FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	BR 2019 (360), ETC.		1
STATE	STATE DIST.	COUNTY	
TEXAS	TYL	VAN ZANDT	
CONT.	SECT.	JOB	HIGHWAY NO.
0910	12	134,ETC	CR 2918,ETC

INDEX OF SHEETS

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

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $_____

CONTRACTOR: _____

FINAL AS BUILT PLANS

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

_____ _____
DATE AREA ENGINEER

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

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO: BR 2019(360), ETC.
CSJ 0910-12-134, ETC.
NET LENGTH OF PROJECT = 1375.00 FEET = 0.260 MILE

VAN ZANDT COUNTY
CR 2918 @ STEVE CREEK RELIEF
CR 2918 @ STEVE CREEK
CR 2708 @ CANEY CREEK
CR 2319 @ ALLIGATOR CREEK

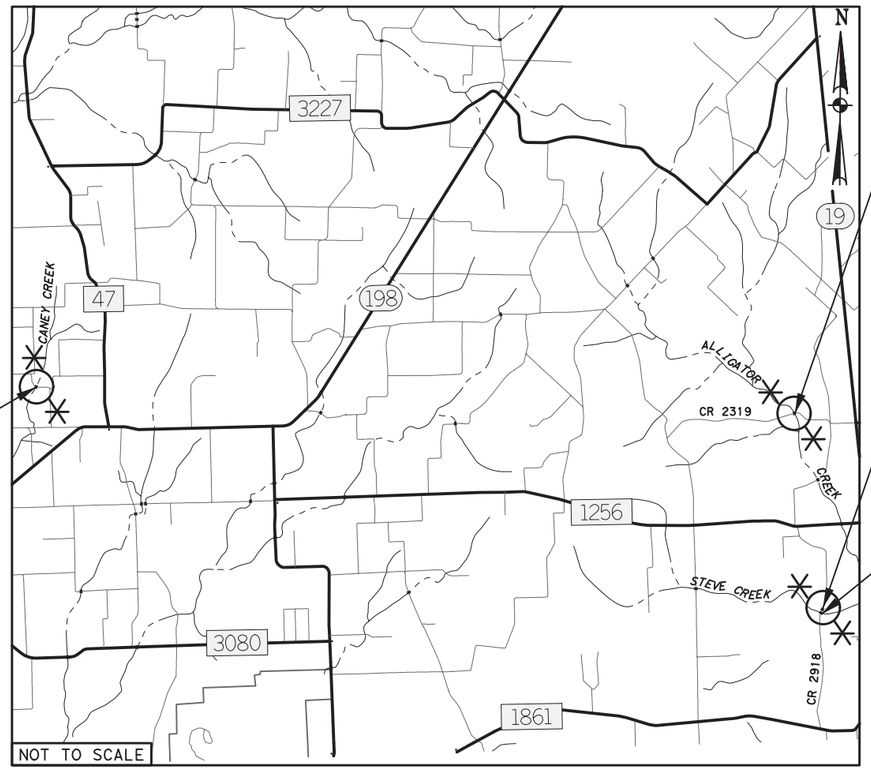
FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT
CONSISTING OF REPLACING BRIDGE AND APPROACHES

CR 2918: CSJ 0910-12-134
ROADWAY: = 300.00 FT. = 0.057 MI.
BRIDGE: = 35.00 FT. = 0.006 MI.
TOTAL = 335.00 FT. = 0.063 MI.

CR 2918: CSJ 0910-12-135
ROADWAY: = 300.00 FT. = 0.057 MI.
BRIDGE: = 40.00 FT. = 0.008 MI.
TOTAL = 340.00 FT. = 0.065 MI.

CR 2319: CSJ 0910-12-136
ROADWAY: = 300.00 FT. = 0.057 MI.
BRIDGE: = 65.00 FT. = 0.012 MI.
TOTAL = 365.00 FT. = 0.069 MI.

CR 2708: CSJ 0910-12-137
ROADWAY: = 300.00 FT. = 0.057 MI.
BRIDGE: = 35.00 FT. = 0.006 MI.
TOTAL = 335.00 FT. = 0.063 MI.



NOT TO SCALE

CR 2708 AT CANEY CREEK
CSJ: 0910-12-137
STA 21+50.00
BEGIN PROJECT BR 2019(363)
EXISTING STRUCTURE
NBI# 10-234-0-AA27-08-101
PROPOSED STRUCTURE
NBI# 10-234-0-AA27-08-001
STA 24+85.00
END PROJECT BR 2019(363)

CR 2319 AT ALLIGATOR CREEK
CSJ: 0910-12-136
STA 10+90.00
BEGIN PROJECT BR 2019(362)
EXISTING STRUCTURE
NBI# 10-234-0-AA23-19-101
PROPOSED STRUCTURE
NBI# 10-234-0-AA23-19-001
STA 14+55.00
END PROJECT BR 2019(362)

CR 2918 AT STEVE CREEK RELIEF
CSJ: 0910-12-134
STA 34+45.00
BEGIN PROJECT BR 2019(360)
EXISTING STRUCTURE
NBI# 10-234-0-AA29-18-101
PROPOSED STRUCTURE
NBI# 10-234-0-AA29-18-002
STA 37+80.00
END PROJECT BR 2019(360)

CR 2918 AT STEVE CREEK
CSJ: 0910-12-135
STA 31+05.00
BEGIN PROJECT BR 2019(361)
EXISTING STRUCTURE
NBI# 10-234-0-AA29-18-102
PROPOSED STRUCTURE
NBI# 10-234-0-AA29-18-001
STA 34+45.00
END PROJECT BR 2019(361)

FUNCTION CLASSIFICATION:
RURAL LOCAL ROADWAY

DESIGN SPEED:
30 MPH

ADT:
CR 2319
EXIST= 70 (2015)
PROP= 875 (2035)

CR 2708
EXIST= 50 (2015)
PROP= 57 (2035)

CR 2918
EXIST= 100 (2015)
PROP= 70 (2035)

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

PREPARED FOR LETTING: 11/11/2019

Trevor L. Castilla
PROJECT MANAGER

CONCURRENCE: 11/18/2020

DocuSigned by: Don Kirkpatrick
COUNTY JUDGE, VAN ZANDT COUNTY

Texas Department of Transportation

SUBMITTED FOR LETTING: 12/31/2020

DocuSigned by: Gilbert Arteaga
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 12/31/2020

DocuSigned by: Simon M. Hill
DISTRICT ENGINEER

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012).

EXCEPTIONS: NONE
EQUATIONS: NONE
RR X-ING'S: NONE

T:\Engdata\Standards\Misc\TITLESHT.DGN
FILE LOCATION AND NAME

LEVELS DISPLAYED
1

COUNTY
HWY. NO.
DATE ACCEPTED
PROJ. NO.
LETTING DATE

SHEET NO.		DESCRIPTION
		I. GENERAL
1		TITLE SHEET
2		SUPPLEMENTAL INDEX OF SHEETS
3		CR 2319 TYPICAL SECTIONS
4		CR 2708 TYPICAL SECTION
5		CR 2918 TYPICAL SECTIONS
6		CR 2918 RELIEF TYPICAL SECTIONS
7, 7A-7D		GENERAL NOTES
8 - 8A		ESTIMATE AND QUANTITY
9 - 12		SUMMARY OF QUANTITIES
		II. TRAFFIC CONTROL PLAN
13		CR 2319 TRAFFIC CONTROL PLAN (DETOUR ROUTE AND SEQUENCE OF WORK)
14		CR 2319 TRAFFIC CONTROL PLAN (ADVANCE WARNING LAYOUT)
15		CR 2708 TRAFFIC CONTROL PLAN (DETOUR ROUTE AND SEQUENCE OF WORK)
16		CR 2708 TRAFFIC CONTROL PLAN (ADVANCE WARNING LAYOUT)
17		CR 2918 TRAFFIC CONTROL PLAN (DETOUR ROUTE AND SEQUENCE OF WORK)
18		CR 2918 TRAFFIC CONTROL PLAN (ADVANCE WARNING LAYOUT)
		STANDARDS
19 - 30	*	BC(1)-14 TO BC(12)-14
31	*	TCP(1-3)-18
32	*	TCP(2-3)-18
32A	*	TREATMENT FOR VARIOUS EDGE CONDITIONS
		III. ROADWAY DETAILS
33		CR 2319 HORIZONTAL AND VERTICAL CONTROL INDEX SHEET
34		CR 2708 HORIZONTAL AND VERTICAL CONTROL INDEX SHEET
35		CR 2918 HORIZONTAL AND VERTICAL CONTROL INDEX SHEET
36 - 37		HORIZONTAL ALIGNMENT DATA
38		CR 2319 AT ALLIGATOR CREEK PLAN AND PROFILE
39		CR 2708 AT CANEY CREEK PLAN AND PROFILE
40		CR 2918 AT STEVE CREEK PLAN AND PROFILE
41		CR 2918 AT STEVE CREEK RELIEF PLAN AND PROFILE
41A		MISC DETAILS
		STANDARDS
42	*	GF(31)-19
43 - 43A	*	GF(31)TRTL3-20
44	*	GF(31)MS-19
45	*	BED-14
46	*	SGT(10S)31-16
47	*	SGT(11S)31-18
48	*	SGT(12S)31-18
49	*	WF(2)-10
50	*	D&OM(1)-20
51	*	D&OM(2)-20
52	*	D&OM(3)-20
53	*	D&OM(5)-20
		IV. DRAINAGE DETAILS
54		CR 2319 AT CANEY CREEK DRAINAGE AREA MAP
55		CR 2319 AT CANEY CREEK HYDRAULIC DATA SHEET
56		CR 2319 AT CANEY CREEK SCOUR PROFILE
57		CR 2708 AT ALLIGATOR CREEK DRAINAGE AREA MAP
58		CR 2708 AT ALLIGATOR CREEK HYDRAULIC DATA SHEET
59		CR 2708 AT ALLIGATOR CREEK SCOUR PROFILE
60		CR 2918 AT STEVE CREEK DRAINAGE AREA MAP
61		CR 2918 AT STEVE CREEK HYDRAILIC DATA SHEET
62		CR 2918 AT STEVE CREEK SCOUR PROFILE

SHEET NO.		DESCRIPTION
		V. BRIDGE
63		CR 2319 AT ALLIGATOR CREEK BRIDGE LAYOUT
64		CR 2319 AT ALLIGATOR CREEK BORING LOGS
65		CR 2319 AT ALLIGATOR CREEK ESTIMATED QUANTITIES AND CONTROL ELEVATIONS
66		CR 2708 AT CANEY CREEK BRIDGE LAYOUT
67		CR 2708 AT CANEY CREEK BORING LOGS
68		CR 2708 AT CANEY CREEK ESTIMATED QUANTITIES AND CONTROL ELEVATIONS
69		CR 2918 AT STEVE CREEK BRIDGE LAYOUT
70		CR 2918 AT STEVE CREEK BORING LOGS
71		CR 2918 AT STEVE CREEK ESTIMATED QUANTITIES AND CONTROL ELEVATIONS
72		CR 2918 AT STEVE CREEK RELIEF BRIDGE LAYOUT
73		CR 2918 AT STEVE CREEK RELIEF BORING LOGS
74		CR 2918 AT STEVE CREEK RELIEF ESTIMATED QUANTITIES AND CONTROL ELEVATIONS
		STANDARDS
75 - 76	#	ABB-24(1) TO ABB-24(2)
77	#	APSB-24
78 - 80	#	BB-B20(1) TO BB-B20(3)
81	#	BBEB
82	#	BBRAS
83	#	BBSDS-B20-24
84 - 84A	#	CSAB
85 - 86	#	FD(1) TO FD(2)
87	#	PSB-5SB12
88	#	PSBEB
89	#	PSBRA
90	#	PSBSD
91 - 92	#	SBBS-B20-24(1) TO SBBS-B20-24(2)
93	#	SPSB-24
94 - 95	#	SRR(1) TO SRR(2)
96 - 98	#	T223(1) TO T223(3)
		VII. EROSION CONTROL
99		CR 2319 ENVIRONMENTAL, PERMITS, ISSUES, AND COMMITMENTS (EPIC)
100		CR 2319 SW3P INDEX
101		CR 2319 SW3P LAYOUT
102		CR 2708 ENVIRONMENTAL, PERMITS, ISSUES, AND COMMITMENTS (EPIC)
103		CR 2708 SW3P INDEX
104		CR 2708 SW3P LAYOUT
105		CR 2918 ENVIRONMENTAL, PERMITS, ISSUES, AND COMMITMENTS (EPIC)
106		CR 2918 RELIEF ENVIRONMENTAL, PERMITS, ISSUES, AND COMMITMENTS (EPIC)
107		CR 2918 SW3P INDEX
108 - 109		CR 2918 SW3P LAYOUT
		STANDARDS
110 - 111	*	EC(1)-16 TO EC(2)-16

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

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

Trevor L. Castilla, P.E. 12/14/2020
TREVOR L. CASTILLA, P.E. DATE

STATE OF TEXAS
Samantha McDonald
128678
LICENSED
PROFESSIONAL ENGINEER

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

Samantha McDonald, P.E. 12/14/2020
SAMANTHA MCDONALD, P.E. DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

SUPPLEMENTAL INDEX OF SHEETS

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	BR 2019 (360), ETC.		CR 2918,ETC
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	2
CONTROL	SECTION	JOB	
0910	12	134,ETC	

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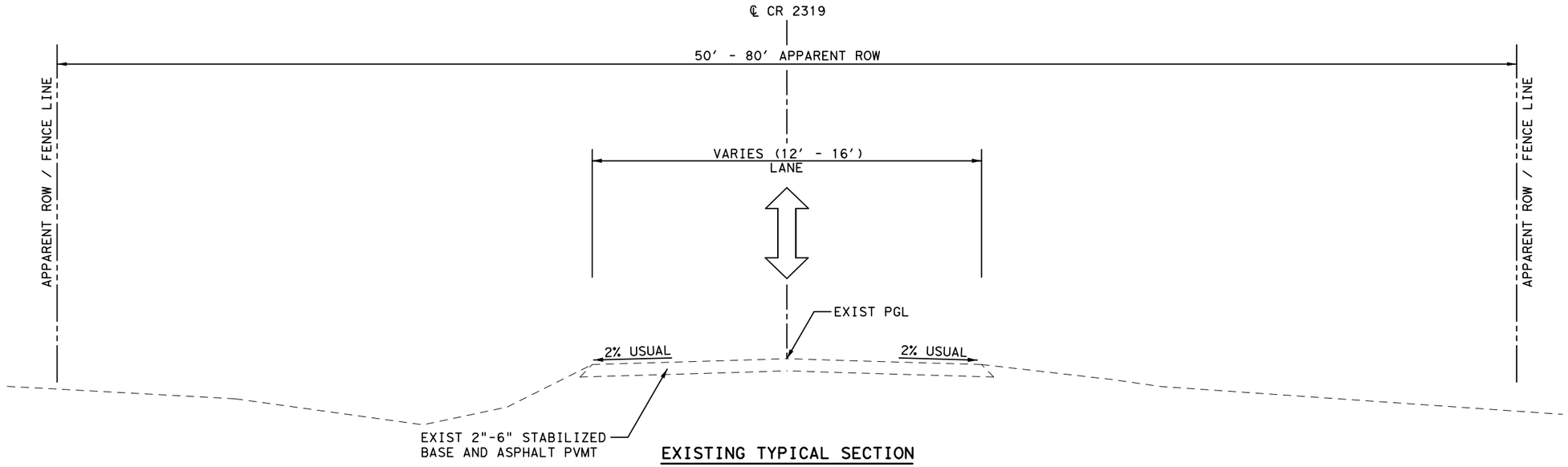
DRAWING DATE: 12/14/2020



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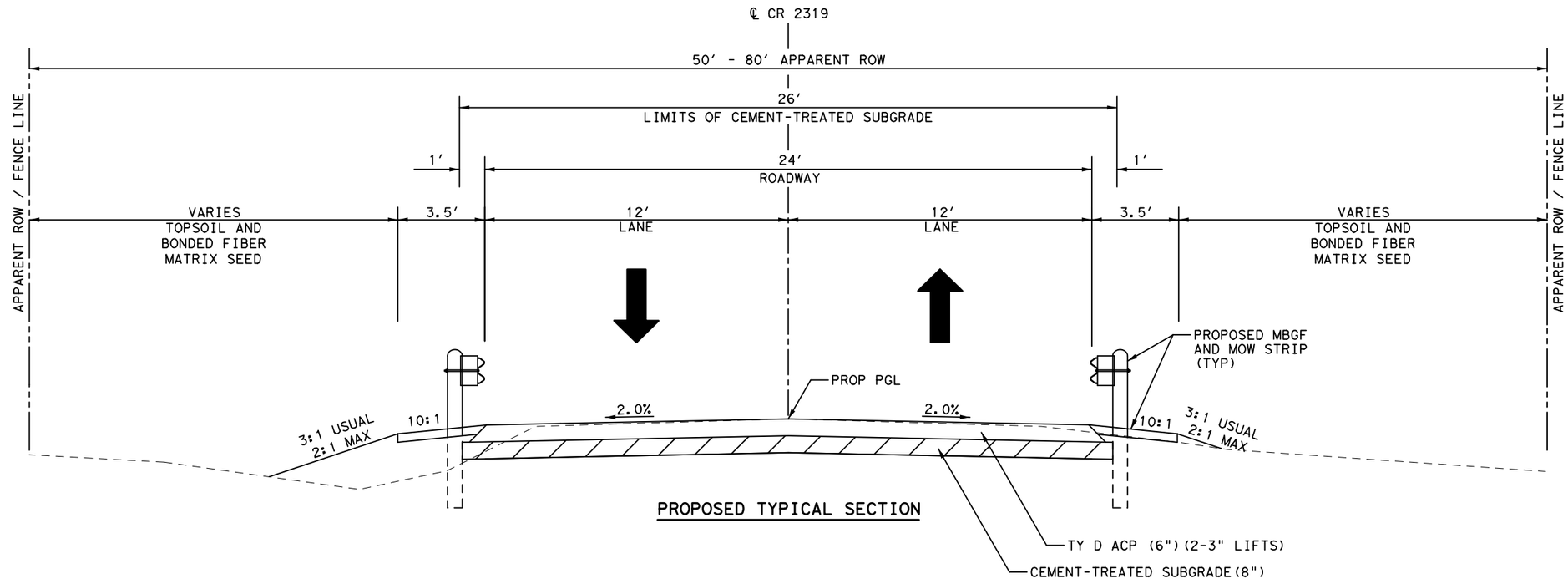

PROPOSED TYPICAL SECTION

0′ 2.5′ 5′

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	3
CONTROL	SECTION	JOB	
0910	12	134,ETC	

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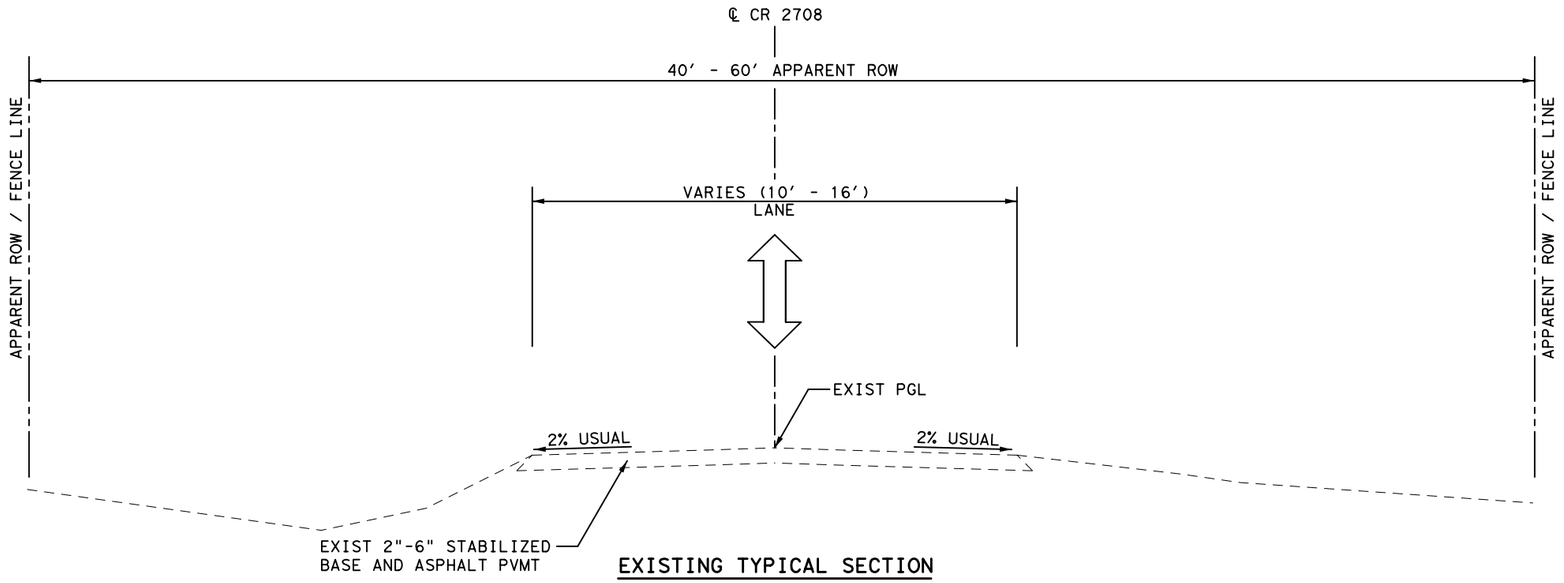

