STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO.			
BR 2024(070), ETC.			
CONT	SECT	JOB	HIGHWAY
0923	08	030	
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		1

FUNCTIONAL CLASS = LOCAL ROAD
DESIGN SPEED = MEETS OR EXCEEDS
EXISTING CONDITIONS

SAN SABA ST	LLANO ST	BRAZOS ST
A.D.T. (2023)= 60	A.D.T. (2023)= 90	A.D.T. (2023)= 220
A.D.T. (2043)= 60	A.D.T. (2043)= 90	A.D.T. (2043)= 220

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS AND CONTRACT.

_____, P.E.
Signature of Registrant & Date

FEDERAL AID PROJECT NO. BR 2024(070), ETC

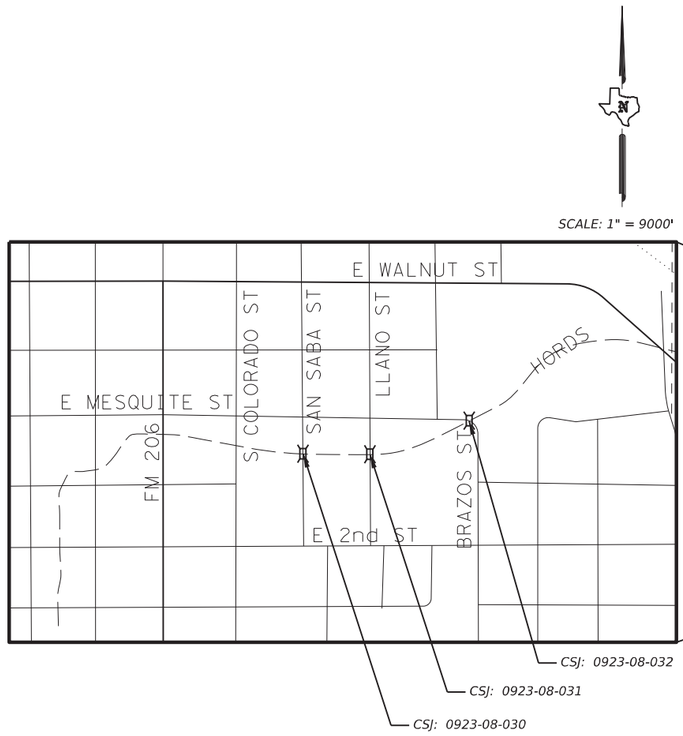
SAN SABA ST, LLANO ST, BRAZOS ST
COLEMAN COUNTY

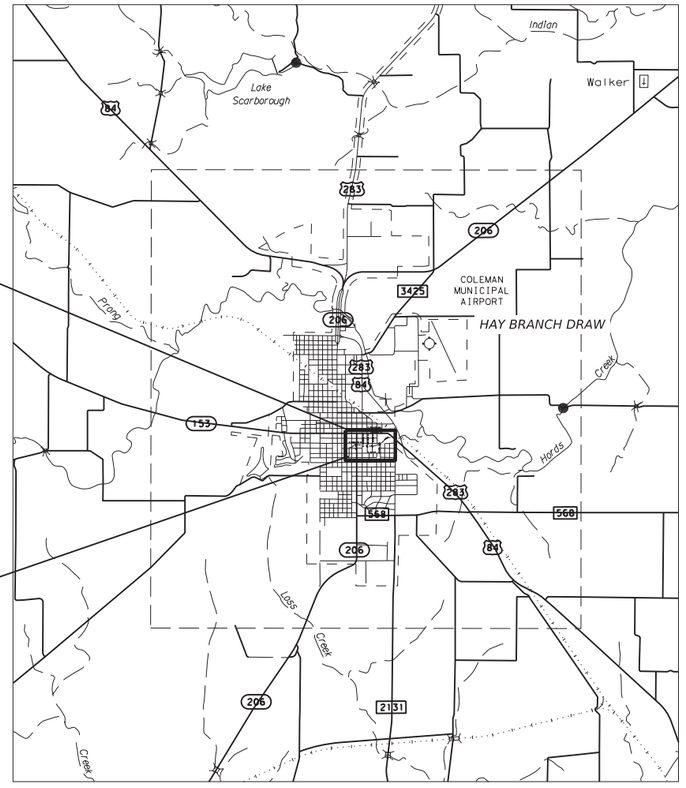
SAN SABA ST.				LLANO ST.				BRAZOS ST.			
NET LENGTH OF ROADWAY =	600.00	FT.=	0.114 MI.	NET LENGTH OF ROADWAY =	600.00	FT.=	0.114 MI.	NET LENGTH OF ROADWAY =	600.00	FT.=	0.114 MI.
NET LENGTH OF BRIDGE =	96.74	FT.=	0.018 MI.	NET LENGTH OF BRIDGE =	96.74	FT.=	0.018 MI.	NET LENGTH OF BRIDGE =	96.74	FT.=	0.018 MI.
NET LENGTH OF PROJECT =	696.74	FT.=	0.132 MI.	NET LENGTH OF PROJECT =	696.74	FT.=	0.132 MI.	NET LENGTH OF PROJECT =	696.74	FT.=	0.132 MI.

LIMITS: BRAZOS ST AT HORDS CREEK DRAW
SAN SABA ST AT HORDS CREEK DRAW
LIANO ST AT HORDS CREEK DRAW

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENTS

CONSISTING OF REPLACING BRIDGE CLASS CULVERTS AND APPROACHES





SCALE: 1" = 120000'

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR : _____

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

SAN SABA
OLD NBI: 230420B00380001
NEW NBI: 230420B00380002
LLANO
OLD NBI: 230420B00225001
NEW NBI: 230420B00225002
BRAZOS
OLD NBI: 230420B00030001
NEW NBI: 230420B00030002

CONCURRENCE: 7/29/2024
Tommy Sloan
MAYOR, CITY OF COLEMAN

Texas Department of Transportation

SUBMITTED FOR LETTING: 07/31/2024
CONSULTANT ENGINEER

RECOMMENDED FOR LETTING: 7/31/2024
DocuSigned by:
77D14777834646F...
PLANNING AND DEVELOPMENT

RECOMMENDED FOR LETTING: 8/1/2024
DocuSigned by:
Gregory W. Cedillo, P.E.
58E2D01C26B344F...

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

TDLR INSPECTION REQUIRED
TDLR PROJECT # TABS2024026641

DATE: 7/12/2024 6:36:03 PM
FILE: c:\bms\bridgefarmer-pw\alicia.hudgens\dms337701\038401030-01-GN-001.dgn

DW: MRM
CK: JWL
DW: AKH
CK: JWL

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS
3	PROJECT LAYOUT
4	SURVEY CONTROL INFORMATION
5	HORIZONTAL AND VERTICAL DATA SAN SABA ST
6	HORIZONTAL AND VERTICAL DATA LLANO ST
7	HORIZONTAL AND VERTICAL DATA BRAZOS ST
8	TYPICAL SECTIONS SAN SABA ST
9	TYPICAL SECTIONS LLANO ST
10	TYPICAL SECTIONS BRAZOS ST
11, 11A-11D	GENERAL NOTES
12, 12A	ESTIMATE & QUANTITY
13-14	SUMMARY SHEET
15	EARTHWORK QUANTITIES SAN SABA ST
16	EARTHWORK QUANTITIES LLANO ST
17	EARTHWORK QUANTITIES BRAZOS ST
18	NARRATIVE AND DETOUR
19	TRAFFIC CONTROL PLAN SAN SABA ST
20	TRAFFIC CONTROL PLAN LLANO ST
21	TRAFFIC CONTROL PLAN BRAZOS ST
22-33	BC(1)-21 THROUGH BC(12)-21
34	REMOVAL PLAN SAN SABA ST
35	REMOVAL PLAN LLANO ST
36	REMOVAL PLAN BRAZOS ST
37	PLAN AND PROFILE SAN SABA ST
38	PLAN AND PROFILE LLANO ST
39	PLAN AND PROFILE BRAZOS ST
40	CCCG-22
41-44	PED-18
45	DRIVEWAY DETAILS
46	MISCELLANEOUS DETAILS
46A	WF(1)-10
46B	WF(2)-10
47	HORDS CREEK DRAW AT SAN SABA DRAINAGE AREA MAP
48	HORDS CREEK DRAW AT LLANO DRAINAGE AREA MAP
49	HORDS CREEK DRAW AT BRAZOS DRAINAGE AREA MAP
50	HYDRAULIC CALCULATIONS HORDS CREEK DRAW EXISTING PROFILE
51	HYDRAULIC CALCULATIONS HORDS CREEK DRAW HECRAS EXISTING TABLE
52	HYDRAULIC CALCULATIONS HORDS CREEK DRAW EXISTING CROSS-SECTIONS
53	HYDRAULIC CALCULATIONS HORDS CREEK DRAW EXISTING CROSS-SECTION
54	HYDRAULIC CALCULATIONS HORDS CREEK DRAW EXISTING CROSS-SECTION
55	HYDRAULIC CALCULATIONS CULVERT DATA EXISTING 2YR, 10YR & 100YR
56	HYDRAULIC CALCULATIONS HORDS CREEK DRAW PROPOSED PROFILE
57	HYDRAULIC CALCULATIONS HORDS CREEK DRAW PROPOSED TABLE
58	HYDRAULIC CALCULATIONS HORDS CREEK DRAW PROPOSED CROSS-SECTION
59	HYDRAULIC CALCULATIONS HORDS CREEK DRAW PROPOSED CROSS-SECTION
60	HYDRAULIC CALCULATIONS HORDS CREEK DRAW PROPOSED CROSS-SECTION
61	HYDRAULIC CALCULATIONS CULVERT DATA PROPOSED 2YR, 10YR & 100YR
62	BRIDGE CLASS CULVERT LAYOUT SAN SABA ST
63	BRIDGE CLASS CULVERT TYPICAL SECTIONS SAN SABA ST
64	BRIDGE CLASS CULVERT LAYOUT LLANO ST
65	BRIDGE CLASS CULVERT TYPICAL SECTIONS LLANO ST

INDEX OF SHEETS

SHEET	DESCRIPTION
66	BRIDGE CLASS CULVERT LAYOUT BRAZOS ST
67	BRIDGE CLASS CULVERT TYPICAL SECTIONS BRAZOS ST
68	WINGWALL DETAILS - SAN SABA ST
69	WINGWALL DETAILS - LLANO ST
70	WINGWALL DETAILS - BRAZOS ST
71	SD-LINE 1 LLANO ST
72	PIPE PENETRATION DETAIL
73	BRIDGE IDENTIFICATION NUMBER DETAILS
74	TEMPORARY CROSSING DETAIL
75-78	TYPE C1W
79-80	MC-9-10
81	ECD
82	BCS
83	PW
84	FW-S
85	PB
86-87	PCO
88-91	CCO
92-93	SRR
94-95	BRSM
96-97	RAC
98	EPIC
99	STORM WATER POLLUTION PREVENTION PLAN SAN SABA ST
100	STORM WATER POLLUTION PREVENTION PLAN LLANO ST
101	STORM WATER POLLUTION PREVENTION PLAN BRAZOS ST
102-103	STORMWATER POLLUTION PREVENTION PLAN (SW3P)
104	EC(1)-16
105	EC(2)-16

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

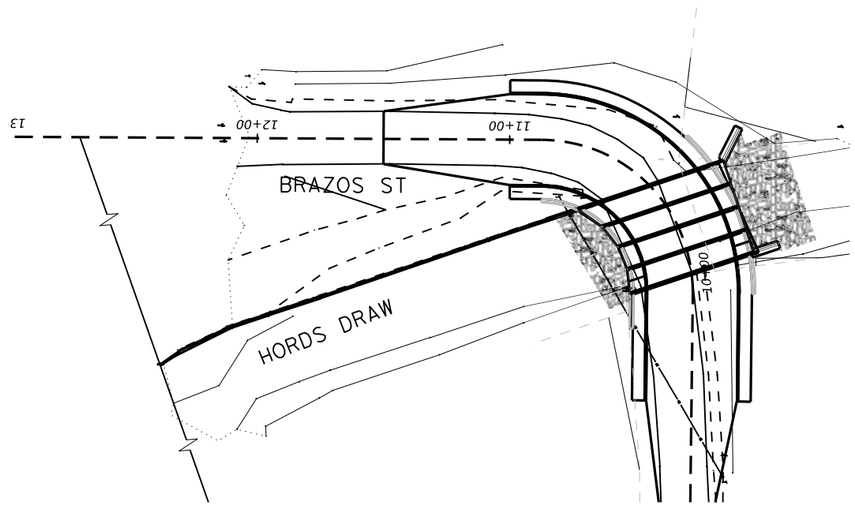
INDEX OF SHEETS

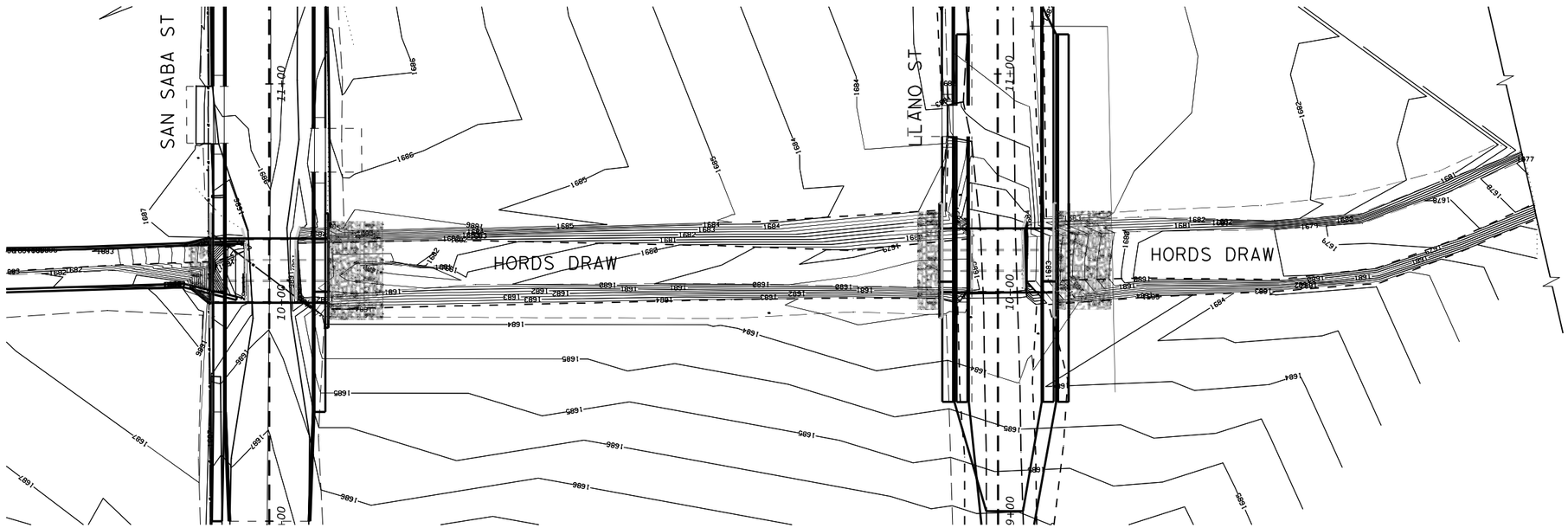
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		2

DATE: 8/1/2024 3:33:26 PM
FILE: c:\bms\bridgefarmer-ow\mansa.moton\dms337701038401030-01-GN-101.dgn

DW: MRM | CK: JWL | DW: AKH | CK: JWL





0 30 60

SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER

07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

PROJECT LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		3

DATE: 7/31/2024 7:07:06 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337701\038401030-01-GN-201.dgn

DW: MRM	CK:
DN: MRM	CK:

TxDOT - Coleman County San Saba & Llano Street Bridge	Texas State Plane	Texas Central Zone 4203	Project Vertical Datum	CSF- 1.0001	US Survey Feet
Coleman County	NAD83(2011)	NAVD88	Geiod 12B	TxDOT VRS	
0923-08-030					

Monument/Target Number	Surface Northing	Surface Easting	Elevation	Description	Grid Northing	Grid Easting	*Latitude (N)	*Longitude (W)	Station	Offset	Note
CP1	10629709.692	2580265.045	1685.578	MAGNL	10628646.827	2580007.044	31° 49' 29.72754"	99° 25' 14.94037"	N/A	N/A	Set on San Saba St. Bridge
CP2	10630258.306	2580276.528	1684.944	MAGNL	10629195.386	2580018.526	31° 49' 35.15493"	99° 25' 14.75514"	N/A	N/A	N/A
CP5	10629335.247	2580575.928	1690.442	ALC	10628272.420	2580317.896	31° 49' 25.99731"	99° 25' 11.37320"	N/A	N/A	N/A
CP6	10630011.148	2580604.762	1683.897	MAGNL	10628948.253	2580346.727	31° 49' 32.68274"	99° 25' 10.97472"	N/A	N/A	Has Brass TxDOT Control Washer
CP7	10629564.687	2580225.707	1686.948	ALC	10628501.837	2579967.710	31° 49' 28.29597"	99° 25' 15.41004"	N/A	N/A	N/A

MAGNL - Magnail Set in Asphalt

ALC - 3-1/4" Aluminum TxDOT Control Cap Set on 5/8" Iron Rod

*Lat/*Long conversion from NOAA NGS Coordinate Conversion Tool (NCAT)

TxDOT Brownwood District
Chet M. Glasscock, RPLS
Travis Jordan
George Trott

Form Completed 6-20-24 THJ

DATE: 7/31/2024 7:07:16 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33770\SURVEY CONTROL MAP.dgn

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

SURVEY CONTROL INFORMATION

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		4

DSN: MRM CK: JWL
DW: AKH CK: JWL

Horizontal Alignment Review Report

Alignment Name: CL-SAN SABA
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	(POT)	800.000 R1	10629499.374	2580256.469
POT	(POT)	1529.333 R1	10630228.708	2580256.469
	Tangential Direction:	N0.000°W		
	Tangential Length:	729.333		

Vertical Alignment Review Report

Horizontal Alignment: CL-SAN SABA
Horizontal Description:
Horizontal Style: Alignment\Baseline
Vertical Alignment: SAN SABA PROFILE
Vertical Description:
Vertical Style: Alignment\Baseline

		Station	Elevation
Element: Linear			
	POT	900.000 R1	1686.842
	VPC	930.000 R1	1686.506
	Tangent Grade:	-0.011	
	Tangent Length:	30.000	
Element: Symmetrical Parabola			
	VPC	930.000 R1	1686.506
	VPI	960.000 R1	1686.170
	VPT	990.000 R1	1686.170
	Length:	60.000	
	Entrance Grade:	-0.011	
	Exit Grade:	0.000	
	r = 100 * (g2 - g1) / L:	1.868	
	K = l / (g2 - g1):	53.546	
	Middle Ordinate:	0.084	
Element: Linear			
	VPT	990.000 R1	1686.170
	VPC	1040.000 R1	1686.170
	Tangent Grade:	0.000	
	Tangent Length:	50.000	
Element: Symmetrical Parabola			
	VPC	1040.000 R1	1686.170
	VPI	1065.000 R1	1686.170
	VPT	1090.000 R1	1686.249
	Length:	50.000	
	Entrance Grade:	0.000	
	Exit Grade:	0.003	
	r = 100 * (g2 - g1) / L:	0.635	
	K = l / (g2 - g1):	157.430	
	Middle Ordinate:	0.020	
Element: Linear			
	VPT	1090.000 R1	1686.249
	POT	1153.150 R1	1686.450
	Tangent Grade:	0.003	
	Tangent Length:	63.150	

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HORIZONTAL AND VERTICAL DATA SAN SABA ST

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		5

DATE: 7/31/2024 7:07:27 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337701\03401030-01-GN-303.dgn

DSN: MRM CK: JWL DWN: AKH CK: JWL

Horizontal Alignment Review Report

Alignment Name: BL CL-LLANO1
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	(POT)	600.000 R1	10629304.023	2580590.381
POT	(POT)	1529.314 R1	10630233.336	2580589.220
Tangential Direction:		N0.072°W		
Tangential Length:		929.314		

Vertical Alignment Review Report

Horizontal Alignment: BL CL-LLANO1
Horizontal Description:
Horizontal Style: Alignment\Baseline
Vertical Alignment: LLANO PROFILE
Vertical Description:
Vertical Style: Alignment\Baseline

	Station	Elevation
Element: Linear		
POT	900.000 R1	1685.404
VPC	939.087 R1	1684.651
Tangent Grade:	-0.019	
Tangent Length:	39.087	
Element: Symmetrical Parabola		
VPC	939.087 R1	1684.651
VPI	962.210 R1	1684.205
VPT	985.334 R1	1684.205
Length:	46.247	
Entrance Grade:	-0.019	
Exit Grade:	0.000	
r = 100 * (g2 - g1) / L:	4.167	
K = l / (g2 - g1):	23.996	
Middle Ordinate:	0.111	
Element: Linear		
VPT	985.334 R1	1684.205
VPC	1032.422 R1	1684.205
Tangent Grade:	0.000	
Tangent Length:	47.088	
Element: Symmetrical Parabola		
VPC	1032.422 R1	1684.205
VPI	1060.000 R1	1684.205
VPT	1087.578 R1	1683.571
Length:	55.157	
Entrance Grade:	0.000	
Exit Grade:	-0.023	
r = 100 * (g2 - g1) / L:	-4.168	
K = l / (g2 - g1):	23.995	
Middle Ordinate:	-0.158	
Element: Linear		
VPT	1087.578 R1	1683.571
VPC	1094.966 R1	1683.401
Tangent Grade:	-0.023	
Tangent Length:	7.387	
Element: Symmetrical Parabola		
VPC	1094.966 R1	1683.401
VPI	1118.416 R1	1682.862
VPT	1141.865 R1	1682.782
Length:	46.900	
Entrance Grade:	-0.023	
Exit Grade:	-0.003	
r = 100 * (g2 - g1) / L:	4.168	
K = l / (g2 - g1):	23.994	
Middle Ordinate:	0.115	
Element: Linear		
VPT	1141.865 R1	1682.782
POT	1156.660 R1	1682.731
Tangent Grade:	-0.003	
Tangent Length:	14.795	

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HORIZONTAL AND VERTICAL DATA LLANO ST

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		6

DATE: 7/31/2024 7:07:37 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337701\038401030-01-GN-302.dgn

DES: MRM
CK: JWL
DW: AKH
CK: JWL

Horizontal Alignment Review Report

Alignment Name: BL CL-BRAZOS1
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	(POT)	500.000 R1	10629349.286	2581134.018
PC	(PC)	769.416 R1	10629618.601	2581126.632
	Tangential Direction:	N1.571°W		
	Tangential Length:	269.416		
Element: Circular				
PC	(PC)	769.416 R1	10629618.601	2581126.632
PI	(PI)	831.740 R1	10629680.902	2581124.924
CC	(CC)		10629704.952	2584275.448
PT	(PT)	894.048 R1	10629743.221	2581125.681
	Radius:	3150.000		
	Delta:	2.267° Right		
	Degree of Curvature (Arc):	1.819°		
	Length:	124.632		
	Tangent:	62.324		
	Chord:	124.624		
	Middle Ordinate:	0.616		
	External:	0.616		
	Back Tangent Direction:	N1.571°W		
	Back Radial Direction:	N88.429°E		
	Chord Direction:	N0.437°W		
	Ahead Radial Direction:	S89.304°E		
	Ahead Tangent Direction:	N0.696°E		
Element: Linear				
PT	(PT)	894.048 R1	10629743.221	2581125.681
PC	(PC)	992.645 R1	10629841.811	2581126.879
	Tangential Direction:	N0.696°E		
	Tangential Length:	98.597		
Element: Circular				
PC	(PC)	992.645 R1	10629841.811	2581126.879
PI	(PI)	1053.039 R1	10629902.200	2581127.613
CC	(CC)		10629842.540	2581066.883
PT	(PT)	1087.285 R1	10629902.539	2581067.220
	Radius:	60.000		
	Delta:	90.375° Left		
	Degree of Curvature (Arc):	95.493°		
	Length:	94.640		
	Tangent:	60.394		
	Chord:	85.130		
	Middle Ordinate:	17.713		
	External:	25.132		
	Back Tangent Direction:	N0.696°E		
	Back Radial Direction:	S89.304°E		
	Chord Direction:	N44.491°W		
	Ahead Radial Direction:	N0.321°E		
	Ahead Tangent Direction:	N89.679°W		
Element: Linear				
PT	(PT)	1087.285 R1	10629902.539	2581067.220
POT	(POT)	1355.067 R1	10629904.040	2580799.443
	Tangential Direction:	N89.679°W		
	Tangential Length:	267.781		

Vertical Alignment Review Report

Horizontal Alignment: BL CL-BRAZOS1
Horizontal Description:
Horizontal Style: Alignment\Baseline
Vertical Alignment: BRAZOS PROFILE
Vertical Description:
Vertical Style: Alignment\Baseline

		Station	Elevation
Element: Linear			
POT	900.000 R1	1683.049	
VPC	937.527 R1	1681.633	
Tangent Grade:	-0.038		
Tangent Length:	37.527		
Element: Symmetrical Parabola			
VPC	937.527 R1	1681.633	
VPI	977.527 R1	1680.124	
VPT	1017.527 R1	1680.005	
Length:	80.000		
Entrance Grade:	-0.038		
Exit Grade:	-0.003		
r = 100 * (g2 - g1) / L:	4.347		
K = l / (g2 - g1):	23.003		
Middle Ordinate:	0.348		
Element: Linear			
VPT	1017.527 R1	1680.005	
VPC	1036.623 R1	1679.949	
Tangent Grade:	-0.003		
Tangent Length:	19.096		
Element: Symmetrical Parabola			
VPC	1036.623 R1	1679.949	
VPI	1076.623 R1	1679.831	
VPT	1116.623 R1	1680.200	
VLP	1056.010 R1	1679.920	
Length:	80.000		
Entrance Grade:	-0.003		
Exit Grade:	0.009		
r = 100 * (g2 - g1) / L:	1.524		
K = l / (g2 - g1):	65.633		
Middle Ordinate:	0.122		
Element: Linear			
VPT	1116.623 R1	1680.200	
POT	1150.000 R1	1680.508	
Tangent Grade:	0.009		
Tangent Length:	33.377		

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

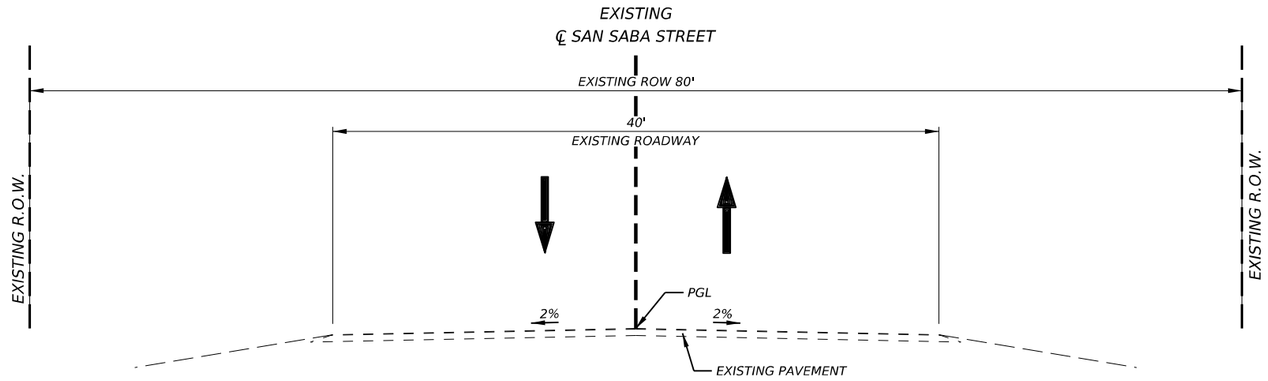
HORIZONTAL AND VERTICAL DATA BRAZOS ST

SHEET 3 OF 3

CONT.	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		7

DATE: 7/31/2024 7:07:48 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33770\038401030-01-GN-301.dgn

DSN:	MRM
CK:	JWL
DW:	AKH
CK:	JWL



EXISTING TYPICAL SECTION

LEGEND

- (A) 6" FLEXIBLE BASE
- (B) PRIME COAT
- (C) ONE COURSE SURFACE TREATMENT
- (D) 2" HMA TY-C

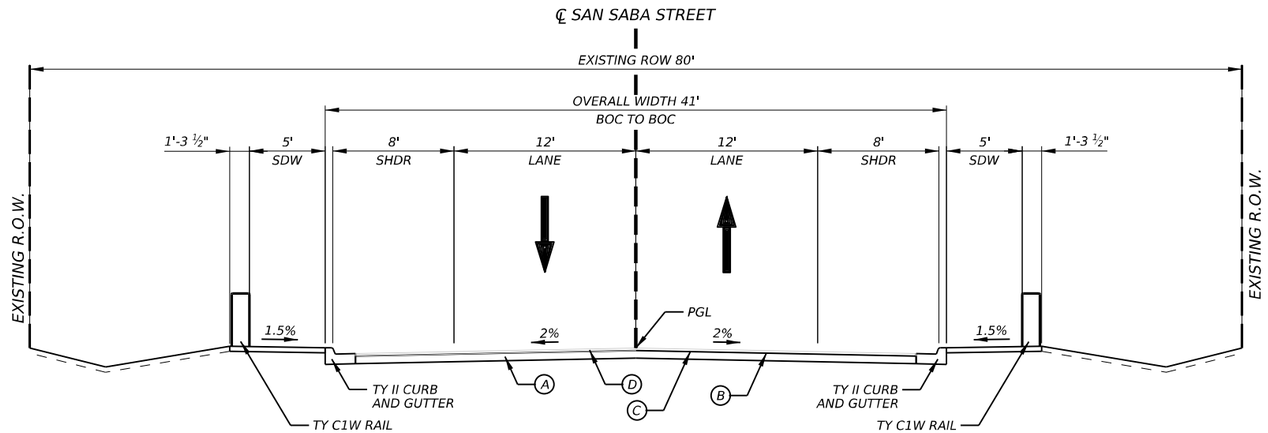
NOTES

BOC = BACK OF CURB TO BACK OF CURB

BRIDGE RAIL (TYP C1W RAIL) EXTENDS BEYOND CULVERT WIDTH. SEE ROADWAY PLAN AND PROFILE SHEETS FOR RAIL LIMITS.

WITHIN TRANSITION SECTION TRANSITION FROM 2% CROSS SLOPE TO MATCH EXISTING ROADWAY CROSS SLOPE

STA 11+03.15 TO STA 11+53.15 TRANSITION FROM 2% CROSS SLOPE TO MATCH EXISTING ROADWAY CROSS SLOPE. FULL WIDTH ROADWAY SECTION SHOULD BE MAINTAINED.



PROPOSED TYPICAL SECTION
FULL DEPTH RECONSTRUCTION

STA 9+50.00 TO STA 10+00.00
STA 10+29.33 TO STA 11+53.15

TRANSITION TO MATCH EXISTING

STA 9+00.00 TO STA 9+50.00

DATE: 8/2/2024 1:06:53 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33770\038401030-01-GN-403.dgn

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

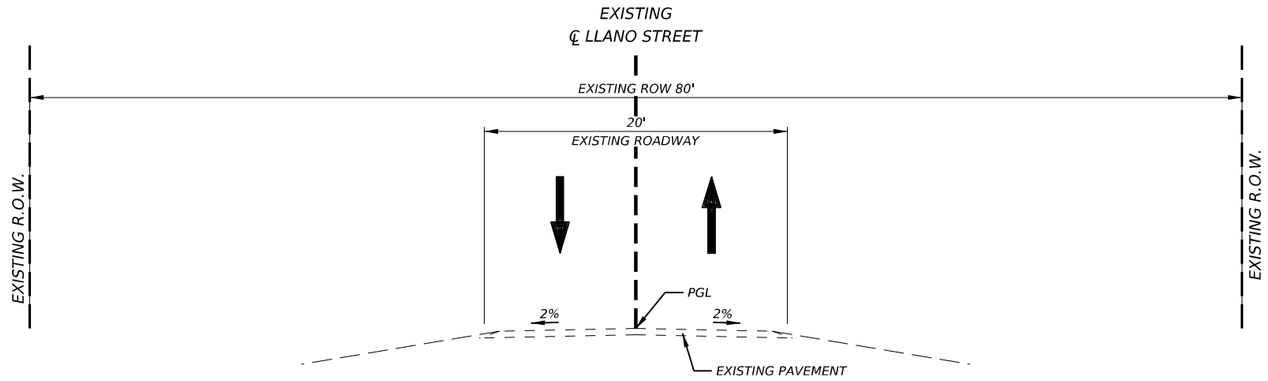
Texas Department of Transportation

TYPICAL SECTIONS
SAN SABA ST

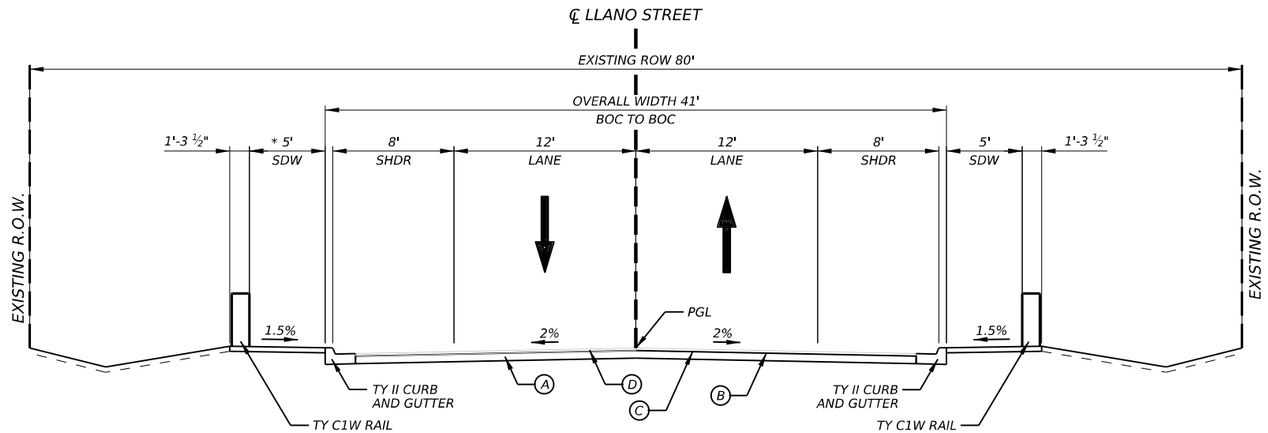
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		8

DSN:	MRM
CK:	JWL
DW:	AKH
CK:	JWL



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION
FULL DEPTH RECONSTRUCTION

STA 9+50.00 TO STA 10+00.00
STA 10+29.33 TO STA 11+56.66

TRANSITION TO MATCH EXISTING

STA 9+00.00 TO STA 9+50.00

LEGEND

- (A) 6" FLEXIBLE BASE
- (B) PRIME COAT
- (C) ONE COURSE SURFACE TREATMENT
- (D) 2" HMA TY-C

NOTES

BOC = BACK OF CURB TO BACK OF CURB

BRIDGE RAIL (TYP C1W RAIL) EXTENDS BEYOND CULVERT WIDTH. SEE ROADWAY PLAN AND PROFILE SHEETS FOR RAIL LIMITS.

WITHIN TRANSITION SECTION TRANSITION FROM 2% CROSS SLOPE TO MATCH EXISTING ROADWAY CROSS SLOPE

STA 11+06.66 TO STA 11+56.66 TRANSITION FROM 2% CROSS SLOPE TO MATCH EXISTING ROADWAY CROSS SLOPE. FULL WIDTH ROADWAY SECTION SHOULD BE MAINTAINED.

* STA 10+29.33 TO STA 11+39.03 SIDEWALK CROSS SLOPE VARIES (1.0% TYP) OFFSET LEFT. SIDEWALK CROSS SLOPE TO BE ADJUSTED TO ALLOW DRAINAGE FROM ADJACENT PROPERTY.

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

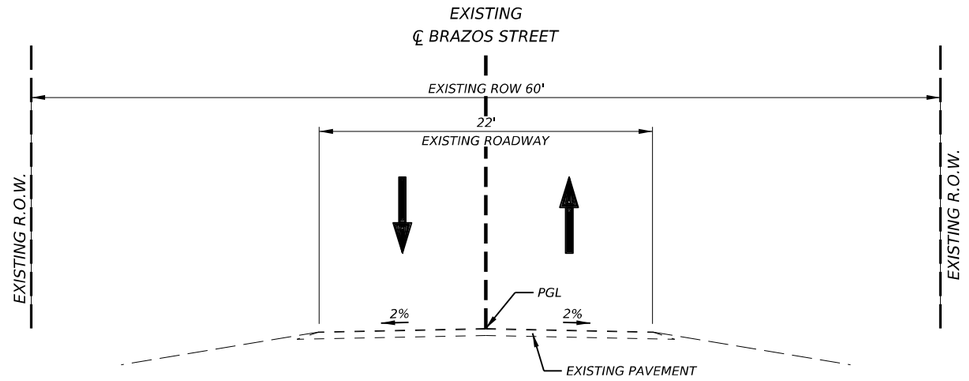
TYPICAL SECTIONS
LLANO ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		9

DATE: 8/2/2024 1:07:02 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33770\038401030-01-GN-402.dgn

DSN:	MRM
CK:	JWL
DW:	AKH
CK:	JWL



EXISTING TYPICAL SECTION

LEGEND

- (A) 6" FLEXIBLE BASE
- (B) PRIME COAT
- (C) ONE COURSE SURFACE TREATMENT
- (D) 2" HMA TY-C

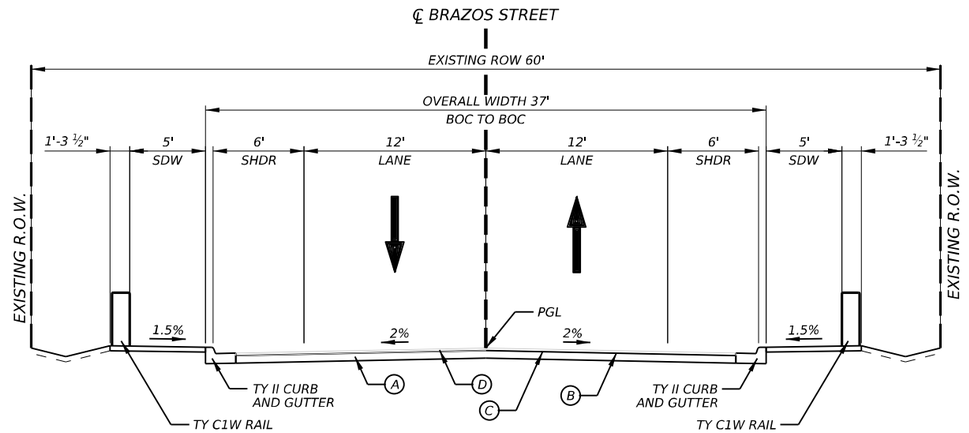
NOTES

BOC = BACK OF CURB TO BACK OF CURB

WITHIN TRANSITION SECTION
TRANSITION FROM 2% CROSS SLOPE TO
MATCH EXISTING ROADWAY CROSS SLOPE

BRIDGE RAIL (TYP C1W RAIL) EXTENDS
BEYOND CULVERT WIDTH. SEE ROADWAY
PLAN AND PROFILE SHEETS FOR RAIL LIMITS.

3" FLEXIBLE BASE DEPTH WITHIN BRIDGE
LIMITS (STA 10+00.43 TO STA 10+40.40)



PROPOSED TYPICAL SECTION
FULL DEPTH RECONSTRUCTION

STA 9+50.00 TO STA 10+00.43
STA 10+40.40 TO STA 11+00.00

TRANSITION TO MATCH EXISTING

STA 9+00.00 TO STA 9+50.00
STA 11+00.00 TO STA 11+50.00

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

TYPICAL SECTIONS
BRAZOS ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		10

DATE: 8/2/2024 1:07:10 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33770\038401030-01-GN-401.dgn

GENERAL NOTES

TEST TO BE IN ACCORDANCE WITH
TEXAS DEPARTMENT OF TRANSPORTATION
STANDARD TEST METHODS.

Item	Description	Soil Constants		
		Max LL.	Max. PI	Min. PI
132	Embankment (Final)(Ord Comp)(Ty C)	40	30	3
247	FL BS (CMP IN PLC)(TY A GR 4)(FNAL POS)			3

Job control samples for gradation and P.I. testing will be taken from the windrow after blade mixing.

Asphalt Surface Areas-SY 0923-08-030

Item	Description	Course	Roadway
310	(MC-30)	Prime	1151
316	Asph (AC-20-5TR)	1st	1151
316	Aggr (TY-PB GR-4)	1st	1151
344	SP MIXES SP-C SAC-B PG76-22	Final	1151

Basis of Estimate 0923-08-030

Item	Description	Course	Rate	SY	Quantity
310	MC-30	Prime	0.30 Gal/SY	1151	344 Gal
316	Asph (AC-20-5TR)	1st	0.42 Gal/SY	1151	484 Gal
316	Aggr (TY-PB GR-4)	1st	100 SY/CY	1151	12 CY
344	SP MIXES SP-C SAC-B PG76-22	Final	226 LBS/SY	1151	130 TON

Asphalt Surface Areas-SY 0923-08-031

Item	Description	Course	Roadway
310	(MC-30)	Prime	951
316	Asph (AC-20-5TR)	1st	951
316	Aggr (TY-PB GR-4)	1st	951
344	SP MIXES SP-C SAC-B PG76-22	Final	951

Basis of Estimate 0923-08-031

Item	Description	Course	Rate	SY	Quantity
310	MC-30	Prime	0.30 Gal/SY	951	286 Gal
316	Asph (AC-20-5TR)	1st	0.42 Gal/SY	951	400 Gal
316	Aggr (TY-PB GR-4)	1st	100 SY/CY	951	10 CY
344	SP MIXES SP-C SAC-B PG76-22	Final	226 LBS/SY	951	108 TON

County: COLEMAN SHEET 11

Highway: SAN SABA ST., ETC. **Control:** 0923-08-030, ETC.

Asphalt Surface Areas-SY 0923-08-032

Item	Description	Course	Roadway
310	(MC-30)	Prime	912
316	Asph (AC-20-5TR)	1st	912
316	Aggr (TY-PB GR-4)	1st	912
344	SP MIXES SP-C SAC-B PG76-22	Final	912

Basis of Estimate 0923-08-032

Item	Description	Course	Rate	SY	Quantity
310	MC-30	Prime	0.30 Gal/SY	912	274 Gal
316	Asph (AC-20-5TR)	1st	0.42 Gal/SY	912	383 Gal
316	Aggr (TY-PB GR-4)	1st	100 SY/CY	912	10 CY
344	SP MIXES SP-C SAC-B PG76-22	Final	226 LBS/SY	912	103 TON

TEXAS ONE CALL

Fiber optic cable systems, gas lines, underground power lines, water lines, sewer lines, and other various utilities may be buried within the project limits. Protection of these utility systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. The Contractor shall telephone Texas One Call at 1-800-344-8377 (a 24-hour number), to determine if utilities are buried anywhere on the project in accordance with all UNDERGROUND FACILITY DAMAGE PREVENTION AND SAFETY laws. This action, however, will in no way be interpreted as relief of responsibilities under the terms of the Contract as set out in the plans and specifications. Coordinate the repair of all damages caused by daily operations and have facilities restored to service in a timely manner as directed at no additional cost to TxDOT.

GENERAL

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

Name	Email Address
Chris Graf, P.E.	Chris.Graf@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individual(s).

Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

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

The term "Article" or "Section" referred to hereon is defined in the forward of the *Standard Specifications for Construction and Maintenance of Highways, Streets, And Bridges* adopted by the Texas Department of Transportation November 2014.

The total disturbed area is shown on the SW3P sheet(s).

The Contractor will establish drainage in ditches before seeding or as directed by the Engineer.

Watering for dust control will be required as Directed by the Engineer and will be considered subsidiary to the various bid items.

ITEM 5 CONTROL OF WORK

The responsibility for the construction surveying on this contract will be in accordance with Section 5.9.1. "Method A".

The contractor will be required to place and maintain Blue Tops with wooden hubs for new flexible base.

Prior to contract letting, bidders may obtain a free computer diskette or a computerized transfer of files (from the Engineer's office) that contains the earthwork information. If copies of the actual cross-sections in addition to, or instead of, the diskette are requested, they will be available at the Engineers office for borrowing by copying companies for the purpose of making copies for the bidder at the bidder's expense.

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

ITEM 6 CONTROL OF MATERIALS

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

The Department will not be obligated for the cost of paint testing and/or abatement materials, processes, personnel, incidentals, etc.

County: COLEMAN SHEET 11A

Highway: SAN SABA ST., ETC. **Control:** 0923-08-030, ETC.

Lead Containing Paint (LCP):

The following structure components contain Lead-Containing Paint (LCP):

*Brazos Street Hords Creek Draw – rails (silver paint) – NBI #*230420B00030001

The LCP Inspection Report is part of the project PS&E. Item 6.10.1.2 in the TxDOT 2024 Standard Specifications shall be utilized for this project.

Demolition plan should limit disturbance where lead paint is located when possible.

The Contractor shall dismantle the structure components that contain LCP in a manner that will comply with OSHA and other applicable rules and regulations relating to lead. Different dismantling methods may be utilized for dismantling the structure components containing LCP such as machine shearing, strip abatement, long-handle torching, etc. provided the method is approved by TxDOT and follows all rules and regulations related to lead.

Lead Abatement Option:
The lead abatement work may be subcontracted to a firm or company with the appropriate certifications outlined in Item 6.10.1.2 of the TxDOT 2024 Texas Standard Specifications.

The Contractor shall abate sufficient LCP to facilitate the project work, per Item 6.10.1.2 or as outlined in the project plans. Where paint-stripping is utilized as a protective measure to facilitate torch cutting, submit paint-stripping locations to the TxDOT Project Manager for review and approval.

ITEM 7 LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

ITEM 8 PROSECUTION AND PROGRESS

Working days will be computed and charged in accordance with Section 8.3.1.4. "Standard Workweek". Work will not be performed without time being charged unless otherwise exempted by the Section as defined above.

Work on Sunday(s) will not be allowed.

Working day charges will be in accordance with **SP 008---005. This delay is for the manufacturing of flex base.**

PROJECT SCHEDULES

Critical Path Method (CPM) scheduling will be required to be submitted and maintained monthly by the Contractor unless otherwise directed by the Engineer. (8.5.2.)

ITEM 9 MEASUREMENT AND PAYMENT

Monthly estimates will be computed from the 26th of the previous month through the 25th of the current month unless otherwise approved in writing by the Engineer.

ITEM 100 PREPARING RIGHT OF WAY

Trees that are to be trimmed and brush that is to be trimmed or removed that are not over the roadway or bridge(s), will be trimmed or removed in accordance with the Roadside Vegetation Management Manual to a height of fourteen feet. Remove limbs at the trunk with less than twenty-one feet of clearance above the pavement or bridge(s). All trees and brush that are to be trimmed as directed by the Engineer, will not be paid for directly but will be considered subsidiary to Item 100 "Preparing Right Of Way".
See the "Environmental" section of the plans for additional information.

Perform "Preparing Right of Way" operations in the usual manner within the limits of the excavation and fill areas. Remove only such trees and brush as designated by the Engineer. Exercise care to avoid disturbing the native grasses unnecessarily during construction, removal of the existing bridge, and during the installation of the temporary fence.

Within the construction limits, blade and windrow the top 8 inches of vegetative material to just outside the construction limits. Once ditch slopes and drainage have been established and approved, blade the windrow evenly over the disturbed area within the construction limits. This work is to be done as the job progresses and in conjunction with seeding. Work on the project may be suspended, if in the opinion of the Engineer, the Contractor does not make a good faith effort to stabilize loose material as the project progresses. Time will not be suspended. This work is subsidiary to Item 100.

The removal of existing and temporary fence will not be paid for directly but will be considered subsidiary to Item 100 "Preparing Right Of Way".

ITEM 164 SEEDING FOR EROSION CONTROL

The Contractor should anticipate two (2) separate mobilizations for seeding at each project location.

Blade and windrow outside construction limits, grass, weeds, and topsoil to grass roots depth.

TEM 166 FERTILIZER
Fertilize all areas of project to be seeded.

Furnish and apply fertilizer with analysis of 20-10-10 at a rate of 300 bulk pounds per acre.

ITEM 247 FLEXIBLE BASE

A grader (a road grader, a blade, a maintainer, or a motor grader) will be used to process base unless otherwise approved by the Engineer.

County: COLEMAN SHEET 11B

Highway: SAN SABA ST., ETC. **Control:** 0923-08-030, ETC.

Do not add field sand to modify the finish material to meet requirements.

Place new flexible base in lifts of approximately equal depth not to exceed 6 inches unless otherwise directed.

Aggregate Material Requirements

Property	Test Method	Grade 4[2]			
Sampling	Tex-400-A				
Master gradation sieve size (cumulative % retained)					
2-1/2"	Tex-110-E	0			
1-3/4"		0–10			
7/8"		10–35			
3/8"		30–65			
#4		45–75			
#40		65–90			
Liquid Limit, % Max	Tex-104-E	40			
Plasticity Index, Max[1]	Tex-106-E	10			
Plasticity index, Min[1]		3			
Wet ball mill, % Max	Tex-116-E	40			
Wet ball mill, % Max increase passing the #40 sieve		20			
Min compressive strength, psi					
lateral pressure 0 psi	Tex-117-E	20			
lateral pressure 3 psi		–			
lateral pressure 15 psi		175			

1. Determine plastic index in accordance with Tex-107-E (linear shrinkage) when liquid limit is unattainable as defined in Tex-104-E.
2. Grade 4 may be further designated as Grade 4A, Grade 4B, etc.

ITEM 310 PRIME COAT

Cure prime placed with a cutback asphalt binder for 21 days before placing subsequent surface courses unless otherwise directed by the Engineer.

Finished base must be dampened before the application of a cutback asphalt binder is placed. This work will not be paid for directly but will be considered subsidiary to Item 310.

ITEM 316 SURFACE TREATMENTS

All precoated aggregate will use PG 64-22 asphalt.

Furnish aggregate with a minimum B surface aggregate classification.
The asphalt rates shown hereon are for average conditions. The rate may be varied as determined by the Engineer to obtain proper embedment of aggregate.
Warm season asphalts are not to be placed between September 1st and April 30th unless otherwise directed/approved.

Protect all existing bridges, and other exposed concrete surfaces within the limits of this project(s), as much as practicable, from asphalt materials by any means approved by the Engineer at the contractor's expense.

Use a medium pneumatic roller meeting the requirements of Item 210 as directed by the Engineer. This work will be subsidiary to the various bid items.

ITEM 344 SUPERPAVE MIXTURES

Binder substitution is not allowed.

RAP and RAS will not be allowed.

Surge Volume and Remixing MTV will be required for this project.

During paving operations; proper adjustment of Surge Volume and Remixing MTV is required to ensure clean pickup of HMAC and to have residual HMAC not be in excess of 1/4" to 3/8" as approved by the Engineer. HMAC will not be dumped in a windrow that is determined by the Engineer to be an excessive distance from the paving operation.

Belly dumps will not be allowed if a spray paver is used.

See item 504 for additional structure requirements located at HMAC plant(s).

ITEM 420 CONCRETE SUBSTRUCTURES

All Class C Concrete has been measured for plan quantity payment.

ITEM 421 HYDRAULIC CEMENT CONCRETE

Furnish dome lids with 4" x 8" cylinder test molds.

Strength testing equipment is not required for Contract controlling test.

ITEM 427 SURFACE FINISHES FOR CONCRETE

County: COLEMAN SHEET 11C

Highway: SAN SABA ST., ETC. **Control:** 0923-08-030, ETC.

Surface Area II will receive a rub finish.

ITEM 432 RIPRAP

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

Due to field conditions changing during the removal of the existing bridge and the construction of the new structure, riprap will be verified by the Engineer before the Contractor installs the riprap. Riprap located under the bridge will be installed before the bridge beams are installed.

Limit excavation to within 1' of riprap. If excavation exceeds these limits without the Engineer's approval, riprap will be extended to the limits of the disturbance. No additional compensation will be allowed for this work.

All riprap stone protection shall have toe walls in accordance to standard SRR.

ITEM 496 REMOVING STRUCTURES

Handle materials when removing structures in accordance with Item 6.

Exercise care to avoid disturbing the native grasses unnecessarily during removal of the existing bridge.

Notify TxDOT at least 60 days prior to any bridge removal. The Texas Department of State Health Services (DSHS) requires TxDOT to notify the DSHS of the bridge removal even if no asbestos is present. The notification form to retain/notify the DSHS licensed asbestos consultant must be postmarked at least 10 working days prior to the scheduled abatement and/or demolition. If the work does not happen on the notified date, then another 10 Working-Day, Prior-To-Work Notification will be required.

Provide a detailed plan for the removal of the existing structure to include the schedule of removal and list of all equipment to be used.

The structure or structures to be removed may have surface coatings, which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations as well as those set by Texas Department of State Health Services (DSHS).

ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING

The Contractor will be required to keep all TCP devices clean. If notified by the Engineer to clean the TCP devices, the Contractor will have until the end of that daylight period to comply. Failure to comply will result in a suspension of all work until the TCP devices are clean. Time will not be suspended.

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.

All equipment operated by the Contractor on or within thirty feet (30') of the roadway will have a functioning flashing beacon mounted on it. Motor graders will have two standard orange warning flags mounted on them in addition to the flashing beacon.

The Contractor will be responsible for maintaining the edge of the roadway throughout the project in a traversable condition and/or as directed by the Engineer. Salvaged milling may be used as directed by the Engineer. This work will not be paid for directly and will be considered subsidiary to Item 502 "Barricades, Signs, and Traffic Handling".

All devices shown on the TCP Standards are required and considered subsidiary to Item 502 unless specifically outlined elsewhere in the plans.
All signs will be constructed in accordance with the details shown in the current Standard Highway Sign Designs for Texas manual.

ITEM 504 FIELD OFFICE AND LABORATORY

One Type D Structure (Asphalt Mix Control Laboratory) will be required for this project.

ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

The Contractor should anticipate multiple mobilizations for the installation of BMP's on this project.

BMP's will not be installed until authorized by the Engineer.

The Engineer will determine actual time and placement locations of BMP's and temporary measures once construction has begun.
Stockpile sites may be cleared of cover vegetation, but the vegetation root system will not be destroyed.

ITEM 552 WIRE FENCE

Wire fence quantities shown on the plans are approximate and may be adjusted in the field as approved by the Engineer.

Notify the Engineer three weeks prior to beginning any fence work.

All corner/pull posts, line posts, and braces, shall be steel pipe with a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 11#4" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer.

Notify the Engineer three weeks prior to beginning any fence work.

All corner/pull posts, line posts, and braces, shall be steel pipe with a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 11#4" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0923-08-030 **DISTRICT** Brownwood **COUNTY** Coleman
HIGHWAY BRAZOS, LLANO, SAN SABA

				0923-08-030		0923-08-031		0923-08-032		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB									
		PROJECT ID		**A00135430**		**A00135678**		**A00141232**			
		COUNTY		**Coleman**		**Coleman**		**Coleman**			
		HIGHWAY		**SAN SABA**		**LLANO**		**BRAZOS**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-7002	PREPARING ROW	STA	2.500		2.600		2.500		7.600	
	104-7013	REMOV CONC (SIDEWALK, RAMP OR SUP)	SY	49.000						49.000	
	104-7018	REMOV CONC (CURB OR CURB & GUTTER)	LF	252.000						252.000	
	104-7025	REMOV CONC (RETAINING WALLS)	SY	32.000				13.000		45.000	
	110-7001	EXCAV (ROADWAY)	CY	639.000		560.000		675.000		1,874.000	
	132-7005	EMBANK (FNL)(OC)(TY C)	CY	184.000		186.000		292.000		662.000	
	164-7005	BROADCAST SEED (TEMP_WARM)	SY	297.000		292.000		155.000		744.000	
	164-7006	BROADCAST SEED (TEMP_COOL)	SY	297.000		292.000		155.000		744.000	
	164-7083	BOND FBR MTRX SEED (PERM)(RURAL)(CLAY)	SY	593.000		583.000		309.000		1,485.000	
	168-7001	VEGETATIVE WATERING	TGL	8.000		8.000		4.000		20.000	
	247-7178	FL BS (CMP IN PLC)(TY A GR 4)(FNAL POS)	CY	193.000		160.000		140.000		493.000	
	310-7004	PRIME COAT (MC-30)	GAL	344.000		286.000		274.000		904.000	
	316-7007	ASPH (AC-20-5TR)	GAL	484.000		400.000		383.000		1,267.000	
	316-7256	AGGR (TY-PB, GR-4)	CY	12.000		10.000		10.000		32.000	
	344-7031	SP MIXES SP-C SAC-B PG76-22	TON	130.000		108.000		103.000		341.000	
	400-7010	CEM STABIL BKFL	CY	108.000		74.000		91.000		273.000	
	402-7001	TRENCH EXCAVATION PROTECTION	LF	74.000		74.000		81.000		229.000	
	432-7038	RIPRAP (STONE COMMON)(GROUT)(12 IN)	CY	52.000		59.000		62.000		173.000	
	450-7030	RAIL (TY C1W)	LF	110.000		110.000		143.000		363.000	
	462-7026	CONC BOX CULV (9 FT X 4 FT)	LF	168.000		168.000		224.000		560.000	
	464-7005	RC PIPE (CL III)(24 IN)	LF			100.000				100.000	
	465-7024	INLET (COMPL)(PCO)(5FT)(BOTH)	EA			1.000				1.000	
	466-7162	WINGWALL (FW - S) (HW=6 FT)	EA					1.000		1.000	
	466-7176	WINGWALL (PW - 1) (HW=6 FT)	EA	2.000		2.000		1.000		5.000	
	496-7007	REMOV STR (PIPE)	LF	23.000		20.000				43.000	
	496-7009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000		1.000		1.000		3.000	
	500-7001	MOBILIZATION	LS	0.360		0.300		0.340		1.000	
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		3.000		3.000		9.000	
	506-7004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	80.000		80.000		80.000		240.000	
	506-7011	ROCK FILTER DAMS (REMOVE)	LF	80.000		80.000		80.000		240.000	
	506-7039	TEMP SEDMT CONT FENCE (INSTALL)	LF	466.000		365.000		83.000		914.000	
	506-7041	TEMP SEDMT CONT FENCE (REMOVE)	LF	466.000		365.000		83.000		914.000	
	529-7002	CONC CURB (TY II)	LF	381.000		396.000		301.000		1,078.000	
	530-7006	DRIVEWAYS (CONC)	SY	77.000		16.000				93.000	
	531-7001	CONC SIDEWALKS (4")	SY	246.000		204.000		168.000		618.000	
	531-7011	CURB RAMPS (TY 10)	EA	2.000		1.000				3.000	
	552-7001	WIRE FENCE (TY A)	LF					62.000		62.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0923-08-030 **DISTRICT** Brownwood **COUNTY** Coleman
HIGHWAY BRAZOS, LLANO, SAN SABA

				0923-08-030		0923-08-031		0923-08-032		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB									
		PROJECT ID		**A00135430**		**A00135678**		**A00141232**			
		COUNTY		**Coleman**		**Coleman**		**Coleman**			
		HIGHWAY		**SAN SABA**		**LLANO**		**BRAZOS**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	552-7003	WIRE FENCE (TY C)	LF					196.000		196.000	
	552-7011	WIRE FENCE (REMOVE)	LF					182.000		182.000	
	5017-7001	STONE MASONRY (ROCK WALL)	SF	138.000				80.000		218.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000						1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000						1.000	

DN: MRM CK: JWL DW: AKH CK: JWL

SUMMARY OF REMOVAL ITEMS

LOCATION	104 7013	104 7018	104 7025	496 7007	496 7009	552 7011
	REMOV CONC (SIDEWALK, RAMP OR SUP)	REMOV CONC (CURB OR CURB & GUTTER)	REMOV CONC (RETAINING WALLS)	REMOV STR (PIPE)	REMOV STR (BRIDGE Ø - 99 FT LENGTH)	WIRE FENCE (REMOVE)
	SY	LF	SY	LF	EA	LF
SAN SABA ST						
STA 9+00.00 TO STA 11+53.15	49	252	32	23	1	
LLANO ST						
STA 9+00.00 TO STA 11+56.66				20	1	
BRAZOS ST						
STA 9+00.00 TO STA 11+50.00			13		1	182
PROJECT TOTALS	**49**	**252**	**45**	**43**	**3**	**182**

SUMMARY OF DRAINAGE ITEMS

LOCATION	464 7005	465 7024
	RC PIPE (CL III)(24 IN)	INLET (COMPL)(PCO)(5FT)(BOTH)
	LF	EA
SAN SABA ST		
STA 9+00.00 TO STA 11+53.15		
LLANO ST		
STA 9+00.00 TO STA 11+56.66	100	1
BRAZOS ST		
STA 9+00.00 TO STA 11+50.00		
PROJECT TOTALS	**100**	**1**

SUMMARY OF ROADWAY ITEMS

LOCATION	100 7002	110 7001	132 7005	247 7178	432 7038	529 7002	530 7006	531 7001	531 7011	552 7001	552 7003	5
	PREPARING ROW	EXCAV (ROADWAY)	EMBANK (FNL)(OC) (TY C)	FL BS (CMP IN PLC)(TY A GR 4)(FNAL POS)	RIPRAP (STONE COMMON)(GROUT)(12 IN)	CONC CURB (TY II)	DRIVEWAYS (CONC)	CONC SIDEWALKS (4")	CURB RAMPS (TY 10)	WIRE FENCE (TY A)	WIRE FENCE (TY C)	STONE MASONRY (ROCK WALL)
	STA	CY	CY	CY	CY	LF	SY	SY	EA	LF	LF	SF
SAN SABA ST												
STA 9+00.00 TO STA 11+53.15	2.5	639	184	193	52	381	77	246	2			138
LLANO ST												
STA 9+00.00 TO STA 11+56.66	2.6	560	186	160	59	396	16	204	1			
BRAZOS ST												
STA 9+00.00 TO STA 11+50.00	2.5	675	292	140	62	301		168		62	196	80
PROJECT TOTALS	**7.6**	**1874**	**662**	**493**	**173**	**1078**	**93**	**618**	**3**	**62**	**196**	**218**

SUMMARY OF BRIDGE = 1 ITEMS

LOCATION	400 7010	450 7030	462 7026	466 7162	466 7176
	CEM STABIL BKFL	RAIL (TY C1W)	CONC BOX CULV (9 FT X 4 FT)	WINGWALL (FW - S) (HW=6 FT)	WINGWALL (PW - 1) (HW=6 FT)
	CY	LF	LF	EA	EA
SAN SABA ST					
NBI: 230420B00380002	108	110	168		2
LLANO ST					
NBI: 230420B00225002	74	110	168		2
BRAZOS ST					
NBI: 230420B00030002	91	143	224	1	1
PROJECT TOTALS	**273**	**363**	**560**	**1**	**5**

DATE: 8/2/2024 2:00:16 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337701038401030-01-GN-701.dgn

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

SUMMARY SHEET

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		13

CK: JWL
DW: AKH
CK: JWL
DW: MRM

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	164 7005	164 7006	164 7083	168 7001	402 7001	506 7004	506 7011	506 7039	506 7041
	BROADCAST SEED (TEMP*WARM)	BROADCAST SEED (TEMP*COOL)	BOND FBR MTRX SEED (PERM)(RURAL)(CLAY)	VEGETATIVE WATERING	TRENCH EXCAVATION PROTECTION	ROCK FILTER DAMS (INSTALL) (TY 4)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	SY	SY	SY	TGL	LF	LF	LF	LF	LF
SAN SABA ST									
STA 9+00.00 TO STA 11+53.15	297	297	593	8	74	80	80	466	466
LLANO ST									
STA 9+00.00 TO STA 11+56.66	292	292	583	8	74	80	80	365	365
BRAZOS ST									
STA 9+00.00 TO STA 11+50.00	155	155	309	4	81	80	80	83	83
PROJECT TOTALS	**744**	**744**	**1485**	**20**	**229**	**240**	**240**	**914**	**914**

1. WATERING BASED ON 2 APPLICATIONS, 0.5" RAINFALL EQUIVALENT = 0.003 TGL/SY/CYCLE

DATE: $DATE$ $TIME$
FILE: $FILE$

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

SUMMARY SHEET

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		14

STATION	110 7001 EXCAVATION (ROADWAY)	132 7005 EMBANKMENT (FNL)(QC)(TY C)
9+00		
9+10	0	0
9+20	37	1
9+30	35	1
9+40	36	0
9+50	40	1
9+60	40	1
9+70	31	3
9+80	27	4
9+90	23	6
10+00	18	12
10+01.00	27	32
10+29.33	4	6
10+30	0	0
10+40	1	5
10+50	22	36
10+60	25	10
10+70	21	11
10+80	22	9
10+90	26	7
11+00	27	6
11+10	28	6
11+20	28	6
11+30	27	5
11+40	26	4
11+40.30	28	3
11+40.69	1	1
11+43.75	2	1
11+44.12	10	1
11+47.12	2	1
11+47.47	10	1
11+50	2	1
11+50.31	9	1
11+50.65	2	1
11+53.15	2	1
TOTAL	639	184

DW: MRM CK: JWL DW: AKH CK: JWL

DATE: $DATE$ $TIME$
FILE: $FILE$

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

EARTHWORK QUANTITIES
SAN SABA ST

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		15

STATION	110 7001 EXCAVATION (ROADWAY)	132 7005 EMBANKMENT (FNL)(QC)(TY C)
9+00		
9+05	11	
9+10	11	1
9+15	13	1
9+20	14	1
9+25	16	1
9+30	17	1
9+35	19	1
9+39.09	17	
9+40	4	
9+45	23	
9+49.89	24	
9+49.92		
9+50	1	
9+50.00	1	
9+60	1	
9+70	43	
9+80	40	1
9+85.33	34	1
9+90	16	1
10+00	13	2
10+29.33	19	46
10+30		
10+32.42	4	21
10+40	12	29
10+50	10	14
10+60	4	15
10+70	5	11
10+80	8	5
10+85.58	5	2
10+87.58	2	1
10+90	2	2
10+94.97	4	4
11+00	6	3
11+10	17	4
11+20	25	4
11+30	28	3
11+38.98	28	2
11+39.02	1	1
11+40	4	1
11+41.87	7	1
11+42.03	1	1
11+44.97	10	1
11+47.81	11	1
11+50	9	1
11+50.48	2	1
11+52.94	10	1
11+55.14	8	
TOTAL	560	186

CK:
DW:
CK:
DW:

DATE: $DATE$ $TIME$
FILE: $FILE$

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

EARTHWORK QUANTITIES
LLANO ST

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		16

STATION	110 7001 EXCAVATION (ROADWAY)	132 7005 EMBANKMENT (FNL)(QC)(TY C)
9+00		
9+10	26	1
9+20	26	1
9+30	27	1
9+37.527	24	1
9+40	9	1
9+50	35	1
9+60	34	2
9+70	33	2
9+80	31	3
9+90	29	3
9+92.645	8	2
9+97.626	13	9
9+98.212	2	2
9+99.405	3	5
10+00	2	3
10+02.607	7	18
10+03.348	2	7
10+33.687	0	0
10+36.623	0	62
10+37.182	0	10
10+37.475	0	5
10+39.965	1	34
10+40	1	1
10+42.456	1	24
10+42.749	1	3
10+46.725	2	27
10+47.437	1	4
10+48.316	1	4
10+50	2	7
10+52.418	4	8
10+43.485	2	4
10+53.883	1	2
10+57.399	6	9
10+59.450	4	4
10+60	2	1
10+60.245	1	1
10+62.380	5	2
10+65.017	6	1
10+67.005	5	1
10+67.361	1	1
10+70	8	1
10+70.584	2	1
10+72.342	6	1
10+73.765	5	1
10+76.151	8	1
10+77.323	5	1
10+80	10	1
10+80.525	2	1
10+81.718	5	1
10+82.304	3	1
10+87.285	18	1
10+90	10	1
11+00	35	1
11+10	47	0
11+16.623	30	0
11+20	15	0
11+30	41	0
11+40	36	1
11+50	31	1
TOTAL	675	292

CK:
DW:
CK:
DW:

DATE: $DATE$ $TIME$
FILE: $FILE$

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

EARTHWORK QUANTITIES
BRAZOS ST

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		17

N

1 — Type 3 barricade

2 — ROAD CLOSED, R11-2, 48" x 30"

3 — NAME / ADDRESS / CITY / STATE / CONTRACTOR, G20-6, 48" x 30"

NOTES:

1. WORK IS TO PROGRESS ON ONE CULVERT AT A TIME. DO NOT CLOSE ALL STREETS SIMULTANEOUSLY UNLESS APPROVED BY THE ENGINEER.
2. MAINTAIN ACCESS FOR BUSINESS/RESIDENTS CLOSE TO THE CULVERT.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER

07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

NARRATIVE AND DETOUR

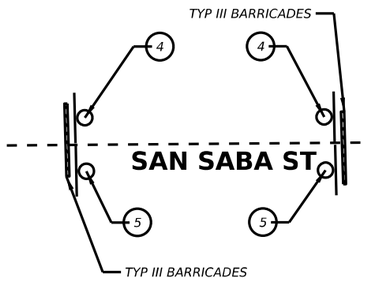
SHEET 1 OF 1

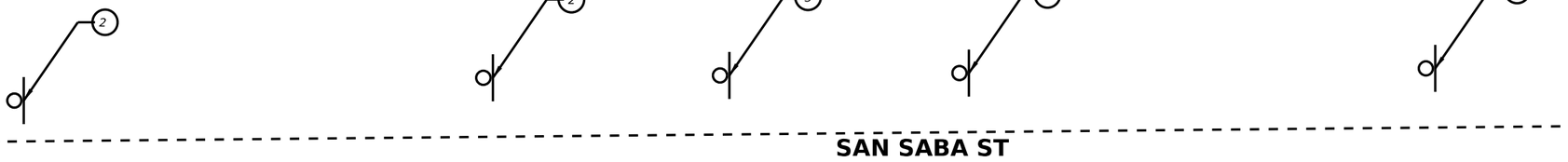
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST		COUNTY	SHEET NO.
BWD		COLEMAN	18

DN: MRM CK: JWL DW: AKH CK: JWL

DATE: 7/31/2024 7:09:09 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33779\0384010300-2-TC-0001.dgn

DW:	DS
CK:	CK1
DW:	DW
CK:	CK2





E MESQUITE ST

SEQUENCE OF WORK

THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE TO THE AREA ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION, WHICH GENERALLY CONFORMS TO THE FOLLOWING SEQUENCE:

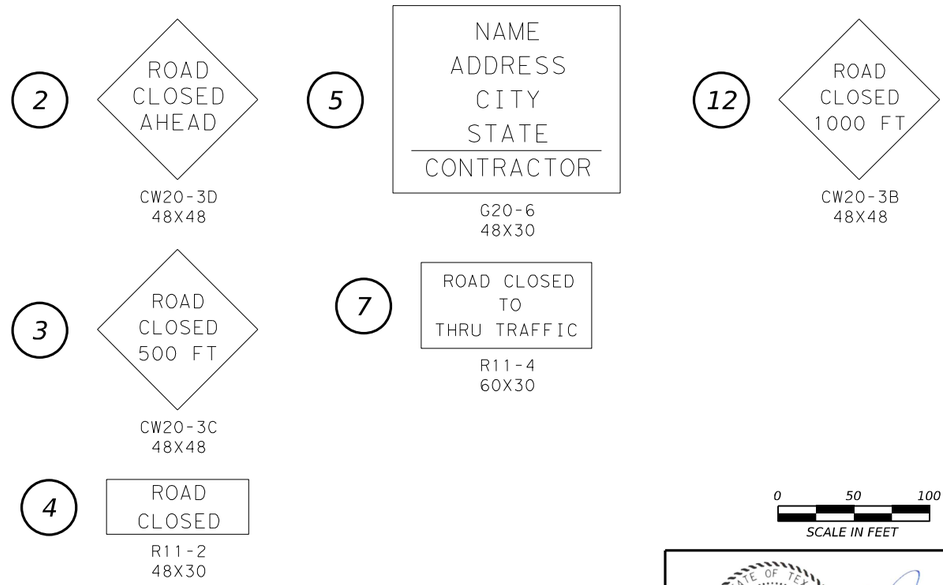
1. *INSTALL PROJECT LIMIT SIGNING AND BARRICADES AND SW3P PRIOR TO BEGINNING ANY OTHER WORK.*

2. *ALL ROAD CLOSURE SIGNING SHALL BE IN PLACE PRIOR TO ANY ACTIVITIES WHICH WILL PROHIBIT THROUGH TRAFFIC AND SHALL NOT BE PLACED MORE THAN 24 HOURS PRIOR TO SUCH ACTIVITY.*

3. *COMPLETE THE CONSTRUCTION OF THE BRIDGES AND APPROACHES ACCORDING TO THE PLANS AND SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.*

4. *THE ROADWAY SHALL BE OPEN TO THROUGH TRAFFIC AS SOON AS DETERMINED PRACTICAL BY THE ENGINEER.*

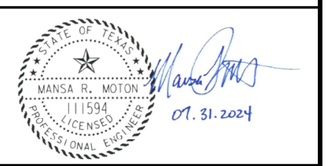
5. *COMPLETE ALL OTHER WORK AS DIRECTED BY THE ENGINEER.*



GENERAL NOTES

1. *SIGNS SHALL BE PLACED IN ACCORDANCE WITH THE BARRICADE AND CONSTRUCTION STANDARDS OR AS DIRECTED BY THE ENGINEER.*

2. *OTHER SIGNS AS DETAILED IN THE BARRICADE AND CONSTRUCTION STANDARDS AND IN THE TMUTCD MAY BE USED AS REQUIRED BY THE ENGINEER.*



BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

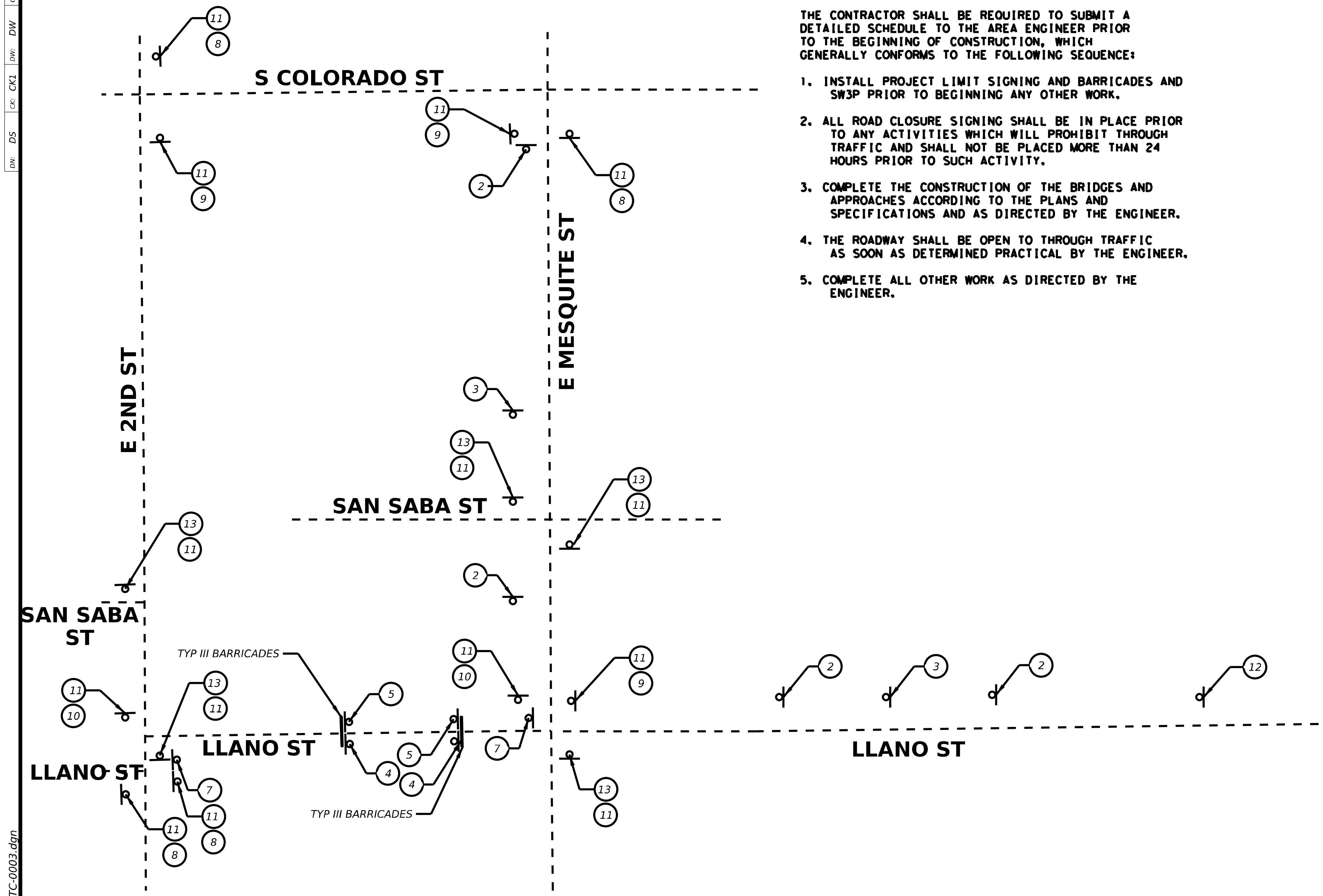
Texas Department of Transportation

TRAFFIC CONTROL PLAN
SAN SABA ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		19

DATE: 7/31/2024 7:09:17 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-0004.dgn



SEQUENCE OF WORK

THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE TO THE AREA ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION, WHICH GENERALLY CONFORMS TO THE FOLLOWING SEQUENCE:

1. INSTALL PROJECT LIMIT SIGNING AND BARRICADES AND SW3P PRIOR TO BEGINNING ANY OTHER WORK.
2. ALL ROAD CLOSURE SIGNING SHALL BE IN PLACE PRIOR TO ANY ACTIVITIES WHICH WILL PROHIBIT THROUGH TRAFFIC AND SHALL NOT BE PLACED MORE THAN 24 HOURS PRIOR TO SUCH ACTIVITY.
3. COMPLETE THE CONSTRUCTION OF THE BRIDGES AND APPROACHES ACCORDING TO THE PLANS AND SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.
4. THE ROADWAY SHALL BE OPEN TO THROUGH TRAFFIC AS SOON AS DETERMINED PRACTICAL BY THE ENGINEER.
5. COMPLETE ALL OTHER WORK AS DIRECTED BY THE ENGINEER.

