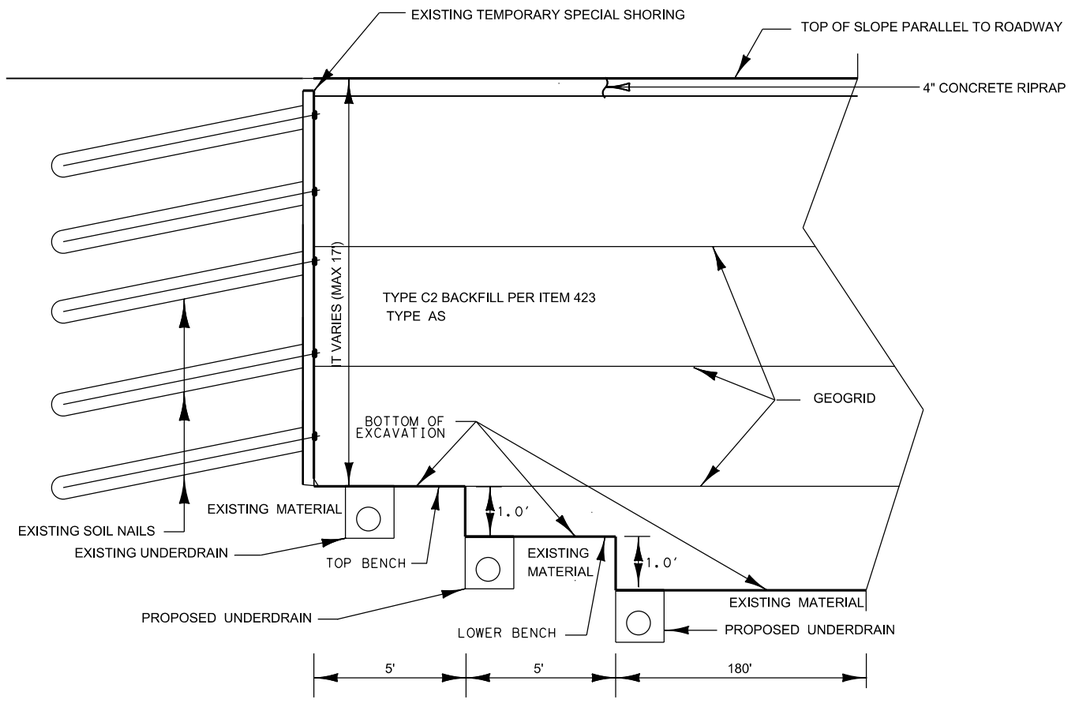
User: dalbrdg



EXISTING TYPICAL SECTION OF FAILED SLOPE
NTS



PROPOSED TYPICAL SECTION OF SLOPE A - A
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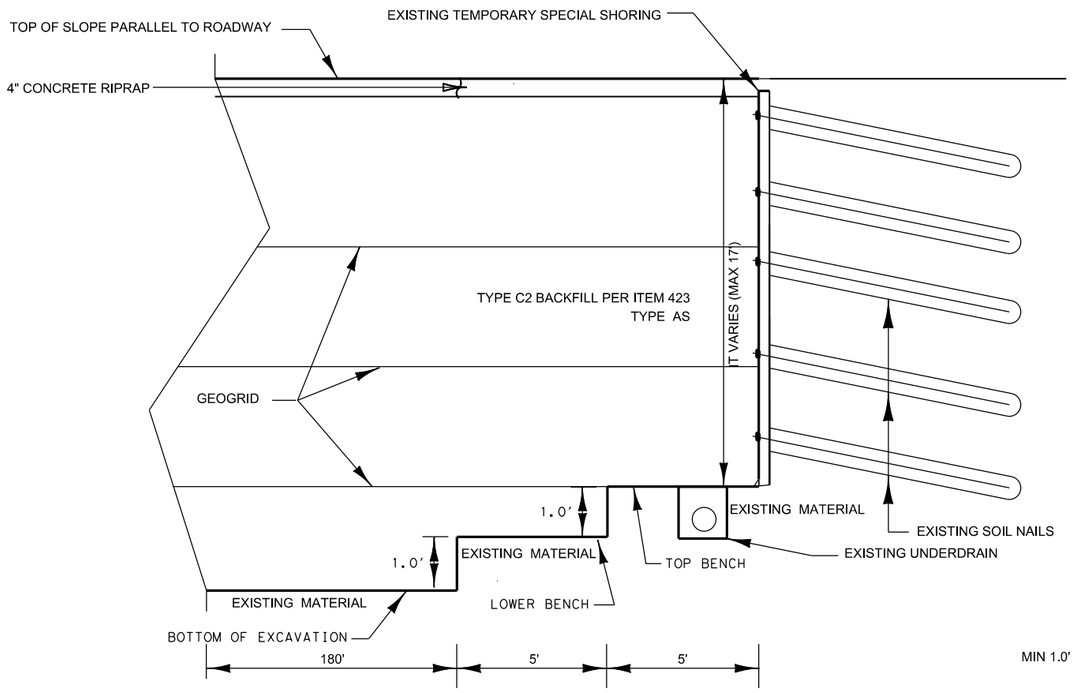

PROPOSED TYPICAL SECTION OF SLOPE B - B
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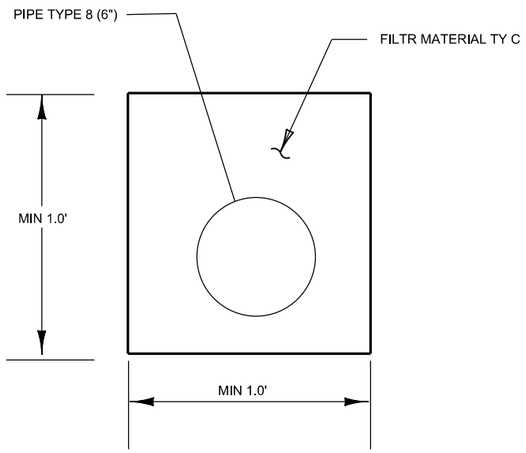


PROPOSED UNDERDRAIN DETAIL

STATE OF TEXAS
NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER

Nicasio Lozano

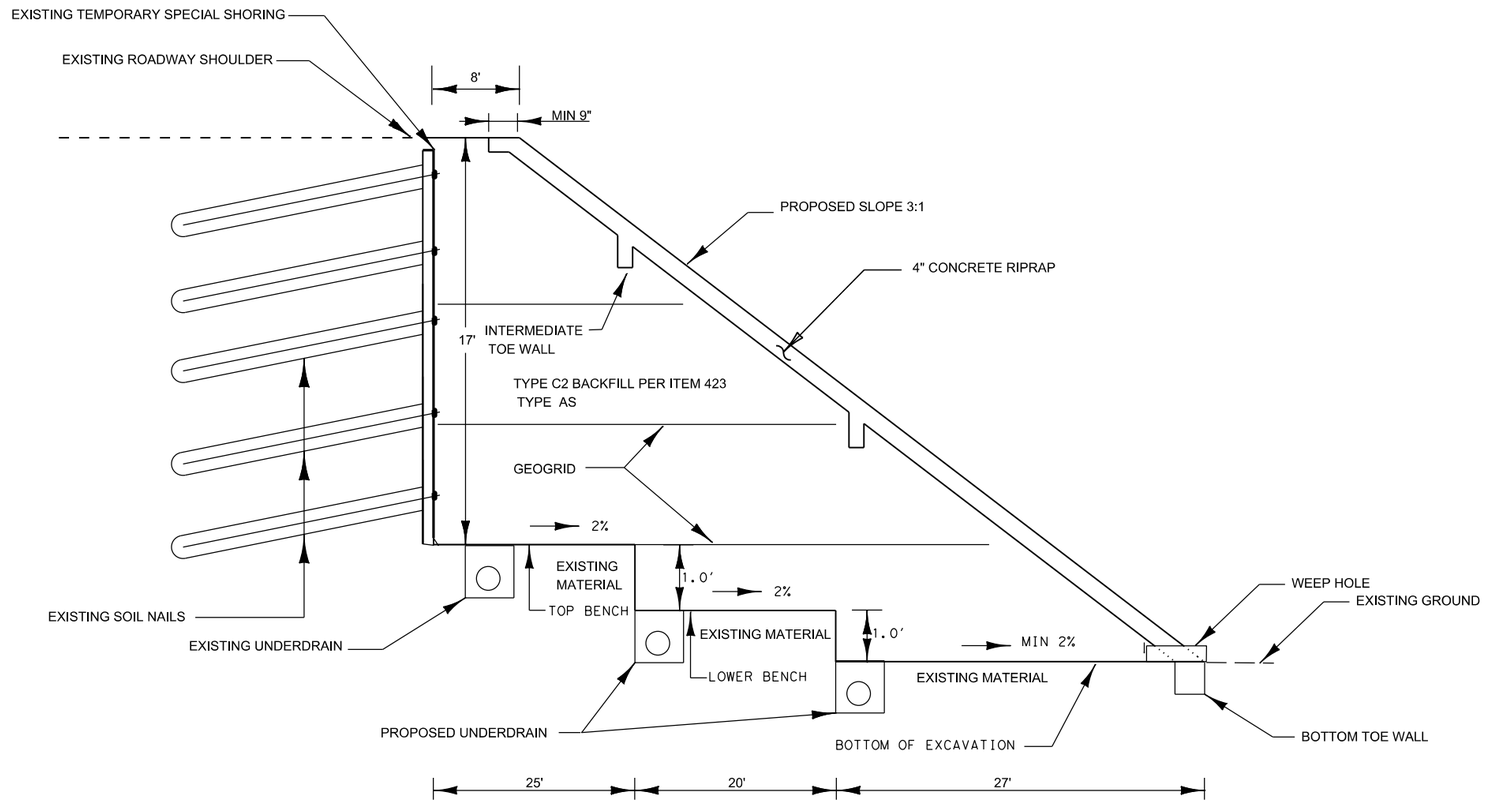
7/29/2024

Sheet 4 of 8 Sheets

Texas Department of Transportation
Dallas District Bridge

US 287 SB
SLOPE REPAIR
EXISTING AND PROPOSED TYPICAL SECTIONS
STA. 219+80 TO STA. 223+20

FILE: SEE PATH	DN: NL	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		87



PROPOSED TYPICAL SECTION OF SLOPE C - C
STA 219+80 TO STA 223+20
NTS

STATE OF TEXAS
NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER

Nicasio Lozano
7/29/2024

Sheet 5 of 8 Sheets

Texas Department of Transportation
Dallas District Bridge

US 287 SB
SLOPE REPAIR
PROPOSED DETAILS
STA. 219+80 TO STA. 223+20

FILE: SEE PATH.	DN: NL	CK:	DW:	CK:
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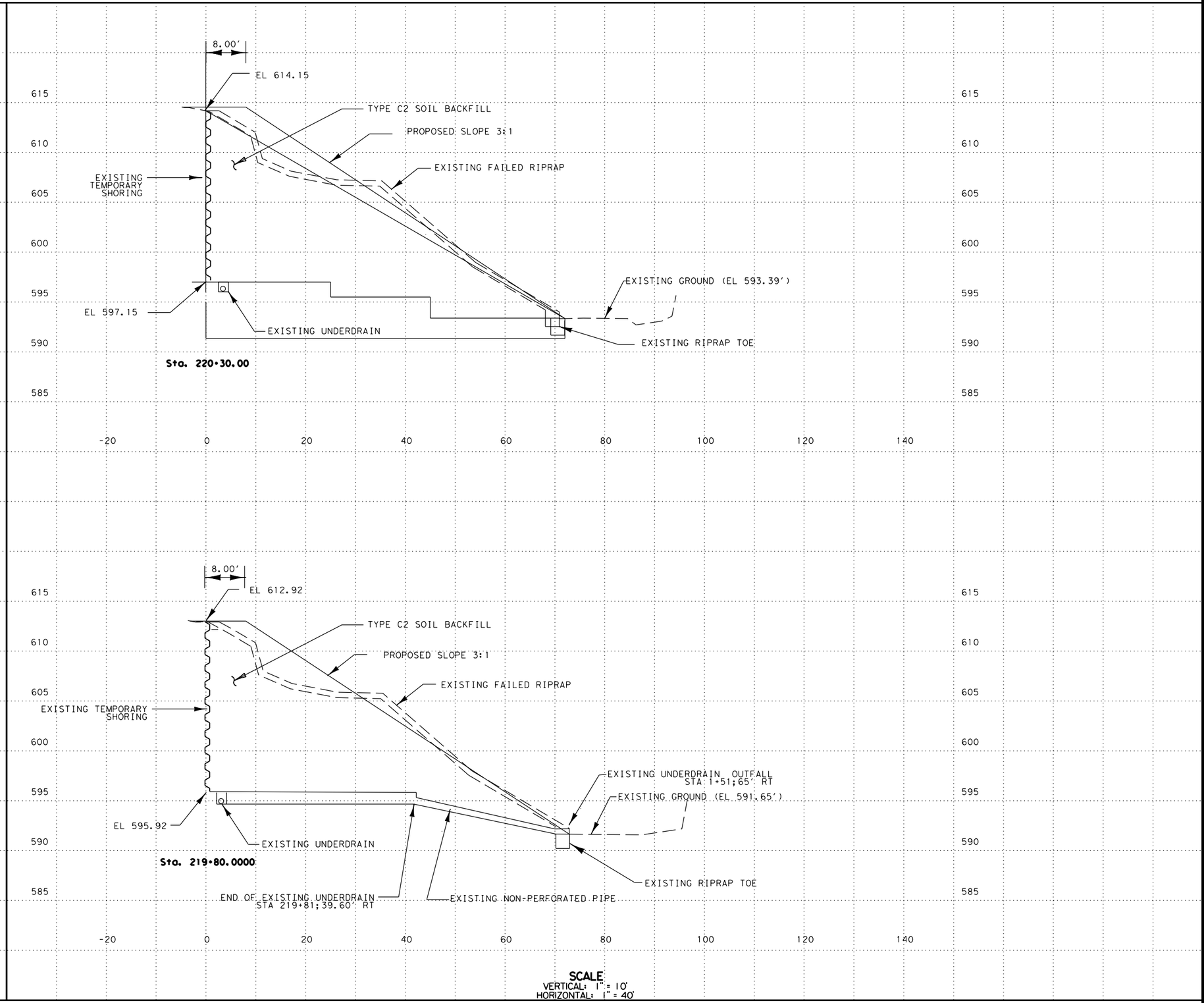

SCALE
VERTICAL: 1" = 10'
HORIZONTAL: 1" = 40'

STATE OF TEXAS
NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER

Nicasio Lozano
7/29/2024

Sheet 6 of 8 Sheets

Texas Department of Transportation

Dallas District Bridge

US 287 SB

SLOPE REPAIR CROSS SECTION

STA 219+80 & STA 220+30

FILE: SEE PATH	DN: NL	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
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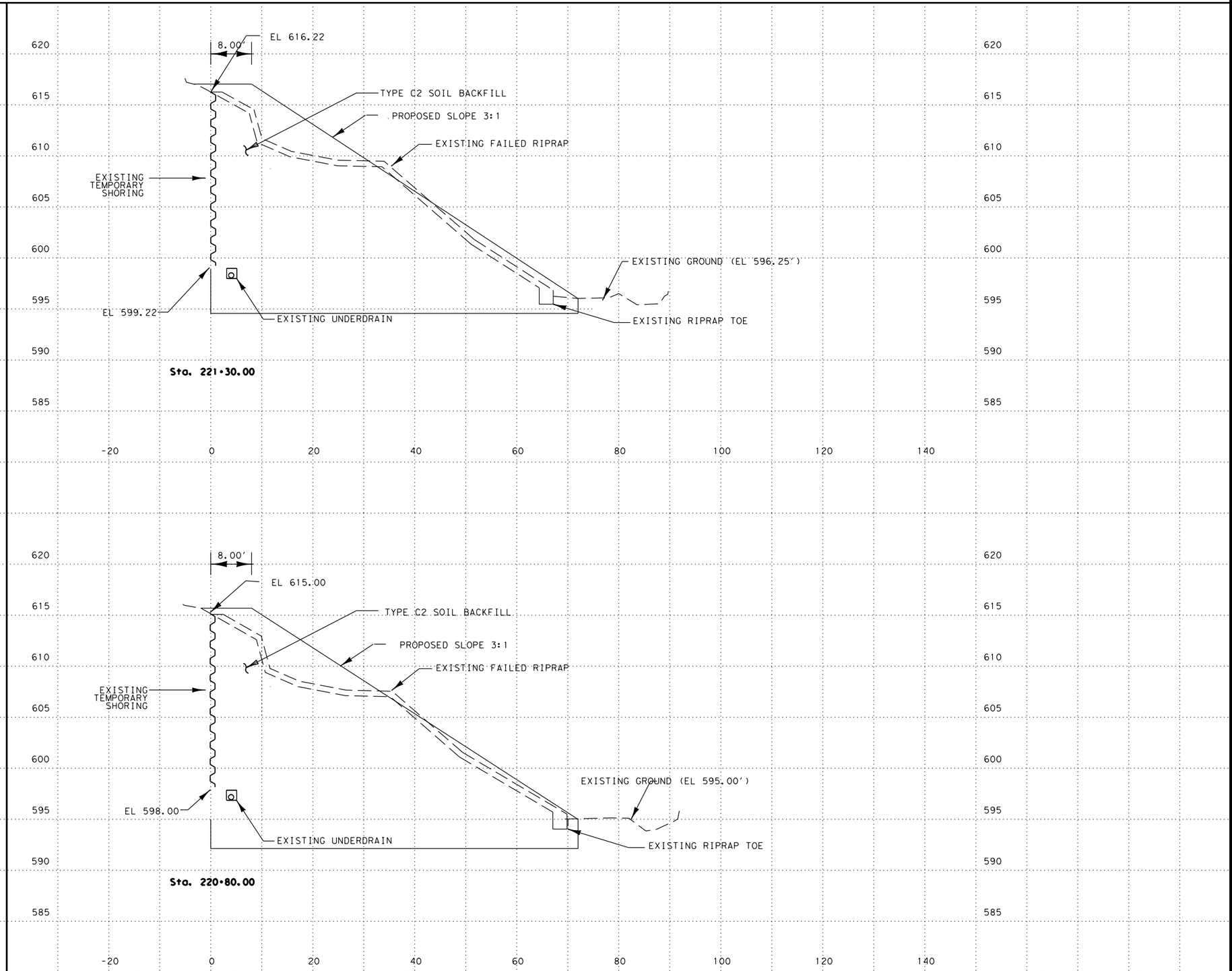

SCALE
VERTICAL: 1" = 10'
HORIZONTAL: 1" = 40'

NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Nicasio Lozano
7/29/2024

Sheet 7 of 8 Sheets

Texas Department of Transportation

Dallas District Bridge

US 287 SB

SLOPE REPAIR
CROSS SECTIONS
STA 220+80 STA 1+30

FILE: SEE PATH	DN:	CK: NL	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
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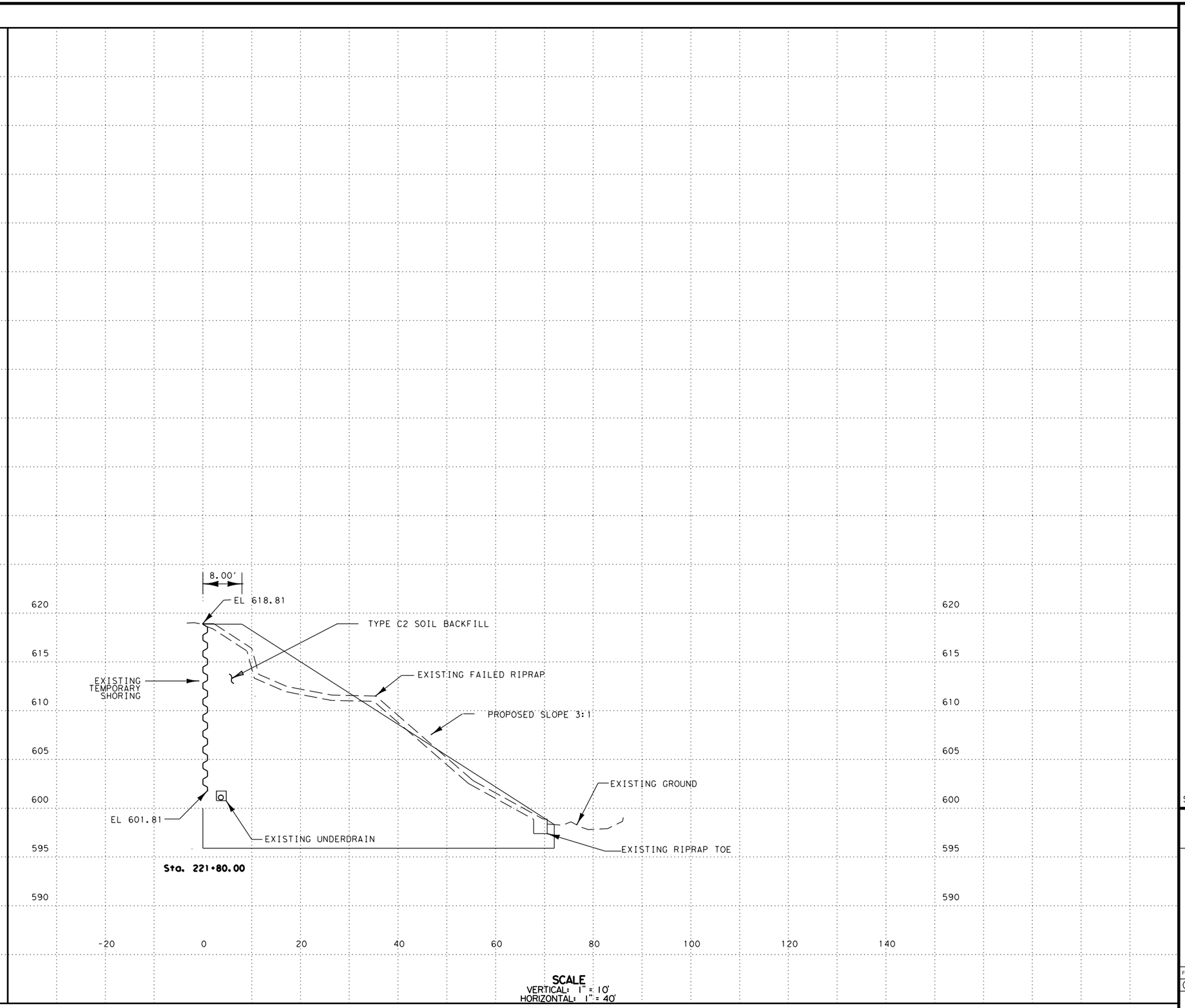


Sta. 221+80.00

SCALE
VERTICAL: 1" = 10'
HORIZONTAL: 1" = 40'

STATE OF TEXAS
NICASIO LOZANO
89964
LICENSED PROFESSIONAL ENGINEER

Nicasio Lozano

7/29/2024

Sheet 8 of 8 Sheets

Texas Department of Transportation

Dallas District Bridge

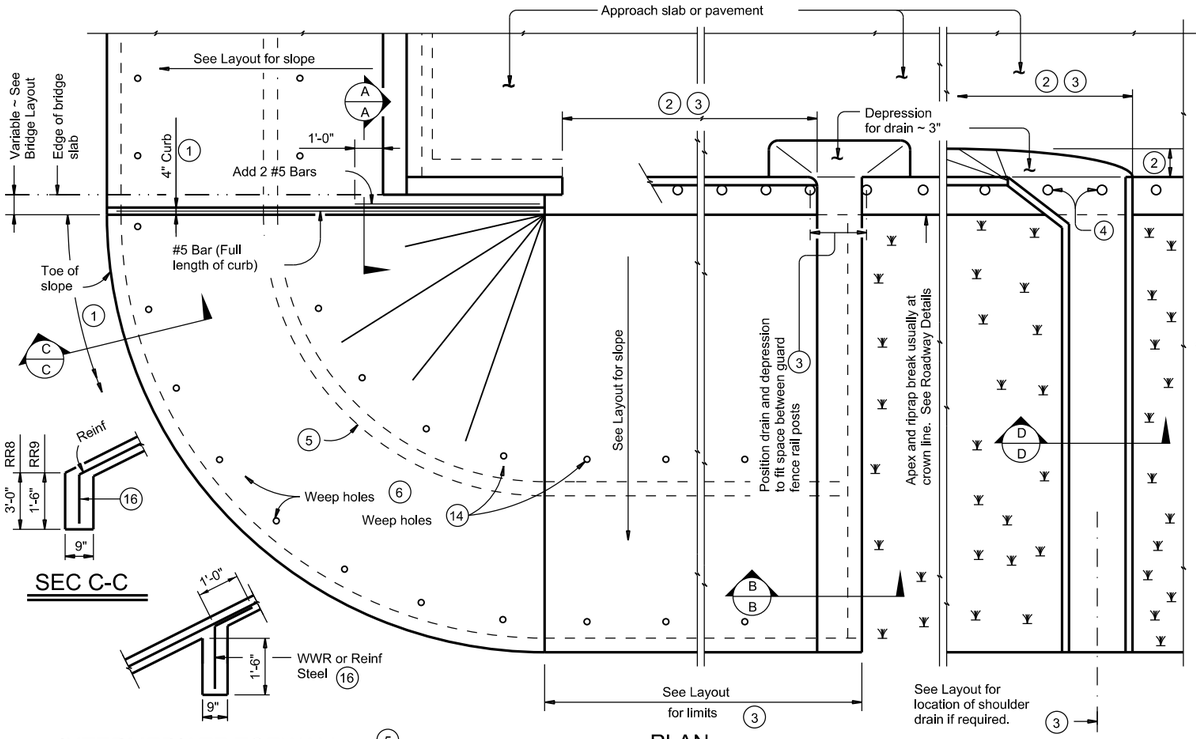
US 287 SB

SLOPE REPAIR CROSS SECTION

STA 221+80

FILE: SEE PATH	DN: NL	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		91

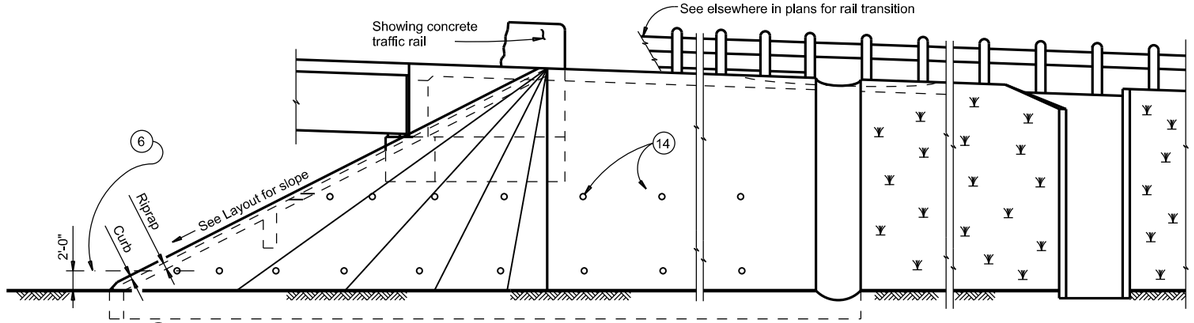
DATE:
FILE:



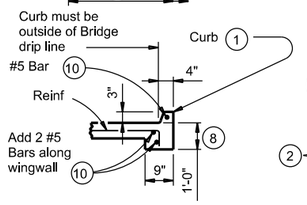
PLAN

SEC C-C

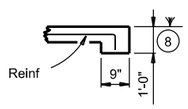
INTERMEDIATE TOEWALL (5)



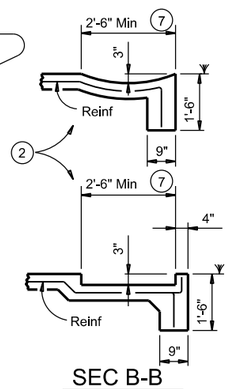
ELEVATION



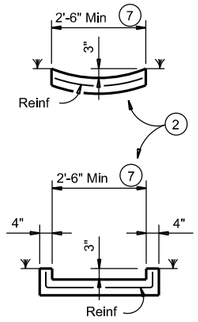
SEC A-A



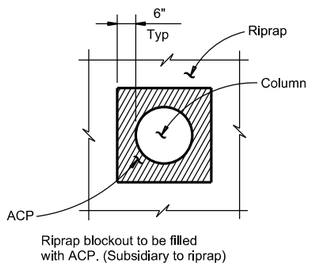
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

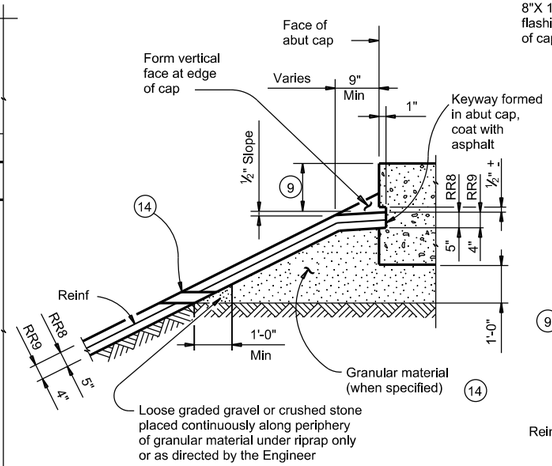


SEC D-D
(Shoulder drain)

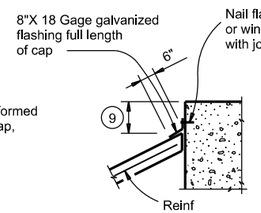


Riprap blockout to be filled with ACP. (Subsidiary to riprap)

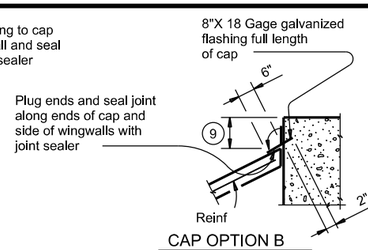
RIPRAP DETAIL AT COLUMNS
(As directed by the Engineer)



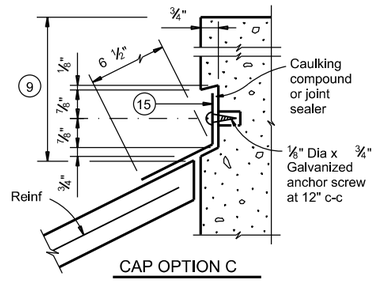
SHOWING KEYWAY OPTION



CAP OPTION A

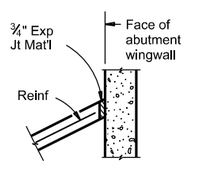


CAP OPTION B

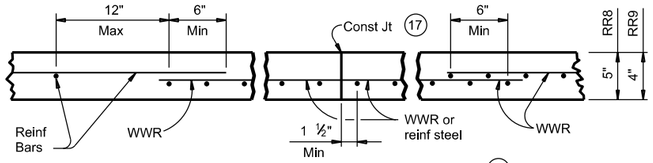


CAP OPTION C

SECTIONS THRU RIPRAP AT CAP (11)



SECT THRU RIPRAP AT WINGWALL (12)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

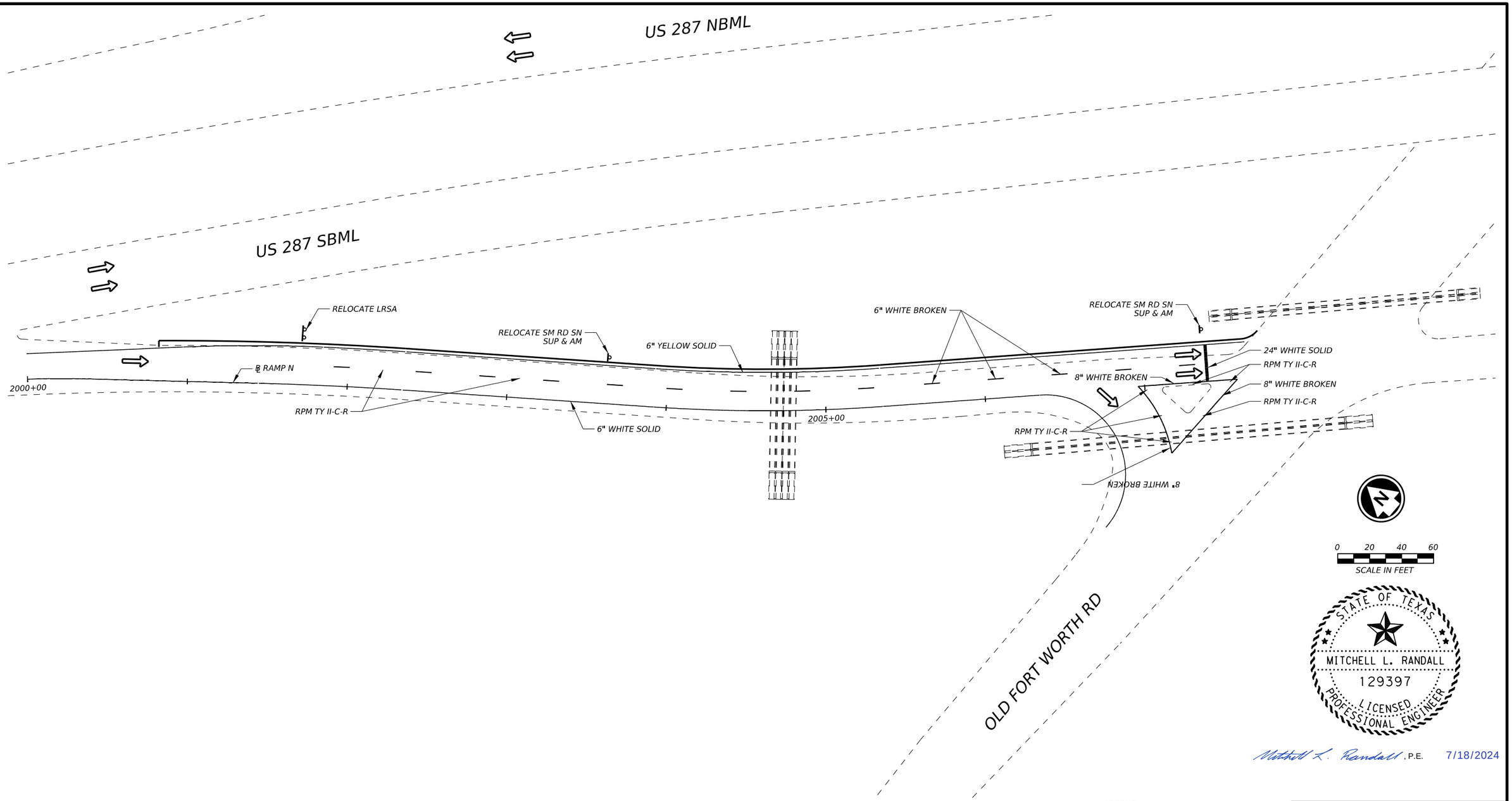
Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		92



STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 7/18/2024

LEGEND:
PROPOSED SIGN RELOCATION
TRAFFIC FLOW

Texas Department of Transportation

RAMP N

SIGNING & STRIPING LAYOUT

CONT	SECT	JOB	HIGHWAY
0172	04	050, ETC.	US 287
DIST	COUNTY		SHEET NO.
DAL	ELLIS		93

DATE: 7/17/2024 3:39:06 PM
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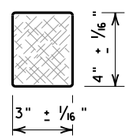
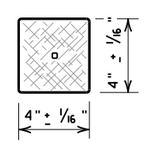
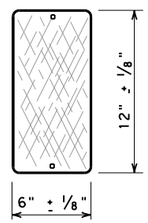
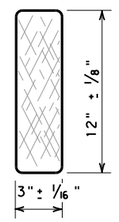
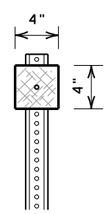
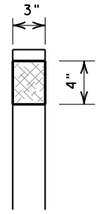
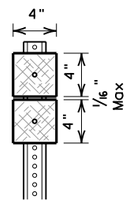
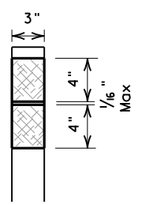
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
- S = Single
- D = Double

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

REFLECTOR UNIT SIZE
- 1 or 2

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

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

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

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

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

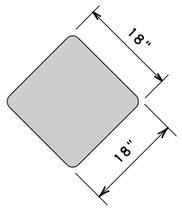
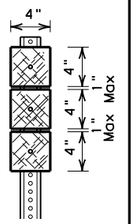
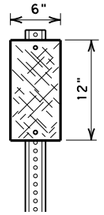
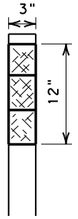
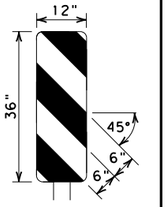
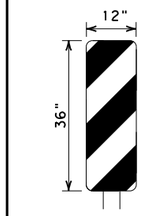
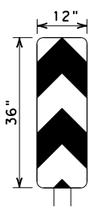
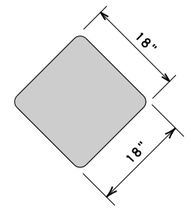
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker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

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

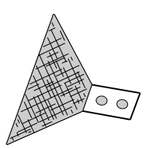
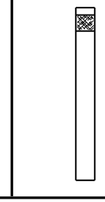
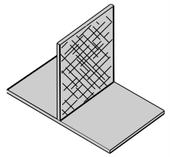
TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

DIRECTION
If Required
- BI = Bi-Directional

OBJECT MARKERS

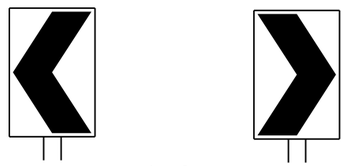
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



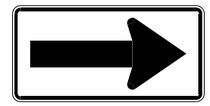
W1-8

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

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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.