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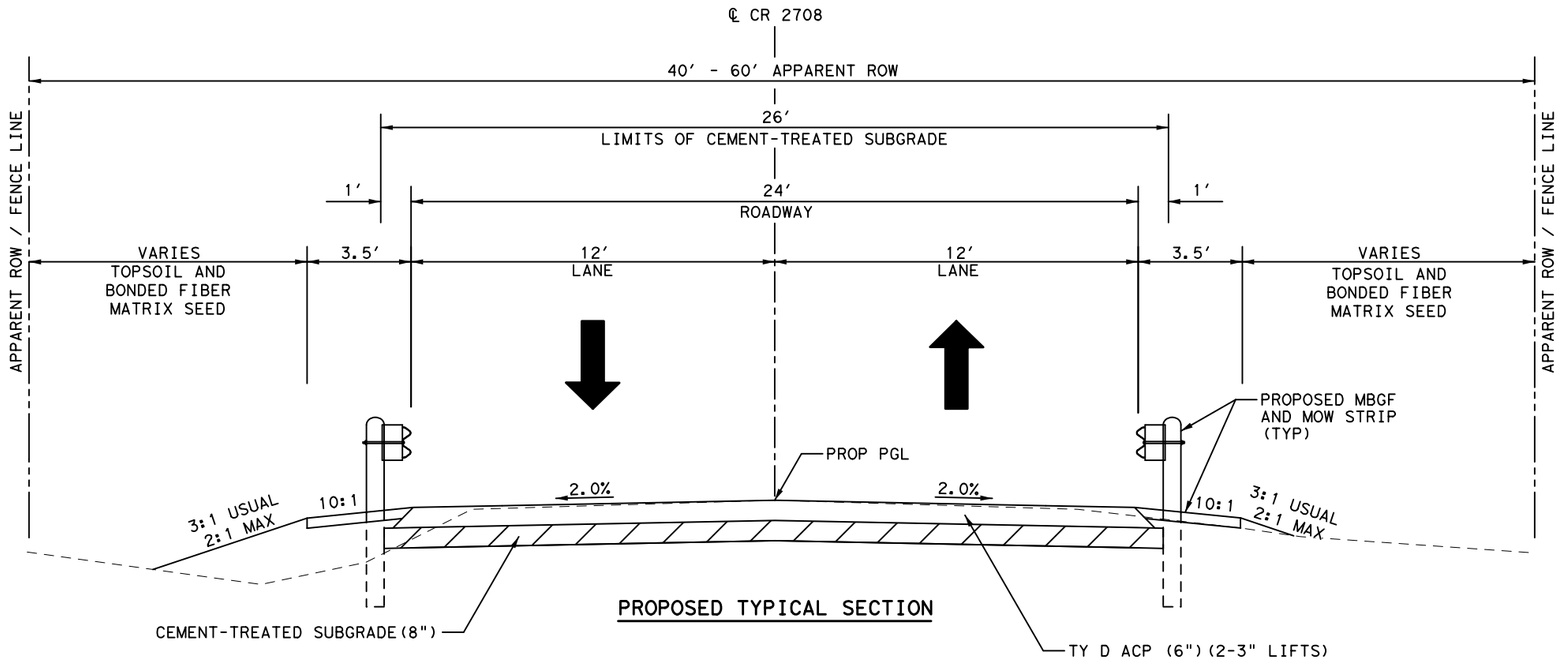


PROPOSED TYPICAL SECTION

0′ 2.5′ 5′

TREVOR L. CASTILLA 85405 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

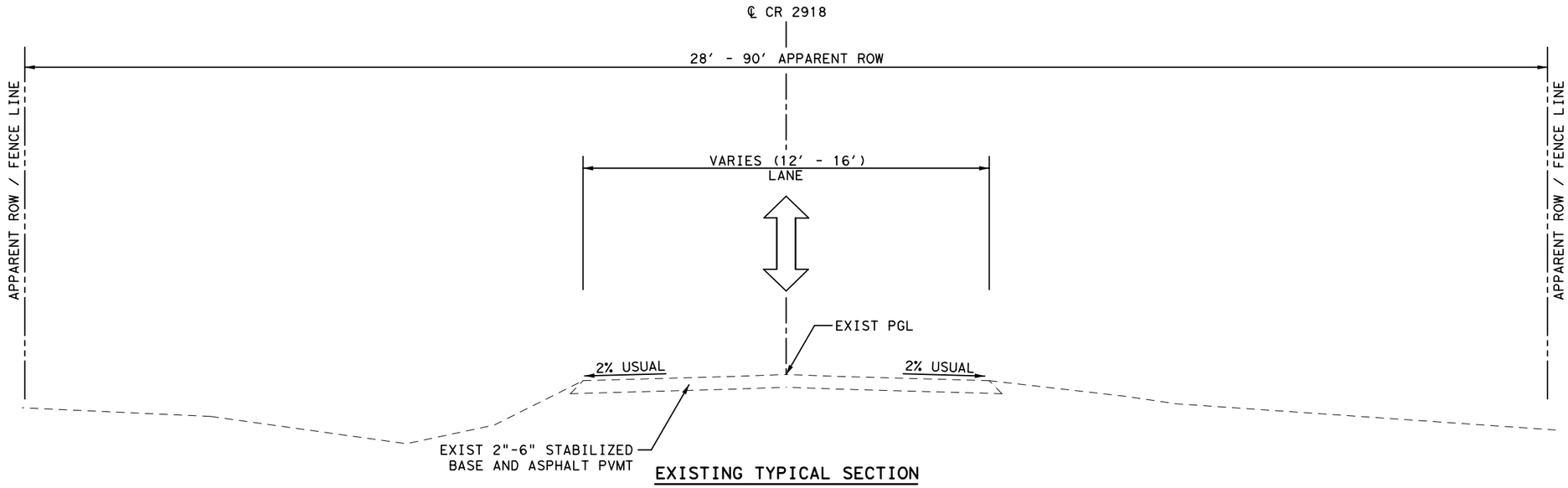
CR 2708 @ CANEY CREEK

TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	4
CONTROL	SECTION	JOB	
0910	12	134, ETC	

DRAWING DATE: 11/11/2019 FILENAME: ...\01 General\2708*TYP01.dgn



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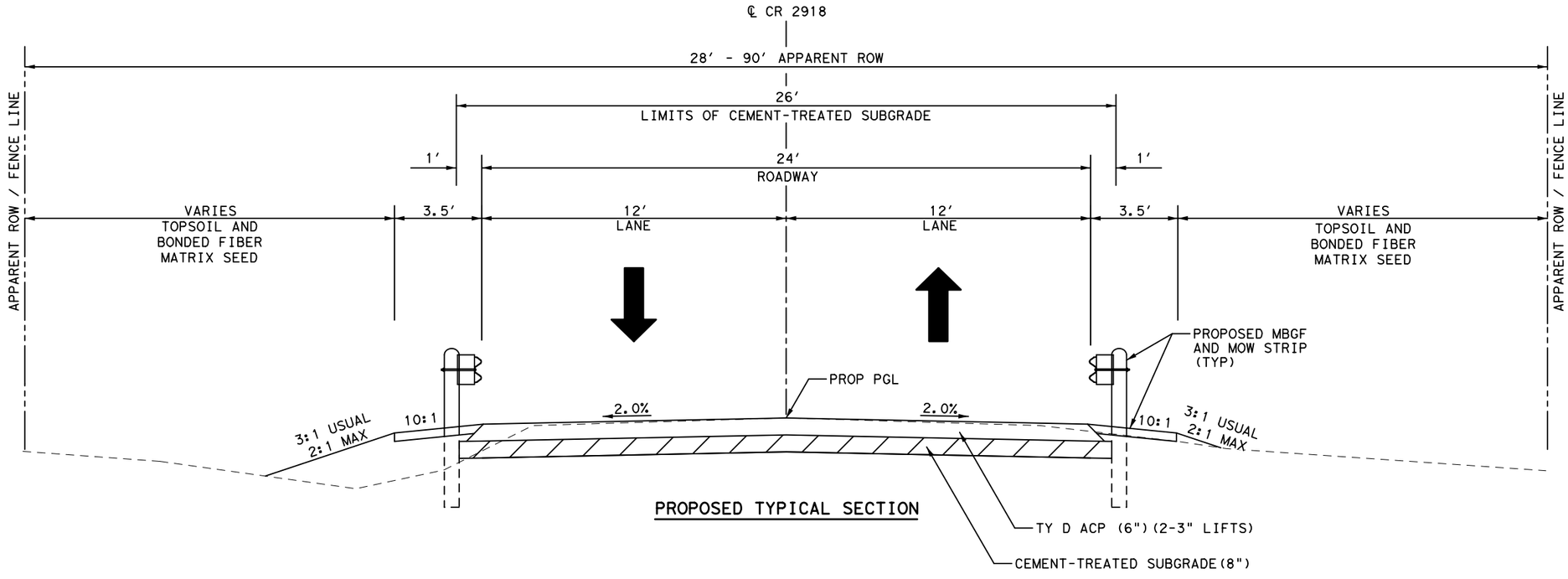


PROPOSED TYPICAL SECTION

0′ 2.5′ 5′

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2918 @ STEVE CREEK

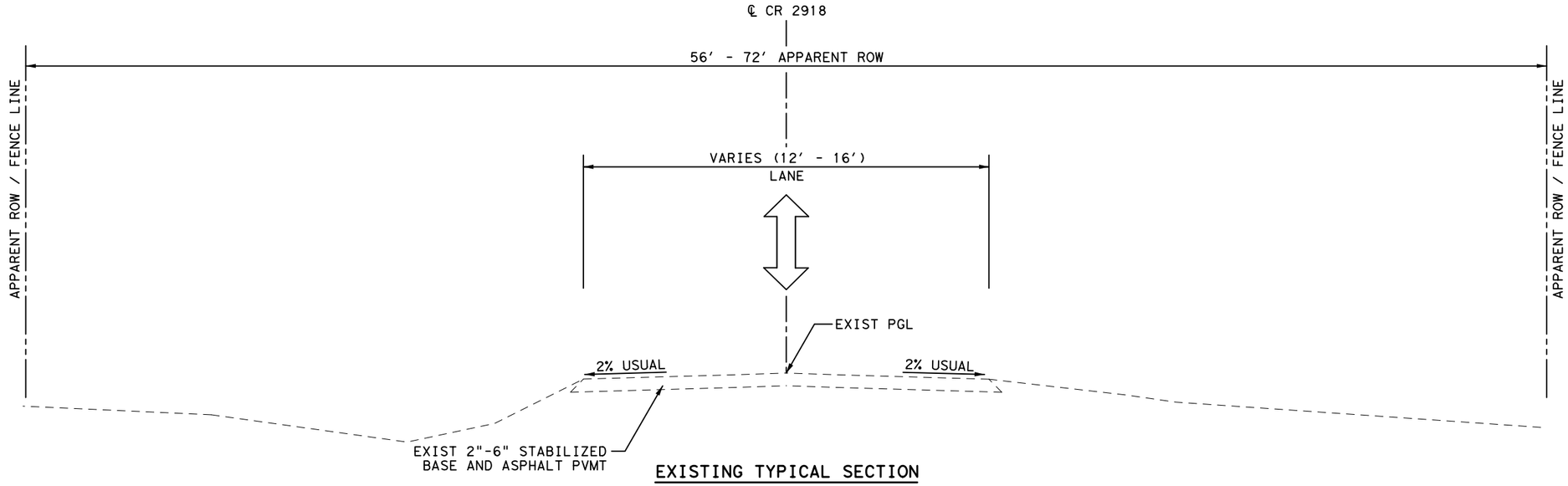
TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	5
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\01 General\2918*TYP01.dgn

DRAWING DATE: 11/11/2019



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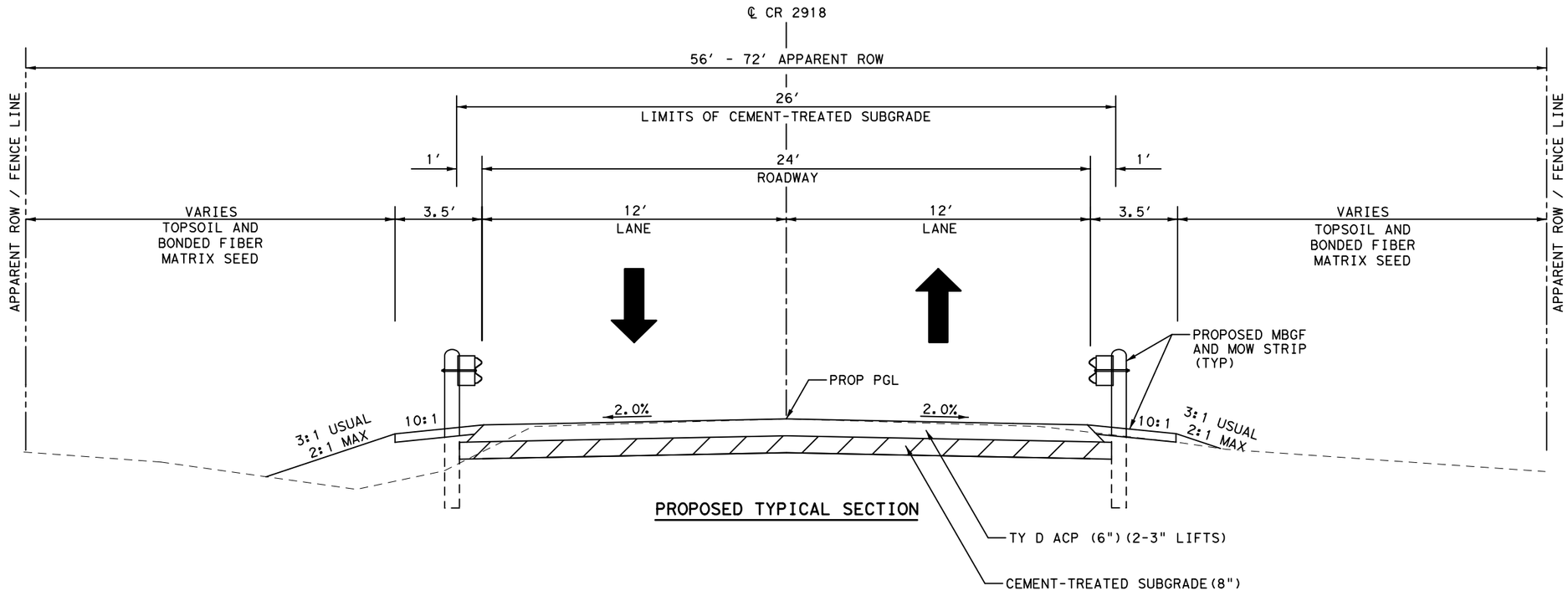

PROPOSED TYPICAL SECTION

0′ 2.5′ 5′

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2918 @ STEVE CREEK RELIEF

TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	6
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\01 General\2918*TYP02.dgn

DRAWING DATE: 11/11/2019

GENERAL NOTES:

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

Preston Friend Preston.Friend@txdot.gov

Kyle Dykes Kyle.Dykes@txdot.gov

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

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

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

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

COMMISSIONER CONTACT INFORMATION:

Project	Precinct #	Commissioner	Contact #
CR 2318	2	Virgil Melton, Jr	903-567-2166

ITEM 4. SCOPE OF WORK

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

ITEM 5. CONTROL OF THE WORK

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

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

Project Number: **Sheet 7**

County: Van Zandt **Control:** 0910-12-134, Etc.

Highway: CR 2918, Etc.

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

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

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

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

Verify survey control for accuracy before beginning construction.

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

ITEM 7. LEGAL RELATIONS AND RESPONSIBILITIES

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

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

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

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

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

The total disturbed area for this project is 1.34 acres. The disturbed area in this project and the Contractor Project Specific Locations (PSL's) within 1 mile of the project limits for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSL for construction support activities on or off the ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceed 5 acres, before disturbance, provide a copy of the Contractor NOI for PSLs on the ROW and within 1 mile of the project limits to the Engineer and to any local government that operates a Municipal Separate Storm Sewer System (MSSS).

No significant traffic generator events identified.

ITEM 8. PROSECUTION AND PROGRESS

Prepare the progress schedule as a bar chart. Construct bridges in the following order:

1. CR 2319 @ Alligator Creek
2. CR 2708 @ Caney Creek
3. CR 2918 @ Steve Creek
4. CR 2918 @ Steve Creek Relief

It is the intent to close each bridge site for a minimum length of time. Do not close the road until the Contractor is mobilized for bridge construction. Work on one bridge at a time unless otherwise approved by the Engineer.

ITEM 9. MEASUREMENT & PAYMENT

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

ITEM 100. PREPARING RIGHT OF WAY

Perform work as necessary off the right of way on temporary or drainage easements and at those locations where improvements have been taken or partially taken by right of way acquisition.

Project Number: **Sheet 7A**

County: Van Zandt **Control:** 0910-12-134, Etc.

Highway: CR 2918, Etc.

Review these locations with the Area Engineer. The cost of this work will be included in the unit price bid for this Item.

Burning will not be permitted within the right-of-way.

ITEMS 110 & 132. EXCAVATION & EMBANKMENT

Before Contract letting, prospective bidders may review the earthwork cross-sections at the Area Engineer's office. The computer data is for non-construction purposes only and is the prospective bidder's responsibility to validate the data with the accompanying plans, specifications, and estimates for this Contract.

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

ITEM 132. EMBANKMENT

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

ITEM 164. SEEDING FOR EROSION CONTROL

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

Species and Rates (lb. PLS/ac.)	
(Season: September 1 to February 1)	
Bermuda (unhulled)	12
Crimson Clover	10

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

Place topsoil before temporary seeding unless otherwise directed.

Do not use Bahiagrass.

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

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

Project Number: **Sheet 7B**

County: Van Zandt **Control:** 0910-12-134, Etc.

Highway: CR 2918, Etc.

ITEM 166. FERTILIZER

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

ITEM 168. VEGETATIVE WATERING

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

Apply water at the rate of 11 gallons per sq. yr. on areas prepared for seeding.

ITEM 204. SPRINKLING

Apply water for dust control as directed. When dust control is not being maintained, cease operations until proper resources have been utilized to adequately minimize dust during earthwork, base construction. This Item will not be paid directly, but will be subsidiary to pertinent Items.

ITEM 340. DENSE-GRADED HOT-MIX ASPHALT (Small Quantity)

The Engineer may accept a previously approved design, if prior experience using the design was satisfactory. Unless waived by the Engineer, a trial batch will be required as outlined in Item 340. The Hamburg Wheel Tracking requirements are waived for driveways.

Give the TxDOT inspector at the spreading and finishing machine 1 weight ticket for each load of material. When directed, weigh asphaltic concrete loads on public scales to ensure the proper weight of material.

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

Apply a tack coat with a rate of 0.12 gal/sy of residual asphalt between each layer of ACP pavement unless otherwise directed.

ITEM 416. DRILLED SHAFT FOUNDATIONS

Collect all cuttings, spoils, and slurry resulting from drilled shaft operations and deposit material into a storage tank for disposal outside the limits of the project. Dispose of waste material in accordance with Section 416.3.7., “Additional Requirements for Slurry Displacement or Underwater Concrete Placement Methods.”

Contractor is solely responsible to maintain the stability of the holes. Casing must be removed, if utilized; otherwise contact the Engineer immediately.

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

Do not use membrane curing for structural elements.

Provide a rub surface finish to the following elements: Surface Area II.

ITEM 421. HYDRAULIC CEMENT CONCRETE

The Engineer will provide strength-testing equipment.

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

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

ITEM 432. RIPRAP

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

ITEM 496. REMOVING STRUCTURES

Coordinate with Van Zandt County Commissioner Virgil Melton Jr., at 903-567-2166 and vvmj@vanzandtcounty.org, to allow personnel to be present during bridge demolition to collect salvageable material. All other materials removed under this Item are the property of the Contractor.

Old timber becomes the property of the Contractor to dispose of off the right of way in a manner satisfactory to the Engineer. Furnish evidence of concurrence by the Owner of the disposal site.

Contractor will not be permitted to use a torch to remove metal elements.

Project Number: **Sheet 7C**

County: Van Zandt **Control:** 0910-12-134, Etc.

Highway: CR 2918, Etc.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

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

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

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

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

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

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

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

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

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

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

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

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

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

ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

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

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

ITEM 540. METAL BEAM GUARD FENCE

Use round wood posts on all metal beam guard fence except where steel posts are required in accordance with "Low Fill Culvert Post Mounting" details shown on standard sheet MBGF.

Length of steel posts for low fill culvert post mounting will be determined in the field to ensure proper metal beam guard fence height.

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

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

Project Number: **Sheet 7D**

County: Van Zandt **Control:** 0910-12-134, Etc.

Highway: CR 2918, Etc.

ITEM 552. WIRE FENCE

Use treated wood posts for Type "A" fence. Usual testing requirements will be waived, but posts will be subject to visual inspection and approval by the Engineer.

Attach the permanent fence to the end of the proposed structures designated on the plans and as shown on standard sheet WF(2).

ITEM 644. SMALL ROADSIDE SIGN ASSEMBLIES

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

Stake all sign locations for approval prior to placement.

ITEM 658. DELINEATOR AND OBJECT MARKER ASSEMBLIES

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

ITEM 5070. STEEL FENCE

Furnish, install, remove or relocate, if approved, steel fence in accordance with the plans.

Provide a permanent steel fence that is equal to or better than the existing steel fence.

Coordinate with Van Zandt County Commissioner Virgil Melton, vvmj@vanzandtcounty.org, prior to removing the existing steel fence to give property owners notice.

Provide shop drawing for approval by the Engineer.