GENERAL NOTES

1. SIGNS SHALL BE PLACED IN ACCORDANCE WITH THE BARRICADE AND CONSTRUCTION STANDARDS OR AS DIRECTED BY THE ENGINEER.
2. OTHER SIGNS AS DETAILED IN THE BARRICADE AND CONSTRUCTION STANDARDS AND IN THE TMUTCD MAY BE USED AS REQUIRED BY THE ENGINEER.
3. DETOUR LENGTH = 0.57 MI

LEGEND

SIGN AND SIGN SUPPORT

1. OBEY WARNING SIGNS STATE LAW — R20-3T 48X42
2. ROAD CLOSED AHEAD — CW20-3D 48X48
3. ROAD CLOSED 500 FT — CW20-3C 48X48
4. ROAD CLOSED — R11-2 48X30
5. NAME ADDRESS CITY STATE CONTRACTOR — G20-6 48X30
6. END ROAD WORK — G20-2a 48X24
7. ROAD CLOSED TO THRU TRAFFIC — R11-4 60X30
8. DETOUR — M4-9L 30X24
9. DETOUR — M4-9R 30X24
10. END DETOUR — M4-8a 24X18
11. LLANO ST — M4-12T VARIESX8
12. ROAD CLOSED 1000 FT — CW20-3B 48X48
13. DETOUR — M4-9S 30X24

0 100 200
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

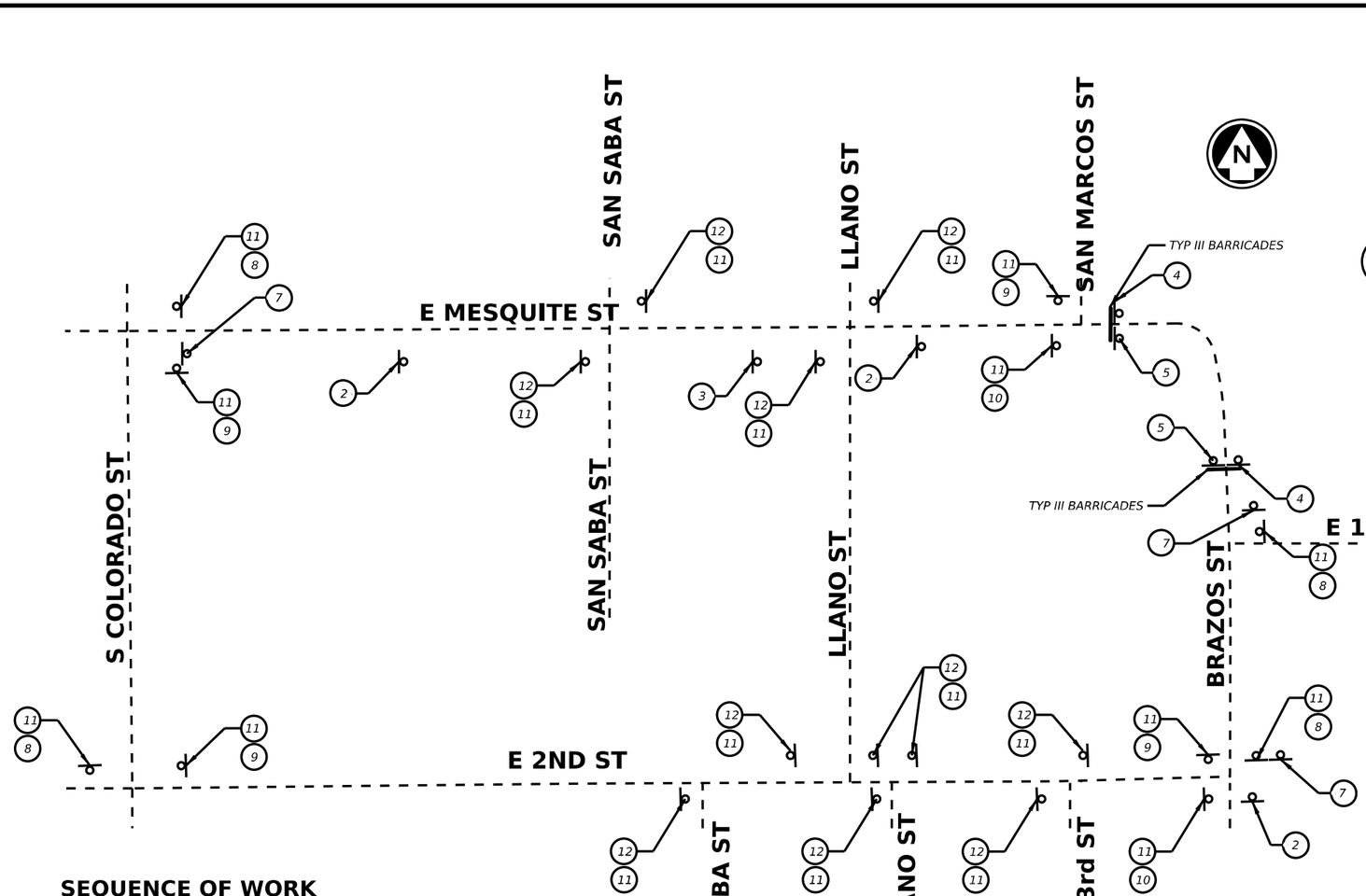
TRAFFIC CONTROL PLAN
LLANO ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		20

DN: DS CK: CK1 DW: DW CK: CK2

DATE: 7/31/2024 7:09:25 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-0003.dgn



SEQUENCE OF WORK

THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE TO THE AREA ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION, WHICH GENERALLY CONFORMS TO THE FOLLOWING SEQUENCE:

1. *INSTALL PROJECT LIMIT SIGNING AND BARRICADES AND SW3P PRIOR TO BEGINNING ANY OTHER WORK.*
2. *ALL ROAD CLOSURE SIGNING SHALL BE IN PLACE PRIOR TO ANY ACTIVITIES WHICH WILL PROHIBIT THROUGH TRAFFIC AND SHALL NOT BE PLACED MORE THAN 24 HOURS PRIOR TO SUCH ACTIVITY.*
3. *COMPLETE THE CONSTRUCTION OF THE BRIDGES AND APPROACHES ACCORDING TO THE PLANS AND SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.*
4. *THE ROADWAY SHALL BE OPEN TO THROUGH TRAFFIC AS SOON AS DETERMINED PRACTICAL BY THE ENGINEER.*
5. *COMPLETE ALL OTHER WORK AS DIRECTED BY THE ENGINEER.*

GENERAL NOTES

1. *SIGNS SHALL BE PLACED IN ACCORDANCE WITH THE BARRICADE AND CONSTRUCTION STANDARDS OR AS DIRECTED BY THE ENGINEER.*
2. *OTHER SIGNS AS DETAILED IN THE BARRICADE AND CONSTRUCTION STANDARDS AND IN THE TMUTCD MAY BE USED AS REQUIRED BY THE ENGINEER.*
3. *DETOUR LENGTH = 0.75 MI*

LEGEND

SIGN AND SIGN SUPPORT

1. OBEY WARNING SIGNS STATE LAW — R20-3T 48X42
2. ROAD CLOSED AHEAD — CW20-3D 48X48
3. ROAD CLOSED 500 FT — CW20-3C 48X48
4. ROAD CLOSED — R11-2 48X30
5. NAME ADDRESS CITY STATE CONTRACTOR — G20-6 48X30
6. END ROAD WORK — G20-2a 48X24
7. ROAD CLOSED TO THRU TRAFFIC — R11-4 60X30
8. DETOUR — M4-9L 30X24
9. DETOUR — M4-9R 30X24
10. END DETOUR — M4-8a 24X18
11. BRAZOS ST — M4-12T VARIESX8
12. DETOUR — M4-9S 30X24

0 100 200

SCALE IN FEET

STATE OF TEXAS · MANSA R. MOTON · 111594 · LICENSED · PROFESSIONAL ENGINEER

07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

TRAFFIC CONTROL PLAN
BRAZOS ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		21

DATE: 7/31/2024 7:09:33 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337791038401030-02-TC-0002.dgn

DW: DS | CK: CK1 | DW: DW | CK: CK2

DATE: 7/31/2024 7:09:57 PM
FILE: c:\tms\bridgefarmer-pw\mansa.morton\dms33779\038401030-02-TC-9901.dgn
mMorton

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

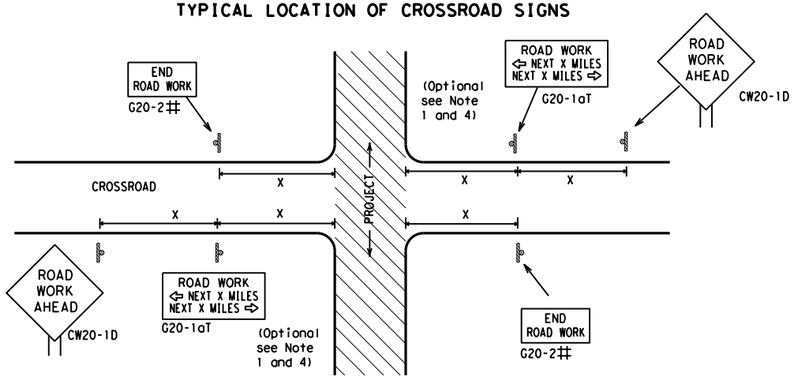
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0923	08	030, ETC	SAN SABA ST. ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		22

DATE: 7/31/2024 7:10:06 PM
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms337791\038401030-02-TC-9902.dgn
mMoton

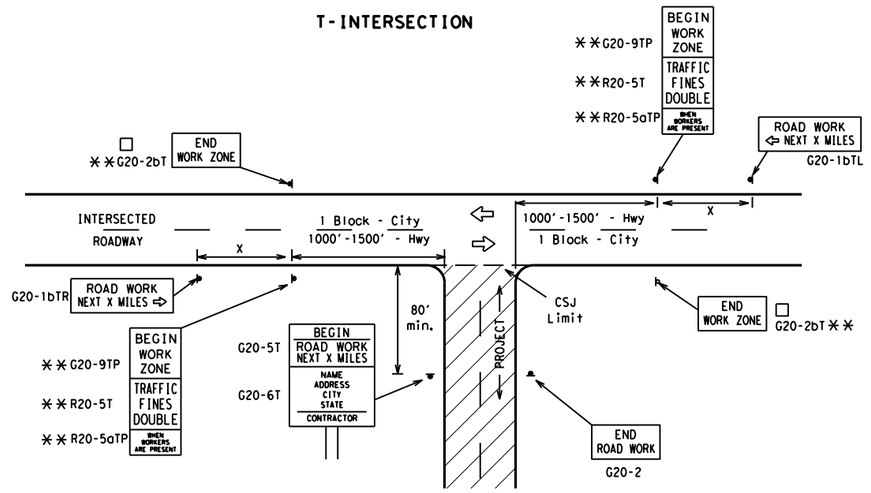
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

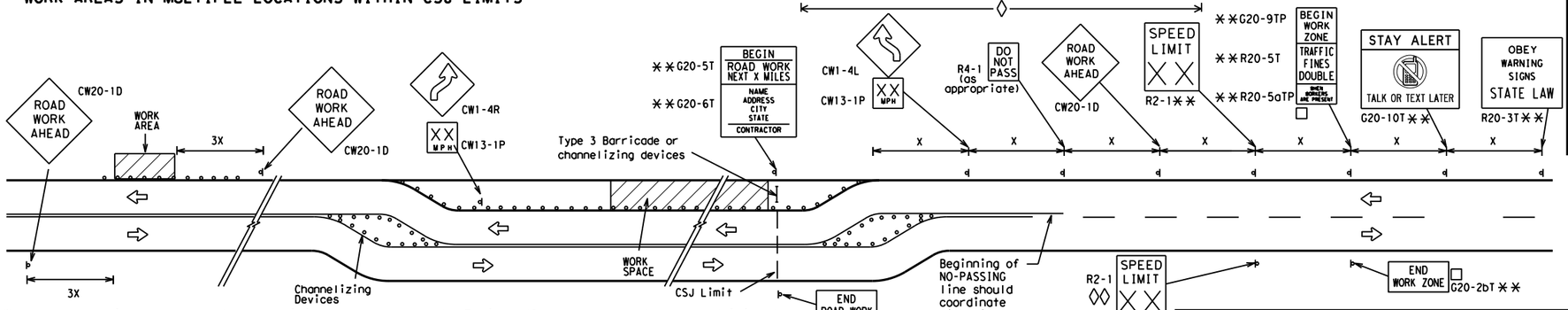
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

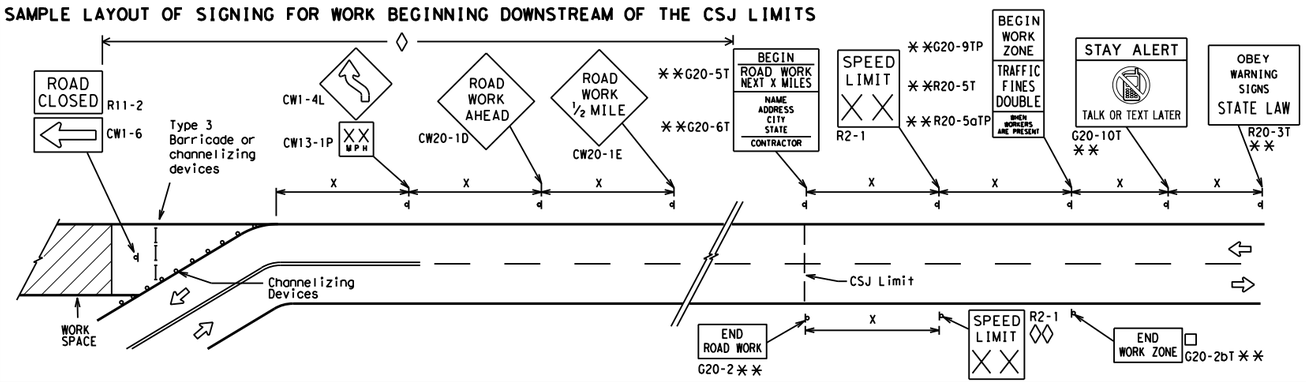
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COLEMAN		23

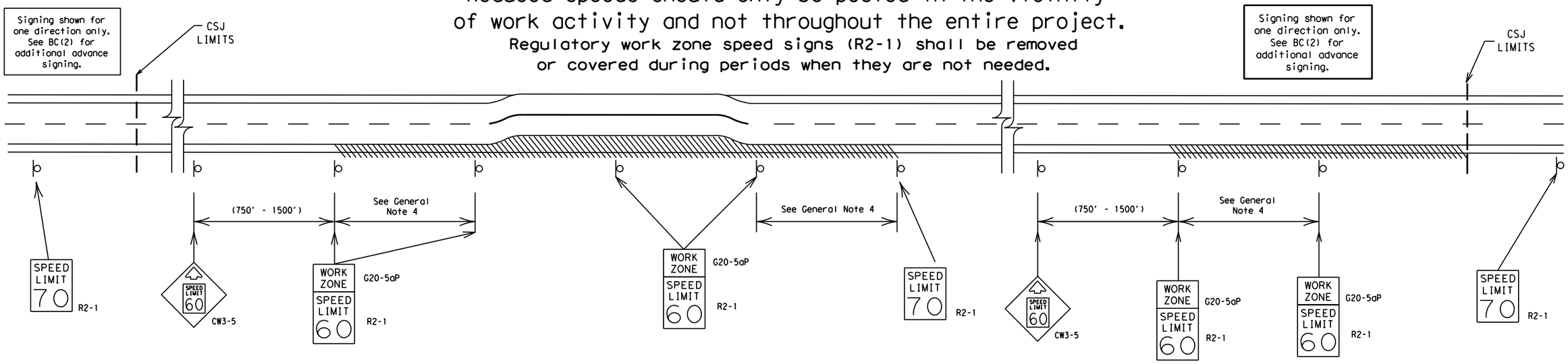
DATE: 7/31/2024 7:10:15 PM
FILE: c:\tams\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-9903.dgn
mMoton

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

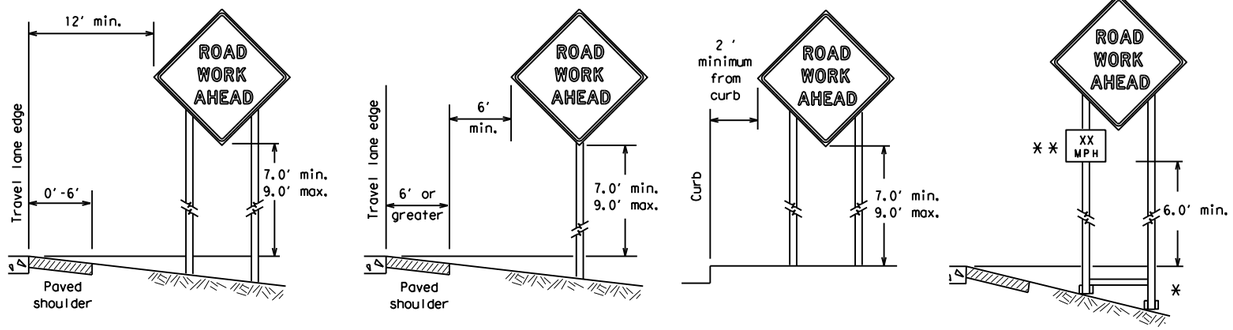
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		24

DATE: 7/31/2024 7:10:23 PM
FILE: c:\tms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-9904.dgn
mMoton

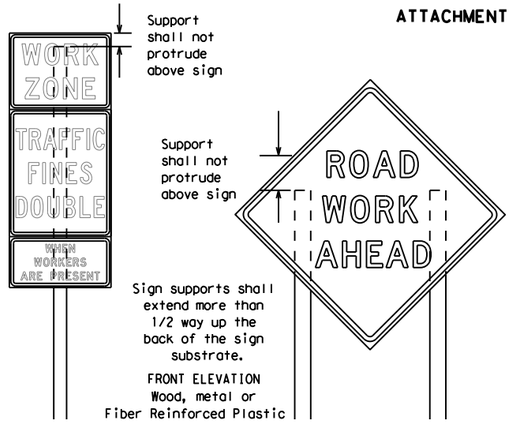
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

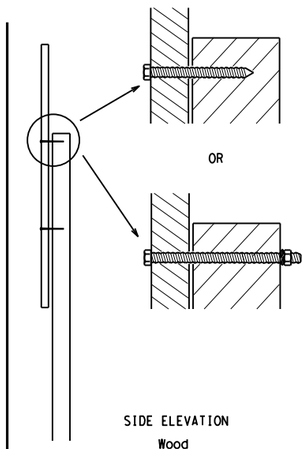


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





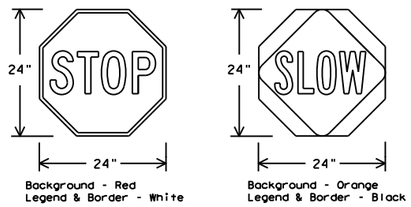
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

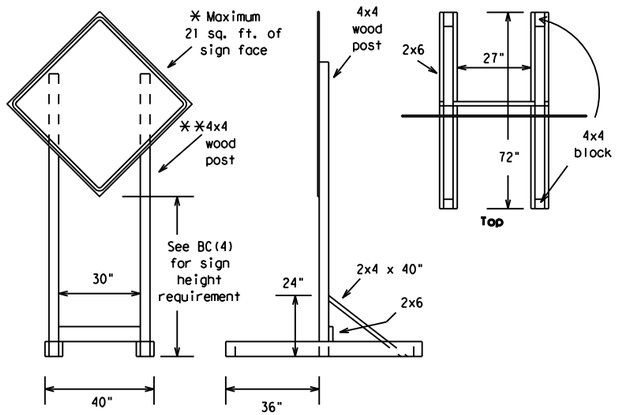
Texas Department of Transportation | Traffic Safety Division Standard

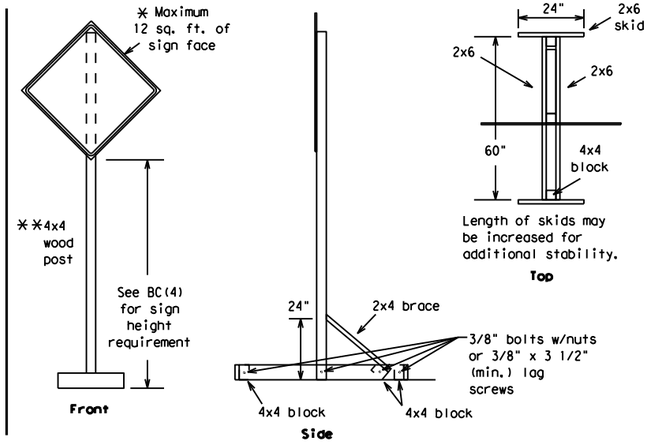
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST. ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COLEMAN		25

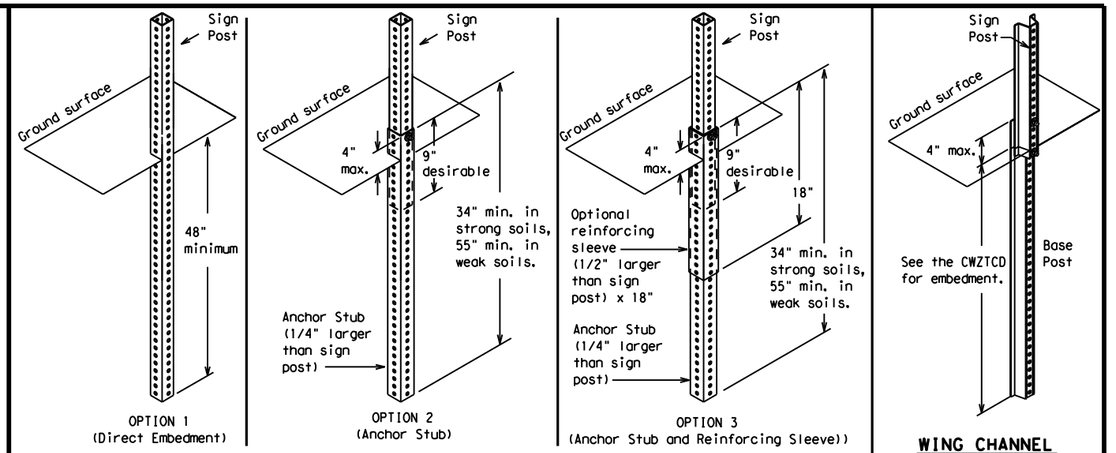
DATE: 7/31/2024
FILE: c:\tms\bridgefarmer-pw\mansa.morton\dms33779\038401030-02-TC-9905.dgn
mMorton 7:10:33 PM





SKID MOUNTED WOOD SIGN SUPPORTS

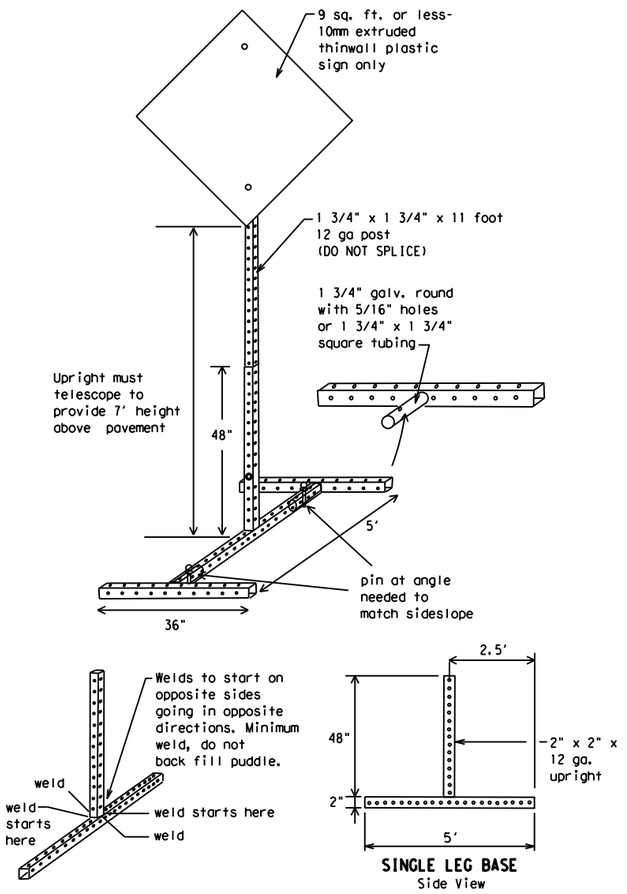
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

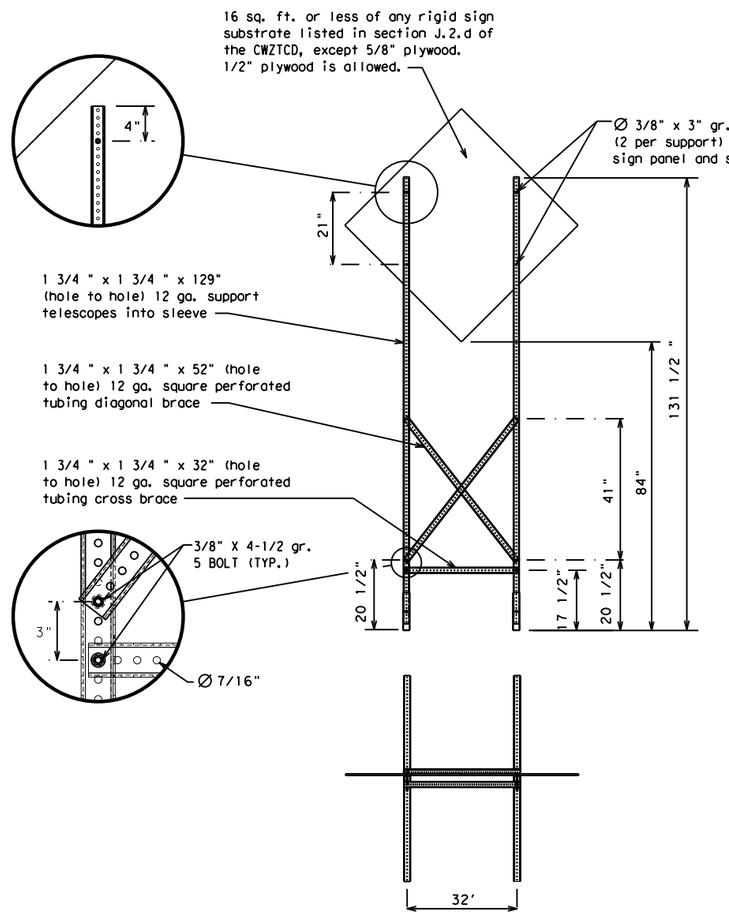


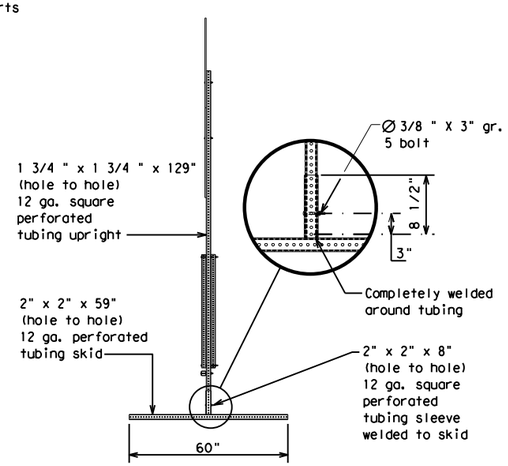
PERFORATED SQUARE METAL TUBING

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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST. ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COLEMAN		26

DATE: 7/31/2024 7:10:41 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-9906.dgn
mMoton

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

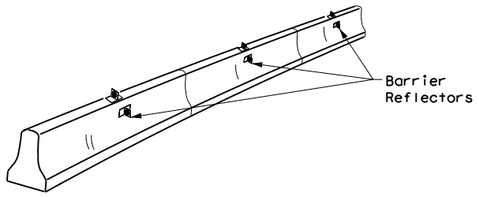
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0923	08	030, ETC	SAN SABA ST, ETC
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		BWD	COLEMAN		27

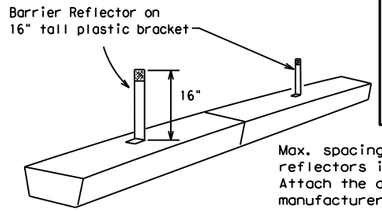
DATE: 7/31/2024 7:10:50 PM
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-9907.dgn
mMoton

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.



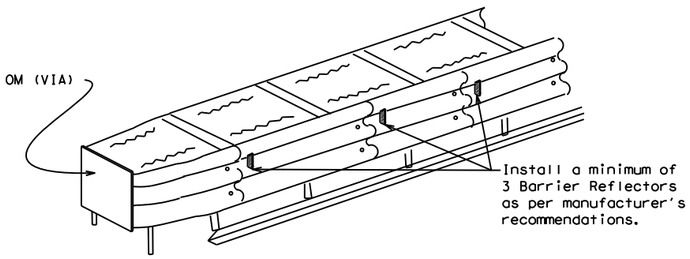
CONCRETE TRAFFIC BARRIER (CTB)

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

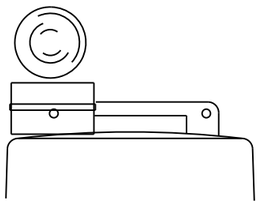
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

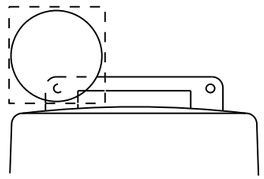
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

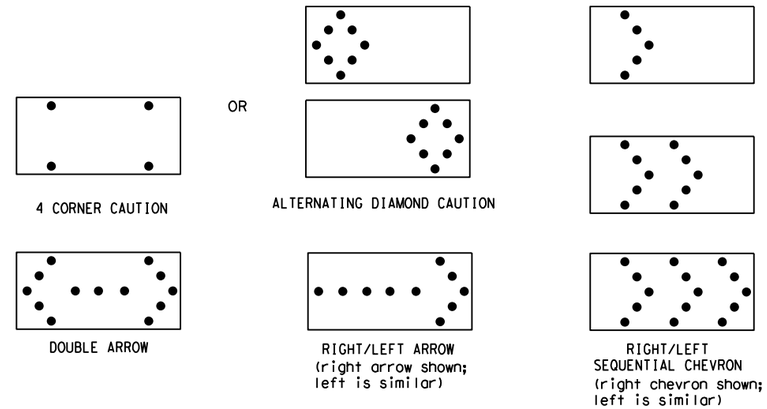
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COLEMAN		28

101

DATE: 7/31/2024 7:10:59 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33779\d038401030-02-TC-9908.dgn
mMoton

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:

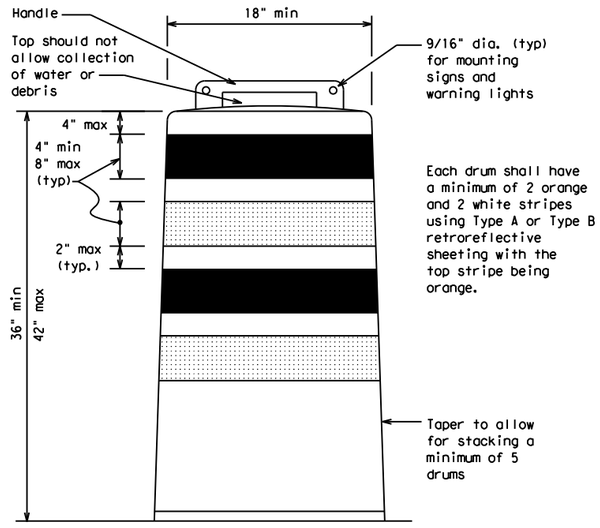
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

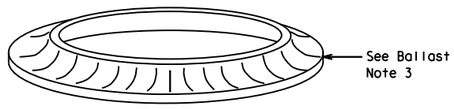
RETROREFLECTIVE SHEETING

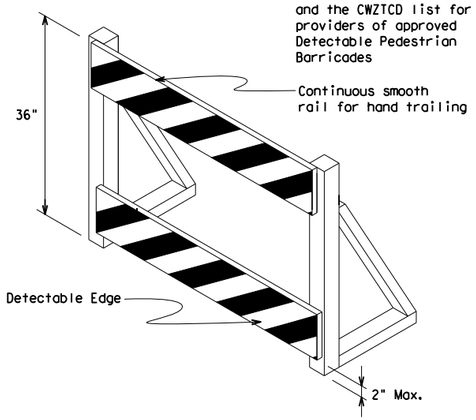
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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





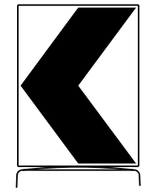


This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

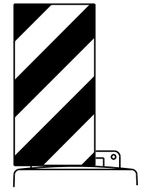
Continuous smooth rail for hand trailing

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

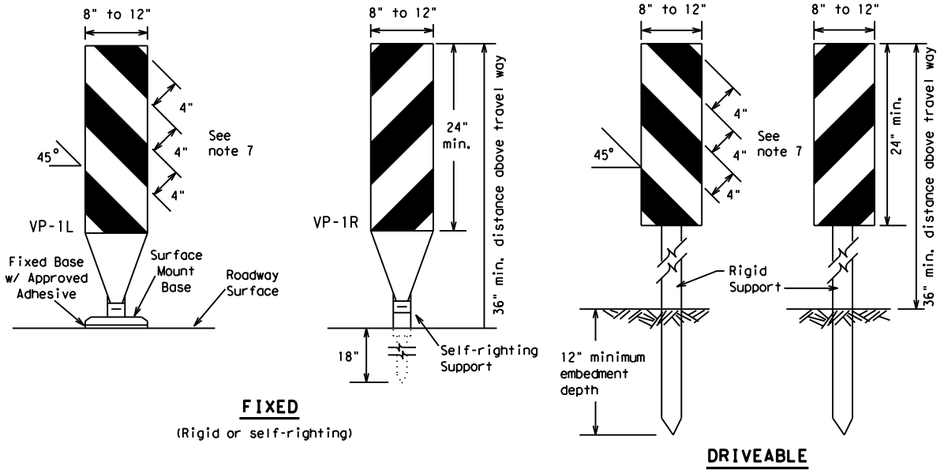
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST. ETC
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	BWD	COLEMAN		29
7-13				

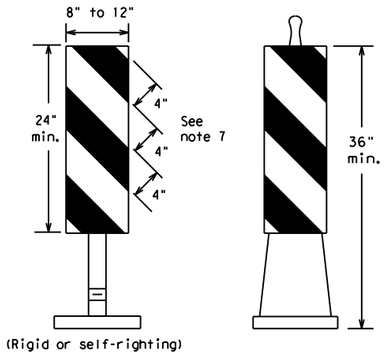
102

DATE: 7/31/2024 7:11:07 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33779\d038401030-02-TC-9909.dgn
mMoton



FIXED
(Rigid or self-righting)

DRIVEABLE

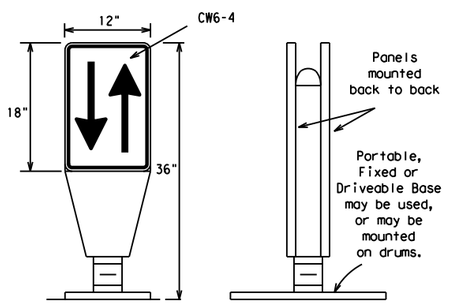


(Rigid or self-righting)

PORTABLE

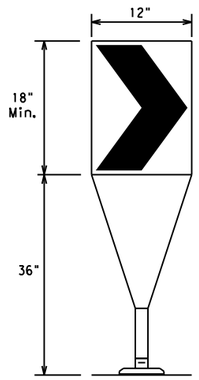
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



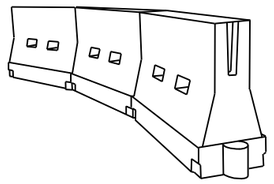
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

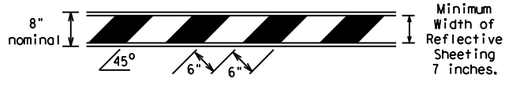
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COLEMAN		30

DATE: 7/31/2024 7:11:19 PM
FILE: c:\bms\bridgefarmer-pw\mansa.morton\dms33779\038401030-02-TC-9910.dgn
mMorton

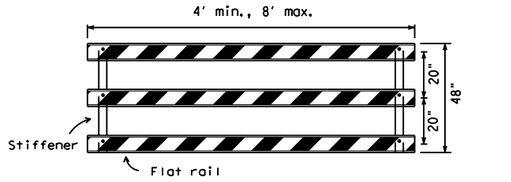
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



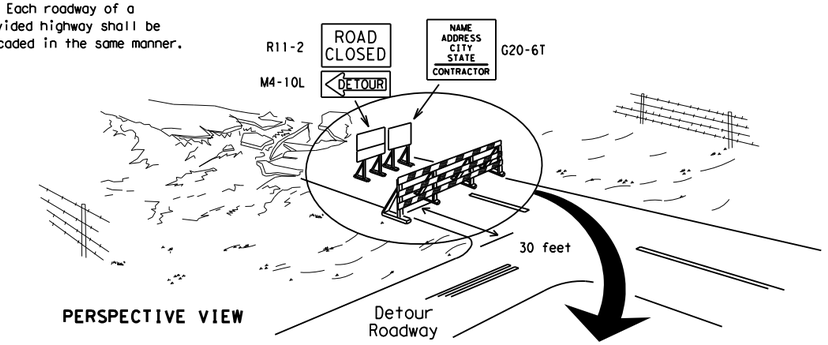
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

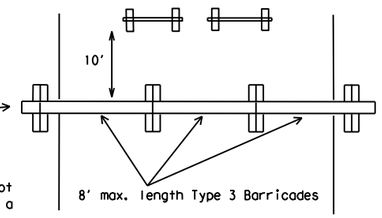
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

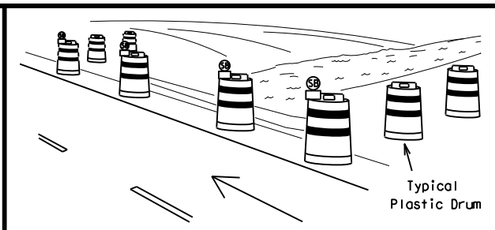
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

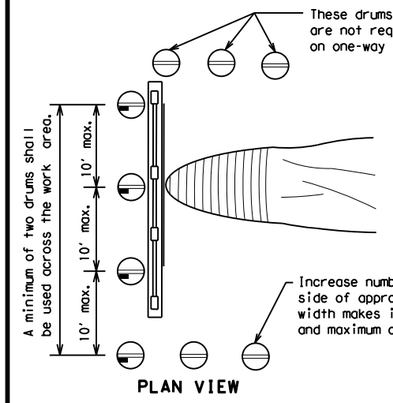
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

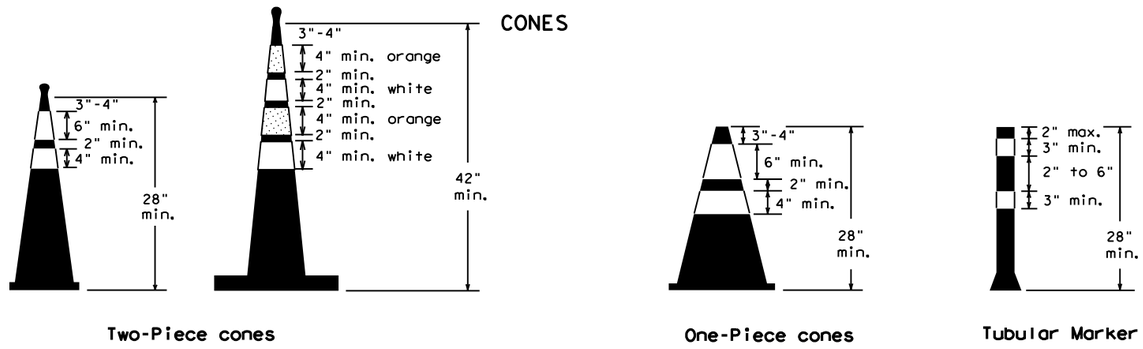
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

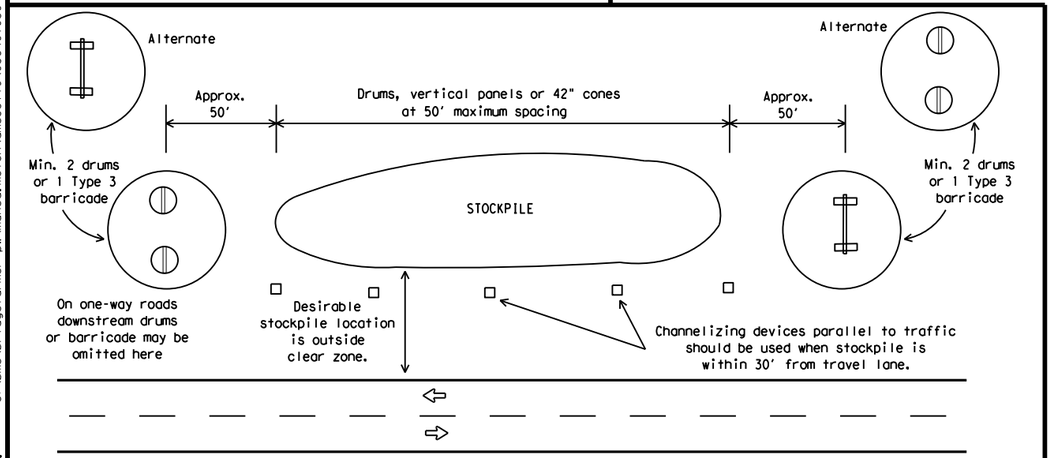


Two-Piece cones | One-Piece cones | Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BWD	COLEMAN		31

DATE: 7/31/2024 7:11:28 PM
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-9911.dgn
mMoton

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

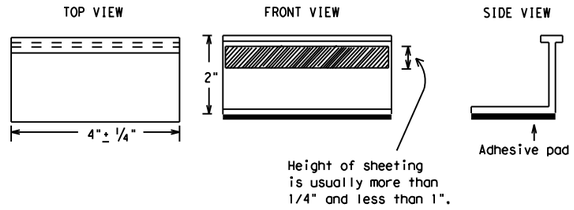
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

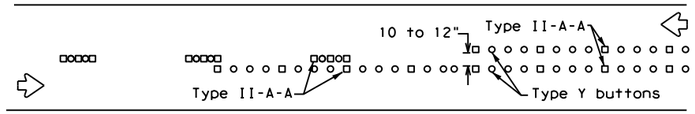
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	0923	08	030, ETC	SAN SABA ST, ETC
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	BWD	COLEMAN		32

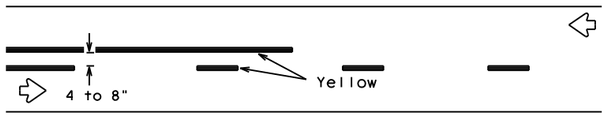
DATE: 7/31/2024 7:11:38 PM
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33779\038401030-02-TC-9912.dgn
mMoton

PAVEMENT MARKING PATTERNS

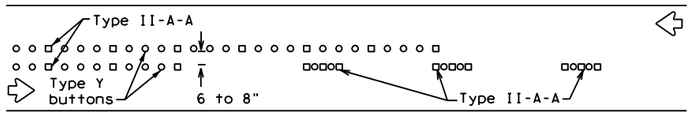
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



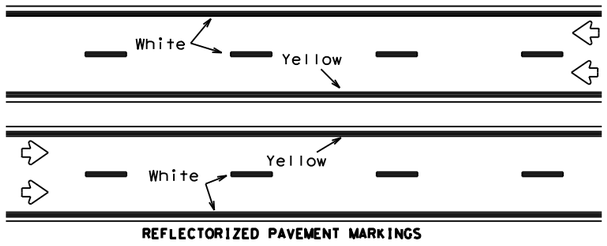
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



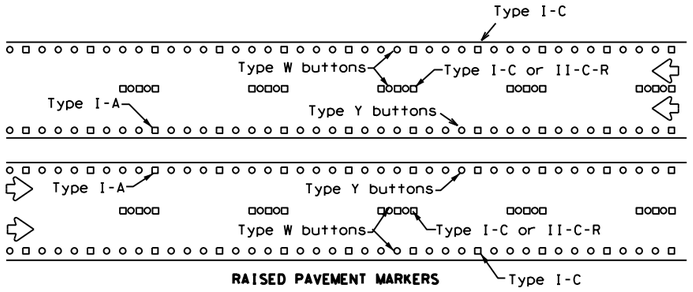
RAISED PAVEMENT MARKERS - PATTERN B

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



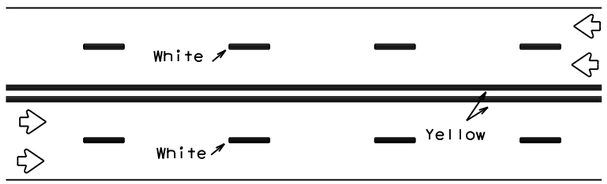
REFLECTORIZED PAVEMENT MARKINGS



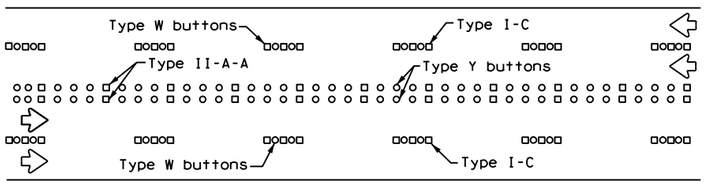
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



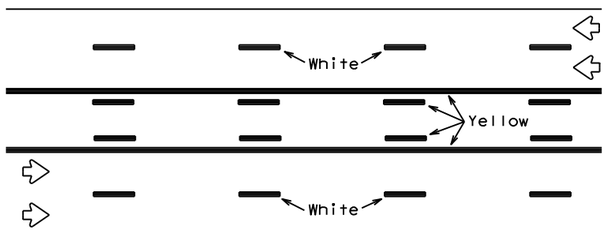
REFLECTORIZED PAVEMENT MARKINGS



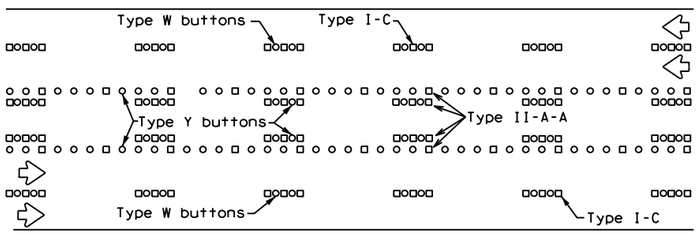
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

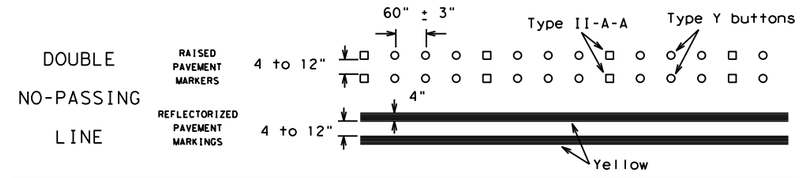
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

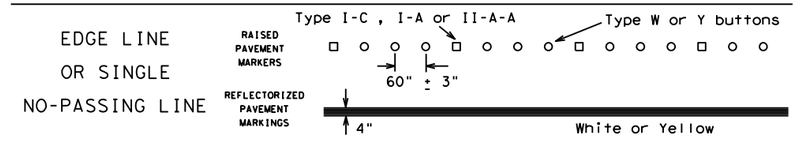
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

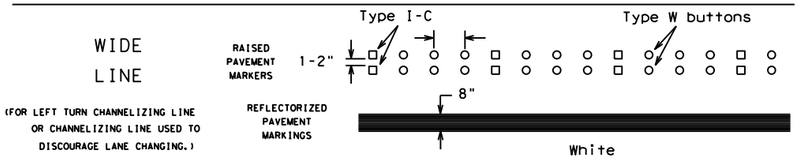


EDGE LINE OR SINGLE NO-PASSING LINE



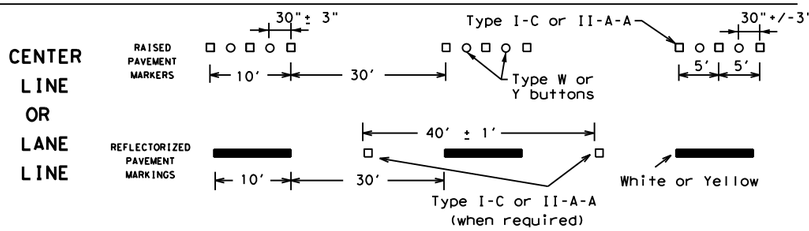
WIDE LINE

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

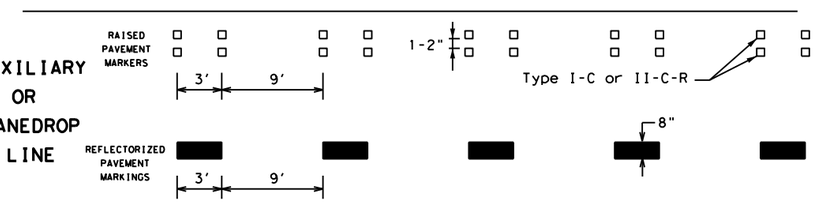


BROKEN LINES

CENTER LINE OR LANE LINE

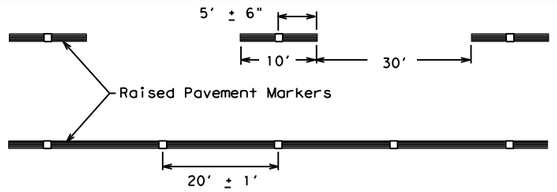


AUXILIARY OR LANEDROP LINE



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

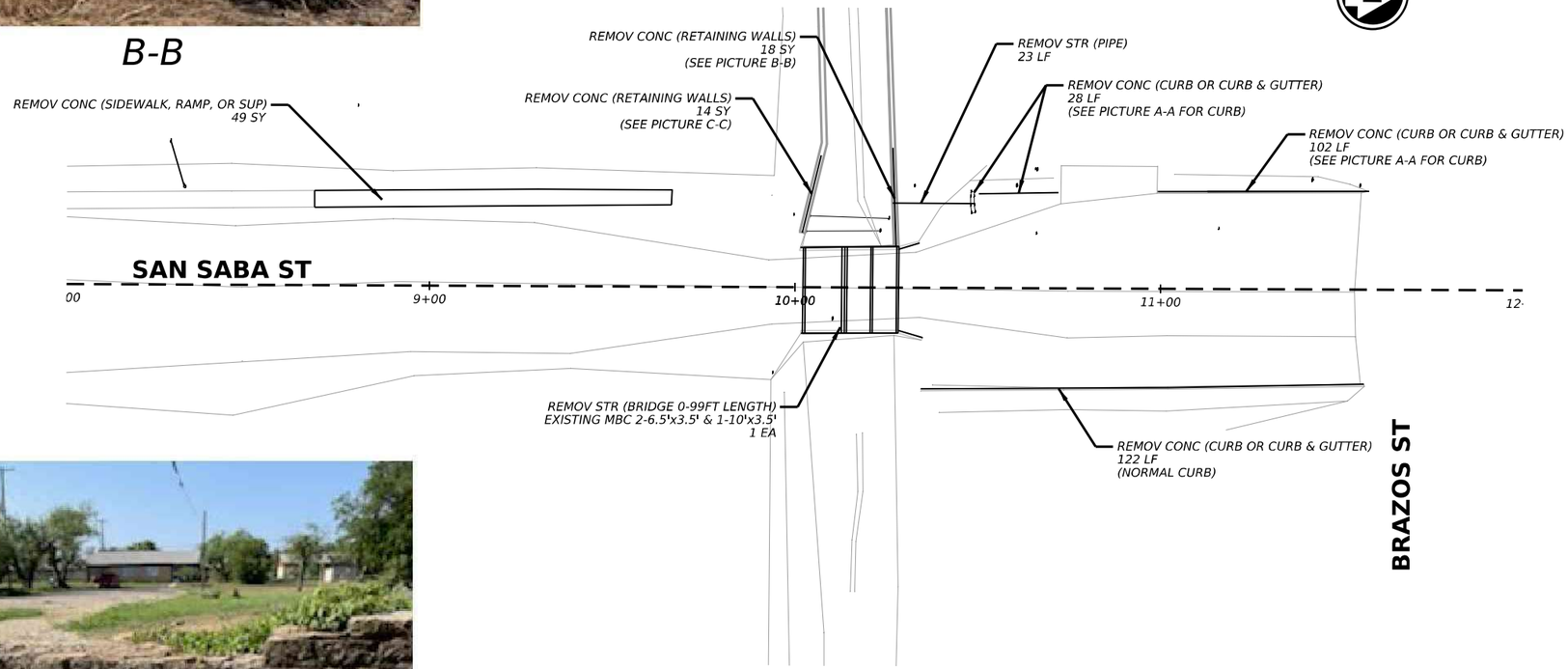
BC(12)-21

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	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		33

DW:	DS
CK:	CK1
DW:	DW
CK:	CK2

B-B

A-A



C-C

CONTRACTOR SHALL TAKE CARE IN THE DISMANTLING OF EXISTING WALLS TO PREVENT DAMAGE TO STONE. STONE TO BE REUSED FOR PROPOSED STONE FACADE WINGWALLS AT BRAZOS ST. ON THE NW WINGWALL AND SAN SABA ST. ON THE NW AND SW WINGWALLS.

0 20 40

SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER

07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

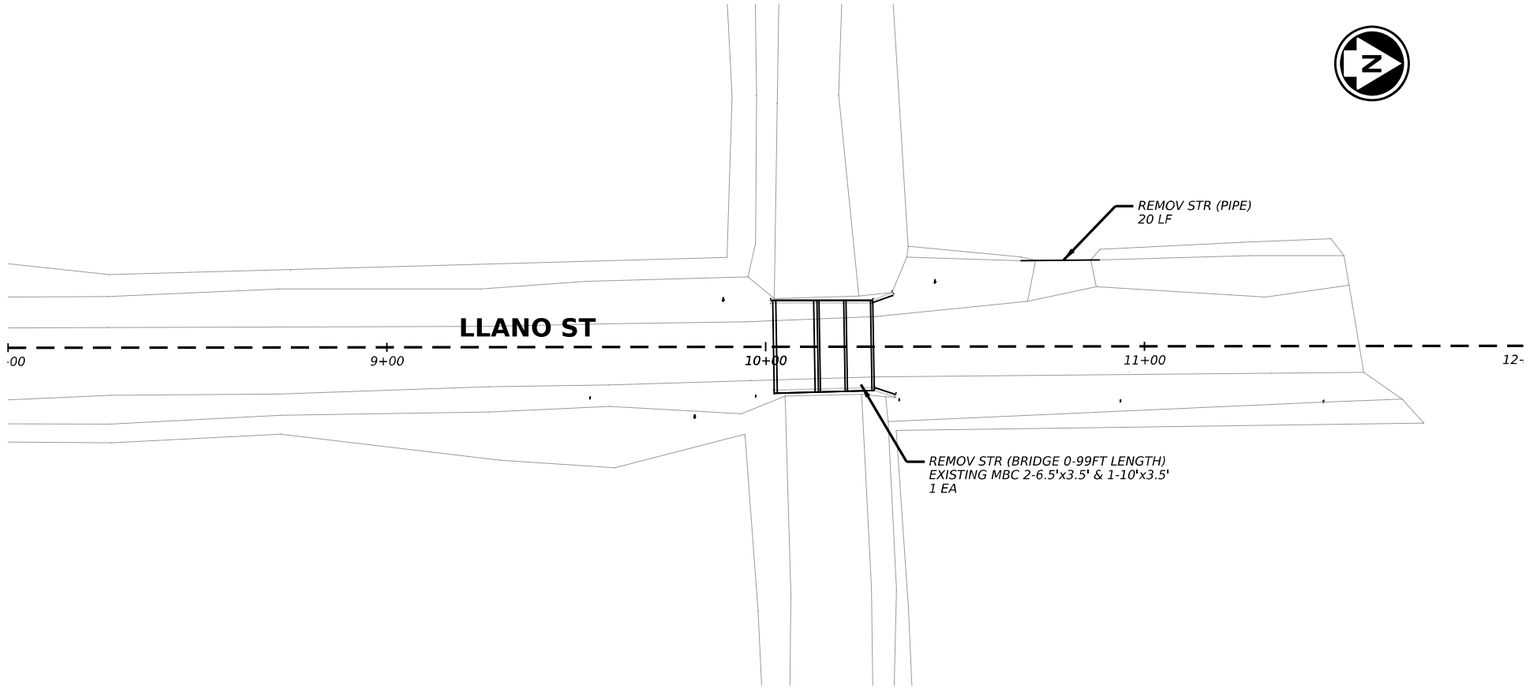
REMOVAL PLAN
SAN SABA ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		34

DATE: 7/31/2024 7:11:47 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337871038401030-03-RM-003.dgn

DES CK2
DW DW
CK1 CK
DS DW



0 20 40
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

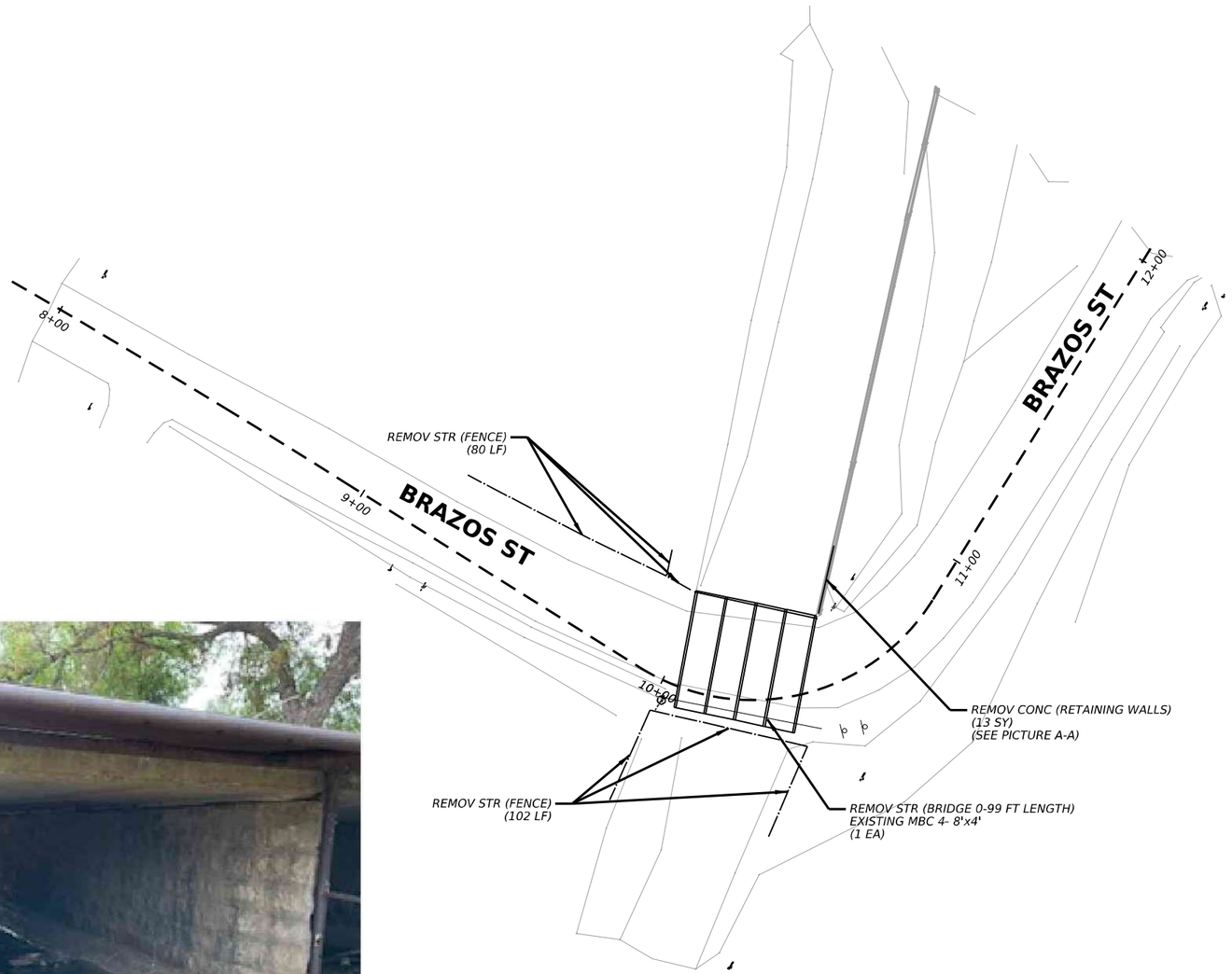
REMOVAL PLAN
LLANO ST

SHEET 1 OF 1

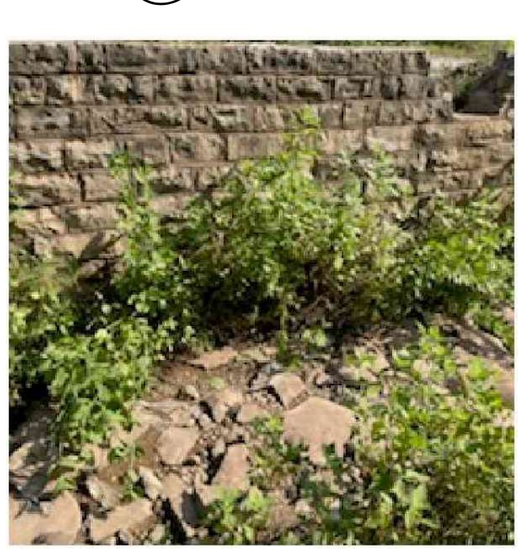
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		35

DATE: 7/31/2024 7:11:55 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33787\038401030-03-RM-002.dgn

DW: DS | DW: CK1 | DW: DW | DW: CK2



WHEN REMOVING STRUCTURE (BRIDGE 0-99FT LENGTH) CONTRACTOR SHALL TAKE CARE IN THE DISMANTLING OF EXISTING CULVERT WALLS TO PREVENT DAMAGE TO STONE. STONE TO BE REUSED FOR PROPOSED STONE FACADE WINGWALLS AT BRAZOS STREET ON THE NW WINGWALL AND SAN SABA ST. ON THE NW AND SW WINGWALLS.



A-A

CONTRACTOR SHALL TAKE CARE IN THE DISMANTLING OF THE EXISTING WALLS TO PREVENT DAMAGE TO STONE. STONE TO BE REUSED FOR PROPOSED STONE FACADE WINGWALLS AT BRAZOS STREET ON THE NW WINGWALL AND SAN SABA ST. ON THE NW AND SW WINGWALLS.

0 20 40
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

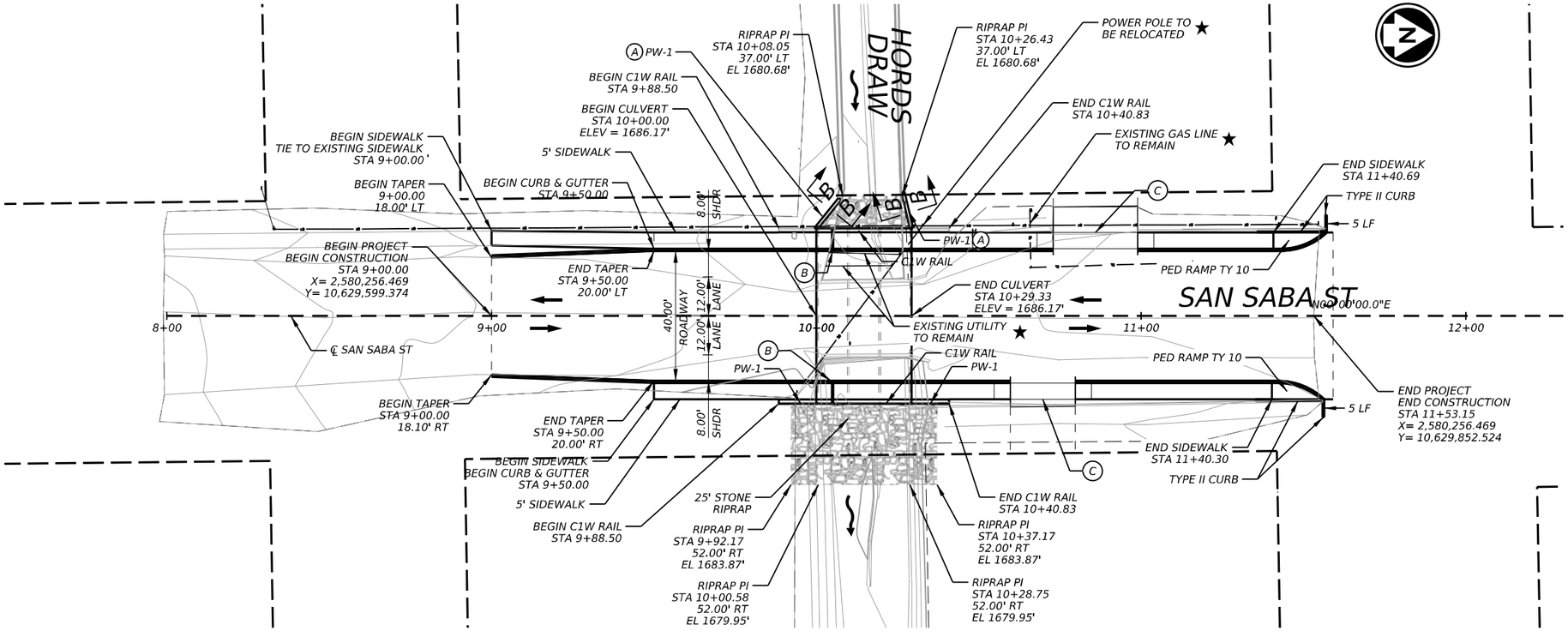
REMOVAL PLAN
BRAZOS ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		36

DATE: 7/31/2024 7:12:03 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33787\03840\030-03-RM-001.dgn

DW: MRM | DW: CK1 | DC: | DW: DW | DC: CK2



LEGEND

- EXISTING ROW
- TRAFFIC DIRECTION
- STONE RIPRAP
- CONCRETE RIPRAP

NOTES:

A. ROCK COVERED WINGWALL. SEE MISCELLANEOUS DETAIL SHEET FOR ADDITIONAL DETAILS.

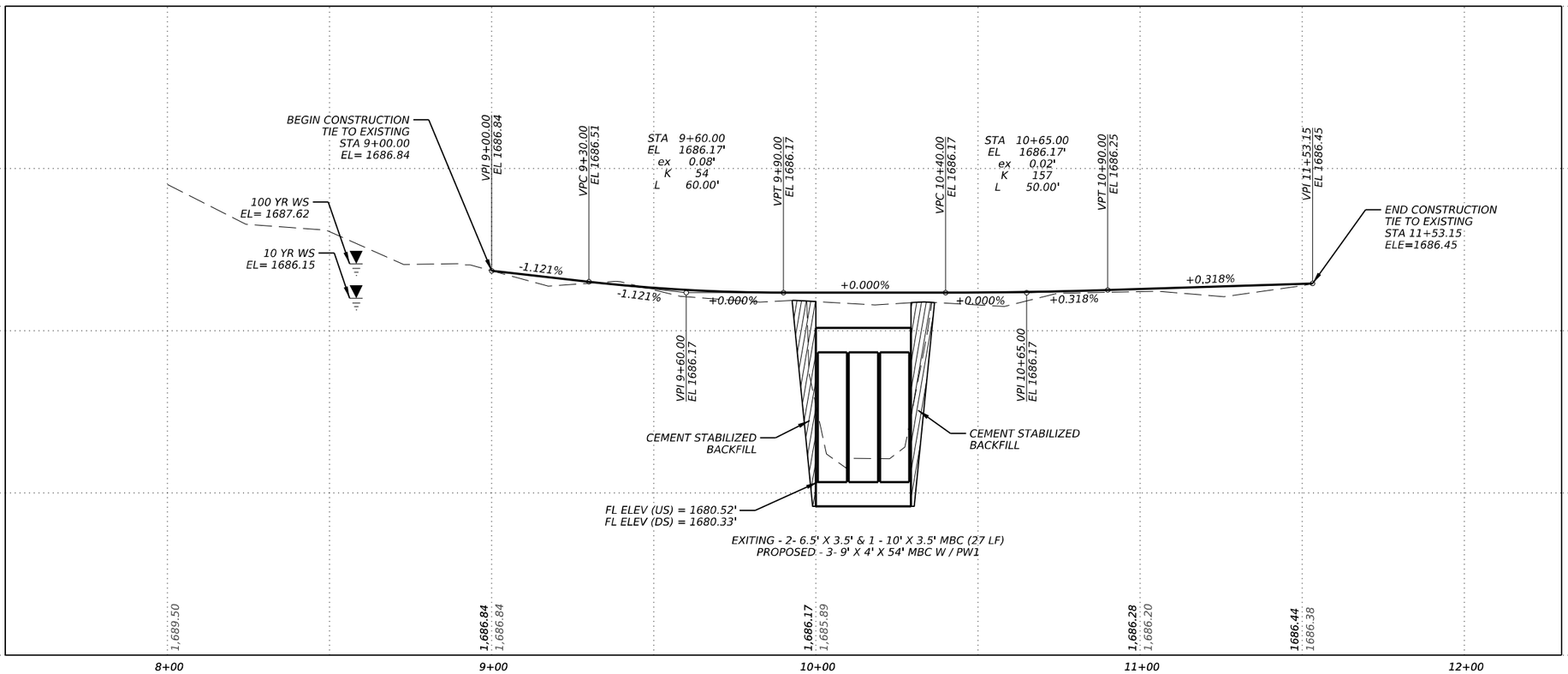
B. ℄ SIDEWALK DRAIN SLOT STA 10+05.00. SEE STANDARD DETAILS FOR INFO.