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

DATE:
FILE: dom1-20.dgn

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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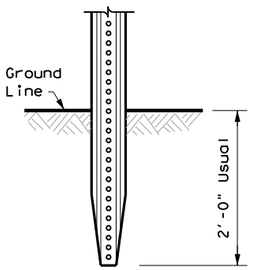
4-10 7-20	DAL	ELLIS		94

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

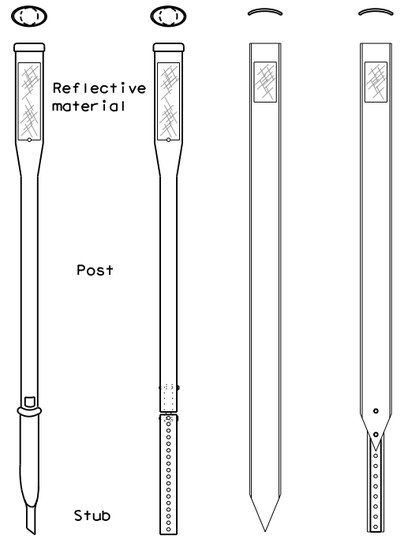


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

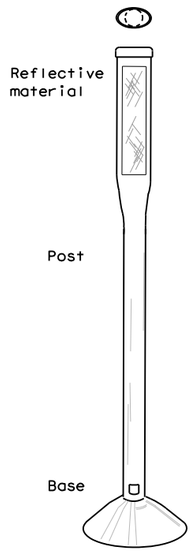
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



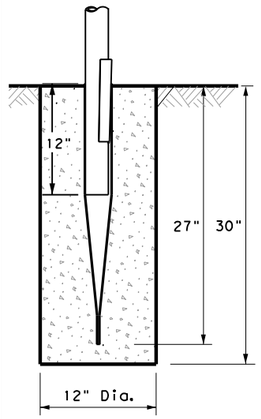
SURFACE MOUNT

NOTES

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

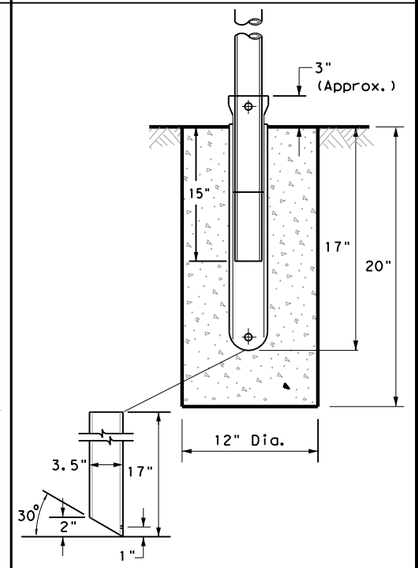
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

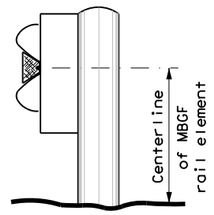
NOTE

1. Install per manufacturer's recommendations.

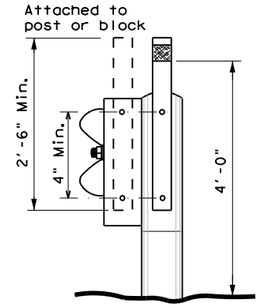
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

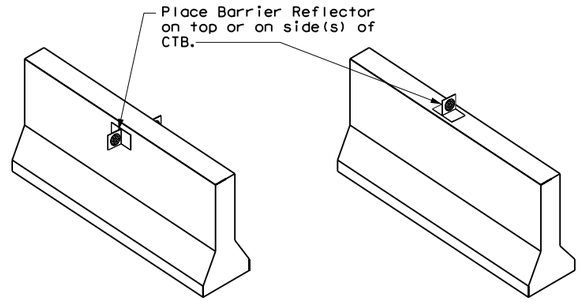
GF1



GF2



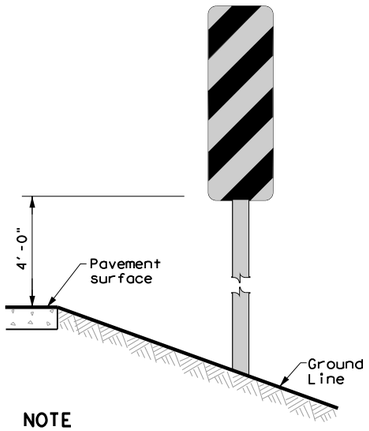
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

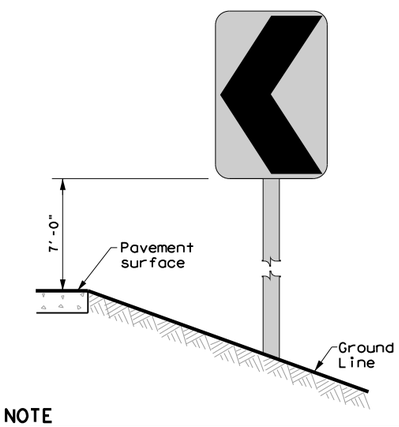
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

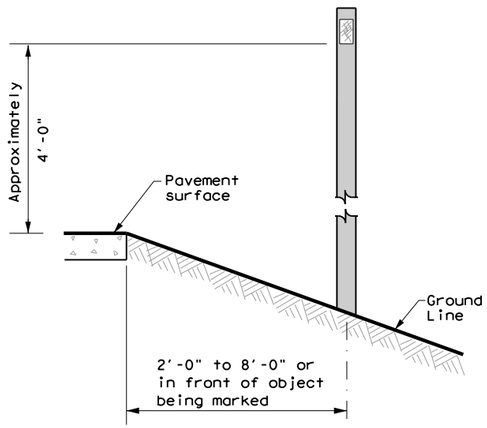
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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20B

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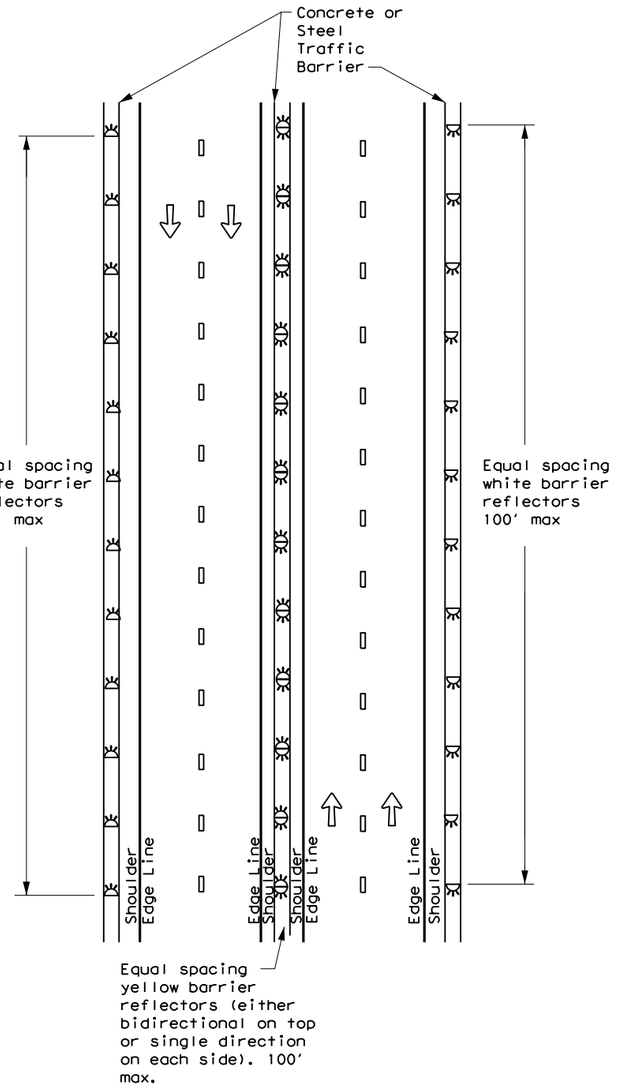
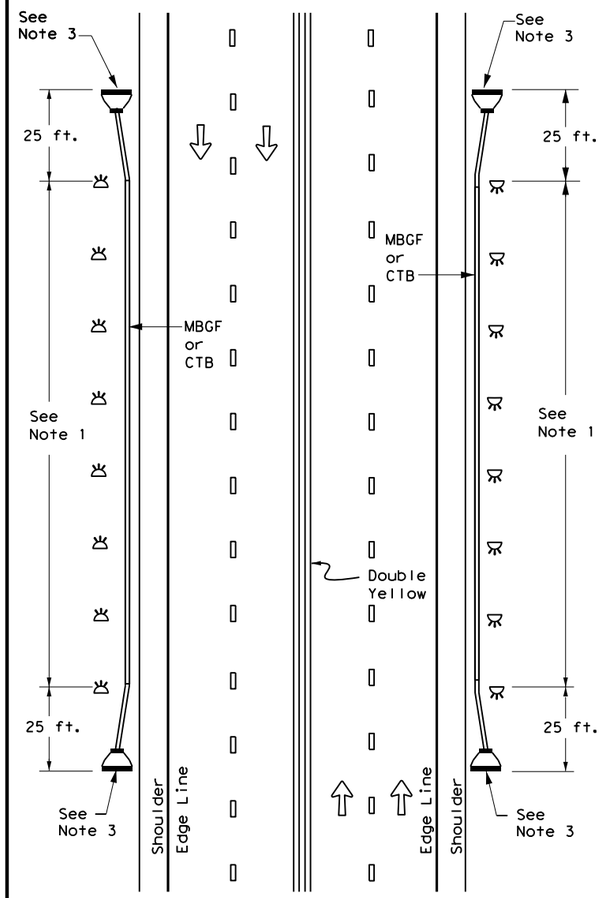
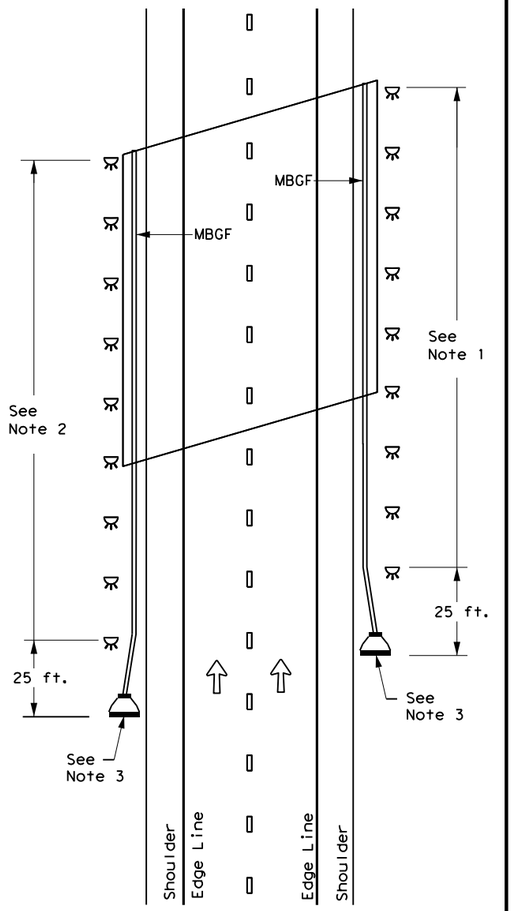
CONTINUOUS CONCRETE OR STEEL BARRIER



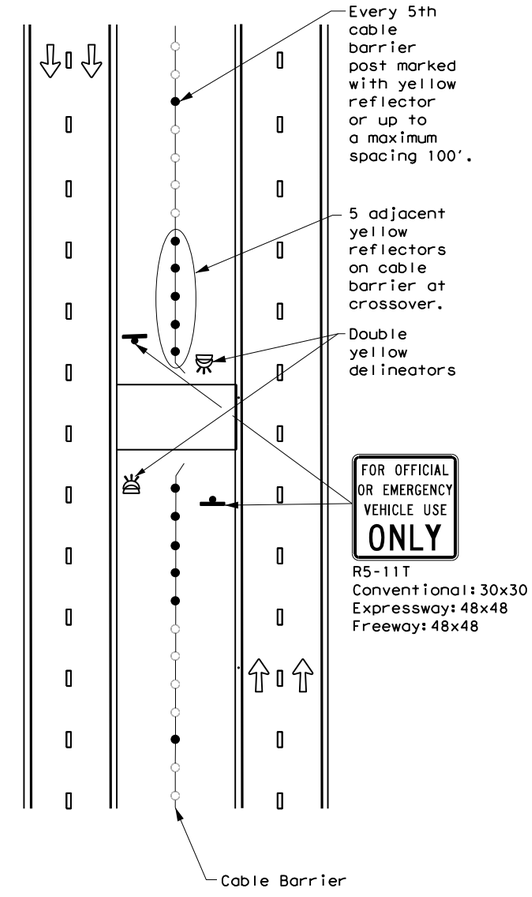
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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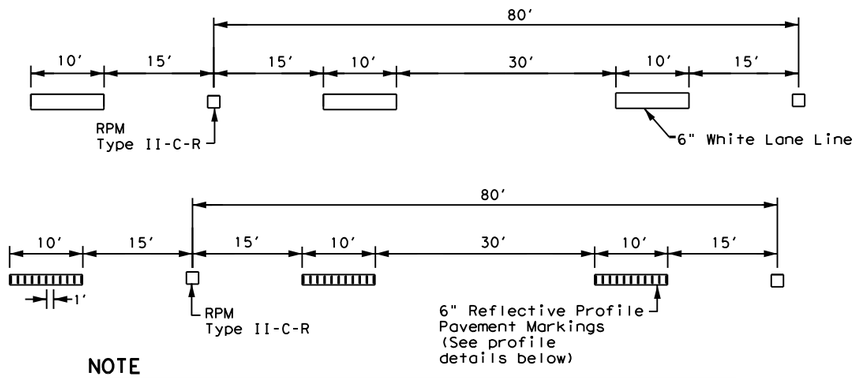
REVISIONS	0172	04	050, ETC	US 287
7-20	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		96

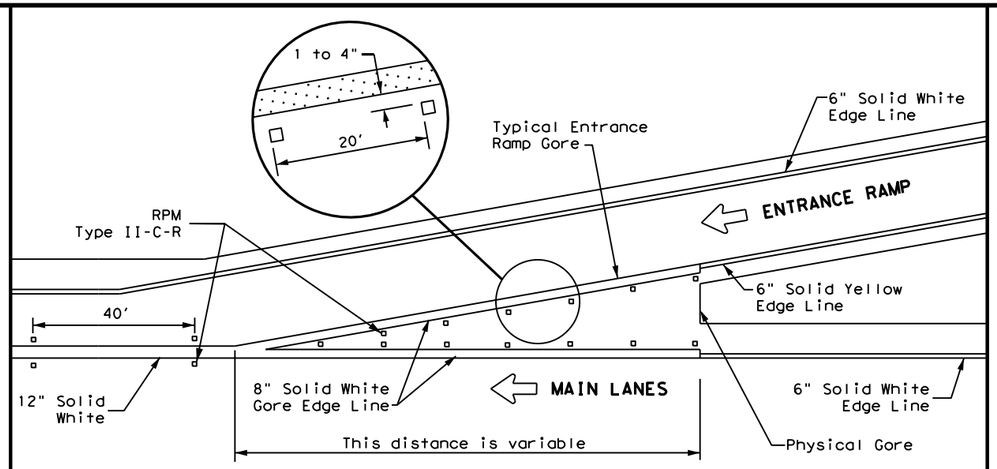
DATE:
FILE:



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

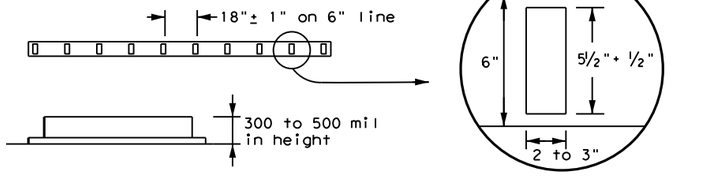


TYPICAL ENTRANCE RAMP GORE MARKING

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.

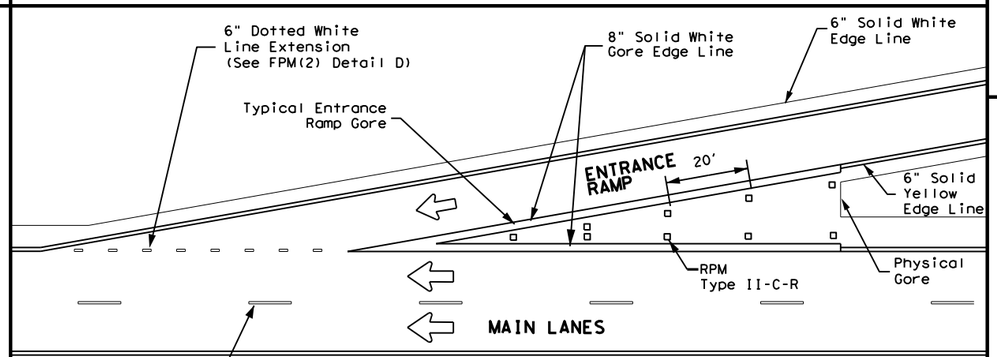
LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R



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

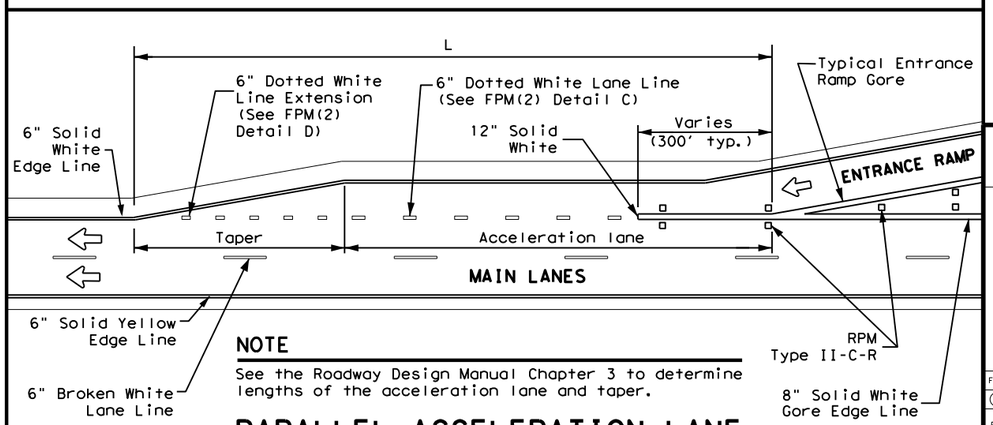
See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