ITEM 6001. PORTABLE CHANGEABLE MESSAGE SIGN

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

ESTIMATE & QUANTITY SHEET

CONTROLLING PROJECT ID 0910-12-134 **DISTRICT** Tyler **COUNTY** Van Zandt
HIGHWAY CR 2319, CR 2708, CR 2918

				0910-12-134		0910-12-135		0910-12-136		0910-12-137		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB											
		PROJECT ID		**A00059090**		**A00059091**		**A00062927**		**A00063900**			
		COUNTY		**Van Zandt**		**Van Zandt**		**Van Zandt**		**Van Zandt**			
		HIGHWAY		**CR 2918**		**CR 2918**		**CR 2319**		**CR 2708**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	3.350		3.400		3.650		3.350		13.750	
	105-6011	REMOVING STAB BASE AND ASPH PAV (2"-6")	SY	447.000		473.000		488.000		403.000		1,811.000	
	110-6001	EXCAVATION (ROADWAY)	CY	26.000		17.000		10.000		31.000		84.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	70.000		391.000		538.000		104.000		1,103.000	
	164-6054	BOND FBR MTRX SEED (PERM)(RURAL)(SAND)	SY	1,142.000		1,245.000		1,456.000		563.000		4,406.000	
	164-6055	BONDED FBR MTRX SEED (TEMP)(WARM)	SY	571.000		623.000		728.000		282.000		2,204.000	
	164-6056	BONDED FBR MTRX SEED (TEMP)(COOL)	SY	571.000		623.000		728.000		282.000		2,204.000	
	275-6001	CEMENT	TON	17.000		15.000		15.000		15.000		62.000	
	275-6011	CEMENT TREAT(EXIST MATL)(8")	SY	843.000		840.000		811.000		801.000		3,295.000	
	340-6106	D-GR HMA(SQ) TY-D PG64-22	TON	277.000		278.000		268.000		264.000		1,087.000	
	400-6005	CEM STABIL BKFL	CY	30.000		31.000		44.000		30.000		135.000	
	416-6002	DRILL SHAFT (24 IN)	LF	312.000		300.000				222.000		834.000	
	416-6003	DRILL SHAFT (30 IN)	LF					462.000				462.000	
	420-6013	CL C CONC (ABUT)	CY	19.600		19.600		27.200		19.600		86.000	
	422-6005	REINF CONC SLAB (BOX BEAM)	SF					1,701.000				1,701.000	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	910.000		1,040.000				910.000		2,860.000	
	422-6023	SHEAR KEY	CY					8.600				8.600	
	425-6001	PRESTR CONC BOX BEAM (4B20)	LF					258.000				258.000	
	425-6002	PRESTR CONC BOX BEAM (5B20)	LF					129.000				129.000	
	425-6010	PRESTR CONC SLAB BEAM (5SB12)	LF	172.500		197.500				172.500		542.500	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	240.000		294.000		378.000		222.000		1,134.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	20.000		20.000		20.000		20.000		80.000	
	450-6006	RAIL (TY T223)	LF	94.000		104.000		162.000		94.000		454.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000		1.000		1.000		1.000		4.000	
	500-6001	MOBILIZATION	LS	0.250		0.250		0.250		0.250		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000		4.000		4.000		16.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	40.000		20.000		40.000		40.000		140.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	40.000		20.000		40.000		40.000		140.000	
	506-6029	EARTHWORK (EROSN & SEDMT CONT, IN VEH)	CY	20.000		20.000		20.000		20.000		80.000	
	506-6030	BACKHOE WORK (EROSION & SEDMT CONT)	HR	15.000		15.000		15.000		15.000		60.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	600.000		611.000		630.000		671.000		2,512.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	600.000		611.000		630.000		671.000		2,512.000	
	506-6046	TRACKHOE WORK (EROSION & SEDMT CONT)	HR	15.000		15.000		15.000		15.000		60.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	100.000		100.000		100.000		100.000		400.000	
	540-6021	MTL THRIE-BEAM GD FEN (TIM POST)	EA	4.000		4.000		4.000		4.000		16.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000		4.000		4.000		16.000	
	552-6003	WIRE FENCE (TY C)	LF			121.000		79.000				200.000	

ESTIMATE & QUANTITY SHEET

CONTROLLING PROJECT ID 0910-12-134 **DISTRICT** Tyler **COUNTY** Van Zandt
HIGHWAY CR 2319, CR 2708, CR 2918

				0910-12-134		0910-12-135		0910-12-136		0910-12-137		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB											
		PROJECT ID		**A00059090**		**A00059091**		**A00062927**		**A00063900**			
		COUNTY		**Van Zandt**		**Van Zandt**		**Van Zandt**		**Van Zandt**			
		HIGHWAY		**CR 2918**		**CR 2918**		**CR 2319**		**CR 2708**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	4.000		4.000		4.000		4.000		16.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	4.000		4.000		4.000		4.000		16.000	
	5070-6001	STEEL FENCE (REMOVE)	LF							191.000		191.000	
	5070-6002	STEEL FENCE (INSTALL)	LF							205.000		205.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	14.000		14.000		14.000		14.000		56.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000								1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000								1.000	

BASIS OF ESTIMATE

	ITEM	DESCRIPTION	RATE	CR 2319 CSJ 0910-12-136 AMOUNT	CR 2708 CSJ 0910-12-137 AMOUNT	CR 2918 CSJ 0910-12-135 AMOUNT	CR 2918 RELIEF CSJ 0910-12-134 AMOUNT	UNIT	CR 2319 CSJ 0910-12-136 QUANTITY	CR 2708 CSJ 0910-12-137 QUANTITY	CR 2918 CSJ 0910-12-135 QUANTITY	CR 2918 RELIEF CSJ 0910-12-134 QUANTITY	PROJECT TOTAL	PAY UNIT
(1)	166	FERTILIZER	1 LB/9 SY	2842	1040	2304	2218	SY	0.16	0.06	0.13	0.12	0.47	TON
(1)	168	VEGETATIVE WATERING	11 GAL/SY	2842	1040	2304	2218	SY	0.03	0.01	0.03	0.02	0.09	MG
	275	CEMENT (5%) (120 LB/CF)		816	840	840	960	SY	15	15	15	17	62	TON
	340	D-GR HMA TY-C PG 64-22	660 LB/SY	811	801	843	840	SY	268	264	278	277	1087	TON
	500	MOBILIZATION						LS	0.25	0.25	0.25	0.25	1	LS
	502	BARRICADES, SIGNS AND TRAFFIC HANDLING						MO	4	4	4	4	16	MO

(1) FOR CONTRACTOR'S INFORMATION ONLY.

ROADWAY SUMMARY

LOCATION	ITEM 100	ITEM 105	ITEM 110	ITEM 132	ITEM 275	ITEM 275	ITEM 340	ITEM 552	ITEM 658	ITEM 658	ITEM 5070	ITEM 5070	ITEM 6001
	PREPARING ROW	REMOVING STAB BASE AND ASPH PAV (2"-6")	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CEMENT	CEMENT TREAT (EXIST MATL) (8")	D-GR HMA (SQ) TY-D PG64-22	WIRE FENCE (TY C)	INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BI)	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	STEEL FENCE (REMOVE)	STEEL FENCE (INSTALL)	PORTABLE CHANGEABLE MESSAGE SIGN
	STA	SY	CY	CY	TON	SY	TON	LF	EA	EA	LF	LF	DAY
CSJ 0910-12-136 SUBTOTAL	3.65	488	10	538	15	811	268	79	4	4	0	0	14
CSJ 0910-12-137 SUBTOTAL	3.35	403	31	104	15	801	264	0	4	4	191	205	14
CSJ 0910-12-135 SUBTOTAL	3.40	473	17	391	15	840	278	121	4	4	0	0	14
CSJ 0910-12-134 SUBTOTAL	3.35	447	26	70	17	843	277	0	4	4	0	0	14
PROJECT TOTAL	13.75	1,811	84	1,103	62	3,295	1,087	200	16	16	191	205	56

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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC
STATE	**DISTRICT**	**COUNTY**
TEXAS	TYL	VAN ZANDT
CONTROL	**SECTION**	**JOB**
0910	12	134, ETC

SHEET NO. 9

DRAWING DATE: 11/11/2019 FILENAME: ...\01 General\TYL*SUM01.dgn

BRIDGE SUMMARY

LOCATION	ITEM 400	ITEM 416	ITEM 416	ITEM 420	ITEM 422	ITEM 422	ITEM 422	ITEM 425	ITEM 425	ITEM 425	ITEM 432	ITEM 450	ITEM 496
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	DRILL SHAFT (30 IN)	CL C CONC (ABUT)	REINF CONC SLAB (BOX BEAM)	REINF CONC SLAB (SLAB BEAM)	SHEAR KEY	PRESTR CONC BOX BEAM (4B20)	PRESTR CONC BOX BEAM (5B20)	PRESTR CONC SLAB BEAM (5SB12)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY T223)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	LF	CY	SF	SF	CY	LF	LF	LF	CY	LF	EA
CSJ: 0910-12-136 SUBTOTAL	**44**		**462**	**27.2**	**1701**		**8.6**	**258.00**	**129.00**		**378**	**162.0**	**1**
CSJ: 0910-12-137 SUBTOTAL	**30**	**222**		**19.6**		**910**				**172.50**	**222**	**94.0**	**1**
CSJ: 0910-12-135 SUBTOTAL	**31**	**300**		**19.6**		**1040**				**197.50**	**294**	**104.0**	**1**
CSJ: 0910-12-134 SUBTOTAL	**30**	**312**		**19.6**		**910**				**172.50**	**240**	**94.0**	**1**
PROJECT TOTAL	**135**	**834**	**462**	**86.0**	**1701**	**2860**	**8.6**	**258.00**	**129.00**	**542.50**	**1134**	**454.0**	**4**

METAL BEAM GUARD FENCE SUMMARY

LOCATION	ITEM 432	ITEM 540	ITEM 540	ITEM 544
	RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (TIM POST)	MTL THRIE-BEAM GD FEN (TIM POST)	GUARDRAIL END TREATMENT (INSTALL)
	CY	LF	EA	EA
CSJ: 0910-12-136 SUBTOTAL	**20**	**100**	**4**	**4**
CSJ: 0910-12-137 SUBTOTAL	**20**	**100**	**4**	**4**
CSJ: 0910-12-135 SUBTOTAL	**20**	**100**	**4**	**4**
CSJ: 0910-12-134 SUBTOTAL	**20**	**100**	**4**	**4**
PROJECT TOTAL	**80**	**400**	**16**	**16**

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SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC
STATE	**DISTRICT**	**COUNTY**
TEXAS	TYL	VAN ZANDT
CONTROL	**SECTION**	**JOB**
0910	12	134, ETC

SHEET NO. 10

FILENAME: ...\01 General\TYL*SUM02.dgn
DRAWING DATE: 11/26/2019

SWP3 SUMMARY

LOCATION (STATION TO STATION)	OFFSET	ITEM 164	ITEM 164	ITEM 164	ITEM 506	ITEM 506	ITEM 506	ITEM 506	ITEM 506	ITEM 506	ITEM 506
		BOND FBR MTRX SEED (PERM) (RURAL) (SAND)	BONDED FBR MTRX SEED (TEMP) (WARM)	BONDED FBR MTRX SEED (TEMP) (COOL)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	EARTHWORK (EROSN & SEDMT CONT, IN VEH)	BACKHOE WORK (EROSION & SEDMT CONT)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	TRACKHOE WORK (EROSION & SEDMT CONT)
		SY	SY	SY	LF	LF	CY	HR	LF	LF	HR
10+90.00 TO 11+90.00	LT	323	162	162					98	98	
10+90.00 TO 11+90.00	RT	257	129	129					101	101	
11+90.00 TO 12+40.00	LT	92	46	46	10	10			50	50	
11+90.00 TO 12+40.00	RT	72	36	36	10	10			50	50	
BRIDGE	LT										
BRIDGE	RT	7	4	4					25	25	
13+05.00 TO 14+05.00	LT	207	104	104	10	10			111	111	
13+05.00 TO 14+05.00	RT	141	71	71	10	10			90	90	
14+05.00 TO 14+55.00	LT	238	119	119					60	60	
14+05.00 TO 14+55.00	RT	119	60	60					45	45	
CSJ: 0910-12-136 SUBTOTAL		**1456**	**728**	**728**	**40**	**40**	**20**	**15**	**630**	**630**	**15**
21+50.00 TO 22+50.00	LT	104	52	52	10	10			88	88	
21+50.00 TO 22+50.00	RT	110	55	55	10	10			114	114	
22+50.00 TO 23+00.00	LT	33	17	17					55	55	
22+50.00 TO 23+00.00	RT	47	24	24					82	82	
BRIDGE	LT										
BRIDGE	RT										
23+35.00 TO 24+35.00	LT	66	33	33	10	10			99	99	
23+35.00 TO 24+35.00	RT	66	33	33	10	10			133	133	
24+35.00 TO 24+85.00	LT	72	36	36					50	50	
24+35.00 TO 24+85.00	RT	65	33	33					50	50	
CSJ: 0910-12-137 SUBTOTAL		**563**	**282**	**282**	**40**	**40**	**20**	**15**	**671**	**671**	**15**

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SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC
STATE	**DISTRICT**	**COUNTY**
TEXAS	TYL	VAN ZANDT
CONTROL	**SECTION**	**JOB**
0910	12	134, ETC

SHEET NO. 11

DRAWING DATE: 11/11/2019 FILENAME: ...\01 General\TYL*SUM03.dgn

SWP3 SUMMARY

LOCATION (STATION TO STATION)	OFFSET	ITEM 164	ITEM 164	ITEM 164	ITEM 506	ITEM 506	ITEM 506	ITEM 506	ITEM 506	ITEM 506	ITEM 506
		BOND FBR MTRX SEED (PERM) (RURAL) (SAND)	BONDED FBR MTRX SEED (TEMP) (WARM)	BONDED FBR MTRX SEED (TEMP) (COOL)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	EARTHWORK (EROSN & SEDMT CONT, IN VEH)	BACKHOE WORK (EROSION & SEDMT CONT)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	TRACKHOE WORK (EROSION & SEDMT CONT)
		SY	SY	SY	LF	LF	CY	HR	LF	LF	HR
31+10.00 TO 32+10.00	LT	298	149	149					105	105	
31+10.00 TO 32+10.00	RT	178	89	89					97	97	
32+10.00 TO 32+55.00	LT	109	55	55	10	10			46	46	
32+10.00 TO 32+55.00	RT	58	29	29	10	10			67	67	
BRIDGE	LT										
BRIDGE	RT										
32+95.00 TO 33+95.00	LT	271	136	136					99	99	
32+95.00 TO 33+95.00	RT	95	48	48					101	101	
33+95.00 TO 34+45.00	LT	156	78	78					49	49	
33+95.00 TO 34+45.00	RT	80	40	40					47	47	
CSJ: 0910-16-135 SUBTOTAL		**1245**	**623**	**623**	**20**	**20**	**20**	**15**	**611**	**611**	**15**
34+45.00 TO 35+95.00	LT	349	175	175	10	10			150	150	
34+45.00 TO 35+95.00	RT	270	135	135	10	10			150	150	
BRIDGE	LT										
BRIDGE	RT										
36+30.00 TO 37+30.00	LT	157	79	79	10	10			100	100	
36+30.00 TO 37+30.00	RT	153	77	77	10	10			101	101	
37+30.00 TO 37+80.00	LT	118	59	59					49	49	
37+30.00 TO 37+80.00	RT	95	48	48					50	50	
CSJ: 0910-16-134 SUBTOTAL		**1142**	**571**	**571**	**40**	**40**	**20**	**15**	**600**	**600**	**15**
PROJECT TOTAL		**4406**	**2204**	**2204**	**140**	**140**	**80**	**60**	**2512**	**2512**	**60**

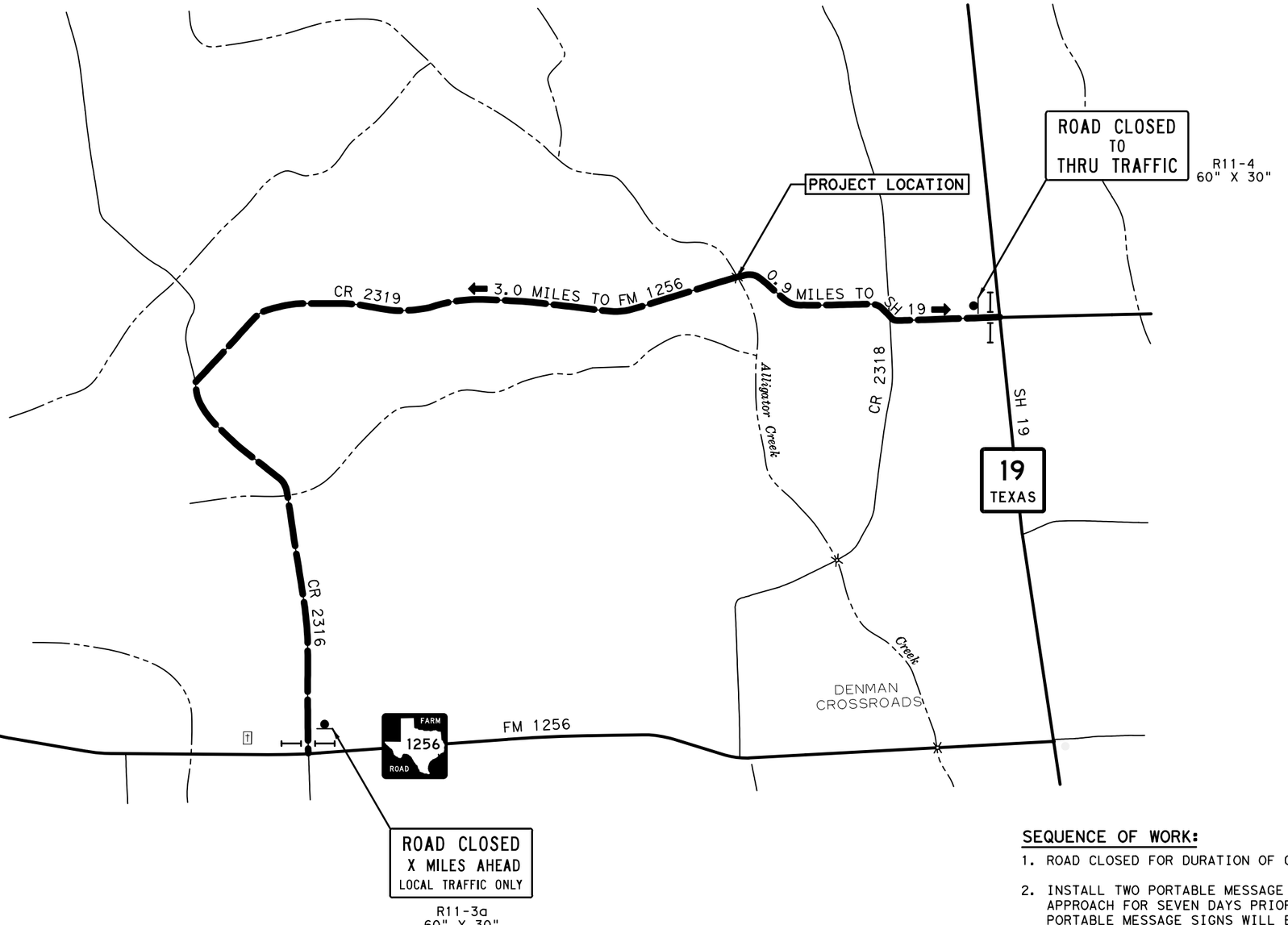
CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC
STATE	**DISTRICT**	**COUNTY**
TEXAS	TYL	VAN ZANDT
CONTROL	**SECTION**	**JOB**
0910	12	134, ETC

SHEET NO. 12

DRAWING DATE: 11/11/2019 FILENAME: ...\01 General\TYL*SUM04.dgn



N

LEGEND

- CONSTRUCTION SIGN
- EXISTING ROADS
- STREAMS
- FOR CONTRACTOR'S INFORMATION ONLY. APPROXIMATE ROUTE DISTANCE.
- TYPE 3 BARRICADE

NOTES:

1. ALL SIGNS, DEVICES, LOCATION AND SPACING SHALL CONFORM TO THE TMUTCD AND THE BC STANDARD DRAWINGS.
2. TY 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. BARRICADES SHOULD NOT BLOCK ACCESS TO PROPERTY OWNERS OUTSIDE OF THE PROJECT LIMITS.

SEQUENCE OF WORK:

1. ROAD CLOSED FOR DURATION OF CONSTRUCTION.
2. INSTALL TWO PORTABLE MESSAGE SIGNS AT EACH BRIDGE APPROACH FOR SEVEN DAYS PRIOR TO CLOSURE. PORTABLE MESSAGE SIGNS WILL BE MOVED TO ADVANCED PROJECT APPROACH FOR ADDITIONAL SEVEN DAYS TO ASSIST WITH DETOUR ROUTING FOR A TOTAL OF 14 DAYS. CONTRACTOR TO ADJUST TIMES AND LOCATIONS AS DIRECTED BY THE ENGINEER.
3. INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUT.
4. DEMO EXIST BRIDGE.
5. CONSTRUCT NEW STRUCTURE AND APPROACHES.
6. OPEN ROAD TO TRAFFIC.
7. REMOVE SW3P DEVICES, ESTABLISH FINAL VEGETATION, CLEAN-UP BETWEEN PROJECT LIMITS.