C. DRIVEWAY TO HAVE TYPE I CURB IN FRONT. SEE DRIVEWAY DETAILS FOR INFORMATION NOT SHOWN

D. SEE BCS STANDARD SHEET FOR WINGWALL INFO. NOT SHOWN.

E. PRECAST BOXES WILL NOT BE PERMITTED. CULVERT INSTALL SHALL BE IN ACCORDANCE WITH TxDOT MC-9-10 STANDARD.

★ APPROXIMATE LOCATION OF EXISTING UTILITIES SHOWN. UTILITIES SHALL BE FIELD VERIFIED CLEARED AND/OR LOCATED PRIOR TO CONSTRUCTION.



H 0 20 40
V 0 2 4
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07. 31. 2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

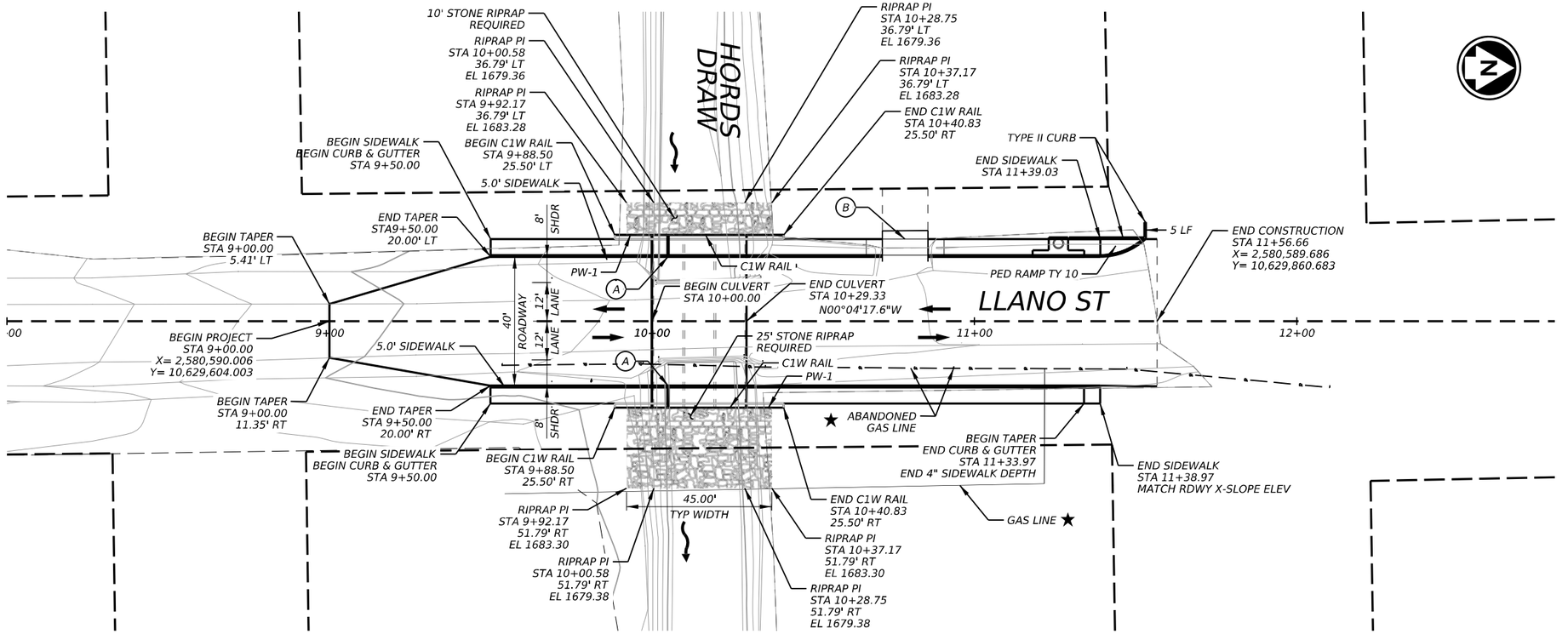
PLAN AND PROFILE SAN SABA ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		37

DATE: 8/1/2024 3:35:03 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms\33788\038401030-04-RD-303.dgn

CK2 | CK | DW | DW | CK1 | CK | DS | DW



NOTES:

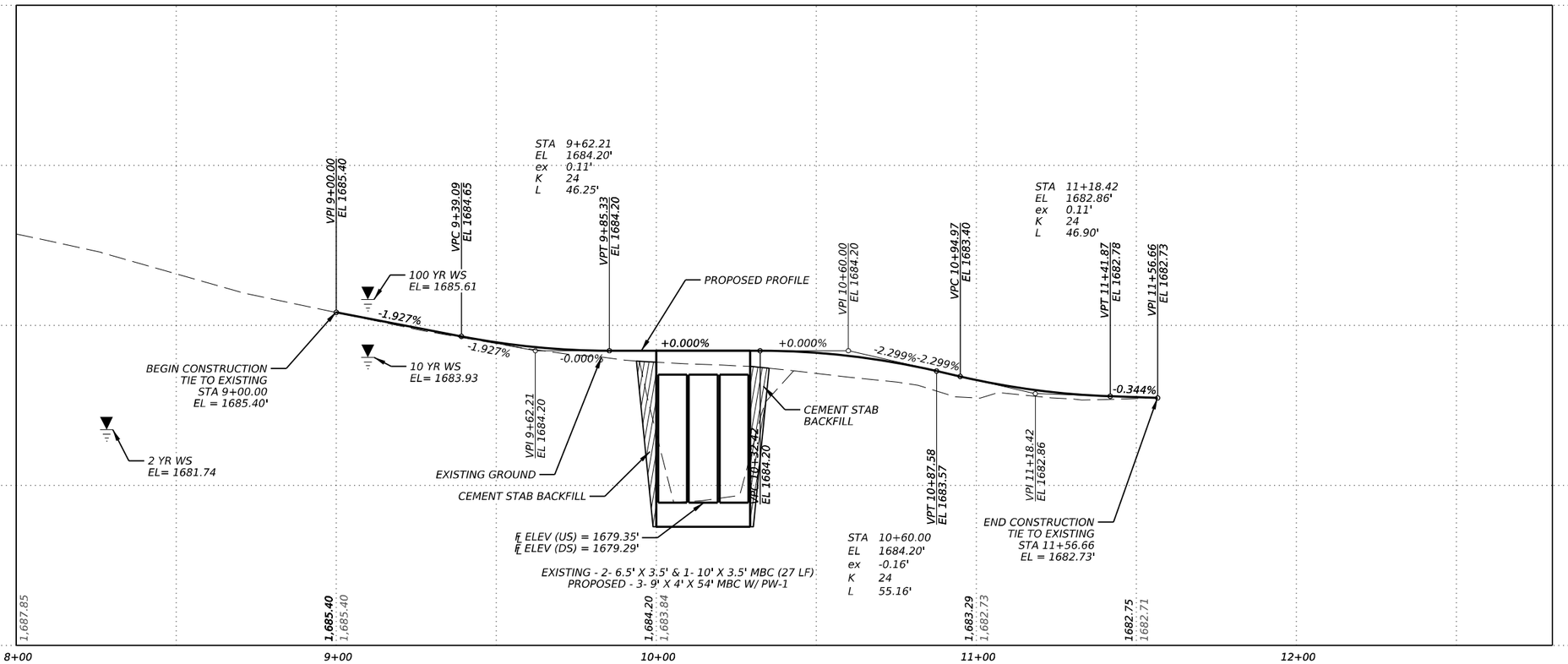
A. ℄ SIDEWALK DRAIN SLOT STA 10+05.00. SEE STANDARD DETAILS FOR INFO.

B. DRIVEWAY TO HAVE TYPE I CURB IN FRONT. SEE DRIVEWAY DETAILS FOR INFORMATION NOT SHOWN

C. SEE BCS STANDARD SHEET FOR WINGWALL INFO, NOT SHOWN.

D. PRECAST BOXES WILL NOT BE PERMITTED. CULVERT INSTALL SHALL BE IN ACCORDANCE WITH TxDOT MC-9-10 STANDARD.

★ APPROXIMATE LOCATION OF EXISTING UTILITIES SHOWN. UTILITIES SHALL BE FIELD VERIFIED CLEARED AND/OR LOCATED PRIOR TO CONSTRUCTION.



H 0 20 40
V 0 2 4
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
01.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

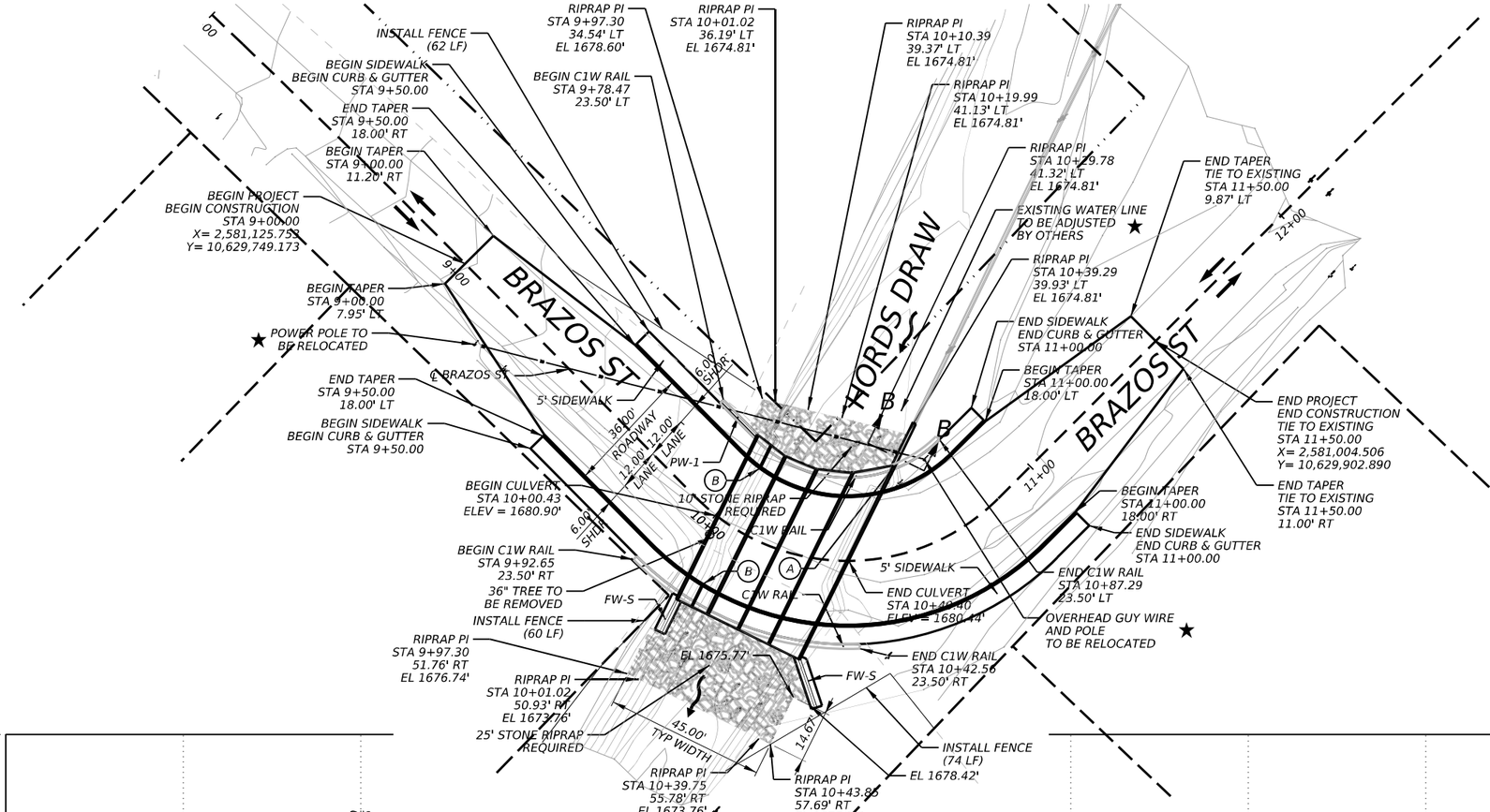
PLAN AND PROFILE LLANO ST

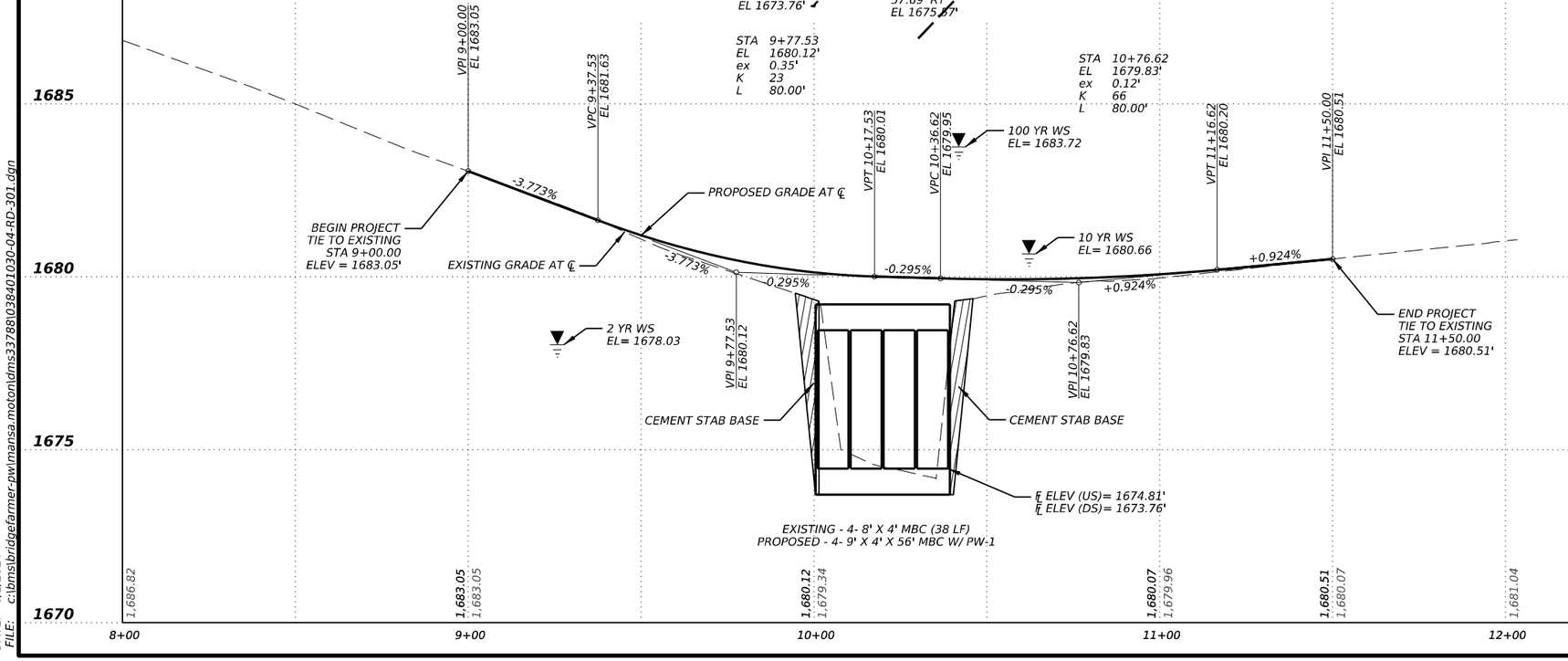
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		38

DATE: 8/1/2024 3:35:12 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms\33788\038401030-04-RD-302.dgn

CK2 | CK | DW | DW | CK1 | CK | DS | DW





H 0 20 40
V 0 2 4
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

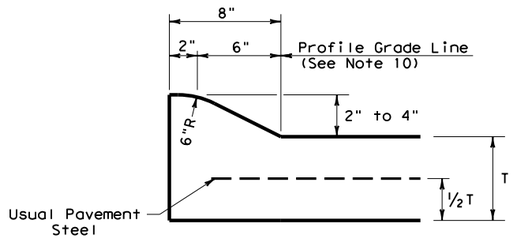
PLAN AND PROFILE
BRAZOS STREET

SHEET 1 OF 1

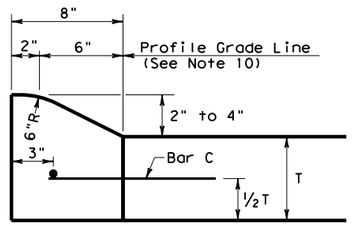
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		39

DATE: 8/1/2024 3:35:21 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337869\038401030-04-RD-301.dgn

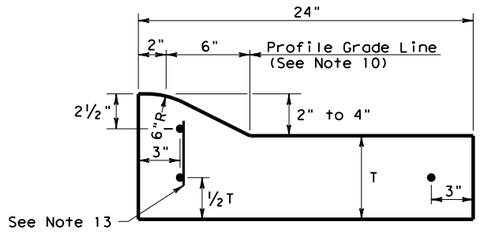
DATE: 7/31/2024 7:12:47 PM
FILE: c:\dms\bridgefarmer-pw\mansg.moton\dms33788\038401030-04-RD-901.dgn
mMoton



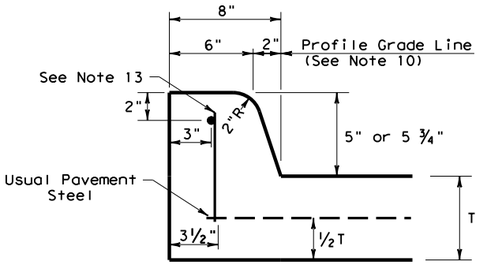
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



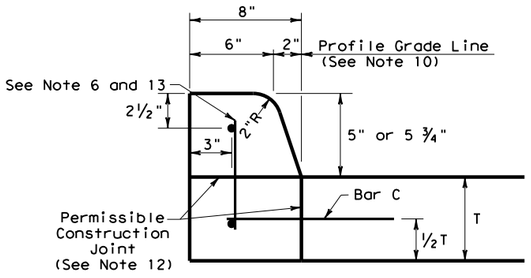
TYPE I CURB
2" - 4" HEIGHT



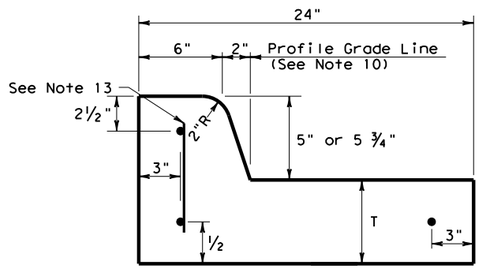
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



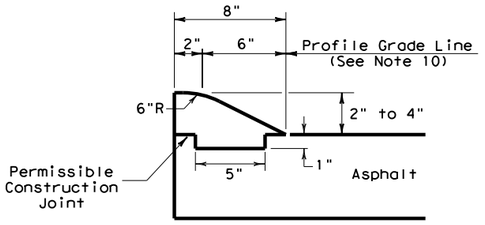
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



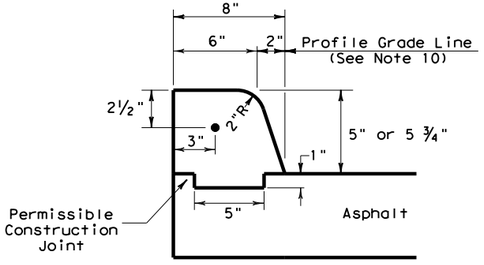
TYPE II CURB
5" - 5 ¾" HEIGHT



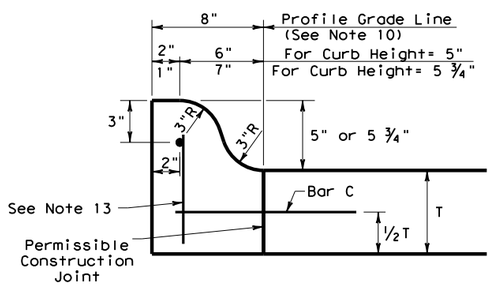
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



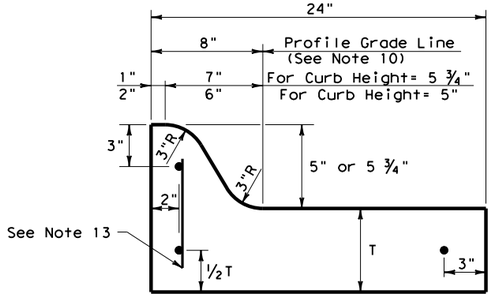
TYPE III CURB (KEYED)
2" - 4" HEIGHT



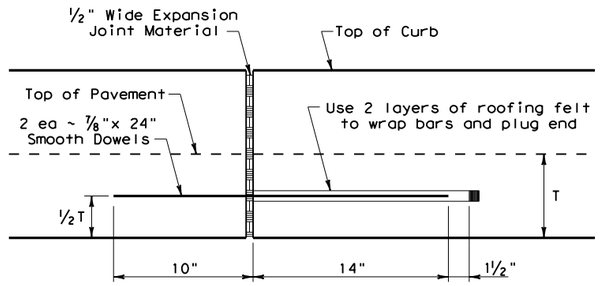
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

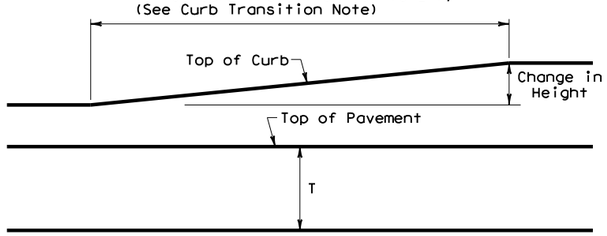


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

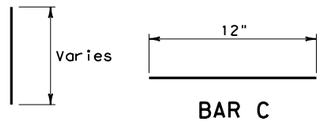
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

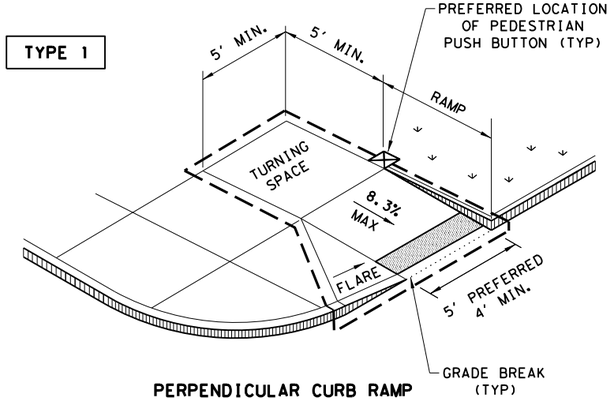
CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		40

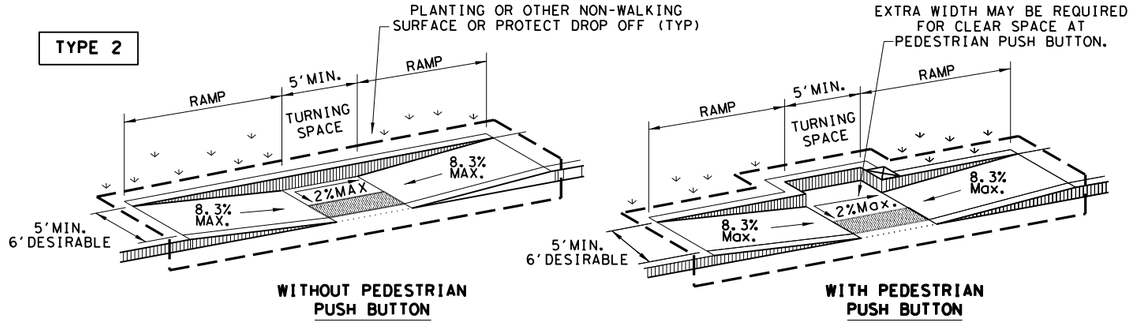
DATE: 7/31/2024 11:12:58 PM
FILE: c:\pms\bridgefarmer-pw\mansa.moton\dms33788\038401030-04-RD-902.dgn
mMoton

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

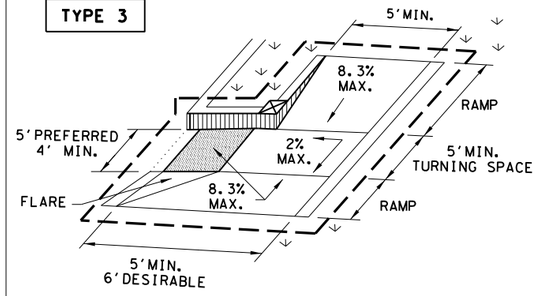


WITHOUT PEDESTRIAN PUSH BUTTON

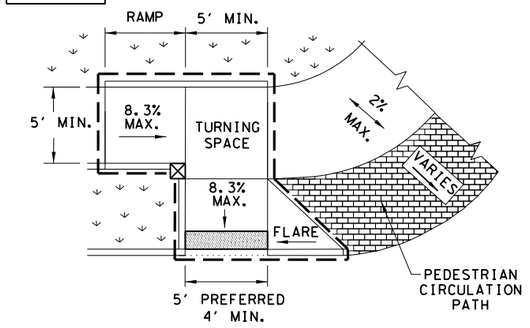
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

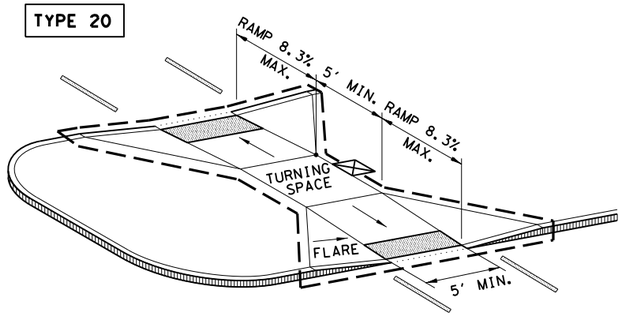


TYPE 6



COMBINATION CURB RAMPS

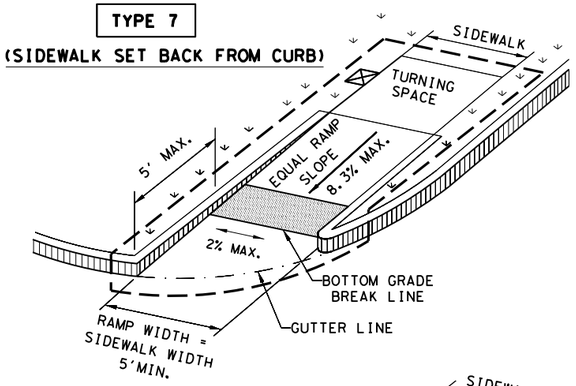
TYPE 20



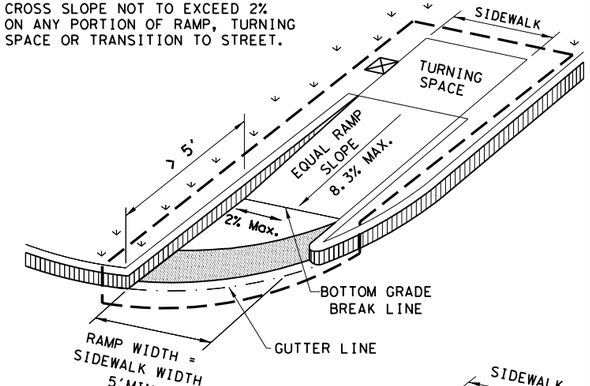
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

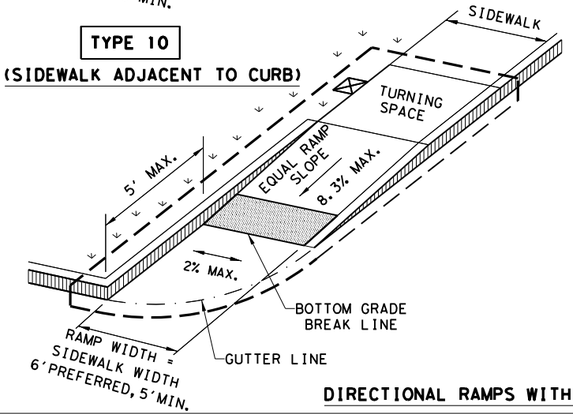


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

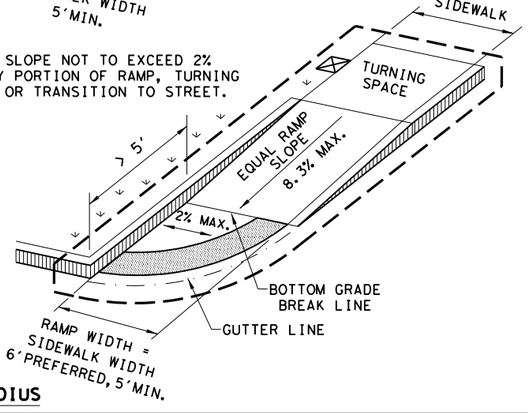


TYPE 10

(SIDEWALK ADJACENT TO CURB)

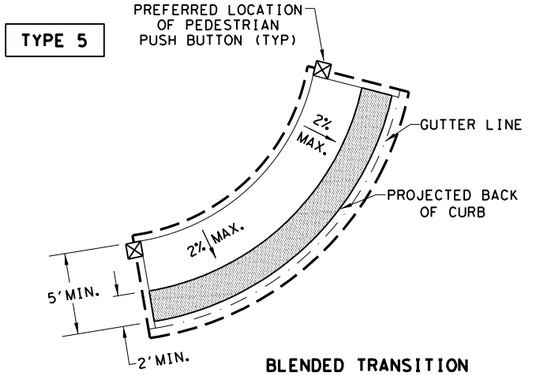


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

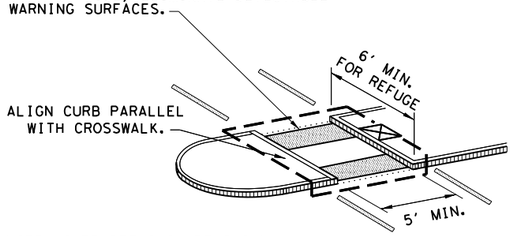
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

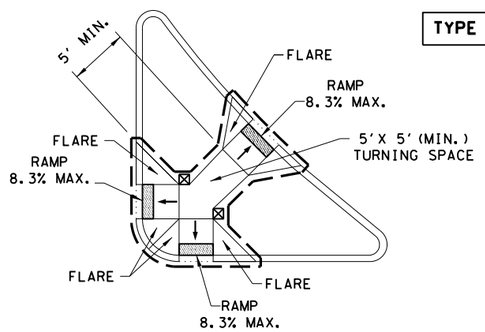
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



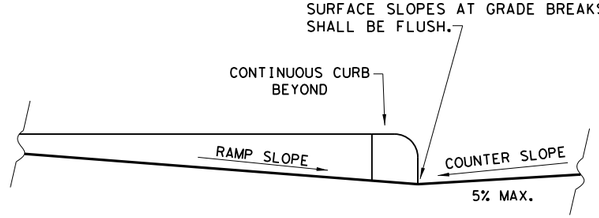
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST. ETC
REVISED 08, 2005	DIST	COUNTY		SHEET NO.
REVISED 06, 2012	BWD	COLEMAN		41
REVISED 01, 2018				

DATE: 7/31/2024
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33788\038401030-04-RD-903.dgn
mMoton 7/31/2024 7:13:06 PM

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

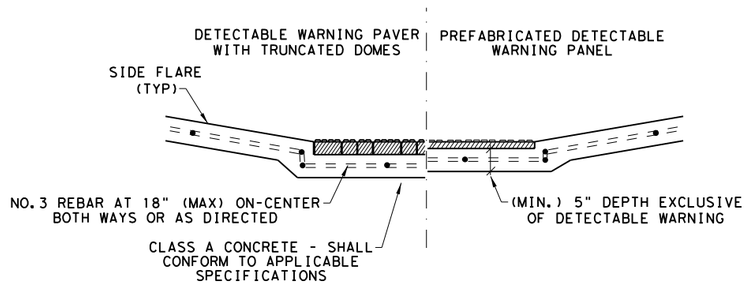
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

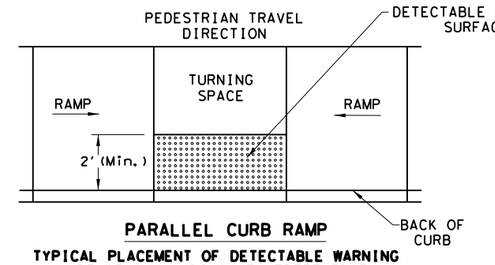
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

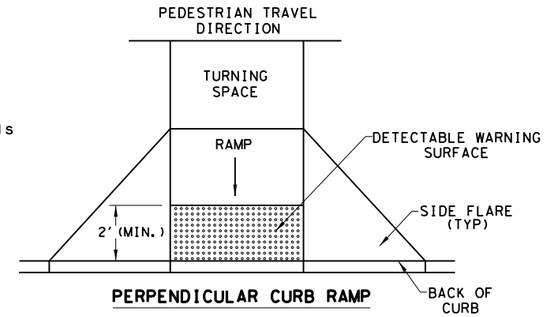


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

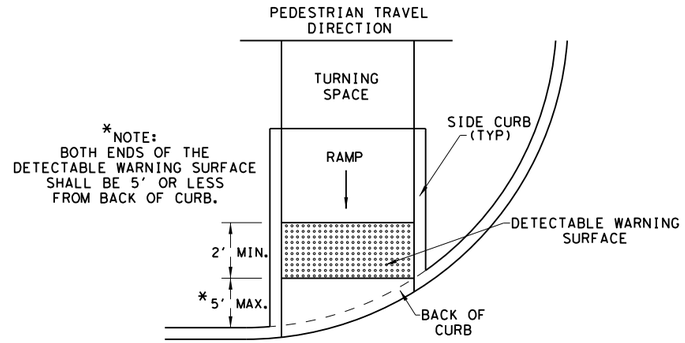
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

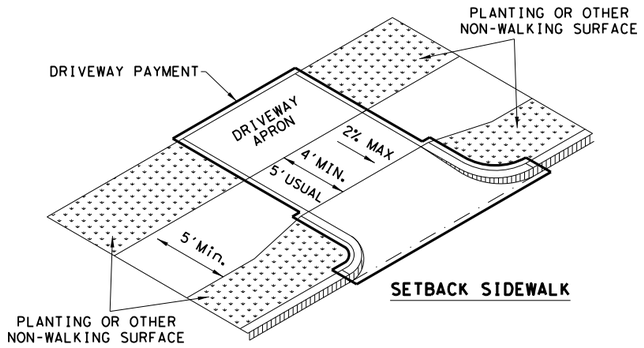
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

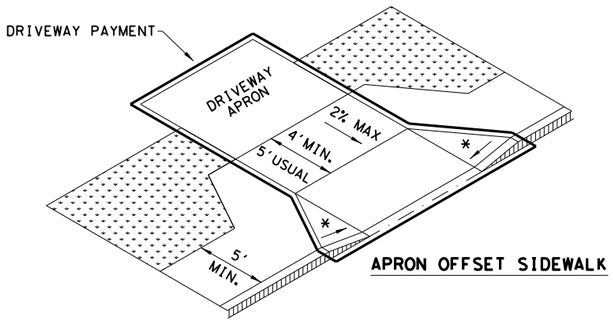
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0923	08	030, ETC		SAN SABA ST, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	BWD	COLEMAN			42

DATE: 7/31/2024 7:13:14 PM
FILE: c:\bms\bridgefarmer-pw\mansg.motion\dms33788\038401030-04-RD-904.dgn
mMotion

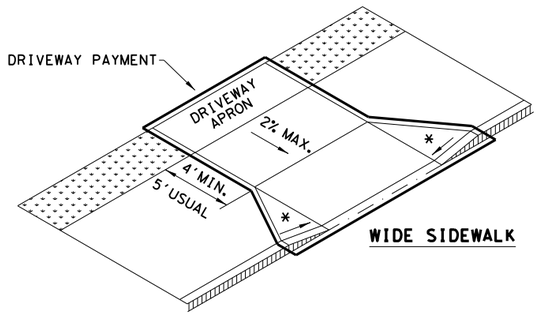
SIDEWALK TREATMENT AT DRIVEWAYS



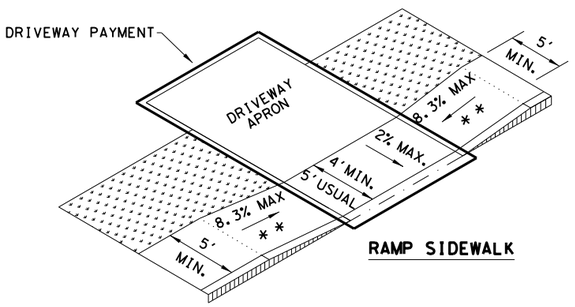
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

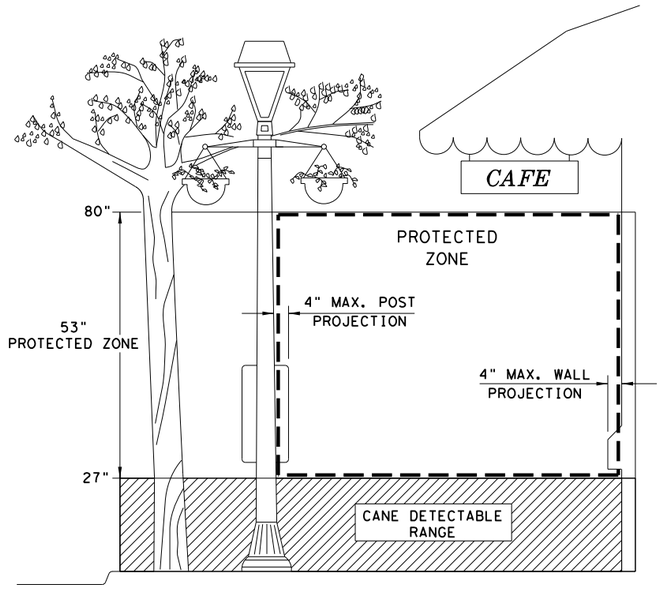


RAMP SIDEWALK

NOTES:

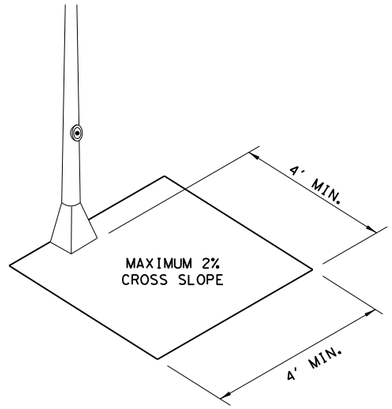
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

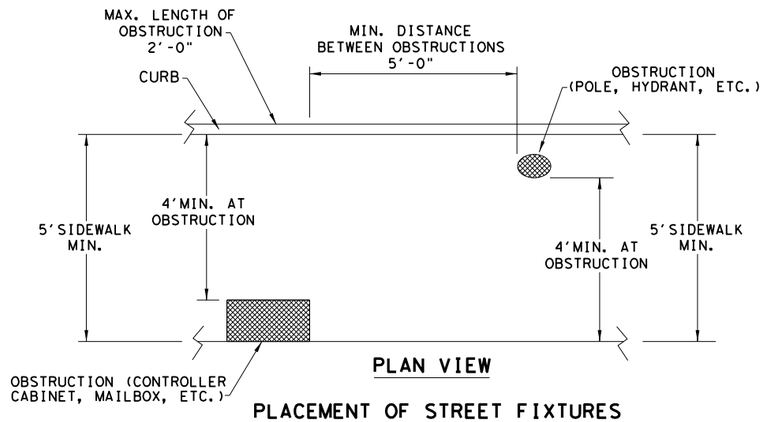


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



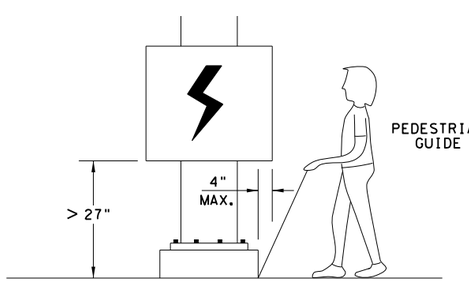
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



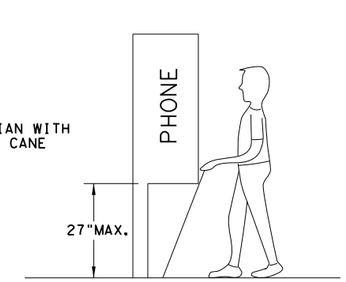
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

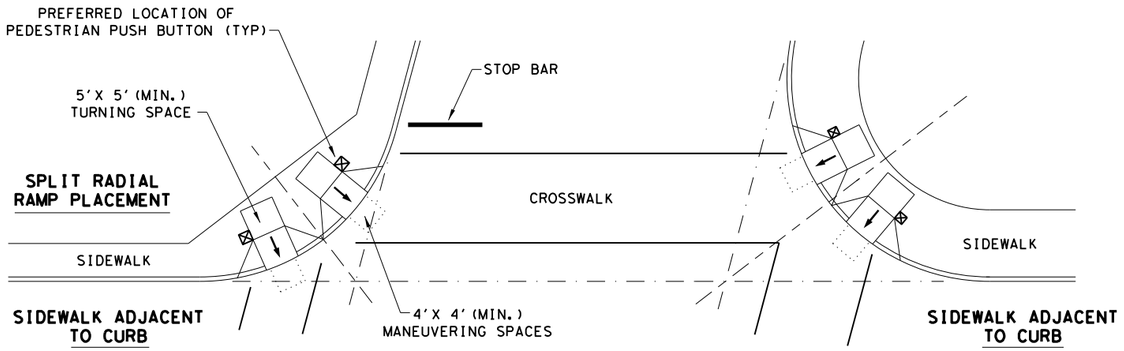
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		43

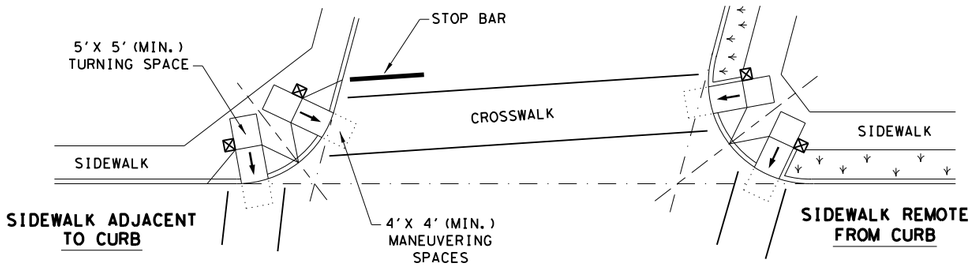
DATE: 7/31/2024 7:13:24 PM
FILE: c:\bms\bridgefarmer-pw\mansg.moton\dms33788\038401030-04-RD-905.dgn
mMoton

TYPICAL CROSSING LAYOUTS

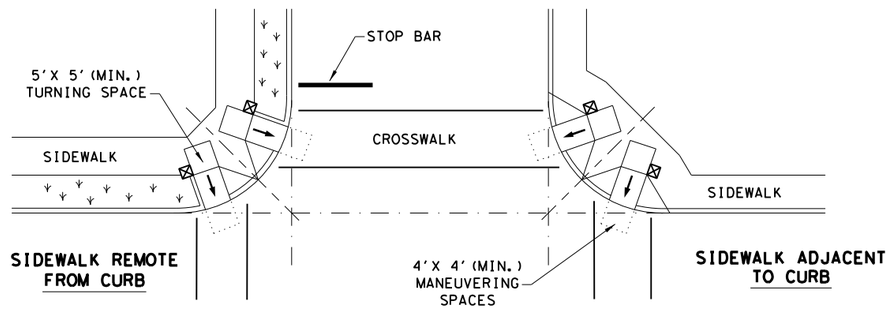
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



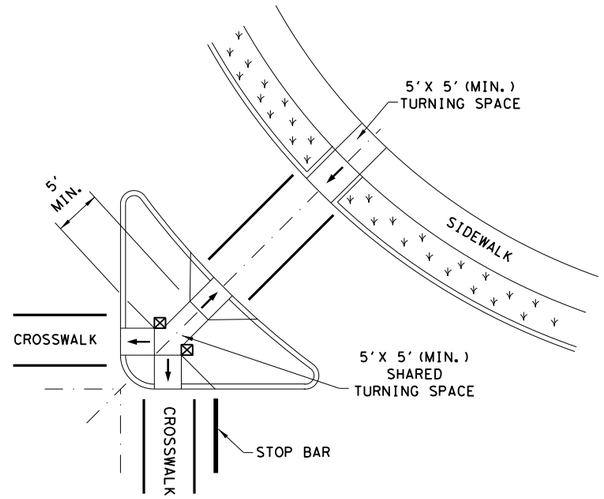
SKEWED INTERSECTION WITH "LARGE" RADIUS



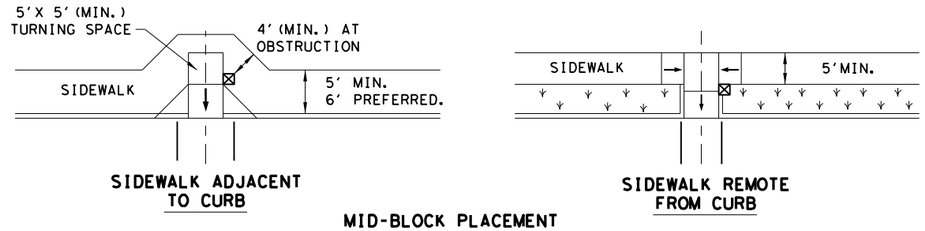
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

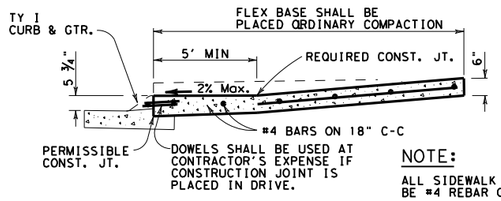
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	BWD	COLEMAN		44	

ROADWAY	STATION	OFFSET RT/LT	WIDTH	DEPTH (MEASURED FROM EDGE OF PAVEMENT)	AREA (SY)
SAN SABA ST	10+69.71	RT	20	9	33
SAN SABA ST	10+85.91	LT	26	15	44
LLANO ST	10+78.51	LT	14	10	16

NOTE:

ALL SIDEWALK WITHIN THE W PORTION OF DRIVE SHALL BE A MINIMUM OF 5' WIDE, 6" DEPTH AND MAINTAIN 1/4 " SLOPE PER FT.



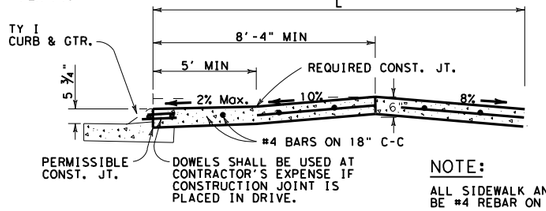
NOTE:

ALL SIDEWALK AND DRIVE REINFORCING SHALL BE #4 REBAR ON 18" CENTERS.

TYPICAL PROPOSED CONC DRIVE CUT SECTION
N.T.S.

NOTE:

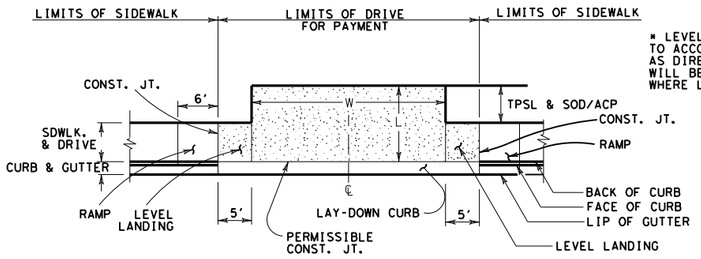
ALL SIDEWALK WITHIN THE W PORTION OF DRIVE SHALL BE A MINIMUM OF 5' WIDE, 6" DEPTH AND MAINTAIN 1/4 " SLOPE PER FT.



NOTE:

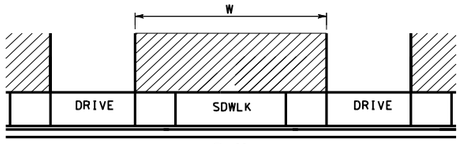
ALL SIDEWALK AND DRIVE REINFORCING SHALL BE #4 REBAR ON 18" CENTERS.

TYPICAL PROPOSED CONC DRIVE FILL SECTION
N.T.S.

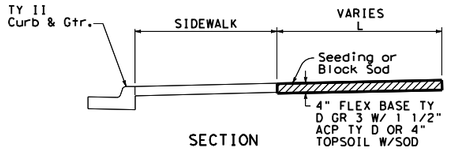


* LEVEL LANDINGS MAY BE OMITTED/SHORTENED TO ACCOMMODATE INLETS, POWER POLES, ETC. AS DIRECTED BY THE ENGINEER. LEVEL LANDING WILL BE REQUIRED AT THE TOP OF SIDEWALK RAMPS WHERE LONGITUDINAL GRADE EXCEEDS 2%.

CONCRETE DRIVE W/SIDEWALK
N.T.S.



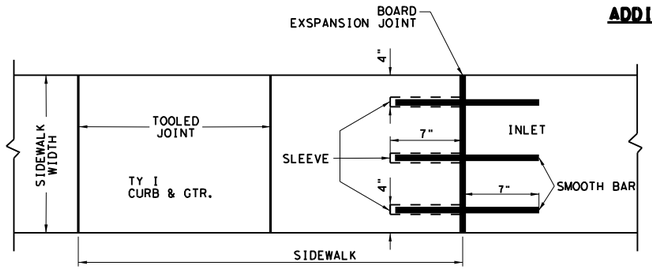
PLAN



SECTION

* SEE ROADWAY DETAIL SHEETS FOR LOCATION OF AREAS BEHIND SIDEWALK.

ADDITIONAL AREAS BACK OF SDWLK
N.T.S.



TRANVERSE JOINT DETAIL
PROPOSED SIDEWALK TO TOP OF INLET
N.T.S.

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

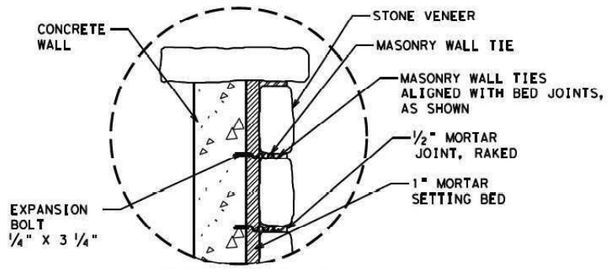
DRIVEWAY DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		45

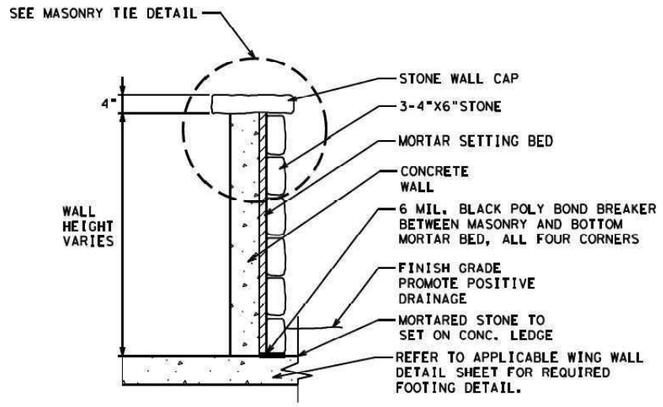
DATE: 8/2/2024 10:38:25 AM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337881\03840130-DRIVEWAY DETAILS.dgn

DW: MRM | CK: CK1 | DW: DW | CK: CK2



MASONRY TIE DETAIL

NTS



SECTION FOR Ⓑ - Ⓑ

NTS

1. CONTRACTOR IS TO SALVAGE HISTORIC STONE AND REPLICATE PLACEMENT OF EXISITNG HISTORIC STONE ON THE FACADE OF CONCRETE WINGWALL LOCATIONS. MORTAR MATERIAL AND JOINT TYPE ARE TO REPLICATE THE EXISTING HISTORIC WALLS. WHEN DEMOLISHING OLD BRIDGE STRUCTURES SALVAGE ROCK. BRAZOS ST. STRUCTURE HAS INTERIOR WALLS WHERE STONE SHALL BE SALVAGED. ANY UNUSED STONE SHALL BE PALLETIZED AND MADE AVAILABLE TO THE CITY OF COLEMAN FOR USE ON OTHER PORTIONS OF THE DITCH
2. EXISTING STONES MAY BE MODIFIED ONLY IF NECESSARY BY CUTTING AND HAMMERING EDGES. KEEP MODIFICATIONS OF EXISTING STONE TO A MINIMUM.
3. FOR WINGWALLS, KEEP EXISTING STONE VISIBLE ABOVE FINISH GRADE. NEW CONCRETE HEADWALL NOT TO BE VISIBLE. NEW HEADWALL TO BE COVERED WITH SALVAGED STONE FROM SITE.
4. REINFORCING STEEL IS CONSIDERED SUBSIDIARY TO STONE MASONRY AND WILL NOT BE PAID FOR SEPARATELY. PROVIDE ¾" BED JOINTS ON FACE OF MASONRY WALL. MATCH HISTORIC MORTAR AND JOINT TYPE AT STONE WALL JOINTS. SEE PHOTO FOR LOCATION OF SALVAGED STONES.
5. WALL TIES SHALL BE 22 GAUGE, GALV. CORRUGATED STEEL, SECURED WITH HILTI EXPANSION ANCHOR BOLT KB 3¼ X 3¼ SS 304, OR APPROVED EQUAL INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. PLACE WALL TIES AT EVERY SECOND HORIZONTAL BED JOINT, IN THE CENTER OF THE WALL FACE, AS SHOWN.
6. ADJUST HEIGHT OF MASONRY TO ENSURE THAT THE TOP OF WALL MASONRY IS IN HORIZONTAL ALIGNMENT.
7. PLACE BLACK POLY SHEETING (6 MIL) AS A BOND BREAKER AT BOTTOM CORNERS OF MASONRY. PLACE SHEETING BETWEEN MASONRY LEDGE AND THE BOTTOM MORTAR BED, EXTENDING 12" FROM CORNERS.
8. MORTAR, GROUT, REINFORCING STEEL, AND TIES ARE CONSIDERED SUBSIDIARY TO STONE MASONRY AND WILL NOT BE PAID FOR SEPARATELY.
9. APPROVED EQUAL MASONRY SECURING DEVICES OR SYSTEMS MUST BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION.
10. CONTRACTOR TO PROVIDE A 3' X 3' MOCK-UP OF STONE WALL TO INCLUDE PATTERN LAYOUT AND RAKED JOINT FOR APPROVAL BY THE TxDOT DISTRICT ENVIRONMENTAL PLANNER PRIOR TO PROCEEDING WITH MASONRY
11. SEE PLAN AND PROFILE SHEETS (BRAZOS ST. AND SAN SABA ST.) FOR LOCATIONS AND LIMITS OF ROCK COVERED WINGWALLS.

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

MISCELLANEOUS DETAILS

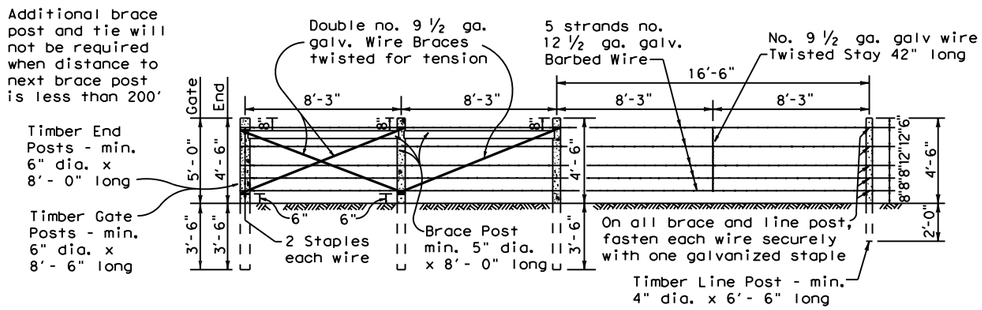
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		46

DATE: 8/1/2024 3:37:19 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms337921038401030-05-WL-301.dgn

DW: DS | CK: CK1 | DW: DW | CK: CK2

DATE: $DATE$
FILE: $FILE$
$TIME$
$USER$

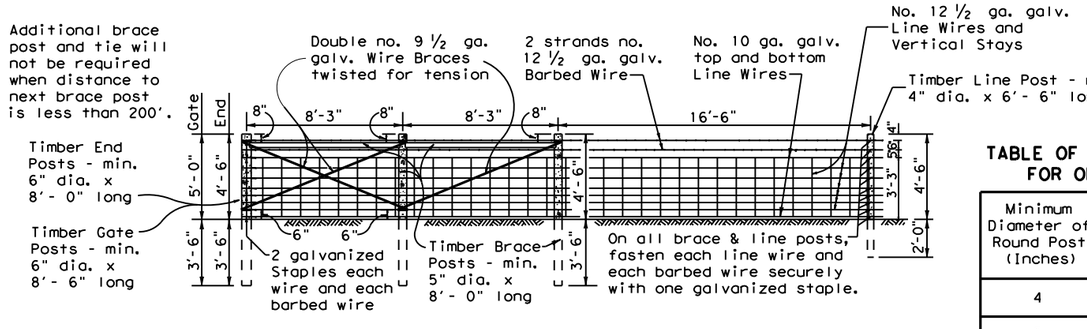


SECTION GALVANIZED BARBED WIRE FENCE WITH WOOD POSTS

Bracing Detail Used at Ends and Gates

TYPE "A" FENCE

(See General Note 6)



SECTION GALVANIZED WOVEN WIRE FENCE WITH WOOD POSTS

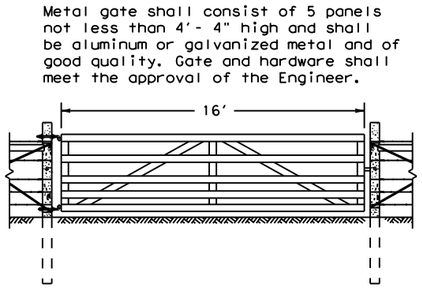
Bracing Detail Used at Ends and Gates

TYPE "B" FENCE

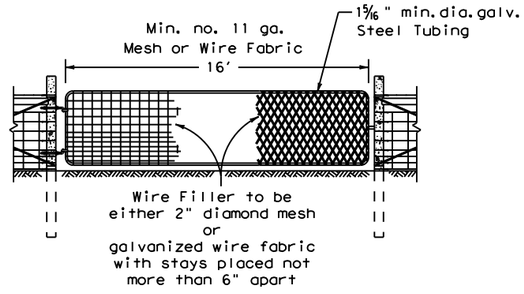
(See General Note 6)

TABLE OF EQUIVALENT SIZES FOR OPTIONAL SHAPE

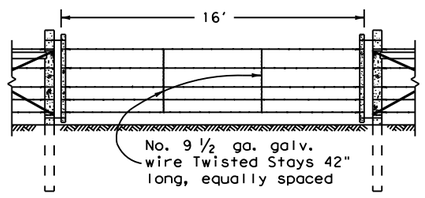
Minimum Diameter of Round Post (Inches)	Minimum Equivalent Dimension for Each Side of Square Post (Inches)
4	3 ½
5	4 ½
6	5 ¼



DETAIL TYPE 1 GATE



DETAIL TYPE 2 GATE

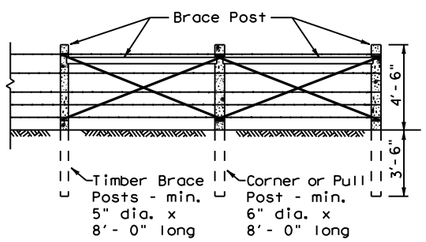


DETAIL TYPE 3 GATE

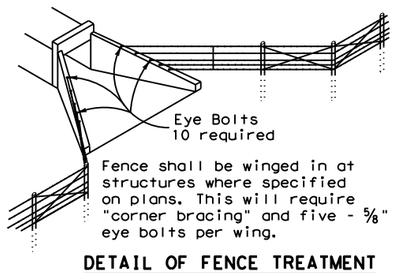
GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide 2" clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latches of the spring, fork or chain type. All latches shall be suitable for the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. If rock is encountered at a depth less than the embedded depth required, a 15" or larger diameter hole shall be drilled for the post and the post shall be set in concrete. If rock is encountered at a depth of 1'- 6" or more below the ground surface, the hole shall be drilled to the required depth. If rock is encountered at a depth less than 1'- 6" below the ground surface, the holes shall be drilled a minimum of 2'- 0" into the rock or to the depth whichever is the lesser depth.
6. Barbed Wire shall be in accordance with ASTM A 121 (Class 1) Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

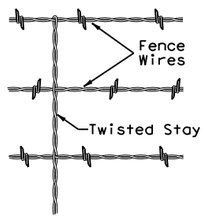
   Woven Wire Fence (Type B) shall be in accordance with ASTM A 116 (Class 1) No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
7. The location of gates and corner posts will be as indicated elsewhere on these plans.
8. Square wood posts may be used in lieu of round posts provided minimum equivalent size requirements, as shown are met. All wood posts shall be in accordance with Item 552, "Wire Fence."



CORNER OR PULL POST ASSEMBLY

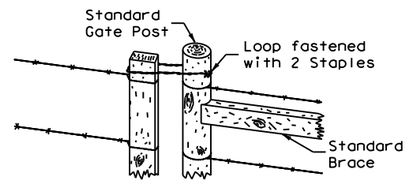


DETAIL OF FENCE TREATMENT AT STRUCTURES



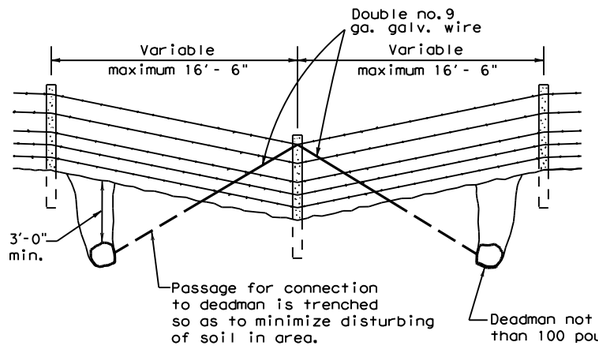
DETAIL OF STAY

(Barbed wire fence)



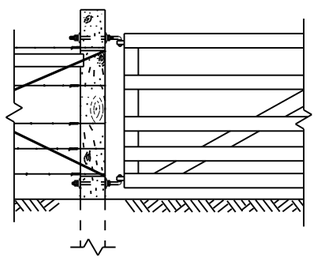
Loop to be made from two strands twisted no. 9 ½ ga. galv. smooth wire, and to be securely fastened to gate post with two galv. staples.

DETAIL FASTENER TYPE 3 GATE

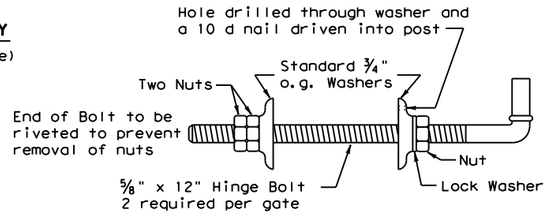


DETAIL OF FENCE SAG

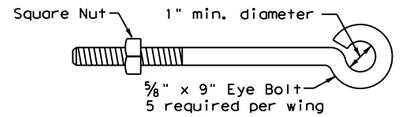
(Single Line Connection)



DETAIL SHOWING INSTALLATION OF HINGES OF TYPE 1 & 2 GATE



DETAIL OF GATE HINGE BOLT ASSEMBLY



DETAIL OF EYE BOLT

Texas Department of Transportation

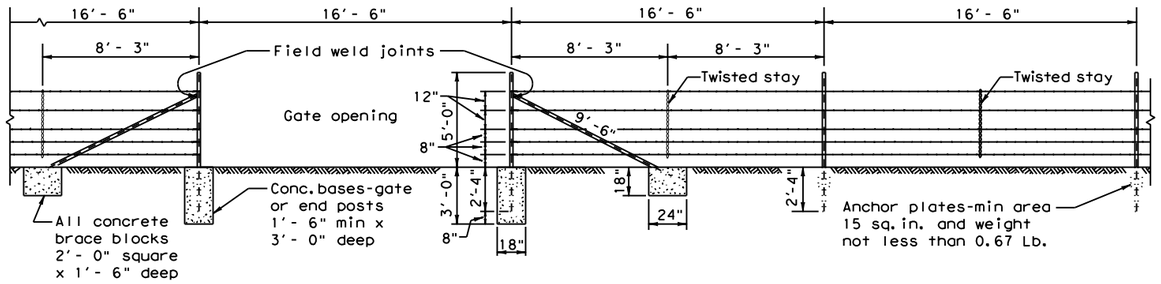
Design Division Standard

BARBED WIRE AND WOVEN WIRE FENCE (WOOD POSTS)

WF(1)-10

FILE: wf110.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		46A

DATE: $DATE$
FILE: $FILE$
$TIME$
$USER$



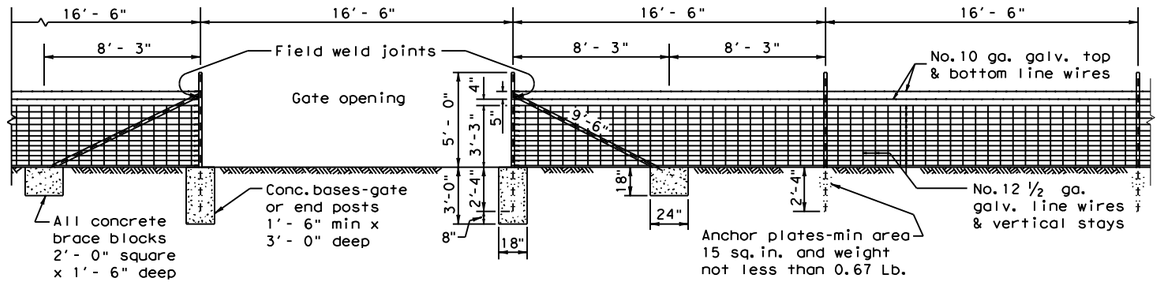
SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

TYPE "C" FENCE

(See General Note 8)

Note:
For Steel pipe and T-Post requirements. (See General Notes 6 & 7)

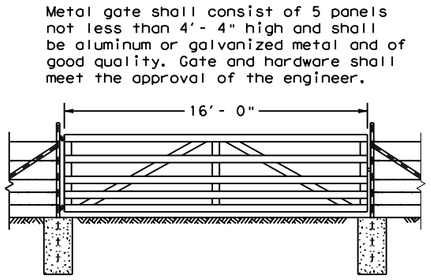


SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS

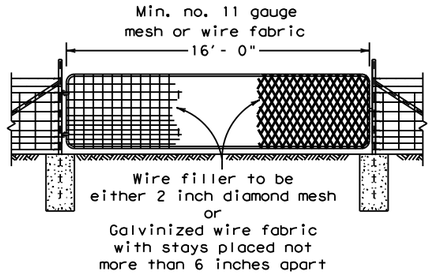
BRACING DETAIL USED AT ENDS AND GATES

TYPE "D" FENCE

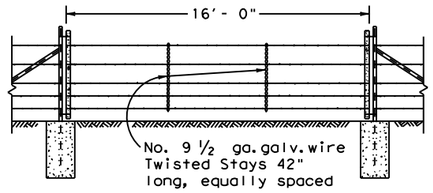
(See General Note 8)



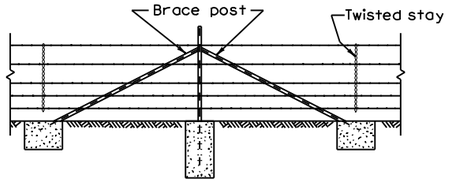
DETAIL TYPE 1 GATE



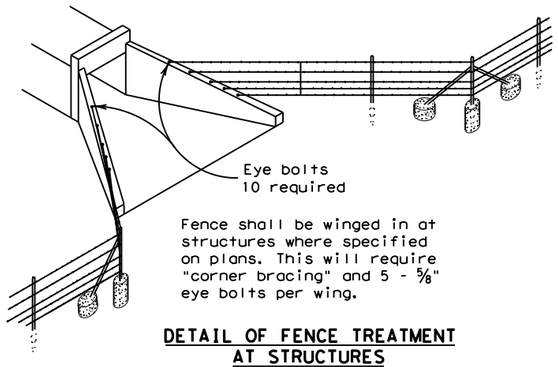
DETAIL TYPE 2 GATE



DETAIL TYPE 3 GATE

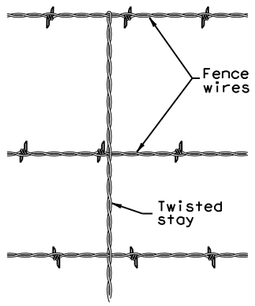


CORNER OR PULL POST ASSEMBLY



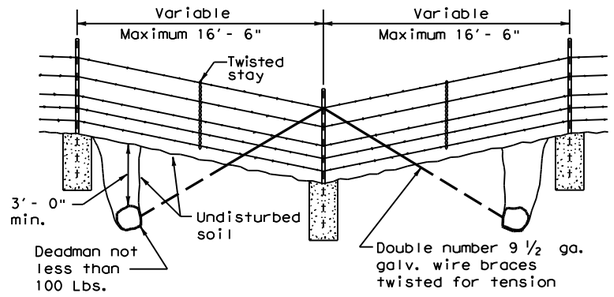
Fence shall be winged in at structures where specified on plans. This will require "corner bracing" and 5 - ⅝" eye bolts per wing.