TAPERED ACCELERATION LANE

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



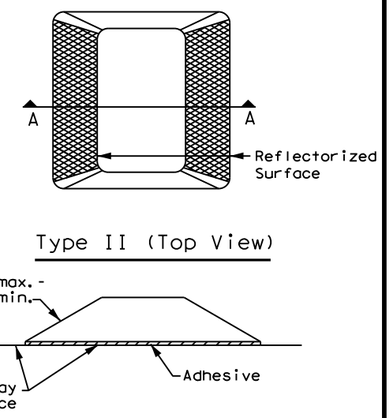
NOTE

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

PARALLEL ACCELERATION LANE

GENERAL NOTE

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



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

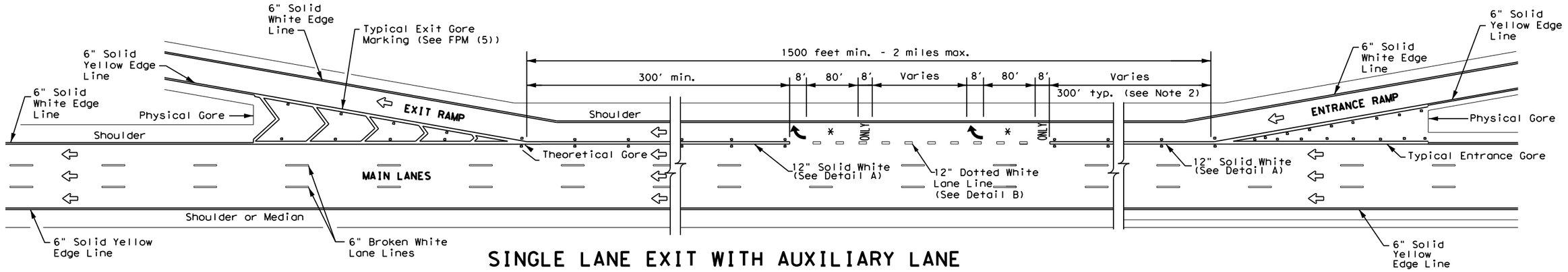
Texas Department of Transportation — Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-22

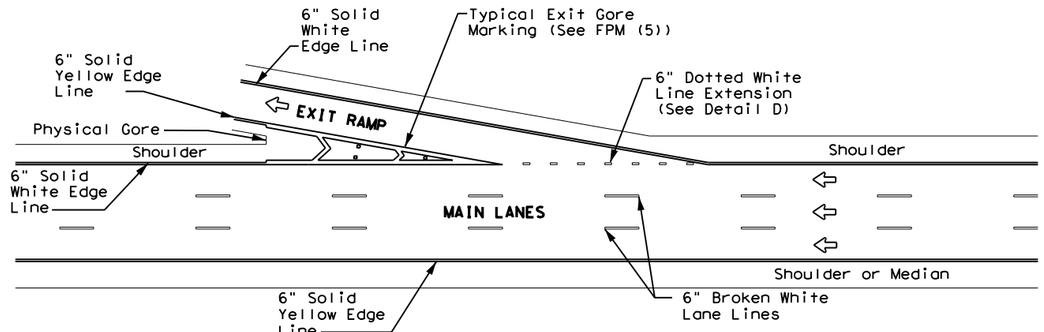
FILE: fpm(1)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
5-74 8-00 2-12	DIST	COUNTY		SHEET NO.
4-92 2-08 10-22	DAL	ELLIS		97
5-00 2-10				

23A



SINGLE LANE EXIT WITH AUXILIARY LANE

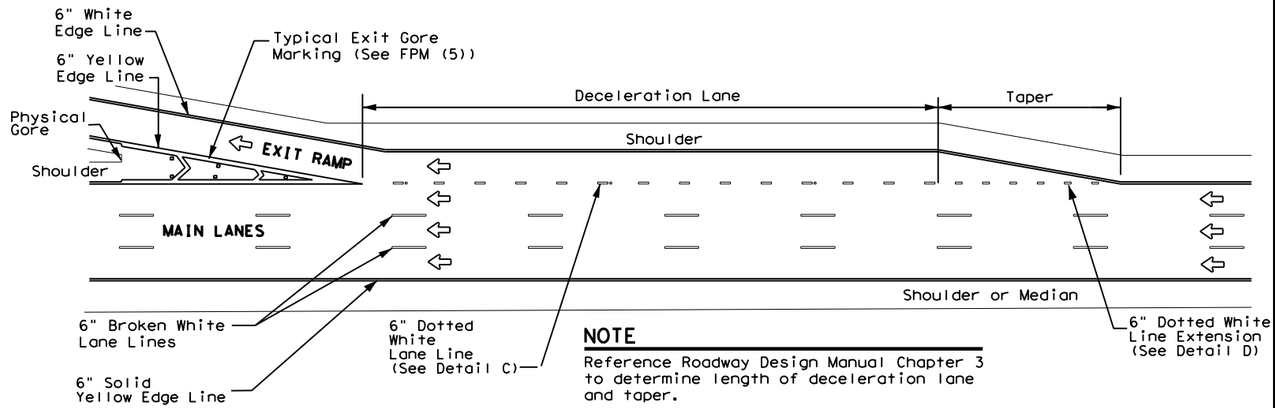
(See Note 2)



NOTE

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

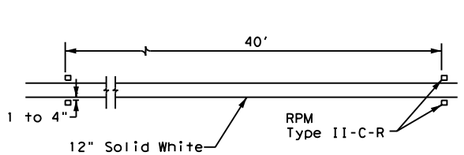
TAPERED DECELERATION LANE



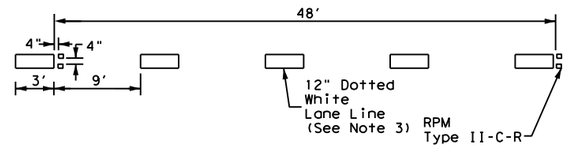
NOTE

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

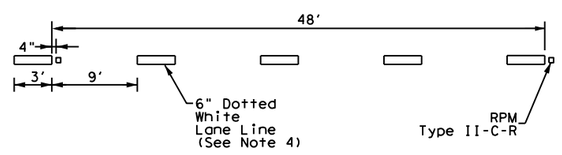
PARALLEL DECELERATION LANE



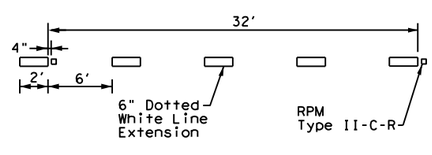
DETAIL A



DETAIL B



DETAIL C



DETAIL D

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Normal (6") dotted lane line (see Detail C) is used at parallel acceleration and deceleration lanes.
5. See FPM(1) for traffic lane line pavement marking details.

LEGEND	
⇦	Traffic flow
↱	Pavement marking arrows (white)
▫	Reflectorized Raised Markers (RPM) Type II-C-R
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

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

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

Texas Department of Transportation

Traffic Safety Division Standard

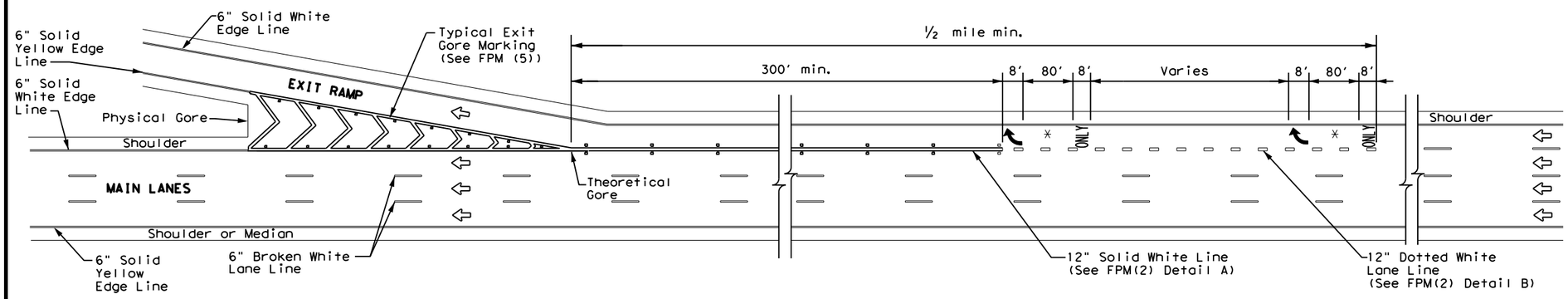
TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-22

FILE: fpm(2)-22.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-77 5-00 2-12 4-92 8-00 10-22 8-95 2-10	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		98

23B

DATE:
FILE:

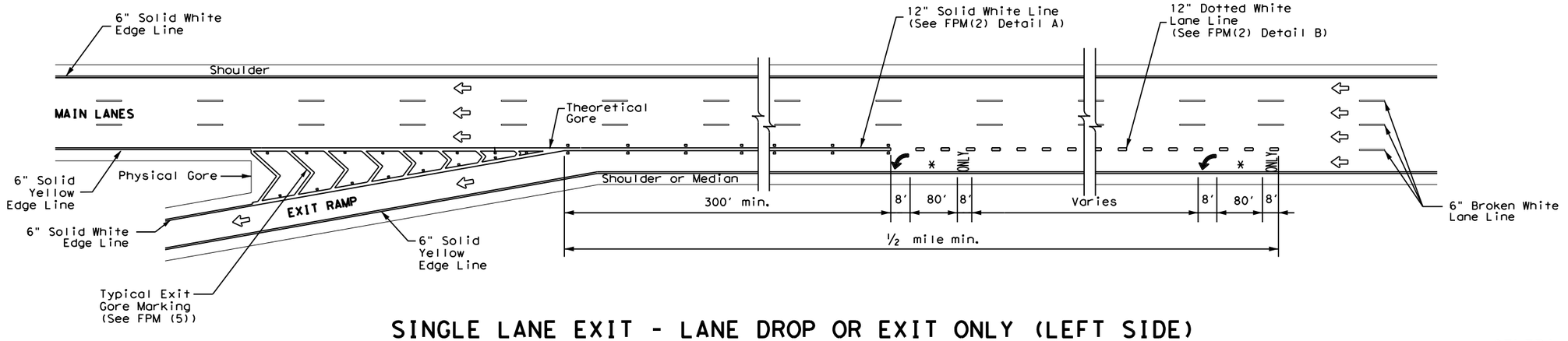


SINGLE LANE EXIT - LANE DROP OR EXIT ONLY

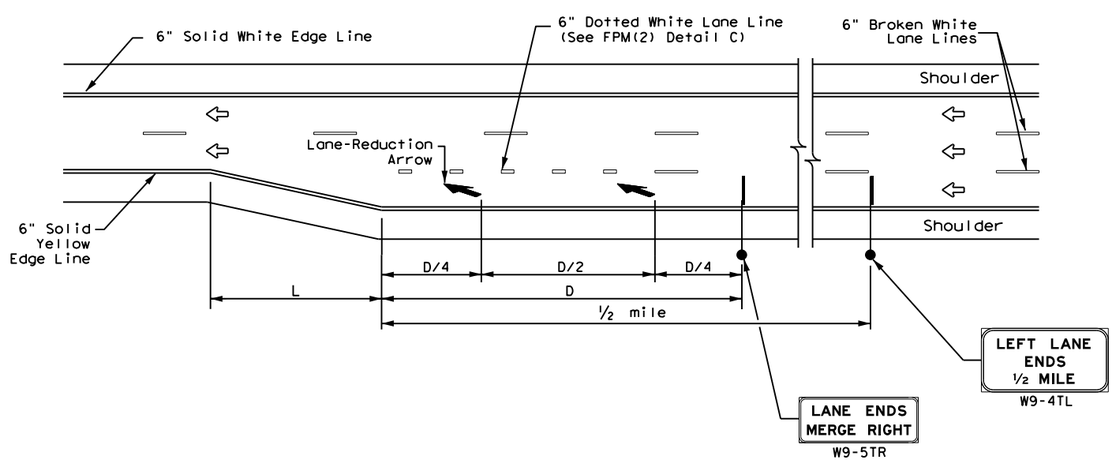
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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
*	Arrow markings are optional, however "ONLY" is required if arrow is used



SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFT SIDE)



FREEWAY LANE REDUCTION

NOTES

1. Large Guide signs shall conform to the TxDOT Freeway Signing Handbook.
2. 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.
3. Arrows and sign details can be found in the Standard Highway Sign Designs for Texas (SHSD) at http://www.txdot.gov.
4. These guidelines may also be applied to the design of a right side lane reduction. Use LANE ENDS MERGE LEFT (W9-5TL) and RIGHT LANE ENDS 1/2 MILE (W9-4TR) signs in lieu of what is shown on drawing.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
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	
80 MPH	1,500	
85 MPH	1,625	

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 FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
5. See FPM(1) for traffic lane line pavement marking details.

Texas Department of Transportation

Traffic Safety Division Standard

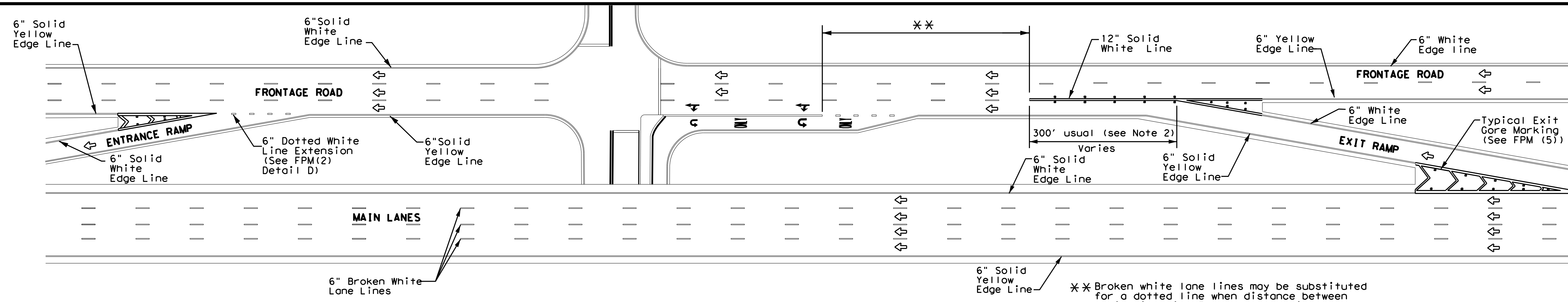
TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS SINGLE LANE DROP (EXIT ONLY) AND LANE REDUCTION DETAILS

FPM(3)-22

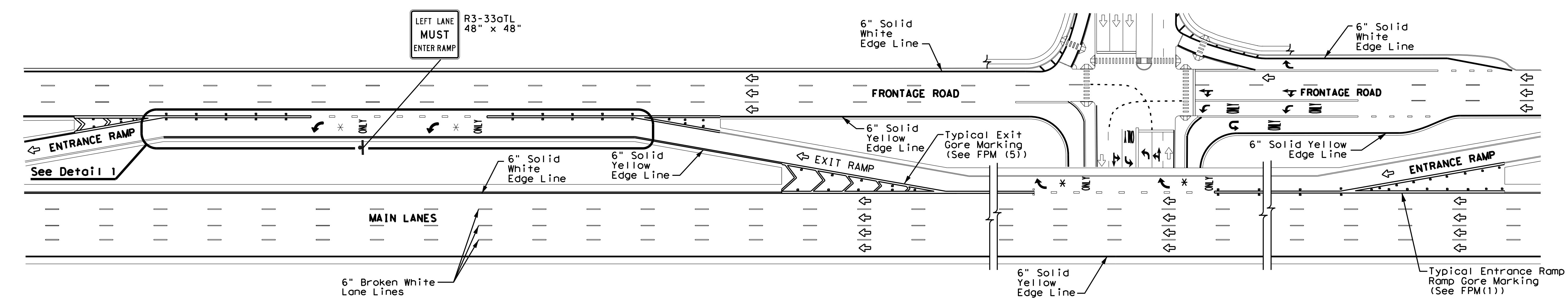
FILE: fpm(3)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0172	04	050, ETC	US 287
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 10-22	DAL	ELLIS		99

DATE:
FILE:

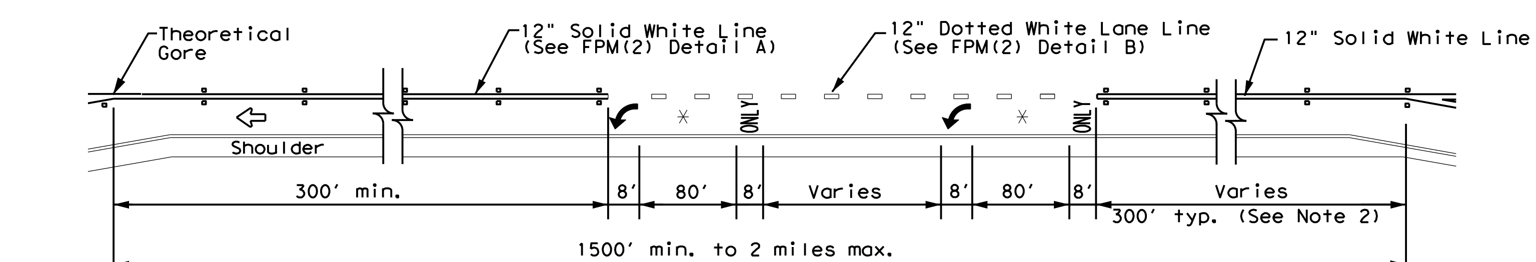
23C



DIAMOND INTERCHANGE



URBAN X-RAMP WITH FRONTAGE ROAD AUXILIARY LANE



DETAIL 1

(Frontage Road Auxiliary Lane for X-Ramps)

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.