0' 1000' 2000'
SCALE: 1"=2000'

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

TRAFFIC CONTROL PLAN

(SEQUENCE OF WORK AND DETOUR ROUTE)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	13
CONTROL	SECTION	JOB	
0910	12	134, ETC	

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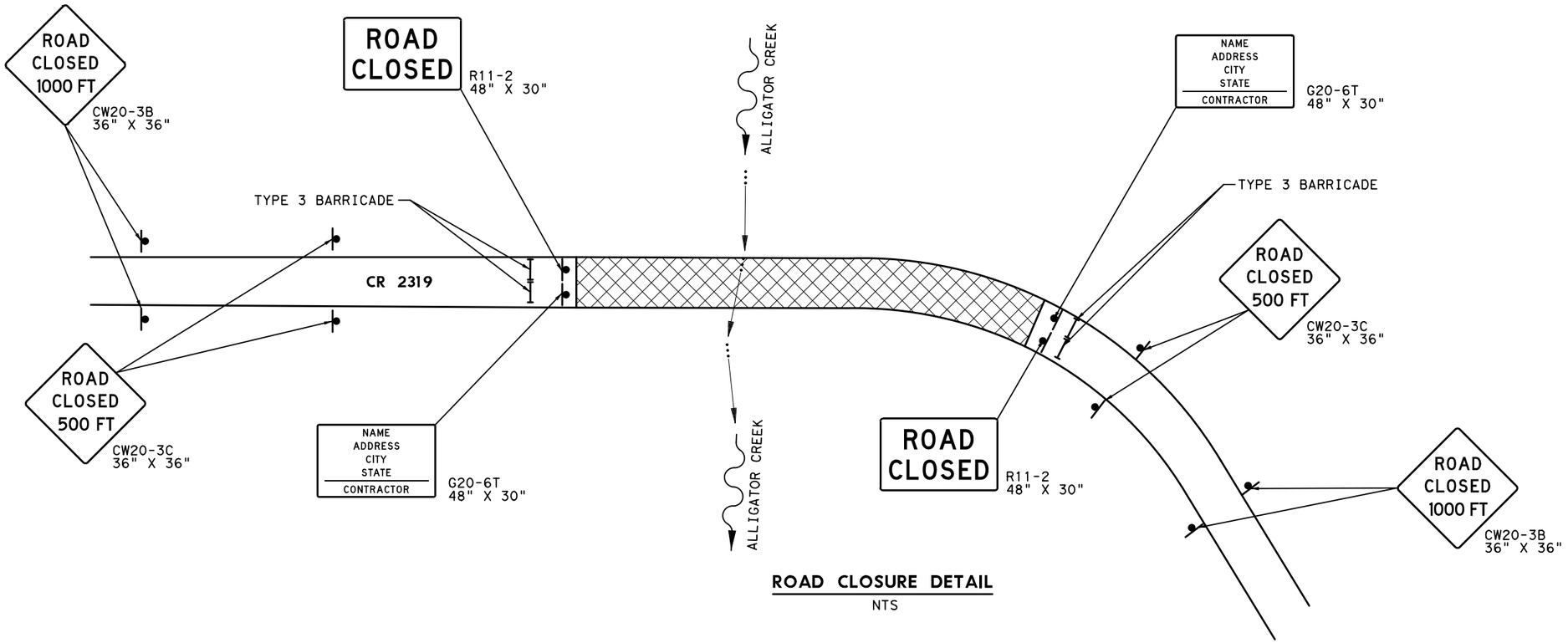
DRAWING DATE: 11/11/2019



ROAD CLOSURE DETAIL

NTS

N

LEGEND

- WORK ZONE
- TYPE 3 BARRICADE
- CONSTRUCTION SIGN

NOTES:

1. LOCATIONS SHOWN FOR SIGNING ARE APPROXIMATE AND FOR VISUAL AID. EXACT LOCATIONS AND SIGN SPACING ARE TO BE ACCORDING TO TMUTCD, BARRICADE & TCP STANDARDS, OR AS DIRECTED. TYPE 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. ALLOW EGRESS AND INGRESS FOR LOCAL PROPERTY OWNERS AT ALL TIMES. BARRICADES SHOULD NOT BLOCK ACCESS TO PROPERTY OWNERS OUTSIDE OF PROJECT LIMITS.

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

TRAFFIC CONTROL PLAN

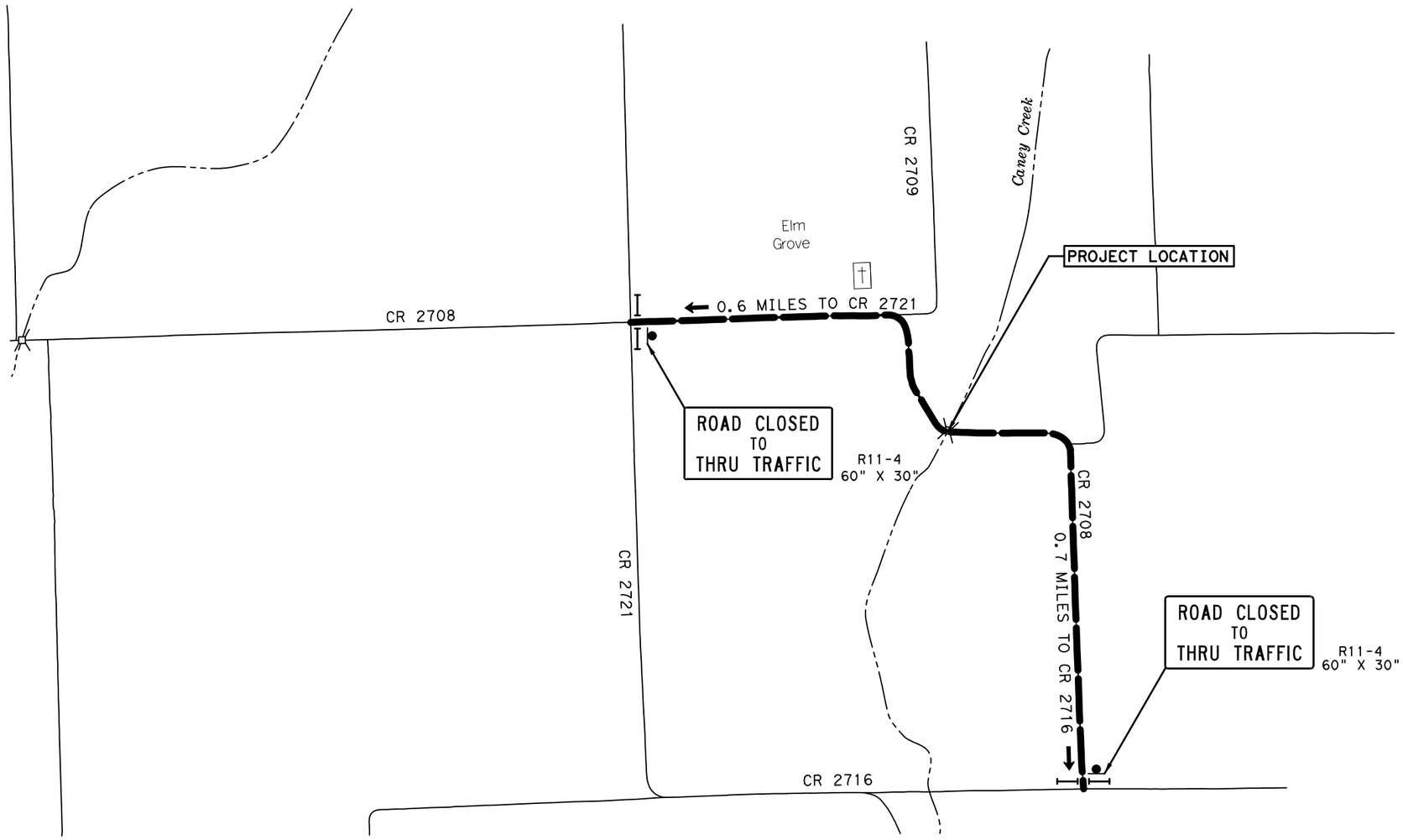
SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	14
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2319*DET02.dgn

DRAWING DATE: 11/11/2019



N

LEGEND

- CONSTRUCTION SIGN
- EXISTING ROADS
- STREAMS
- FOR CONTRACTOR'S INFORMATION ONLY. APPROXIMATE ROUTE DISTANCE.
- TYPE 3 BARRICADE

NOTES:

1. ALL SIGNS, DEVICES, LOCATION AND SPACING SHALL CONFORM TO THE TMUTCD AND THE BC STANDARD DRAWINGS.
2. TY 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. BARRICADES SHOULD NOT BLOCK ACCESS TO PROPERTY OWNERS OUTSIDE OF THE PROJECT LIMITS.

SEQUENCE OF WORK:

1. ROAD CLOSED FOR DURATION OF CONSTRUCTION.
2. INSTALL TWO PORTABLE MESSAGE SIGNS AT EACH BRIDGE APPROACH FOR SEVEN DAYS PRIOR TO CLOSURE. PORTABLE MESSAGE SIGNS WILL BE MOVED TO ADVANCED PROJECT APPROACH FOR ADDITIONAL SEVEN DAYS TO ASSIST WITH DETOUR ROUTING FOR A TOTAL OF 14 DAYS. CONTRACTOR TO ADJUST TIMES AND LOCATIONS AS DIRECTED BY THE ENGINEER.
3. INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUT.
4. DEMO EXIST BRIDGE.
5. CONSTRUCT NEW STRUCTURE AND APPROACHES.
6. OPEN ROAD TO TRAFFIC.
7. REMOVE SW3P DEVICES, ESTABLISH FINAL VEGETATION, CLEAN-UP BETWEEN PROJECT LIMITS.

0' 500' 1000'
SCALE: 1"=1000'

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2708 @ CANEY CREEK

TRAFFIC CONTROL PLAN

(SEQUENCE OF WORK AND DETOUR ROUTE)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	15
CONTROL	SECTION	JOB	
0910	12	134, ETC	

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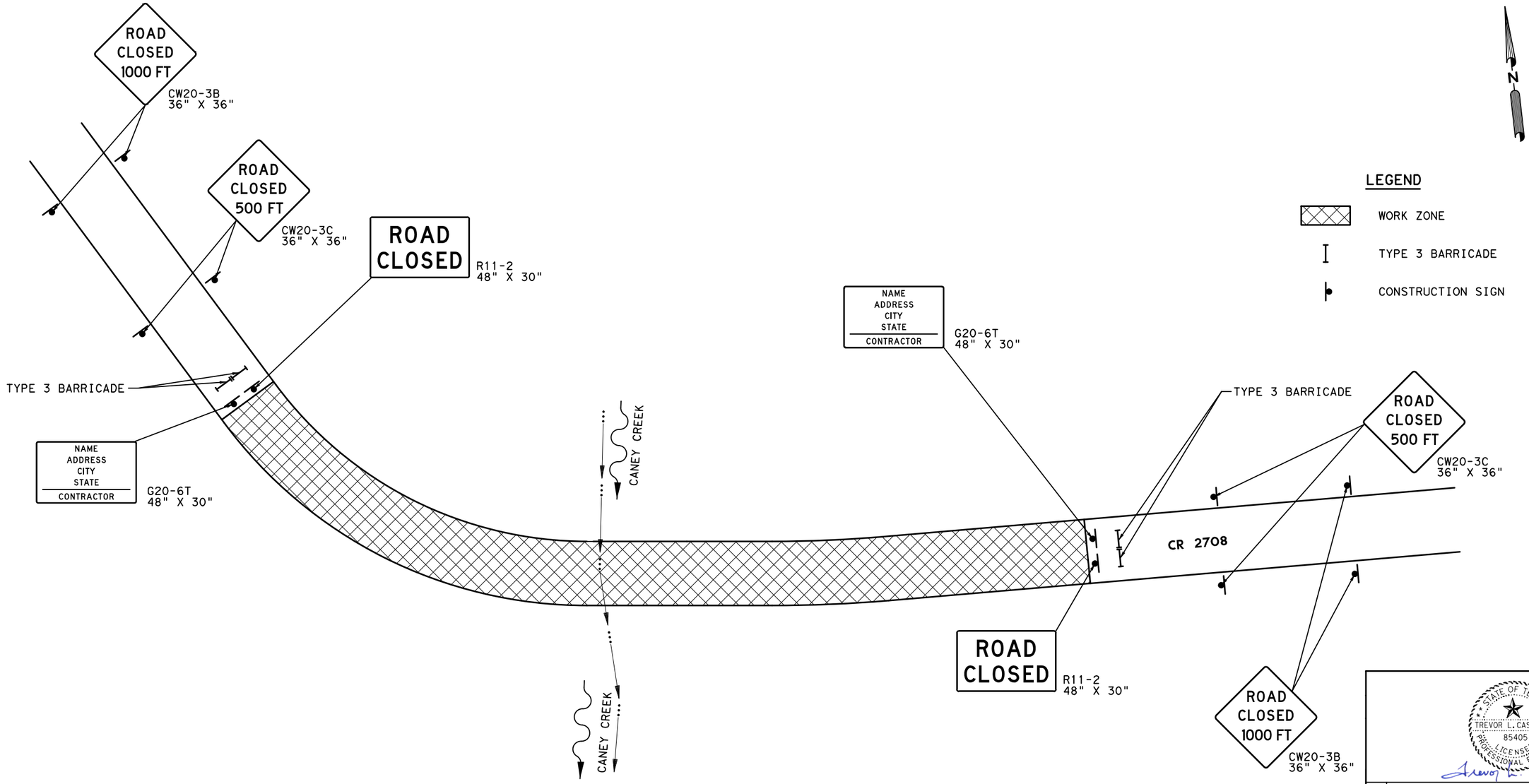
DRAWING DATE: 11/11/2019



ROAD CLOSURE DETAIL

NTS

NOTES:

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STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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Texas Department of Transportation

CR 2708 @ CANEY CREEK

TRAFFIC CONTROL PLAN

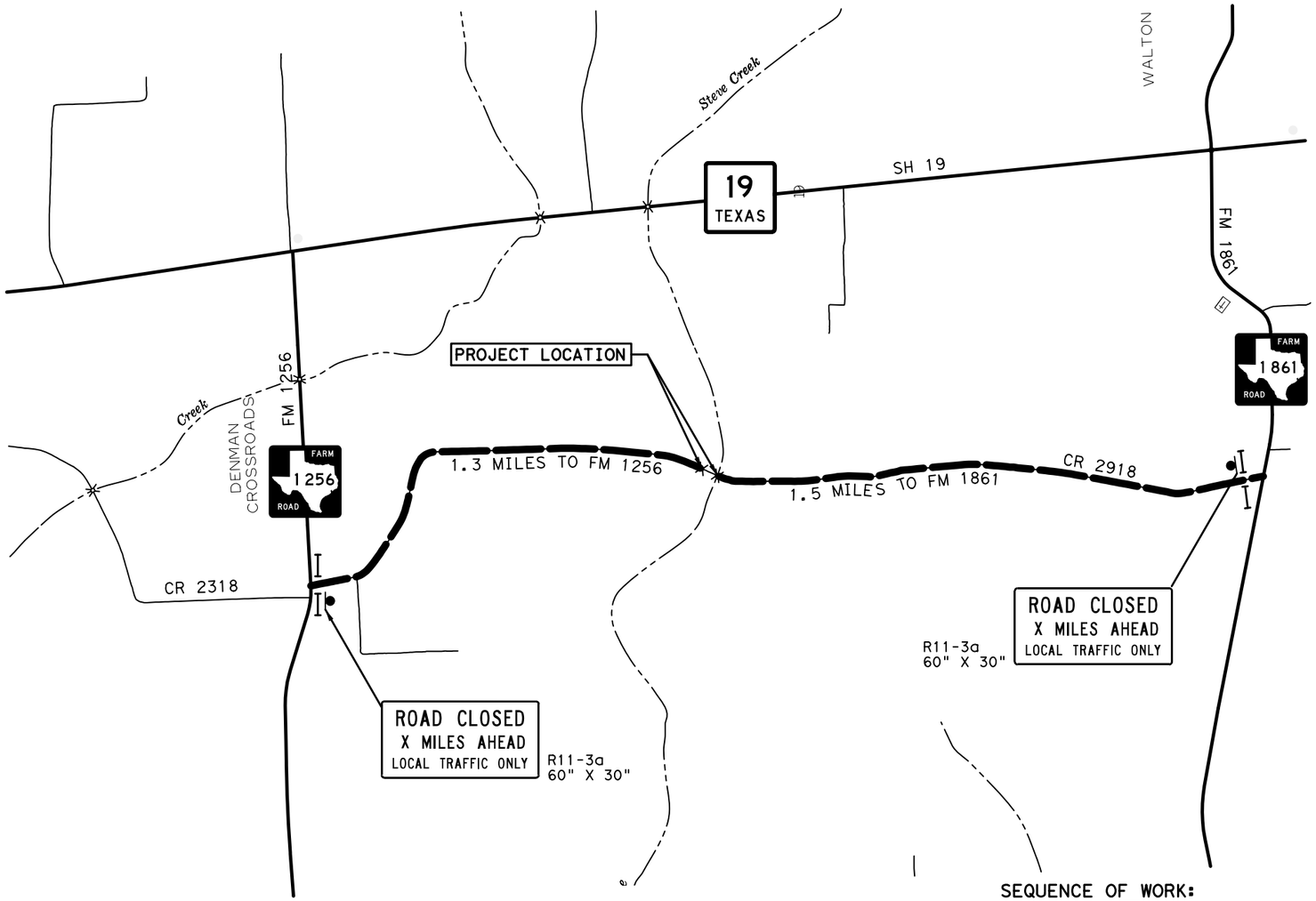
SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	16
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2708*DET02.dgn

DRAWING DATE: 11/11/2019



LEGEND

- CONSTRUCTION SIGN
- EXISTING ROADS
- STREAMS
- FOR CONTRACTOR'S INFORMATION ONLY. APPROXIMATE ROUTE DISTANCE.
- TYPE 3 BARRICADE

NOTES:

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SEQUENCE OF WORK:

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3. INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUT.
4. DEMO STEVE CREEK EXIST BRIDGE.
5. CONSTRUCT NEW STEVE CREEK STRUCTURE AND APPROACHES.
6. DEMO STEVE CREEK RELIEF EXIST BRIDGE.
7. CONSTRUCT NEW STEVE CREEK RELIEF STRUCTURE AND APPROACHES.
8. OPEN ROAD TO TRAFFIC.
9. REMOVE SW3P DEVICES, ESTABLISH FINAL VEGETATION, CLEAN-UP BETWEEN PROJECT LIMITS.

0' 1000' 2000'

SCALE: 1"=2000'

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

CR 2918 @ STEVE CREEK

TRAFFIC CONTROL PLAN

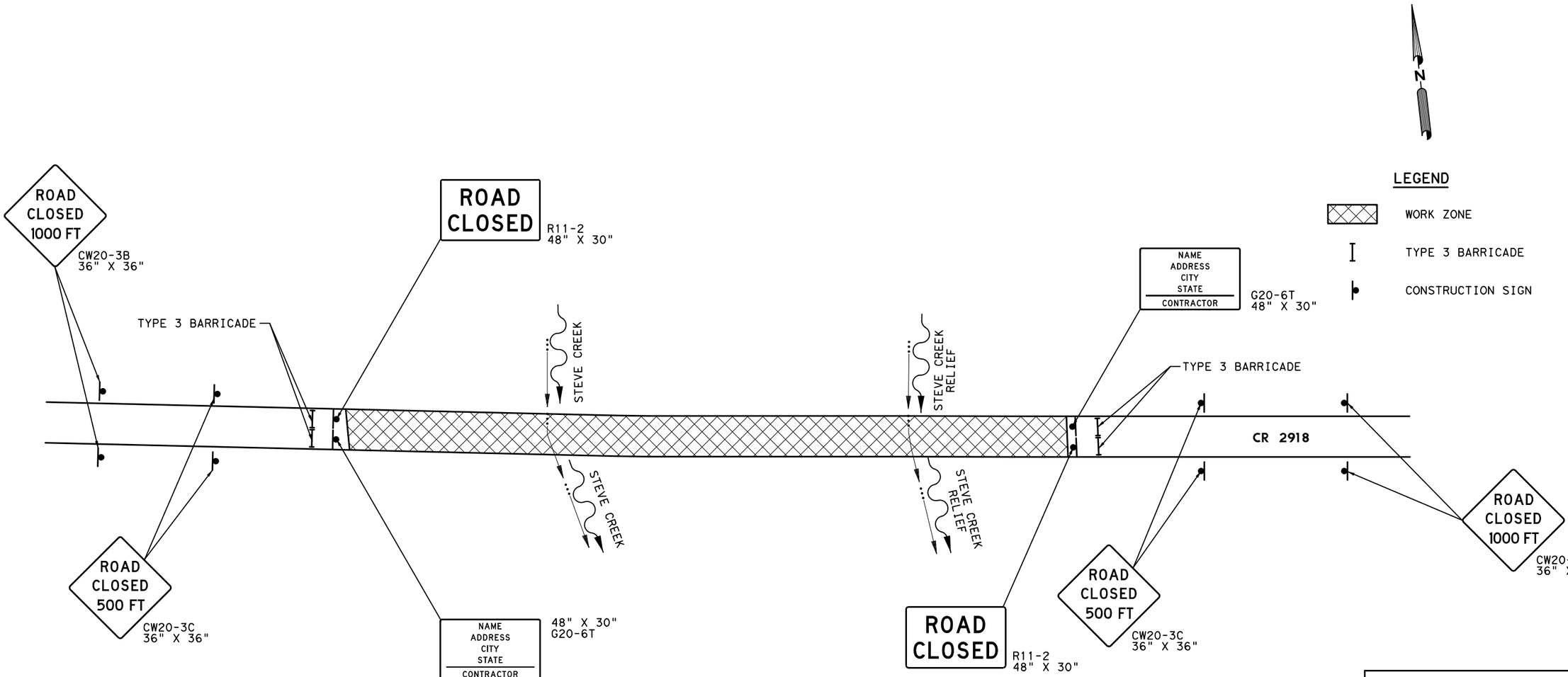
(SEQUENCE OF WORK AND DETOUR ROUTE)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	17
CONTROL	SECTION	JOB	
0910	12	134,ETC	

DRAWING DATE: 11/11/2019 FILENAME: ...\2918*DET01.dgn



ROAD CLOSURE DETAIL

NTS

NOTES:

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STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

CR 2918 @ STEVE CREEK

TRAFFIC CONTROL PLAN

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	18
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2918*DET02.dgn
DRAWING DATE: 11/11/2019

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

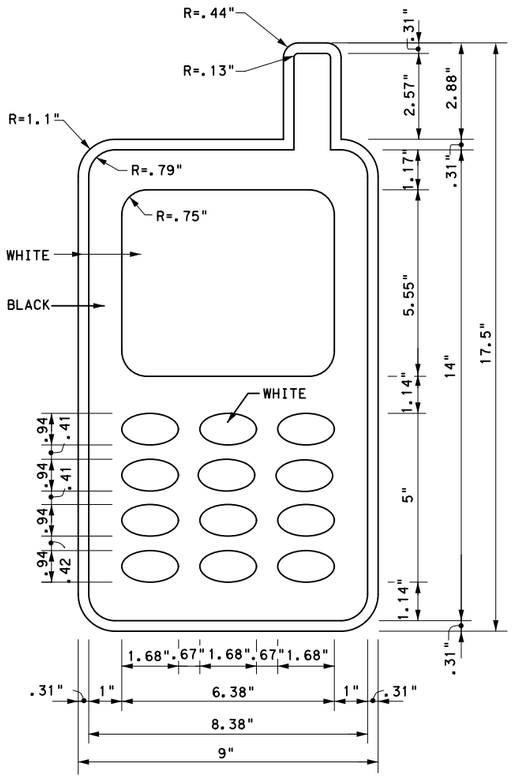
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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 APPAREL 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.