DETAIL OF FENCE TREATMENT AT STRUCTURES

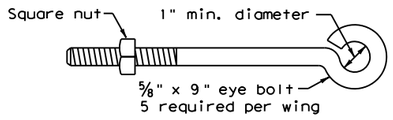


DETAIL OF STAY

(Barbed Wire Fence)



DETAIL OF FENCE SAG



DETAIL OF EYE BOLT

GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
6. Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1¼" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
7. If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6'-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These Items shall be in accordance with Item 552, "Wire Fence."
8. Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

   Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
9. The location of gates and corner posts will be as indicated elsewhere in these plans.

Texas Department of Transportation

Design Division Standard

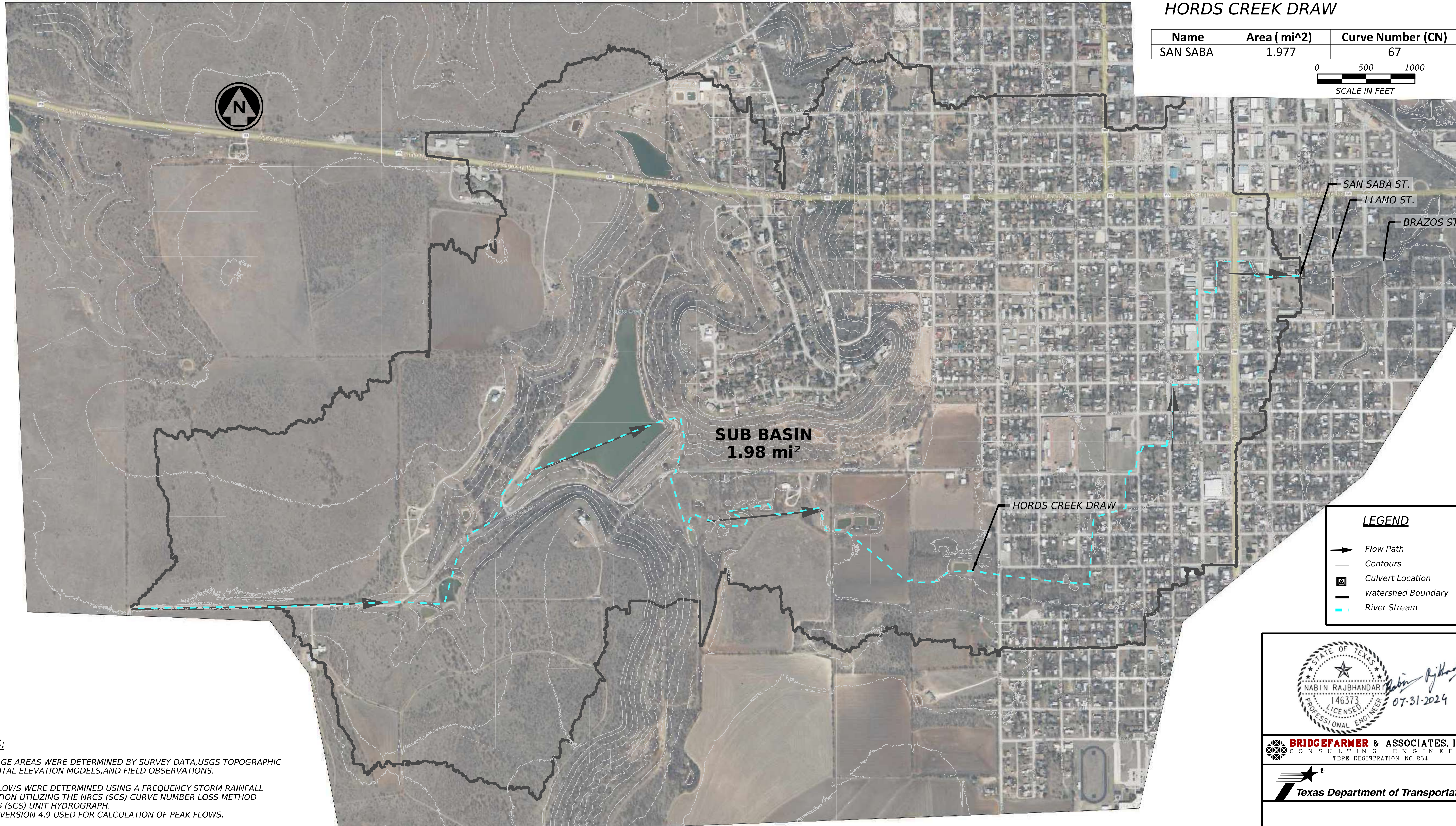
BARBED WIRE AND WOVEN WIRE FENCE (STEEL POSTS)

WF(2)-10

FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		46B

HORDS CREEK DRAW

Name	Area (mi^2)	Curve Number (CN)
SAN SABA	1.977	67



NOTES:

1. DRAINAGE AREAS WERE DETERMINED BY SURVEY DATA,USGS TOPOGRAPHIC MAPS,DIGITAL ELEVATION MODELS,AND FIELD OBSERVATIONS.

2. PEAK FLOWS WERE DETERMINED USING A FREQUENCY STORM RAINFALL DISTRIBUTION UTILIZING THE NRCS (SCS) CURVE NUMBER LOSS METHOD AND NRCS (SCS) UNIT HYDROGRAPH.
HEC-HMS VERSION 4.9 USED FOR CALCULATION OF PEAK FLOWS.

3. THE NATURAL GROUND, EXISTING AND PROPOSED CULVERT CONDITIONS WERE MODELLED IN HEC-RAS USING THE ENERGY (STANDARD STEP) METHOD. THE REACH BOUNDARY CONDITION OF NORMAL DEPTH OF 0.01 FT/FT WAS ASSUMED AT THE FURTHEST DOWNSTREAM CROSS-SECTION (ESTIMATED FROM THE SLOPE OF THE CHANNEL).

4. THE 2023 ATLAS 14 DEPTHS WERE USED TO TABULATE RAINFALL AMOUNT

5. NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) WAS USED.

6.THE SITE LIES WITHIN THE 'ZONE A' FLOOD HAZARD AREA AS SHOWN ON FEMA FLOOD INSURANCE MAP NO. 480129 0002 B EFFECTIVE ON 04/01/1981

DATE: 7/31/2024 4:02:17 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms33796\038401030-06-DN-001.dgn

DN: NR CK: JWL DW: NR CK: JWL

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07-31-2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HORDS CREEK DRAW AT
SAN SABA
DRAINAGE AREA MAP

SHEET 3 OF 3

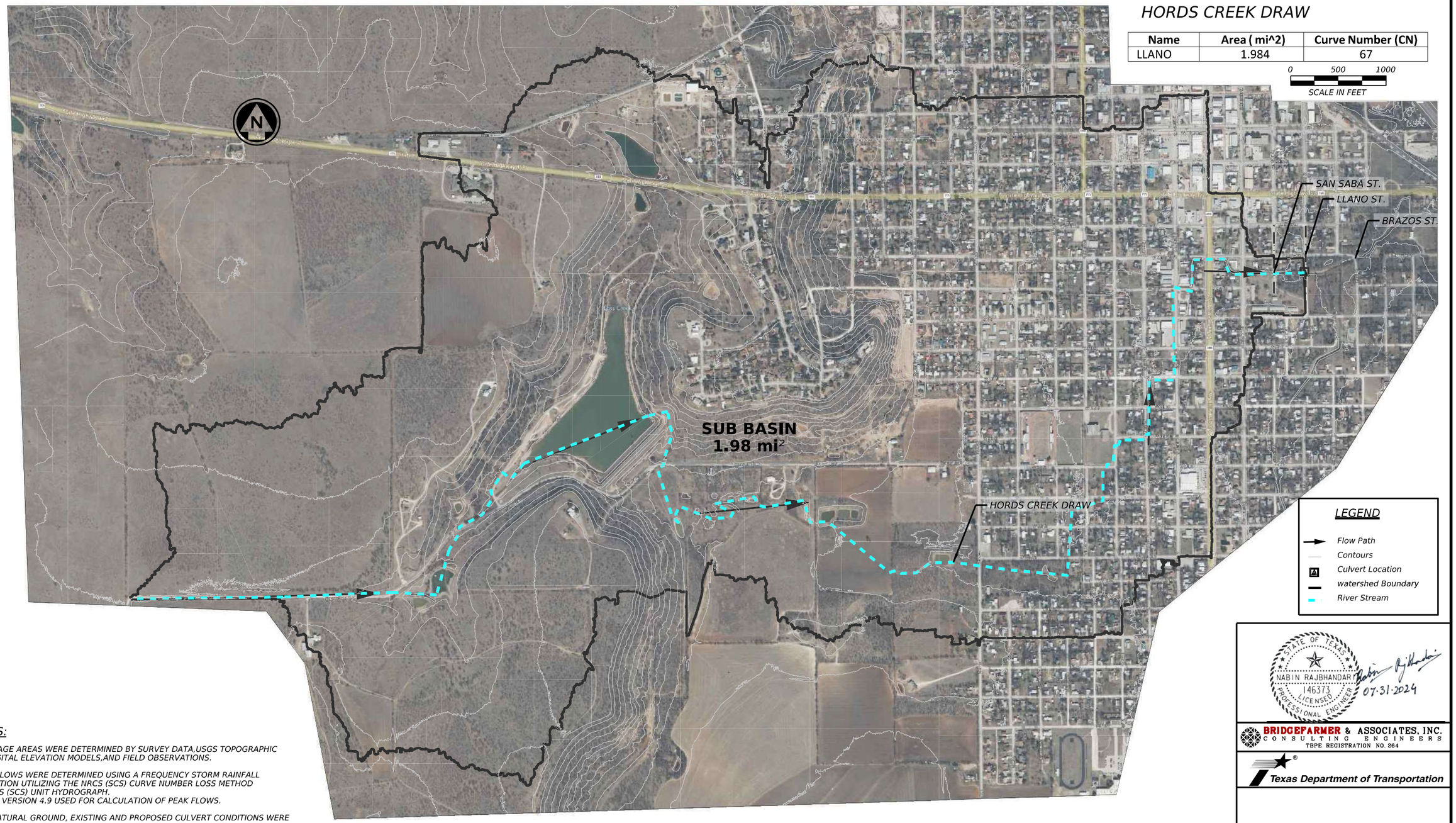
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		47

JWL CK
NR DW
JWL CK
NR DW

HORDS CREEK DRAW

Name	Area (mi^2)	Curve Number (CN)
LLANO	1.984	67

0 500 1000
SCALE IN FEET



LEGEND

- Flow Path
- Contours
- Culvert Location
- watershed Boundary
- River Stream

NOTES:

1. DRAINAGE AREAS WERE DETERMINED BY SURVEY DATA,USGS TOPOGRAPHIC MAPS,DIGITAL ELEVATION MODELS,AND FIELD OBSERVATIONS.

2. PEAK FLOWS WERE DETERMINED USING A FREQUENCY STORM RAINFALL DISTRIBUTION UTILIZING THE NRCS (SCS) CURVE NUMBER LOSS METHOD AND NRCS (SCS) UNIT HYDROGRAPH.
HEC-HMS VERSION 4.9 USED FOR CALCULATION OF PEAK FLOWS.

3. THE NATURAL GROUND, EXISTING AND PROPOSED CULVERT CONDITIONS WERE MODELLED IN HEC-RAS USING THE ENERGY (STANDARD STEP) METHOD. THE REACH BOUNDARY CONDITION OF NORMAL DEPTH OF 0.01 FT/FT WAS ASSUMED AT THE FURTHEST DOWNSTREAM CROSS-SECTION (ESTIMATED FROM THE SLOPE OF THE CHANNEL).

4. THE 2023 ATLAS 14 DEPTHS WERE USED TO TABULATE RAINFALL AMOUNT

5. NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) WAS USED.

6.THE SITE LIES WITHIN THE 'ZONE A' FLOOD HAZARD AREA AS SHOWN ON FEMA FLOOD INSURANCE MAP NO. 480129 0002 B EFFECTIVE ON 04/01/1981

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HORDS CREEK DRAW AT LLANO
DRAINAGE AREA MAP

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		48

DATE: 7/31/2024 4:02:46 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms33796\038401030-06-DN-002.dgn

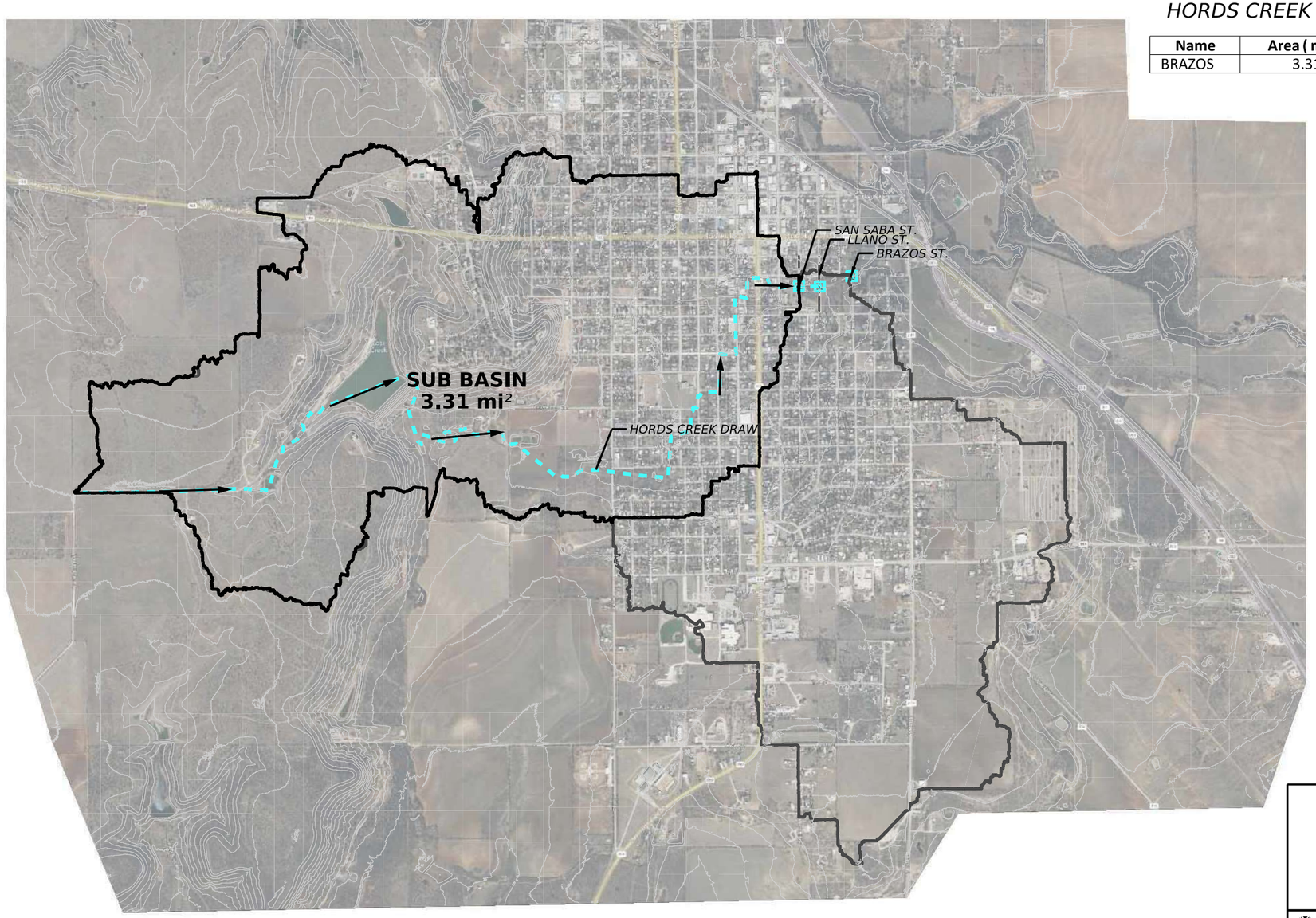
CK: JWL
DW: NR
CK: JWL
DW: NR

DATE: 7/31/2024 4:03:04 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961028401030-06-DN-003.dgn

HORDS CREEK DRAW

Name	Area (mi^2)	Curve Number (CN)
BRAZOS	3.314	69

0 1000 2000
SCALE IN FEET



LEGEND
- Flow Path
- Contours
- Culvert Location
- watershed Boundary
- River Stream

NOTES:

1. DRAINAGE AREAS WERE DETERMINED BY SURVEY DATA,USGS TOPOGRAPHIC MAPS,DIGITAL ELEVATION MODELS,AND FIELD OBSERVATIONS.

2. PEAK FLOWS WERE DETERMINED USING A FREQUENCY STORM RAINFALL DISTRIBUTION UTILIZING THE NRCS (SCS) CURVE NUMBER LOSS METHOD AND NRCS (SCS) UNIT HYDROGRAPH.
HEC-HMS VERSION 4.9 USED FOR CALCULATION OF PEAK FLOWS.

3. THE NATURAL GROUND, EXISTING AND PROPOSED CULVERT CONDITIONS WERE MODELLED IN HEC-RAS USING THE ENERGY (STANDARD STEP) METHOD. THE REACH BOUNDARY CONDITION OF NORMAL DEPTH OF 0.01 FT/FT WAS ASSUMED AT THE FURTHEST DOWNSTREAM CROSS-SECTION (ESTIMATED FROM THE SLOPE OF THE CHANNEL).

4. THE 2023 ATLAS 14 DEPTHS WERE USED TO TABULATE RAINFALL AMOUNT

5. NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) WAS USED.

6.THE SITE LIES WITHIN THE 'ZONE A' FLOOD HAZARD AREA AS SHOWN ON FEMA FLOOD INSURANCE MAP NO. 480129 0002 B EFFECTIVE ON 04/01/1981

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07-31-2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

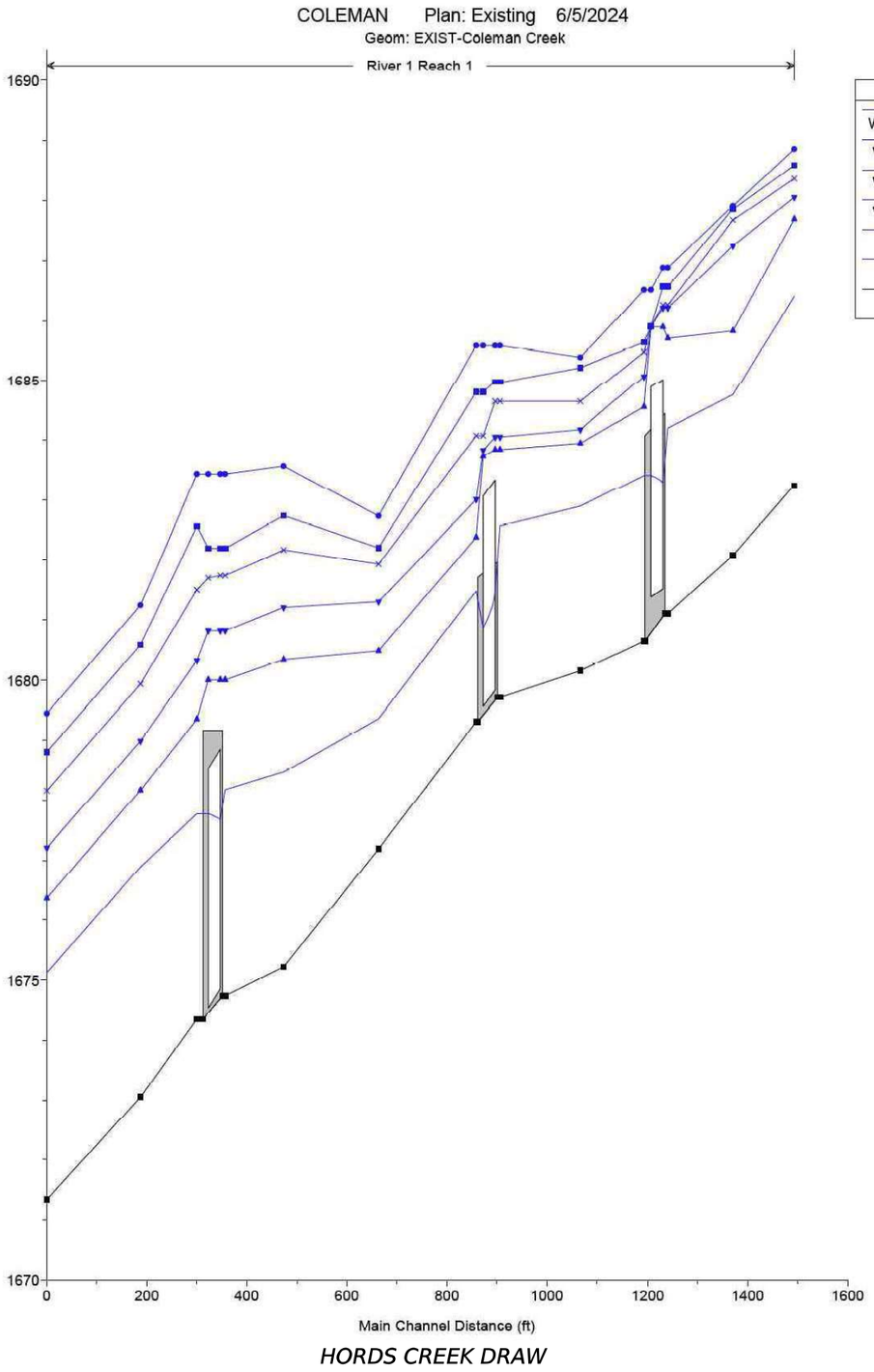
Texas Department of Transportation

HORDS CREEK DRAW AT BRAZOS DRAINAGE AREA MAP

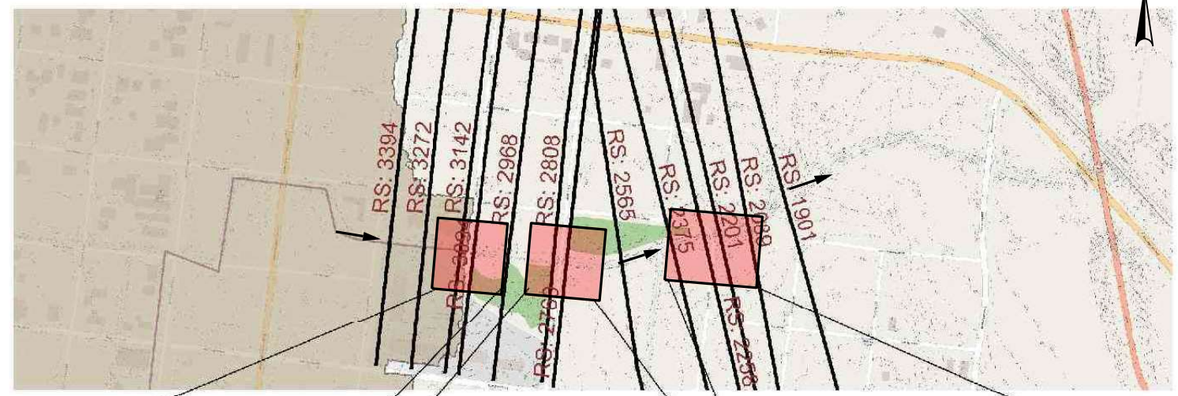
SHEET 1 OF 3

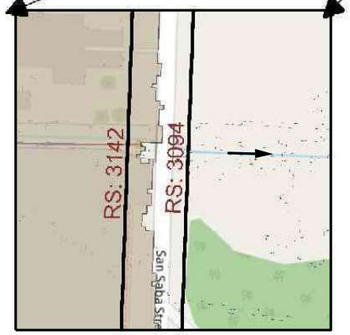
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		49

CK JWL
DN NR
CK JWL
DN NR

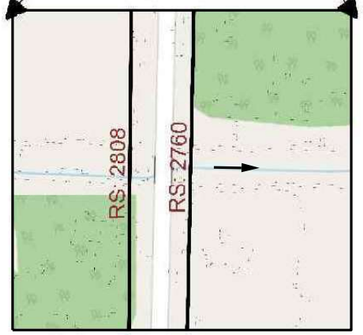


HORDS CREEK DRAW

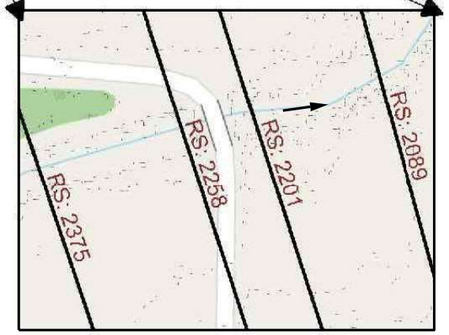




SAN SABA



LLANO



BRAZOS

N.T.S

NOTES:

1. THE EXISTING AND PROPOSED WATER SURFACE ELEVATIONS WERE COMPUTED USING HEC-RAS 6.1.0
2. A DESIGN STORM OF 2 YEARS AND A CHECK STORM OF 100 YEARS WAS USED

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HYDRAULIC CALCULATIONS HORDS CREEK DRAW EXISTING PROFILE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		50

DATE: 7/31/2024 4:03:31 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961038401030-06-DN-101.dgn

HEC-RAS Plan: EXISTING River: River 1 Reach: Reach 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	3394	2YR	278.50	1683.24	1686.41	1685.75	1686.81	0.005715	5.09	54.67	25.89	0.62
Reach 1	3394	5YR	545.00	1683.24	1687.69	1687.29	1687.87	0.002777	3.94	222.68	384.62	0.45
Reach 1	3394	10YR	781.60	1683.24	1688.06	1687.58	1688.21	0.002273	3.92	368.71	531.11	0.41
Reach 1	3394	25YR	1134.30	1683.24	1688.37	1687.89	1688.54	0.002510	4.42	479.57	605.80	0.44
Reach 1	3394	50YR	1422.60	1683.24	1688.59	1688.02	1688.79	0.002831	4.91	566.83	720.33	0.47
Reach 1	3394	100YR	1739.80	1683.24	1688.86	1688.05	1688.97	0.001858	4.19	984.65	868.72	0.39
Reach 1	3272	2YR	278.50	1682.08	1684.75	1684.75	1685.66	0.015715	7.67	36.30	19.82	1.00
Reach 1	3272	5YR	545.00	1682.08	1685.83	1685.83	1687.11	0.014645	9.06	60.17	26.45	1.01
Reach 1	3272	10YR	781.60	1682.08	1687.25	1687.25	1687.78	0.004780	6.47	205.10	423.99	0.61
Reach 1	3272	25YR	1134.30	1682.08	1687.68	1687.68	1688.12	0.004260	6.59	359.87	657.55	0.59
Reach 1	3272	50YR	1422.60	1682.08	1687.86	1687.86	1688.33	0.004603	7.07	440.02	747.59	0.62
Reach 1	3272	100YR	1739.80	1682.08	1687.91	1687.91	1688.54	0.006213	8.29	464.65	763.96	0.72
Reach 1	3142	2YR	278.50	1681.10	1684.20	1682.71	1684.37	0.001824	3.35	83.05	28.95	0.35
Reach 1	3142	5YR	545.00	1681.10	1685.71	1683.54	1685.96	0.002649	4.03	135.38	285.70	0.42
Reach 1	3142	10YR	781.60	1681.10	1686.21	1684.15	1686.55	0.003822	4.68	186.25	498.95	0.51
Reach 1	3142	25YR	1134.30	1681.10	1686.26	1685.28	1686.93	0.007717	6.64	195.30	524.95	0.72
Reach 1	3142	50YR	1422.60	1681.10	1686.57	1686.57	1687.26	0.007387	6.97	270.09	659.68	0.72
Reach 1	3142	100YR	1739.80	1681.10	1686.88	1686.88	1687.54	0.006574	7.05	365.62	761.88	0.69
Reach 1	3129		Culvert									
Reach 1	3094	2YR	278.50	1680.64	1683.41	1682.26	1683.60	0.002408	3.56	78.17	32.20	0.40
Reach 1	3094	5YR	545.00	1680.64	1684.55	1683.04	1684.89	0.002651	4.68	116.42	150.00	0.45
Reach 1	3094	10YR	781.60	1680.64	1685.07	1683.62	1685.59	0.003406	5.83	134.07	295.44	0.52
Reach 1	3094	25YR	1134.30	1680.64	1685.47	1684.40	1686.39	0.005168	7.67	147.93	427.86	0.65
Reach 1	3094	50YR	1422.60	1680.64	1685.64	1684.93	1686.97	0.007145	9.25	153.77	503.86	0.77
Reach 1	3094	100YR	1739.80	1680.64	1686.51	1685.46	1686.62	0.001188	3.60	1029.64	745.59	0.31
Reach 1	2968	2YR	278.50	1680.15	1682.90	1682.02	1683.19	0.004019	4.35	64.07	36.76	0.52
Reach 1	2968	5YR	545.00	1680.15	1683.94	1682.92	1684.40	0.005055	5.48	105.55	166.47	0.60
Reach 1	2968	10YR	781.60	1680.15	1684.17	1683.61	1684.92	0.007454	7.04	127.43	194.46	0.74
Reach 1	2968	25YR	1134.30	1680.15	1684.64	1684.64	1685.58	0.008090	8.13	174.77	309.05	0.79
Reach 1	2968	50YR	1422.60	1680.15	1685.21	1685.21	1685.86	0.005298	7.33	322.48	460.73	0.66
Reach 1	2968	100YR	1739.80	1680.15	1685.38	1685.38	1686.14	0.006076	8.09	370.15	492.50	0.71
Reach 1	2808	2YR	278.50	1679.71	1682.57	1681.20	1682.73	0.001854	3.22	86.48	95.45	0.36
Reach 1	2808	5YR	545.00	1679.71	1683.84	1681.99	1683.96	0.001174	3.12	271.51	405.91	0.30
Reach 1	2808	10YR	781.60	1679.71	1684.05	1682.58	1684.23	0.001777	4.00	318.48	460.75	0.37
Reach 1	2808	25YR	1134.30	1679.71	1684.64	1683.33	1684.82	0.001550	4.14	460.91	600.93	0.36
Reach 1	2808	50YR	1422.60	1679.71	1684.97	1683.82	1685.17	0.001620	4.45	550.30	734.81	0.37
Reach 1	2808	100YR	1739.80	1679.71	1685.58	1684.23	1685.62	0.000434	2.51	1550.87	826.97	0.20
Reach 1	2796		Culvert									
Reach 1	2760	2YR	278.50	1679.31	1681.48	1680.80	1681.77	0.004688	4.36	63.87	32.69	0.55
Reach 1	2760	5YR	545.00	1679.31	1682.38	1681.59	1682.90	0.005264	5.80	93.96	146.30	0.61
Reach 1	2760	10YR	781.60	1679.31	1683.01	1682.13	1683.72	0.005624	6.78	115.28	287.32	0.65
Reach 1	2760	25YR	1134.30	1679.31	1684.07	1682.87	1684.15	0.001089	3.20	783.01	656.04	0.29
Reach 1	2760	50YR	1422.60	1679.31	1684.00	1683.39	1684.03	0.000461	2.34	1270.99	706.20	0.20
Reach 1	2760	100YR	1739.80	1679.31	1685.59	1683.83	1685.61	0.000240	1.89	1876.96	817.09	0.15
Reach 1	2565	2YR	278.50	1677.19	1679.36	1679.36	1680.11	0.015650	6.95	40.09	56.76	0.99
Reach 1	2565	5YR	545.00	1677.19	1680.48	1680.26	1681.37	0.010738	7.55	72.18	242.42	0.87
Reach 1	2565	10YR	781.60	1677.19	1681.30	1680.89	1682.27	0.009079	7.89	99.00	319.41	0.83
Reach 1	2565	25YR	1134.30	1677.19	1681.93	1681.67	1683.29	0.009700	9.34	121.38	450.42	0.89
Reach 1	2565	50YR	1422.60	1677.19	1682.20	1682.20	1684.04	0.011076	10.87	130.86	544.77	0.99
Reach 1	2565	100YR	1739.80	1677.19	1682.73	1682.73	1684.84	0.011402	11.64	149.47	716.10	1.00
Reach 1	2375	2YR	278.50	1675.22	1678.47	1677.25	1678.66	0.002234	3.46	80.52	34.07	0.40
Reach 1	2375	5YR	545.00	1675.22	1680.33	1678.08	1680.54	0.001571	3.60	151.24	45.91	0.35
Reach 1	2375	10YR	781.60	1675.22	1681.20	1678.66	1681.44	0.001613	3.95	207.07	105.24	0.36
Reach 1	2375	25YR	1134.30	1675.22	1682.17	1679.41	1682.42	0.001327	4.19	348.88	498.87	0.34
Reach 1	2375	50YR	1422.60	1675.22	1682.74	1679.99	1682.90	0.001175	4.26	407.06	627.55	0.33
Reach 1	2375	100YR	1739.80	1675.22	1683.56	1680.74	1683.63	0.000388	2.70	1412.09	738.62	0.19
Reach 1	2258	2YR	506.80	1674.74	1678.18	1676.62	1678.41	0.002024	3.84	131.90	41.24	0.38
Reach 1	2258	5YR	969.00	1674.74	1680.00	1677.54	1680.33	0.001743	4.60	223.05	92.87	0.37
Reach 1	2258	10YR	1373.90	1674.74	1680.82	1678.25	1681.22	0.001855	5.27	319.54	194.90	0.39
Reach 1	2258	25YR	1972.20	1674.74	1681.74	1679.18	1682.21	0.001900	5.90	458.92	466.29	0.41
Reach 1	2258	50YR	2458.50	1674.74	1682.20	1680.40	1682.75	0.002151	6.56	536.81	545.35	0.44
Reach 1	2258	100YR	2990.80	1674.74	1683.44	1681.12	1683.56	0.000619	3.92	1700.03	706.02	0.24
Reach 1	2240		Culvert									

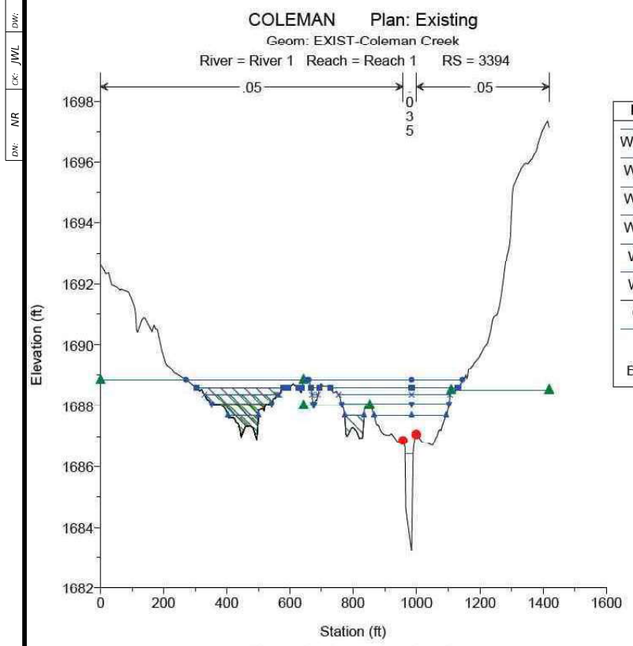
HEC-RAS Plan: EXISTING River: River 1 Reach: Reach 1 (Continued)

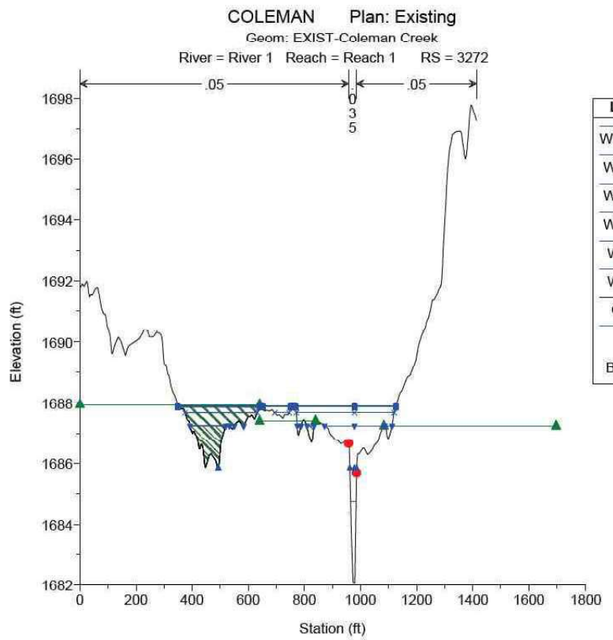
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	2201	2YR	506.80	1674.35	1677.77	1676.25	1678.01	0.002143	3.93	128.96	40.48	0.39
Reach 1	2201	5YR	969.00	1674.35	1679.35	1677.19	1679.71	0.002908	4.83	200.55	59.41	0.46
Reach 1	2201	10YR	1373.90	1674.35	1680.32	1677.88	1680.75	0.002548	5.29	264.25	164.44	0.45
Reach 1	2201	25YR	1972.20	1674.35	1681.50	1679.07	1682.02	0.002257	5.85	358.43	404.57	0.44
Reach 1	2201	50YR	2458.50	1674.35	1682.56	1679.76	1682.73	0.000831	4.00	1148.16	535.03	0.28
Reach 1	2201	100YR	2990.80	1674.35	1683.43	1680.35	1683.54	0.000545	3.52	1691.79	702.83	0.23
Reach 1	2089	2YR	506.80	1673.05	1676.89	1676.38	1677.56	0.007619	6.54	77.46	31.83	0.74
Reach 1	2089	5YR	969.00	1673.05	1678.17	1677.60	1679.15	0.007870	7.92	122.28	38.40	0.78
Reach 1	2089	10YR	1373.90	1673.05	1678.99	1678.42	1680.20	0.008200	8.83	155.61	45.61	0.82
Reach 1	2089	25YR	1972.20	1673.05	1679.93	1679.47	1681.47	0.008808	9.95	198.25	258.24	0.86
Reach 1	2089	50YR	2458.50	1673.05	1680.58	1680.19	1682.35	0.009174	10.66	230.60	363.21	0.89
Reach 1	2089	100YR	2990.80	1673.05	1681.24	1680.90	1683.20	0.009526	11.24	266.17	460.82	0.92
Reach 1	1901	2YR	506.80	1671.33	1675.12	1674.79	1675.92	0.010005	7.15	70.90	31.14	0.84
Reach 1	1901	5YR	969.00	1671.33	1676.37	1676.05	1677.48	0.010011	8.42	115.07	39.38	0.87
Reach 1	1901	10YR	1373.90	1671.33	1677.21	1676.89	1678.50	0.010010	9.12	150.65	45.73	0.89
Reach 1	1901	25YR	1972.20	1671.33	1678.16	1677.88	1679.71	0.010003	9.99	197.43	52.19	0.91
Reach 1	1901	50YR	2458.50	1671.33	1678.81	1678.54	1680.55	0.010004	10.58	232.45	120.07	0.92
Reach 1	1901	100YR	2990.80	1671.33	1679.45	1679.19	1681.36	0.010000	11.08	269.92	193.18	0.93

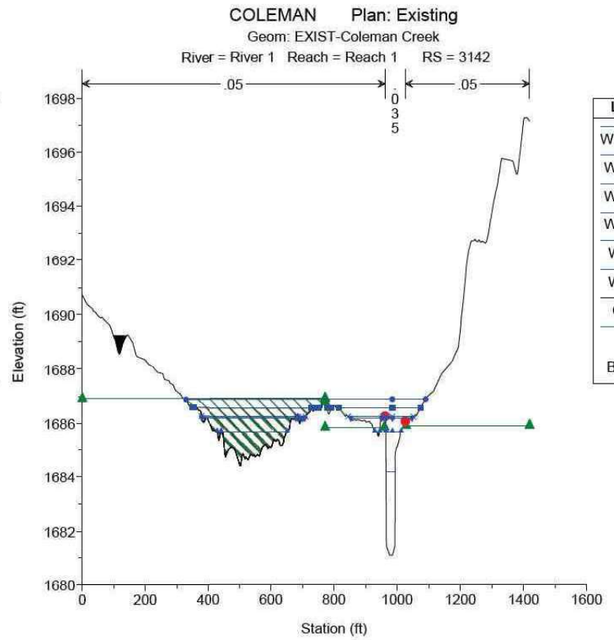
HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
HECRAS EXISTING TABLE

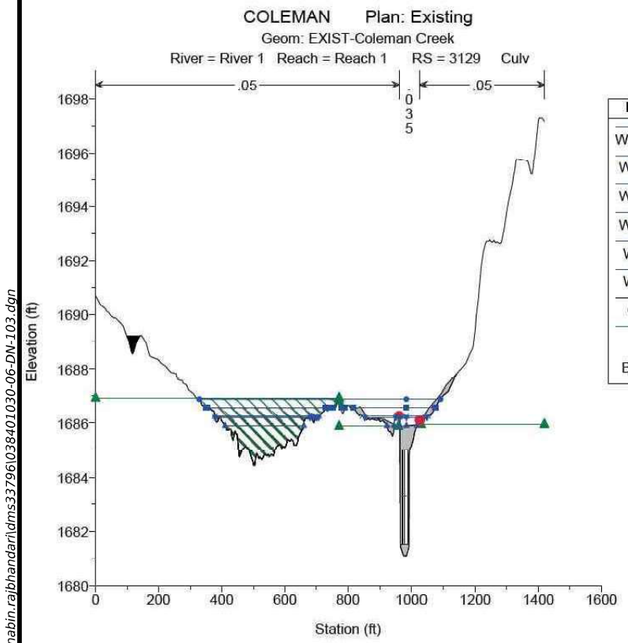
SHEET OF

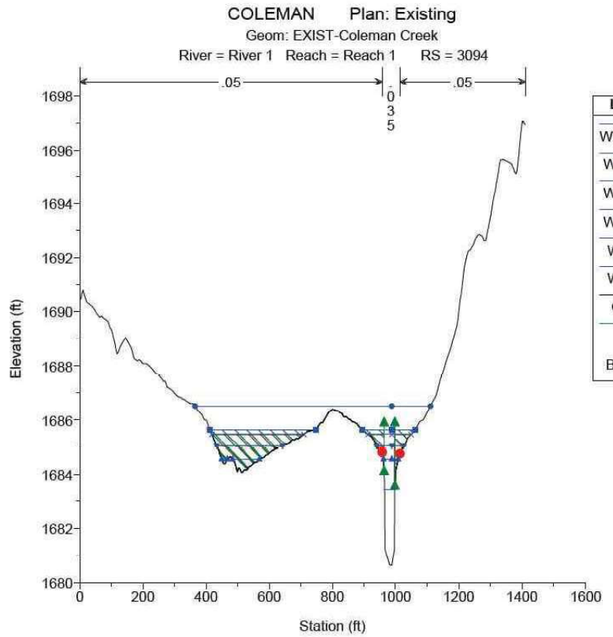
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		51

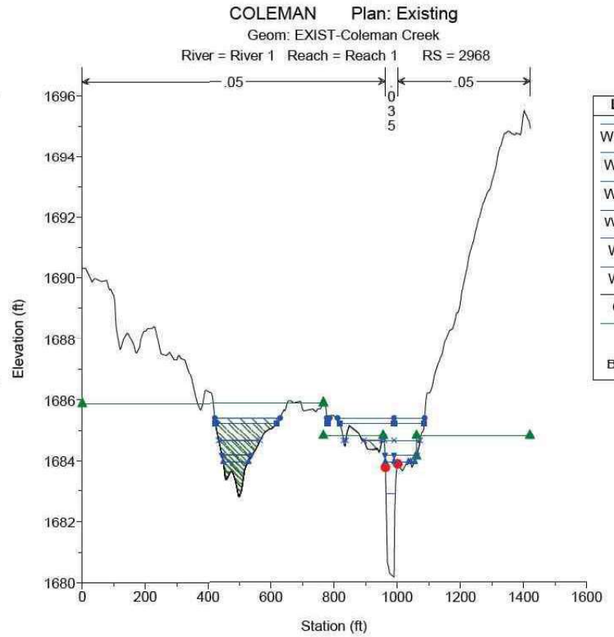












DATE: 7/31/2024 4:04:04 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961\038401030-06-DN-103.dgn

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

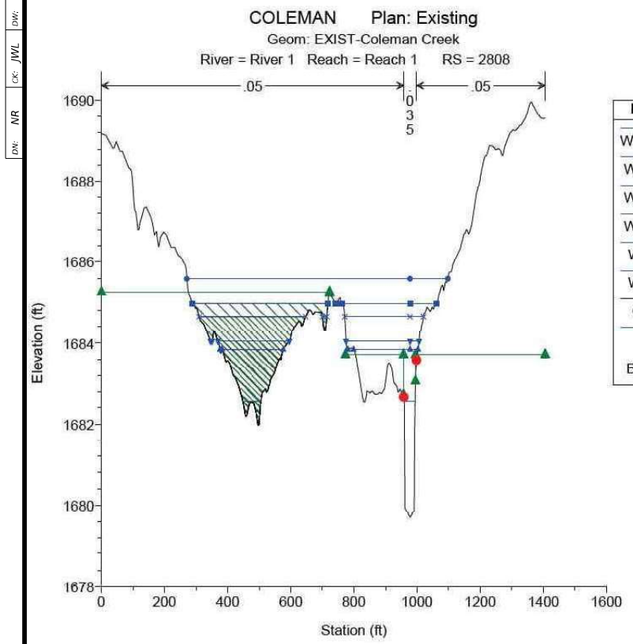
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

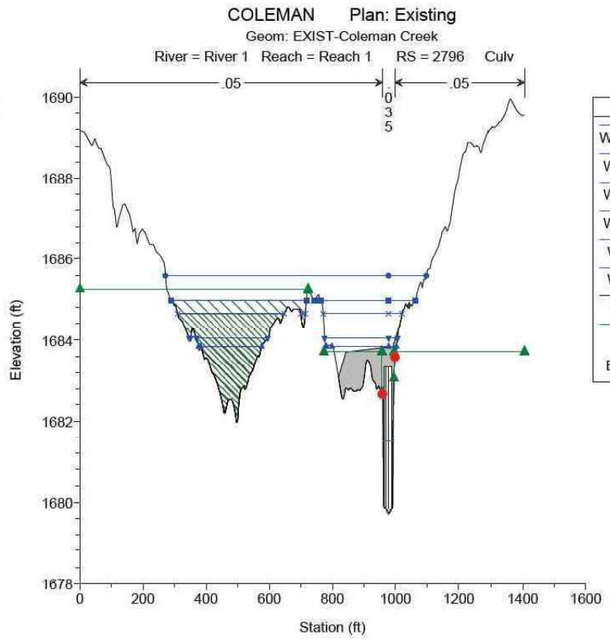
Texas Department of Transportation

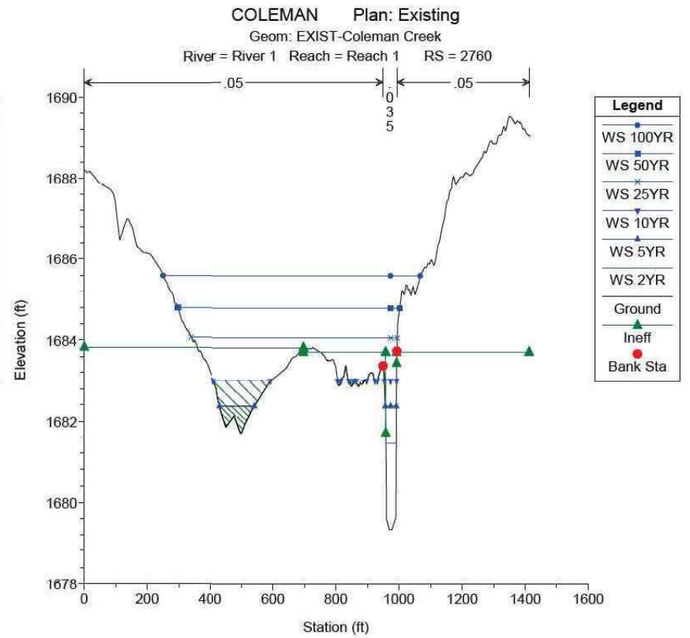
HYDRAULIC CALCULATION
HORDS CREEK DRAW
EXISTING CROSS-SECTIONS

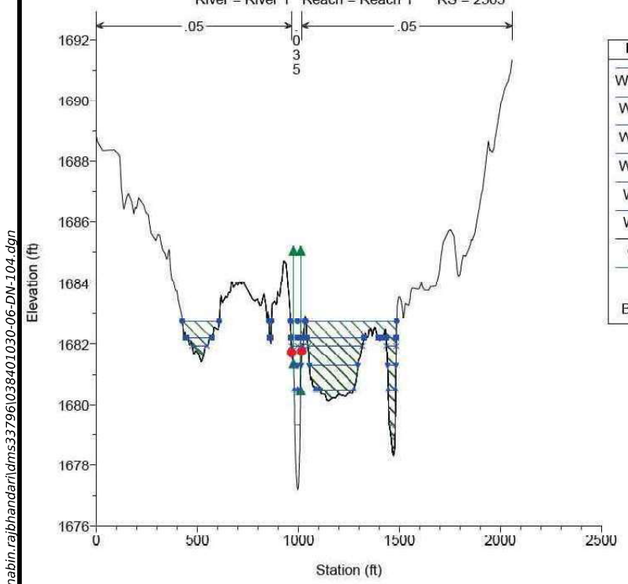
SHEET 1 OF 3

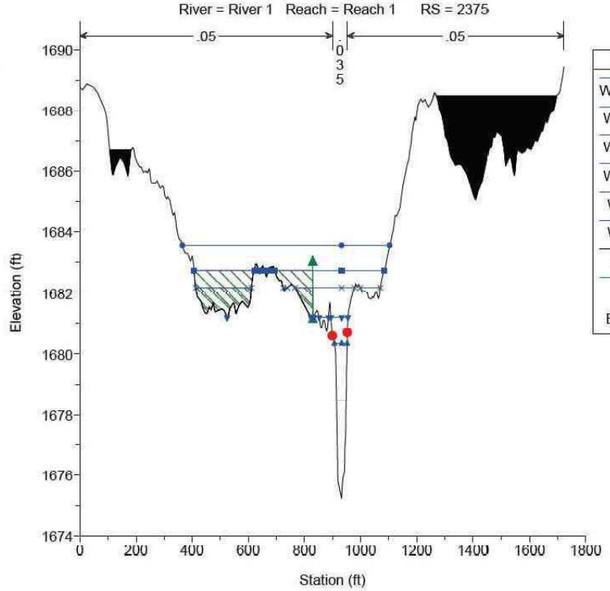
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		52

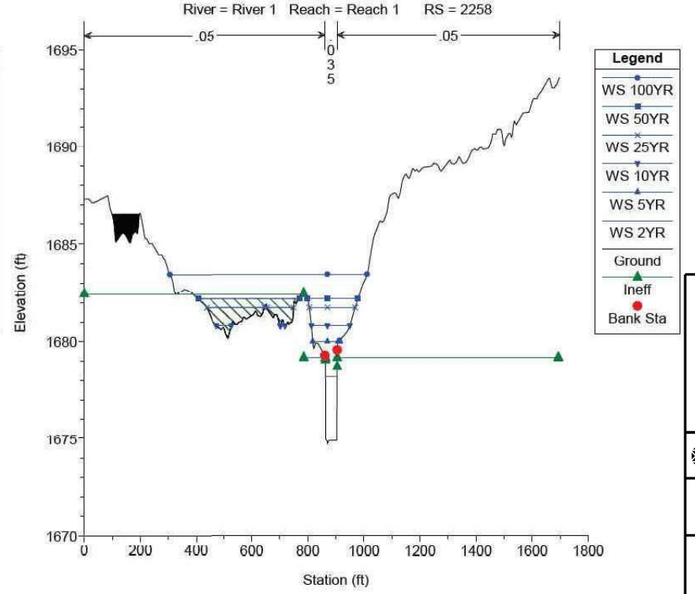












DATE: 7/31/2024 4:04:19 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961038401030-06-DN-104.dgn

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07-31-2024

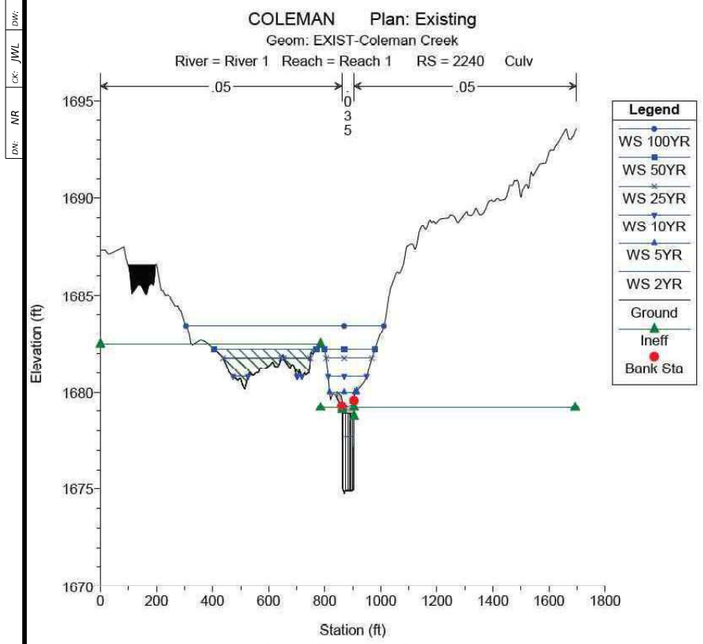
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

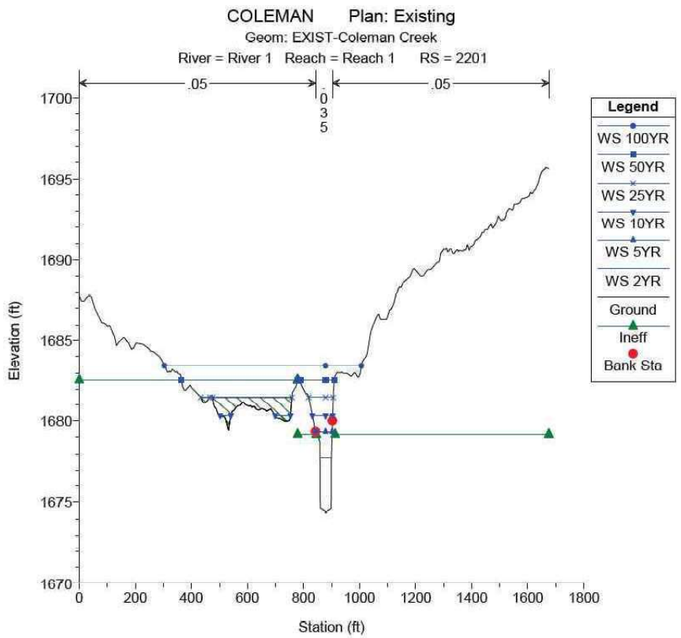
Texas Department of Transportation

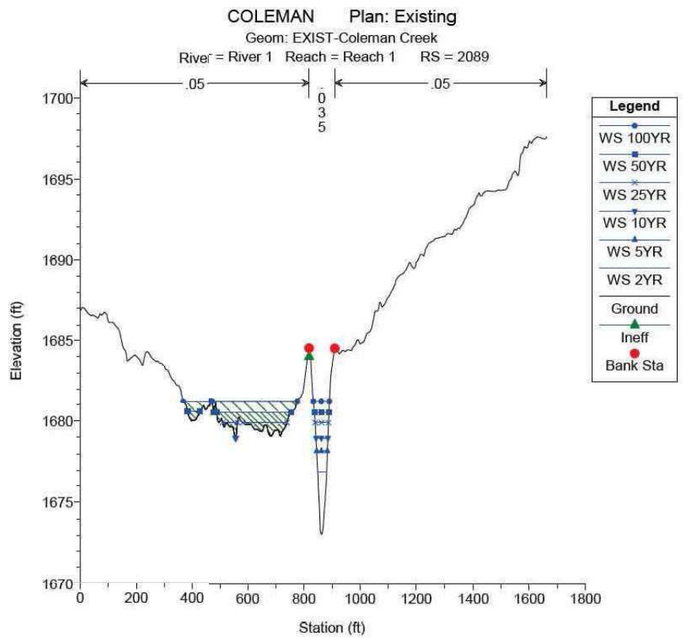
HYDRAULIC CALCULATION
HORDS CREEK DRAW
EXISTING CROSS-SECTION

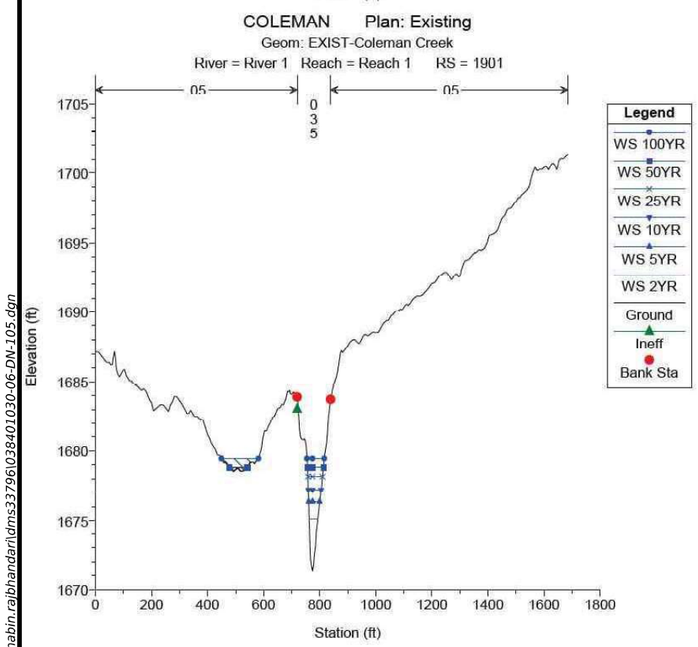
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		53









DATE: 7/31/2024 4:04:35 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961038401030-06-DN-105.dgn

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07-31-2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
EXISTING CROSS-SECTION

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		54

Plan: EXISTING River 1 Reach 1 RS: 3129 Culv Group: SanSaba Profile: 2YR

Q Culv Group (cfs)	157.81	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	6.85
Q Barrel (cfs)	78.91	Culv Vel DS (ft/s)	5.99
E.G. US. (ft)	1684.38	Culv Inv El Up (ft)	1681.51
W.S. US. (ft)	1684.20	Culv Inv El Dn (ft)	1681.38
E.G. DS (ft)	1683.60	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	1683.41	Culv Exit Loss (ft)	0.36
Delta EG (ft)	0.77	Culv Entr Loss (ft)	0.36
Delta WS (ft)	0.79	Q Weir (cfs)	
E.G. IC (ft)	1684.02	Weir Sta Lft (ft)	
E.G. OC (ft)	1684.38	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1683.29	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1683.41	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.36	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.66	Min El Weir Flow (ft)	1685.90

Plan: EXISTING River 1 Reach 1 RS: 3129 Culv Group: SanSaba Profile: 10YR

Q Culv Group (cfs)	351.51	Culv Full Len (ft)	24.00
# Barrels	2	Culv Vel US (ft/s)	7.73
Q Barrel (cfs)	175.76	Culv Vel DS (ft/s)	7.73
E.G. US. (ft)	1686.54	Culv Inv El Up (ft)	1681.51
W.S. US. (ft)	1686.21	Culv Inv El Dn (ft)	1681.38
E.G. DS (ft)	1685.59	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	1685.07	Culv Exit Loss (ft)	0.40
Delta EG (ft)	0.94	Culv Entr Loss (ft)	0.46
Delta WS (ft)	1.15	Q Weir (cfs)	157.88
E.G. IC (ft)	1686.98	Weir Sta Lft (ft)	778.63
E.G. OC (ft)	1686.54	Weir Sta Rgt (ft)	1052.87
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	1685.01	Weir Max Depth (ft)	0.65
Culv WS Outlet (ft)	1684.88	Weir Avg Depth (ft)	0.39
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	89.54
Culv Crt Depth (ft)	2.83	Min El Weir Flow (ft)	1685.90

Plan: EXISTING River 1 Reach 1 RS: 3129 Culv Group: SanSaba Profile: 100YR

Q Culv Group (cfs)	186.18	Culv Full Len (ft)	24.00
# Barrels	2	Culv Vel US (ft/s)	4.09
Q Barrel (cfs)	93.09	Culv Vel DS (ft/s)	4.09
E.G. US. (ft)	1686.92	Culv Inv El Up (ft)	1681.51
W.S. US. (ft)	1686.88	Culv Inv El Dn (ft)	1681.38
E.G. DS (ft)	1686.62	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	1686.51	Culv Exit Loss (ft)	0.15
Delta EG (ft)	0.30	Culv Entr Loss (ft)	0.13
Delta WS (ft)	0.37	Q Weir (cfs)	2207.89
E.G. IC (ft)	1684.32	Weir Sta Lft (ft)	319.79
E.G. OC (ft)	1686.93	Weir Sta Rgt (ft)	1080.12
Culvert Control	Outlet	Weir Submerg	0.67
Culv WS Inlet (ft)	1685.01	Weir Max Depth (ft)	2.48
Culv WS Outlet (ft)	1684.88	Weir Avg Depth (ft)	0.98
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	745.84
Culv Crt Depth (ft)	1.85	Min El Weir Flow (ft)	1685.90

Plan: EXISTING River 1 Reach 1 RS: 2796 Culv Group: Llano Profile: 2YR

Q Culv Group (cfs)	157.05	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.30
Q Barrel (cfs)	78.52	Culv Vel DS (ft/s)	9.24
E.G. US. (ft)	1682.74	Culv Inv El Up (ft)	1679.83
W.S. US. (ft)	1682.57	Culv Inv El Dn (ft)	1679.56
E.G. DS (ft)	1681.77	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	1681.48	Culv Exit Loss (ft)	0.42
Delta EG (ft)	0.96	Culv Entr Loss (ft)	0.41
Delta WS (ft)	1.09	Q Weir (cfs)	
E.G. IC (ft)	1682.34	Weir Sta Lft (ft)	
E.G. OC (ft)	1682.73	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1681.49	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1680.87	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.06	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.66	Min El Weir Flow (ft)	1683.72

Plan: EXISTING River 1 Reach 1 RS: 2796 Culv Group: Llano Profile: 10YR

Q Culv Group (cfs)	302.62	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.80
Q Barrel (cfs)	151.31	Culv Vel DS (ft/s)	6.74
E.G. US. (ft)	1684.23	Culv Inv El Up (ft)	1679.83
W.S. US. (ft)	1684.05	Culv Inv El Dn (ft)	1679.56
E.G. DS (ft)	1683.72	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	1683.01	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.51	Culv Entr Loss (ft)	0.47
Delta WS (ft)	1.04	Q Weir (cfs)	218.52
E.G. IC (ft)	1683.74	Weir Sta Lft (ft)	773.88
E.G. OC (ft)	1684.24	Weir Sta Rgt (ft)	1007.36
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	1682.82	Weir Max Depth (ft)	1.15
Culv WS Outlet (ft)	1683.02	Weir Avg Depth (ft)	0.49
Culv Nml Depth (ft)	1.66	Weir Flow Area (sq ft)	114.87
Culv Crt Depth (ft)	2.56	Min El Weir Flow (ft)	1683.72

Plan: EXISTING River 1 Reach 1 RS: 2796 Culv Group: Llano Profile: 100YR

Q Culv Group (cfs)	22.69	Culv Full Len (ft)	24.00
# Barrels	2	Culv Vel US (ft/s)	0.50
Q Barrel (cfs)	11.35	Culv Vel DS (ft/s)	0.50
E.G. US. (ft)	1685.61	Culv Inv El Up (ft)	1679.83
W.S. US. (ft)	1685.58	Culv Inv El Dn (ft)	1679.56
E.G. DS (ft)	1685.61	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	1685.59	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.01	Culv Entr Loss (ft)	0.00
Delta WS (ft)	0.00	Q Weir (cfs)	1682.20
E.G. IC (ft)	1680.52	Weir Sta Lft (ft)	270.64
E.G. OC (ft)	1685.61	Weir Sta Rgt (ft)	1098.73
Culvert Control	Outlet	Weir Submerg	0.99
Culv WS Inlet (ft)	1683.33	Weir Max Depth (ft)	3.65
Culv WS Outlet (ft)	1683.06	Weir Avg Depth (ft)	1.61
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	1331.75
Culv Crt Depth (ft)	0.46	Min El Weir Flow (ft)	1683.72

Plan: EXISTING River 1 Reach 1 RS: 2240 Culv Group: Brazos Profile: 2YR

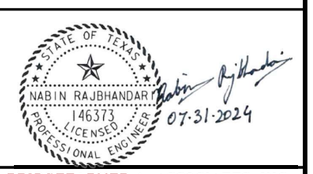
Q Culv Group (cfs)	506.80	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	5.61
Q Barrel (cfs)	126.70	Culv Vel DS (ft/s)	4.89
E.G. US. (ft)	1678.41	Culv Inv El Up (ft)	1674.85
W.S. US. (ft)	1678.18	Culv Inv El Dn (ft)	1674.54
E.G. DS (ft)	1678.01	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	1677.77	Culv Exit Loss (ft)	0.13
Delta EG (ft)	0.40	Culv Entr Loss (ft)	0.24
Delta WS (ft)	0.41	Q Weir (cfs)	
E.G. IC (ft)	1678.39	Weir Sta Lft (ft)	
E.G. OC (ft)	1678.41	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1677.68	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1677.77	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.18	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.98	Min El Weir Flow (ft)	1679.18

Plan: EXISTING River 1 Reach 1 RS: 2240 Culv Group: Brazos Profile: 10YR

Q Culv Group (cfs)	775.16	Culv Full Len (ft)	24.00
# Barrels	4	Culv Vel US (ft/s)	6.06
Q Barrel (cfs)	193.79	Culv Vel DS (ft/s)	6.06
E.G. US. (ft)	1681.21	Culv Inv El Up (ft)	1674.85
W.S. US. (ft)	1680.82	Culv Inv El Dn (ft)	1674.54
E.G. DS (ft)	1680.75	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	1680.32	Culv Exit Loss (ft)	0.14
Delta EG (ft)	0.46	Culv Entr Loss (ft)	0.28
Delta WS (ft)	0.50	Q Weir (cfs)	598.74
E.G. IC (ft)	1680.79	Weir Sta Lft (ft)	809.32
E.G. OC (ft)	1681.21	Weir Sta Rgt (ft)	957.97
Culvert Control	Outlet	Weir Submerg	0.40
Culv WS Inlet (ft)	1678.85	Weir Max Depth (ft)	2.05
Culv WS Outlet (ft)	1678.54	Weir Avg Depth (ft)	1.28
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	190.46
Culv Crt Depth (ft)	2.63	Min El Weir Flow (ft)	1679.18

Plan: EXISTING River 1 Reach 1 RS: 2240 Culv Group: Brazos Profile: 100YR

Q Culv Group (cfs)	153.42	Culv Full Len (ft)	24.00
# Barrels	4	Culv Vel US (ft/s)	1.20
Q Barrel (cfs)	38.35	Culv Vel DS (ft/s)	1.20
E.G. US. (ft)	1683.56	Culv Inv El Up (ft)	1674.85
W.S. US. (ft)	1683.44	Culv Inv El Dn (ft)	1674.54
E.G. DS (ft)	1683.54	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	1683.43	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.01	Culv Entr Loss (ft)	0.01
Delta WS (ft)	0.00	Q Weir (cfs)	2837.38
E.G. IC (ft)	1683.55	Weir Sta Lft (ft)	300.52
E.G. OC (ft)	1683.56	Weir Sta Rgt (ft)	1013.69
Culvert Control	Outlet	Weir Submerg	0.99
Culv WS Inlet (ft)	1678.85	Weir Max Depth (ft)	4.40
Culv WS Outlet (ft)	1678.54	Weir Avg Depth (ft)	2.25
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	1605.21
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	1679.18



BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

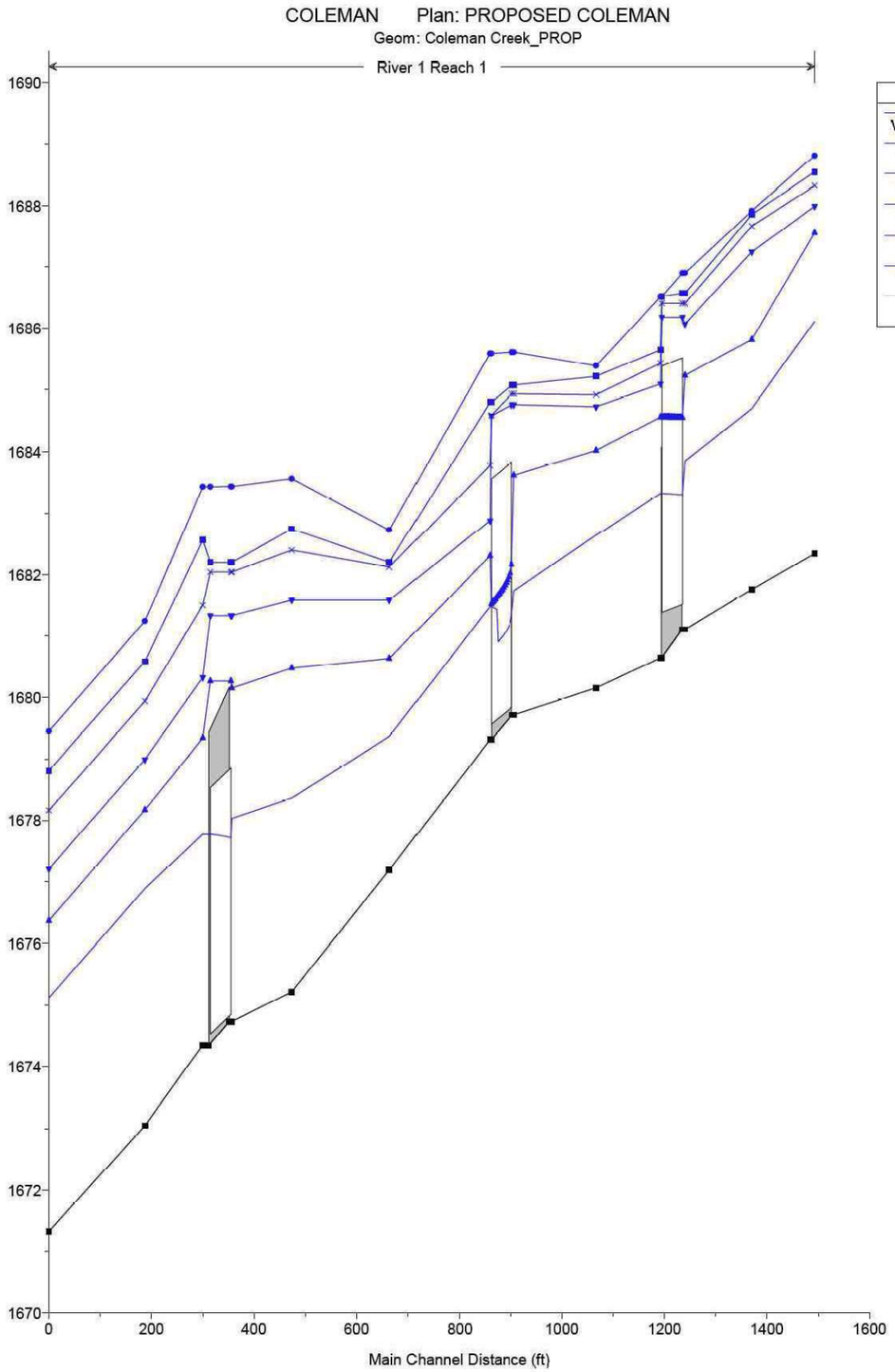
HYDRAULIC CALCULATIONS
CULVERT DATA
EXISTING 2YR,10YR & 100YR

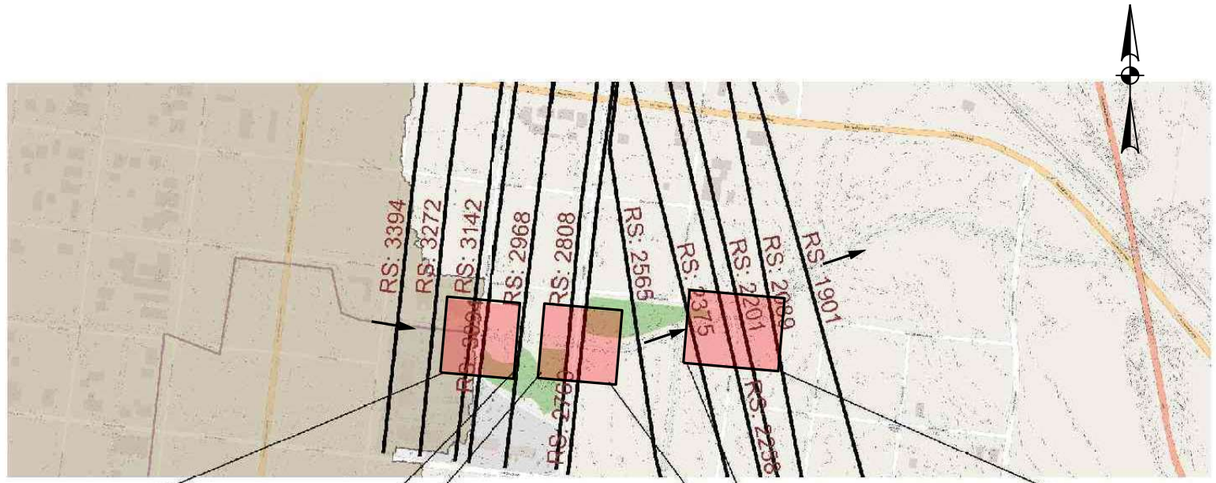
SHEET OF

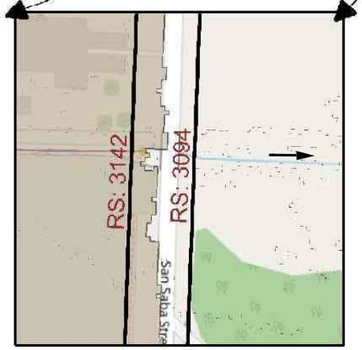
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		55