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 FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
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

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD FREEWAY AND FRONTAGE ROAD PAVEMENT MARKINGS

FPM(6)-22

FILE: fpm(6)-22.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
10-22	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		100

23F

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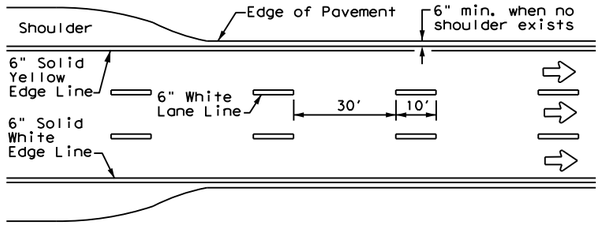
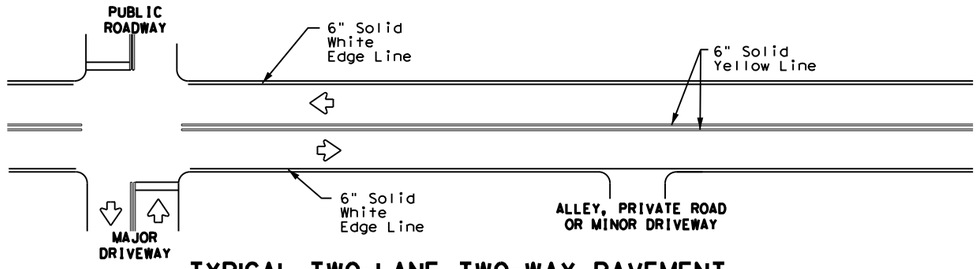
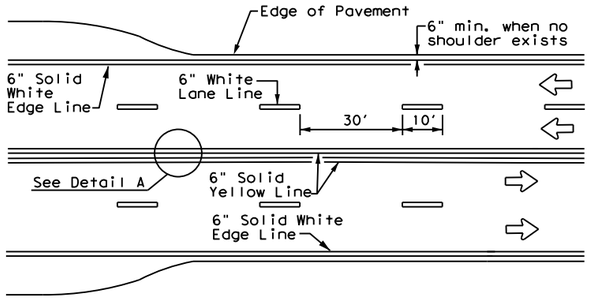
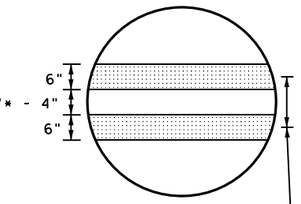


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





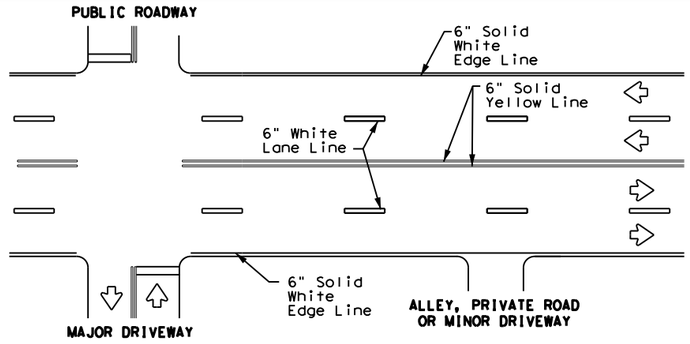
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

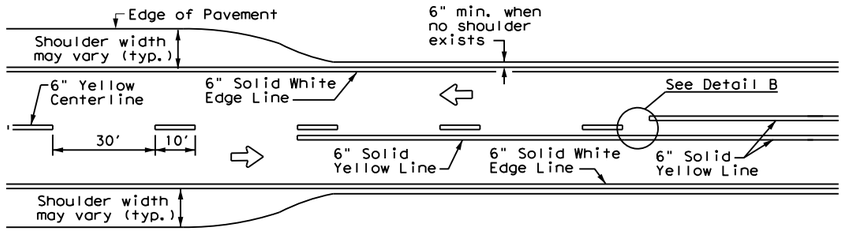
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

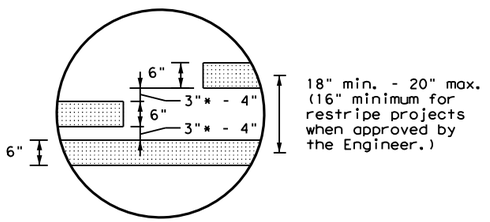
** 8" minimum for restripe projects when approved by the Engineer.



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

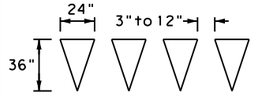


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



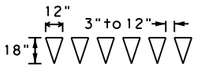
DETAIL "B"

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

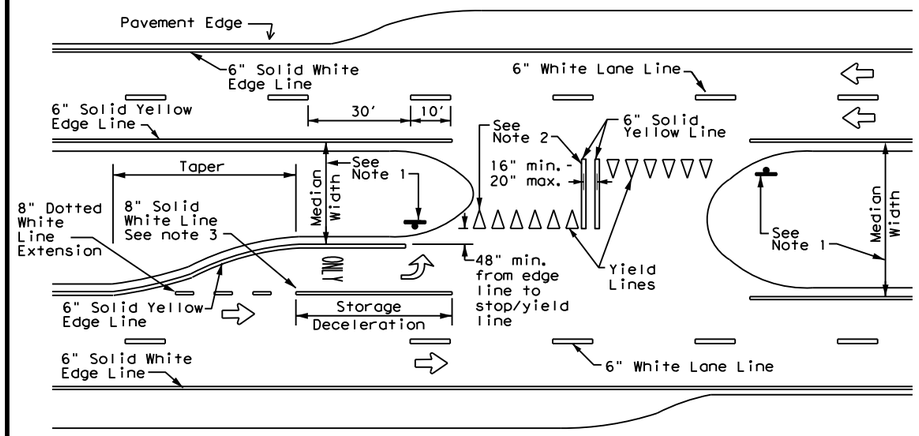


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

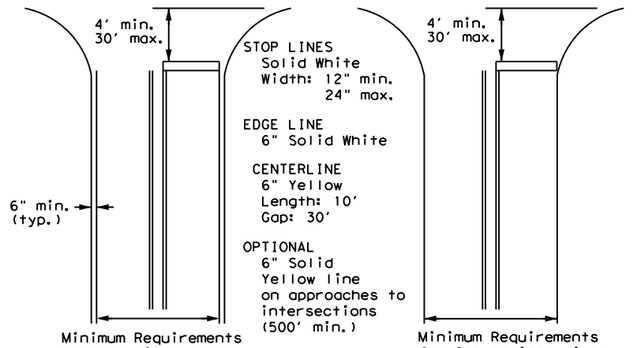
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

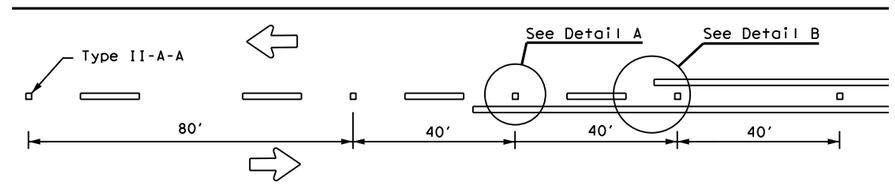
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0172	04	050, ETC	US 287
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	DAL	ELLIS		101

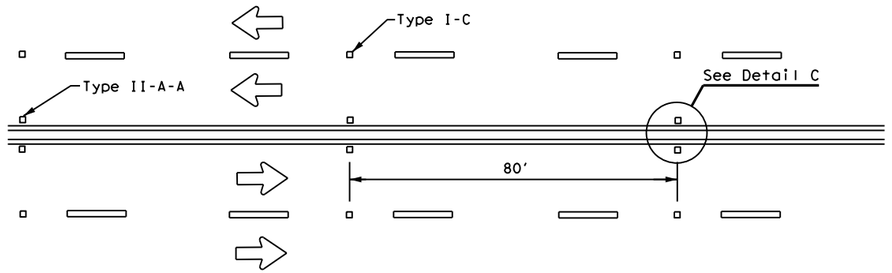
22A

DATE:
FILE:

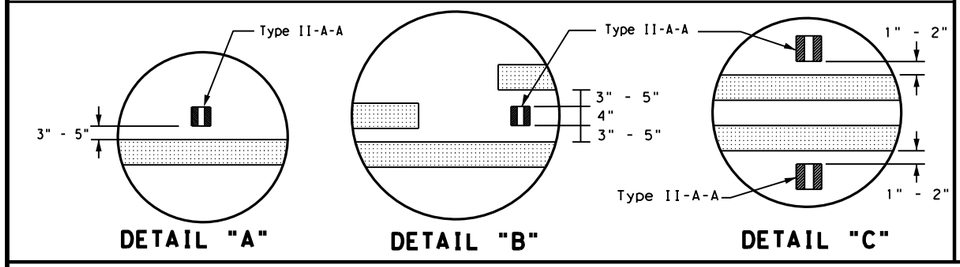
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

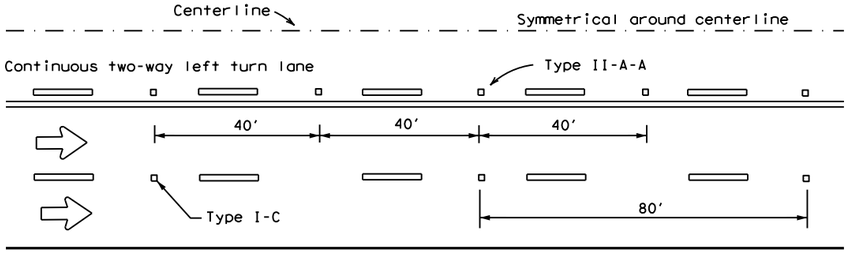


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

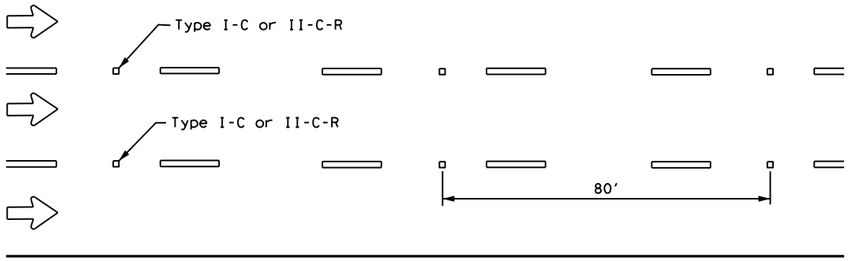


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



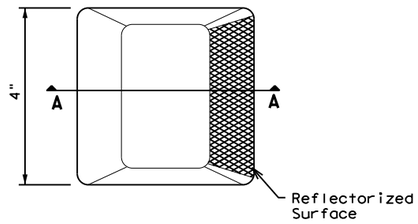
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

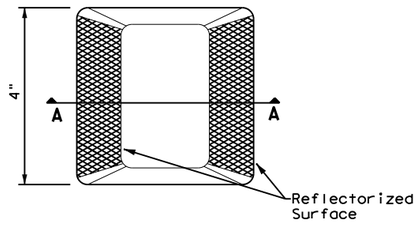
See Note 3.

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

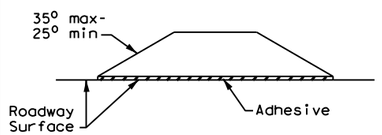
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

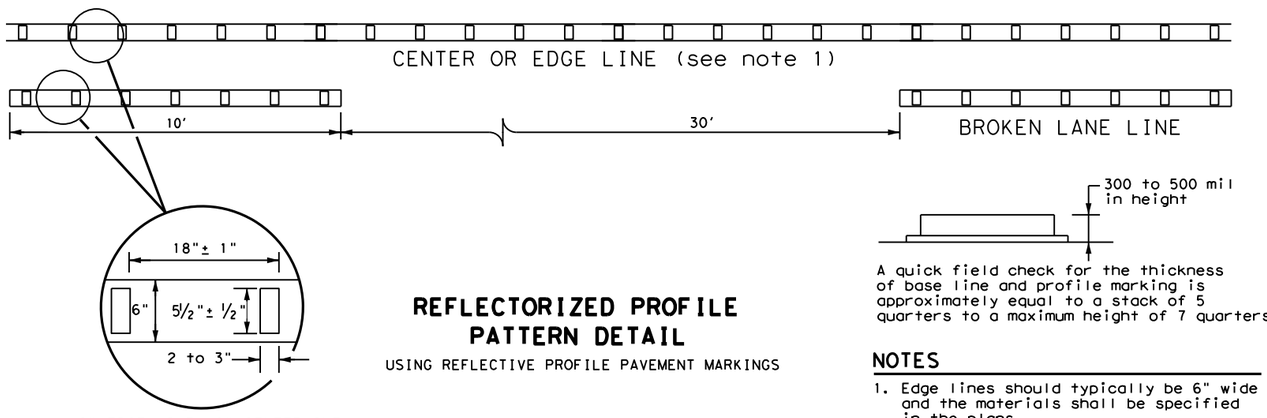


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

NOTES

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

GENERAL NOTES

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

Texas Department of Transportation

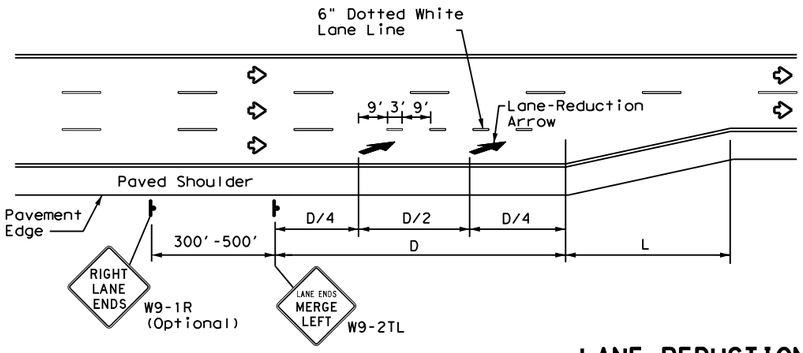
Traffic Safety Division Standard

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

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0172	04	050, ETC	US 287
	DIST	COUNTY		SHEET NO.
	DAL	ELLIS		102

22B

DATE:
FILE:

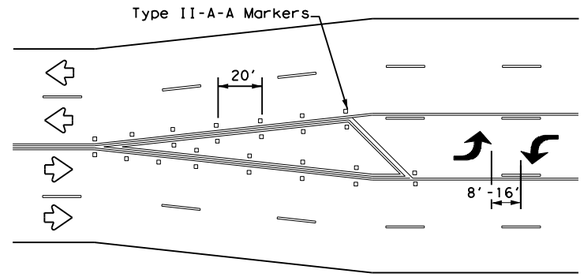


LANE REDUCTION

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



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

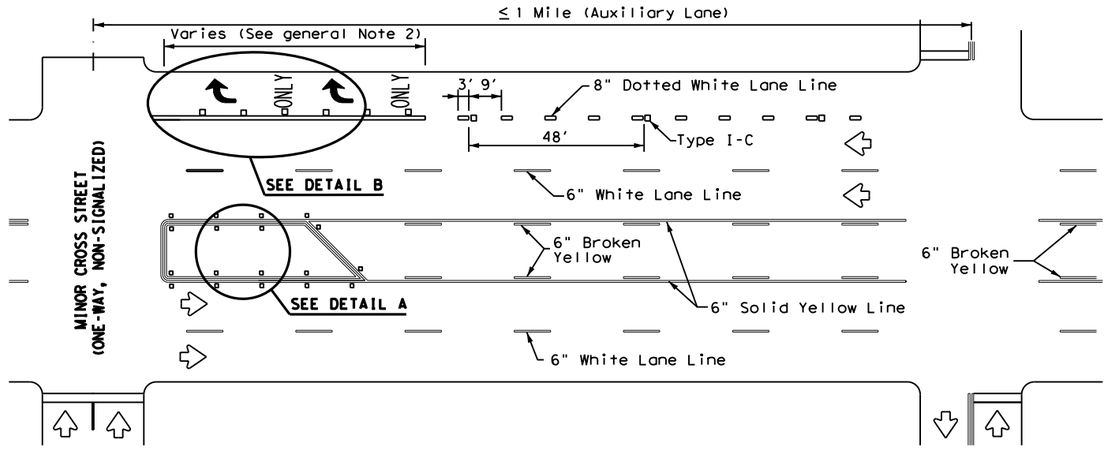
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

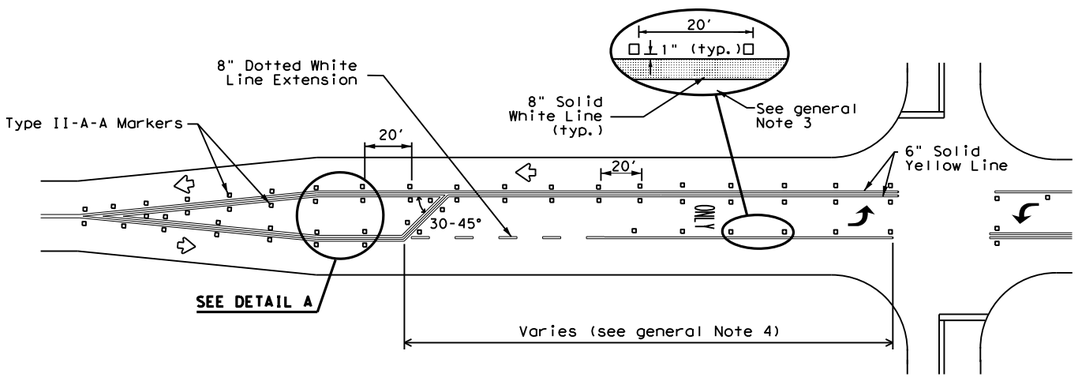
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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

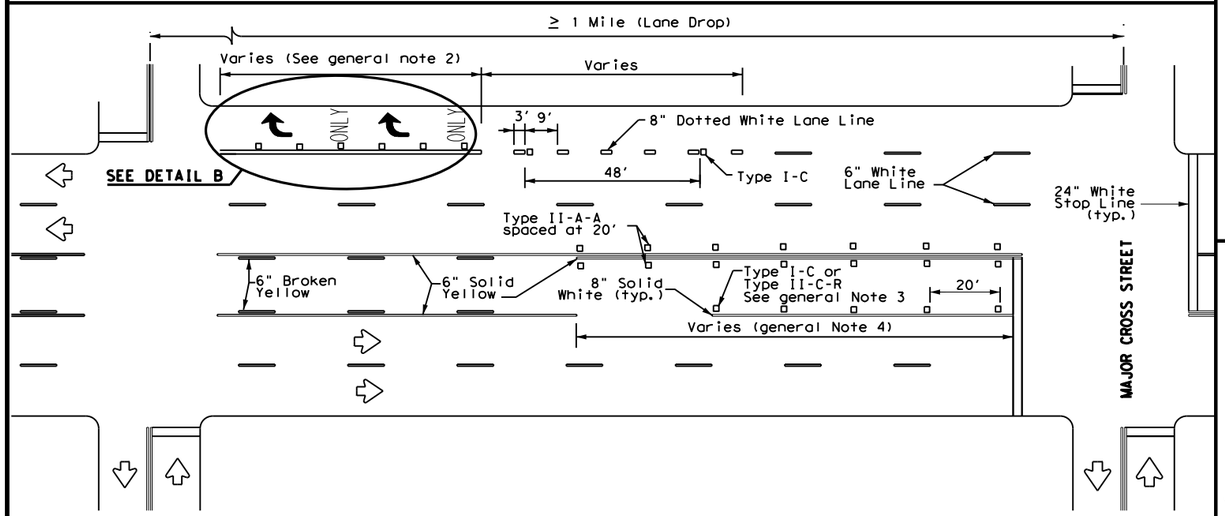
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



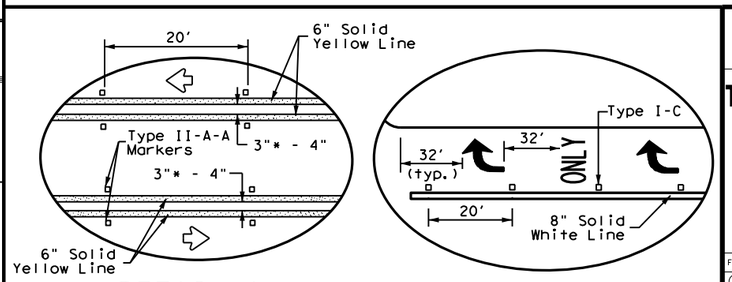
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