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

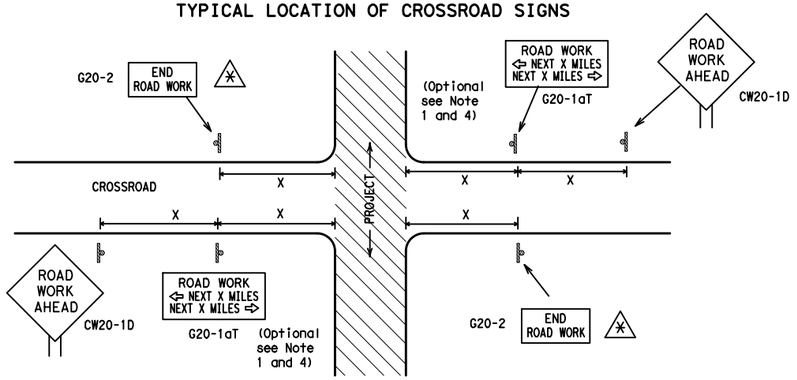
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	TYL	VAN ZANDT		19

DATE: 11/11/2019 $TIME$
FILE: ...\STANDARDS\bc-14.dgn

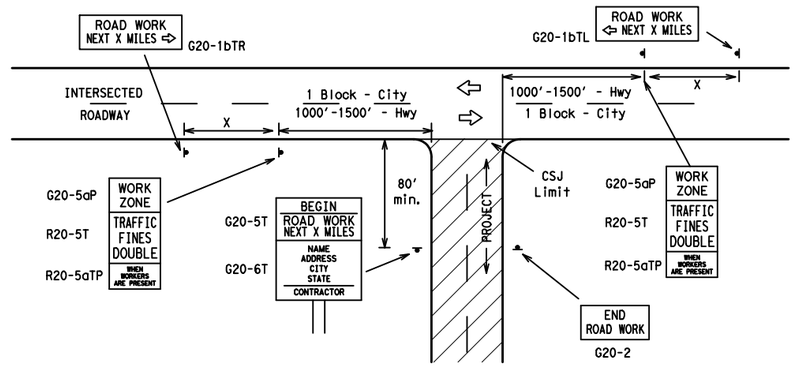
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. 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]

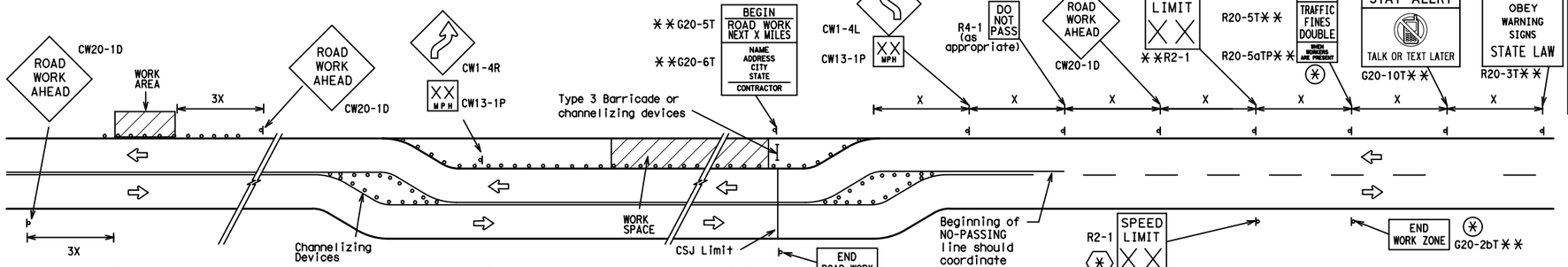
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

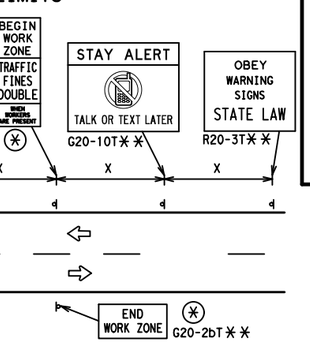
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. 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

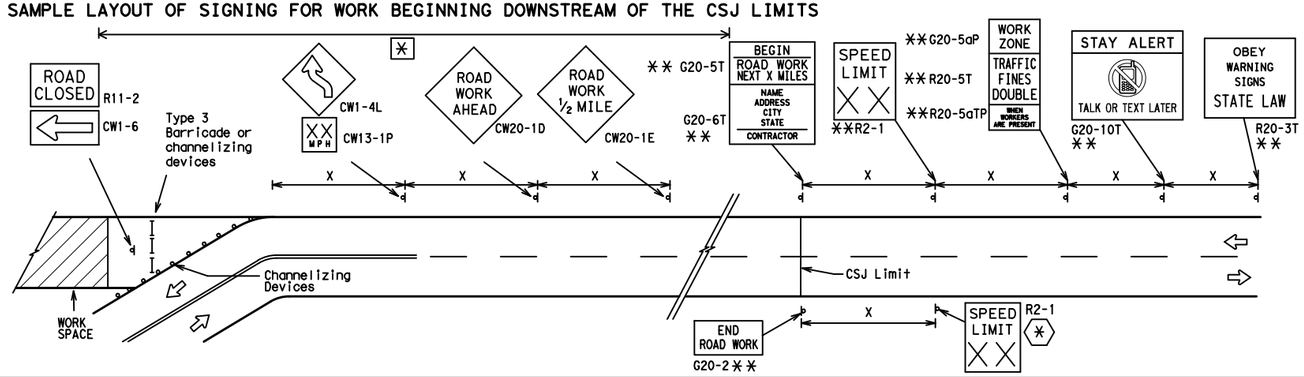


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

✱ 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
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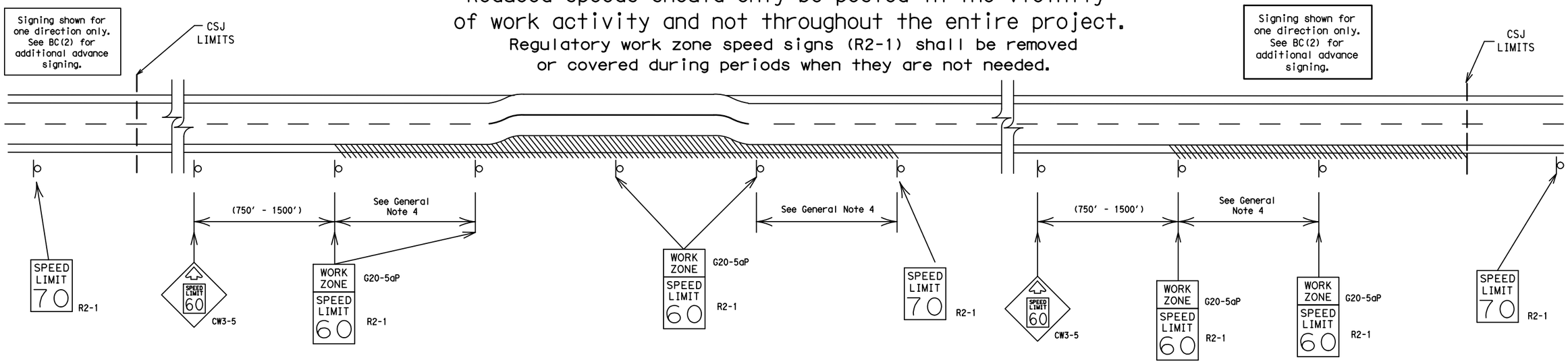
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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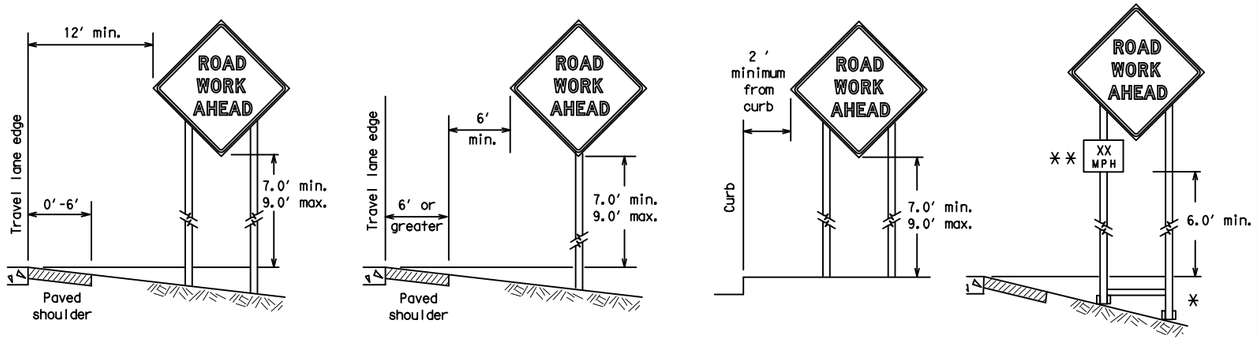
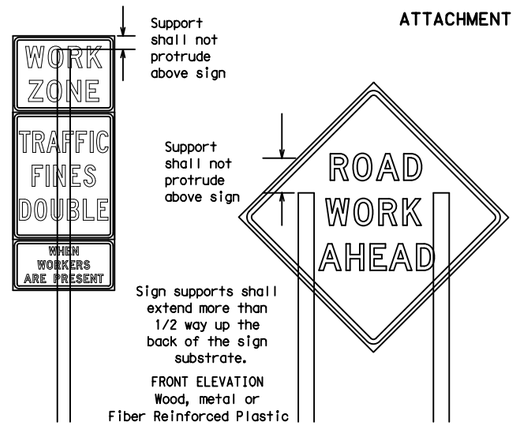
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

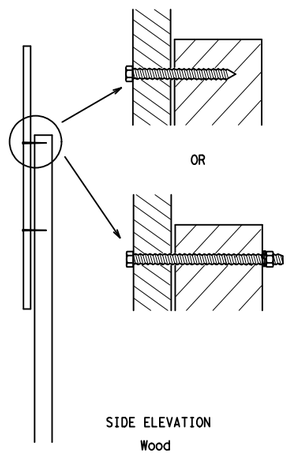
⁎⁎ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic

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.



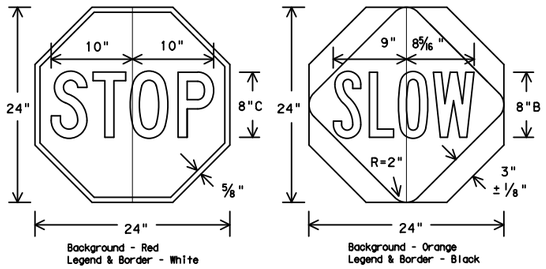
SIDE ELEVATION
Wood

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.

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). 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 Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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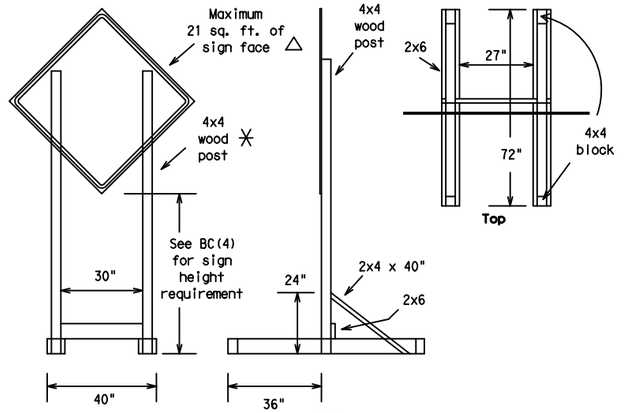
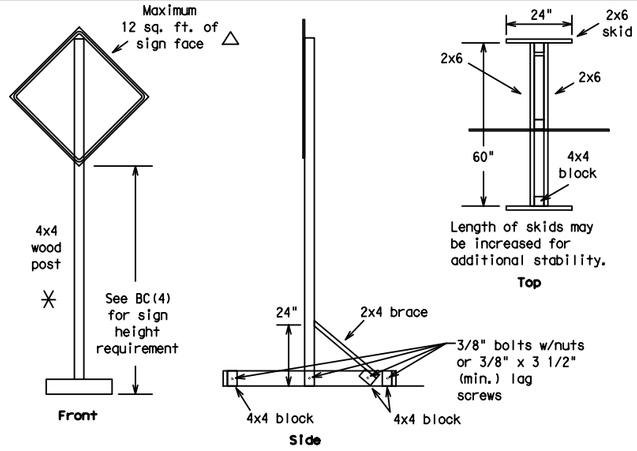
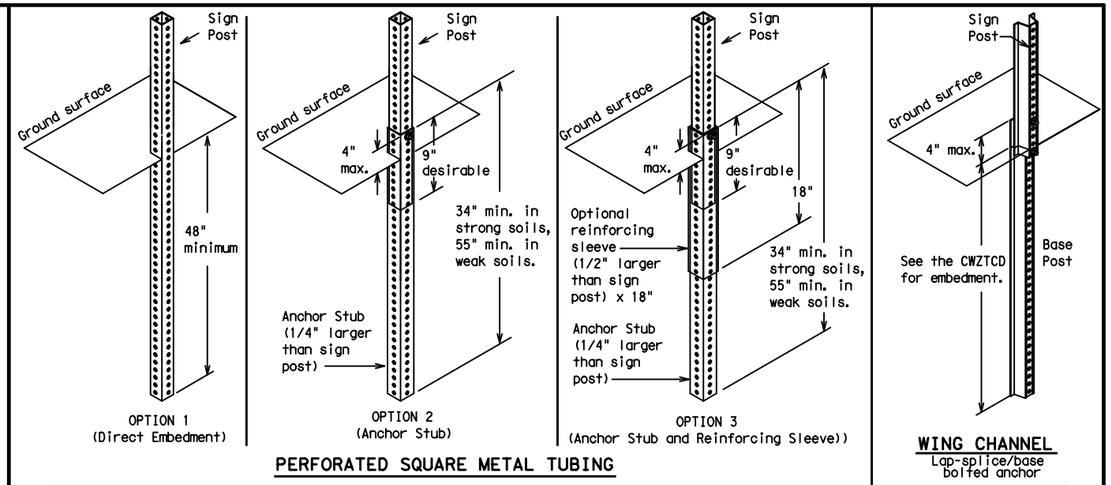




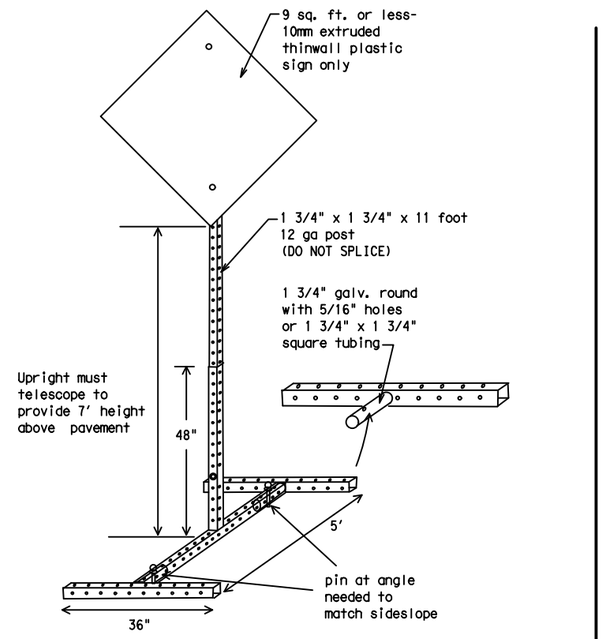
SKID MOUNTED WOOD SIGN SUPPORTS

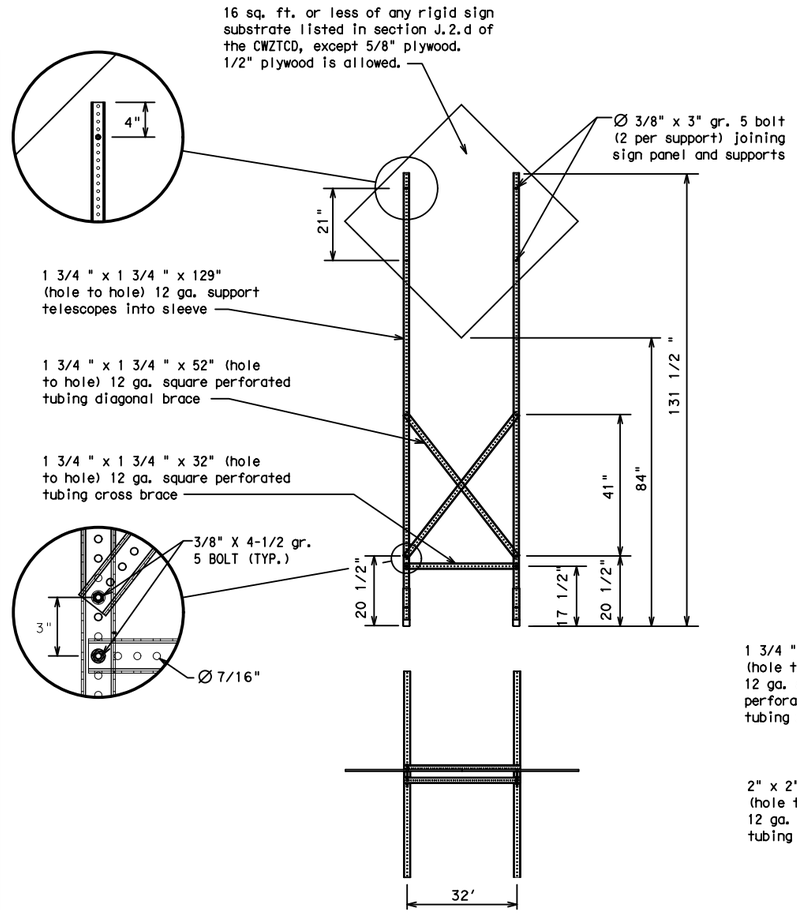
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

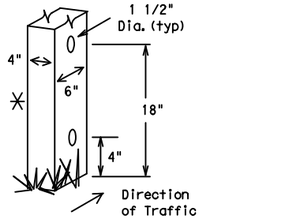


GROUND MOUNTED SIGN SUPPORTS

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

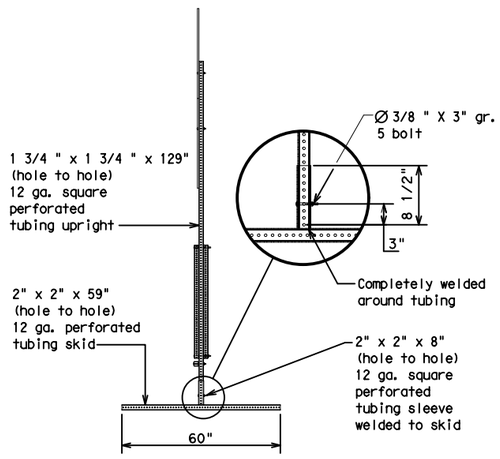






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND 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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

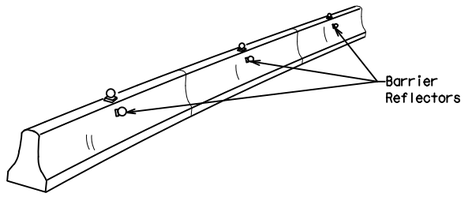
BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	TYL	VAN ZANDT		24

100

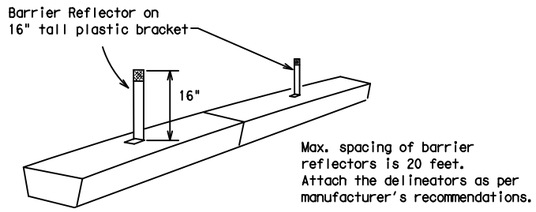
DATE: 11/11/2019 $TIME$
FILE: ...\STANDARDS\bc-14.dgn

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

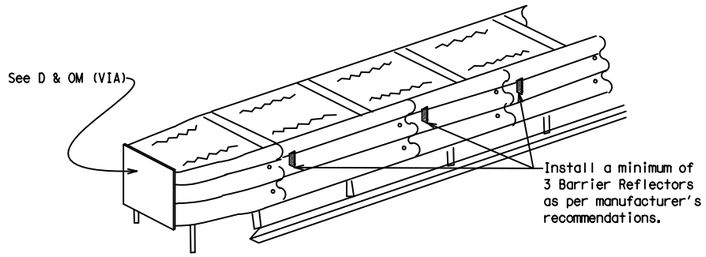


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

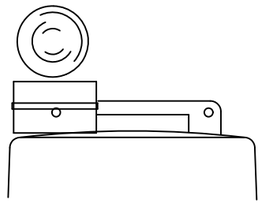


DELINEATION OF END TREATMENTS

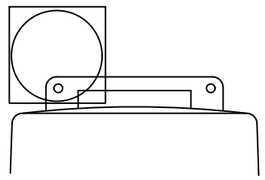
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. 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

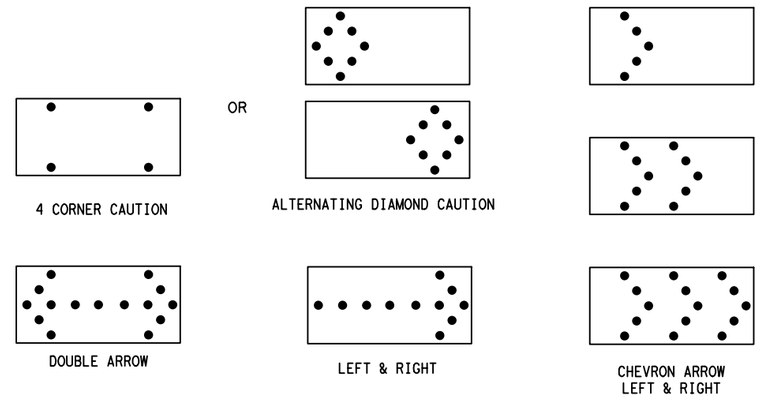
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or 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 Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		25

101

DATE: 11/11/2019 $TIME$
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

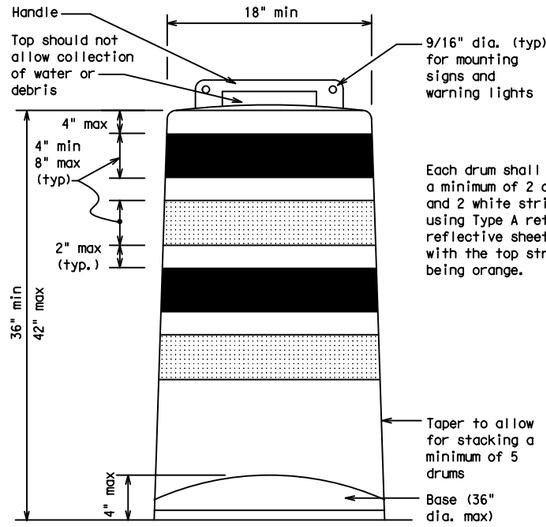
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

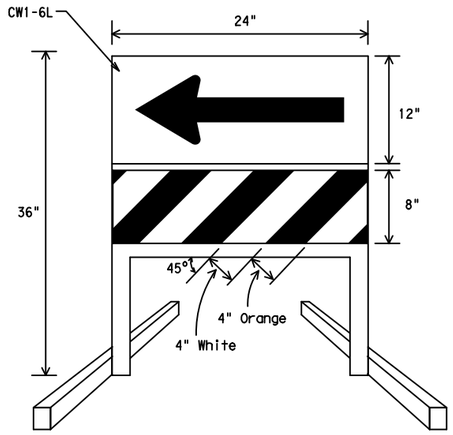
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A 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

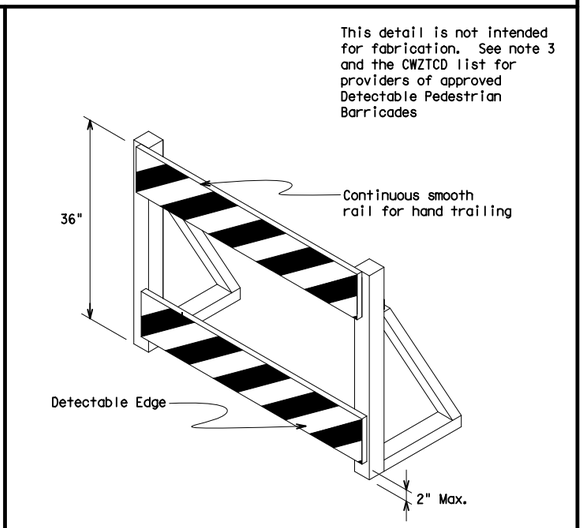
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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.