DATE: 7/31/2024 4:05:04 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms33796\HYDRAULIC CALCULATIONS CULVERT DATA EXISTING 2YR 10YR & 100YR.dgn

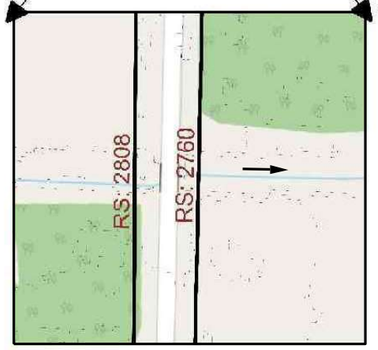
DW: NR CK
DW: NR CK



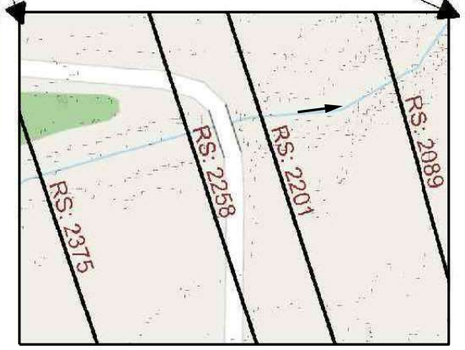




SAN SABA



LLANO



BRAZOS

N.T.S

NOTES:

1. THE EXISTING AND PROPOSED WATER SURFACE ELEVATIONS WERE COMPUTED USING HEC-RAS 6.1.0
2. A DESIGN STORM OF 2 YEARS AND A CHECK STORM OF 100 YEARS WAS USED

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07-31-2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
PROPOSED PROFILE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		56

DATE: 7/31/2024 4:05:22 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961038401030-06-DN-106.dgn

HEC-RAS Plan: PROPOSED COLEMAN River: River 1 Reach: Reach 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	3394	2YR	278.50	1682.34	1686.11	1684.82	1686.39	0.002949	4.22	66.06	24.88	0.46
Reach 1	3394	5YR	545.00	1682.34	1687.56	1685.89	1687.76	0.002350	3.90	212.55	350.96	0.42
Reach 1	3394	10YR	781.60	1682.34	1687.99	1687.37	1688.19	0.002195	4.16	311.80	455.41	0.41
Reach 1	3394	25YR	1134.30	1682.34	1688.32	1687.77	1688.51	0.002164	4.41	480.76	592.38	0.42
Reach 1	3394	50YR	1422.60	1682.34	1688.54	1688.00	1688.76	0.002494	4.93	564.81	695.77	0.45
Reach 1	3394	100YR	1739.80	1682.34	1688.81	1688.05	1689.04	0.002514	5.19	688.28	850.85	0.46
Reach 1	3272	2YR	278.50	1681.76	1684.69	1684.69	1685.62	0.015791	7.72	36.09	19.59	1.00
Reach 1	3272	5YR	545.00	1681.76	1685.82	1685.82	1687.07	0.014216	8.98	60.69	25.39	1.00
Reach 1	3272	10YR	781.60	1681.76	1687.25	1687.25	1687.78	0.004670	6.43	205.98	423.99	0.61
Reach 1	3272	25YR	1134.30	1681.76	1687.67	1687.67	1688.12	0.004243	6.61	358.35	656.10	0.59
Reach 1	3272	50YR	1422.60	1681.76	1687.85	1687.85	1688.33	0.004615	7.10	437.11	744.92	0.62
Reach 1	3272	100YR	1739.80	1681.76	1687.91	1687.91	1688.54	0.006131	8.27	465.52	763.96	0.71
Reach 1	3142	2YR	278.50	1681.10	1683.85	1682.70	1684.08	0.002706	3.81	73.09	28.70	0.42
Reach 1	3142	5YR	545.00	1681.10	1685.23	1683.54	1685.58	0.003470	4.76	114.61	201.18	0.48
Reach 1	3142	10YR	781.60	1681.10	1686.07	1684.16	1686.47	0.004636	5.04	155.05	376.31	0.56
Reach 1	3142	25YR	1134.30	1681.10	1686.41	1685.28	1686.96	0.006137	6.12	228.63	589.04	0.65
Reach 1	3142	50YR	1422.60	1681.10	1686.57	1686.57	1687.26	0.007384	6.97	270.15	659.84	0.72
Reach 1	3142	100YR	1739.80	1681.10	1686.90	1686.90	1687.54	0.006378	6.97	371.36	766.54	0.68
Reach 1	3129		Culvert									
Reach 1	3094	2YR	278.50	1680.64	1683.33	1682.26	1683.54	0.002661	3.68	75.61	31.98	0.42
Reach 1	3094	5YR	545.00	1680.64	1684.56	1683.04	1684.90	0.002617	4.66	116.88	153.98	0.44
Reach 1	3094	10YR	781.60	1680.64	1685.09	1683.63	1685.61	0.003329	5.79	134.99	304.37	0.51
Reach 1	3094	25YR	1134.30	1680.64	1685.43	1684.39	1686.36	0.005360	7.75	146.32	411.31	0.66
Reach 1	3094	50YR	1422.60	1680.64	1685.64	1684.93	1686.97	0.007145	9.25	153.77	503.86	0.77
Reach 1	3094	100YR	1739.80	1680.64	1686.51	1685.48	1686.62	0.001188	3.60	1029.64	745.59	0.31
Reach 1	2968	2YR	278.50	1680.15	1682.64	1682.02	1683.02	0.005703	4.91	56.67	28.44	0.61
Reach 1	2968	5YR	545.00	1680.15	1684.02	1682.92	1684.45	0.004502	5.28	112.88	181.80	0.57
Reach 1	2968	10YR	781.60	1680.15	1684.72	1683.61	1685.13	0.003439	5.39	183.39	332.88	0.52
Reach 1	2968	25YR	1134.30	1680.15	1684.92	1684.64	1685.54	0.005202	6.89	249.14	369.18	0.65
Reach 1	2968	50YR	1422.60	1680.15	1685.21	1685.21	1685.86	0.005298	7.33	322.48	460.73	0.66
Reach 1	2968	100YR	1739.80	1680.15	1685.38	1685.38	1686.14	0.006076	8.09	370.15	492.50	0.71
Reach 1	2808	2YR	278.50	1679.71	1681.74	1681.21	1682.08	0.005840	4.71	59.09	31.72	0.61
Reach 1	2808	5YR	545.00	1679.71	1683.62	1681.98	1683.91	0.002267	4.35	125.92	368.48	0.42
Reach 1	2808	10YR	781.60	1679.71	1684.76	1682.58	1684.83	0.000630	2.69	490.94	655.35	0.23
Reach 1	2808	25YR	1134.30	1679.71	1684.93	1683.33	1685.06	0.001074	3.60	538.83	717.08	0.30
Reach 1	2808	50YR	1422.60	1679.71	1685.07	1683.83	1685.25	0.001445	4.27	582.24	762.61	0.35
Reach 1	2808	100YR	1739.80	1679.71	1685.61	1684.23	1685.64	0.000420	2.47	1570.16	827.77	0.19
Reach 1	2796		Culvert									
Reach 1	2760	2YR	278.50	1679.31	1681.48	1680.79	1681.77	0.004688	4.36	63.87	32.69	0.55
Reach 1	2760	5YR	545.00	1679.31	1682.31	1681.59	1682.86	0.005728	5.95	91.53	138.02	0.64
Reach 1	2760	10YR	781.60	1679.31	1682.88	1682.16	1683.65	0.006329	7.04	111.10	209.87	0.69
Reach 1	2760	25YR	1134.30	1679.31	1683.78	1682.89	1684.77	0.006049	7.99	141.92	588.79	0.69
Reach 1	2760	50YR	1422.60	1679.31	1684.80	1683.43	1684.83	0.000461	2.34	1278.99	706.20	0.20
Reach 1	2760	100YR	1739.80	1679.31	1685.59	1683.93	1685.61	0.000240	1.89	1876.96	817.09	0.15
Reach 1	2565	2YR	278.50	1677.19	1679.36	1679.36	1680.11	0.015650	6.95	40.09	56.76	0.99
Reach 1	2565	5YR	545.00	1677.19	1680.03	1680.20	1681.41	0.008874	7.10	76.81	278.07	0.80
Reach 1	2565	10YR	781.60	1677.19	1681.58	1680.89	1682.38	0.006582	7.17	109.05	363.84	0.72
Reach 1	2565	25YR	1134.30	1677.19	1682.12	1681.67	1683.34	0.008115	8.86	128.06	497.94	0.82
Reach 1	2565	50YR	1422.60	1677.19	1682.20	1682.20	1684.04	0.011876	10.87	130.86	544.77	0.99
Reach 1	2565	100YR	1739.80	1677.19	1682.73	1682.73	1684.84	0.011402	11.64	149.47	716.10	1.00
Reach 1	2375	2YR	278.50	1675.22	1678.36	1677.25	1678.57	0.002566	3.62	76.84	33.66	0.42
Reach 1	2375	5YR	545.00	1675.22	1680.47	1678.08	1680.66	0.001509	3.45	157.79	49.69	0.34
Reach 1	2375	10YR	781.60	1675.22	1681.59	1678.66	1681.77	0.001114	3.51	251.38	284.74	0.31
Reach 1	2375	25YR	1134.30	1675.22	1682.40	1679.41	1682.61	0.001053	3.85	403.39	567.87	0.31
Reach 1	2375	50YR	1422.60	1675.22	1682.74	1679.99	1682.98	0.001171	4.25	488.54	628.18	0.33
Reach 1	2375	100YR	1739.80	1675.22	1683.57	1680.74	1683.63	0.000388	2.70	1413.17	736.69	0.19
Reach 1	2258	2YR	506.80	1674.74	1678.03	1676.64	1678.28	0.002364	4.04	125.54	41.15	0.41
Reach 1	2258	5YR	969.00	1674.74	1680.14	1677.55	1680.46	0.001549	4.54	213.63	103.60	0.35
Reach 1	2258	10YR	1373.90	1674.74	1681.33	1678.25	1681.62	0.001250	4.58	393.87	380.66	0.33
Reach 1	2258	25YR	1972.20	1674.74	1682.04	1679.15	1682.43	0.001534	5.46	510.13	517.17	0.37
Reach 1	2258	50YR	2458.50	1674.74	1682.20	1680.40	1682.75	0.002146	6.55	537.51	546.42	0.44
Reach 1	2258	100YR	2990.80	1674.74	1683.44	1681.14	1683.56	0.000618	3.92	1701.15	706.11	0.24
Reach 1	2240		Culvert									

HEC-RAS Plan: PROPOSED COLEMAN River: River 1 Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	2201	2YR	506.80	1674.35	1677.77	1676.25	1678.01	0.002143	3.93	128.96	40.48	0.39
Reach 1	2201	5YR	969.00	1674.35	1679.34	1677.19	1679.70	0.002817	4.86	199.55	59.22	0.46
Reach 1	2201	10YR	1373.90	1674.35	1680.32	1677.89	1680.75	0.002548	5.29	264.25	164.44	0.45
Reach 1	2201	25YR	1972.20	1674.35	1681.50	1679.06	1682.02	0.002257	5.85	358.43	404.57	0.44
Reach 1	2201	50YR	2458.50	1674.35	1682.56	1679.71	1682.73	0.000031	4.00	1140.16	535.03	0.20
Reach 1	2201	100YR	2990.80	1674.35	1683.43	1680.35	1683.54	0.000545	3.52	1691.79	702.83	0.23
Reach 1	2089	2YR	506.80	1673.05	1676.89	1676.38	1677.56	0.007619	6.54	77.46	31.83	0.74
Reach 1	2089	5YR	969.00	1673.05	1678.17	1677.60	1679.15	0.007870	7.92	122.28	38.40	0.78
Reach 1	2089	10YR	1373.90	1673.05	1678.99	1678.42	1680.20	0.008200	8.83	155.61	45.61	0.82
Reach 1	2089	25YR	1972.20	1673.05	1679.93	1679.47	1681.47	0.008808	9.95	198.25	258.24	0.86
Reach 1	2089	50YR	2458.50	1673.05	1680.58	1680.19	1682.35	0.009174	10.66	230.60	363.21	0.89
Reach 1	2089	100YR	2990.80	1673.05	1681.24	1680.90	1683.20	0.009526	11.24	266.17	460.82	0.92
Reach 1	1901	2YR	506.80	1671.33	1675.12	1674.79	1675.92	0.010005	7.15	70.90	31.14	0.84
Reach 1	1901	5YR	969.00	1671.33	1676.37	1676.05	1677.48	0.010011	8.42	115.07	39.38	0.87
Reach 1	1901	10YR	1373.90	1671.33	1677.21	1676.89	1678.50	0.010010	9.12	150.65	45.73	0.89
Reach 1	1901	25YR	1972.20	1671.33	1678.16	1677.88	1679.71	0.010003	9.99	197.43	52.19	0.91
Reach 1	1901	50YR	2458.50	1671.33	1678.81	1678.54	1680.55	0.010004	10.58	232.45	120.07	0.92
Reach 1	1901	100YR	2990.80	1671.33	1679.45	1679.19	1681.36	0.010000	11.08	269.92	193.18	0.93

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

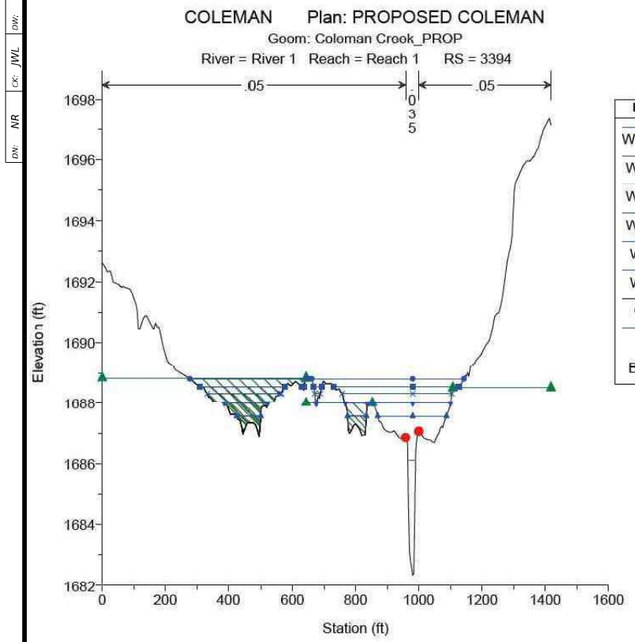
HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
PROPOSED TABLE

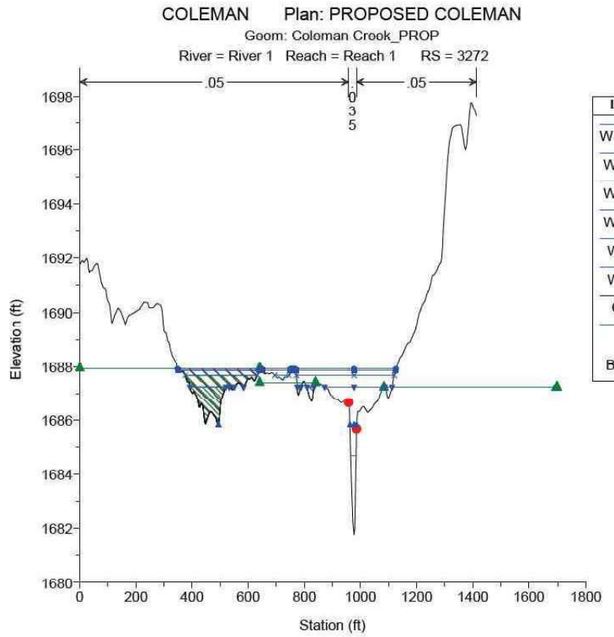
SHEET 1 OF 1

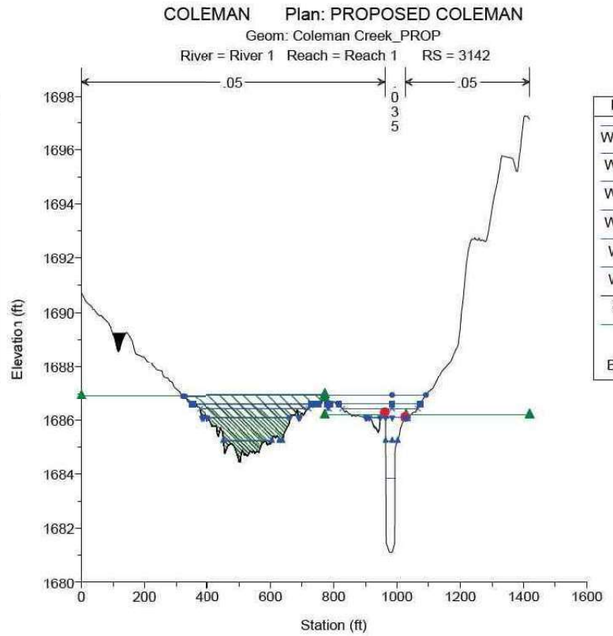
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		57

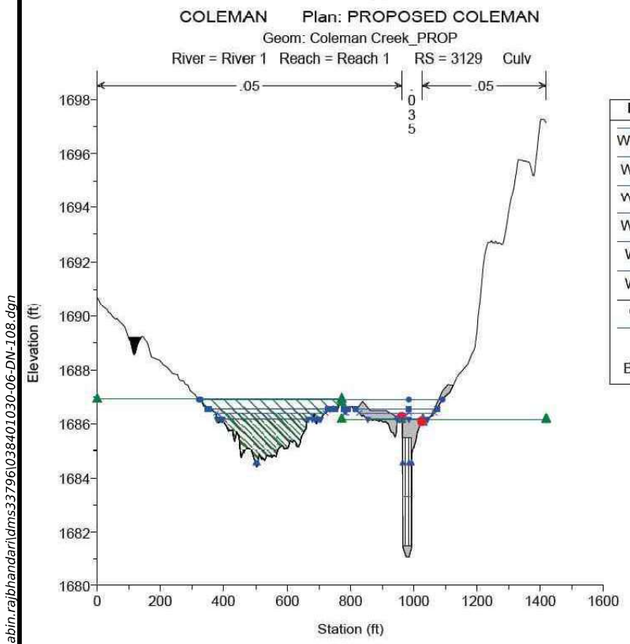
DATE: 7/31/2024 4:05:36 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961038401030-06-DN-107.dgn

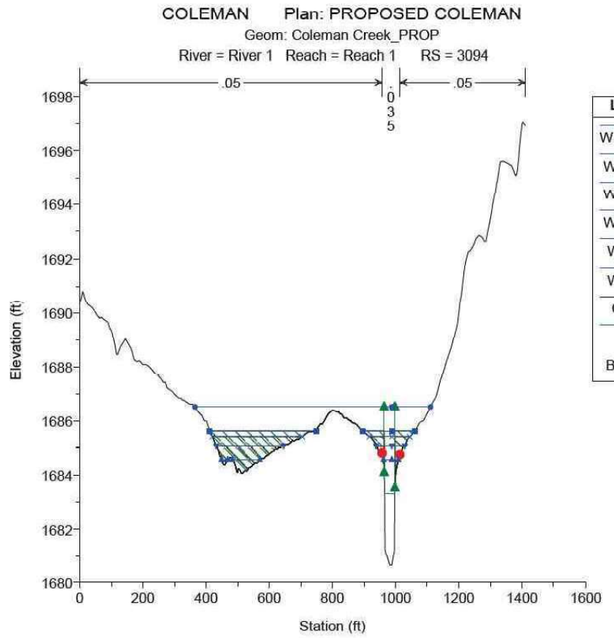
CK: JWL | DW: NR | CK: JWL | DW: NR

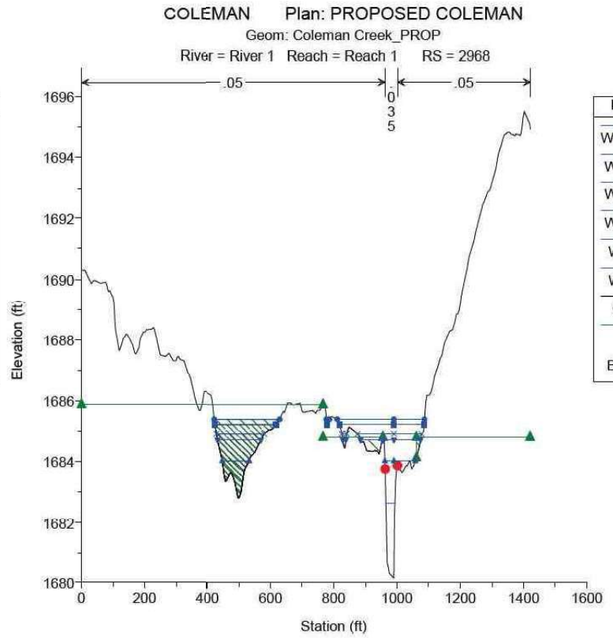












STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07-31-2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

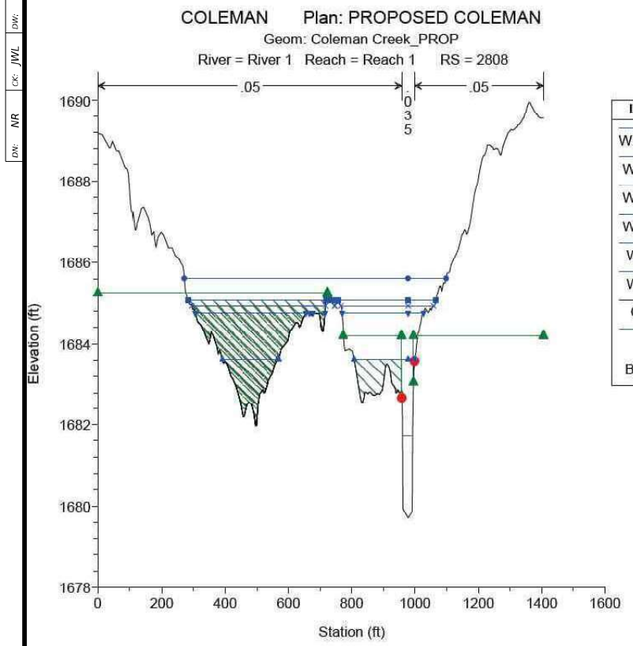
HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
PROPOSED CROSS-SECTION

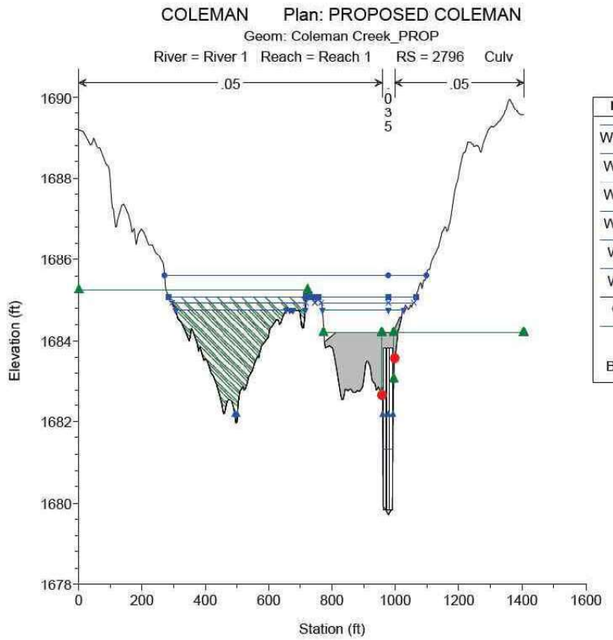
SHEET 1 OF 3

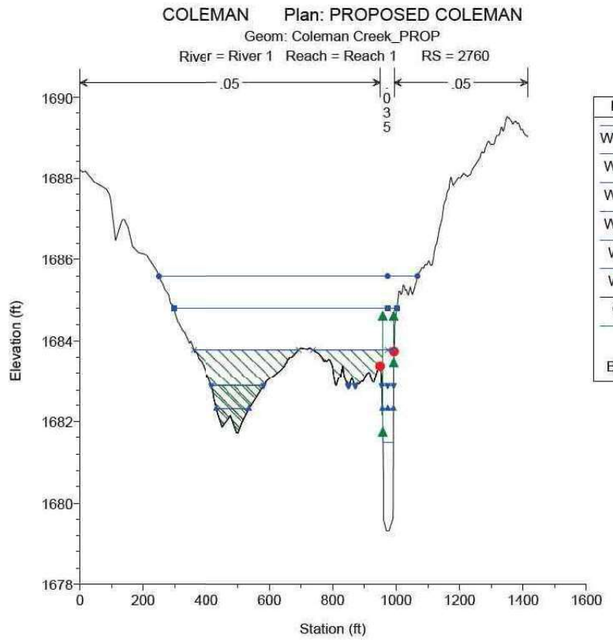
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		58

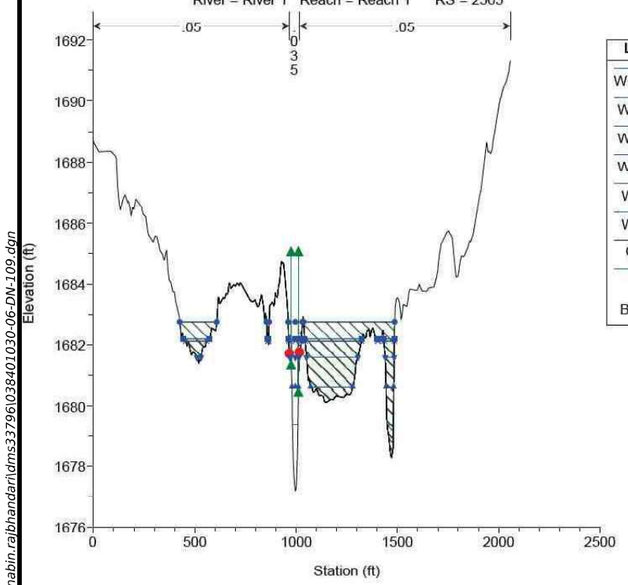
DATE: 7/31/2024 4:05:52 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961\038401030-06-DN-108.dgn

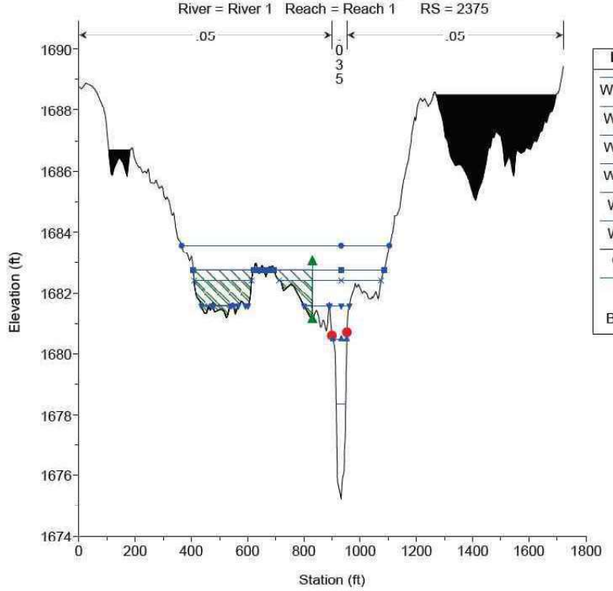
DW: NR JWL CK: JWL

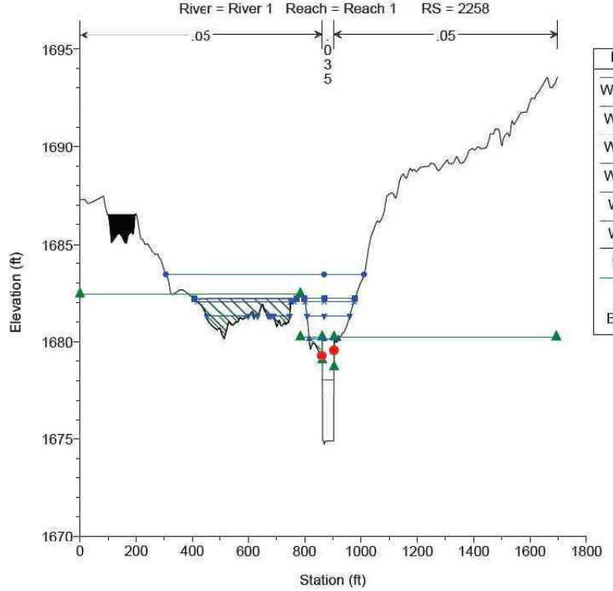












STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

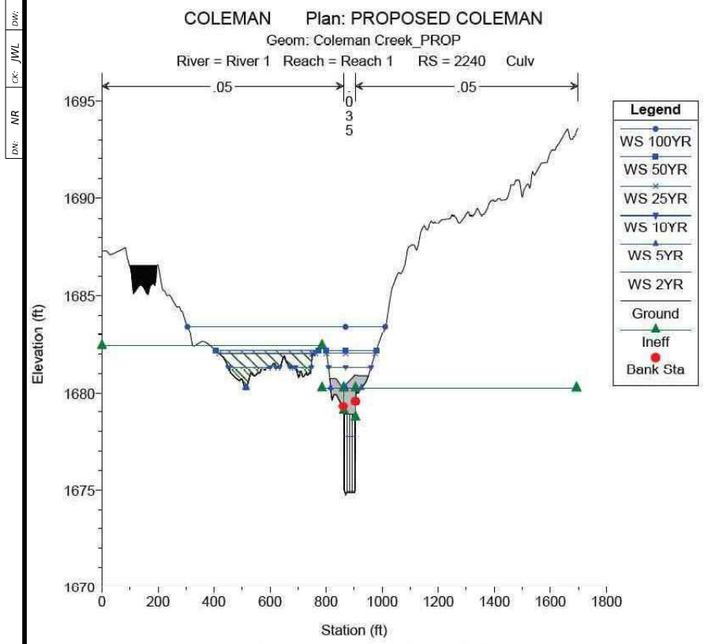
Texas Department of Transportation

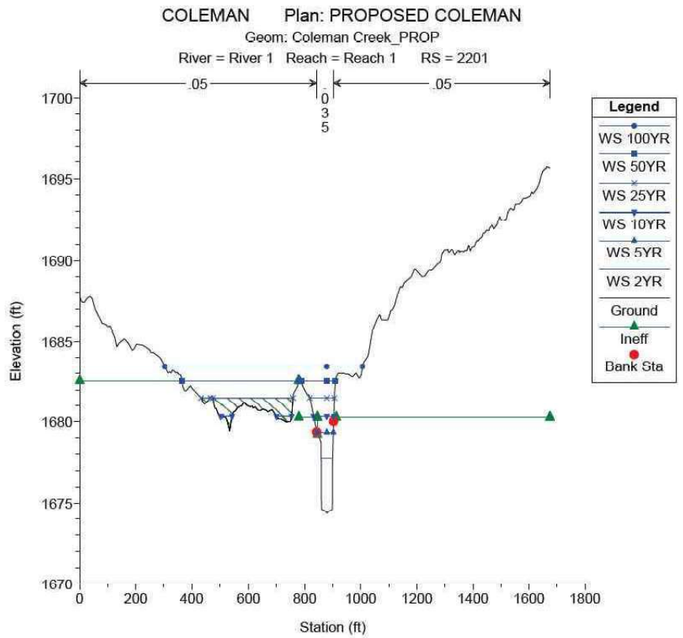
HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
PROPOSED CROSS-SECTION

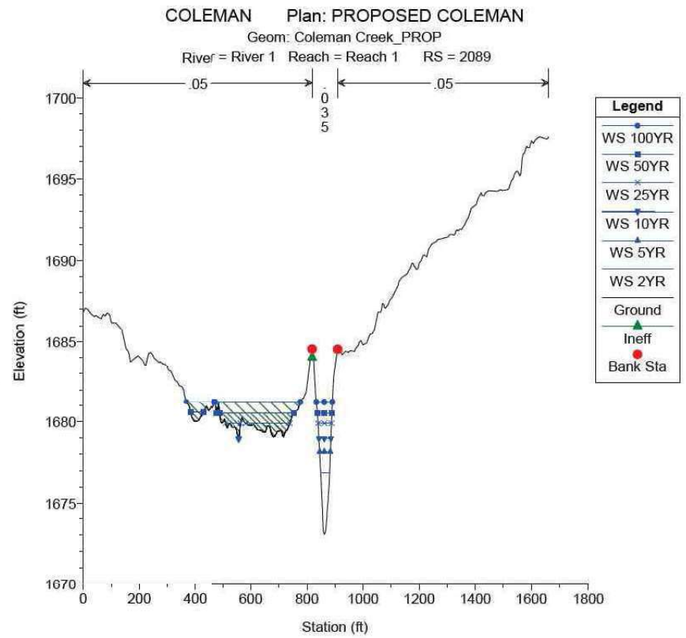
SHEET 2 OF 3

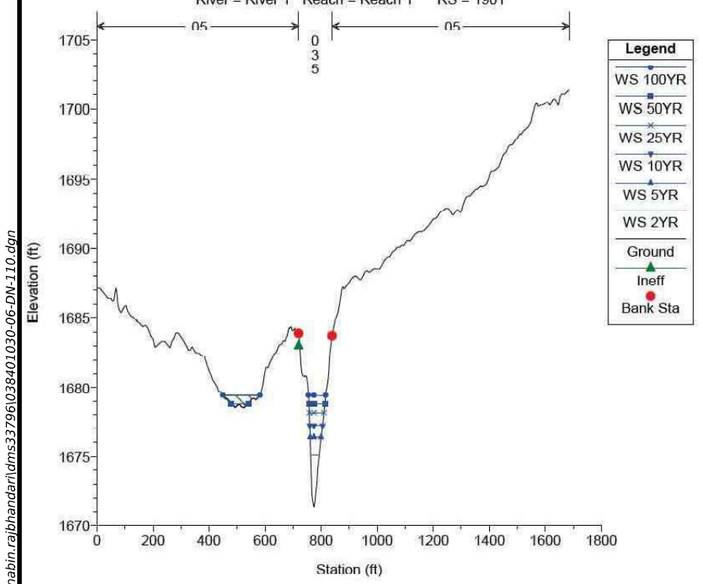
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		59

DATE: 7/31/2024 4:06:06 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961038401030-06-DN-109.dgn









DATE: 7/31/2024 4:06:23 PM
FILE: c:\bms\bridgefarmer-pw\nabin.rajbhandari\dms337961\038401030-06-DN-110.dgn

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

HYDRAULIC CALCULATIONS
HORDS CREEK DRAW
PROPOSED CROSS SECTION

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		60

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 3129 Culv Group: SanSaba Profile: 2YR

Q Culv Group (cfs)	278.50	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	5.77
Q Barrel (cfs)	92.83	Culv Vel DS (ft/s)	5.30
E.G. US. (ft)	1684.08	Culv Inv El Up (ft)	1681.51
W.S. US. (ft)	1683.85	Culv Inv El Dn (ft)	1681.38
E.G. DS (ft)	1683.54	Culv Frctn Ls (ft)	0.06
W.S. DS (ft)	1683.33	Culv Exit Loss (ft)	0.23
Delta EG (ft)	0.54	Culv Entr Loss (ft)	0.26
Delta WS (ft)	0.52	Q Weir (cfs)	
E.G. IC (ft)	1683.76	Weir Sta Lft (ft)	
E.G. OC (ft)	1684.08	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1683.30	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1683.33	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.39	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.49	Min El Weir Flow (ft)	1686.18

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 3129 Culv Group: SanSaba Profile: 10

Q Culv Group (cfs)	741.49	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.69
Q Barrel (cfs)	247.16	Culv Vel DS (ft/s)	7.40
E.G. US. (ft)	1686.46	Culv Inv El Up (ft)	1681.51
W.S. US. (ft)	1686.07	Culv Inv El Dn (ft)	1681.38
E.G. DS (ft)	1685.61	Culv Frctn Ls (ft)	0.06
W.S. DS (ft)	1685.09	Culv Exit Loss (ft)	0.33
Delta EG (ft)	0.85	Culv Entr Loss (ft)	0.46
Delta WS (ft)	0.98	Q Weir (cfs)	40.11
E.G. IC (ft)	1686.07	Weir Sta Lft (ft)	779.49
E.G. OC (ft)	1686.46	Weir Sta Rgt (ft)	1060.39
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	1685.08	Weir Max Depth (ft)	0.29
Culv WS Outlet (ft)	1685.09	Weir Avg Depth (ft)	0.21
Culv Nml Depth (ft)	2.72	Weir Flow Area (sq ft)	31.73
Culv Crt Depth (ft)	2.86	Min El Weir Flow (ft)	1686.18

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 3129 Culv Group: SanSaba Profile: 100YR

Q Culv Group (cfs)	435.33	Culv Full Len (ft)	40.00
# Barrels	3	Culv Vel US (ft/s)	4.03
Q Barrel (cfs)	145.11	Culv Vel DS (ft/s)	4.03
E.G. US. (ft)	1686.92	Culv Inv El Up (ft)	1681.51
W.S. US. (ft)	1686.90	Culv Inv El Dn (ft)	1681.38
E.G. DS (ft)	1686.62	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	1686.51	Culv Exit Loss (ft)	0.15
Delta EG (ft)	0.30	Culv Entr Loss (ft)	0.13
Delta WS (ft)	0.39	Q Weir (cfs)	290.23
E.G. IC (ft)	1686.92	Weir Sta Lft (ft)	771.61
E.G. OC (ft)	1686.92	Weir Sta Rgt (ft)	1078.76
Culvert Control	Outlet	Weir Submerg	0.29
Culv WS Inlet (ft)	1685.51	Weir Max Depth (ft)	0.75
Culv WS Outlet (ft)	1685.38	Weir Avg Depth (ft)	0.49
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	150.71
Culv Crt Depth (ft)	2.01	Min El Weir Flow (ft)	1686.18

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 2796 Culv Group: Llano Profile: 2YR

Q Culv Group (cfs)	278.50	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.92
Q Barrel (cfs)	92.83	Culv Vel DS (ft/s)	5.39
E.G. US. (ft)	1682.09	Culv Inv El Up (ft)	1679.83
W.S. US. (ft)	1681.74	Culv Inv El Dn (ft)	1679.56
E.G. DS (ft)	1681.77	Culv Frctn Ls (ft)	0.14
W.S. DS (ft)	1681.48	Culv Exit Loss (ft)	0.16
Delta EG (ft)	0.31	Culv Entr Loss (ft)	0.02
Delta WS (ft)	0.26	Q Weir (cfs)	
E.G. IC (ft)	1682.09	Weir Sta Lft (ft)	
E.G. OC (ft)	1682.44	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	1681.32	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1681.48	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.09	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.49	Min El Weir Flow (ft)	1684.21

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 2796 Culv Group: Llano Profile: 10YR

Q Culv Group (cfs)	738.75	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.58
Q Barrel (cfs)	246.25	Culv Vel DS (ft/s)	11.24
E.G. US. (ft)	1684.83	Culv Inv El Up (ft)	1679.83
W.S. US. (ft)	1684.76	Culv Inv El Dn (ft)	1679.56
E.G. DS (ft)	1683.65	Culv Frctn Ls (ft)	0.16
W.S. DS (ft)	1682.88	Culv Exit Loss (ft)	0.31
Delta EG (ft)	1.18	Culv Entr Loss (ft)	0.71
Delta WS (ft)	1.88	Q Weir (cfs)	50.31
E.G. IC (ft)	1684.15	Weir Sta Lft (ft)	773.00
E.G. OC (ft)	1684.83	Weir Sta Rgt (ft)	1001.64
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	1682.69	Weir Max Depth (ft)	0.41
Culv WS Outlet (ft)	1682.00	Weir Avg Depth (ft)	0.19
Culv Nml Depth (ft)	2.11	Weir Flow Area (sq ft)	43.36
Culv Crt Depth (ft)	2.85	Min El Weir Flow (ft)	1684.21

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 2796 Culv Group: Llano Profile: 100YR

Q Culv Group (cfs)	153.06	Culv Full Len (ft)	40.00
# Barrels	3	Culv Vel US (ft/s)	1.42
Q Barrel (cfs)	51.02	Culv Vel DS (ft/s)	1.42
E.G. US. (ft)	1685.64	Culv Inv El Up (ft)	1679.83
W.S. US. (ft)	1685.61	Culv Inv El Dn (ft)	1679.56
E.G. DS (ft)	1685.61	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	1685.59	Culv Exit Loss (ft)	0.01
Delta EG (ft)	0.03	Culv Entr Loss (ft)	0.02
Delta WS (ft)	0.02	Q Weir (cfs)	1586.74
E.G. IC (ft)	1685.57	Weir Sta Lft (ft)	270.63
E.G. OC (ft)	1685.64	Weir Sta Rgt (ft)	1098.75
Culvert Control	Outlet	Weir Submerg	0.99
Culv WS Inlet (ft)	1683.83	Weir Max Depth (ft)	3.65
Culv WS Outlet (ft)	1683.56	Weir Avg Depth (ft)	1.48
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	1226.50
Culv Crt Depth (ft)	1.00	Min El Weir Flow (ft)	1684.21

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 2240 Culv Group: Brazos Profile: 2YR

Q Culv Group (cfs)	506.80	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	4.92
Q Barrel (cfs)	126.70	Culv Vel DS (ft/s)	4.35
E.G. US. (ft)	1678.28	Culv Inv El Up (ft)	1674.85
W.S. US. (ft)	1678.03	Culv Inv El Dn (ft)	1674.54
E.G. DS (ft)	1678.01	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	1677.77	Culv Exit Loss (ft)	0.05
Delta EG (ft)	0.27	Culv Entr Loss (ft)	0.19
Delta WS (ft)	0.25	Q Weir (cfs)	
E.G. IC (ft)	1678.12	Weir Sta Lft (ft)	
E.G. OC (ft)	1678.28	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	1677.72	Weir Max Depth (ft)	
Culv WS Outlet (ft)	1677.77	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.28	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.83	Min El Weir Flow (ft)	1680.26

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 2240 Culv Group: Brazos Profile: 10Y

Q Culv Group (cfs)	1034.74	Culv Full Len (ft)	40.00
# Barrels	4	Culv Vel US (ft/s)	7.19
Q Barrel (cfs)	258.68	Culv Vel DS (ft/s)	7.19
E.G. US. (ft)	1681.61	Culv Inv El Up (ft)	1674.85
W.S. US. (ft)	1681.33	Culv Inv El Dn (ft)	1674.54
E.G. DS (ft)	1680.75	Culv Frctn Ls (ft)	0.09
W.S. DS (ft)	1680.32	Culv Exit Loss (ft)	0.37
Delta EG (ft)	0.86	Culv Entr Loss (ft)	0.40
Delta WS (ft)	1.01	Q Weir (cfs)	339.16
E.G. IC (ft)	1681.17	Weir Sta Lft (ft)	805.63
E.G. OC (ft)	1681.61	Weir Sta Rgt (ft)	965.84
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	1678.85	Weir Max Depth (ft)	1.36
Culv WS Outlet (ft)	1678.54	Weir Avg Depth (ft)	0.85
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	136.92
Culv Crt Depth (ft)	2.95	Min El Weir Flow (ft)	1680.26

Plan: PROPOSED COLEMAN River 1 Reach 1 RS: 2240 Culv Group: Brazos Profile: 100YR

Q Culv Group (cfs)	186.88	Culv Full Len (ft)	40.00
# Barrels	4	Culv Vel US (ft/s)	1.30
Q Barrel (cfs)	46.72	Culv Vel DS (ft/s)	1.30
E.G. US. (ft)	1683.56	Culv Inv El Up (ft)	1674.85
W.S. US. (ft)	1683.44	Culv Inv El Dn (ft)	1674.54
E.G. DS (ft)	1683.54	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	1683.43	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.02	Culv Entr Loss (ft)	0.01
Delta WS (ft)	0.00	Q Weir (cfs)	2803.92
E.G. IC (ft)	1683.55	Weir Sta Lft (ft)	300.45
E.G. OC (ft)	1683.56	Weir Sta Rgt (ft)	1013.75
Culvert Control	Outlet	Weir Submerg	0.98
Culv WS Inlet (ft)	1678.85	Weir Max Depth (ft)	3.41
Culv WS Outlet (ft)	1678.54	Weir Avg Depth (ft)	2.09
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	1492.15
Culv Crt Depth (ft)	0.94	Min El Weir Flow (ft)	1680.26

STATE OF TEXAS
NABIN RAJBHANDARI
146373
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

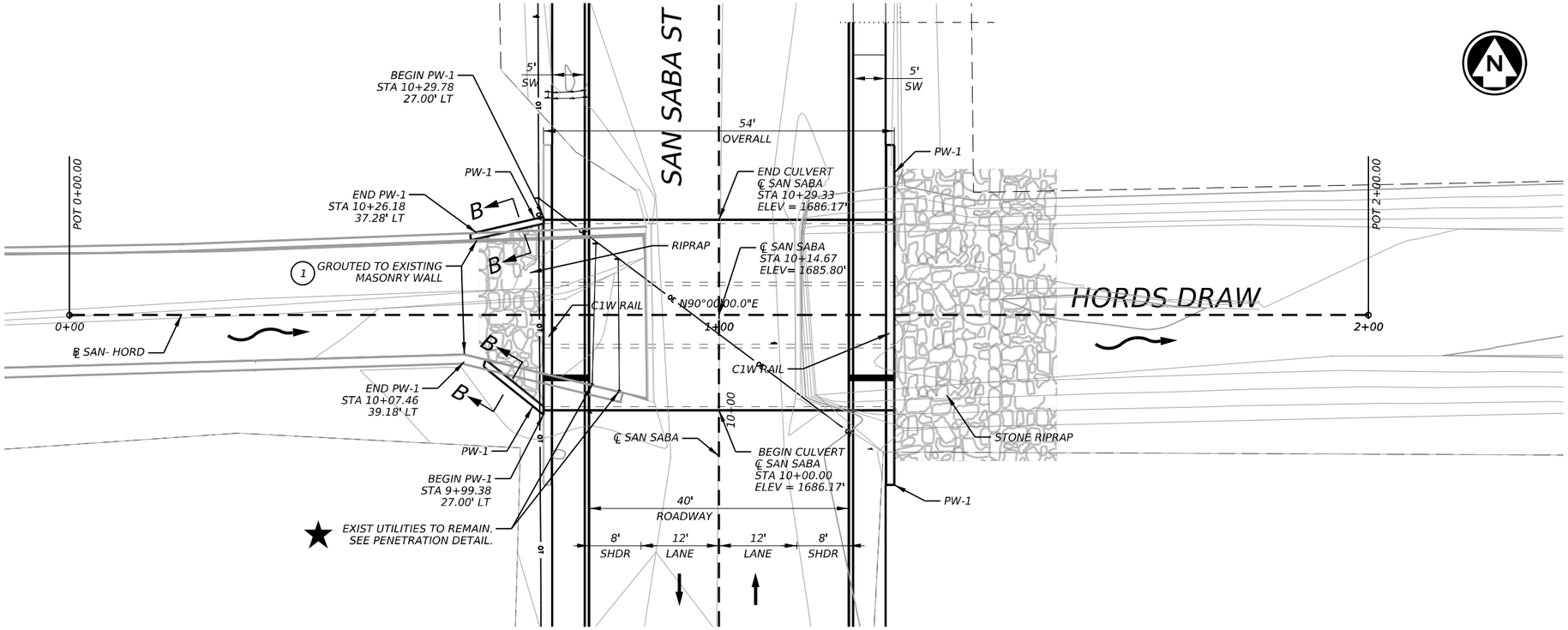
HYDRAULIC CALCULATIONS
CULVERT DATA
PROPOSED 2YR,10YR & 100YR

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		61

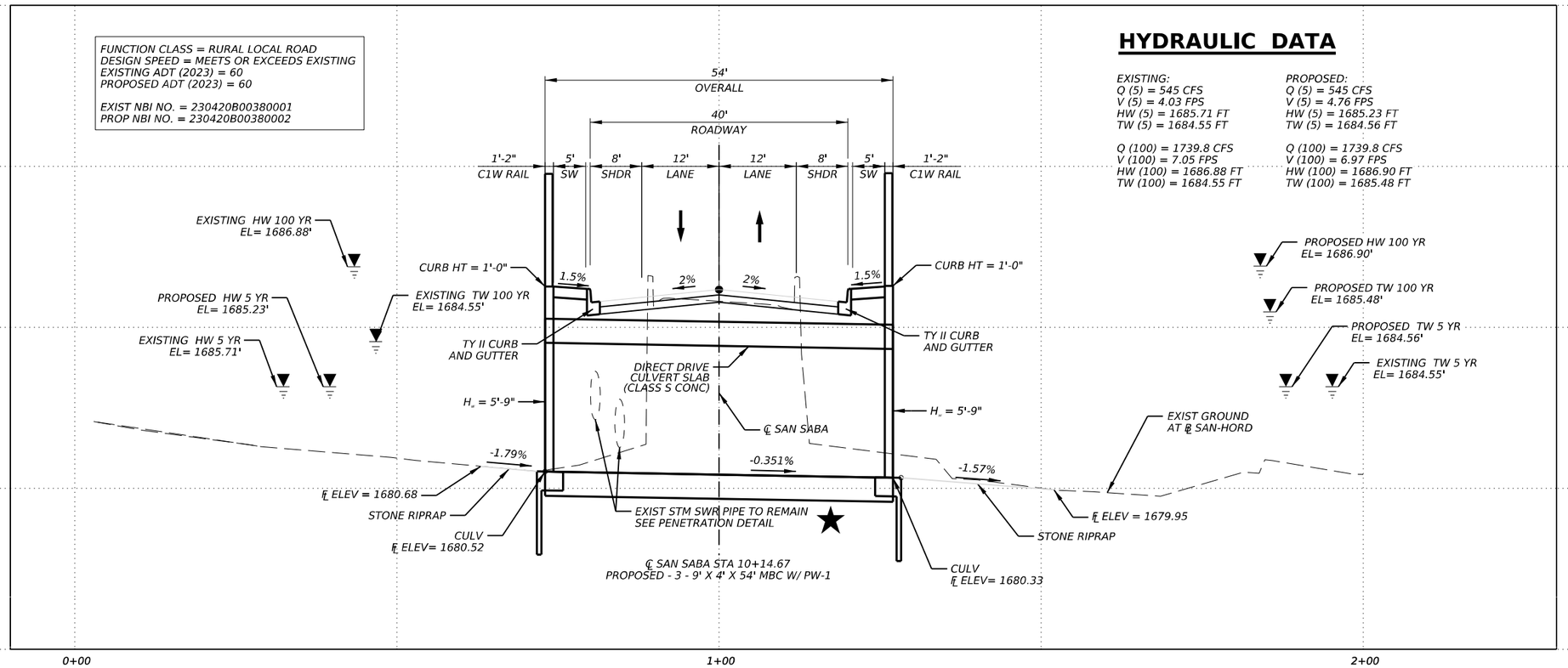
DATE: 7/31/2024 4:17:19 PM
FILE: c:\bmsbridgefarmer-pw\nabin.rajbhandari\dms33796\HYDRAULIC CALCULATIONS CULVERT DATA PROPOSED 10YR & 100YR.dgn

CK: JWL DW: NR CK: JWL DW: NR



NOTES:

1. ROCK COVERED WINGWALL. SEE MISCELLANEOUS DETAIL SHEET FOR ADDITIONAL DETAILS.
2. COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR OCCURRED ON 06/14/2024, IN THE FORM OF PLANS SENT TO JOHN PEARCE, THE FLOODPLAIN ADMINISTRATOR FOR COLEMAN COUNTY.
3. EXISTING STM SWR PIPE TO REMAIN SEE PENETRATION DETAIL FOR ADDITIONAL INFORMATION.
4. SEE BRIDGE CLASS CULVERT TYPICAL SECTIONS FOR ADDITIONAL INFORMATION
5. SEE BCS STANDARD SHEET FOR WINGWALL INFO. NOT SHOWN
6. SEE PLAN AND PROFILE SHEET FOR STONE RIPRAP INFO. NOT SHOWN
7. PRECAST BOXES WILL NOT BE PERMITTED. CULVERT INSTALL SHALL BE IN ACCORDANCE WITH TxDOT MC-9-10 STANDARD.



★ APPROXIMATE LOCATION OF EXISTING UTILITIES SHOWN. UTILITIES SHALL BE FIELD VERIFIED CLEARED AND/OR LOCATED PRIOR TO CONSTRUCTION.

H 0 10 20
V 0 2 4
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

BRIDGE CLASS CULVERT LAYOUT SAN SABA ST

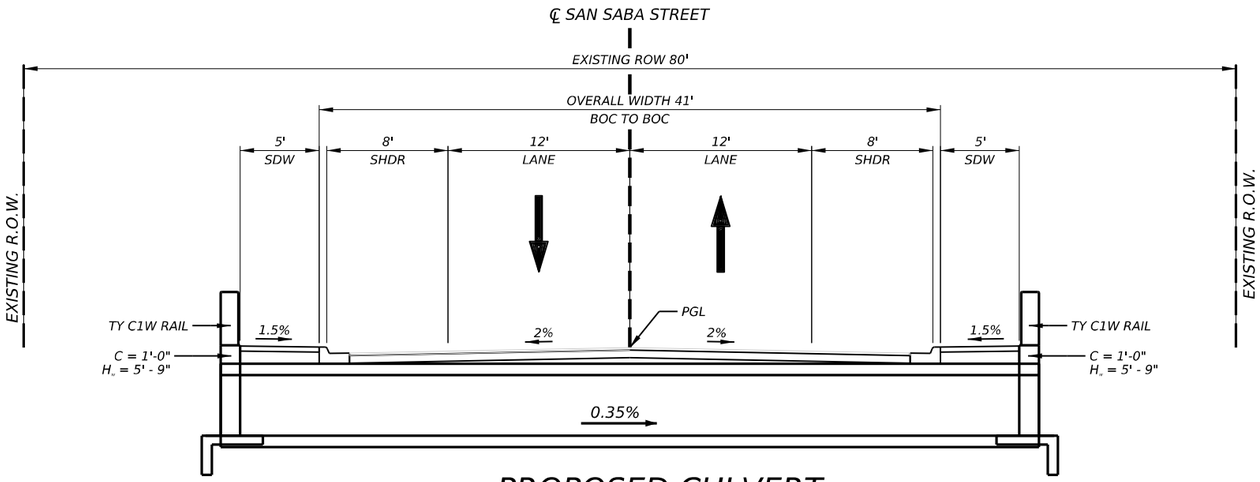
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		62

DATE: 8/1/2024 3:37:43 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms338051\038401030-08-BR03-101.dgn

CK: CK2 | DW: DW | CK: CK1 | DW: DS

DSN:	CK:	DW:	CK:
MRM	JWL	AKH	JWL



PROPOSED CULVERT TYPICAL SECTION

SAN SABA ST.
STA. 10+00.00 to STA 10+29.33
EXISTING - 2- 6.5' X 3.5' & 1- 10' X 3.5' MBC
PROPOSED - 3- 9' X 4' MBC W/ PW-1

DATE: 7/31/2024 7:18:24 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\03840103O-08-BR03-201.dgn

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

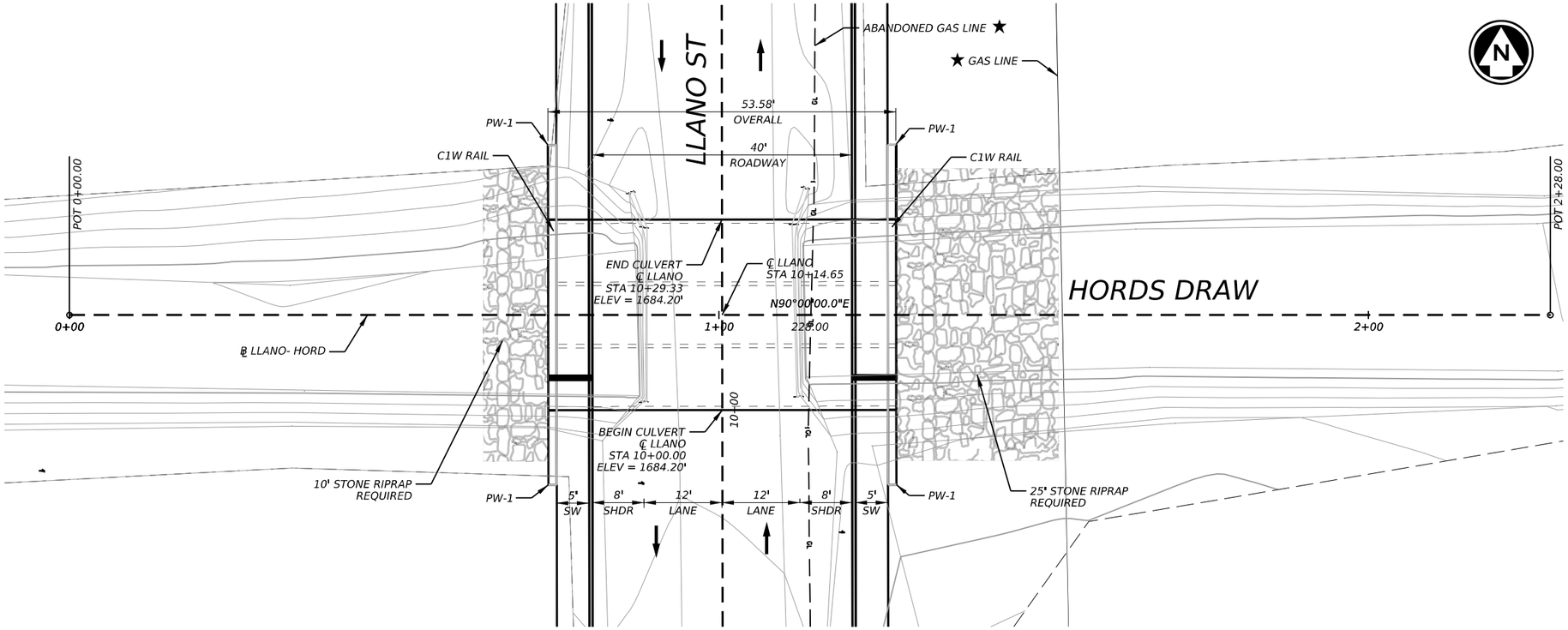
Texas Department of Transportation

BRIDGE CLASS CULVERT
TYPICAL SECTIONS
SAN SABA ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		63

DW:	DS
CK:	CK1
DW:	
CK:	CK2



NOTES:

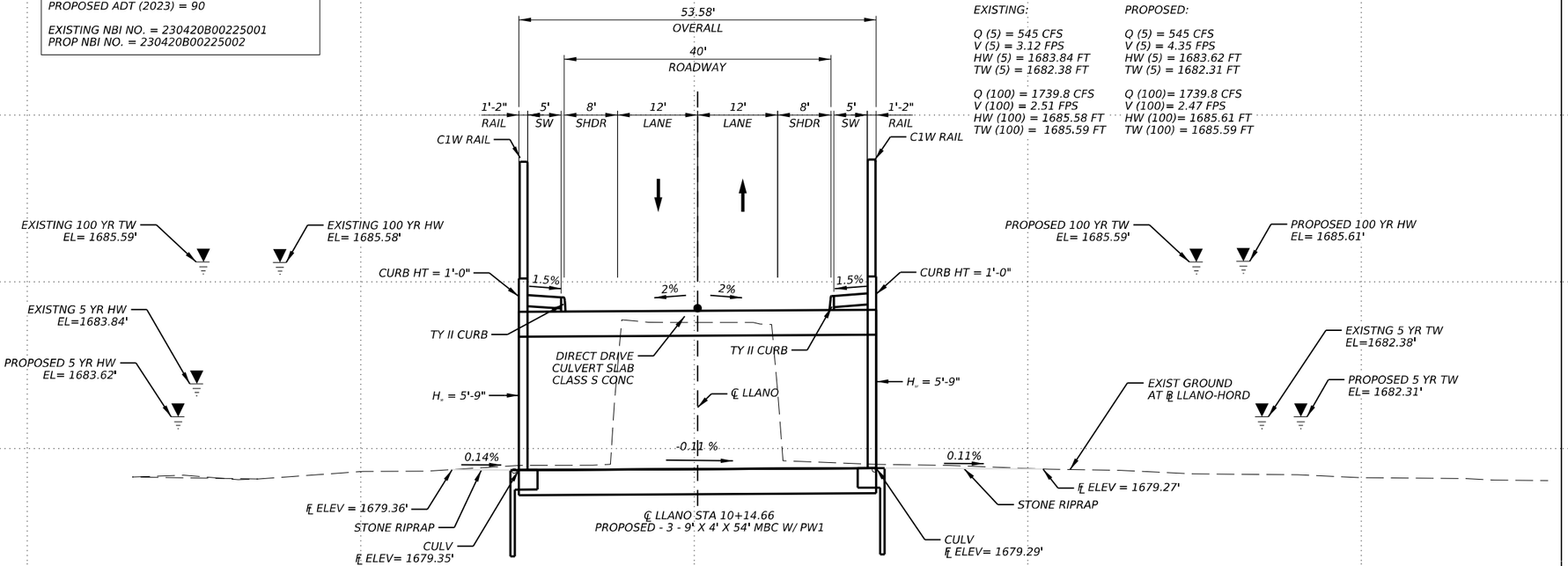
1. *COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR OCCURRED ON 06/14/2024, IN THE FORM OF PLANS SENT TO JOHN PEARCE, THE FLOODPLAIN ADMINISTRATOR FOR COLEMAN COUNTY.*
2. *SEE BRIDGE CLASS CULVERT TYPICAL SECTIONS FOR ADDITIONAL INFORMATION*
3. *SEE BCS STANDARD SHEET FOR WINGWALL INFO. NOT SHOWN*
4. *SEE PLAN AND PROFILE SHEET FOR STONE RIPRAP INFO. NOT SHOWN*
5. *PRECAST BOXES WILL NOT BE PERMITTED. CULVERT INSTALL SHALL BE IN ACCORDANCE WITH TxDOT MC-9-10 STANDARD.*

FUNCTION CLASS = RURAL LOCAL ROAD
DESIGN SPEED = MEETS OR EXCEEDS EXISTING
EXISTING ADT (2023) = 90
PROPOSED ADT (2023) = 90

EXISTING NBI NO. = 230420B00225001
PROP NBI NO. = 230420B00225002

HYDRAULIC DATA

EXISTING:	*PROPOSED:*
Q (5) = 545 CFS	*Q (5) = 545 CFS*
V (5) = 3.12 FPS	*V (5) = 4.35 FPS*
HW (5) = 1683.84 FT	*HW (5) = 1683.62 FT*
TW (5) = 1682.38 FT	*TW (5) = 1682.31 FT*
Q (100) = 1739.8 CFS	*Q (100)= 1739.8 CFS*
V (100) = 2.51 FPS	*V (100)= 2.47 FPS*
HW (100) = 1685.58 FT	*HW (100)= 1685.61 FT*
TW (100) = 1685.59 FT	*TW (100) = 1685.59 FT*



★ *APPROXIMATE LOCATION OF EXISTING UTILITIES SHOWN. UTILITIES SHALL BE FIELD VERIFIED CLEARED AND/OR LOCATED PRIOR TO CONSTRUCTION.*

H 0 10 20
V 0 2 4
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

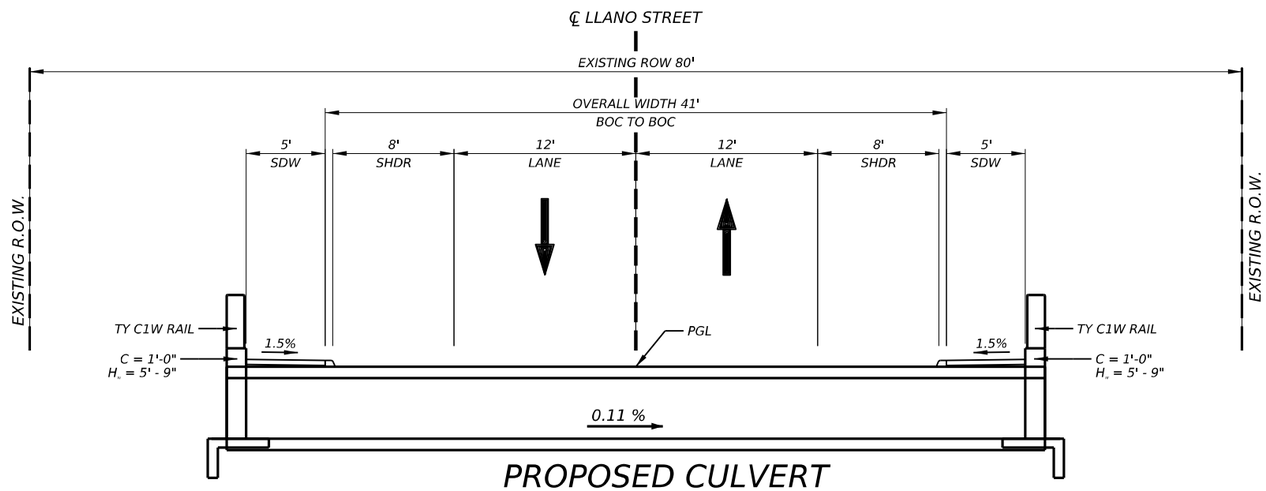
BRIDGE CLASS CULVERT LAYOUT LLANO ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		64

DATE: 8/1/2024 3:37:51 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms\338051\03840103O-08-BR02-101.dgn

DW: MRM | CK: JWL | DW: AKH | CK: JWL



PROPOSED CULVERT TYPICAL SECTION

LLANO ST.
STA. 10+00.00 TO STA. 10+29.33
EXISTING - 2- 6.5' X 3.5' & 1- 10' X 3.5' MBC
PROPOSED - 3- 9' X 4' MBC W/ PW-1

DATE: 7/31/2024 7:18:07 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\03840103O-08-BR02-201.dgn

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

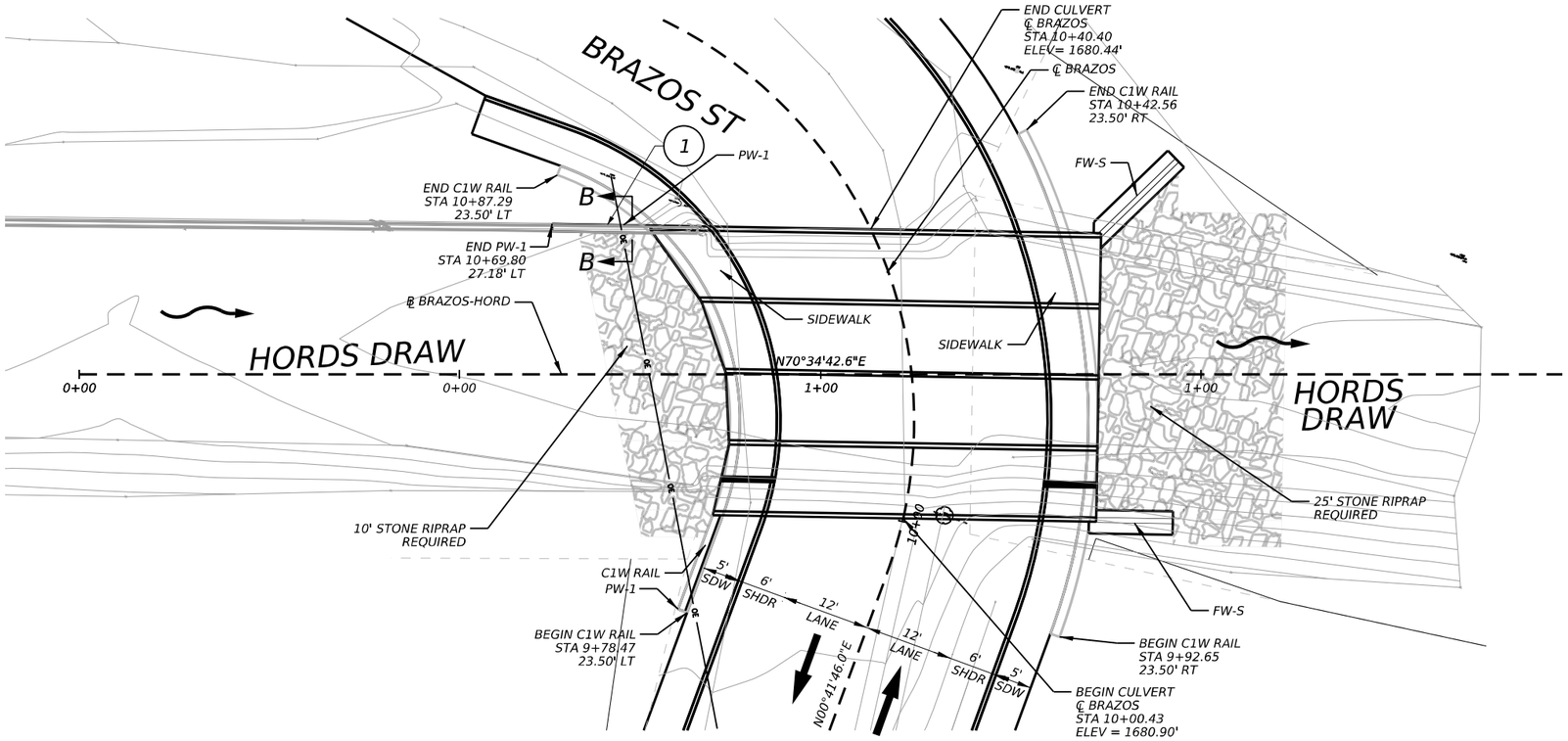
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

BRIDGE CLASS CULVERT
TYPICAL SECTIONS
LLANO ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		65



NOTES:

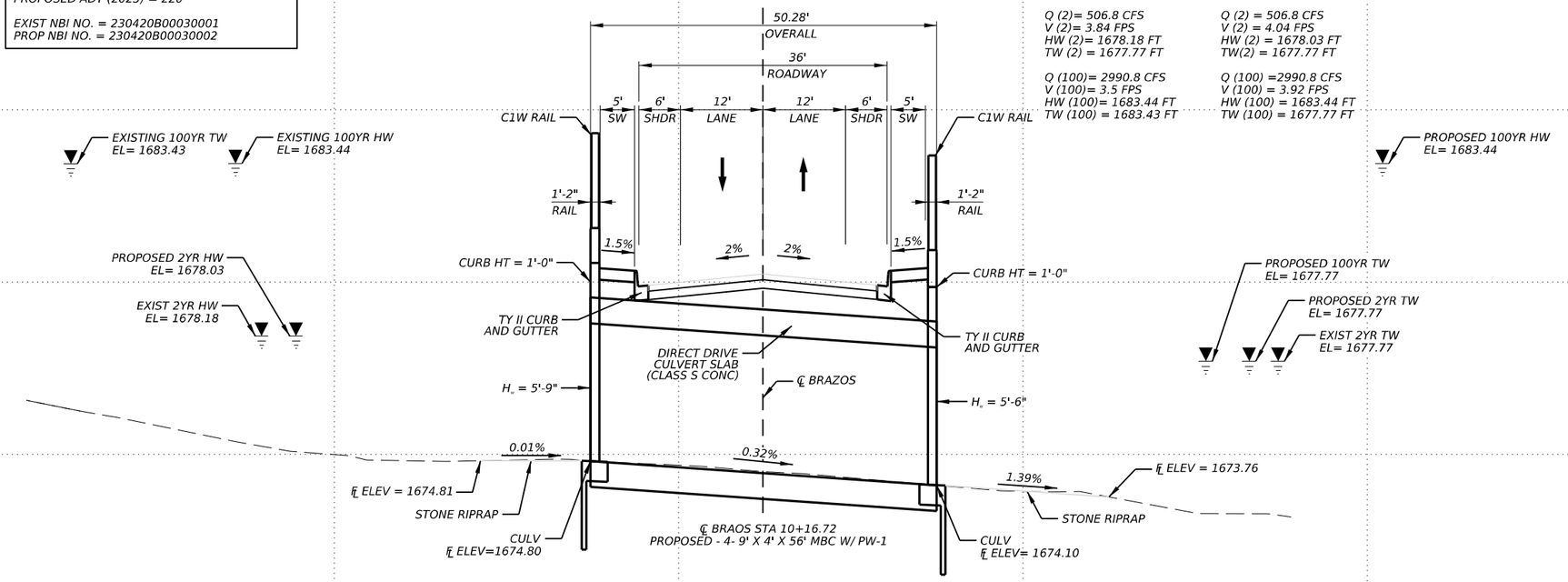
1. *ROCK COVERED WINGWALL. SEE MISCELLANEOUS DETAIL SHEET FOR ADDITIONAL DETAILS.*
2. *COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR OCCURRED ON 06/14/2024, IN THE FORM OF PLANS SENT TO JOHN PEARCE, THE FLOODPLAIN ADMINISTRATOR FOR COLEMAN COUNTY.*
3. *SEE BRIDGE CLASS CULVERT TYPICAL SECTIONS FOR ADDITIONAL INFORMATION*
4. *SEE BCS STANDARD SHEET FOR WINGWALL INFO. NOT SHOWN*
5. *SEE PLAN AND PROFILE SHEET FOR STONE RIPRAP INFO. NOT SHOWN*
6. *PRECAST BOXES WILL NOT BE PERMITTED. CULVERT INSTALL SHALL BE IN ACCORDANCE WITH TxDOT MC-9-10 STANDARD.*

FUNCTION CLASS = RURAL LOCAL ROAD
DESIGN SPEED = MEETS OR EXCEEDS EXISTING
EXISTING ADT (2023) = 220
PROPOSED ADT (2023) = 220

EXIST NBI NO. = 230420B00030001
PROP NBI NO. = 230420B00030002

HYDRAULIC DATA

EXISTING:	*PROPOSED:*
Q (2)= 506.8 CFS	*Q (2) = 506.8 CFS*
V (2)= 3.84 FPS	*V (2) = 4.04 FPS*
HW (2)= 1678.18 FT	*HW (2) = 1678.03 FT*
TW (2) = 1677.77 FT	*TW(2) = 1677.77 FT*
Q (100)= 2990.8 CFS	*Q (100) =2990.8 CFS*
V (100)= 3.5 FPS	*V (100) = 3.92 FPS*
HW (100)= 1683.44 FT	*HW (100) = 1683.44 FT*
TW (100) = 1683.43 FT	*TW (100) = 1677.77 FT*



H 0 10 20
V 0 2 4
SCALE IN FEET

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07. 31. 2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

BRIDGE CLASS CULVERT LAYOUT BRAZOS ST

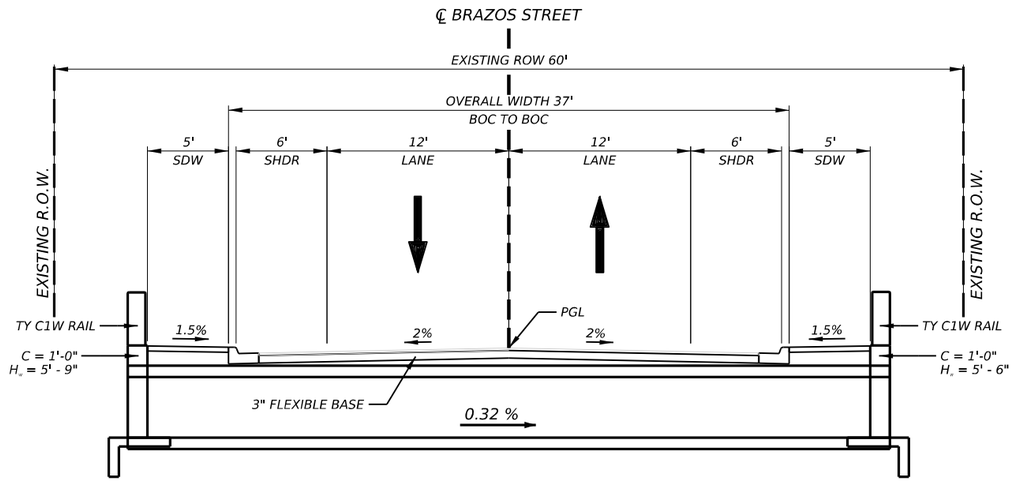
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		66

DATE: 8/1/2024 3:37:59 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms\338051\03840103O-08-BR01-101.dgn

CK2 CK DW DW CK1 CK DS DW

DSN:	MRM	CK:	JWL	DWN:	AKH	CK:	JWL



PROPOSED CULVERT TYPICAL SECTION

BRAZOS ST.
STA. 10+00.43 TO STA. 10+40.40
EXISTING - 4- 8' X 4' MBC
PROPOSED - 4- 9' X 4' MBC W/ PW-1 (LT) AND FW-S (RT)

DATE: 7/31/2024 7:17:50 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms338051038401030-08-BR01-201.dgn

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

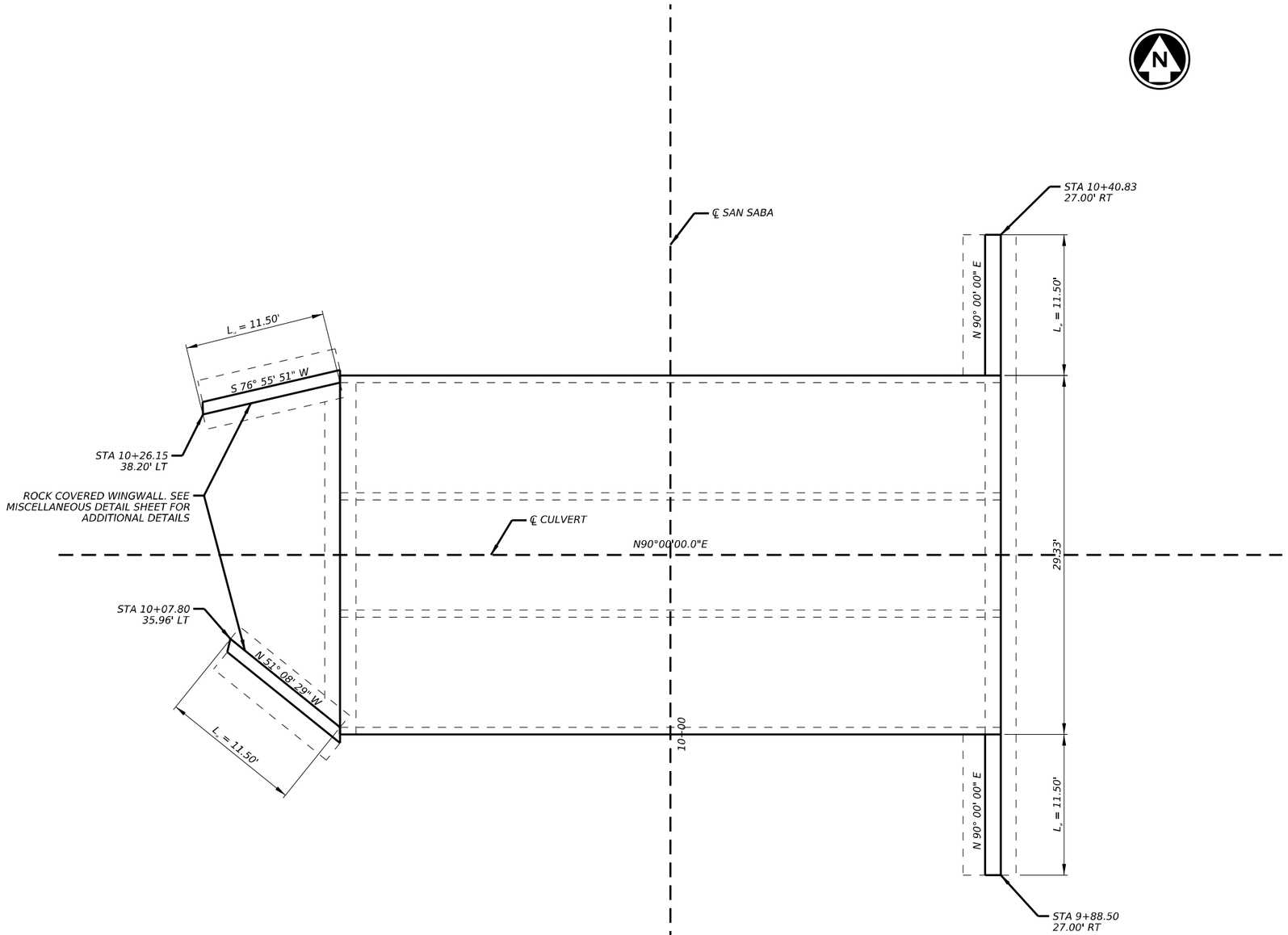
BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

BRIDGE CLASS CULVERT
TYPICAL SECTIONS
BRAZOS ST

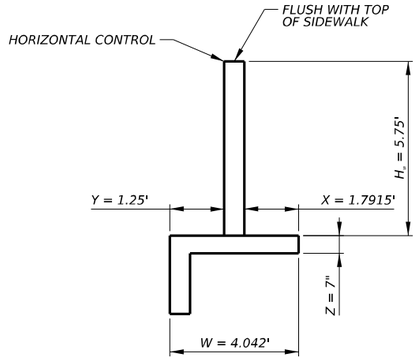
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		67



WINGWALL PLAN

NOTES:
1. DIMENSIONS ARE ALONG OUTSIDE FACE OF WINGWALL STEM.
2. SEE STANDARD "PW" FOR REINFORCEMENT DETAILS.
3. USE TYPE PW-1 WINGWALL.
4. BAR SPACINGS ARE ALONG ℄ 12" WINGWALL STEM.
5. ALIGN BARS J PERPENDICULAR TO ℄ 12" HEADWALL STEM.