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

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

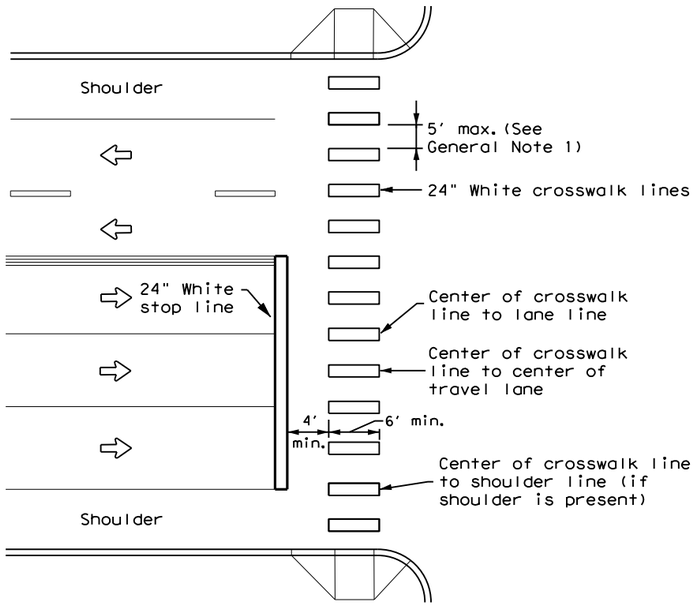
PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20	0172	04	050, ETC	US 287
5-00 2-10 12-22	DIST	COUNTY		SHEET NO.
8-00 2-12	DAL	ELLIS		103

220

DATE:
FILE:

DATE:
FILE:



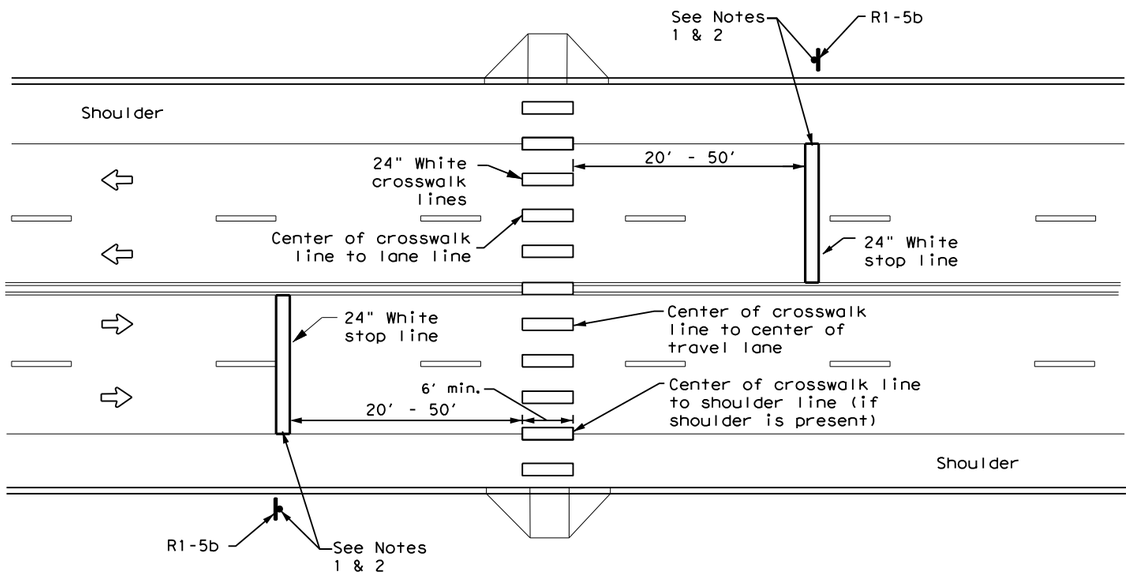
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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

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



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

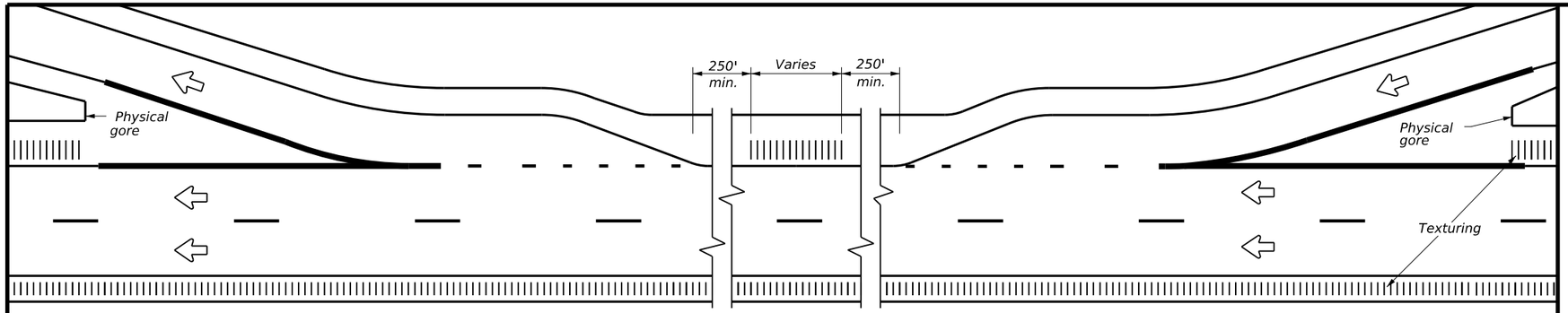
Texas Department of Transportation

Traffic Safety Division Standard

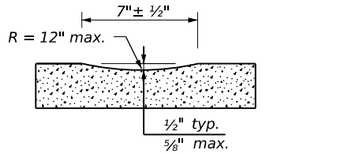
CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

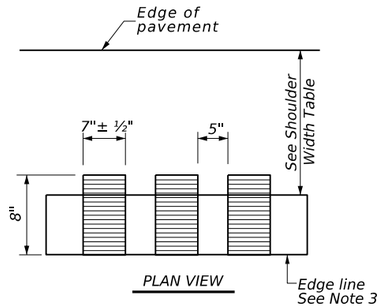
FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
6-20	DIST	COUNTY		SHEET NO.
6-22	DAL	ELLIS		104
12-22				
22D				



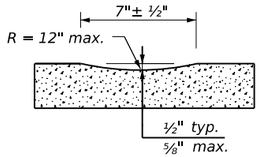
TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



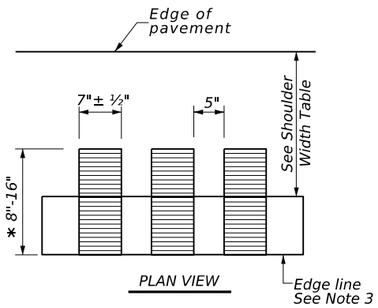
PROFILE VIEW
OPTION 1



CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

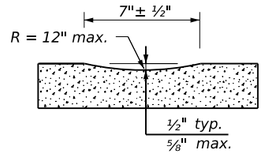


PROFILE VIEW
OPTION 2

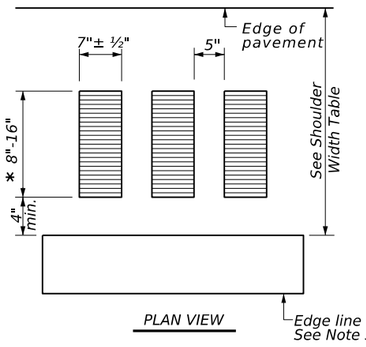


* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

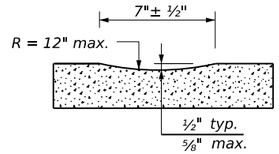


PROFILE VIEW
OPTION 3

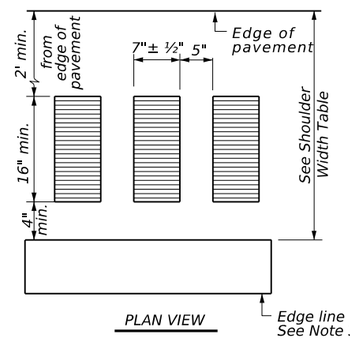


* This distance may vary based on width of shoulder

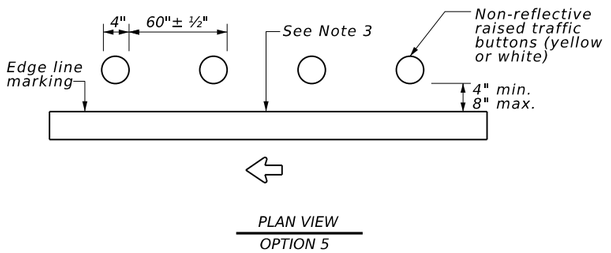
CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PROFILE VIEW
OPTION 4

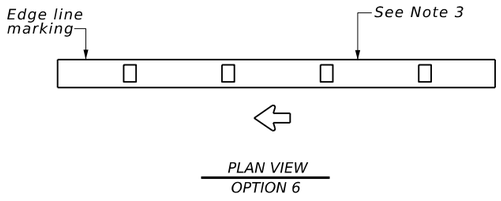


CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGE LINE
(Rumble Strips)



PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS
(Rumble Strips)

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.

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

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
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0172	04	050, ETC	US 287
4-06 1-23	DIST	COUNTY		SHEET NO.
2-10	DAL	ELLIS		105
10-13				

DATE:
FILE:

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

Notes To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.
3. All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.

Filled Out: xx/xx/xxxx
Prepared by: Name/Section

I. STORMWATER POLLUTION PREVENTION PLAN-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.
List adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.
(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

1. CITY OF Midlothian - PHASE II MS4 - CONTACT SCOTT MORROW

☐ No Action Required ☒ Required Action

Action Number:

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. No equipment is allowed in any sream channel below the ordinary High Water Mark except on approved temporary stream crossings or drill pads.

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

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# 3(a)

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

1.

2.

3.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices for applicable 401 General Conditions:
(Note: If CORP Permit not required, do not check boxes.)

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action Number:

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

☐ No Action Required ☒ Required Action

Action Number:

1. The following species could occur in the project area: prairie skink, Texas garter snake, timber (canebrake) rattlesnake. Follow the special note on the EPIC sheet and the BMPs listed below to protect these species.

2. Contractor to implement the following BMPs from Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources available at https://ftp.txdot.gov/pub/txdot-info/env/toolkit/300-01-bmp.pdf.

a. Section 1.2 Vegetation BMP
b. Section 2.6.2 Terrestrial Amphibian and Reptile BMP

Special Notes:

1. Avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.

2. If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

3. The Migratory Bird Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade or transport any migratory bird, nest, young, feather or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):
Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Safety Data Sheets (SDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the SDS. In the event of a spill, take actions to mitigate the spill as indicated in the SDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

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

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action Number:

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

LAST REVISION: 1/15/15

 Texas Department of Transportation
Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED.RD. DIV.NO.	STATE PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		US 287
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	ELLIS	
CONTROL	SECTION	JOB	SHEET NO.
0172	04	050 etc.	106

STORMWATER POLLUTION PRVENTION PLAN (SWP3):
This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0172-04-050, ETC. (US 287)

1.2 PROJECT LIMITS:

From: JOHNSON COUNTY LINE TO
BS 287-Q (MIDLOTHIAN PKWY IN ELLIS COUNTY

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 32.524735 ,(Long) -97.086917

END: (Lat) 32.470830 ,(Long) -96.976612

1.4 TOTAL PROJECT AREA (Acres): 110

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.70

1.6 NATURE OF CONSTRUCTION ACTIVITY:
CONSISTING OF MILL AND INLAY AND PAVEMENT MARKINGS AND SLOPE REPAIR

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Austin Silty Clay, 1 to 3 % slope	mostly silty clay and bedrock, well drained and high rate of runoff
Eddy Soils, 3 to 8 % slope	mostly gravelly clay loam and bedrock, well drained and high rate of runoff, and eroded
Ellis and Heiden Clay, 3 to 5 % slope	mostly clay and shaly clay, well drained, very high rate of runoff and eroded
Branyon Clay, 1 to 3 % slope	100% clay, moderately well drained, very high rate of runoff
Stephens Silty Clay, 1 to 4 % slope	Silty clay, extremely paracobbly silty clay and bedrock, well drained, very high rate of runoff
Trinity Clay, 0 to 1 % slope	100% clay, moderately well drained, high rate of runoff, and frequenly flooded
Houston Black Clay, 1 to 3 % slope	100% clay, moderately well drained, very high rate of runoff

Approximately 90% of the project site is covered with various native and imported grasses.

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:
☒ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)
☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☒ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☒ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☒ Other: BLADE AND WINDROW EXISTING VEGETATION ALONG PAVEMENT EDGES (OVER EXISTING ROADWAY)
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:
☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐
x
☒ Other: ROADWAY SURFACE MILLING AND GRINDING
☒ Other: _____
☒ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
SOAP CREEK (0838E) AND MOUNTAIN CREEK (0838A)	FLOW TO JOE POOL LAKE (0838)
NEWTON BRANCH AND ITS TRUBUTARIES AND COTTONWOOD CREEK,	FLOW TO SOAP CREEK (0838E)TO JOE POOL LAKE .(0838)
TRIBUTARIES TO WAXAHACHIE CREEK,	WAXAHACHIE CREEK (0815A) TO BARDWELL RESERVOIR (0815) IMPAIRED BY SULFATE IN WATER

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT
☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: INSPECT SWP3 AND ASSOCIATED BMPs DURING SLOPE REPAIR WORK.
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR
☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

STATE OF TEXAS
KEPHA O. ABONGO
137972
LICENSED
PROFESSIONAL ENGINEER

Kepha Abongo ,P.E. 7/25/24
Signature of Registrant & Date

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 1 of 2
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
18	SEE TITLE SHEET		107
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	ELLIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0172	04	050, ETC	US 287

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [X] [ ] Protection of Existing Vegetation
- [X] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [ ] [ ] Temporary Seeding
- [ ] [X] Permanent Planting, Sodding or Seeding
- [ ] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [X] [ ] Vertical Tracking
- [ ] [ ] Interceptor Swale
- [X] [ ] Riprap
- [ ] [ ] Diversion Dike
- [ ] [ ] Temporary Pipe Slope Drain
- [X] [ ] Embankment for Erosion Control
- [ ] [ ] Paved Flumes
- [ ] [ ] Other: Install SWP control devices (BMPs) as needed to protect drainage features and receiving waters, adjacent properties, and pavedsurfaces prior to pontential pollutant-generating construction activities in their vicinity, and as directed or authorized by Engineer.Do not install BMPs more than two week prior to the activity in theircontrol area.

2.2 SEDIMENT CONTROL BMPs:

T / P

- [ ] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [ ] [ ] Inlet Protection
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [X] [ ] Sediment Control Fence
- [ ] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [X] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
No permanent control are planned.		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [X] Excess dirt/mud on road removed daily
- [ ] Haul roads dampened for dust control
- [X] Loaded haul trucks to be covered with tarpaulin
- [ ] Stabilized construction exit
- [ ] Daily street sweeping
- [X] Other: MAINTAIN ROADWAYS, FACILITIES AND ADJACENT PROPERTIES FREE OF PROJECT
- [ ] Other: SEDIMENTS AND LOOSE MATERIALS.
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [X] Chemical Management
- [X] Concrete and Materials Waste Management
- [X] Debris and Trash Management
- [X] Dust Control
- [X] Sanitary Facilities
- [X] Other: AVOID STORING PORTABLE SANITARY U NITS WITHIN 50 FEET
- [ ] Other: UPGRADIENT OF A RECEIVING WATER OR DRAINAGE CONVEYANCE WITHOUT ADEQUATE POLLUTION CONTROLS.
- [ ] Other: CAPTURE SAW-CUTTING DEBRIS, SLURRY, SPOILS AND WASHOUT FOR PROPER DISPOSAL.
- [ ] Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
No planned disturbance surface of project area surface water of their vegation buffer.		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [X] Fire hydrant flushings
- [X] Irrigation drainage
- [X] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [X] Potable water sources
- [X] Springs
- [X] Uncontaminated groundwater
- [X] Water used to wash vehicles or control dust
- [X] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STATE OF TEXAS
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STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
18	SEE TITLE SHEET		108
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	ELLIS	
CONT.	SECT.	JOB	HIGHWAY NO.
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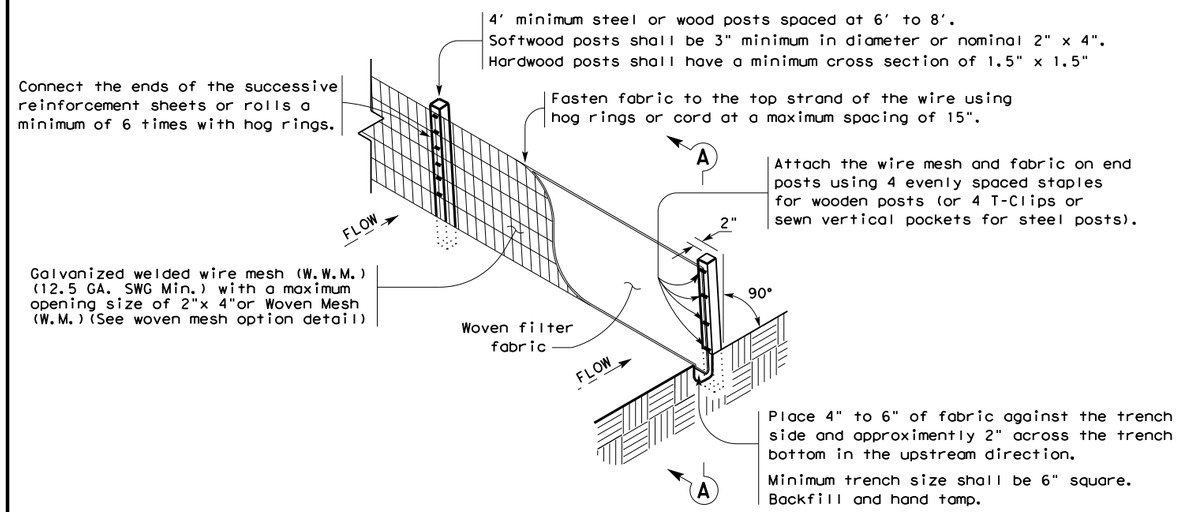
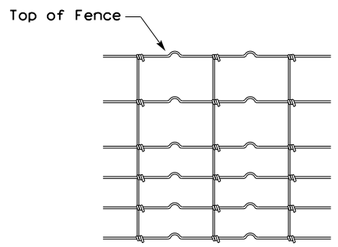
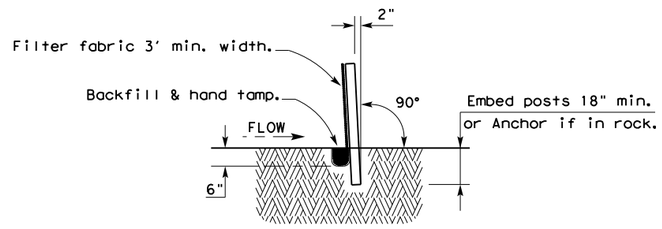