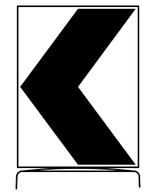
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

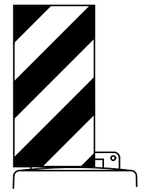


DETECTABLE PEDESTRIAN BARRICADES

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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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 Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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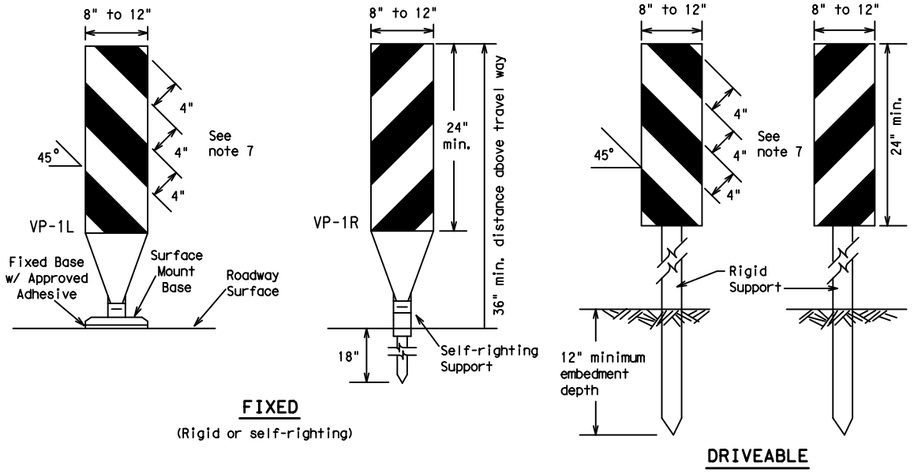
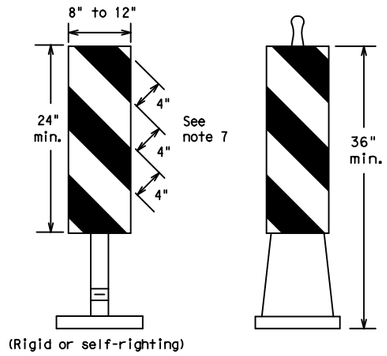


FIXED

(Rigid or self-righting)

DRIVEABLE

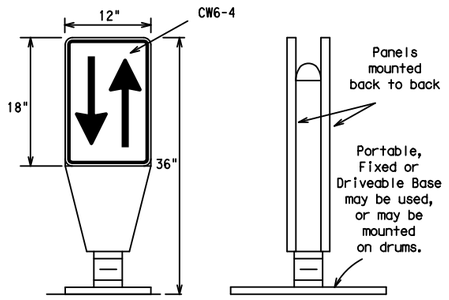


(Rigid or self-righting)

PORTABLE

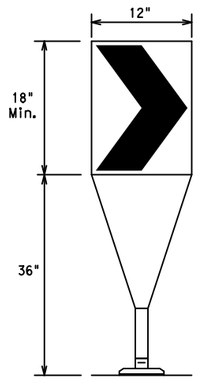
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 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)



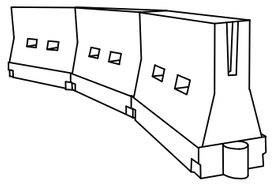
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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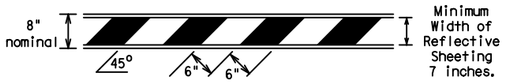
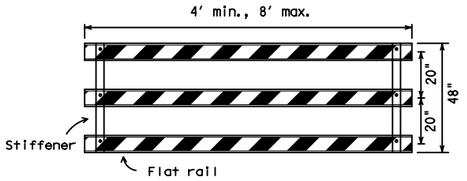
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



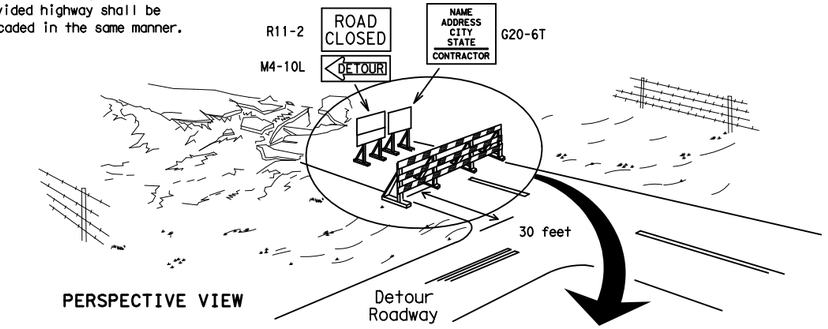
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

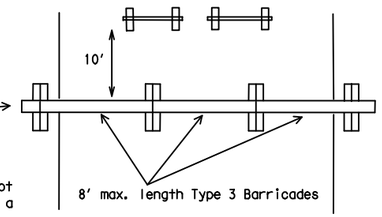
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

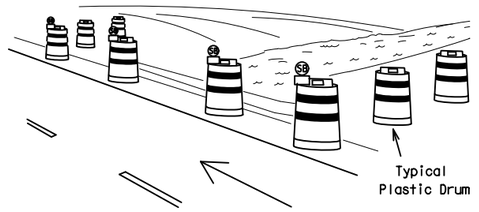
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

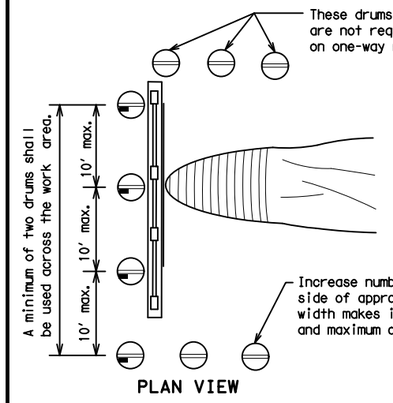
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

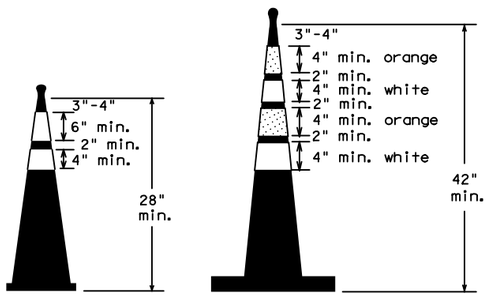
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

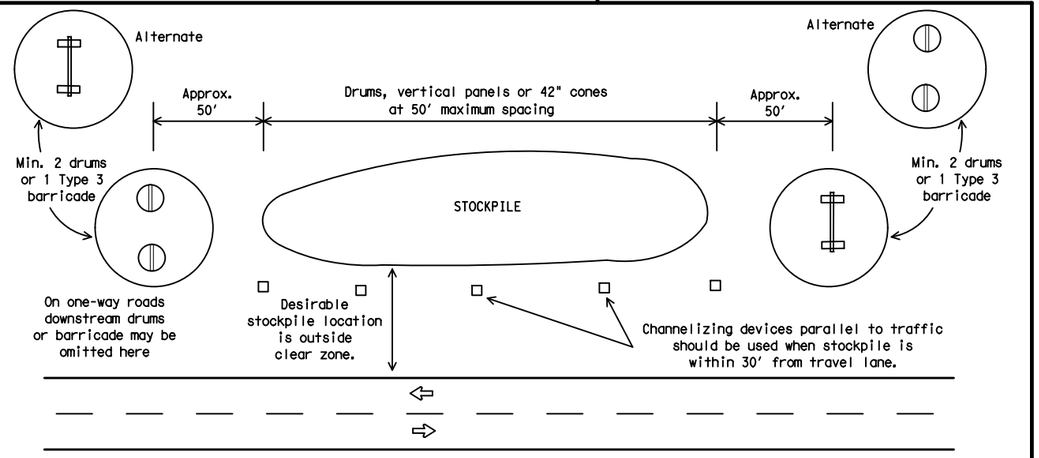
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

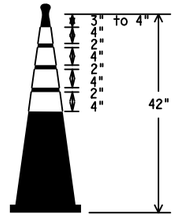
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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 used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

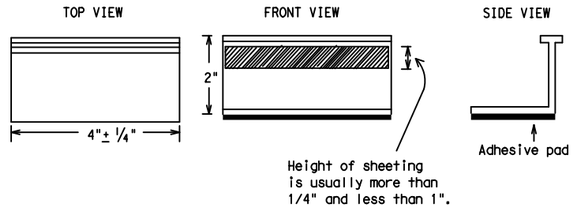
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

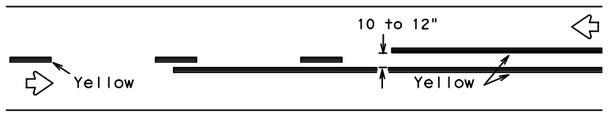
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

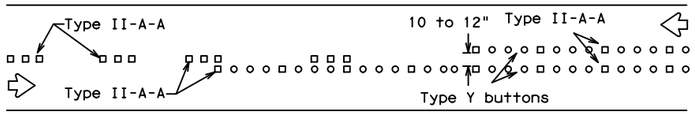
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13	TYL	VAN ZANDT		29
11-02 8-14				

DATE: 11/11/2019 $TIME$
FILE: ...\STANDARDS\bc-14.dgn

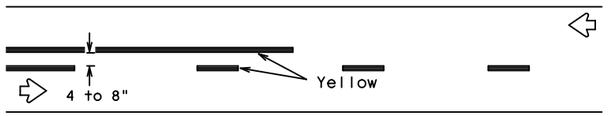
PAVEMENT MARKING PATTERNS



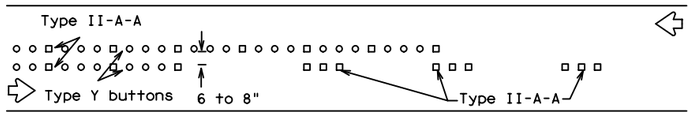
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



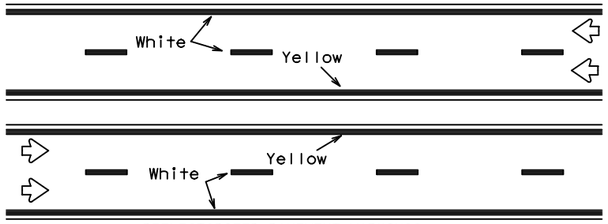
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



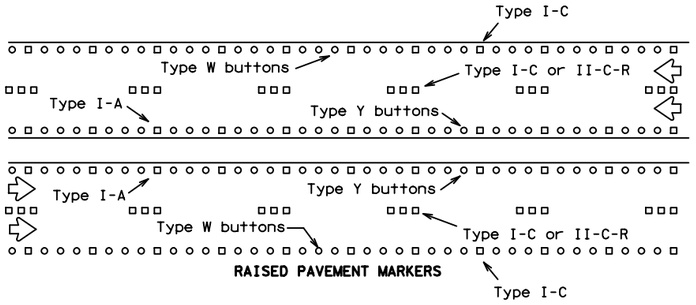
RAISED PAVEMENT MARKERS - PATTERN B

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



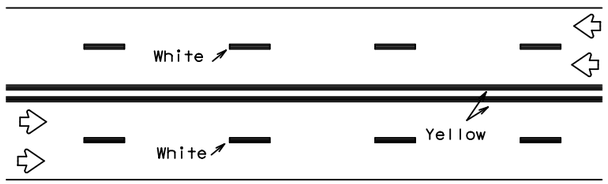
REFLECTORIZED PAVEMENT MARKINGS



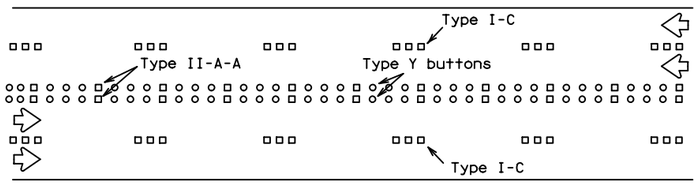
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



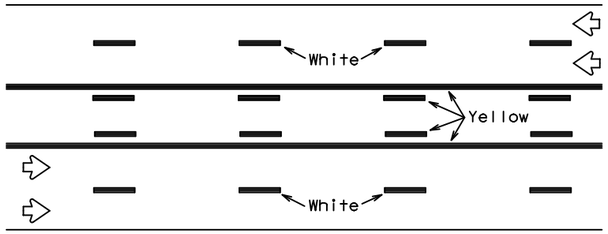
REFLECTORIZED PAVEMENT MARKINGS



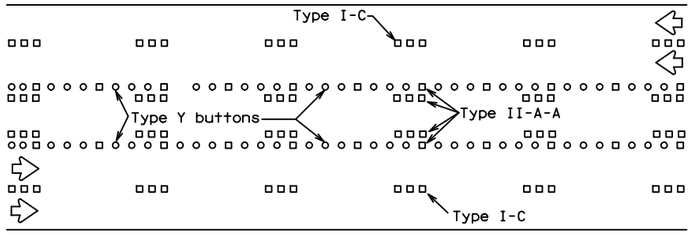
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

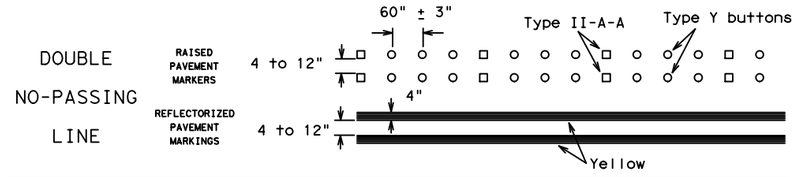
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

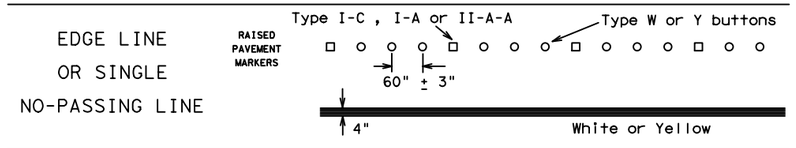
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

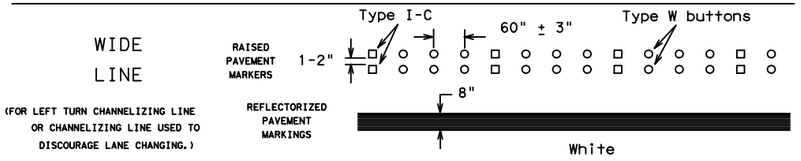


EDGE LINE OR SINGLE NO-PASSING LINE



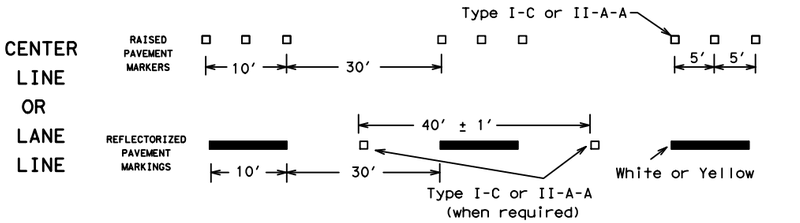
WIDE LINE

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

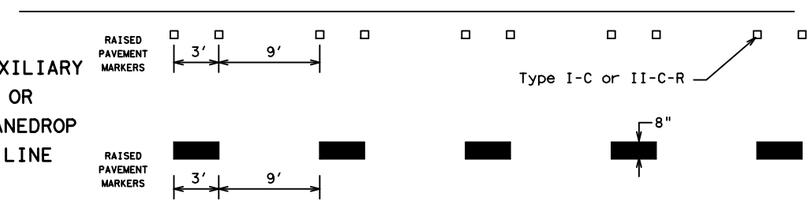


BROKEN LINES

CENTER LINE OR LANE LINE

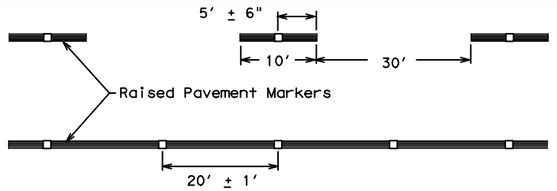


AUXILIARY OR LANEDROP LINE



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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0910	12	134,ETC	CR 2918,ETC
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	TYL	VAN ZANDT		30
11-02 8-14				