WINGWALL SECTION

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

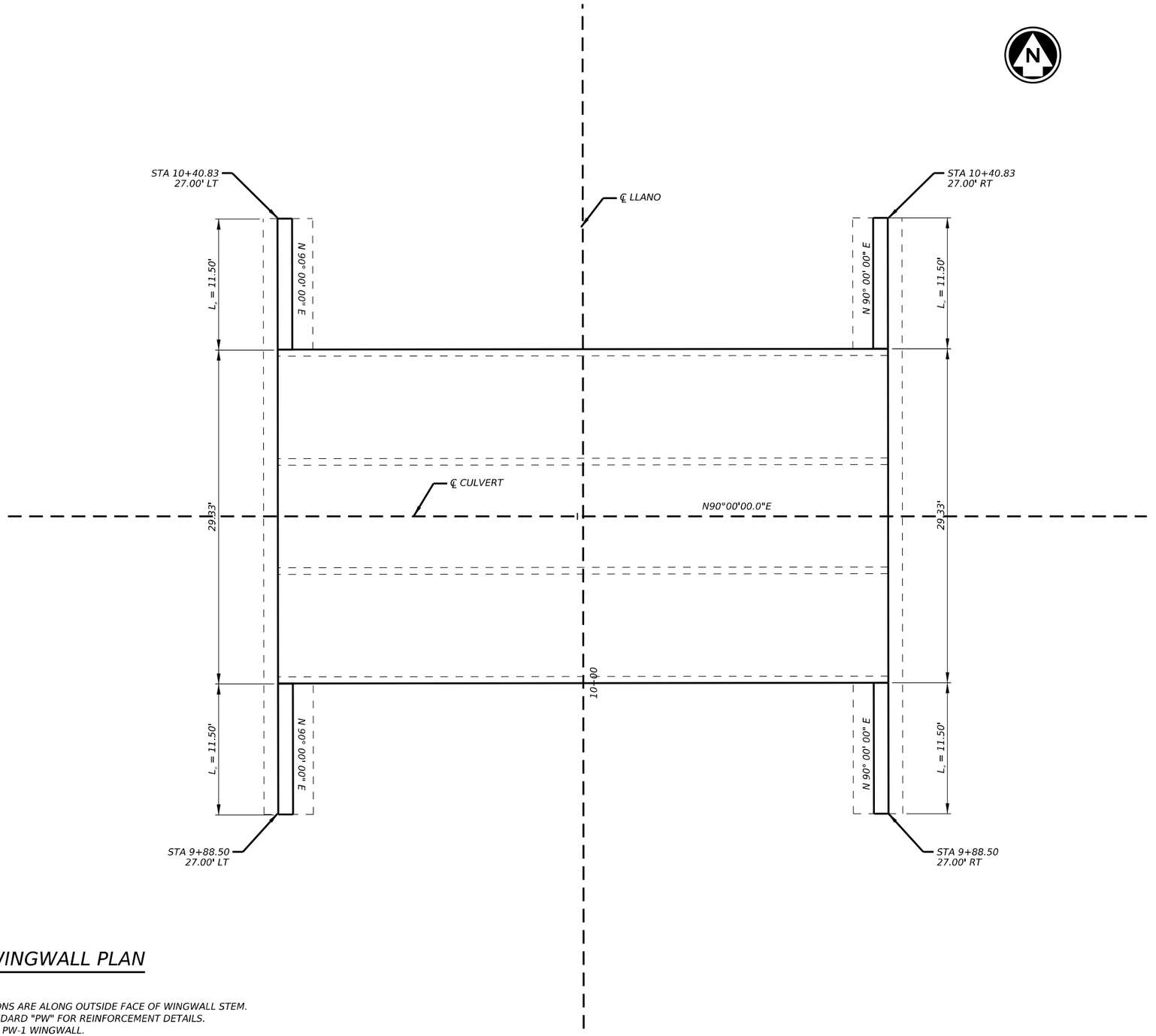
WINGWALL DETAILS
SAN SABA ST

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		68

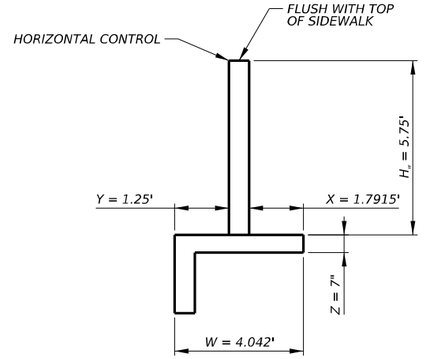
DATE: 8/1/2024 3:38:09 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\WINGWALL DETAILS SAN SABA.dgn

CK:
DW:
CK:
DW:



WINGWALL PLAN

NOTES:
1. DIMENSIONS ARE ALONG OUTSIDE FACE OF WINGWALL STEM.
2. SEE STANDARD "PW" FOR REINFORCEMENT DETAILS.
3. USE TYPE PW-1 WINGWALL.
4. BAR SPACINGS ARE ALONG ℄ 12" WINGWALL STEM.
5. ALIGN BARS J PERPENDICULAR TO ℄ 12" HEADWALL STEM.



WINGWALL SECTION

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

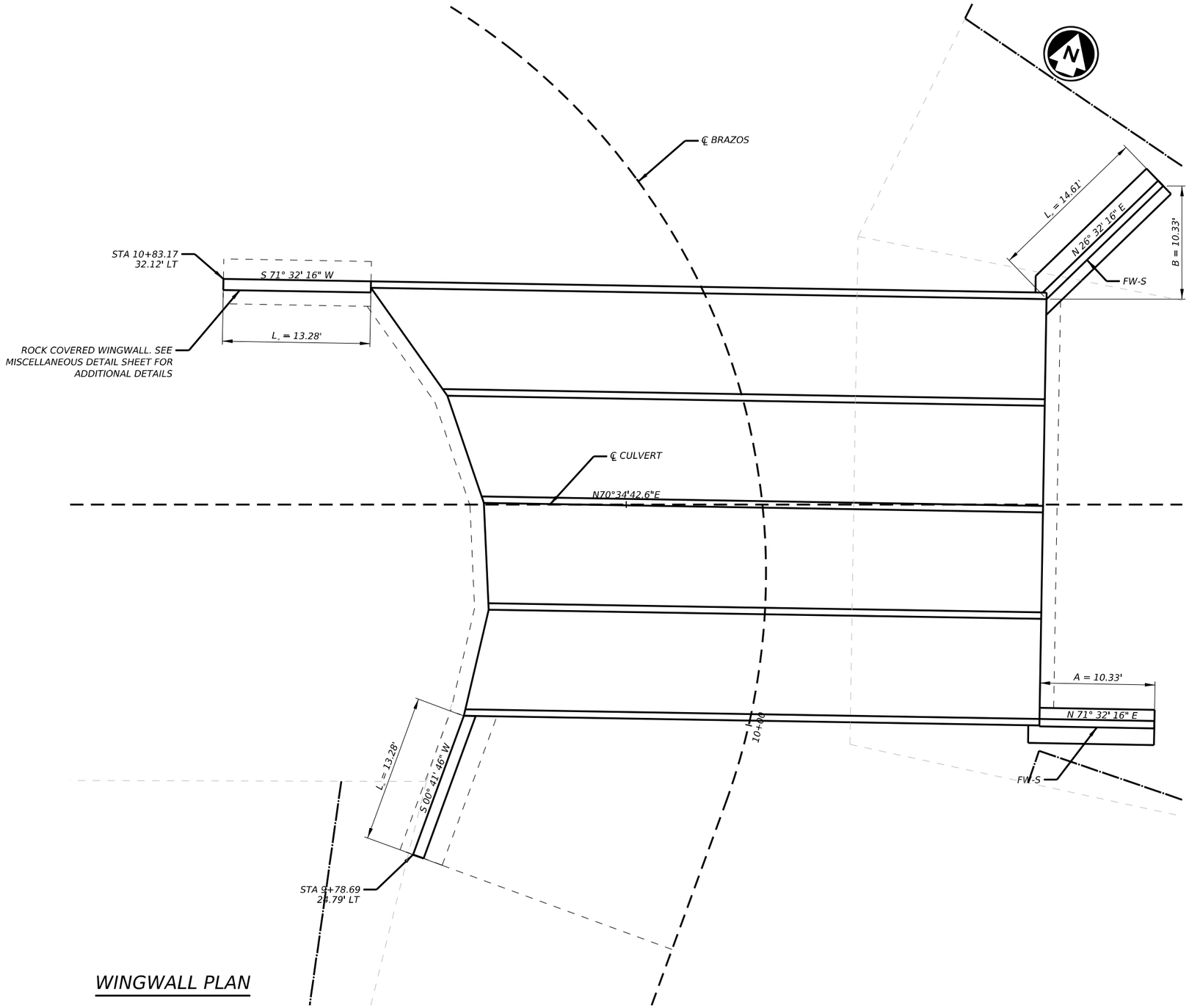
WINGWALL DETAILS
LLANO ST

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		69

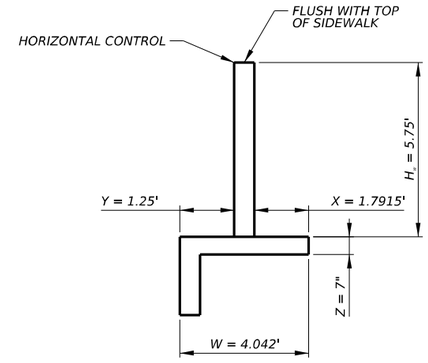
DATE: 7/31/2024 7:18:41 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\WINGWALL DETAILS LLANO.dgn

CK:
DW:
CK:
DW:

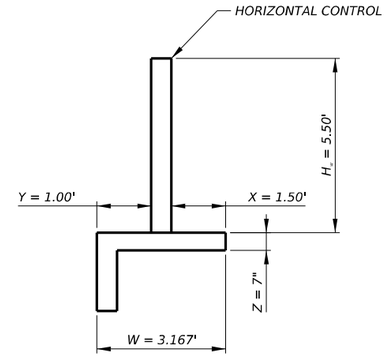


WINGWALL PLAN

NOTES:
1. DIMENSIONS ARE ALONG OUTSIDE FACE OF WINGWALL STEM.
2. SEE STANDARD "PW" FOR REINFORCEMENT DETAILS.
3. USE TYPE PW-1 WINGWALL.
4. BAR SPACINGS ARE ALONG ℄ 12" WINGWALL STEM.
5. ALIGN BARS J PERPENDICULAR TO ℄ 12" HEADWALL STEM.



PARALLEL WINGWALL SECTION



FLARED WINGWALL SECTION

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07. 31. 2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

WINGWALL DETAILS
BRAZOS ST

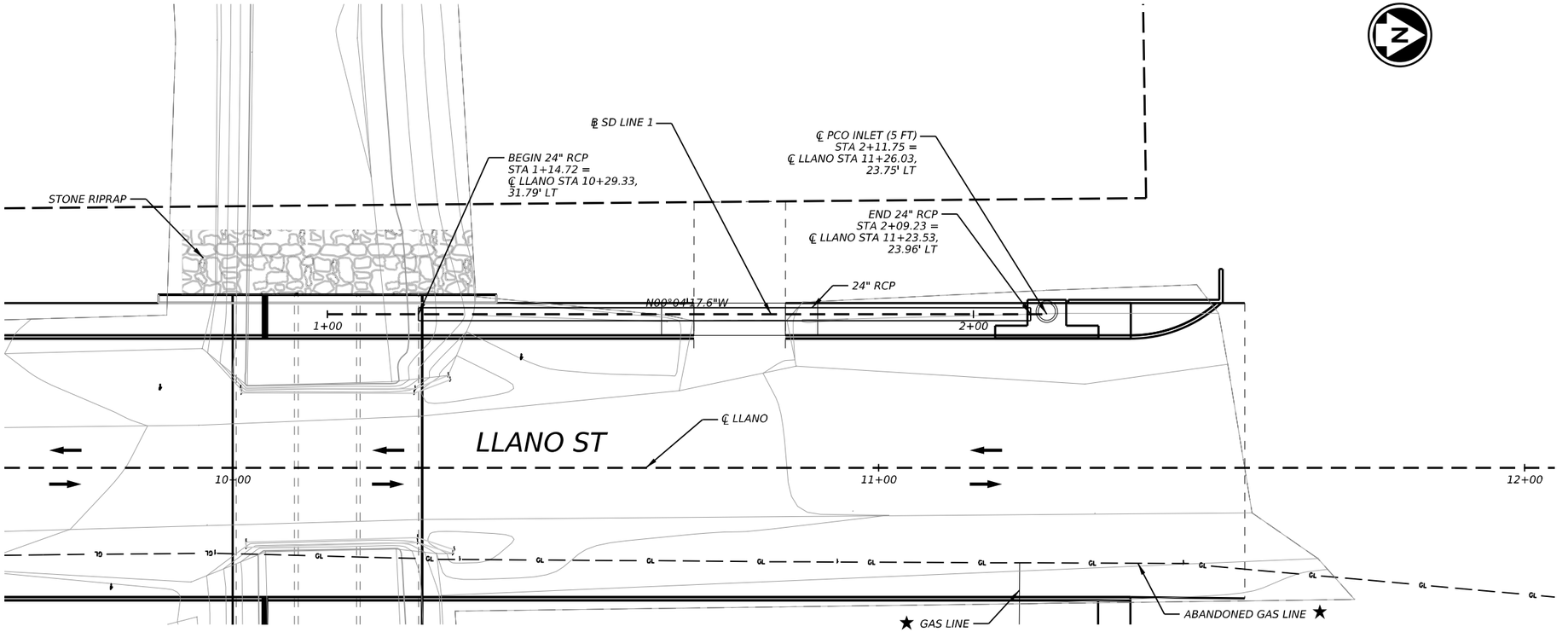
SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		70

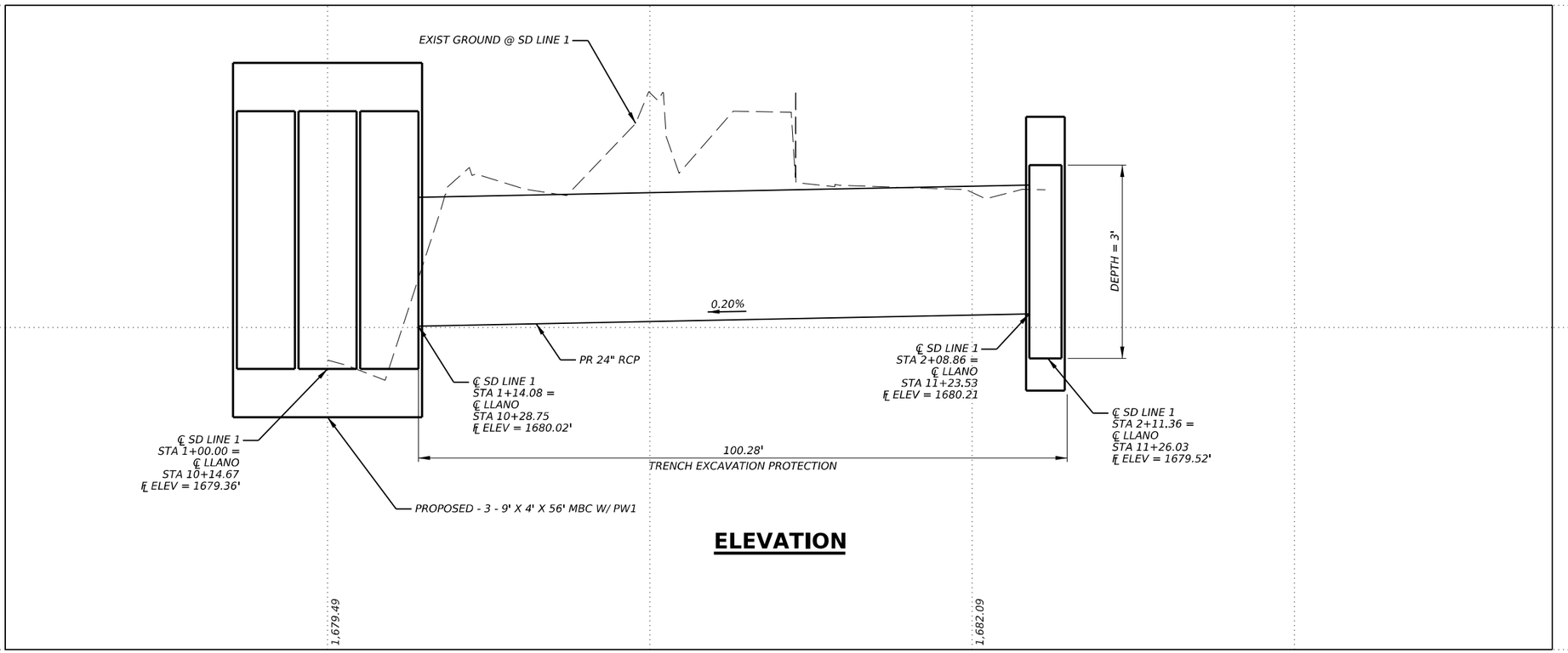
DATE: 7/31/2024 7:18:33 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\WINGWALL DETAILS BRAZOS.dgn

CK:
DW:
CK:
DW:

DW: DS | DW: CK1 | DC: | DW: DW | DC: CK2



★ APPROXIMATE LOCATION OF EXISTING UTILITIES SHOWN. UTILITIES SHALL BE FIELD VERIFIED CLEARED AND/OR LOCATED PRIOR TO CONSTRUCTION.



ELEVATION

DATE: $DATE$ $TIME$
FILE: $FILE$

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

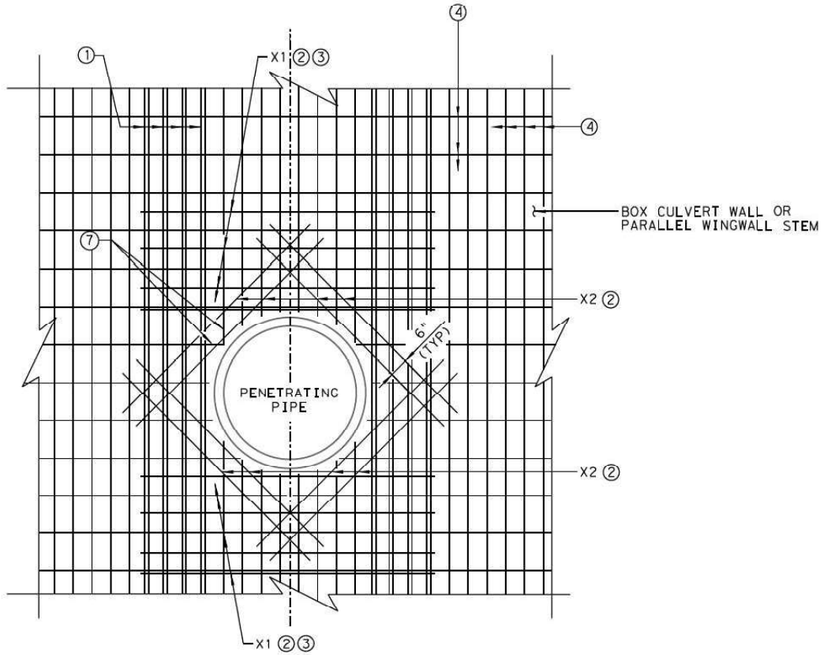
Texas Department of Transportation

SD LINE 1
LLANO ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		71

DW: MRM | DW: CK1 | DW: DW | DW: CK2



PIPE PENETRATION DETAIL

① BUNDLE ADDITIONAL VERTICAL REINFORCING TO MATCH SIZE AND SPACING OF ORIGINAL.

② PROVIDE 3" CLEAR SPACING BETWEEN PENETRATING PIPE AND BARS X.

③ SPACE BARS X1 MIDWAY BETWEEN ROWS OF ORIGINAL STRUCTURE HORIZONTAL REINFORCING.

④ ORIGINAL STRUCTURE REINFORCING

⑤ CUT ORIGINAL STRUCTURE REINFORCING AS REQUIRED TO PROVIDE 2" END CLEAR COVER.

⑥ PROVIDE GRADE 60 REINFORCING STEEL.

⑦ PROVIDE BARS X IN BOTH FRONT AND BACK MATS OF STRUCURE MEMBER REINFORCING.

TABLE OF REINFORCING ⑥⑦			
BAR	COUNT	SIZE	MIN. LENGTH
X1	16	#6	PIPE DIA. + 4'-6"
X2	16	#6	PIPE DIA. + 3'-6"

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

PIPE PENETRATION DETAIL

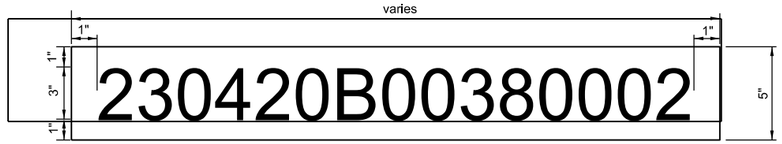
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		72

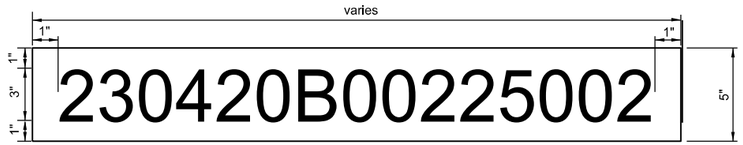
DATE: 7/31/2024 7:19:05 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\PIPE PENETRATION DETAIL.dgn

KEYED NOTES

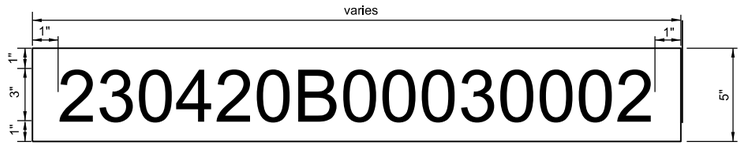
(1) Proposed painted bridge identification number.



BRIDGE IDENTIFICATION NUMBER DETAILS
SAN SABA STREET



BRIDGE IDENTIFICATION NUMBER DETAILS
LLANO STREET



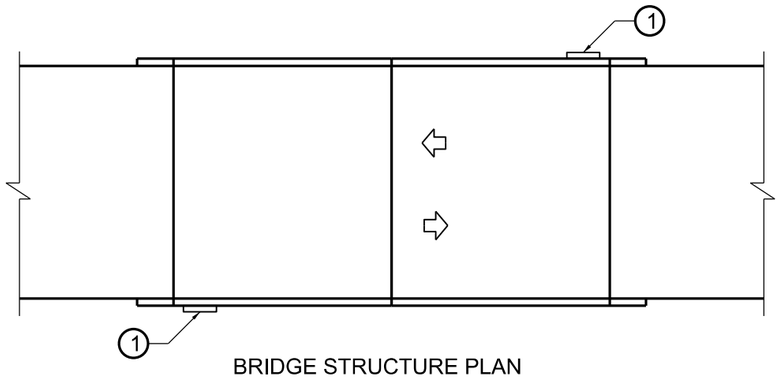
BRIDGE IDENTIFICATION NUMBER DETAILS
BRAZOS STREET

GENERAL NOTES

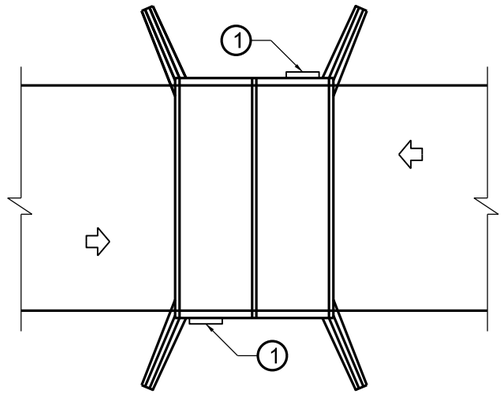
1. Obtain approval of proposed materials and work methods before commencing work.
2. Paints shall be waterproof, weather resistant, and quick drying when used on concrete without smearing, smudging or rippling.
3. Metal stencil set shall have 3 in. interlocking characters, shall include numbers, letters and dashes, and shall have font as approved. C H Hanson stencil set model 10153 or equal.
4. Painted bridge identification numbers shall have white background with black letters. Borders shall be 1 in. minimum. Mask to prevent overspray.
5. For bridge structures, apply painted bridge identification numbers on both sides of structure, except for parallel structures which are only separated by an expansion joint. Apply to each outside edge of concrete deck close to abutment on the upstream traffic side unless otherwise approved.
6. For culvert structures, apply painted bridge identification numbers on both sides of structure. Apply to each headwall adjacent to wingwall on the upstream traffic side unless otherwise approved.
7. The Engineer will provide guidance in cases where painted bridge identification numbers cannot be installed in standard locations.
8. Unless identified in the contract as bid items, painted bridge identification numbers will not be measured and paid for directly, but will be considered as subsidiary to the various bid items of the contract. Submit digital photographs of each new painted bridge identification number to the bridge inspection coordinator. Include the following information visible within the digital photographs: date, latitude, longitude, and direction.

DocuSigned by:

DocuSigned by:
77D14777834646F...
8/1/2024



BRIDGE STRUCTURE PLAN



CULVERT STRUCTURE PLAN

DATE: $DATE$ $TIME$
FILE: $FILEABBREV$

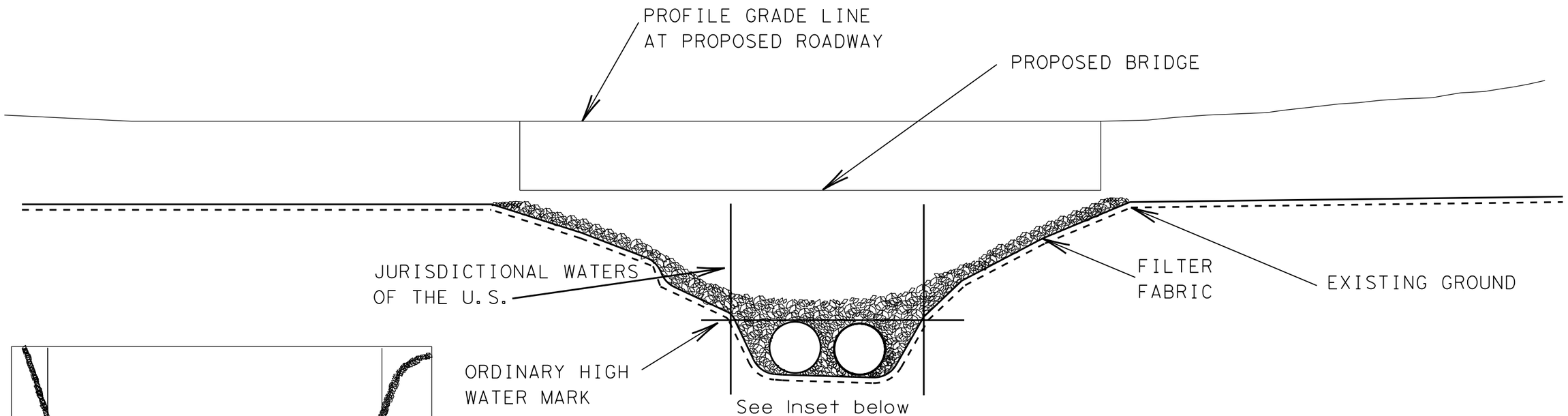
BRIDGE IDENTIFICATION NUMBER DETAILS

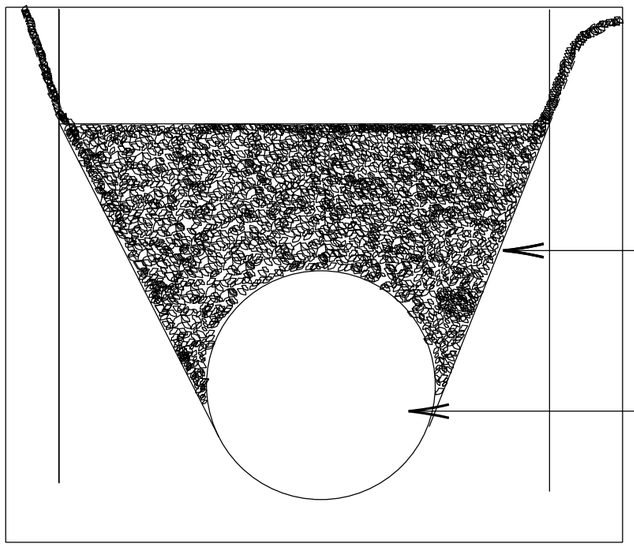
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC.	San Saba St, ETC.
DIST	COUNTY		SHEET NO.
23	COLEMAN		73

TEMPORARY CROSSING

FOR CONSTRUCTION TRAFFIC ONLY

DRAWING NOT TO SCALE





Inset

CAPACITY OF CULVERT(S) SHALL BE ADEQUATE
TO CONVEY THE LOW FLOW OF WATER

DocuSigned by:

STATE OF TEXAS
JASON H. SCANTLING
96633
LICENSED
PROFESSIONAL ENGINEER

DocuSigned by:
77D14777834646F...
8/1/2024

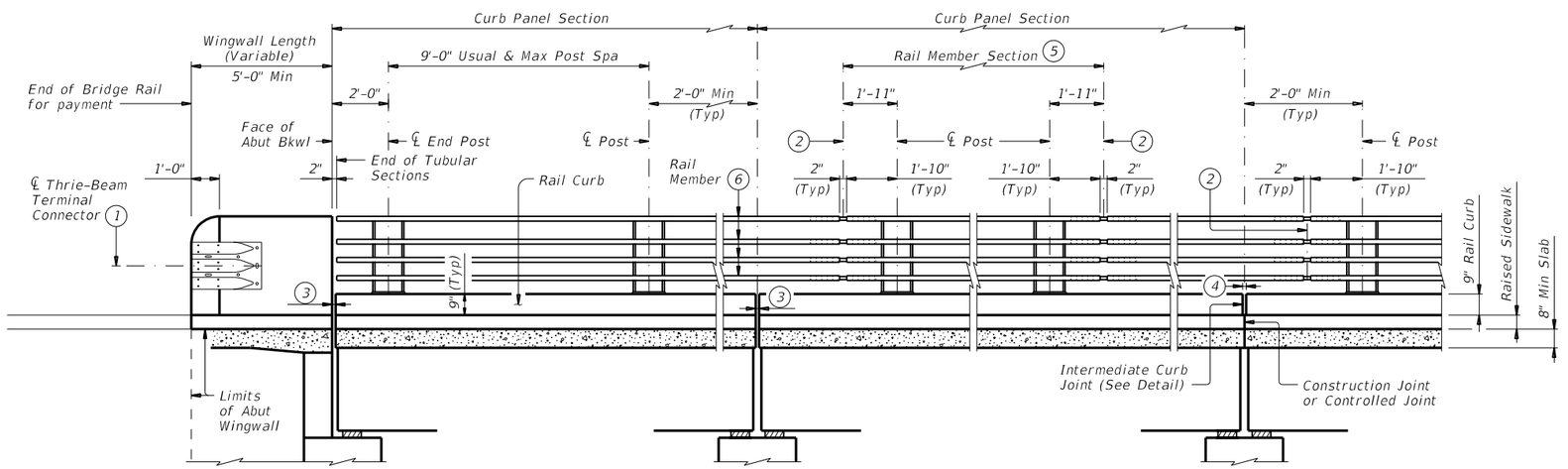
Note: Temporary crossing will not be paid for directly but will be considered subsidiary to pertinent items.

TEMPORARY CROSSING DETAIL

DATE: $DATE$ $TIME$
FILE: $FILE$

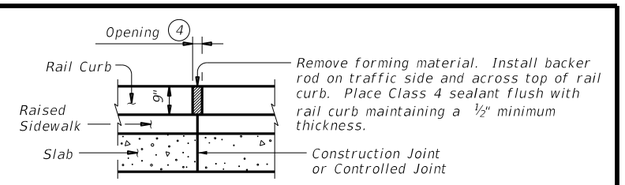
CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		74

DATE: 7/31/2024 7:19:30 PM mMoton
FILE: c:\dms\bridgefarmer-pw\mcmsg.motom\dms33805\038401030-08-BRSD-901.dgn



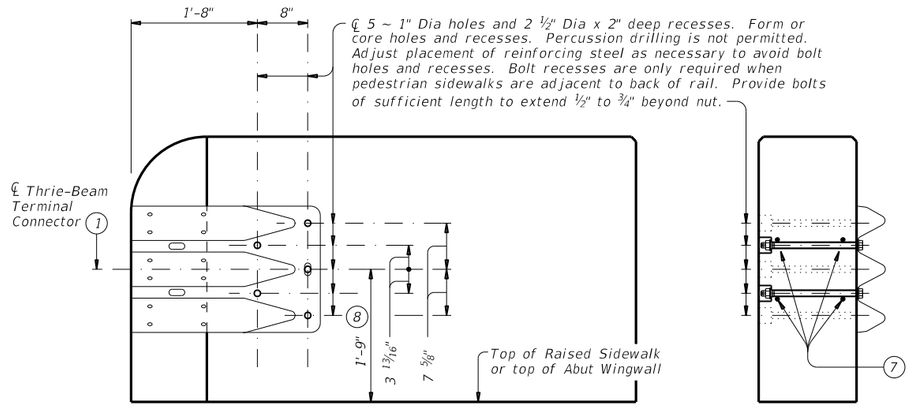
ROADWAY ELEVATION OF RAIL

Showing combination rail on a raised sidewalk.

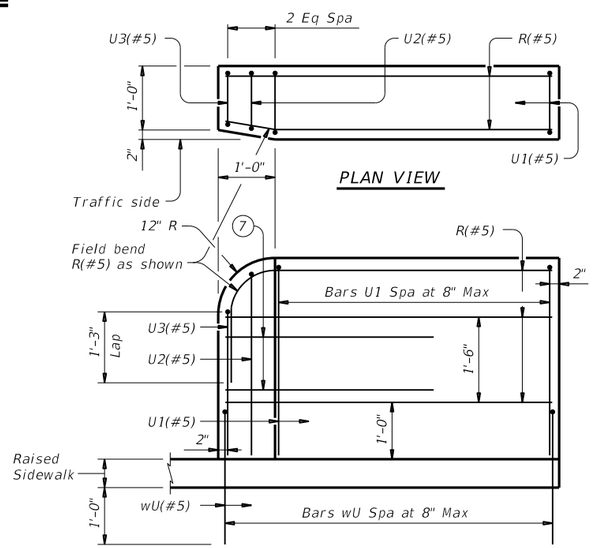


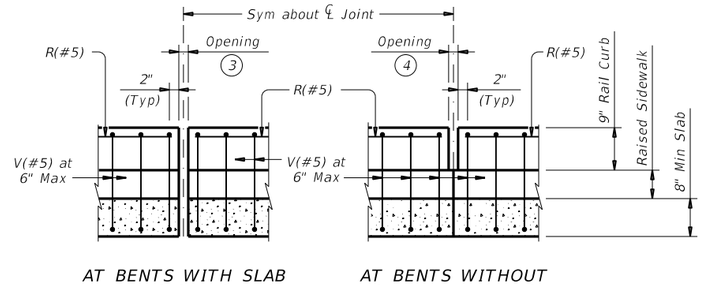
INTERMEDIATE CURB JOINT DETAIL

Provide at all interior bents without slab expansion joints.



TERMINAL CONNECTION DETAILS





ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing with raised sidewalk

(1) *Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence." Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.*

(2) *℄ Expansion Joint or Splice Joint as required.*

(3) *Same as slab joint opening. (5" Max Expansion Joint).*

(4) *¼" Min, ¾" Max.*

(5) *Rail member sections must have at least two posts but not more than four.*

(6) *HSS 6 x 2 x ¼ (ASTM-A1085 or A500 Grade B).*

(7) *Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.*

(8) *Increase 2" for structures with Overlay.*

SHEET 1 OF 4

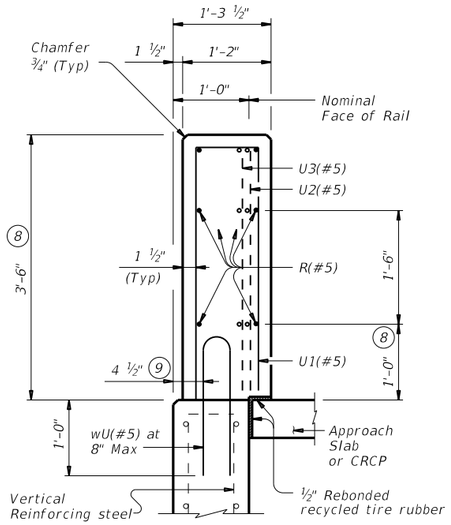
Texas Department of Transportation | Bridge Division Standard

COMBINATION RAIL

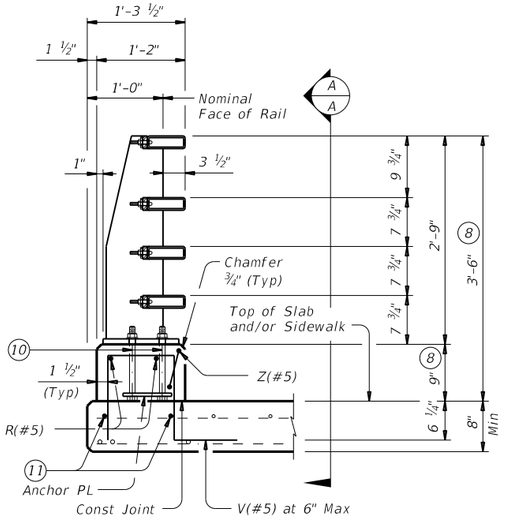
TYPE C1W

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		75

DATE: 7/31/2024
FILE: c:\dms\bridgeformer-pw\mansa.moton\dms33805\038401030-08-BRSD-902.dgn
mMoton 7:19:38 PM

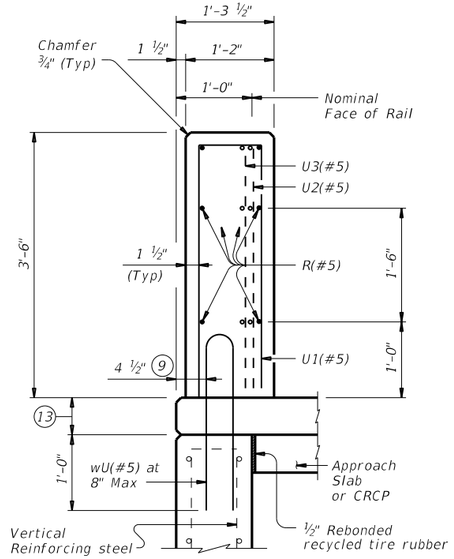


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

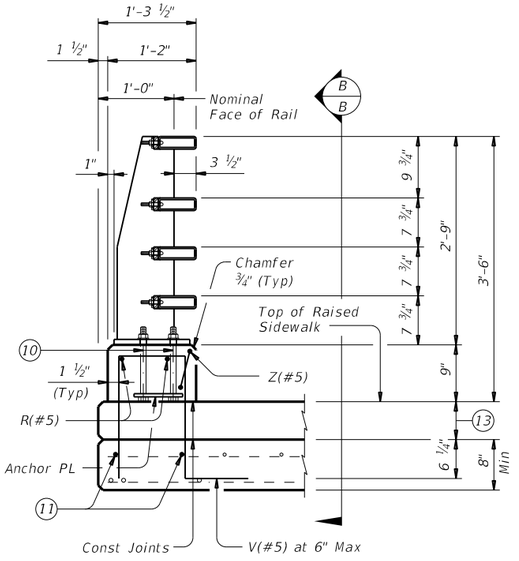


ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

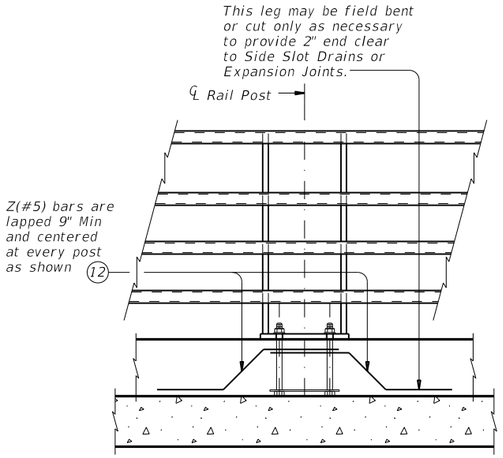


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



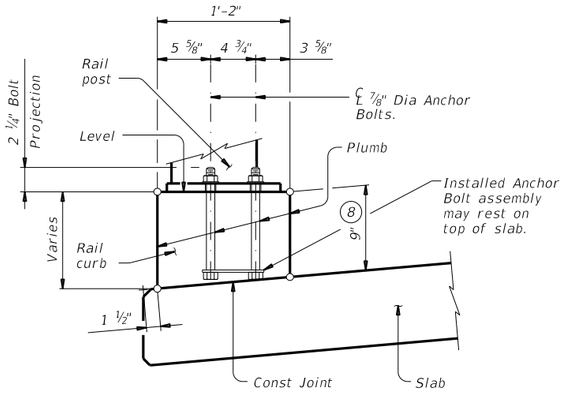
ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK

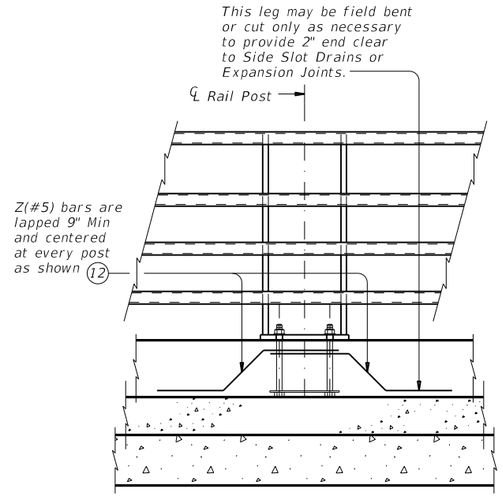


VIEW A-A

Bars V and R omitted for clarity.
Showing without raised sidewalk.

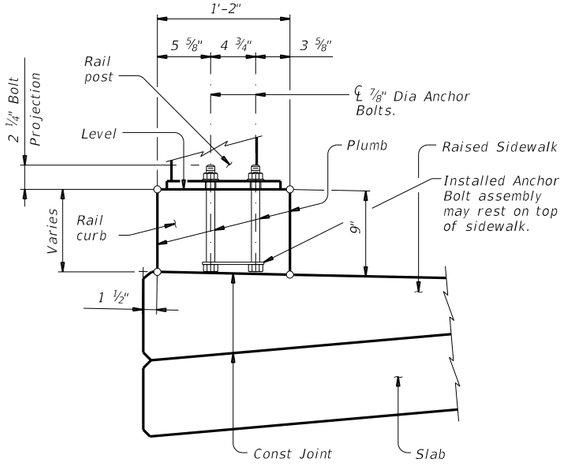


WITHOUT RAISED SIDEWALK



VIEW B-B

Bars V and R omitted for clarity.
Showing with raised sidewalk.



WITH RAISED SIDEWALK

RAIL CURB FORMING DETAIL

Reinforcing steel and rail curb chamfers not shown for clarity.

(8) Increase 2" for structures with Overlay.

(9) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(10) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details."

(11) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(12) Adjust Bars Z(#5) as necessary to avoid Bars V(#5).

(13) Raised Sidewalk.

Texas Department of Transportation

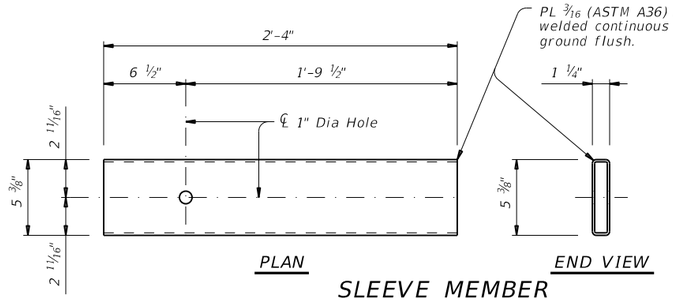
Bridge Division Standard

COMBINATION RAIL

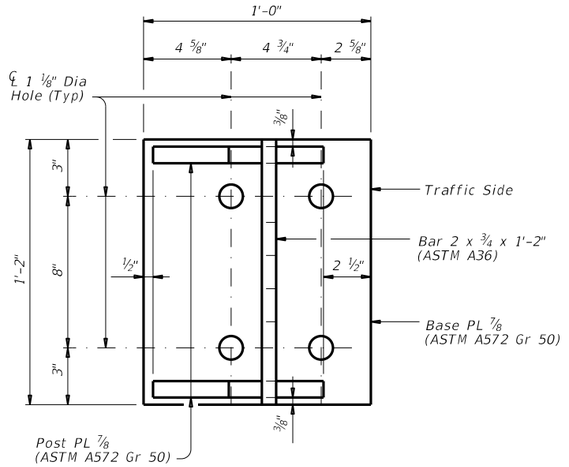
TYPE C1W

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		76

DATE: 7/31/2024 7:19:49 PM mMoton
FILE: c:\dms\bridgeformer-pw\mansa.moton\dms33805\038401030-08-BRSD-903.dgn

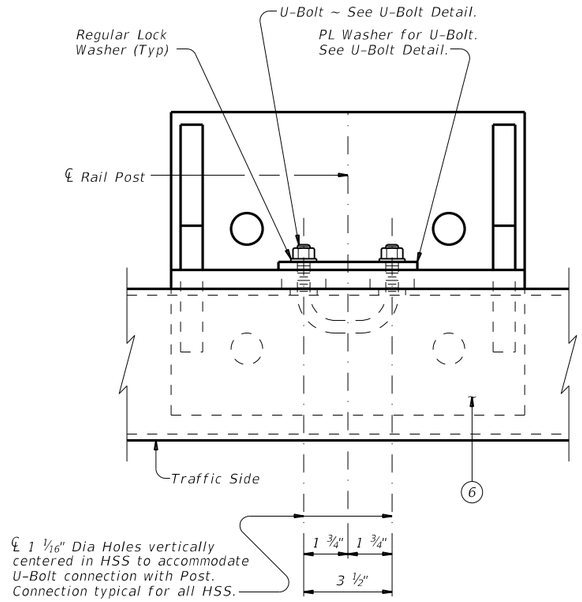


SLEEVE MEMBER



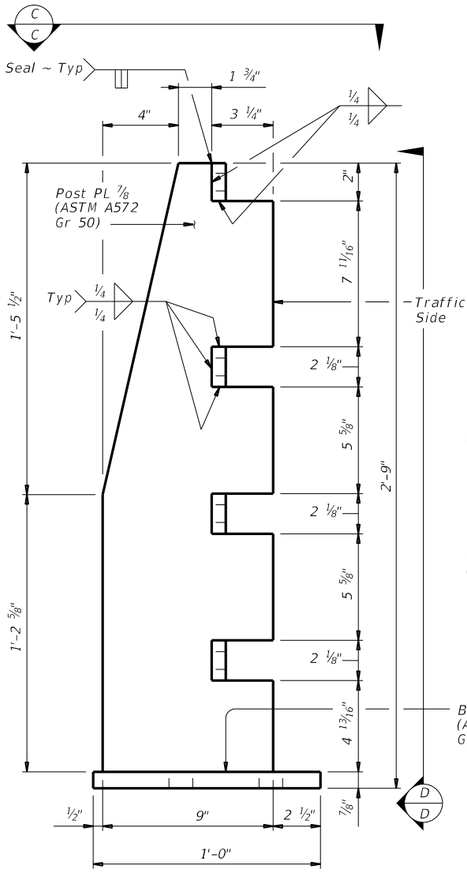
VIEW C-C

(Showing Hole location in Base PL)

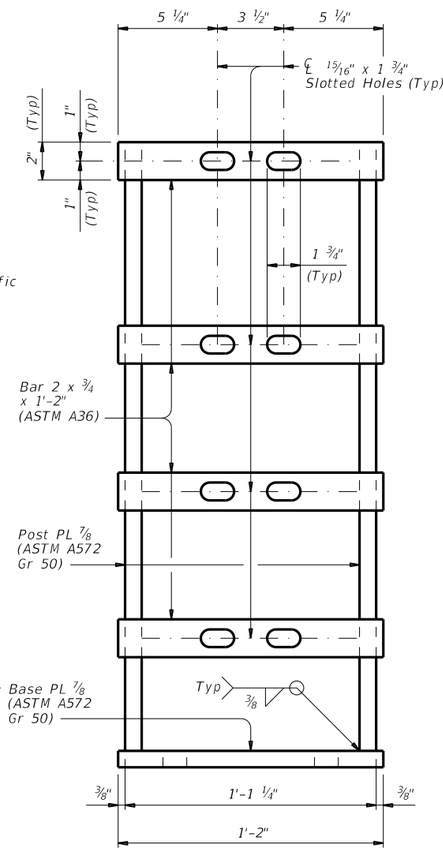


TOP VIEW OF RAIL POST

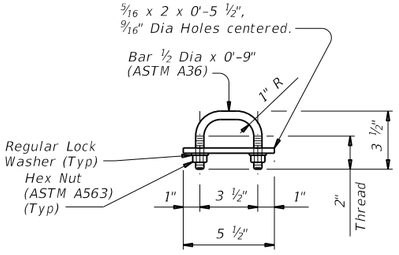
(Showing connection for rail post and HSS.)



POST DETAIL



VIEW D-D

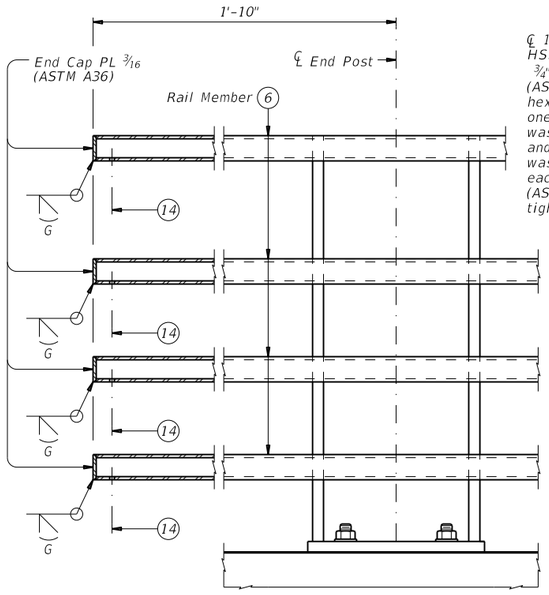


U-BOLT DETAIL

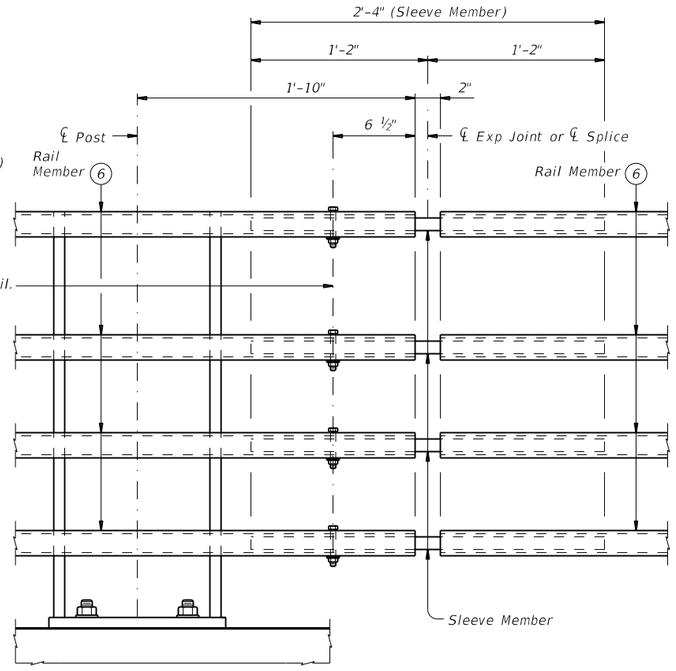
(Showing U-Bolt for rail post and HSS.)

⑥ HSS 6 x 2 x ¼ (ASTM A1085 or A500 Grade B).

⑭ ℄ ⅜" Dia Drain Hole in bottom of HSS.



END CAPS ON HSS AT END POST



EXPANSION JOINT OR SPLICE

℄ 1" Dia holes in HSS centered for ¾" Dia x 3 ½" (ASTM F3125 Gr A325) hex head bolts with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut (ASTM A563). Wrench tight, do not crush rail.

Texas Department of Transportation

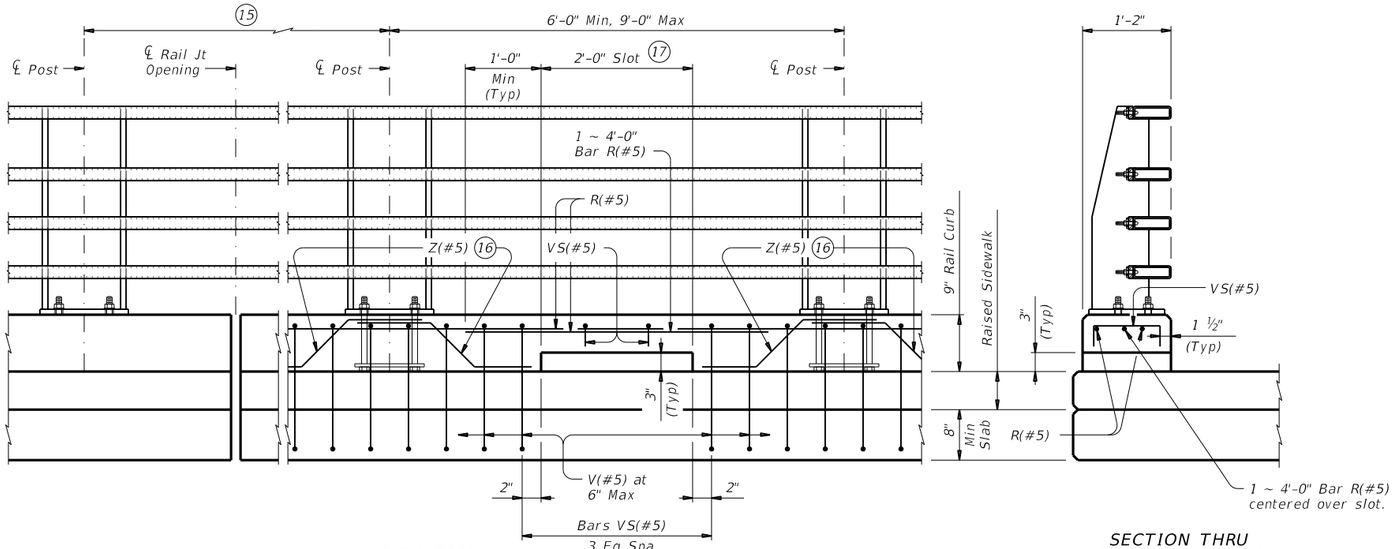
Bridge Division Standard

COMBINATION RAIL

TYPE C1W

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		77

DATE: 7/31/2024 7:19:56 PM mMoton
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33805\038401030-08-BRSD-904.dgn

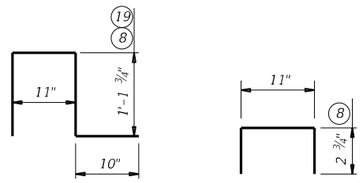


ELEVATION

SECTION THRU SIDE SLOT DRAIN

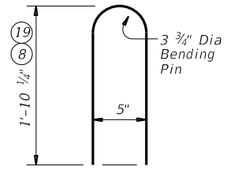
OPTIONAL SIDE SLOT DRAIN DETAILS 18

Showing side slot drain on raised sidewalk, without raised sidewalk similar.

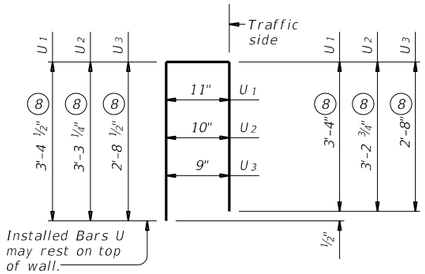


BARS V(#5)

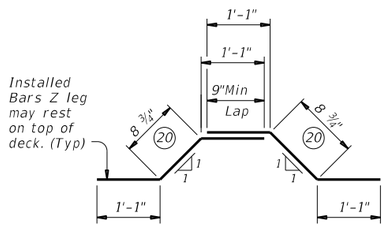
BARS VS(#5)



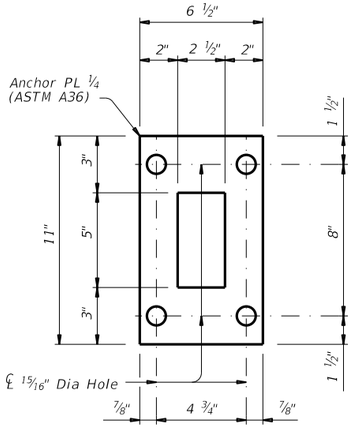
BARS wU(#5)



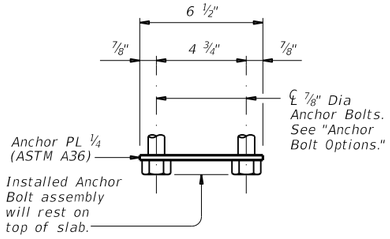
BARS U(#5)



BARS Z(#5)

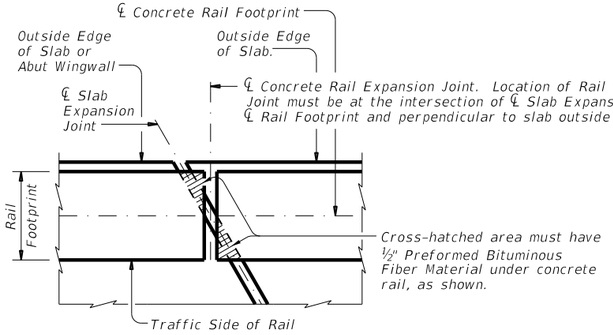


PLAN OF ANCHOR PLATE



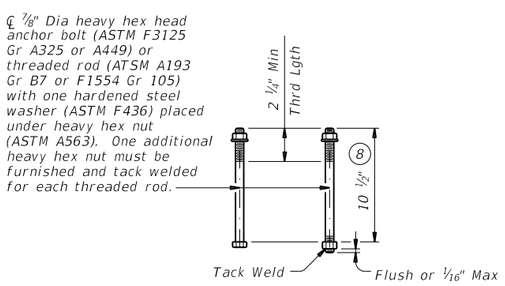
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.



ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for Base Plate)

CONSTRUCTION NOTES:

The face of tubular sections and rail curb must be plumb unless otherwise approved by the Engineer. Steel posts must be square to the top of curb. Use Type VIII epoxy mortar under post base plates if gaps larger than 1⁄16" exist.

Bend tubes to required radius for curved rails. Shop drawings for approval are required for curved rails.

One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single V groove. Grind smooth.

Round or chamfer exposed edges of rail members and rail posts must be rounded or chamfered to approximately 1⁄16" by grinding.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide ASTM A1085 or A500 Gr B for all HSS.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel." Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Provide ⅞" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) placed under each heavy hex nut that conforms to ASTM A563 requirements.

Provide ½" Dia round bar U-bolts (ASTM A36) with plate washer (ASTM A36) and regular lock washers placed under hex nuts that conform to ASTM A563 requirements. See "U-Bolt Detail."

Provide Class "S" concrete. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"

Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

This railing cannot be used on bridges with expansion joints providing more than 5" movement or on cast-in-place retaining walls, unless otherwise noted.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay:

205 plf total

131 plf (Conc)

74 plf (Steel).

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

(8) Increase 2" for structures with Overlay.

(15) Side slot drains are not allowed in areas where there is a joint in the concrete curb between rail posts.

(16) Bars Z(#5). See "Section Thru Rail" and "View A-A or B-B" for Bar Z placement and spacing.

(17) Center side slot drain between posts within the limits shown.

(18) Side slot drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway and a sidewalk, side slot drains are not permitted.

(19) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(20) Increase 2 ¾" for structures with Overlay.