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

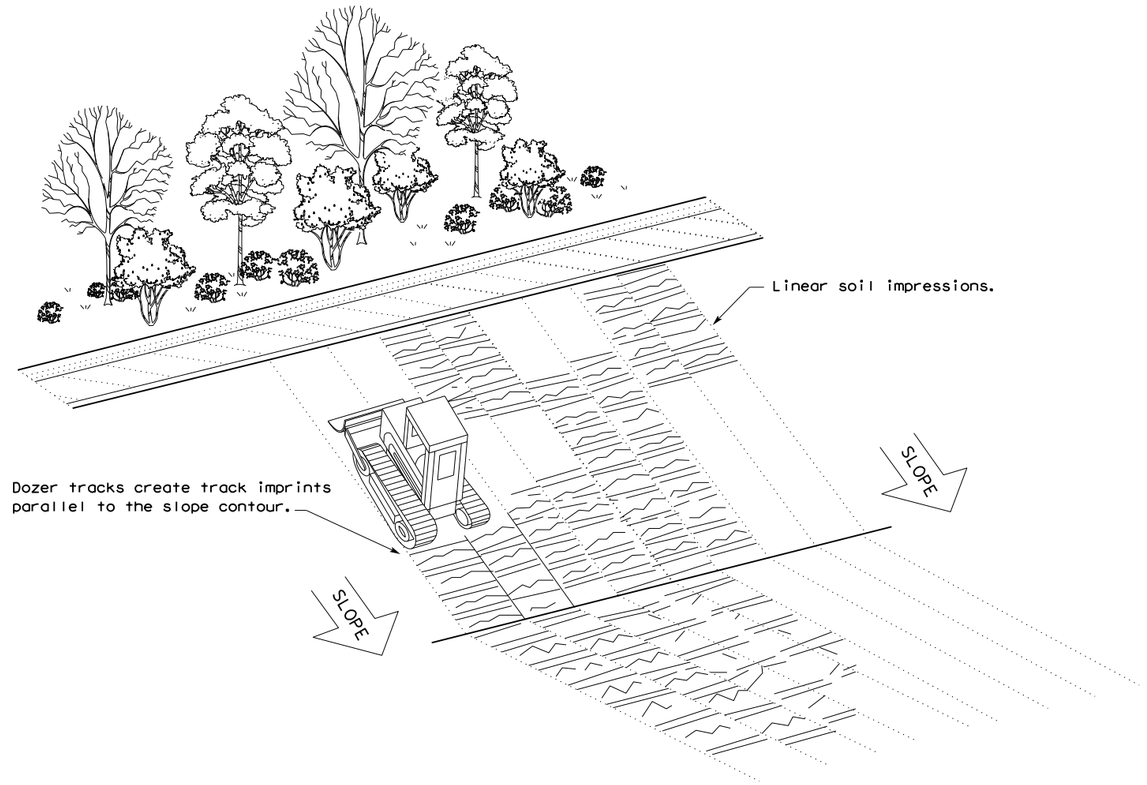
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
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	DAL	ELLIS		109	

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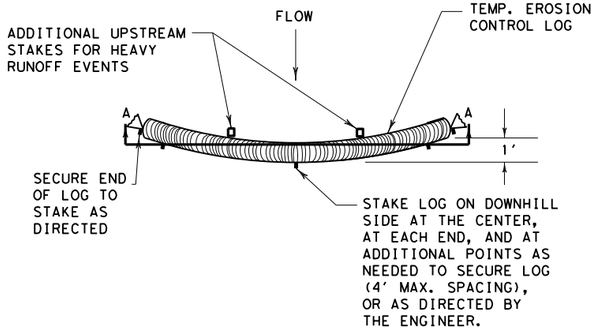
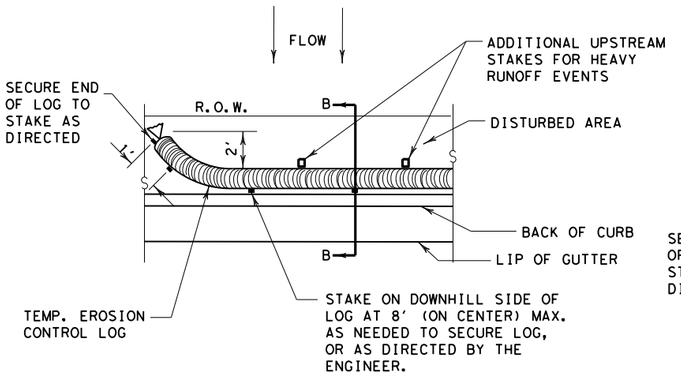
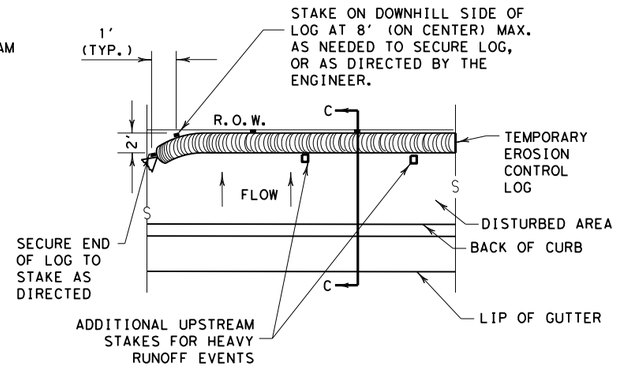


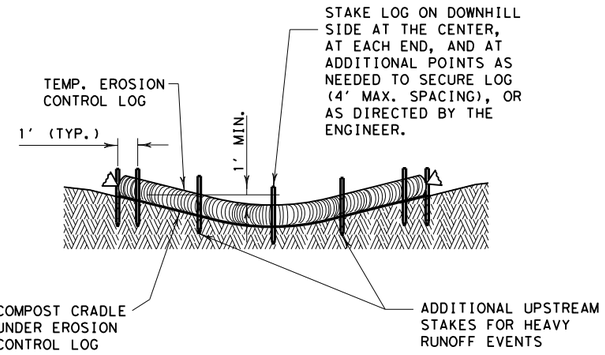
PLAN VIEW



PLAN VIEW



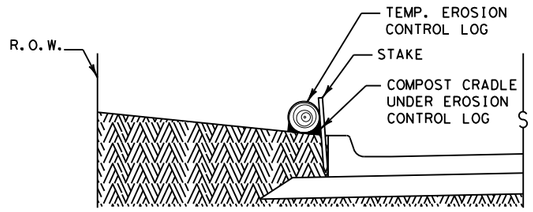
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

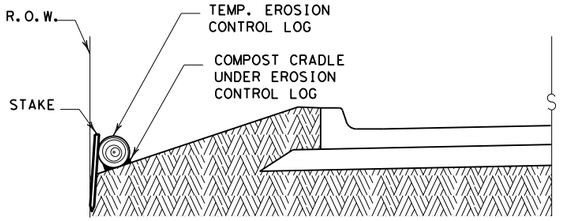
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

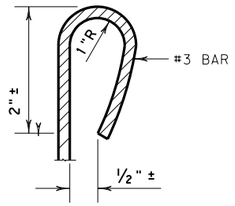
CL-BOC



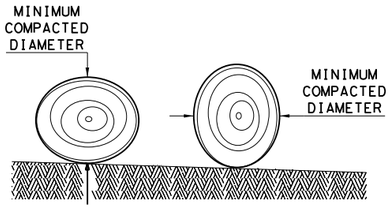
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

GENERAL NOTES:

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

LEGEND

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

SHEET 1 OF 3

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS	
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	DIST	COUNTY		SHEET NO.	
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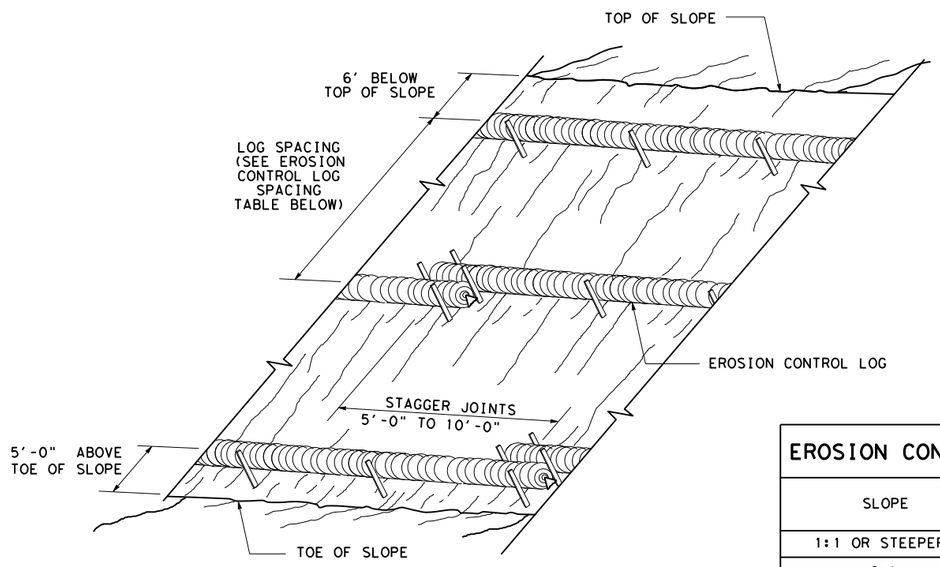
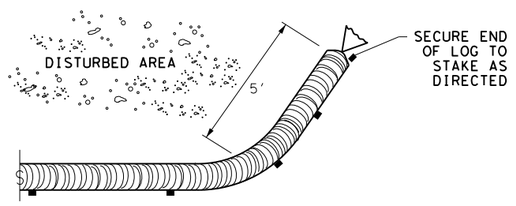


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

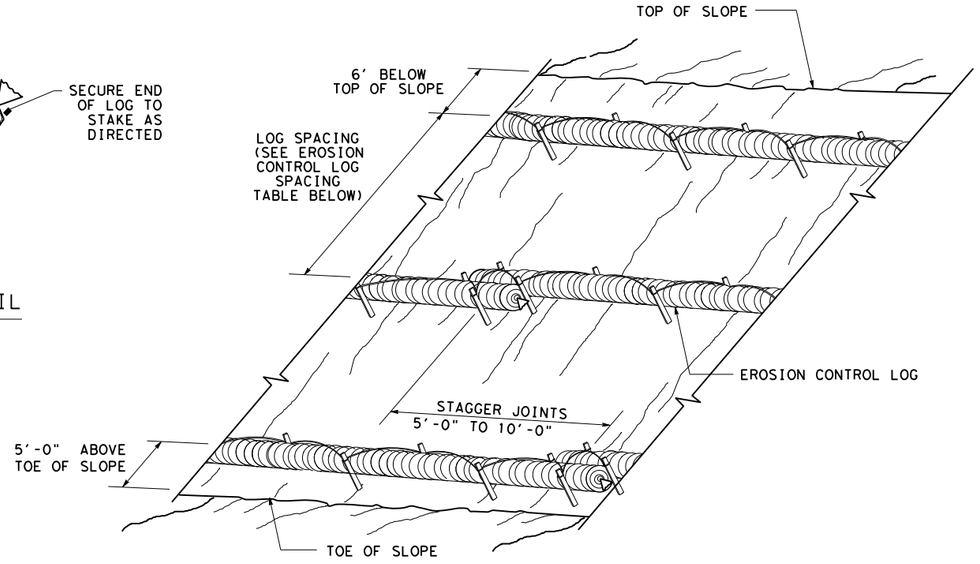
CL-SST



END SECTION RAP DETAIL

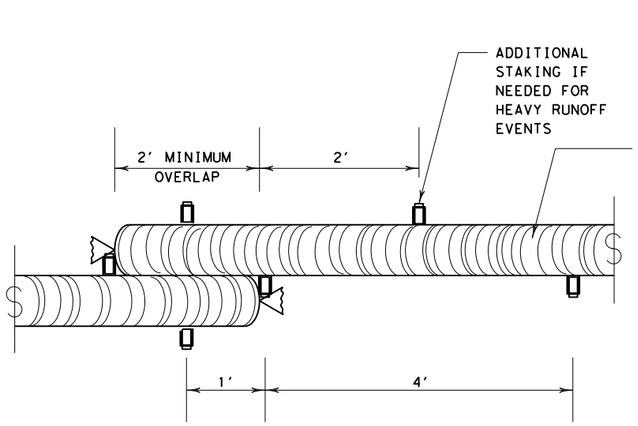
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

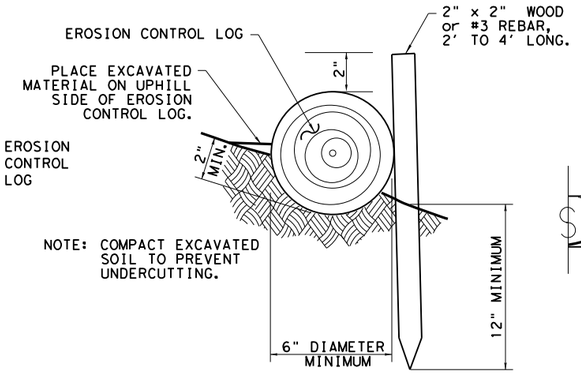
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

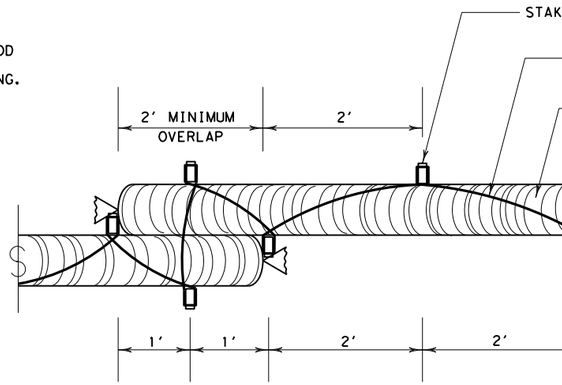


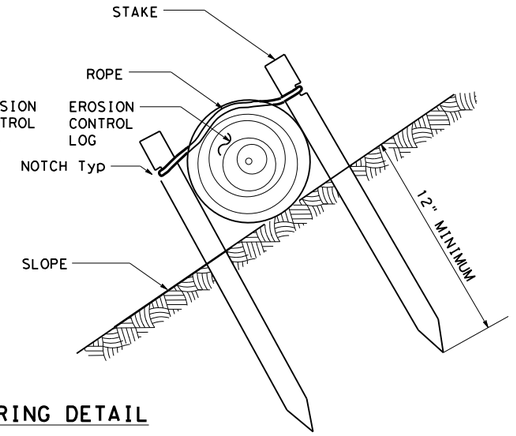


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

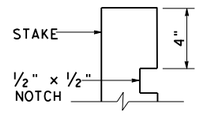
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

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

FILE: ec116	DN: TxDOT		CK: KM	DW: LS/PT	CK: LS
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REVISIONS	0172	04	050, ETC	US 287	
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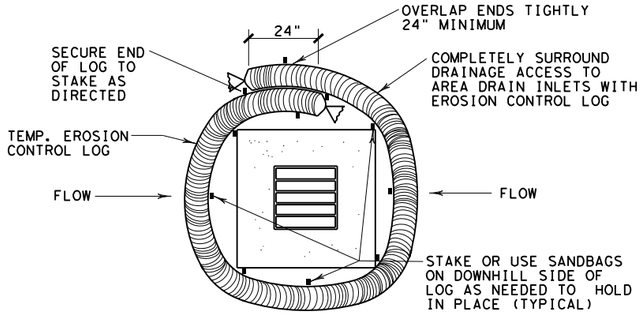
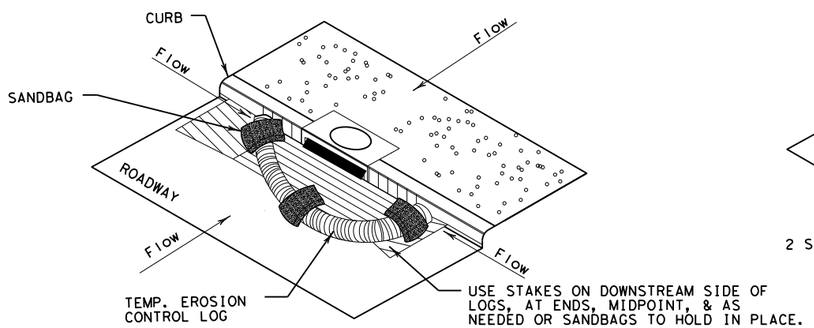


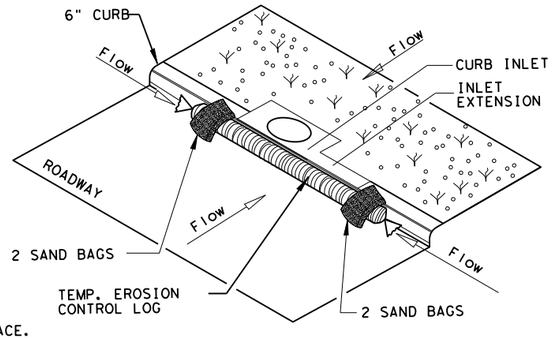
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

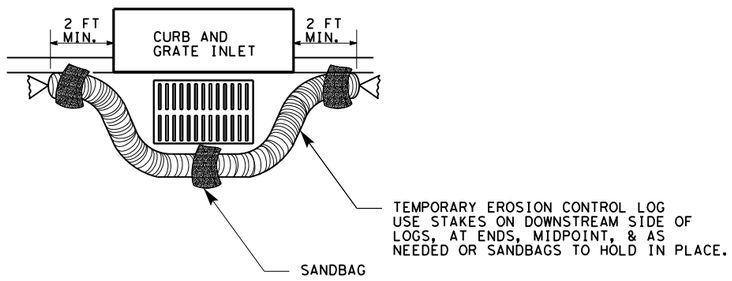
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

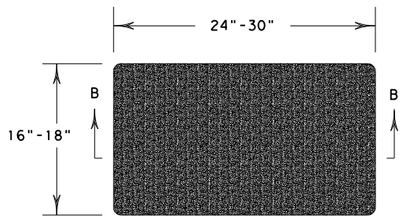
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

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© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0172	04	050, ETC		US 287	
	DIST	COUNTY			SHEET NO.	
	DAL	ELLIS			112	

USER ID

SURFACE PREPARATION ITEM 160* FURN & PLACE TOPSOIL / ITEM 161* COMPOST MANUF TOPSOIL (4") SY

SURFACE PREPARATION

Prepare planting area surface BEFORE placing Topsoil, Compost, Fertilizer, Seed and/or Sod.
Once project area has been completed to final lines, grade and compaction, remove objectionable materials from planting area surface and scarify existing surface to a depth of 4-inches, unless otherwise specified or directed.

Refer to Items 160 and 161 of TxDOT 2024 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.

TOPSOIL NOTES:
1. When Topsoil is specified under Item 160, use suitable material salvaged from the project ROW in accordance with Item 160 specifications, and/or secure additional good material from approved sources.
2. Topsoil shall include only the top 6-inches of its native surface, and be easily cultivated, fertile, erosion-resistant and free of objectionable materials. Topsoil obtained from sites outside of the ROW must come from approved sources and have a pH between 5.5 and 8.5 su.
3. Place Topsoil on pre-scarified surface, spread to a uniform loose cover at thickness specified, and shape per plans.
4. Water and roll the finished surface with a light roller or other suitable equipment per Item 160.3; do not over-compact.