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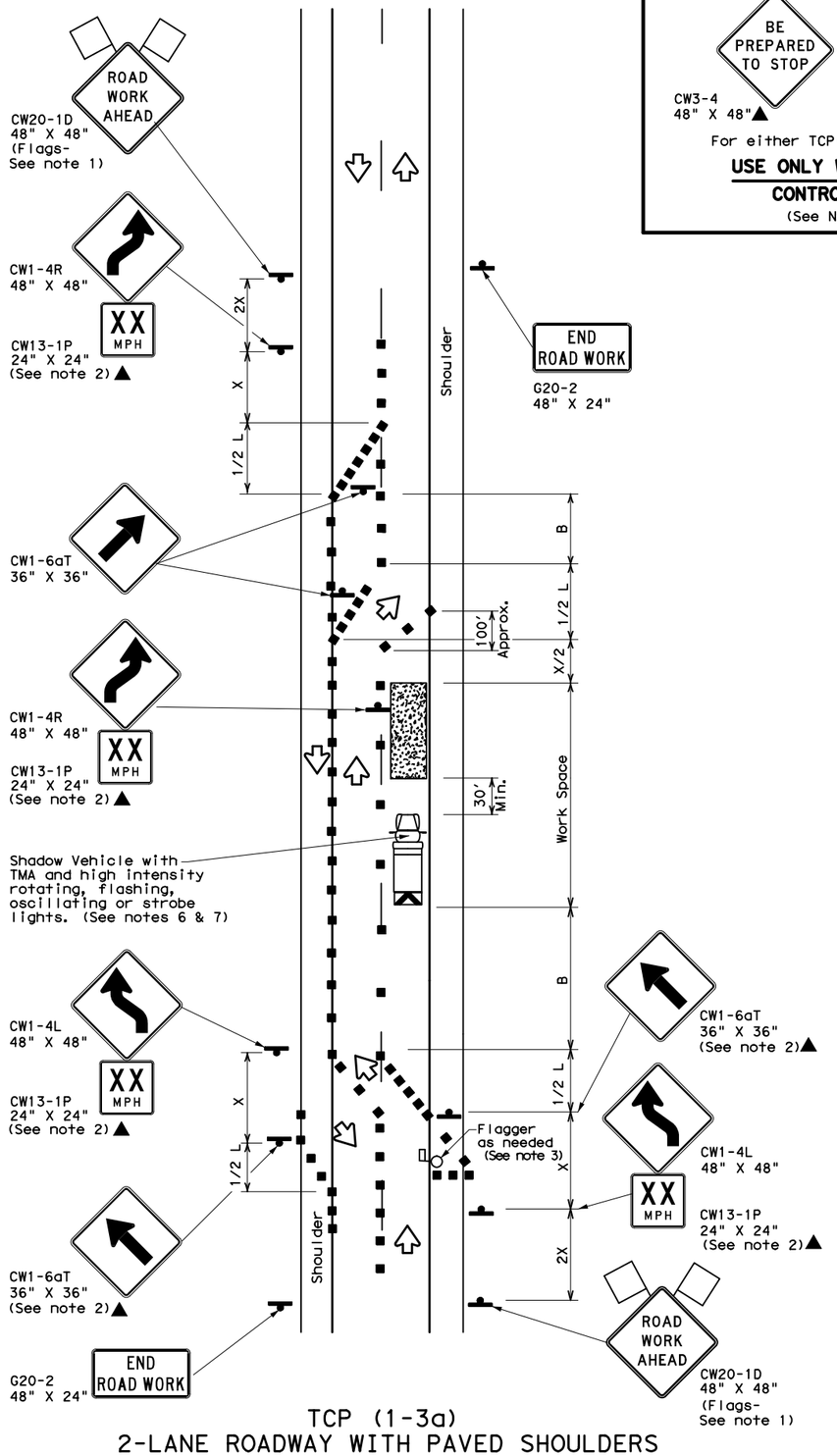
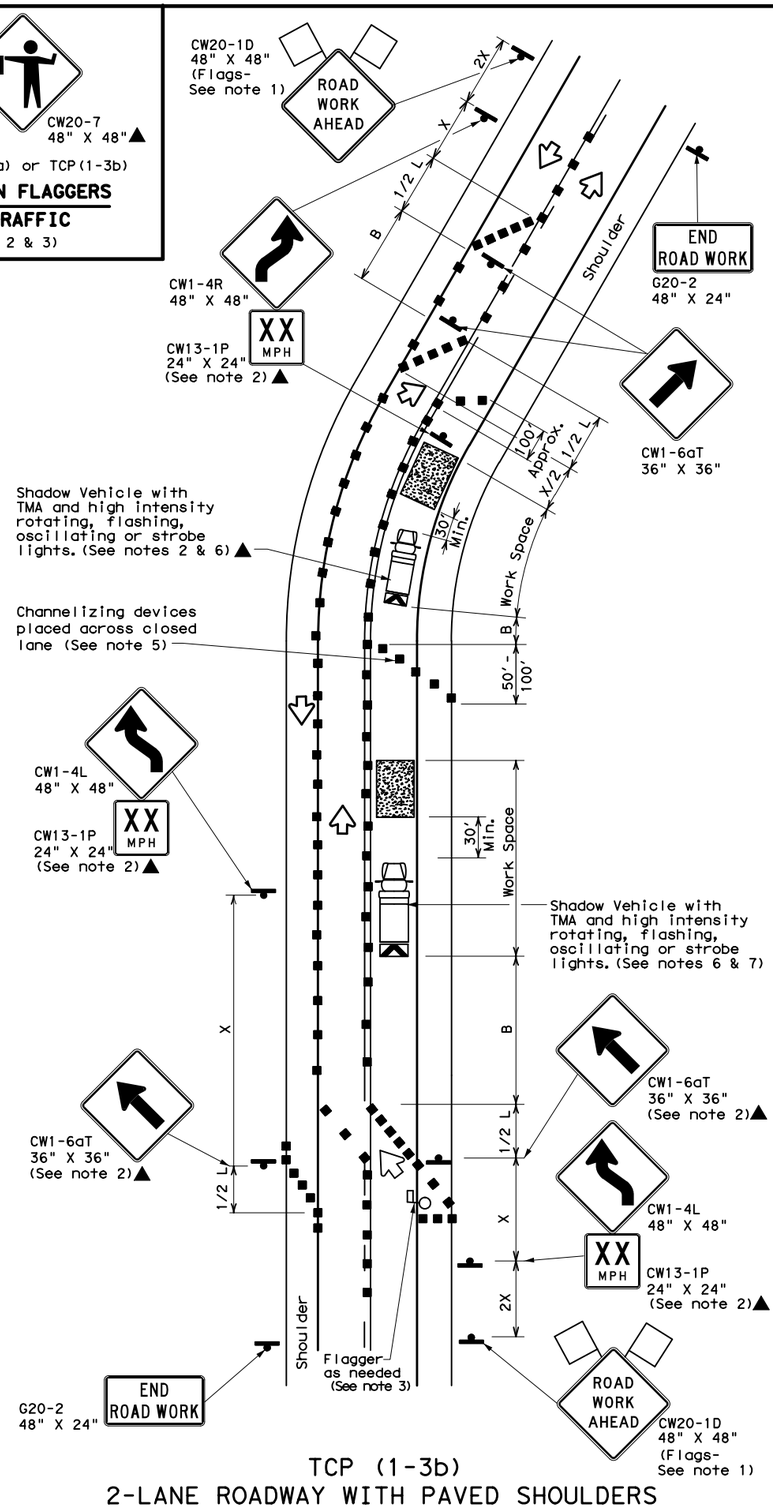


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
CW3-4 48" X 48"
CW20-7 48" X 48"
For either TCP(1-3a) or TCP(1-3b)

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



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS	0910	12	134,ETC	CR 2918,ETC
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	TYL	VAN ZANDT		31
1-97 2-18				

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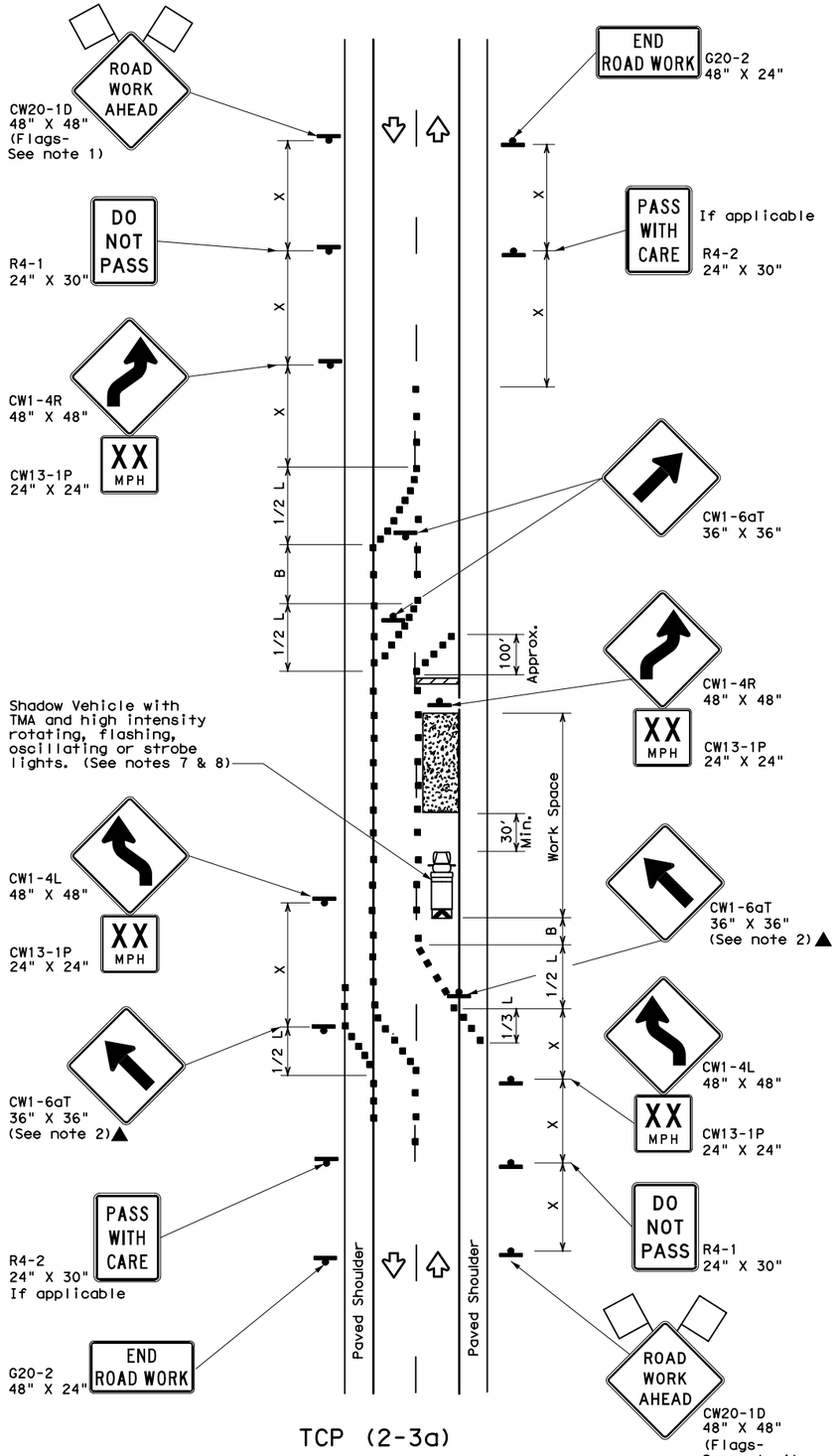
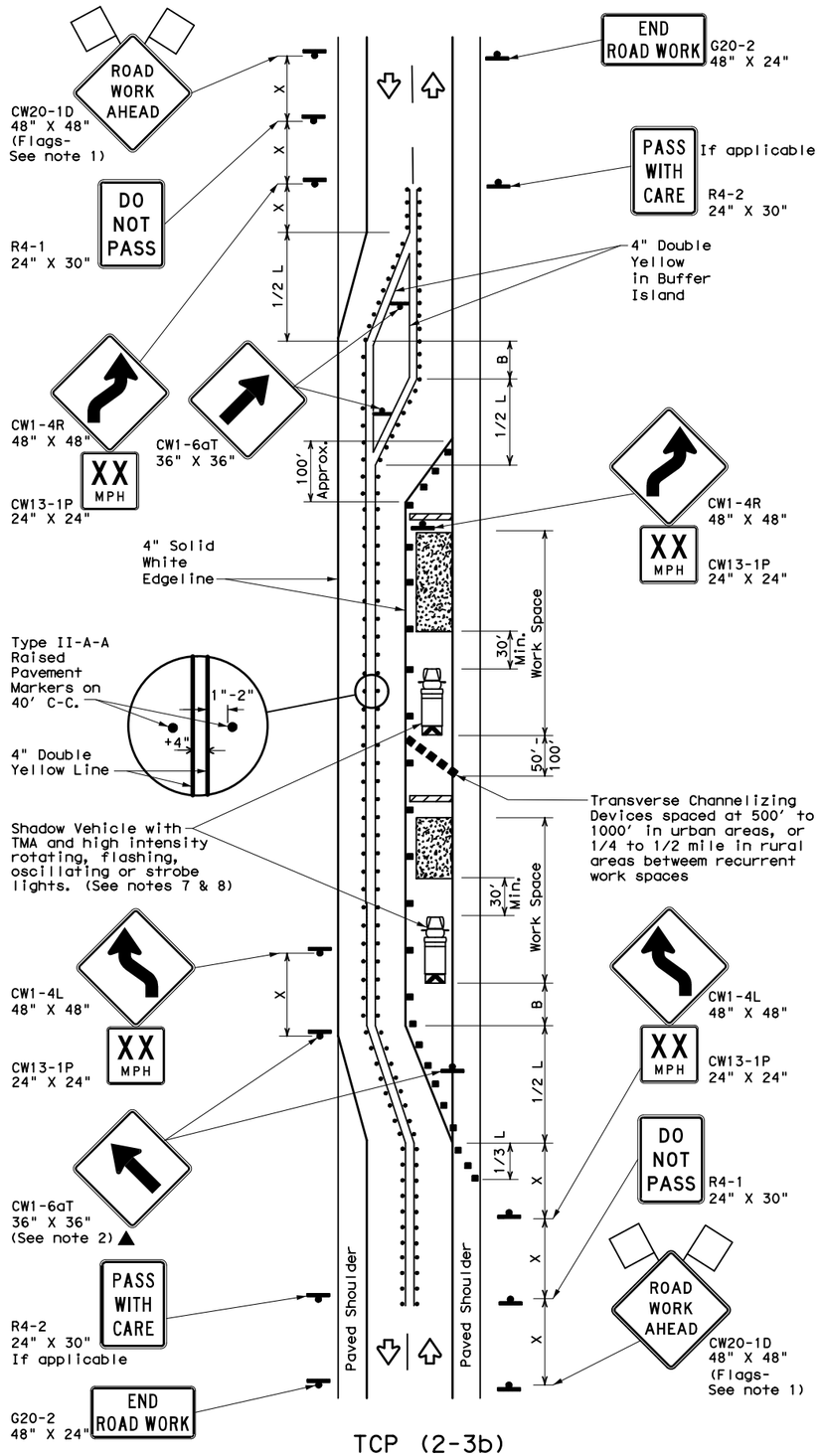


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	TYL	VAN ZANDT		32
4-98 2-18				

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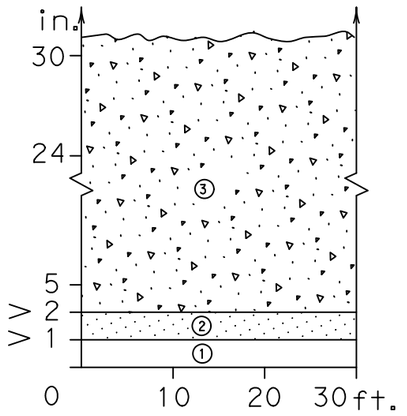
DATE: 11/11/2019 $TIME$
FILE: ...\STANDARDS\tcp2-3-18.dgn

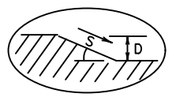
DATE:
FILE:

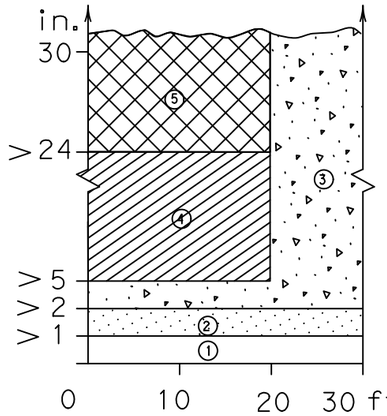
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

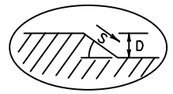


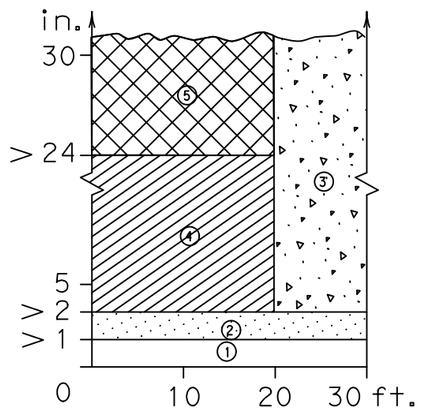
Edge Condition I
S = (3:1) (or flatter)



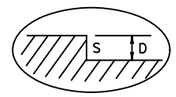


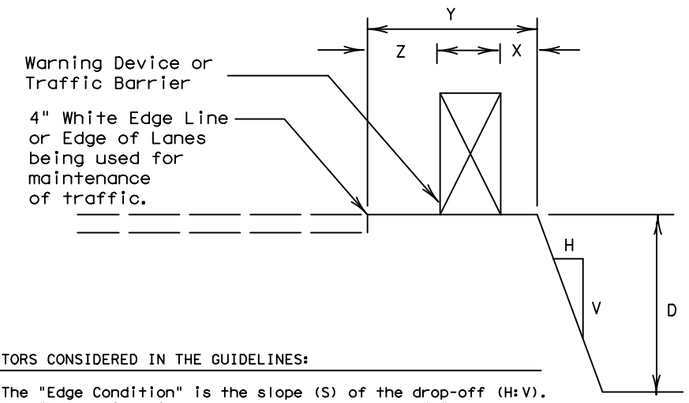
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

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

Edge Condition Notes:

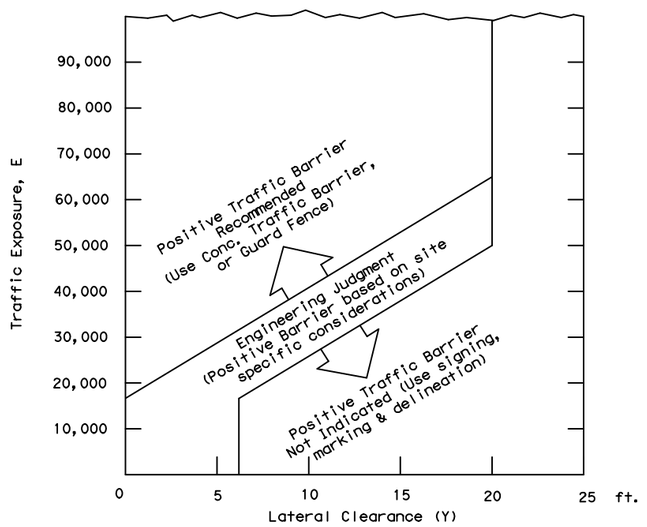
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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

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

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

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



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

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

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

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

Engineer's Seal
Civil Consulting Group, PLLC
FIRM NO. F-9356

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

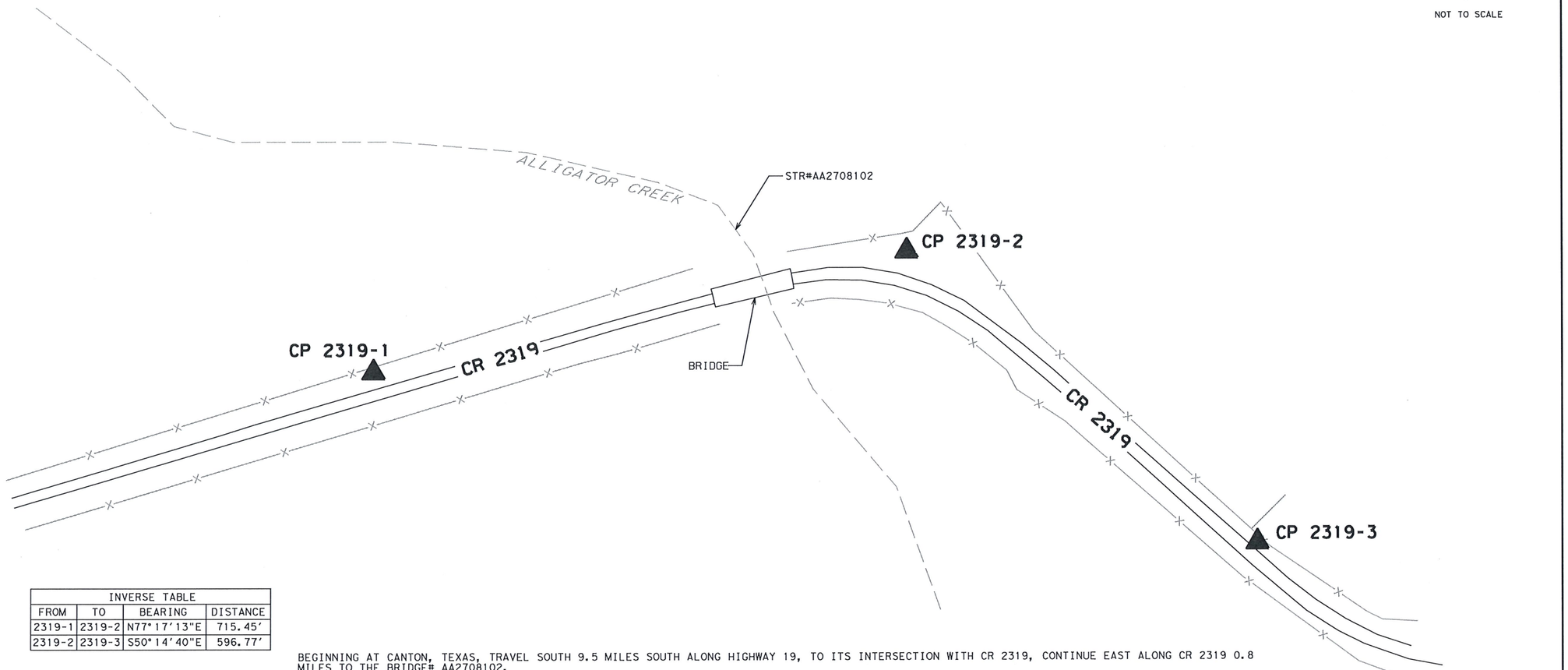
Date 12/14/2020

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
03-01	0910	12	134,ETC	CR 2918,ETC
08-01 correct typos	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		32A

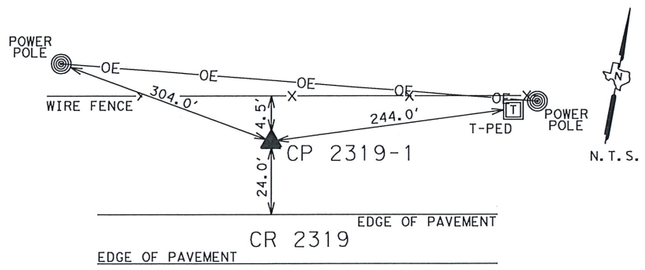


NOT TO SCALE

INVERSE TABLE			
FROM	TO	BEARING	DISTANCE
2319-1	2319-2	N77°17'13"E	715.45'
2319-2	2319-3	S50°14'40"E	596.77'

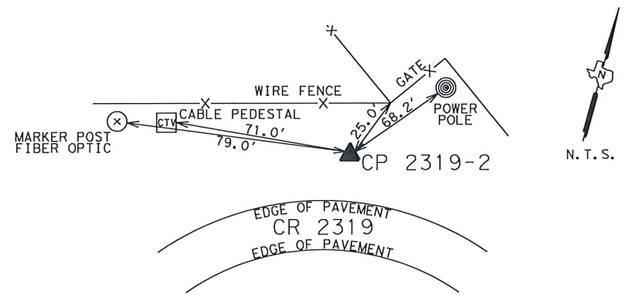
BEGINNING AT CANTON, TEXAS, TRAVEL SOUTH 9.5 MILES SOUTH ALONG HIGHWAY 19, TO ITS INTERSECTION WITH CR 2319, CONTINUE EAST ALONG CR 2319 0.8 MILES TO THE BRIDGE# AA2708102.

UNITS: U.S. SURVEY FEET



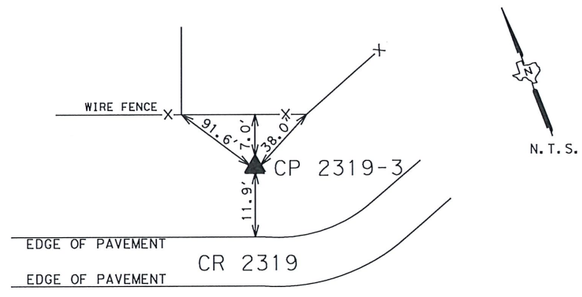
CP2319-1
N: 6,846,524.52
E: 2,780,636.21
El: 460.86'
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP2319-1 IS A TxDOT ALUMINUM DISK IN CONCRETE APPROXIMATELY 24.0 FEET NORTH OF THE NORTH EDGE OF PAVEMENT OF CR 2319, APPROXIMATELY 4.5 FEET PERPENDICULAR SOUTH OF A WIRE FENCE, APPROXIMATELY 244.0 FEET SOUTHWEST OF A TELEPHONE PEDESTAL AND APPROXIMATELY 304.0 FEET SOUTHEAST OF A POWER POLE.