Texas Department of Transportation

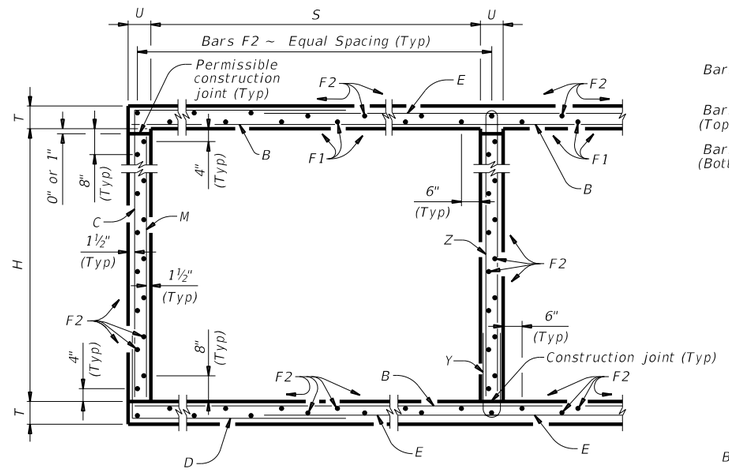
Bridge Division Standard

COMBINATION RAIL

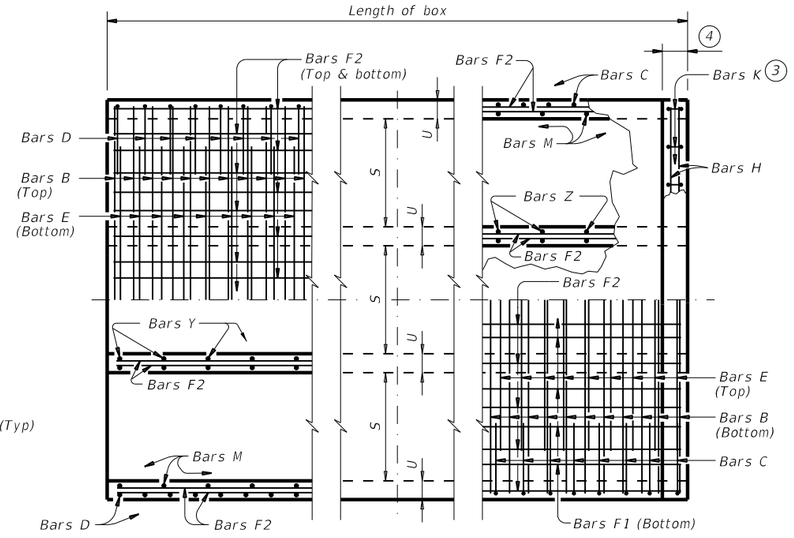
TYPE C1W

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		78

DATE: 7/31/2024 7:20:04 PM
FILE: c:\bms\bridgefarmer-pw\mansa.morton\dms33805\038401030-08-BRSD-905.dgn
mMoton



TYPICAL SECTION



BOTTOM SLAB TOP SLAB

PART PLANS

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

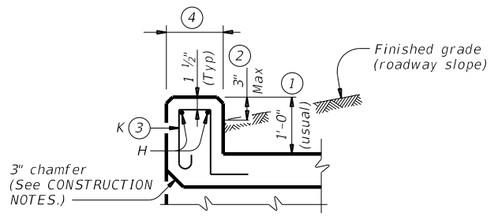
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

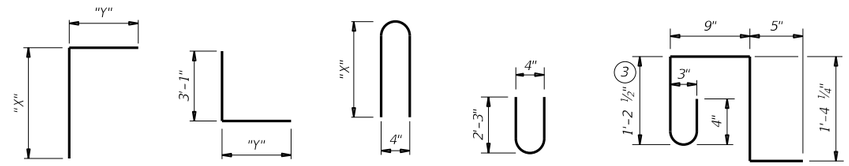
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



SECTION THRU CURB

TABLE OF BAR DIMENSIONS

H	"X"	"Y"
4'-0"	4'-7 ½"	5'-5"
5'-0"	5'-7 ½"	5'-5"
6'-0"	6'-7 ½"	5'-5"
7'-0"	7'-7 ½"	5'-5"
8'-0"	8'-7 ½"	5'-5"
9'-0"	9'-7 ½"	5'-5"



BARS C BARS D BARS Z BARS Y

BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
9'-0" SPAN
0' TO 10' FILL
MC-9-10

FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		79

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4						Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
												Bars C		Bars D																	Bars Y		Bars Z											
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	9' – 0"	4' – 0"	9"	7"	162	#6	6"	19' – 6"	4,745	108	#6	9"	10' – 1"	1,636	8' – 7"	1,392	162	#6	6"	14' – 1"	3,427	14	18"	39' – 9"	372	62	18"	39' – 9"	1,646	108	9"	4' – 0"	289	54	9"	4' – 9"	171	9' – 5"	340	19' – 6"	52	42	117	1.356	350.5	1.5	169	55.7	14,187
3	9' – 0"	4' – 0"	9"	7"	162	#6	6"	29' – 1"	7,077	108	#6	9"	10' – 1"	1,636	8' – 7"	1,392	162	#6	6"	23' – 8"	5,759	21	18"	39' – 9"	558	89	18"	39' – 9"	2,363	108	9"	4' – 0"	289	108	9"	4' – 9"	343	9' – 5"	679	29' – 1"	78	62	173	1.975	502.4	2.2	251	81.2	20,347
4	9' – 0"	4' – 0"	9"	7"	162	#6	6"	38' – 8"	9,409	108	#6	9"	10' – 1"	1,636	8' – 7"	1,392	162	#6	6"	33' – 3"	8,091	28	18"	39' – 9"	743	116	18"	39' – 9"	3,080	108	9"	4' – 0"	289	162	9"	4' – 9"	514	9' – 5"	1,019	38' – 8"	103	80	223	2.594	654.3	2.9	326	106.6	26,499
5	9' – 0"	4' – 0"	9"	7"	162	#6	6"	48' – 3"	11,740	108	#6	9"	10' – 1"	1,636	8' – 7"	1,392	162	#6	6"	42' – 10"	10,422	35	18"	39' – 9"	929	143	18"	39' – 9"	3,797	108	9"	4' – 0"	289	216	9"	4' – 9"	685	9' – 5"	1,359	48' – 3"	129	100	278	3.213	806.2	3.6	407	132.1	32,656
6	9' – 0"	4' – 0"	9"	7"	162	#6	6"	57' – 10"	14,072	108	#6	9"	10' – 1"	1,636	8' – 7"	1,392	162	#6	6"	52' – 5"	12,754	42	18"	39' – 9"	1,115	170	18"	39' – 9"	4,514	108	9"	4' – 0"	289	270	9"	4' – 9"	857	9' – 5"	1,698	57' – 10"	155	118	328	3.832	958.2	4.3	483	157.6	38,810
2	9' – 0"	5' – 0"	9"	7"	162	#6	6"	19' – 6"	4,745	108	#6	9"	11' – 1"	1,798	8' – 7"	1,392	162	#6	6"	14' – 1"	3,427	14	18"	39' – 9"	372	68	18"	39' – 9"	1,806	108	9"	5' – 0"	361	54	9"	4' – 9"	171	11' – 5"	412	19' – 6"	52	42	117	1.421	362.1	1.5	169	58.3	14,653
3	9' – 0"	5' – 0"	9"	7"	162	#6	6"	29' – 1"	7,077	108	#6	9"	11' – 1"	1,798	8' – 7"	1,392	162	#6	6"	23' – 8"	5,759	21	18"	39' – 9"	558	97	18"	39' – 9"	2,576	108	9"	5' – 0"	361	108	9"	4' – 9"	343	11' – 5"	824	29' – 1"	78	62	173	2.062	517.2	2.2	251	84.6	20,939
4	9' – 0"	5' – 0"	9"	7"	162	#6	6"	38' – 8"	9,409	108	#6	9"	11' – 1"	1,798	8' – 7"	1,392	162	#6	6"	33' – 3"	8,091	28	18"	39' – 9"	743	126	18"	39' – 9"	3,346	108	9"	5' – 0"	361	162	9"	4' – 9"	514	11' – 5"	1,235	38' – 8"	103	80	223	2.702	672.2	2.9	326	111.0	27,215
5	9' – 0"	5' – 0"	9"	7"	162	#6	6"	48' – 3"	11,740	108	#6	9"	11' – 1"	1,798	8' – 7"	1,392	162	#6	6"	42' – 10"	10,422	35	18"	39' – 9"	929	155	18"	39' – 9"	4,116	108	9"	5' – 0"	361	216	9"	4' – 9"	685	11' – 5"	1,647	48' – 3"	129	100	278	3.343	827.3	3.6	407	137.3	33,497
6	9' – 0"	5' – 0"	9"	7"	162	#6	6"	57' – 10"	14,072	108	#6	9"	11' – 1"	1,798	8' – 7"	1,392	162	#6	6"	52' – 5"	12,754	42	18"	39' – 9"	1,115	184	18"	39' – 9"	4,886	108	9"	5' – 0"	361	270	9"	4' – 9"	857	11' – 5"	2,059	57' – 10"	155	118	328	3.983	982.4	4.3	483	163.6	39,777
2	9' – 0"	6' – 0"	9"	7"	162	#6	6"	19' – 6"	4,745	108	#6	9"	12' – 1"	1,960	8' – 7"	1,392	162	#6	6"	14' – 1"	3,427	14	18"	39' – 9"	372	74	18"	39' – 9"	1,965	108	9"	6' – 0"	433	54	9"	4' – 9"	171	13' – 5"	484	19' – 6"	52	42	117	1.486	373.7	1.5	169	60.9	15,118
3	9' – 0"	6' – 0"	9"	7"	162	#6	6"	29' – 1"	7,077	108	#6	9"	12' – 1"	1,960	8' – 7"	1,392	162	#6	6"	23' – 8"	5,759	21	18"	39' – 9"	558	105	18"	39' – 9"	2,788	108	9"	6' – 0"	433	108	9"	4' – 9"	343	13' – 5"	968	29' – 1"	78	62	173	2.148	532.0	2.2	251	88.1	21,529
4	9' – 0"	6' – 0"	9"	7"	162	#6	6"	38' – 8"	9,409	108	#6	9"	12' – 1"	1,960	8' – 7"	1,392	162	#6	6"	33' – 3"	8,091	28	18"	39' – 9"	743	136	18"	39' – 9"	3,611	108	9"	6' – 0"	433	162	9"	4' – 9"	514	13' – 5"	1,452	38' – 8"	103	80	223	2.810	690.1	2.9	326	115.3	27,931
5	9' – 0"	6' – 0"	9"	7"	162	#6	6"	48' – 3"	11,740	108	#6	9"	12' – 1"	1,960	8' – 7"	1,392	162	#6	6"	42' – 10"	10,422	35	18"	39' – 9"	929	167	18"	39' – 9"	4,434	108	9"	6' – 0"	433	216	9"	4' – 9"	685	13' – 5"	1,936	48' – 3"	129	100	278	3.472	848.3	3.6	407	142.5	34,338
6	9' – 0"	6' – 0"	9"	7"	162	#6	6"	57' – 10"	14,072	108	#6	9"	12' – 1"	1,960	8' – 7"	1,392	162	#6	6"	52' – 5"	12,754	42	18"	39' – 9"	1,115	198	18"	39' – 9"	5,257	108	9"	6' – 0"	433	270	9"	4' – 9"	857	13' – 5"	2,420	57' – 10"	155	118	328	4.134	1,006.5	4.3	483	169.6	40,743
2	9' – 0"	7' – 0"	9"	7"	162	#6	6"	19' – 6"	4,745	108	#6	9"	13' – 1"	2,122	8' – 7"	1,392	162	#6	6"	14' – 1"	3,427	14	18"	39' – 9"	372	74	18"	39' – 9"	1,965	108	9"	7' – 0"	505	54	9"	4' – 9"	171	15' – 5"	556	19' – 6"	52	42	117	1.551	381.4	1.5	169	63.5	15,424
3	9' – 0"	7' – 0"	9"	7"	162	#6	6"	29' – 1"	7,077	108	#6	9"	13' – 1"	2,122	8' – 7"	1,392	162	#6	6"	23' – 8"	5,759	21	18"	39' – 9"	558	105	18"	39' – 9"	2,788	108	9"	7' – 0"	505	108	9"	4' – 9"	343	15' – 5"	1,112	29' – 1"	78	62	173	2.235	541.4	2.2	251	91.6	21,907
4	9' – 0"	7' – 0"	9"	7"	162	#6	6"	38' – 8"	9,409	108	#6	9"	13' – 1"	2,122	8' – 7"	1,392	162	#6	6"	33' – 3"	8,091	28	18"	39' – 9"	743	136	18"	39' – 9"	3,611	108	9"	7' – 0"	505	162	9"	4' – 9"	514	15' – 5"	1,668	38' – 8"	103	80	223	2.918	701.4	2.9	326	119.6	28,381
5	9' – 0"	7' – 0"	9"	7"	162	#6	6"	48' – 3"	11,740	108	#6	9"	13' – 1"	2,122	8' – 7"	1,392	162	#6	6"	42' – 10"	10,422	35	18"	39' – 9"	929	167	18"	39' – 9"	4,434	108	9"	7' – 0"	505	216	9"	4' – 9"	685	15' – 5"	2,224	48' – 3"	129	100	278	3.602	861.3	3.6	407	147.7	34,860
6	9' – 0"	7' – 0"	9"	7"	162	#6	6"	57' – 10"	14,072	108	#6	9"	13' – 1"	2,122	8' – 7"	1,392	162	#6	6"	52' – 5"	12,754	42	18"	39' – 9"	1,115	198	18"	39' – 9"	5,257	108	9"	7' – 0"	505	270	9"	4' – 9"	857	15' – 5"	2,781	57' – 10"	155	118	328	4.285	1,021.4	4.3	483	175.7	41,338
2	9' – 0"	8' – 0"	9"	7"	162	#6	6"	19' – 6"	4,745	108	#6	9"	14' – 1"	2,285	8' – 7"	1,392	162	#6	6"	14' – 1"	3,427	14	18"	39' – 9"	372	80	18"	39' – 9"	2,124	108	9"	8' – 0"	577	54	9"	4' – 9"	171	17' – 5"	628	19' – 6"	52	42	117	1.616	393.0	1.5	169	66.1	15,890
3	9' – 0"	8' – 0"	9"	7"	162	#6	6"	29' – 1"	7,077	108	#6	9"	14' – 1"	2,285	8' – 7"	1,392	162	#6	6"	23' – 8"	5,759	21	18"	39' – 9"	558	113	18"	39' – 9"	3,000	108	9"	8' – 0"	577	108	9"	4' – 9"	343	17' – 5"	1,257	29' – 1"	78	62	173	2.321	556.2	2.2	251	95.0	22,499
4	9' – 0"	8' – 0"	9"	7"	162	#6	6"	38' – 8"	9,409	108	#6	9"	14' – 1"	2,285	8' – 7"	1,392	162	#6	6"	33' – 3"	8,091	28	18"	39' – 9"	743	146	18"	39' – 9"	3,877	108	9"	8' – 0"	577	162	9"	4' – 9"	514	17' – 5"	1,885	38' – 8"	103	80	223	3.026	719.3	2.9	326	123.9	29,099
5	9' – 0"	8' – 0"	9"	7"	162	#6	6"	48' – 3"	11,740	108	#6	9"	14' – 1"	2,285	8' – 7"	1,392	162	#6	6"	42' – 10"	10,422	35	18"	39' – 9"	929	179	18"	39' – 9"	4,753	108	9"	8' – 0"	577	216	9"	4' – 9"	685	17' – 5"	2,513	48' – 3"	129	100	278	3.731	882.4	3.6	407	152.8	35,703
6	9' – 0"	8' – 0"	9"	7"	162	#6	6"	57' – 10"	14,072	108	#6	9"	14' – 1"	2,285	8' – 7"	1,392	162	#6	6"	52' – 5"	12,754	42	18"	39' – 9"	1,115	212	18"	39' – 9"	5,629	108	9"	8' – 0"	577	270	9"	4' – 9"	857	17' – 5"	3,141	57' – 10"	155	118	328	4.437	1,045.6	4.3	483	181.8	42,305
2	9' – 0"	9' – 0"	9"	7"	162	#6	6"	19' – 6"	4,745	108	#6	9"	15' – 1"	2,447	8' – 7"	1,392	162	#6	6"	14' – 1"	3,427	14	18"	39' – 9"	372	86	18"	39' – 9"	2,284	108	9"	9' – 0"	649	54	9"	4' – 9"	171	19' – 5"	700	19' – 6"	52	42	117	1.681	404.7	1.5	169	68.7	16,356
3	9' – 0"	9' – 0"	9"	7"	162	#6	6"	29' – 1"	7,077	108	#6	9"	15' – 1"	2,447	8' – 7"	1,392	162	#6	6"	23' – 8"	5,759	21	18"	39' – 9"	558	121	18"	39' – 9"	3,213	108	9"	9' – 0"	649	108	9"	4' – 9"	343	19' – 5"	1,401	29' – 1"	78	62	173	2.407	571.0	2.2	251	98.4	23,090
4	9' – 0"	9' – 0"	9"	7"	162	#6	6"	38' – 8"	9,409	108	#6	9"	15' – 1"	2,447	8' – 7"	1,392	162	#6	6"	33' – 3"	8,091	28	18"	39' – 9"	743	156	18"	39' – 9"	4,142	108	9"	9' – 0"	649	162	9"	4' – 9"	514	19' – 5"	2,101	38' – 8"	103	80	223	3.134	737.2	2.9	326	128.2	29,814
5	9' – 0"	9' – 0"	9"	7"	162	#6	6"	48' – 3"	11,740	108	#6	9"	15' – 1"	2,447	8' – 7"	1,392	162	#6	6"	42' – 10"	10,422	35	18"	39' – 9"	929	191	18"	39' – 9"	5,072	108	9"	9' – 0"	649	216	9"	4' – 9"	685	19' – 5"	2,802	48' – 3"	129	100	278	3.861	903.5	3.6	407	158.0	36,545
6	9' – 0"	9' – 0"	9"	7"	162	#6	6"	57' – 10"	14,072	108	#6	9"	15' – 1"	2,447	8' – 7"	1,392	162	#6	6"	52' – 5"	12,754	42	18"	39' – 9"	1,115	226	18"	39' – 9"	6,001	108	9"	9' – 0"	649	270	9"	4' – 9"	857	19' – 5"	3,502	57' – 10"	155	118	328	4.588	1,069.7	4.3	483	187.8	43,272

DATE: 7/31/2024 7:20:14 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\v038401030-08-BRSD-906.dgn
mMoton

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

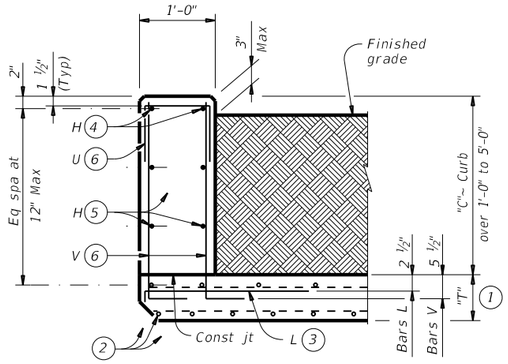
MULTIPLE BOX CULVERTS CAST-IN-PLACE

9'-0" SPAN

0' TO 10' FILL

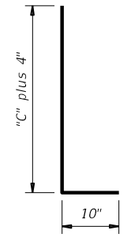
MC-9-10

FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		80



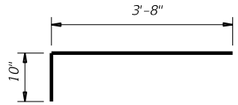
TYPICAL SECTION

Used for curbs over 1'-0" to 5'-0"



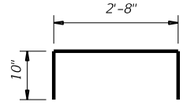
BARS V (#5) (6)

Spaced at 12" Max



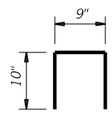
BARS L (#5) (3)

Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)

Spaced at 12" Max



BARS U (#4) (6)

Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'_c = 3,600 psi) minimum for curbs.

Provide bar laps, where required, as follows:

- Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

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

Texas Department of Transportation

Bridge Division Standard

EXTENDED CURB DETAILS FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE:	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		81

DATE: 7/31/2024 7:20:24 PM
FILE: c:\bms\bridgeformer-pw\mansa.moton\dms33805\038401030-08-BRSD-907.dgn
mMoton

DATE: 7/31/2024 7:20:32 PM
FILE: c:\bms\bridgeformer - pw\mansa.moton\dms33805\038401030-08-BRSD-908.dgn
mMoton

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
BRAZOS STREET CROSSING (L†)	4 ~ 9 X 4	10	MC-9-10	PW-1	30	2:1	9	7	1.000	5.750	N/A	N/A	13.279	44.937	N/A	0.0	1.7	13.2	153
BRAZOS STREET CROSSING (R†)	4 ~ 9 X 4	10	MC-9-10	FW-S	30	2:1	9	7	1.000	5.500	10.333	10.333	14.614	N/A	N/A	0.0	1.7	4.4	73
LLANO STREET CROSSING (BOTH)	3 ~ 9 X 4	10	MC-9-10	PW-1	0	2:1	9	7	1.000	5.750	N/A	N/A	11.500	29.333	N/A	0.0	2.2	21.4	264
SAN SABA STREET CROSSING (BOTH)	3 ~ 9 X 4	10	MC-9-10	PW-1	0	2:1	9	7	1.000	5.750	N/A	N/A	11.500	29.333	N/A	0.0	2.2	21.4	264

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		82

DATE: 7/31/2024 7:20:43 PM mMoton
FILE: c:\bms\bridgeformer-pw\mansa.moton\dms3380S\038401030-08-BRSD-910.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

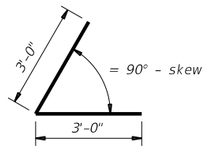
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

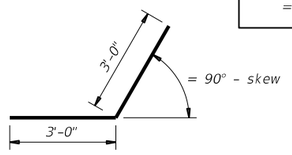
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

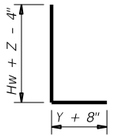
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



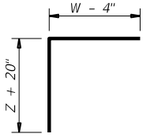
BARS D1



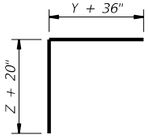
BARS D2



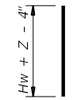
BARS J1



BARS J2



BARS J3



BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

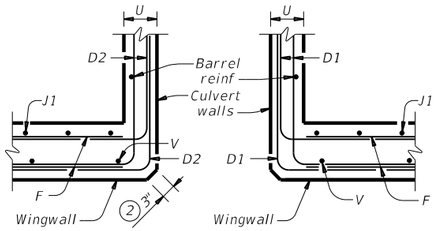
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

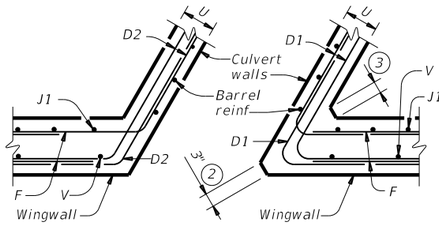
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

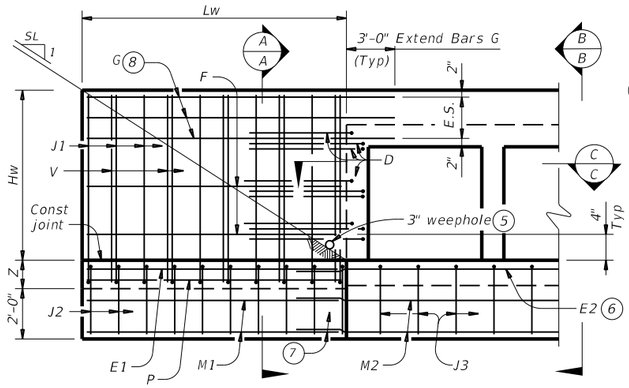
See applicable box culvert standard sheet for S, H, T, and U values.



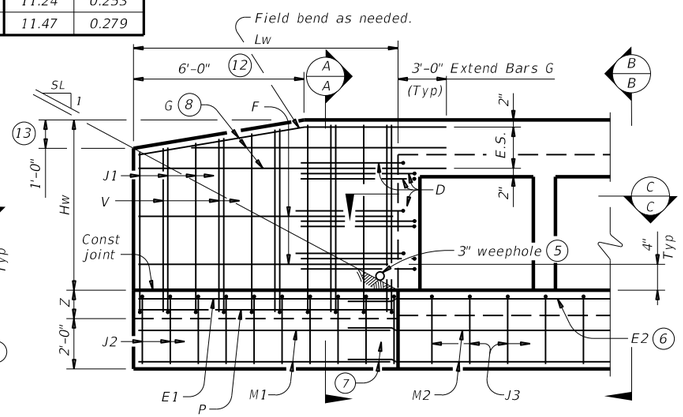
SECTION C-C - PW-1



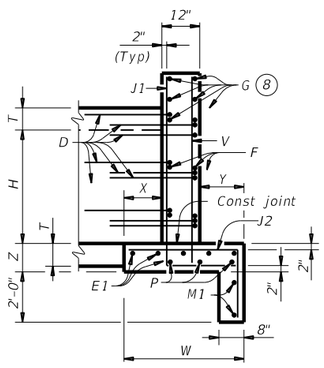
SECTION C-C - PW-2



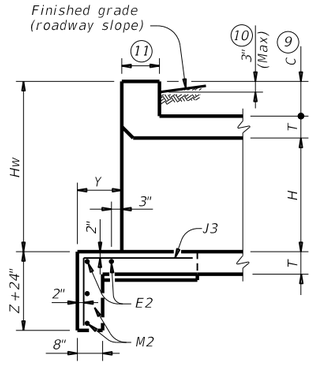
PARTIAL ELEVATION - PW-1



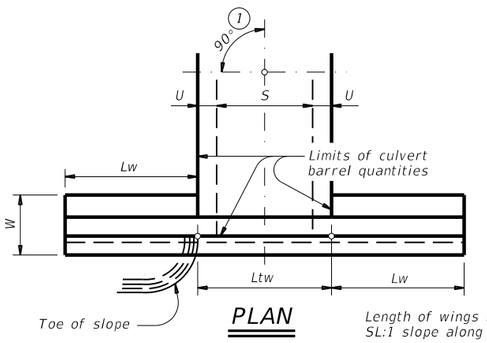
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

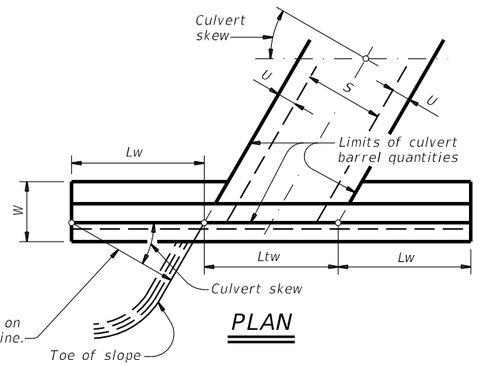


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

(1) Skew = 0°

(2) At discharge end, chamfer may be ¾" minimum.

(3) For 15° skew ~ 1"
For 30° skew ~ 2"
For 45° skew ~ 3"

(4) Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.

(5) Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.

(6) Extend Bars E2 1'-6" minimum into the wingwall footing.

(7) Lap Bars M1 1'-6" minimum with Bars M2.

(8) Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.

(9) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(10) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(11) 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.

(12) 3'-0" for Hw < 4'.

(13) 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		83

DATE: 7/31/2024 7:20:52 PM
FILE: c:\bms\br'idgefarmer-pw\mansa.moton\dms33805\FW-S.dgn
mMoton

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Maximum Wingwall Height Hw	W	X	Y	Z	Variable Reinforcing Bars J1 Size	J1 Spa	Bars J2 Size	J2 Spa	Estimated Quantities per ft of wing length (2~wings) (3) Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
DL	#5	~	1'-0"
DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RS	#5	3	~
RL	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

Hw = H + T + C - 0.250'
A = (Hw - 0.333')(SL)
B = (A) [tangent (θ + 15°)]
Lw = (A) ÷ [cosine (θ + 15°)]

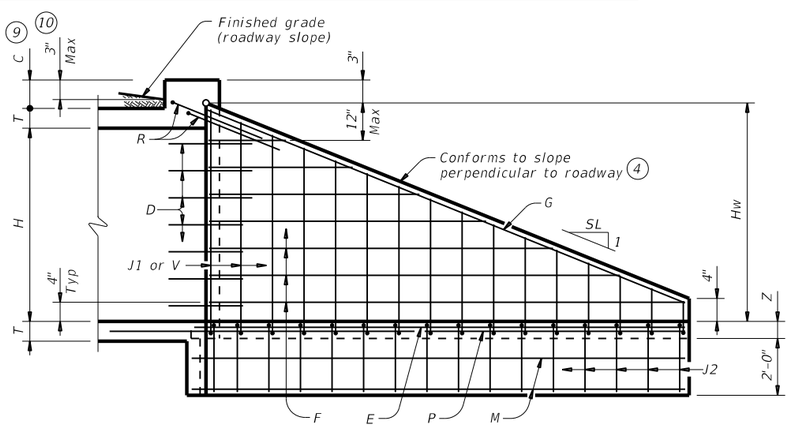
For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine θ

For precast culverts:
Ltw = [(N) (2U + S) + (N - 1) (0.5')] ÷ cosine θ

Total wingwall area (two wings ~ SF) = 0.5 (Hw + 0.333') (Lw + A)

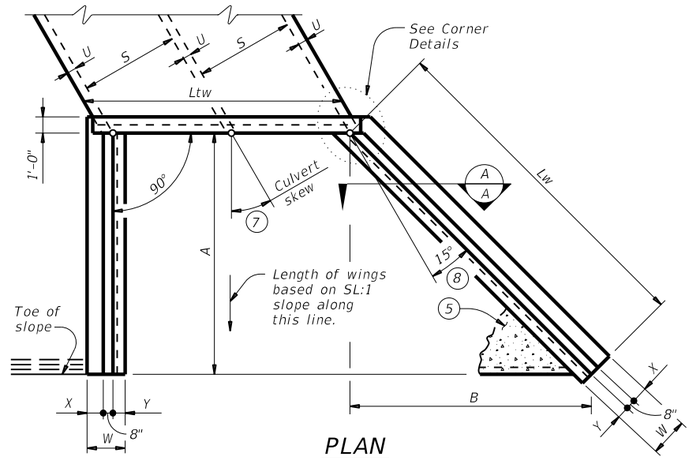
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
A = Length of short wingwalls
Lw = Length of long wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
θ = Culvert skew

See applicable box culvert standard sheet for H, S, T, and U values.



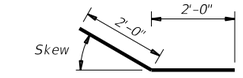
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

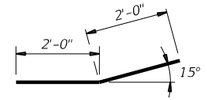


PLAN

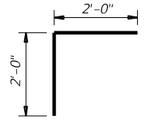
(Showing dimensions and 30° skew.)



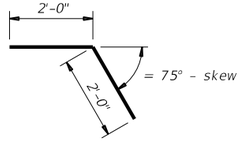
BARS DS
(Short wing)



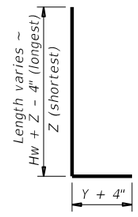
BARS DL
(Long wing)



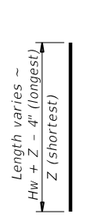
BARS RS
(Short wing)



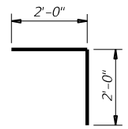
BARS RL
(Long wing)



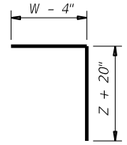
BARS J1



BARS V



BARS L



BARS J2

(1) Extend Bars P 3'-0" minimum into bottom slab of box culvert.

(2) Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by 0.5 x (A + Lw).

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) Applicable values of skew are: 15°, 30°, and 45°.

(8) Typical wingwall angle for all skews.

(9) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

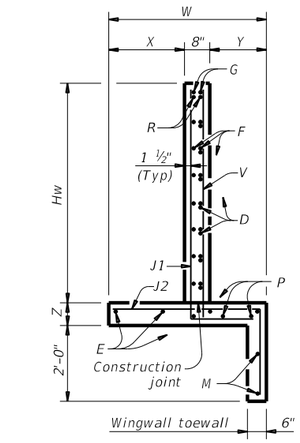
(10) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

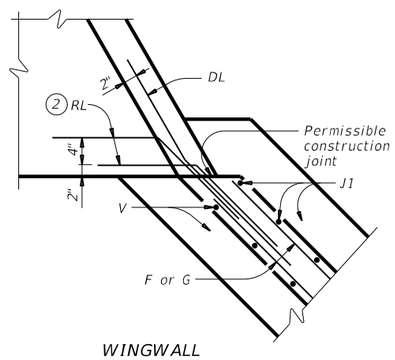
MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

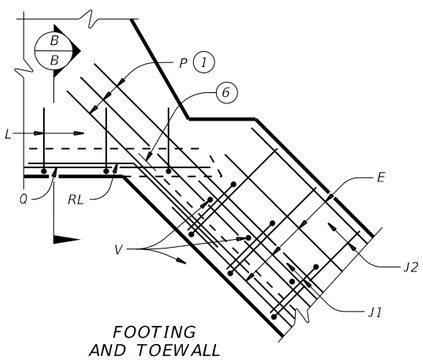
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



SECTION A-A



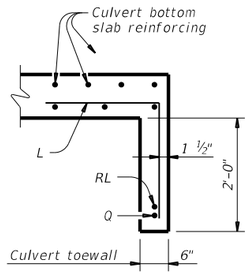
WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS

(Culvert and culvert toewall reinforcing not shown for clarity.)



SECTION B-B (5)

Texas Department of Transportation

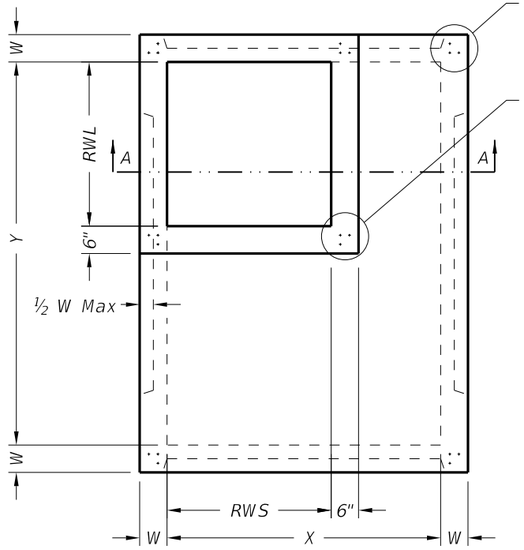
Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR SKEWED BOX CULVERTS

FW-S

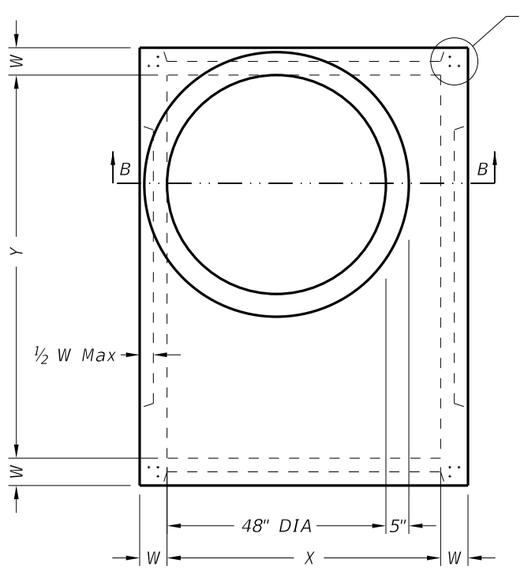
FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		84

DATE: 7/31/2024
FILE: c:\bms\bridgeformer-pw\mansa.moton\dms33805\PB.dgn
mMoton 7:21:00 PM



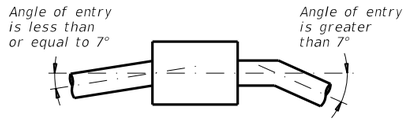
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



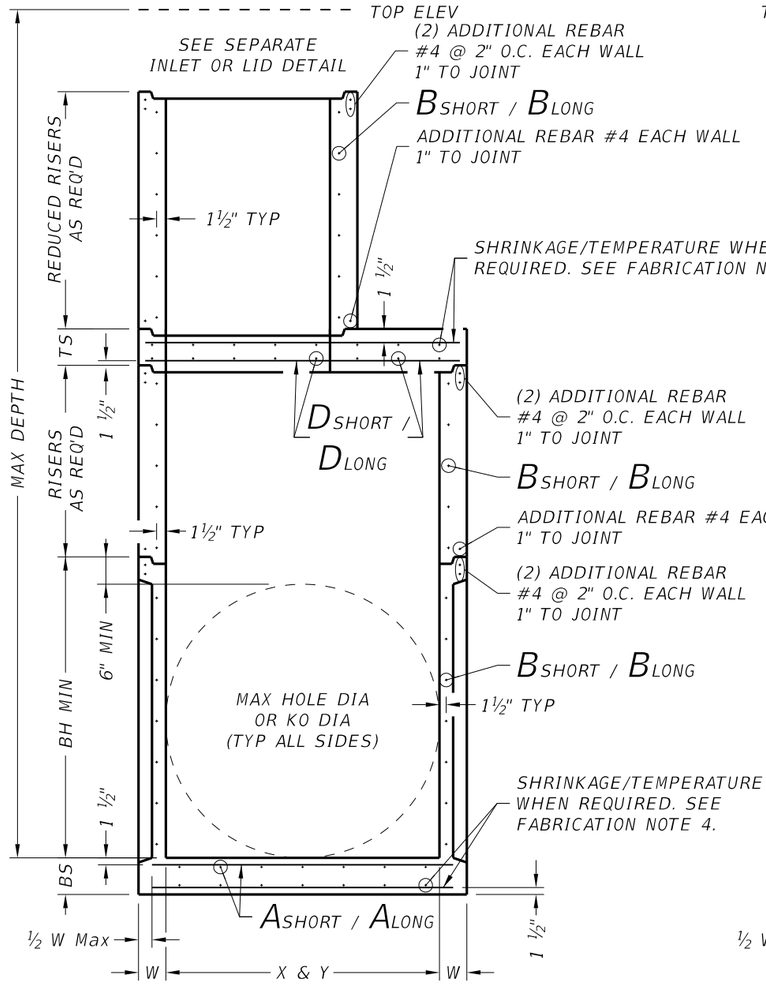
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



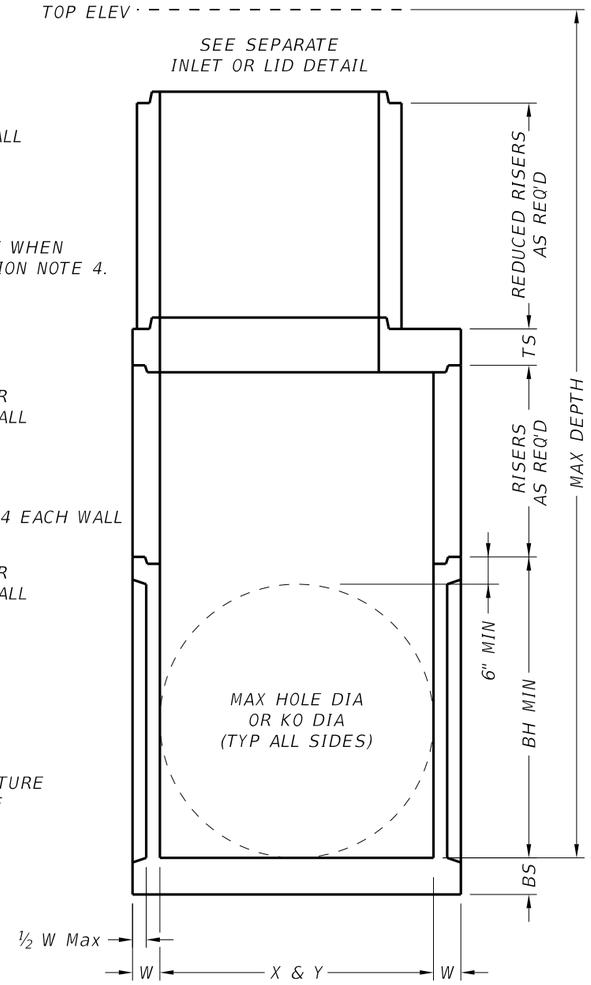
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall. If necessary, use pipe elbow or curved approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

HL93 LOADING

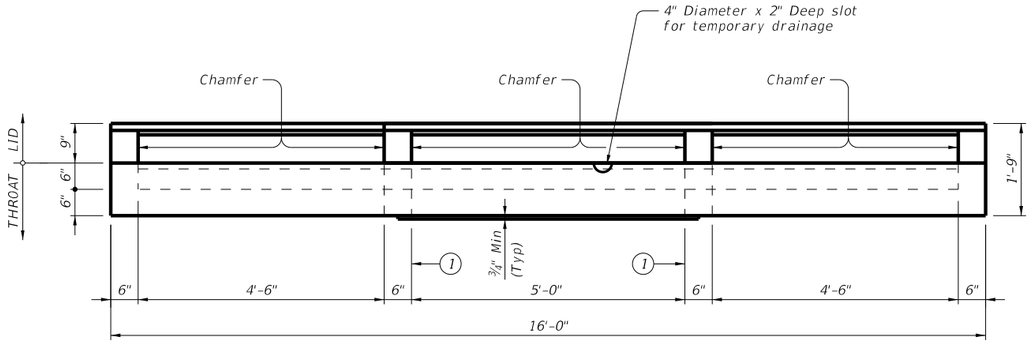
Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

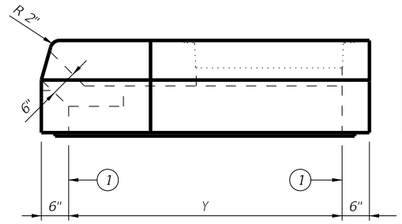
PB

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		85



FRONT VIEW

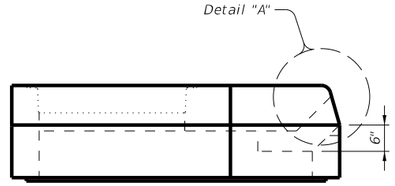
(Showning left and right extensions)



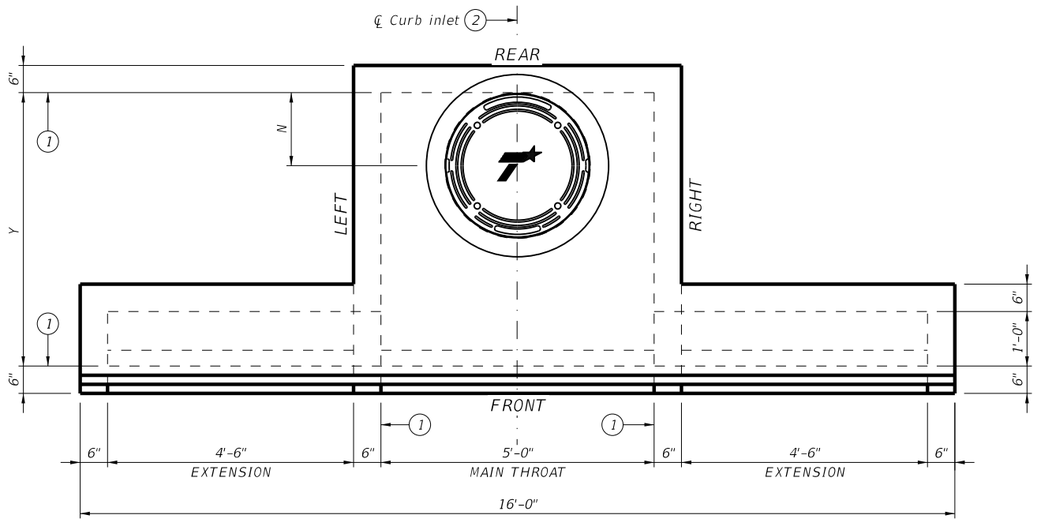
RIGHT VIEW

REAR VIEW

(Extensions not shown)



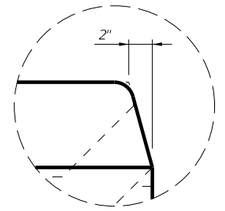
LEFT VIEW



PLAN VIEW

(Showning left and right extensions)

1. Matches inside face of wall of precast base or riser below inlet.
2. Reference point is located where the ℄ of the main throat intersects the normal gutter line. See Curb and Gutter Transition Details for PCO Inlet (CGT-PCO) standard for more information.



DETAIL "A"

HS20 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

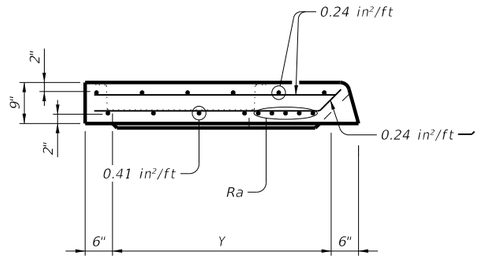
PRECAST CURB INLET OUTSIDE ROADWAY

PCO

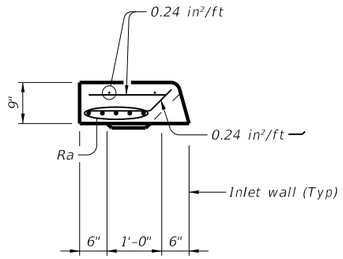
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		86

DATE: 7/31/2024 7:21:09 PM
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33805\PCO-01.dgn
mMoton

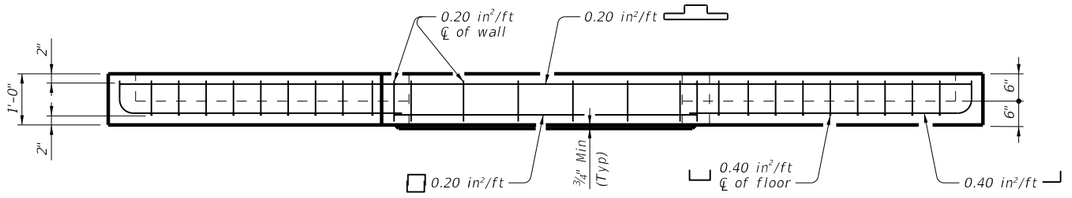
DATE: 7/31/2024
FILE: c:\bms\br'idgefarmer-pw\mansa.moton\dms33805\PCO-02.dgn
mMoton 7:21:20 PM



LID SECTION A-A

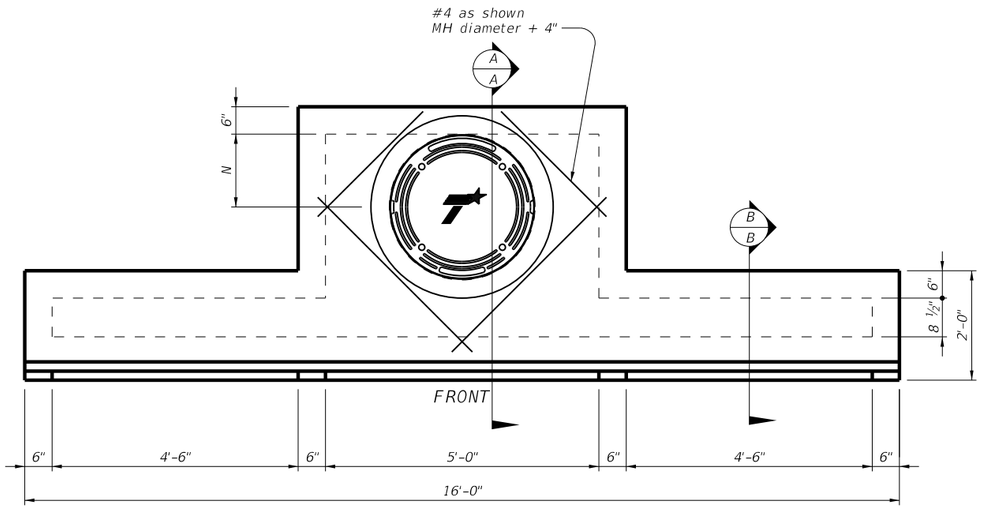


LID SECTION B-B



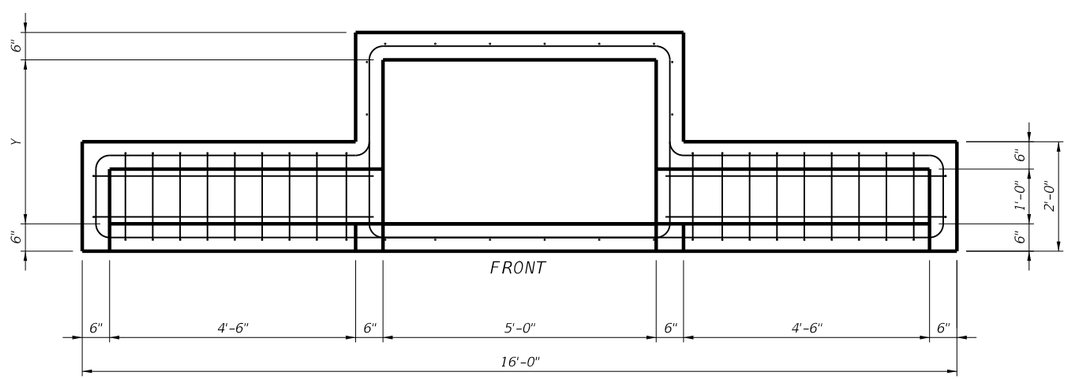
THROAT ELEVATION VIEW

(Showning left and right extensions)



LID PLAN VIEW

(Showning left and right extensions)



THROAT PLAN VIEW

(Showning left and right extensions)

Size (Y)	N	MH Dia*	Ra
3'	9"	18"	(4) #5 Additional
4'	16"	32"	(4) #5 Additional
5'	16"	32"	(4) #5 Additional
6'	16"	32"	(4) #5 Additional

*Nominal ring and cover size.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

HS20 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		87

DATE: 7/31/2024
FILE: c:\bms\bridgeformer-pw\manso.moton\dms33805\CC0-01.dgn
mMoton 7:21:31 PM

Size (Y)	N	MH Dia (2)
3'	9"	18"
4'	16"	32"
5'	16"	32"
6'	16"	32"

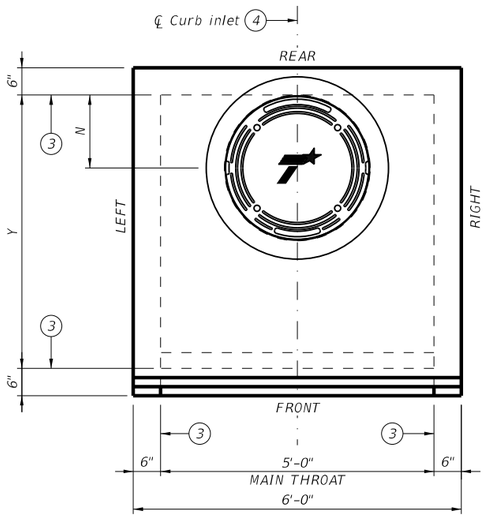
BAR TABLE	
BAR	SIZE
A1	#3
A2	#3
A3 (1)	#3
A4 (1)	#3
B1	#4
B2	#4
B3 (1)	#4
C (1)	#4
G	#4
L (1)	#5
Ra	#5
U1 (1)	#5
U2 (1)	#5

(1) Reinforcing bar used only with extension(s).

(2) Nominal ring and cover size.

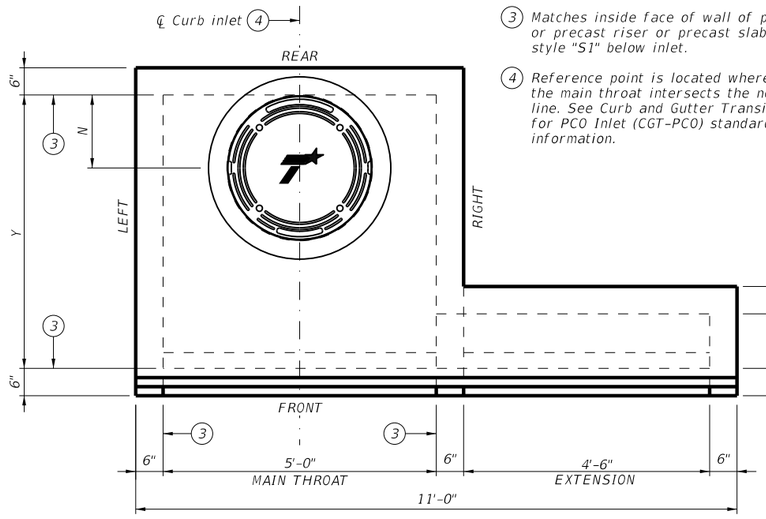
(3) Matches inside face of wall of precast base or precast riser or precast slab lid (PSL) style "S1" below inlet.

(4) Reference point is located where the ℄ of the main throat intersects the normal gutter line. See Curb and Gutter Transition Details for PCO Inlet (CGT-PCO) standard for more information.



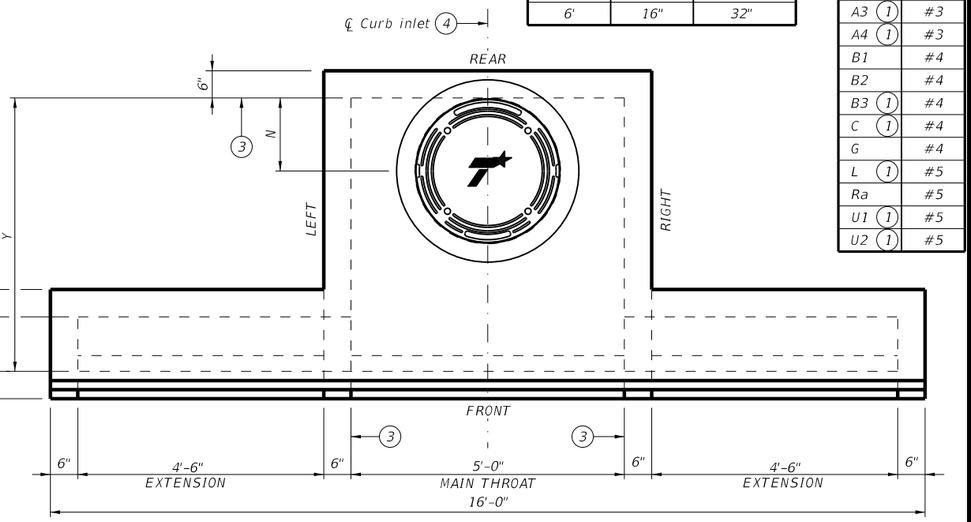
PLAN VIEW

(Shown without extensions.)
See SHEET 2 OF 4 for details.



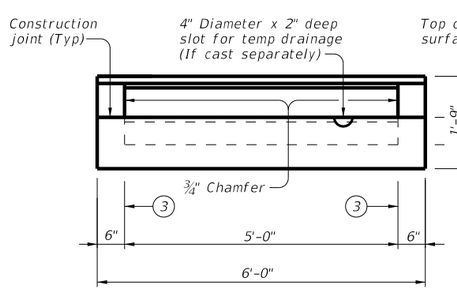
PLAN VIEW

(Showing one extension.)
See SHEET 3 OF 4 for details.



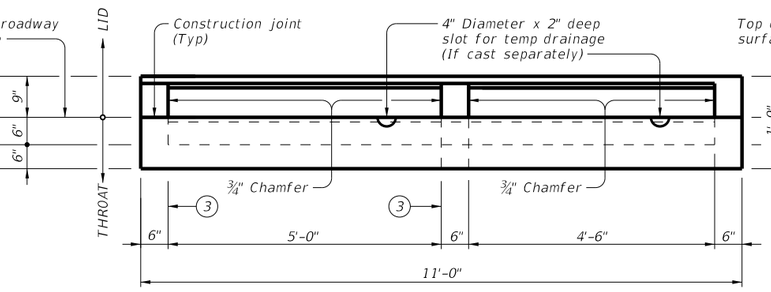
PLAN VIEW

(Showing extension on each side)
See SHEET 4 OF 4 for details.



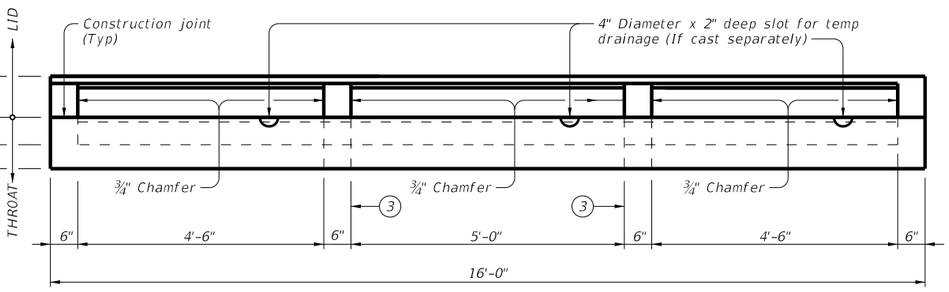
FRONT VIEW

(Shown without extensions.)
See SHEET 2 OF 4 for details.



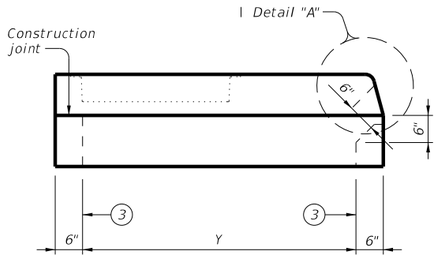
FRONT VIEW

(Showing one extension.)
See SHEET 3 OF 4 for details.



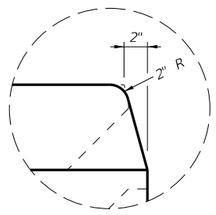
FRONT VIEW

(Showing extension on each side.)
See SHEET 4 OF 4 for details.



LEFT SIDE VIEW

(Extensions not shown for clarity.)



DETAIL "A"

CONSTRUCTION NOTES:

Chamfer all vertical edges of inlet lid ¾" as shown in Front View, Sheet 1 of 4.
Maintain 1 ½" clear cover to ends of all vertical reinforcing bars, unless otherwise noted.

MATERIAL NOTES:

Provide Class "S" concrete (f'c = 4,000 psi).
Provide Grade 60 reinforcing steel or equivalent area of WWR.
Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The intent of this standard is to provide a cast-in-place lid to be used with precast base, precast riser or precast slab lid style "S1".
Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
Lid and throat may be cast monolithically or separately.
See Precast Base (PB) standard for details and notes not shown.
See Precast Slab Lid (PSL) standard for details and notes not shown.
See Curb & Gutter Transitions Details (CGT-PCO) standard for transition examples.
Extensions may be right, left, both, or none. Provide extensions as specified elsewhere in the plans.
Shop drawings for approval are not required.
Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.
Open area of main throat = 360 sq in.
Open area of one extension throat = 324 sq in.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation

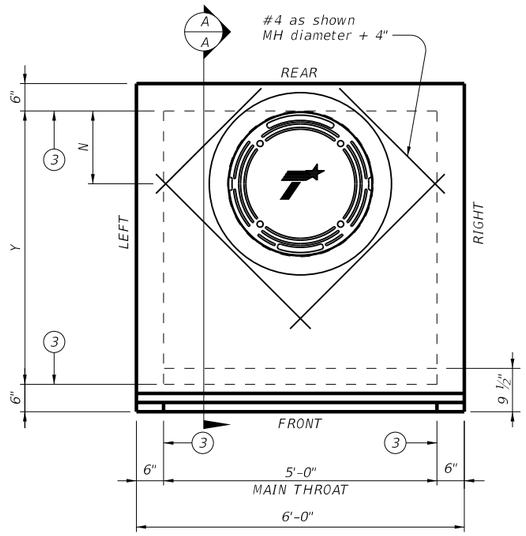
Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

CCO

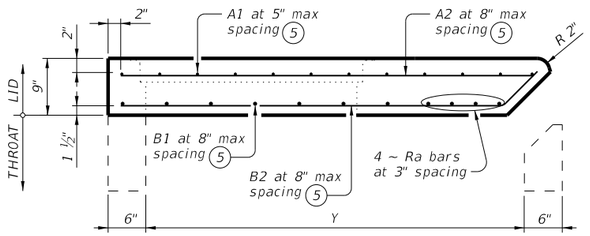
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		88

DATE: 7/31/2024
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33805\CCO-02.dgn
mMoton 7:21:42 PM

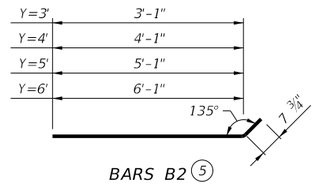


LID PLAN VIEW

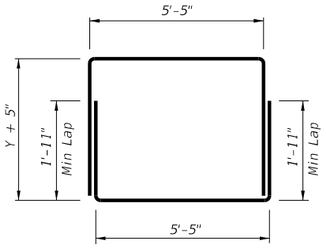
(Shown without extensions)



LID SECTION A-A

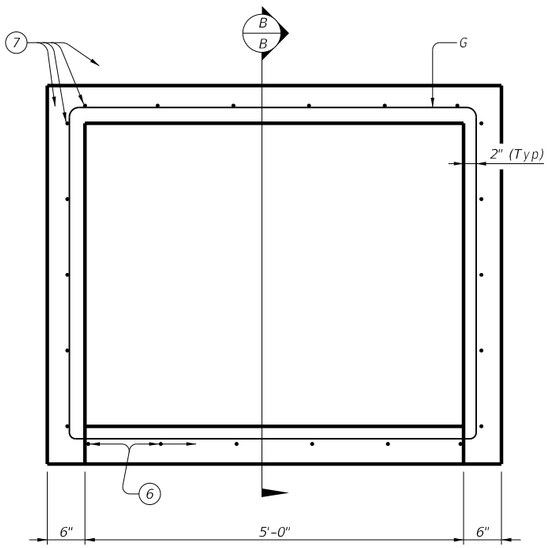


BARS B2 (5)



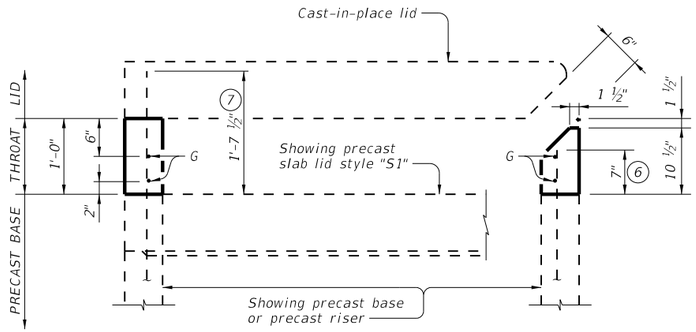
BARS G

Showing one complete bar.



THROAT PLAN VIEW

(Shown without extensions)



THROAT SECTION B-B

(Showing reinforcing bar extended from precast base or precast riser or precast slab lid style "S1".)

(3) Matches inside face of wall of precast base or precast riser or precast slab lid style "S1" below inlet.

(5) Cut reinforcing bars as needed to provide 1 ½" clear to manhole.

(6) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 7".

(7) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 1'-7 ½".

HL93 LOADING

Texas Department of Transportation

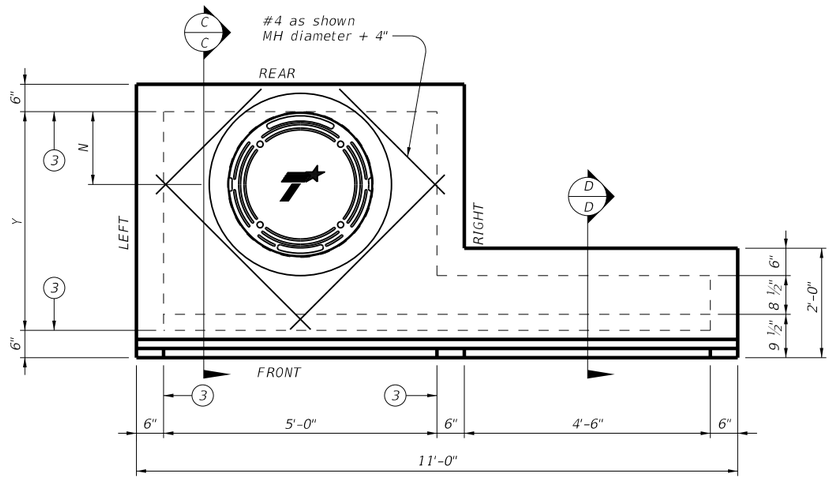
Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

CCO

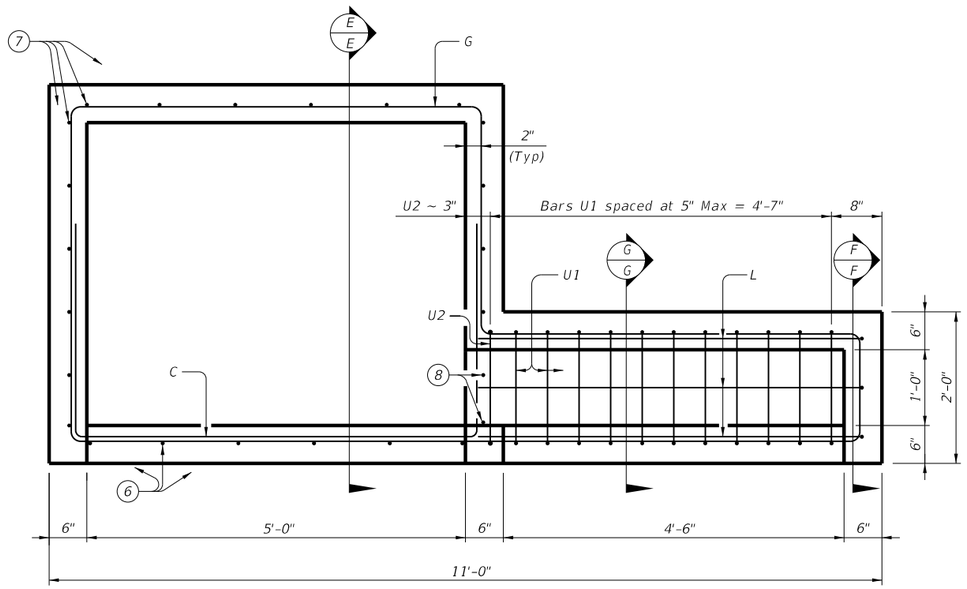
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		89

DATE: 7/31/2024 7:21:53 PM
FILE: c:\bms\br\dgeFarmer-pw\mansa.moton\dms33805\CCO-03.dgn
mMoton



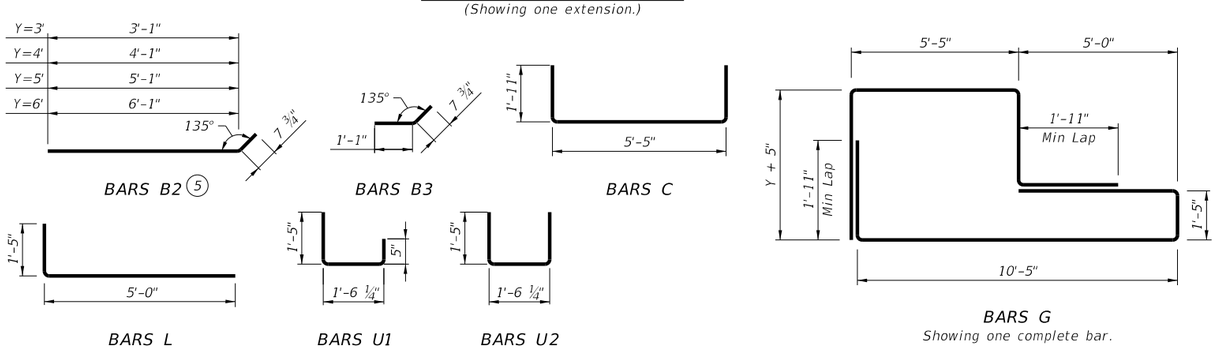
LID PLAN VIEW

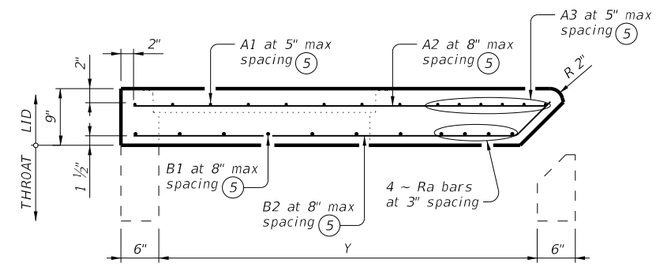
(Showing one extension.)



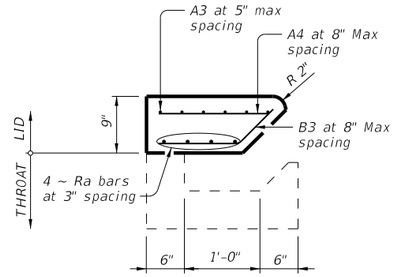
THROAT PLAN VIEW

(Showing one extension.)

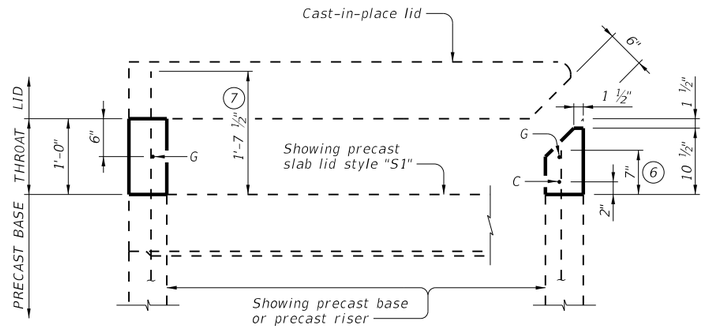




LID SECTION C-C

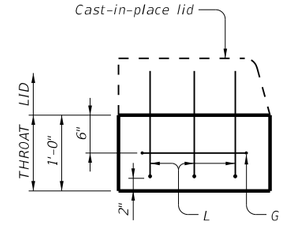


LID SECTION D-D

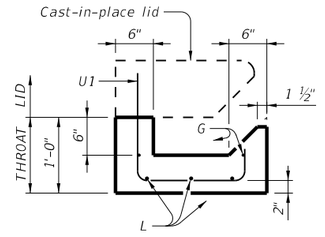


THROAT SECTION E-E

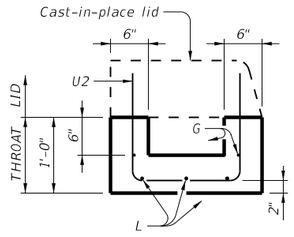
(Showing reinforcing bar extended from precast base or precast riser or precast slab lid style "S1".)



THROAT SECTION F-F



BARS U1 LOCATION



BARS U2 LOCATION

THROAT SECTION G-G

(3) Matches inside face of wall of precast base or precast riser or precast slab lid style "S1" below inlet.

(5) Cut reinforcing bars as needed to provide 1 ½" clear to manhole.

(6) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 7".

(7) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 1'-7 ½".

(8) Do not extend reinforcing bars from precast base.

HL93 LOADING SHEET 3 OF 4

Texas Department of Transportation

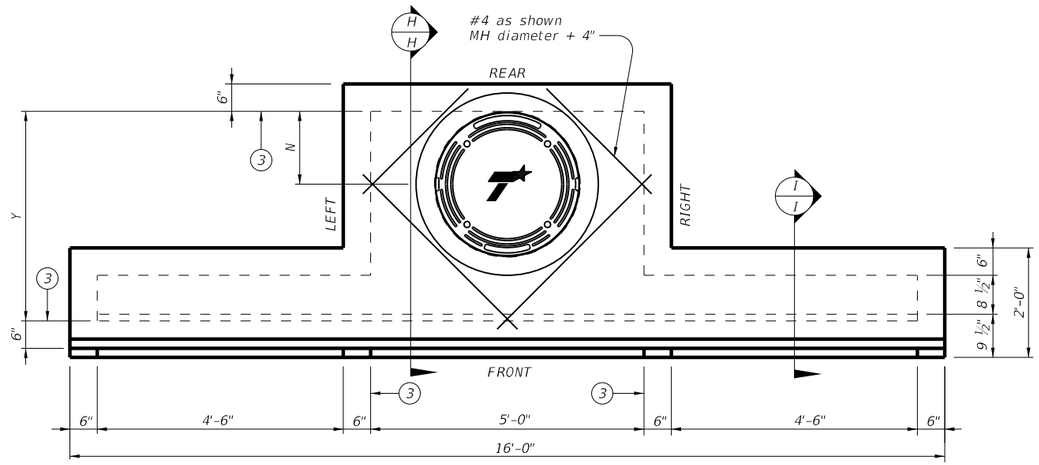
Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

CCO

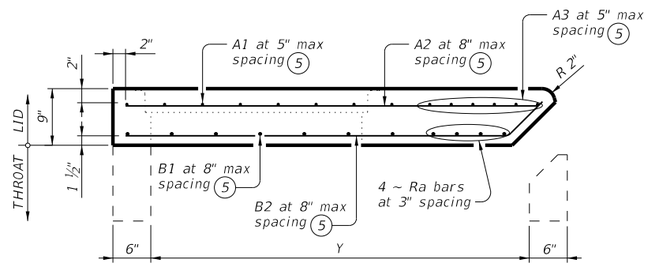
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		90

DATE: 7/31/2024 7:22:01 PM
FILE: c:\bms\br\dgeformer-pw\mansga.moton\dms33805\CC0-04.dgn
mMoton

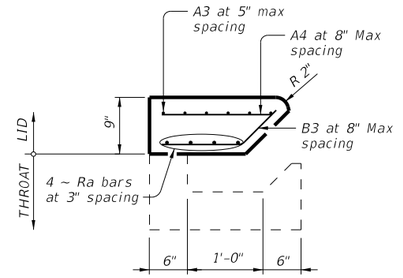


LID PLAN VIEW

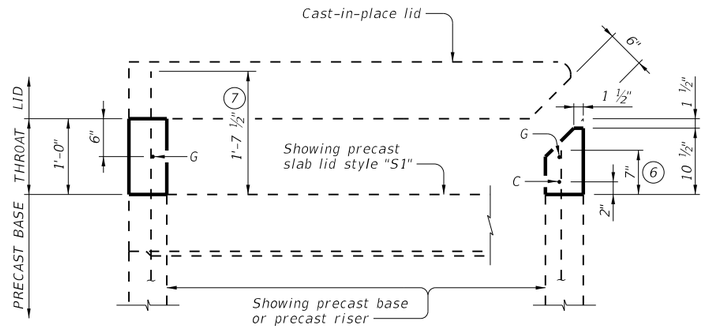
(Showing extension on each side.)