COMPOST NOTES:
1. When Compost Manufactured Topsoil (4") is specified under Item 161, use compost meeting all requirements of Item 161.2 and Table 1. Provide quality control (QC) documentation and obtain Engineer approval prior to compost delivery.
2. Contractor shall provide tickets/invoices that document material type, quantity and placement for all compost delivered.
3. Additional topsoil may be required to be imported to achieve the compost/topsoil mix ratio. Topsoil must meet Item 160 specifications.

APPLICATION OF COMPOST MANUFACTURED TOPSOIL (4")

AFTER Surface Preparation, uniformly spread a 1-inch layer of compost on-grade with 3-inches topsoil over pre-scarified planting area.
(25% compost and 75% topsoil = 1" compost and 3" topsoil.)
Then mix compost and topsoil together by cultivating the compost into the topsoil (by till or disk) to a 4-inch (4") depth.
Roll the finished surface with a light corrugated drum; do not over-compact.

FERTILIZER ITEM 166* FERTILIZER TON

SOIL ANALYSIS FOR FERTILIZER APPLICATION RATE

Unless otherwise stated in the plans, Contractor shall perform at least one soil analysis on each project before fertilization, and submit results to Engineer with recommended fertilizer rates based on soil analysis. Engineer may direct sample location(s).
Soil analysis may be waived if both compost and sod are used on entire project.

FERTILIZER NOTES:
1. Refer to Item 166 of TxDOT 2024 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Apply fertilizer BEFORE seeding, or AFTER placing sod.
3. Use fertilizer containing nitrogen (N), phosphoric acid (P) and potash (K) nutrients, unless otherwise specified. At least 50% of the Nitrogen component shall be a slow-release sulfur-coated urea as described in Item 166.3. Do not apply more than 60-pounds (lbs) Nitrogen per acre without Engineer concurrence.
4. Deliver fertilizer in bags, clearly labeled to show contents, unless otherwise specified or approved prior to delivery. When non-bagged, loose fertilizer is approved, provide documentation for each load of material delivered, to validate authenticity of the material.
5. Apply fertilizer uniformly, as a dry, granular material, essentially dust-free, and do not mix with water for application as a slurry.
6. When both temporary and permanent seeding are specified for the same area, apply half of the required fertilizer before the temporary seeding operation and the other half before the permanent seeding operation.

SODDING FOR EROSION CONTROL ITEM 162* BLOCK SODDING SY

BLOCK OR ROLL SOD	COMMON NAME	BOTANICAL NAME
	Common Bermuda Grass	Cynodon dactylon

SODDING NOTES:
1. Refer to Item 162 of TxDOT 2024 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Place sod between the average date of the last freeze in the Spring and 6 weeks before the average date of the first freeze in the Fall, per the Texas Almanac for the project area.
3. Place sod only AFTER soil surface preparation is complete as detailed in this sheet. Dry soil may require pre-watering.
4. Place all sod (blocks or rolls) within 24-hours of delivery to the site, and keep moist from the time it is dug up until it is planted. Sod with dried roots will not be accepted.
5. Place sod with joints alternating on each row to prevent all joints from lining up, and place blocks firmly against adjacent blocks. Roll, tamp and trim sod per Item 162.3.
6. Place fertilizer promptly AFTER sodding operation is complete in each area.
7. Water sod immediately following placement, and continue Vegetative Watering per Item 168.

VEGETATIVE WATERING FOR ESTABLISHING SEED AND SOD ITEM 168* VEGETATIVE WATERING TGL

WATERING SCHEDULE

SEASON (Usual Months)	RATE	TIME SCHEDULE	TOTAL WATER ESTIMATE
SPRING & FALL (March, April, May, and October)	7,000 gallons/acre per working day	Vegetative watering for seed shall begin on the day after rainfall described below and continue for 60-consecutive working days. Vegetative watering for sod shall begin on the day sod is placed and continue for a minimum of 15-consecutive working days.	420,000 gallons/acre (60 working days)
SUMMER (June through September)	12,000 gallons/acre per working day		720,000 gallons/acre (60 working days)
WINTER (November through February)	1,000 gallons/acre per working day	Vegetative watering for seed and/or sod shall begin on the day after placement and continue for 15-consecutive working days	15,000 gallons/acre (15 working days)

Notes: Watering rate and frequency may be adjusted, with the approval of the Engineer, to meet site conditions (especially with sod).
For informational purposes only: 1,000-gallons equals 1 TGL

VEGETATIVE WATERING NOTES:
1. Refer to Item 168 of TxDOT 2024 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Use clean water, free of industrial waste and other substances harmful to vegetation growth, per Item 168.2.
3. For seeding, use Vegetative Watering to keep the seed bed moist during germination; not to provide initial watering. [After drill seeding, postpone watering operations until site receives at least 1/2-inch of natural rainfall in a single day. Also delay watering operations for warm season grasses until soil temperature exceeds 70 degrees F.]
4. For sod, water immediately.
5. All water distribution equipment shall be furnished and operated to provide water at a uniform and controllable rate. Use a metering device on all watering equipment.
6. Evenly distribute water over entire area designated for seeding and/or sodding, using even spray patterns that do not disturb seed bed and/or dislodge seed from seed bed.
7. Do not water between the hours of 12:00 p.m. and 6:00 p.m. when daytime temperatures exceed 95 degrees F.
8. After initial establishment period, continue intermittent watering of newly established seed or sod at a rate of approximately 1-inch water/week, during summer months until end of contract.
9. If 1/4-inch or more of rainfall occurs on site on any given working day, no vegetative watering will be needed on that working day. (Note: 1/4-inch of rain equals 7,000 gallons of water per acre.)
10. Should the Contractor fail to apply the specified amount of water within the time allowed, any seed or sod in poor condition shall be replaced, fertilized, and watered at Contractor's expense.

SEEDING FOR EROSION CONTROL ITEM 164* DRILL SEED SY

PERMANENT SEEDING MIXES (ADD FLOWER SEEDING MIX TO PERMANENT SEED, ALL SOILS) PERMANENT SEED PLANTING SEASON: FEB. 1 TO MAY 15

			Pure Live Seed Rate **
RURAL CLAY SOILS (PERM_RURAL_CLAY)	Sideoats Grama (Haskell)	15%	1.5 lbs PLS per acre
	Hooded Windmillgrass (Burnet)	15%	0.3 lbs PLS per acre
	White Tridens (Guadalupe)	15%	0.3 lbs PLS per acre
	Little Bluestem (OK Select)	15%	1.05 lbs PLS per acre
	Buffalograss (Texoka)***	10%	1.5 lbs PLS per acre
	Silver Bluestem (Santiago)	05%	0.2 lbs PLS per acre
	Green Sprangletop (Van Horn)	05%	0.2 lbs PLS per acre
	Shortspike Windmillgrass (Welder)	05%	0.1 lbs PLS per acre
	Canada Wildrye (Lavaca)	10%	2.0 lbs PLS per acre
	Sand Dropseed (Taylor)	05%	0.1 lbs PLS per acre
RURAL SANDY SOILS (PERM_RURAL_SAND)	Shortspike Windmillgrass (Welder)	10%	0.2 lbs PLS per acre
	Hairy Grama (Chaparral)	15%	0.6 lbs PLS per acre
	Sand Dropseed (Taylor)	10%	0.2 lbs PLS per acre
	Little Bluestem (OK Select)	15%	1.05 lbs PLS per acre
	Sideoats Grama (Haskell)	10%	1.0 lbs PLS per acre
	Green Sprangletop (Van Horn)	10%	0.4 lbs PLS per acre
	Hooded Windmillgrass (Burnet)	10%	0.2 lbs PLS per acre
	Sand Lovegrass (Mason)	10%	0.4 lbs PLS per acre
	Silver Bluestem (Santiago)	10%	0.4 lbs PLS per acre
URBAN CLAY SOILS (PERM_URBAN_CLAY)	Green Sprangletop		0.3 lbs PLS per acre
	Sideoats Grama (El Reno)		3.6 lbs PLS per acre
	Buffalograss (Texoka)***		1.6 lbs PLS per acre
	Bermudagrass		2.4 lbs PLS per acre
URBAN SANDY SOILS (PERM_URBAN_SAND)	Green Sprangletop		0.3 lbs PLS per acre
	Buffalograss (Texoka)***		1.6 lbs PLS per acre
	Bermudagrass		3.6 lbs PLS per acre
	Sand Dropseed (Borden Co.)		0.4 lbs PLS per acre

TEMPORARY SEEDING MIX DRILL SEED (TEMP_WARM_COOL)

		Pure Live Seed Rate **
COOL SEASON (Sept.1 to Jan.31)	Brownton Millet	20.0 lbs PLS per acre
WARM SEASON (Feb.1 to Aug.30)	Oats	30.0 lbs PLS per acre
	Wheat	30.0 lbs PLS per acre
	Little Barley	5.0 lbs PLS per acre
	Western Wheatgrass	5.0 lbs PLS per acre

FLOWER SEEDING MIX (INCLUDE WITH PERMANENT SEED, ALL SOILS)

Engelmann Daisy (Eldorado)	1.5 lbs PLS per acre
Awnless Bushsunflower (Plateau)	1.5 lbs PLS per acre
Partridge Pea	1.5 lbs PLS per acre
Illinois Bundleflower (Sabine)	1.5 lbs PLS per acre
Rio Grande Clammyweed (Zapata)	2.0 lbs PLS per acre

** Note: The amount of Pure Live Seed (PLS) in one-pound (1 lb) of bulk seed is based on three factors: % Purity, % Germination, and % Dormant. Use the following formula to calculate PLS in bulk seed: PLS = % Purity X (% Germination + % Dormant)
Ensure that the specified amount of pure live seed is placed.
*** Note: When Buffalograss is specified, use seed that is treated with potassium nitrate to overcome dormancy.

SEEDING NOTES:
1. When seeding is specified under Item 164, refer to TxDOT 2024 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown. Materials and construction shall meet all specifications.
2. Conduct seeding upon completion of each applicable construction stage (dependent upon planting season requirements), without compensation for additional move-ins.
3. Place seed AFTER preparing planting area surface. Refer to Surface Preparation detail this sheet, as well as Topsoil Item 160 and Compost Manufactured Topsoil Item 161 when specified. Apply fertilizer per Item 166 BEFORE seeding, per specifications and this sheet, to help drill the fertilizer into the soil.
4. When temporary grasses are well-established and more than 2-inches tall, mow planting area before seeding permanent grasses; mowing for this purpose will be subsidiary. When vegetation is not already well-established, scarify planting area to a depth as described in Item 164.3, before temporary seeding and before permanent seeding.
5. Seed material must be appropriate to the location, soil type and season. Use the seed mix species and pure live seed rates designated in Tables 1-5 of the TxDOT 2024 Standard Specifications* for Item 164, unless otherwise specified.
6. All seed shall meet labeling, delivery, analysis, and testing requirements described in Item 164.2.1. Deliver seed in labeled, unopened bags or containers to Engineer prior to planting.
7. Uniformly plant seed over the designated planting area, along the contour of slopes, and drill seed to a depth as described in Item 164.3.5.
8. Hydroseeding per Item 164.2.5.2 and 164.3.4 may be allowed, when specified or Engineer concurs. For hydroseeding, increase PLS rate by 25% and avoid microplastics.
9. Implement and continue Vegetative Watering per the schedule, rate and volume specified under Item 168.

ROADSIDE MOWING ITEM 730* AC

MOWING NOTES:
1. During project construction, once seed is established, use mowing to promote permanent grasses by mowing any remaining temporary grasses.
2. Also mow established turf and ROW grasses in designated areas of project limits as specified or directed by Engineer.
3. Remove litter and debris prior to mowing.
4. Do not mow on wet ground when soil rutting can occur.
5. Hand-trim around obstructions and stormwater control devices as needed.
6. Maintain paved surfaces free of tracked soils and clipped vegetation.

SEQUENCE OF WORK:
- SCARIFY SURFACE SOIL.
- PREPARE / PLACE TOPSOIL, OR
- PREPARE / PLACE COMPOST MANUFACTURED TOPSOIL.
- APPLY FERTILIZER AND THEN PLACE SEEDING, OR
- PLACE SOD AND THEN APPLY FERTILIZER.
- CONDUCT VEGETATIVE WATERING.
- CONDUCT ROADSIDE MOWING, AS DIRECTED.

TXDOT REFERENCE MATERIALS:
- *"STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES" 2024
- "A GUIDANCE TO ROADSIDE VEGETATION ESTABLISHMENT" 2004
- ONLINE TRAINING COURSE: MNT415 REVEGETATION DURING CONSTRUCTION
- DALLAS DISTRICT "VEGETATION ESTABLISHMENT GUIDELINES"

Texas Department of Transportation

VEGETATION ESTABLISHMENT SHEET
(DALLAS DISTRICT)
TEMPLATE REVISION DATE: 07/17/24

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
RAD	6	(See Title Sheet)		287
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
XXX	TEXAS	DALLAS	ELLIS	
CHECK	CONTROL	SECTION	JOB	
XXX	0172	04	050, ETC.	113
CHECK				
XXX				

DATE

PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

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

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

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

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

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

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

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

3.02 RAILROAD OPERATIONS

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

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

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

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

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

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

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

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

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

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

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

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

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

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

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

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

3.06 COOPERATION

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

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

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

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

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

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	18	ELLIS		114

DATE:
FILE:

3.09 MAINTENANCE OF RAILROAD FACILITIES

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

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

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

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

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

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

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

3.11 RAILROAD REPRESENTATIVES

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

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

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

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

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

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

3.12 COMMUNICATIONS AND SIGNAL LINES

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

3.13 TRAFFIC CONTROL

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

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

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

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

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

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

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

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

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

3.15 RAILROAD FLAGGING

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

3.16 CLEANING OF RIGHT-OF-WAY

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

DATE:
FILE:

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	18	ELLIS		115

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

☐ This project is adjacent or parallel work, not within RR ROW:

DOT No.: See chart
Crossing Type: See chart
RR Company Operating Track at Crossing: BNSF
RR Company Owning Track at Crossing: BNSF
RR MP: See chart
RR Subdivision: See chart
City: See chart
County: See chart
CSJ at this Crossing: See chart
Latitude: See chart
Longitude: See chart

Scope of Work, including any TCP, to be performed by State Contractor:

State's contractor will be performing mill and inlay, pavement marking installation, and traffic control in the RR ROW on US 287 on grade separated crossings only.

Scope of Work to be performed by Railroad Company:

N/A

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 0

On this project, night or weekend flagging is:

☐ Expected
☑ Not Expected

Flagging services will be provided by:

☐ Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
☐ Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

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

Contact Information for Flagging:

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

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

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

☐ OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

☑ Not Required
☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required.
☑ Not Required

Railroad Point of Contact: _____

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

IV. RAILROAD INSURANCE REQUIREMENTS

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

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

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

Escalated Limits

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

Railroad Protective Liability Limits

☐ Not Required	
☑ Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	$2,000,000 / $6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	$5,000,000 / $10,000,000
☐ Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

☑ Not Required
☐ Required: UPRR Maintenance Consent Letter. TxDOT to assist
☐ Required: TxDOT to assist in obtaining the UPRR CROE
☐ Required: Contractor to obtain
- ☐ BNSF: _____
https://bnsf.railpermitting.com
- ☐ CPKCR
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html

Approved CROE templates are not to be modified by the Contractor.

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

VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

VII. RAILROAD SAFETY ORIENTATION

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

UPRR, BNSF, CPKCR will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

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

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call: BNSF
Railroad Emergency Line at: 800-832-5452
Location: DOT See chart
RR Milepost: See chart
Subdivision: See chart

RRD Review Only
Initials: KS
Date: 5-31-2024

Texas Department of Transportation — *Rail Division*

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0172	04	050		US 287	
6/2023		DIST	COUNTY			SHEET NO.	
		18	ELLIS			116	

DOT #	CROSSING TYPE	RAILROAD OPERATOR	RAILROAD OWNER	RAILROAD MILEPOST	RAILROAD SUBDIVISION	CITY	COUNTY	ROADWAY	CSJ	LATITUDE	LONGITUDE
022582T	RR UNDER	BNSF	BNSF	25.769	WARD INDUSTRIAL SPUR	MIDLOTHIAN	ELLIS	US 287	0172-04-050	32.4737215	-97.0098911
966507P	RR UNDER	BNSF	BNSF	25.75	WARD INDUSTRIAL SPUR	MIDLOTHIAN	ELLIS	US 287	0172-04-050	32.4741499	-97.0088678
022581L	RR UNDER	BNSF	BNSF	25.813	WARD INDUSTRIAL SPUR	MIDLOTHIAN	ELLIS	US 287	0172-04-050	32.4740609	-97.0091938
022580E	RR UNDER	BNSF	BNSF	25.927	WARD INDUSTRIAL SPUR	MIDLOTHIAN	ELLIS	US 287	0172-04-050	32.4746979	-97.0075013

Texas Department of Transportation

Rail Division

RAILROAD SCOPE OF WORK

ADDITIONAL CROSSINGS IN PROJECT LIMITS

FILE: RR Scope of Work.dgn	DN: IxDOT	CK:	DW:	CK:
©TxDOT	CONT	SECT	JOB	HIGHWAY
	0172	04	050	US 287
	DIST	COUNTY		SHEET NO.
	18	ELLIS		117

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

☐ This project is adjacent or parallel work, not within RR ROW:

DOT No.: 765215M & 765916B
Crossing Type: RR UNDER
RR Company Operating Track at Crossing: UPRR
RR Company Owning Track at Crossing: UPPR
RR MP: 21.230 & 9.410
RR Subdivision: MIDLOTHIAN
City: MIDLOTHIAN & WAXAHACHIE
County: ELLIS
CSJ at this Crossing: 0172-04-050
Latitude: 32.4725001 & 32.3871189
Longitude: -96.6585544 & -96.8112312

Scope of Work, including any TCP, to be performed by State Contractor:

State's contractor will be performing mill and inlay on the US 287. There will not be any mill and inlay work performed in the RR ROW but traffic control will extend into the RR ROW.

Scope of Work to be performed by Railroad Company:

N/A

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 0

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☐ Expected
☑ Not Expected

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UP.request@nrssinc.net
Call Center 877-984-6777

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

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☐ OTHERS:

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☐ Required. Contact Information for Construction Inspection:

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- ☐ BNSF: _____
  https://bnsf.railpermitting.com
- ☐ CPKCR
  https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

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Railroad Emergency Line at: 800-848-8715
Location: DOT 765215M & 765916B
RR Milepost: 21.230 & 9.410
Subdivision: MIDLOTHIAN

RRD Review Only
Initials: JLL
Date: 9/18/2023

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0172	04	050		US 287	
6/2023		DIST	COUNTY			SHEET NO.	
		18	ELLIS			118	