LID SECTION H-H

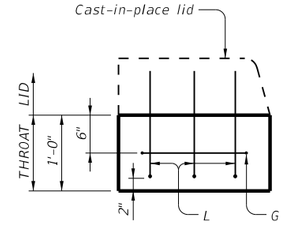


LID SECTION I-I

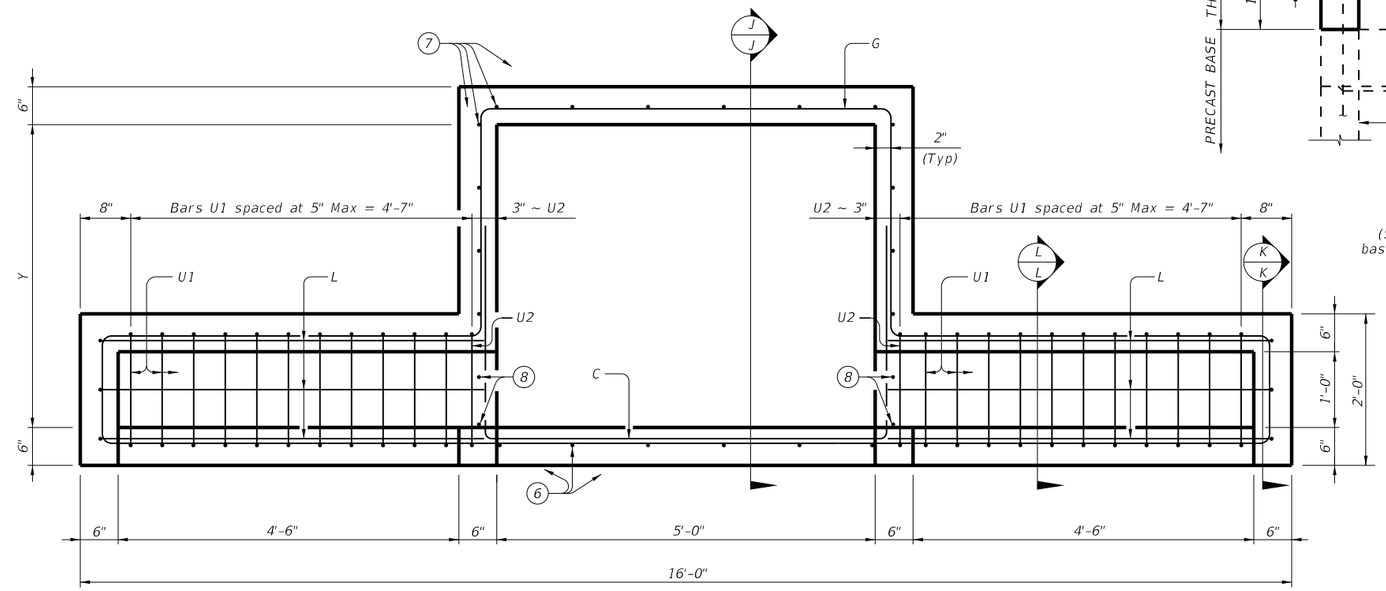


THROAT SECTION J-J

(Showing reinforcing bar extended from precast base or precast riser or precast slab lid style "S1".)

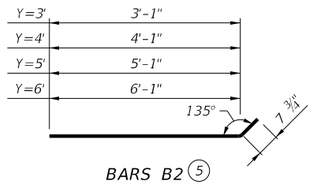


THROAT SECTION K-K

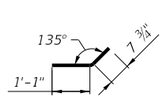


THROAT PLAN VIEW

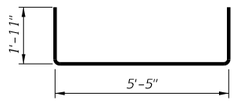
(Showing extension on each side.)



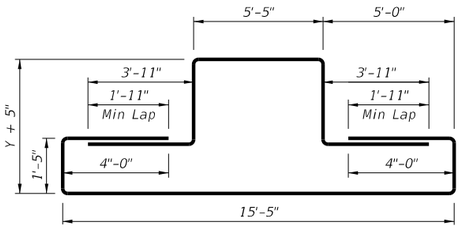
BARS B2 (5)



BARS B3

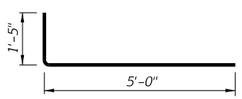


BARS C

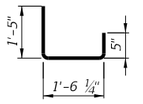


BARS G

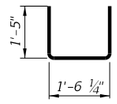
Showing one complete bar.



BARS L



BARS U1



BARS U2

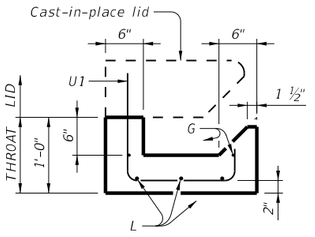
(3) Matches inside face of wall of precast base or precast riser or precast slab lid style "S1" below inlet.

(5) Cut reinforcing bars as needed to provide 1 ½" clear to manhole.

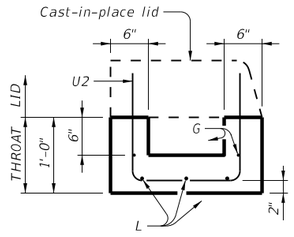
(6) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 7".

(7) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 1'-7 ½".

(8) Do not extend reinforcing bars from precast base.



BARS U1 LOCATION



BARS U2 LOCATION

THROAT SECTION L-L

HL93 LOADING

Texas Department of Transportation

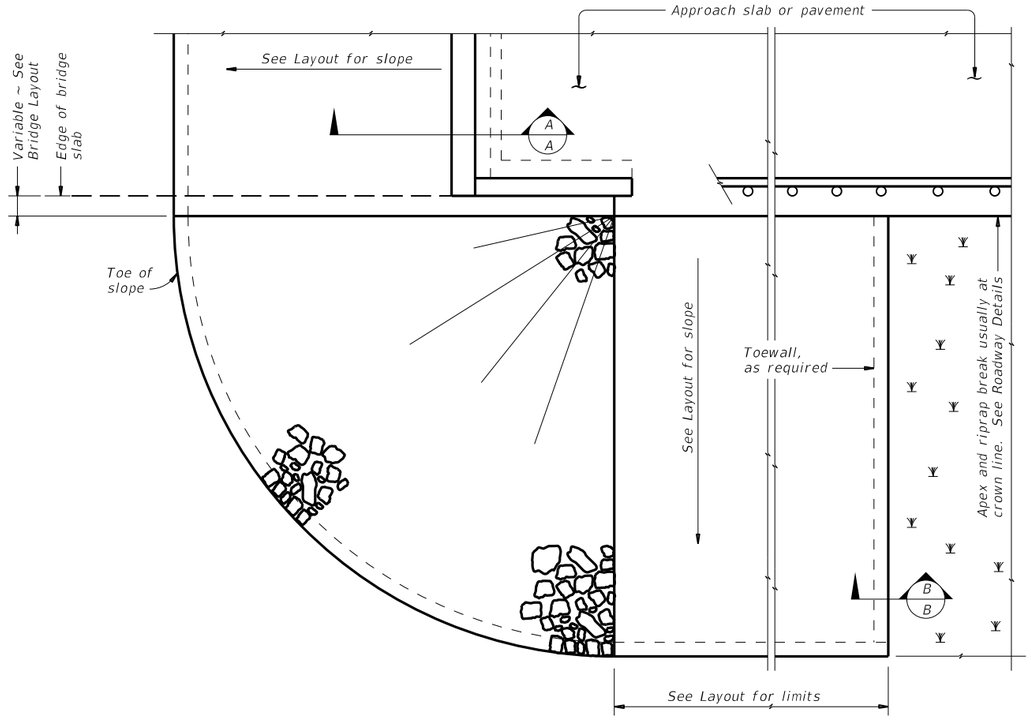
Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

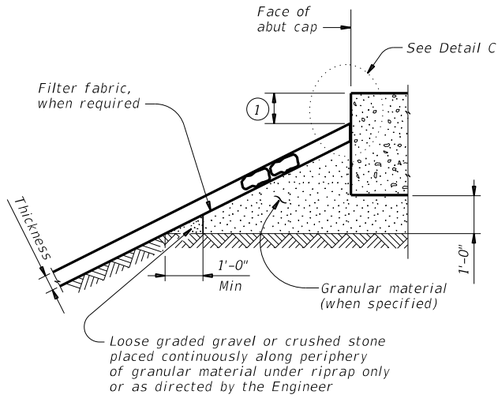
CCO

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		91

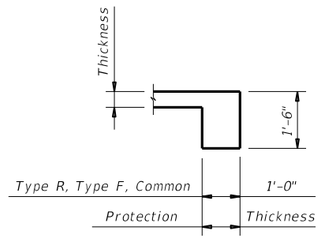
DATE: 7/31/2024 7:22:09 PM
FILE: c:\tms\bridgeformer-pw\mansa.moton\dms33805\038401030-08-BRSD-913.dgn
mMoton



PLAN

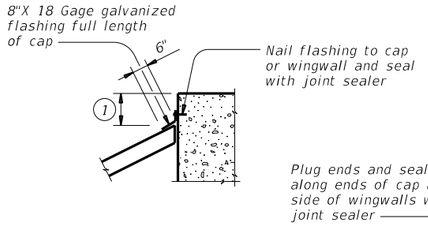


SECTION A-A AT CAP

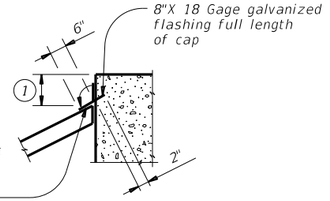


SECTION B-B

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

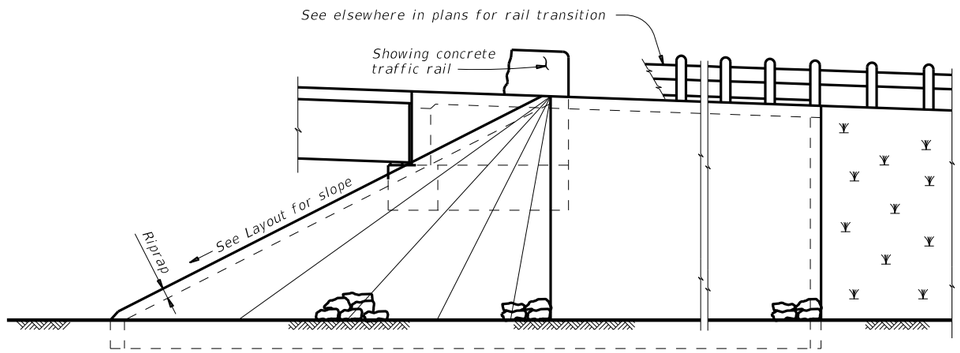


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

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

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		92

DATE: 7/31/2024
FILE: c:\bms\bridgefarmer-pw\marsa.moton\dms33805\038401030-08-BRSD-914.dgn
mMoton 7:22:16 PM

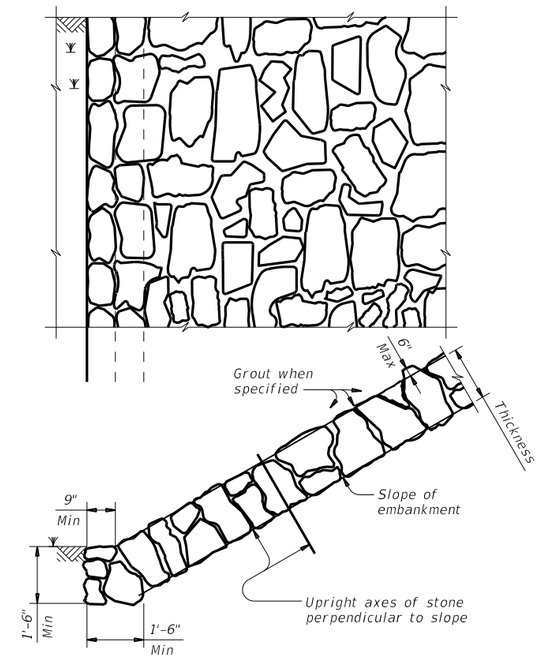


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

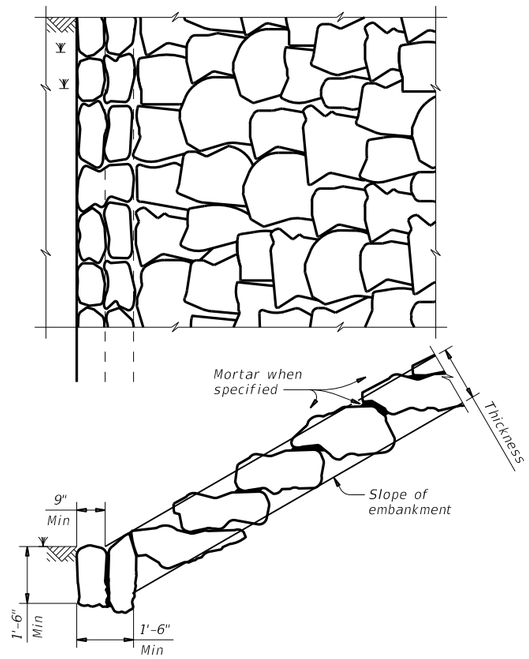


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

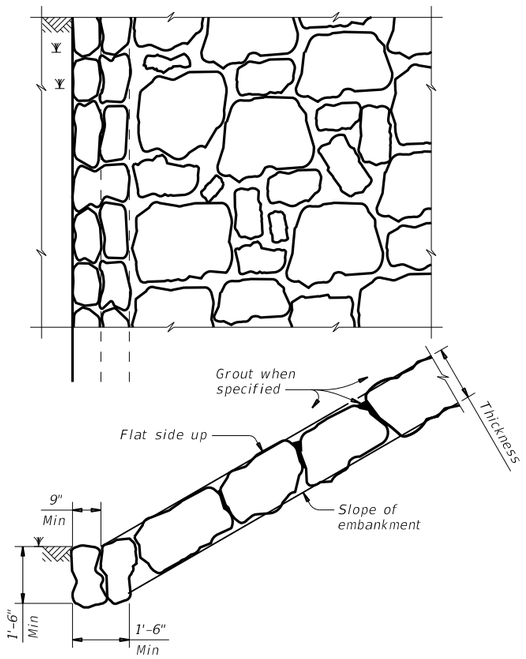


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

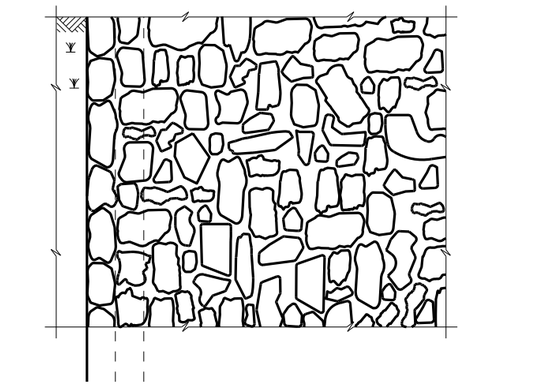


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

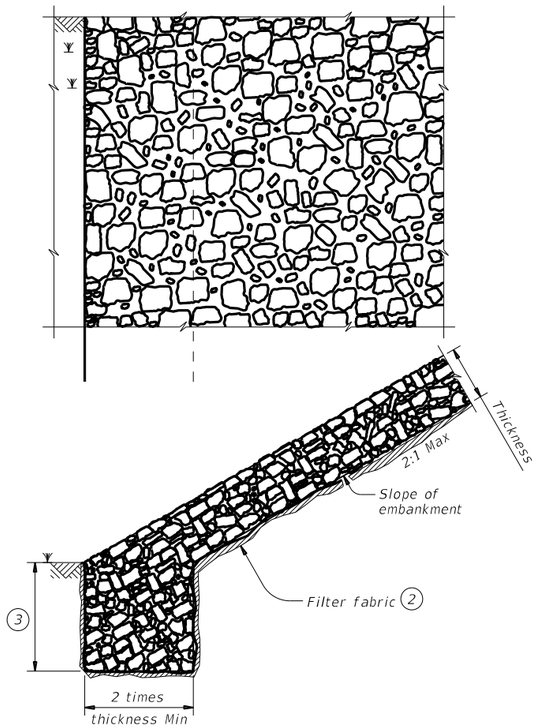


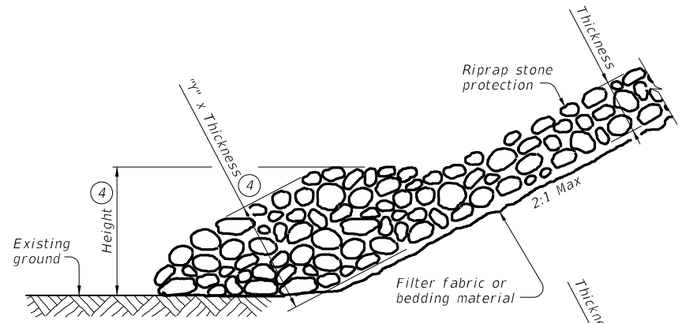
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

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

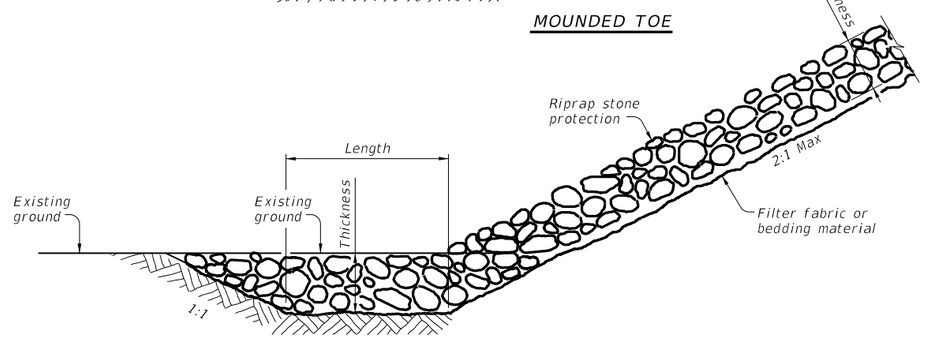
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

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

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



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

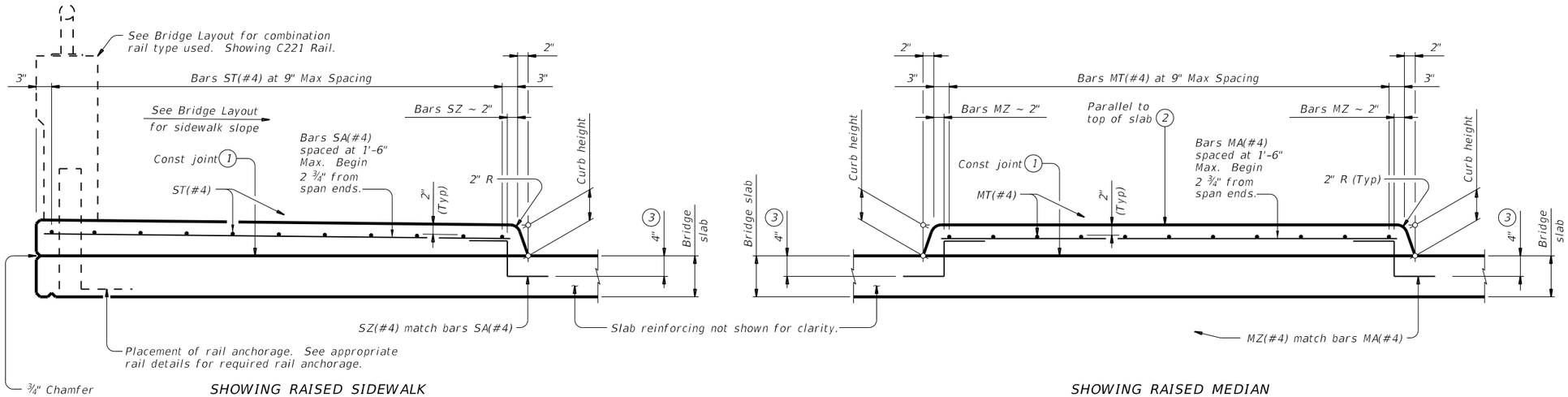
Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		93

DATE: 7/31/2024
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\BRSM-19-01.dgn
mMoton 7:22:24 PM



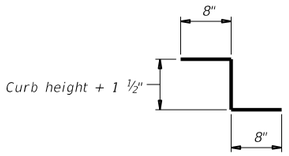
TYPICAL TRANSVERSE SECTIONS

See Span Details for dimensions not shown.

(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(2) Unless noted otherwise on the span details.

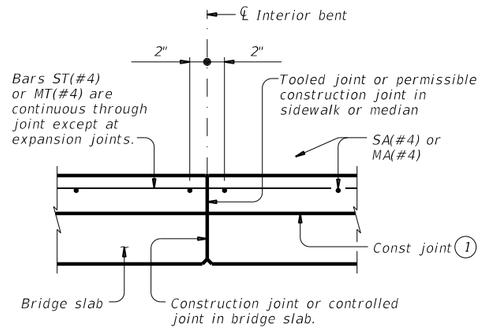
(3) Bars may rest on top of PCPs.



BARS SZ(#4) AND MZ(#4)

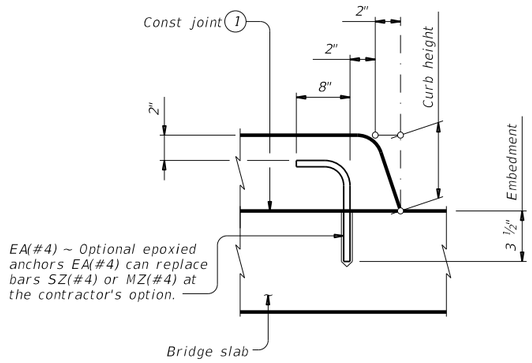
APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide drain cover plates fabricated with a product from this list. No exceptions are permitted.



LONGITUDINAL SECTION AT INTERIOR BENT

At bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIMAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C, D, E, or F) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Follow manufacturer's directions for installing the epoxied anchor bars.

MATERIAL NOTES:

Provide the same concrete required for the bridge deck, Class S or Class S (HPC) concrete.

Provide Grade 60 reinforcing steel. Deformed welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for bars SA, ST, MA, and MT.

Provide epoxy coat or galvanize reinforcement if bridge deck reinforcement is required to be epoxy coated or galvanized.

Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Chamfer or round edges approximately 1/16" prior to galvanizing.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide the following bar or wire lap lengths when required:
- Uncoated, 1'-7" Min
- Coated, 2'-5" Min

Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.

Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).

Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

These details do not apply for longitudinal grades exceeding 5 percent.

Cover dimensions are clear dimensions, unless noted otherwise.

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

Texas Department of Transportation

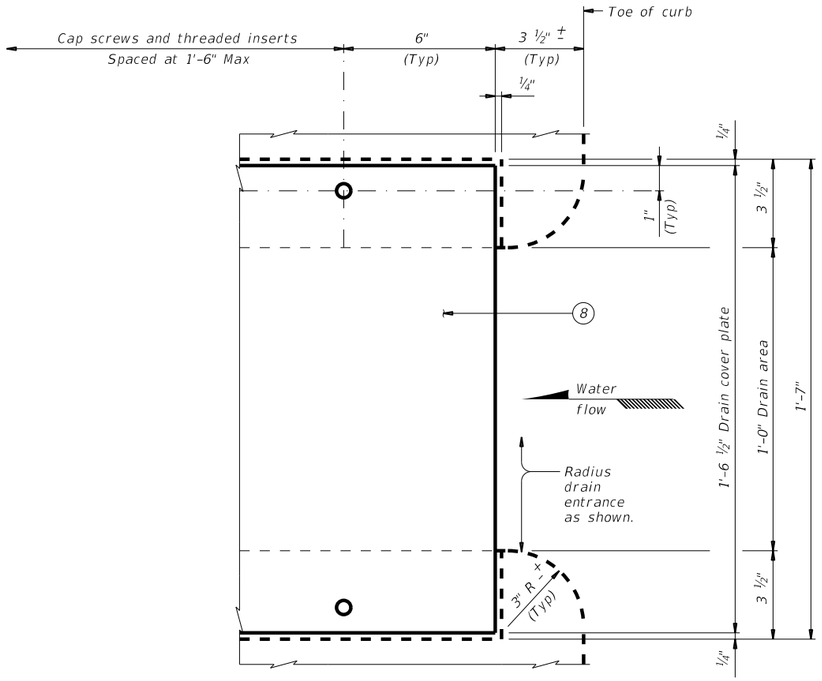
Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

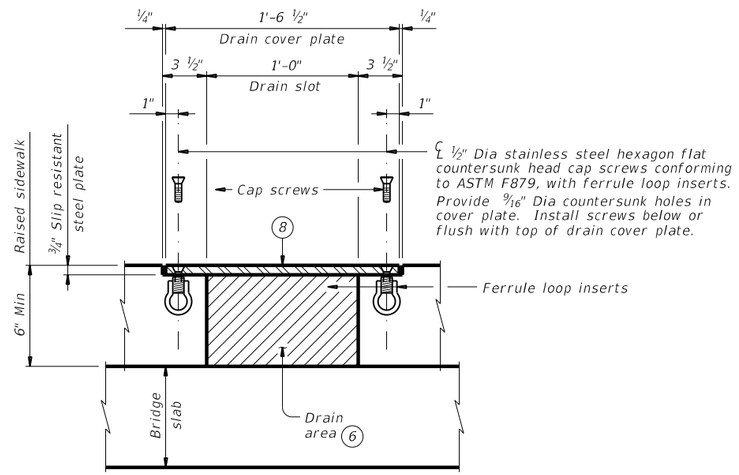
BRSM

FILE:	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		94

DATE: 7/31/2024 7:22:33 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33805\BRSM-19-02.dgn
mMoton

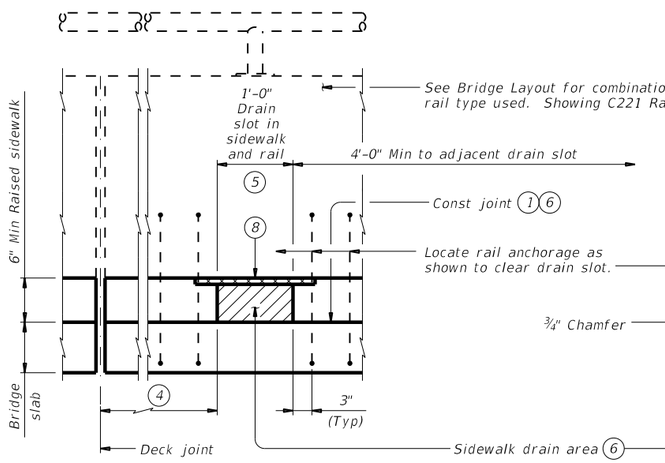


PARTIAL PLAN CURB DRAIN

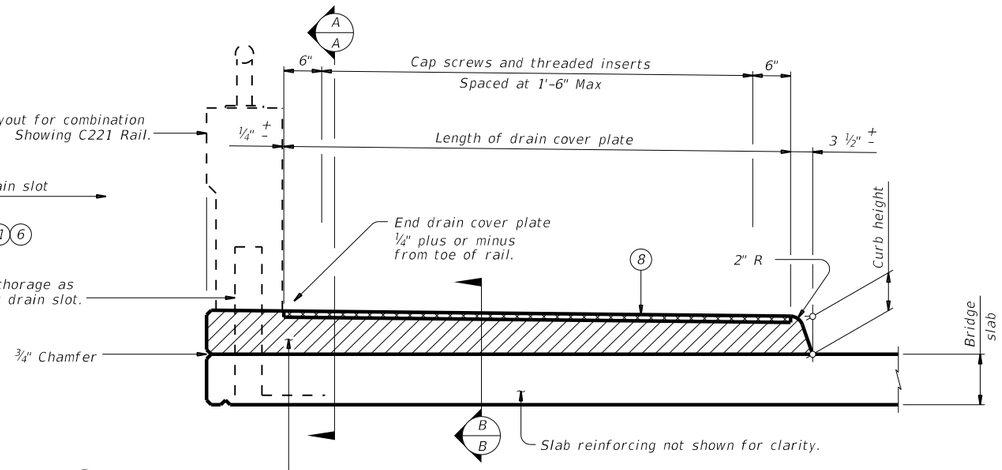


SECTION B-B

Reinforcing not shown for clarity.



SECTION A-A



SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS 7

1. Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.
4. 3'-0" Min at deck expansion joints, deck construction joints or controlled joints, rail intermediate wall joints or from face of substructure.
5. For rail Type C1W, center drain slots between posts.
6. Steel trowel top surface of bridge deck in drain locations.
7. Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place drain and cover plate perpendicular to toe of rail.
8. Drain cover plate (PL ¾ x 18 ½ slip resistant steel plate). Install flush with top of sidewalk.

Texas Department of Transportation

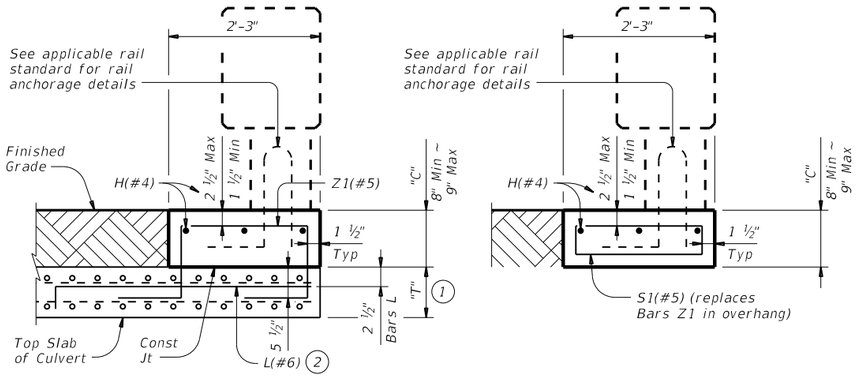
Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

FILE:	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		95

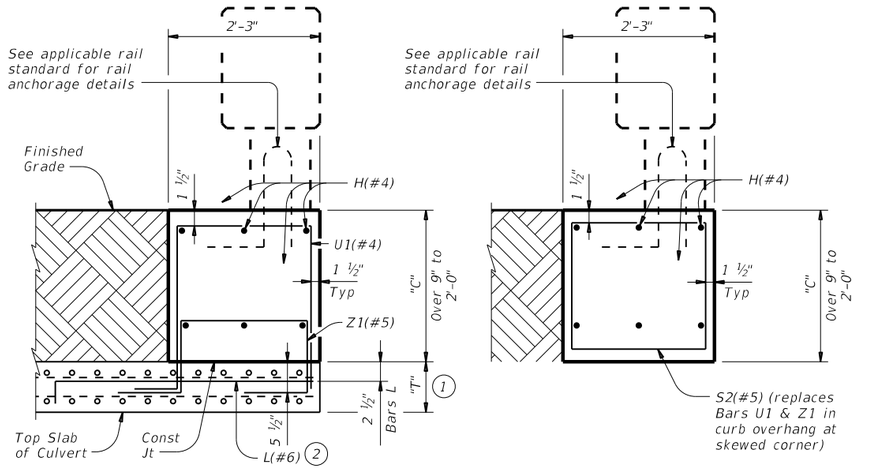
DATE: $DATE$
FILE: $FILE$
$USER$
$TIME$



SECTION A-A SECTION B-B

TYPE 1 CURB

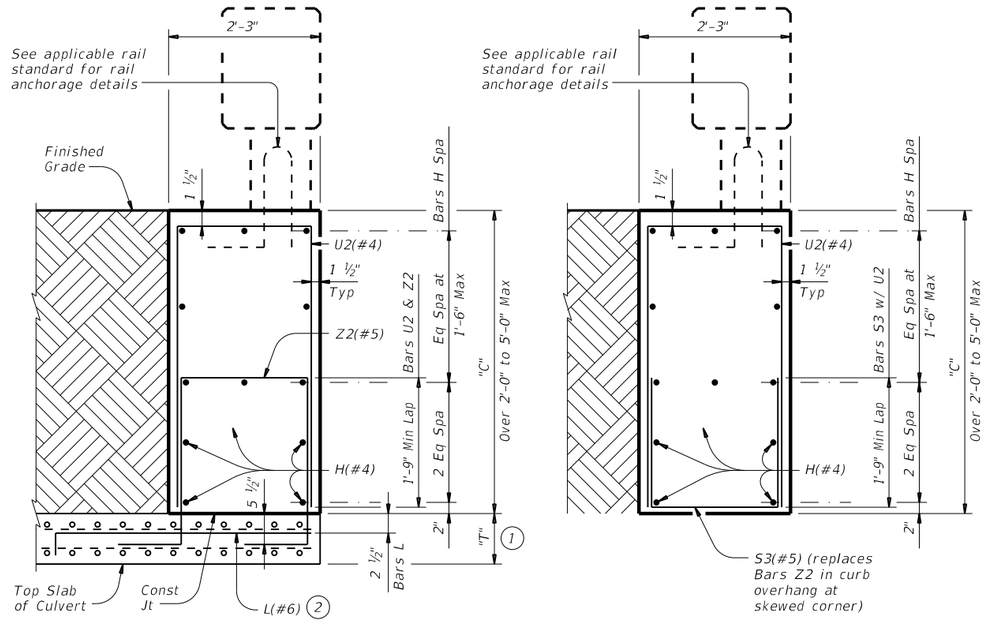
Used for curbs from 8" to 9" (Showing "C" = 9"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



SECTION A-A SECTION B-B

TYPE 2 CURB

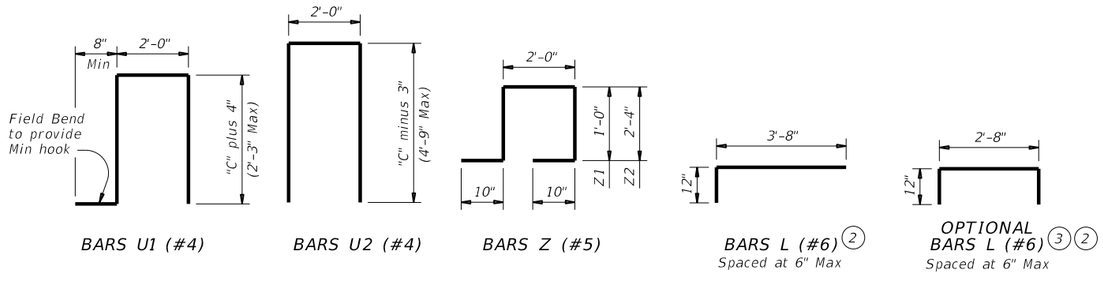
Used for curbs over 9" to 2'-0" (Showing "C" = 2'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.

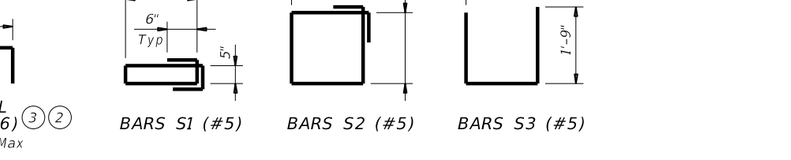


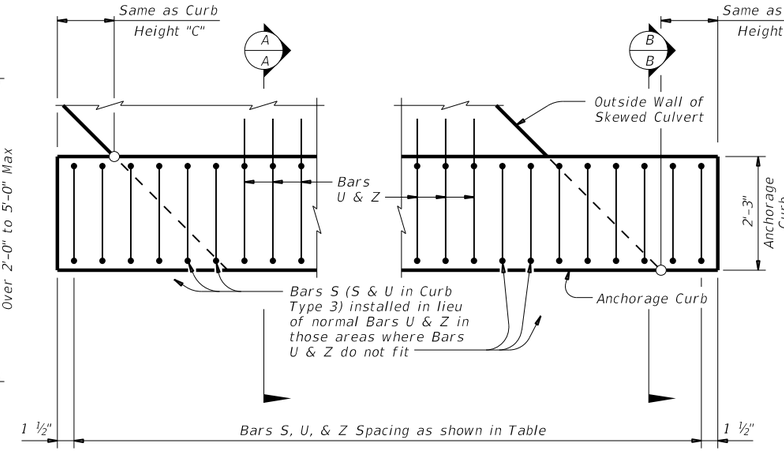
SECTION A-A SECTION B-B

TYPE 3 CURB

Used for curbs over 2'-0" to 5'-0" (Showing "C" = 4'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.







TYPICAL CURB PLAN

Showing typical installation on skewed culvert. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.

TABLE OF REINFORCING SPACING

Curb Height "C"	Section Type	Bars S, U, & Z Spa
8" to 9"	1	12"
Over 9" to 2'-0"	2	9"
Over 2'-0" to 3'-0"	3	7"
Over 3'-0" to 5'-0"	3	5"

TABLE OF ESTIMATED QUANTITIES (4)

Curb Height "C"	Section Type	Reinf Steel (Lb/LF)	Class "C" Concrete (CY/LF)
8"	1	21.5	0.056
9"	1	21.5	0.063
1'-0"	2	29.7	0.083
1'-6"	2	30.6	0.125
2'-0"	2	31.5	0.167
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

(1) "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 8" thick, see SCP-MD Standard for additional details.

(2) Tilt Bars L hook as necessary to maintain cover.

(3) Optional Bars L are to be used only for Precast Box Culverts with 3'-0" closure pours.

(4) Quantities shown are for Contractor's information only. Quantities are per Linear Foot of curb length. The values for each section type in table can be interpolated for intermediate values of Curb Height, "C".

CONSTRUCTION NOTES:

When using this anchorage curb, omit normal culvert curb reinforcing bars K and H shown on the culvert standard sheets.

For vehicle safety, the top of the curb must be flush with the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Galvanize all reinforcing steel if required elsewhere.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-11"

Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The rail anchorage curb details have sufficient strength for use with all standard rail types.

See appropriate rail standard for approved design speed restrictions, notes and details not shown.

This anchorage curb is considered part of the Box Culvert for payment.

These details are for use with curbs that are 8" to 5'-0" tall only. Curb heights that are less than or greater than those shown will require special design.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

SHEET 1 OF 2

Texas Department of Transportation

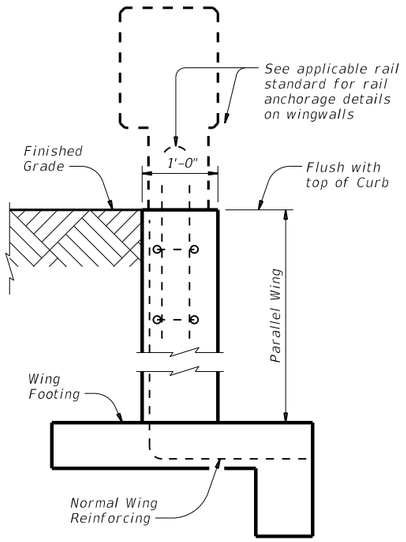
Bridge Division Standard

RAIL ANCHORAGE CURB
BOX CULVERT
RAIL MOUNTING DETAILS
(CURBS 8" TO 5'-0" TALL ONLY)

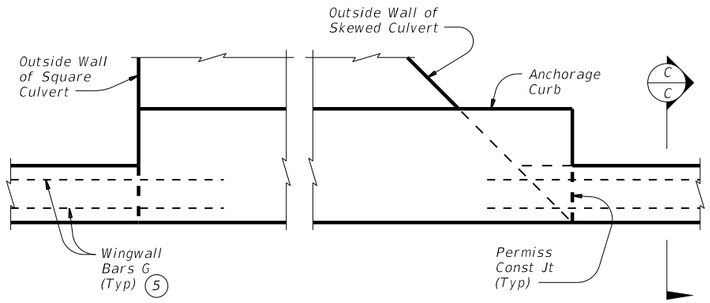
RAC

FILE:	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		96

DATE: $DATE$
FILE: $FILE$
$USER$
$TIME$



SECTION C-C



TYPICAL CURB PLAN
Curb reinforcing and footings not shown for clarity

INSTALLATION AT PARALLEL CULVERT WINGWALLS

See culvert wingwall standard for bars and details not shown.

(5) Bars G (#5), as identified on the PARALLEL WINGS PW standard sheet, must extend 1'-6" into the Anchorage Curb similar to that shown for a normal culvert curb.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE CURB
BOX CULVERT
RAIL MOUNTING DETAILS
(CURBS 8" TO 5'-0" TALL ONLY)

RAC

FILE:	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		97

UPDATED 6/22/2017

During the planning phase of project development the following environmental permits, issues, and commitments have been developed during coordination with resource agencies, local governmental entities, and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities, as additional environmental clearances may be required.

I. Clean Water Act, Sec. 402 Texas Pollutant Discharge Elimination System

(Addresses CGP and MS4 Storm Water requirements for the project.)

(In the event that the Contractor implements a PSL on or within one mile of the project, a Site Notice and/or a NOI will apply.)

☐ No Action Required ☑ Required Action

Action No. 1	Commitment No. 1
The project disturbs less than one acre of surface area. The contractor is responsible for the PSL as defined in the Standard Specifications for Construction and Maintenance of Highways, Street, and Bridges [2014 Edition, Item 7 (7.6) Page 42]. The total disturbed acreage is the combined acreage to be disturbed on the project and the contractor's PSL. This EPIC must be updated if the disturbed area increases to one or more acres during the course of construction. It may become necessary to post a site notice/or NOI for the project and/or PSL.	Refer to the SW3P Plan Sheets, BMPs and Detail. It will address sweeping, chemical storage, sanitary waste, and all other management practices.

II. Clean Water Act, Section 401 and 404 Compliance

(Addresses Nationwide Permits, Individual Permits, and Wetlands.)

(Filling, dredging, or excavating in any water bodies, rivers, creeks, streams, wetlands, or wet area is prohibited unless specified in the USACE permit and approved by the Engineer.)

(When temporary fill is implemented, only stated TxDOT standards will be used unless written authorization for an alternative is obtained from the Engineer. No equipment is allowed in any stream channel below the Ordinary High Water Mark except on temporary stream crossings or drill pads.)

☐ No Action Required ☑ 404 Permit and 401 Certification Required

Permit	Required Action	Waters of the US	App. Plan Sheet(s)
NWP 14	Adher to permit conditions	Hords Creek Draw	Bridge Sheets

Best Management Practices for applicable 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

- ☑ Temporary Vegetation
- ☐ Mulch
- ☐ Interceptor Swale
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Blankets, Matting
- ☐ Sod
- ☐ Diversion Dike
- ☐ Mulch Filter Berms and Socks
- ☐ Compost Blankets

Category II (Sedimentation Control)

- ☑ Sand Bag Berm
- ☑ Silt Fence
- ☐ Triangular Filter Dike
- ☐ Stone Outlet Sediment Traps
- ☐ Erosion Control Compost
- ☑ Compost Filter Berms and Socks
- ☐ Rock Berm
- ☐ Hay Bale Dike
- ☐ Brush Berms
- ☐ Sediment Basins
- ☐ Mulch Filter Berms and Socks

General Condition 25 - Category III BMPs required

Category III (Post-Construction TSS Control)

- ☐ Retention/Irrigation
- ☐ Extended Detention Basin
- ☐ Vegetative Filter Strips
- ☐ Grassy Swales
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Constructed Wetlands
- ☐ Wet Basins
- ☑ Vegetation-Lined Ditches
- ☐ Sand Filter Systems
- ☐ Mulch filter Berms and Socks
- ☐ Sedimentation Chambers

Prepared by ********** DATE: $DATE$ FILE: $FILE$ $TIME$

III. Cultural Resources

(Addresses any special circumstances associated with cultural resources, such as archeological or historic sites.)

(Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.;cease work in the immediate area and contact the Engineer immediately.)

☐ No Action Required ☑ Required Action

Action No.	Station (Rt/Lt)	Commitment
1.	West side of San Saba St. and northwest quadrant of Brazos St.	remove stone and salvage and then install per Special Specifications 5049 and 5009 as well as following other details provided.

IV. Vegetation Resources

(Addresses any special circumstances associated with vegetation, such as large trees to be avoided, or mitigation that will occur as part of the project.)

☐ No Action Required ☑ Required Action

Action No.	Station (Rt/Lt)	Commitment
1.	All	Avoid non-mow locations for stockpiles and equipment parking/storage.
2.	Project Limits	Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

V. Federal Listed, Proposed, Threatened, Endangered Species, Critical Habitat, State Listed Species, Candidate Species, and Migratory Bird Treaty Act (MBTA)

(Addresses any special habitat that may need to be avoided, lists any threatened or endangered species where habitat was observed and might be impacted within the project area, and lists any precautions such as nesting seasons for migratory birds.)

☐ No Action Required ☑ Required Action

Species Potentially within Project Area & Description	Habitat Description
---	---

Contractor is to be aware that various species may be present in the project area and should not harm or harrass them. Particularly, the Texas Tortoise and the Texas Horned Lizard could be present. If a species is identified or other issues arise; contact the Brownwood District Environmental Coordinator, Andrew Chisholm at 325-643-0442.

The Migratory Bird Treaty 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. Migration patterns would not be affected by the proposed project. The contractor will remove all old migratory bird nests from any structure where work would be done from September 1 through the end of February. In addition, the contractor will be prepared to prevent migratory birds from building nests between March 1 and August 31, per the Environmental Permits, Issues, and Commitments (EPIC) plans. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young shall be avoided.

VI. Hazardous Material or Contamination Issues

(Addresses any previously identified high risk sites associated with hazardous materials that may be encountered during construction.)

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

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contractor will follow all applicable storage and management requirements for liquid oil products, liquid petroleum products, and other chemical liquids as per 40 CFR 112 (a.k.a. SPCC) and/or TCEQ Construction General Permit for storm water management.

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/odors
- Underground storage tanks
- Evidence of leaching or seepage of substances
- Any other evidence indicating possible hazardous materials or contamination discovered on-site

---

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

☑ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.
Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☑ No

If "Yes", then TxDOT must retain a Texas Department of State Health Services (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 10 working days prior to scheduled abatement and/or demolition.

If "No", then TxDOT is still required to notify DSHS 10 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.

Bridges on this project may contain Lead-Containing Paint (LCP) or other items that contain lead. The location of (LCP) is identified in the General Notes. Item 6.10.1.2 in the 2014 TxDOT Standard Specifications shall be utilized for this project.

VII. Other Environmental Issues

(Addresses any other environmental issues that may not have been covered in other sections.)

☑ No Action Required ☐ Required Action

Action No.	Station (Rt/Lt)	Commitment
1.	---	---

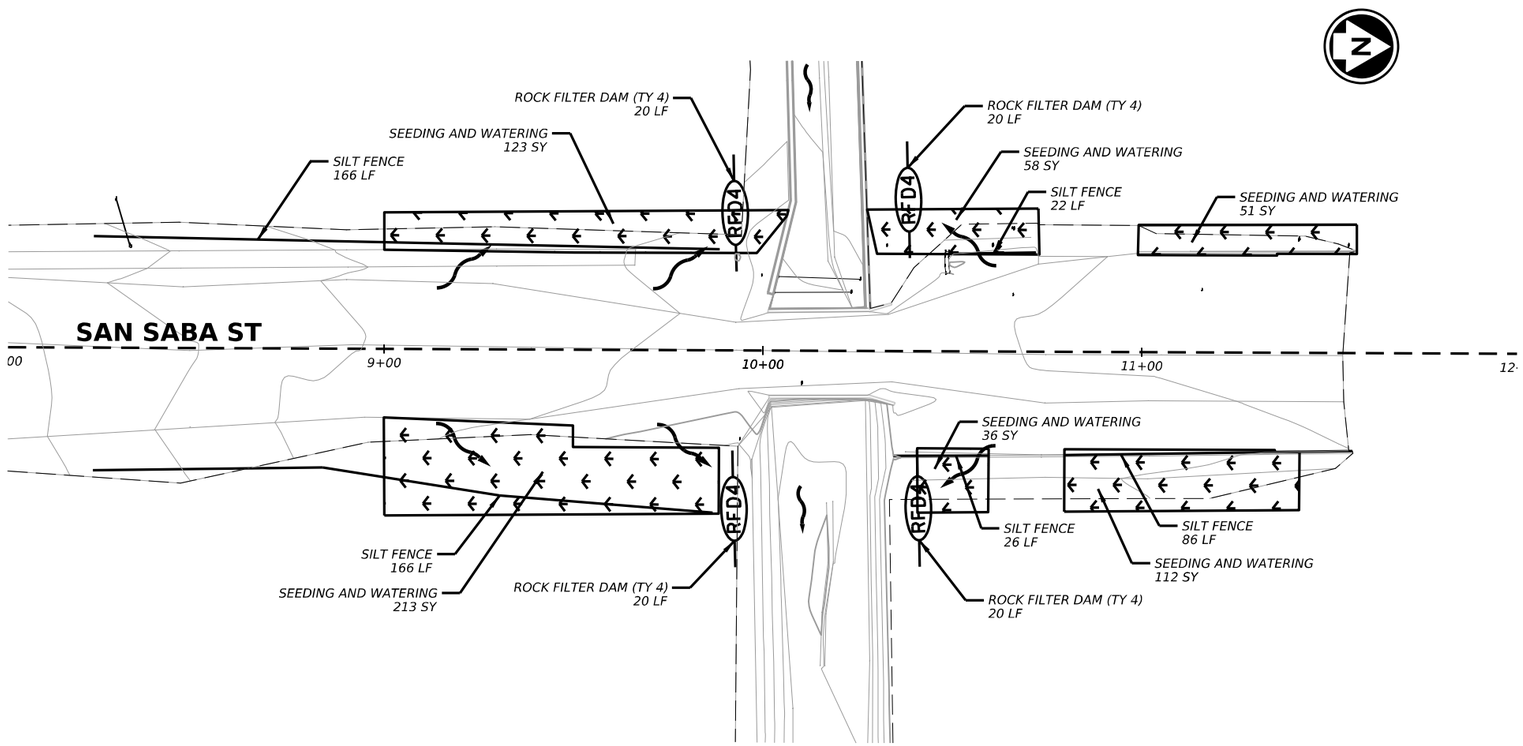
LIST OF ABBREVIATIONS

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

ENVIRONMENTAL PERMITS, ISSUES, AND COMMITMENTS (EPIC)

Texas Department of Transportation
BROWNWOOD DISTRICT

CONT	SECT	JOB	HIGHWAY
0923	08	030,ETC	SAN SABA ST.,ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		98



LEGEND

SF	TEMPORARY SEDIMENT CONTROL FENCE
	PROP SURFACE FLOW
RFD4	ROCK FILTER DAM (TYP 4)
	SEEDING

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

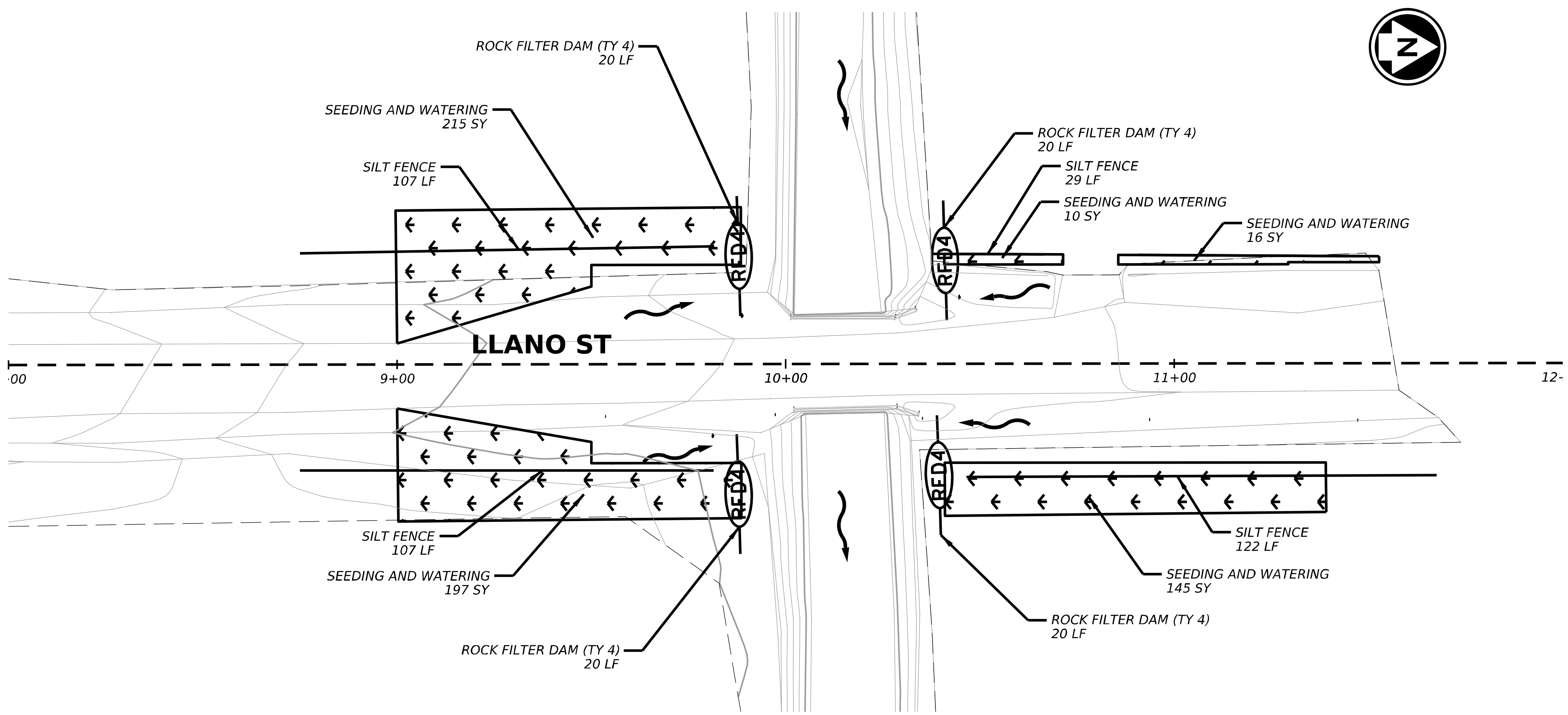
STORM WATER POLLUTION PREVENTION PLAN SAN SABA ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		99

DW: DS | CK: CK1 | DW: | CK: DW | CK: CK2

DATE: 7/31/2024 7:23:06 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms338201\038401030-10-EV-003.dgn



LEGEND

SF	TEMPORARY SEDIMENT CONTROL FENCE
	PROP SURFACE FLOW
RFD4	ROCK FILTER DAM (TYP 4)
	SEEDING

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

STORM WATER POLLUTION PREVENTION PLAN
LLANO ST

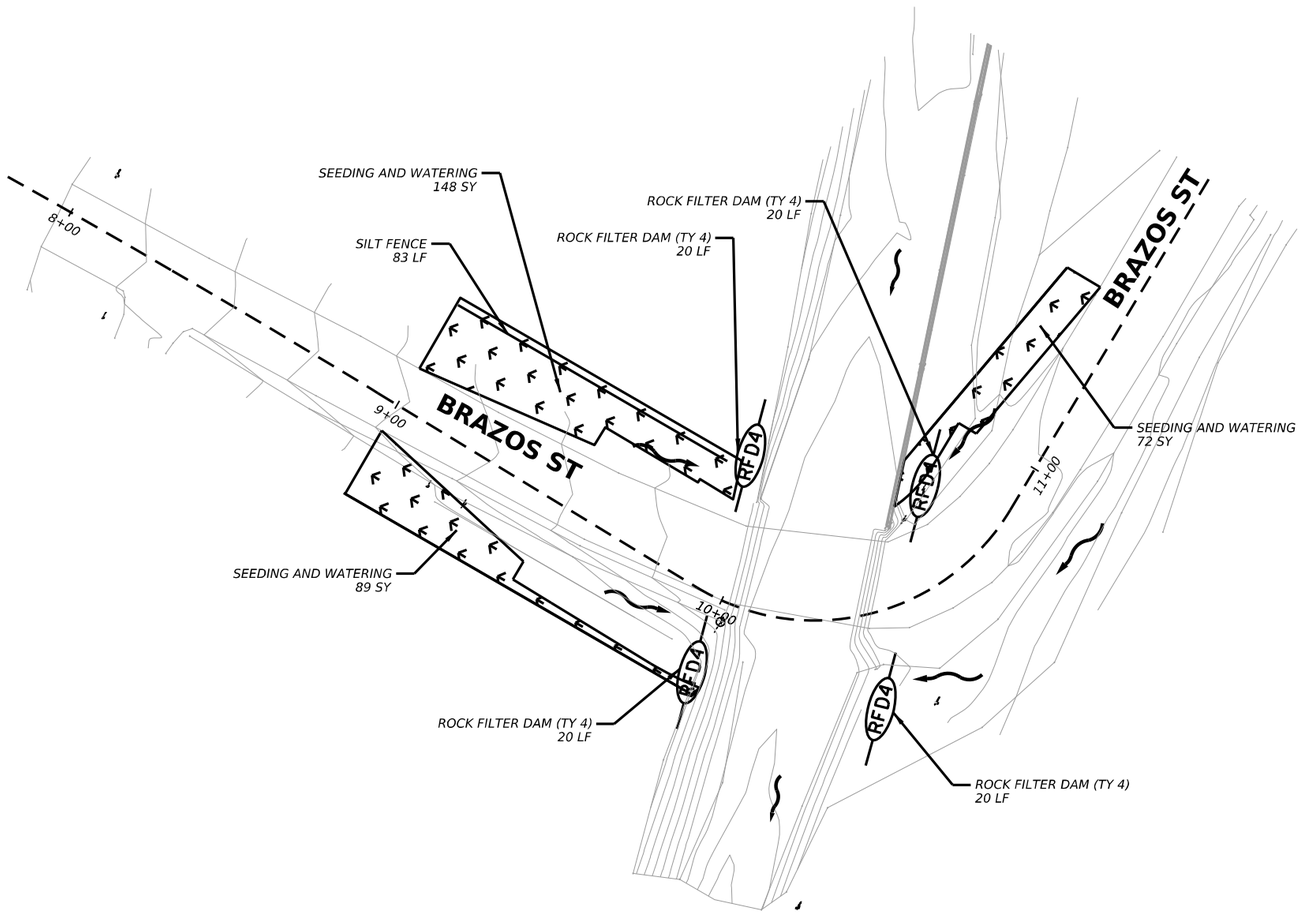
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		100

DN: DS CK: CK1 DW: DW CK: CK2

DATE: 7/31/2024 7:23:14 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms33820\038401030-10-EV-002.dgn

DW: DS | CK: DW | DW: CK1 | CK: DW | CK: CK2



LEGEND

SF	TEMPORARY SEDIMENT CONTROL FENCE PROP SURFACE FLOW
RFD4	ROCK FILTER DAM (TYP 4)
	SEEDING

STATE OF TEXAS
MANSA R. MOTON
111594
LICENSED
PROFESSIONAL ENGINEER
07.31.2024

BRIDGEFARMER & ASSOCIATES, INC.
CONSULTING ENGINEERS
TBPE REGISTRATION NO. 264

Texas Department of Transportation

STORM WATER POLLUTION PREVENTION PLAN BRAZOS ST

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0923	08	030, ETC	SAN SABA ST, ETC
DIST	COUNTY		SHEET NO.
BWD	COLEMAN		101

DATE: 7/31/2024 7:23:22 PM
FILE: c:\bms\bridgefarmer-pw\mansa.moton\dms338201038401030-10-EV-001.dgn

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):

0923-08-030

1.2 PROJECT LIMITS:

From: SAN SABA ST, LLANO ST, AND BRAZOS ST

To:_____

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 31° 49' 31.47" (N),(Long) 99° 25' 15.19" (W)

END: (Lat) 31° 49' 28.33" (N),(Long) 99° 25' 04.90" (W)

1.4 TOTAL PROJECT AREA (Acres): 1.19

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.60

1.6 NATURE OF CONSTRUCTION ACTIVITY:

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENTS CONSISTING OF REPLACING BRIDGE CLASS CULVERTS AND APPROACHES

1.7 MAJOR SOIL TYPES:

Soil Type	Description
LEERAY CLAY	LEERAY CLAY, 0 TO 1 PERCENT SLOPES

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: _____
☐ Other: _____
☐ 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
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
HORDS CREEK	HORDS CREEK (1418A) UNCLASSIFIED
JIM NED CREEK	JIM NED CREEK (1418B) UNCLASSIFIED
LAKE BROWNWOOD	LAKE BROWNWOOD (1418)
No TMDLs or I-Plans were identified	

* 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: _____
☐ 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: _____

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.
			102
STATE	STATE DIST.	COUNTY	
TEXAS	BWD	COLEMAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0923	08	030,ETC	SAN SABA ST, ETC

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ X Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- X ☐ Rock Filter Dams/ Rock Check Dams
- X ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ X Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
No permanent controls 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
- X Haul roads dampened for dust control
- X Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To
VEGETATED BUFFER ZONES ARE INFEASIBLE DUE TO SMALL AMOUNT OF ROW		
SEDIMENT CONTROL FENCE		
SAN SABA ST.	**9+00**	**11+54**
LLANO ST.	**9+00**	**11+57**
BRAZOS ST.	**9+00**	**11+50**
ROCK FILTER DAMS		
SAN SABA ST.	**10+00**	**10+30**
LLANO ST.	**10+00**	**10+30**
BRAZOS ST.	**10+01**	**10+41**

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:

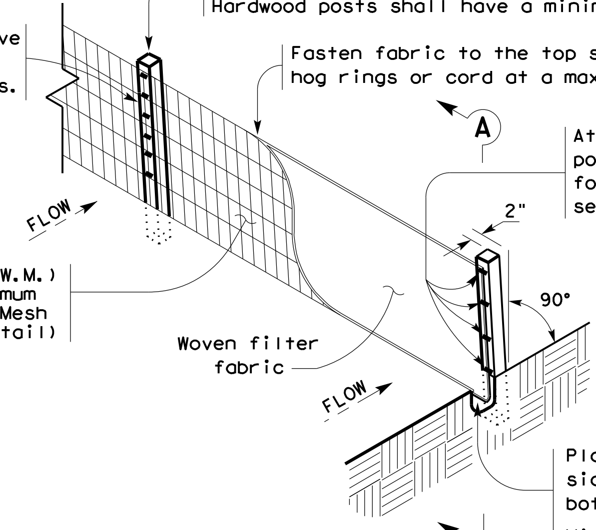
Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being 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.

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

July 2023 Sheet 2 of 2

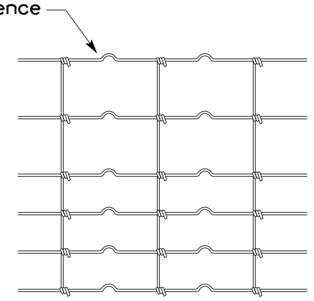
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			103
STATE	STATE DIST.	COUNTY	
TEXAS	BWD	COLEMAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0923	08	030, ETC	SAN SABA ST, ETC



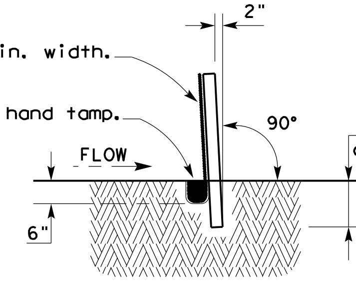
TEMPORARY SEDIMENT CONTROL FENCE

SCF



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.



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

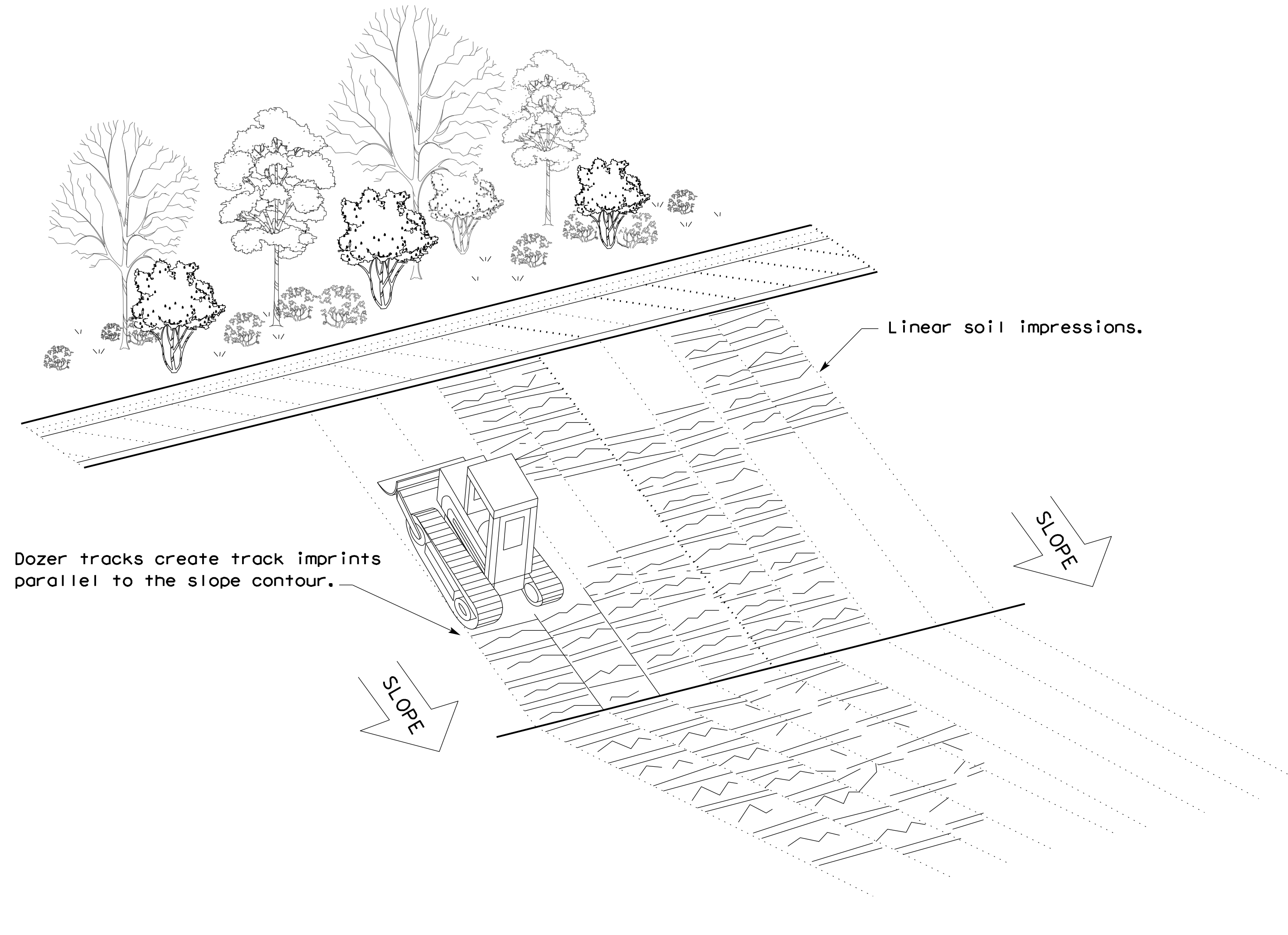
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

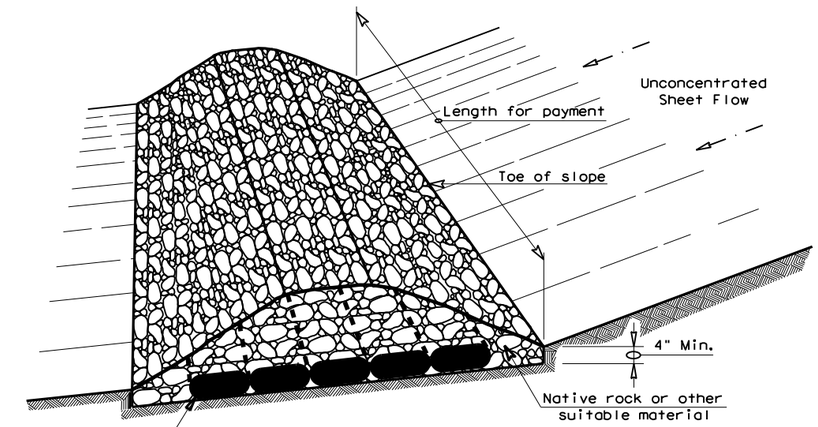
FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST, ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		104

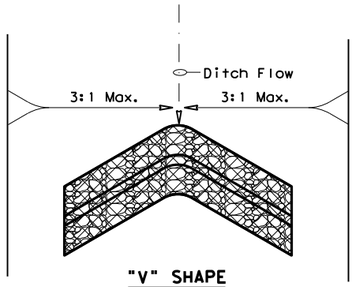
DATE
FILE

DATE: 7/31/2024
FILE: c:\dms\bridgefarmer-pw\mansa.moton\dms33820\038401030-10-EY-904.dgn
mMoton

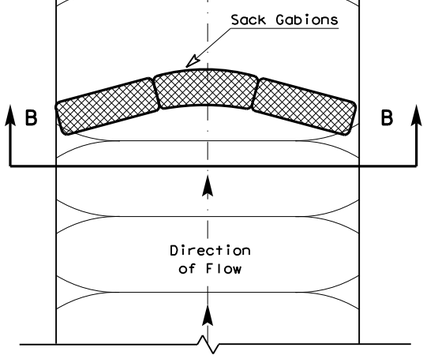


FILTER DAM AT TOE OF SLOPE

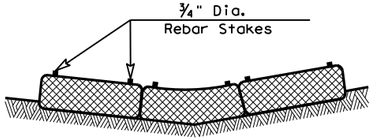
RFD1



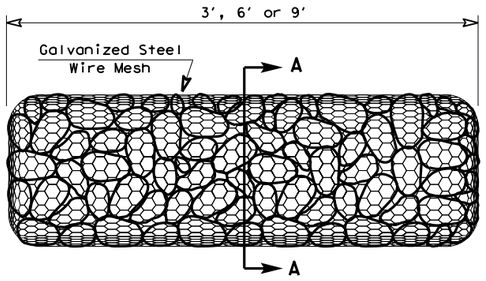
"V" SHAPE
PLAN VIEW



PLAN VIEW

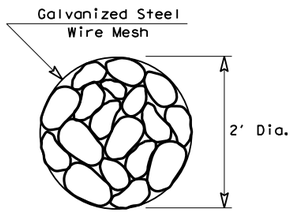


SECTION B-B

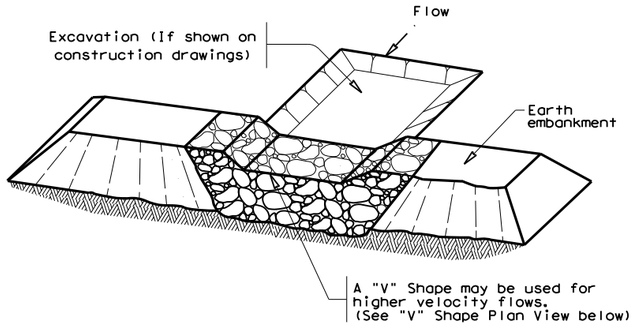


TYPE 4 (SACK GABIONS)

RFD4

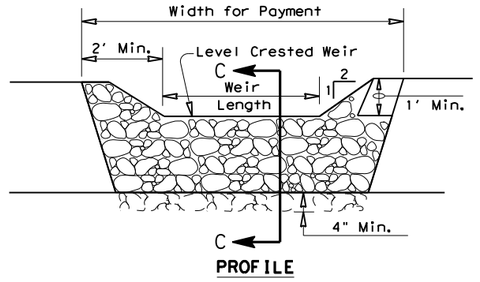


SECTION A-A

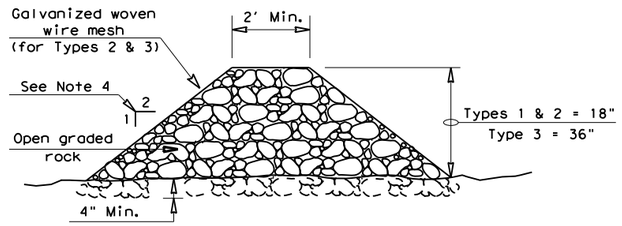


FILTER DAM AT SEDIMENT TRAP

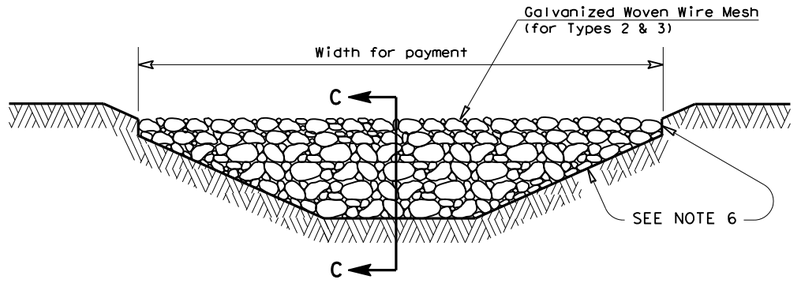
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

GENERAL NOTES

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

ROCK FILTER DAM USAGE GUIDELINES

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

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

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

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

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

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

PLAN SHEET LEGEND

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

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0923	08	030, ETC	SAN SABA ST. ETC
	DIST	COUNTY		SHEET NO.
	BWD	COLEMAN		105