CP2319-2
N: 6,846,681.97
E: 2,781,334.12
El: 463.25'
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP2319-2 IS A TxDOT ALUMINUM DISK IN CONCRETE APPROXIMATELY 79.0 FEET SOUTHEAST OF A MARKER POST FOR FIBER OPTIC CABLE, APPROXIMATELY 71.0 FEET SOUTHEAST OF A CABLE PEDESTAL, APPROXIMATELY 25.0 FEET SOUTHWEST OF A FENCE CORNER, AND APPROXIMATELY 68.2 FEET SOUTHWEST OF A POWER POLE.



CP2319-3
N: 6,846,300.33
E: 2,781,792.91
El: 471.70'
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP2319-3 IS A TxDOT ALUMINUM DISK IN CONCRETE APPROXIMATELY 11.9 FEET NORTHEAST OF THE NORTHEAST EDGE OF PAVEMENT OF CR 2319, APPROXIMATELY 91.6 FEET SOUTHEAST OF A FENCE CORNER, APPROXIMATELY 7.0 SOUTHWEST OF A WIRE FENCE LINE, AND APPROXIMATELY 38.0 FEET SOUTHWEST OF A ANGLE IN A WIRE FENCE.

NOTES:

1. ALL BEARINGS SHOWN ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE, NAD83 (2011) EPOCH 2010.00

2. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR OF 1.00012. UNITS: US SURVEY FEET.

3. COORDINATES AND ELEVATIONS WERE DERIVED FROM REDUNTANT TxDOT RTN OBSERVATIONS.

4. ALL ELEVATIONS SHOWN ARE BASED ON NAVD88, USING GEOID 12A AND ADJUSTED WITH DIGITAL DIFFERENTIAL LEVELING.

LEGEND

▲ SURVEY CONTROL MONUMENT

STATE OF TEXAS
REGISTERED
ROBERT M. ANGUIANO
6347
PROFESSIONAL
LAND SURVEYOR
03-20-19

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND AND UNDER MY SUPERVISION.

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

DESIGN ENGINEER DATE

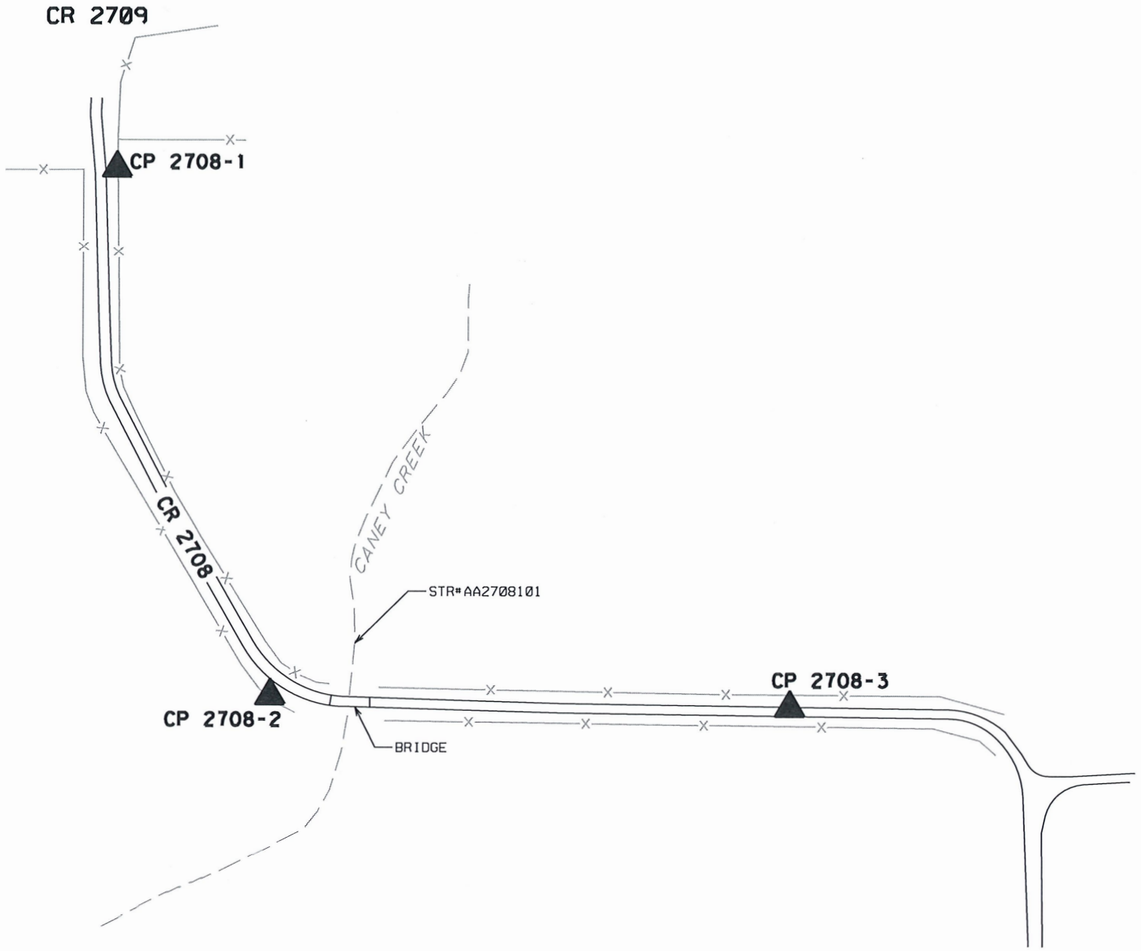
Texas Department of Transportation

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
CIVIL · ENVIRONMENTAL · SURVEY
12940 Country Parkway
San Antonio, TX 78216
Telephone: (210) 349-3271
TBPLS #10004100

CR 2319

SURVEY CONTROL INDEX SHEET

FED. RD. DIST. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	TEXAS				CR 2319
STATE DISTRICT NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
10	VAN ZANDT	0910	12	136	33

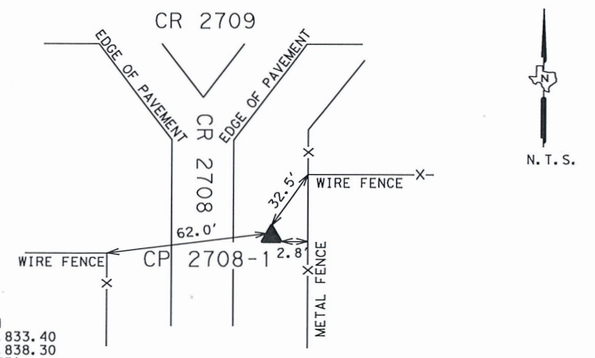


NOT TO SCALE

INVERSE TABLE			
FROM	TO	BEARING	DISTANCE
2708-1	2708-2	S16°23'57"E	746.17'
2708-2	2708-3	S88°44'06"E	706.63'

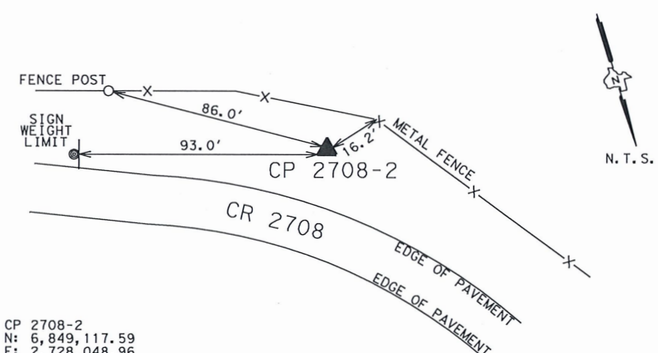
BEGINNING AT MABANK, TEXAS, TRAVEL 4.8 MILES NORTHEAST ALONG FM 198 TO ITS INTERSECTION WITH CR 2721, CONTINUE NORTH ALONG CR 2721, 0.5 MILES TO ITS INTERSECTION WITH CR 2716, CONTINUE WEST 0.3 MILES ALONG CR 2716 TO ITS INTERSECTION WITH CR 2721, CONTINUE NORTH ALONG CR 2721 0.7 MILES TO ITS INTERSECTION WITH CR 2708, CONTINUE EAST ALONG CR 2708, 0.4 MILES TO ITS INTERSECTION WITH CR 2709, CONTINUE 0.18 MILES SOUTH CR 2708 TO BRIDGE#AA2408101.

UNITS: U.S. SURVEY FEET



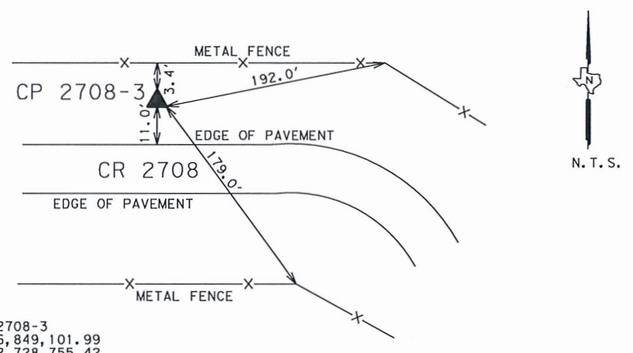
CP 2708-1
N: 6,849,833.40
E: 2,727,838.30
El: 422.33'
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP 2708-1 IS A TxDOT ALUMINUM DISK IN CONCRETE APPROXIMATELY 2.8 FEET WEST OF A METAL FENCE ON THE EAST SIDE OF CR 2708, APPROXIMATELY 32.5 FEET SOUTHWEST FROM THE NEAREST FENCE CORNER OF SAID WIRE FENCE, AND APPROXIMATELY 62.0 FEET NORTHEAST FROM A WIRE FENCE CORNER ON THE WEST SIDE LINE OF CR 2708.



CP 2708-2
N: 6,849,117.59
E: 2,728,048.96
El: 414.97'
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP 2708-2 IS A TxDOT ALUMINUM DISK IN CONCRETE APPROXIMATELY 16.2 FEET SOUTHWEST OF AN ANGLE POINT IN A WIRE FENCE, APPROXIMATELY 86.0 FEET SOUTHEAST OF A FENCE POST, AND APPROXIMATELY 93.0 FEET EAST OF A "WEIGHT LIMIT" SIGN.



CP 2708-3
N: 6,849,101.99
E: 2,728,755.42
El: 428.82'
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP 2708-3 IS A TxDOT ALUMINUM DISK IN CONCRETE APPROXIMATELY 192.0 FEET SOUTHWEST FROM A METAL FENCE POST, APPROXIMATELY 3.4 FEET SOUTH OF A METAL FENCE LINE ON THE NORTH SIDE OF CR 2708, APPROXIMATELY 11.0 FEET NORTH OF THE NORTH EDGE OF CR 2708, AND APPROXIMATELY 179.0 FEET NORTHWEST OF A METAL FENCE POST ON THE SOUTH SIDE LINE OF CR 2708.

NOTES:

1. ALL BEARINGS SHOWN ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE, NAD83 (2011) EPOCH 2010.00

2. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR OF 1.00012. UNITS: US SURVEY FEET.

3. COORDINATES AND ELEVATIONS WERE DERIVED FROM STATIC OBSERVATION METHODS HOLDING TXGE, TXNA AND TXTY.

4. ALL ELEVATIONS SHOWN ARE BASED ON NAVD88, USING GEOID 12A AND ADJUSTED WITH DIGITAL DIFFERENTIAL LEVELING.

LEGEND

▲ SURVEY CONTROL MONUMENT

STATE OF TEXAS
REGISTERED
ROBERT M. ANGUIANO
6347
PROFESSIONAL
LAND SURVEYOR
03-20-19

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND AND UNDER MY SUPERVISION.

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

DESIGN ENGINEER DATE

Texas Department of Transportation

VICKREY & ASSOCIATES, INC.
CONSULTING ENGINEERS
CIVIL - ENVIRONMENTAL - SURVEY
12940 Country Parkway
San Antonio, TX 78216
Telephone: (210) 349-3271
TBPLS #10004100

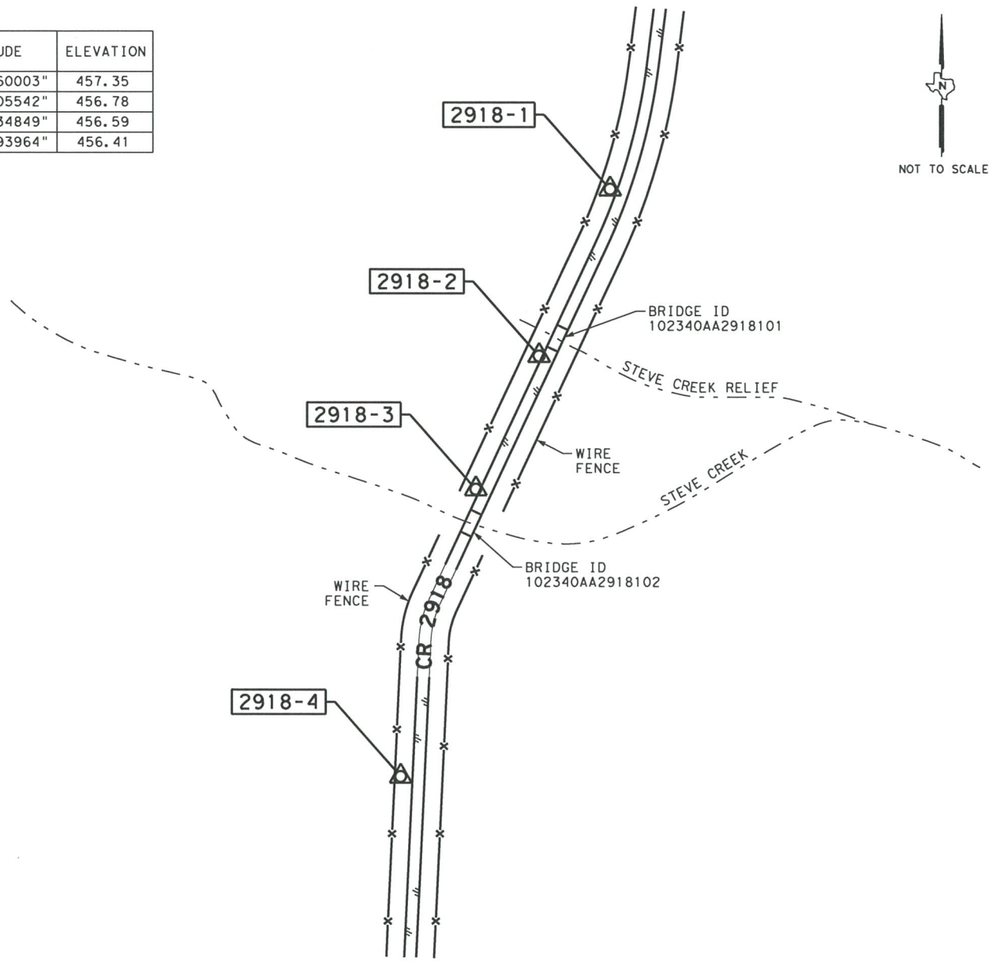
CR 2708

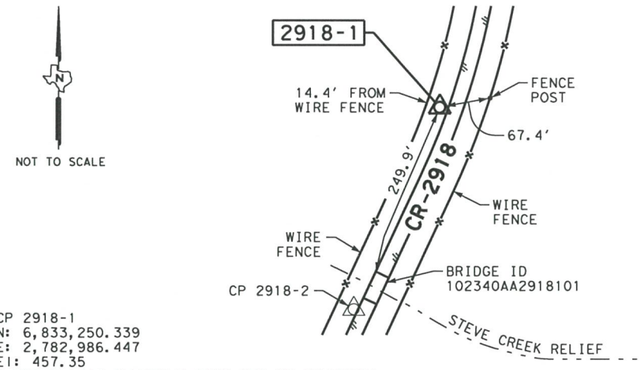
SURVEY CONTROL INDEX SHEET

FED. RD. DIST. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	TEXAS				CR2708
STATE DISTRICT NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
10	VAN ZANDT	0910	12	137	34

CONTROL POINT	SURFACE COORDINATES		GRID COORDINATES		LATITUDE	LONGITUDE	ELEVATION
	NORTHING	EASTING	NORTHING	EASTING			
2918-1	6,833,250.339	2,782,986.447	6,832,430.447	2,782,652.529	32°22'58.09547"	95°51'44.60003"	457.35
2918-2	6,832,973.469	2,782,868.544	6,832,153.611	2,782,534.640	32°22'55.38619"	95°51'46.05542"	456.78
2918-3	6,832,750.810	2,782,763.204	6,831,930.978	2,782,429.312	32°22'53.20998"	95°51'47.34849"	456.59
2918-4	6,832,275.802	2,782,638.623	6,831,456.027	2,782,304.746	32°22'48.54251"	95°51'48.93964"	456.41

INVERSE TABLE			
FROM	TO	BEARING	DISTANCE
2918-1	2918-2	S23°03'59"W	300.93'
2918-2	2918-3	S25°19'08"W	246.32'
2918-3	2918-4	S14°41'46"W	491.07'

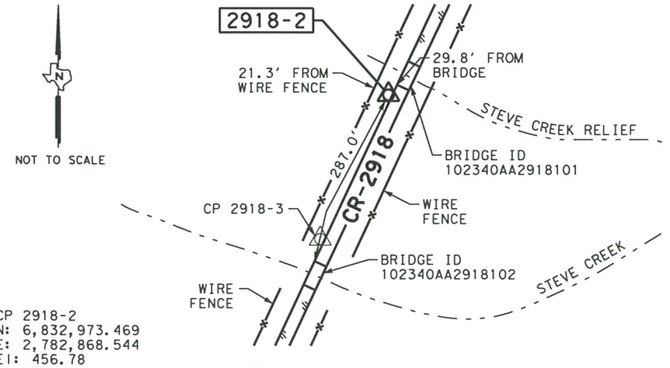




CP 2918-1
N: 6,833,250.339
E: 2,782,986.447
El: 457.35
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

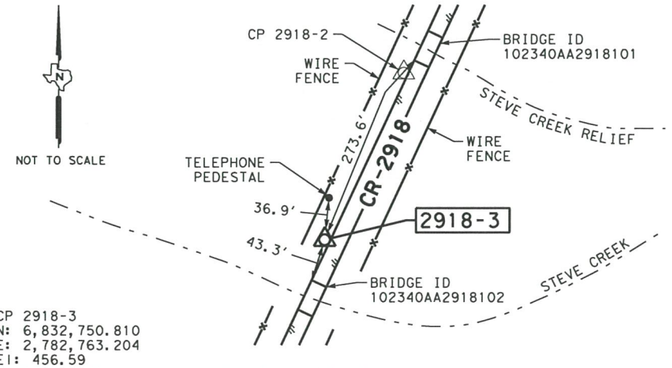
CP 2918-1 IS A TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE. LOCATED ON THE WEST SIDE OF CR 2918, +/- 8,688' NORTH OF THE INTERSECTION OF CR 2918 AND CR 1861, 249.9' NORTH OF A BRIDGE, 67.4' SOUTHWEST OF A WOOD FENCE POST, 14.4' EAST OF A WIRE FENCE

UNITS: U.S. SURVEY FEET



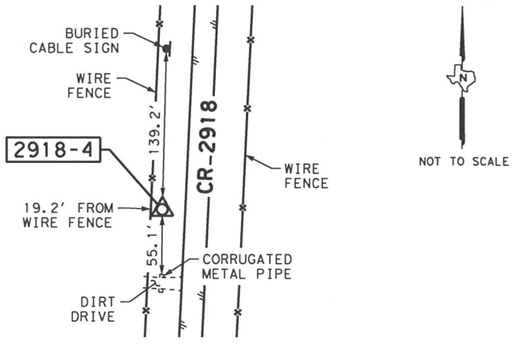
CP 2918-2
N: 6,832,973.469
E: 2,782,868.544
El: 456.78
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP 2918-2 IS A TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE. LOCATED ON THE WEST SIDE OF CR 2918, +/- 8,407' NORTH OF THE INTERSECTION OF CR 2918 AND CR 1861, 29.8' SOUTH OF A BRIDGE, 21.3' EAST OF A WIRE FENCE, 287.0' NORTH OF A BRIDGE



CP 2918-3
N: 6,832,750.810
E: 2,782,763.204
El: 456.59
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP 2918-3 IS A TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE. LOCATED ON THE WEST SIDE OF CR 2918, +/- 8,182' NORTH OF THE INTERSECTION OF CR 2918 AND CR 1861, 273.6' SOUTH OF A BRIDGE, 36.9' SOUTH OF A TELEPHONE PEDESTAL, 43.3' NORTH OF A BRIDGE



CP 2918-4
N: 6,832,275.802
E: 2,782,638.623
El: 456.41
TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE

CP 2918-4 IS A TxDOT 3-1/4" ALUMINUM DISK SET IN CONCRETE. LOCATED ON THE WEST SIDE OF CR 2918, +/- 7,706' NORTH OF THE INTERSECTION OF CR 2918 AND CR 1861, 139.2' SOUTH OF A BURIED CABLE SIGN, 55.1' NORTH OF A CORRUGATED METAL PIPE, 19.2' EAST OF A WIRE FENCE

NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83) 2010 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00012

2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (TYLER), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS

3. UNIT OF MEASURE IS U.S. SURVEY FOOT

4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (TYLER)

5. FIELD SURVEYS WERE PERFORMED DURING DECEMBER 2018

LEGEND

△ SURVEY CONTROL MONUMENT

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND AND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
CHRISTOPHER R. FREEMAN
5701
PROFESSIONAL
LAND SURVEYOR

1-30-19

Christopher R Freeman

THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

DESIGN ENGINEER DATE

Texas Department of Transportation

LINA T. RAMEY & ASSOCIATES, INC.
3320 BELT LINE ROAD
FARMERS BRANCH, TX 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPLS REGISTRATION NO. 10140700

CR 2918

SURVEY CONTROL INDEX SHEET

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
	TEXAS					CR2918
STATE DISTRICT NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
10	VAN ZANDT	0910	12	134/ECT		35

℄ CR 2319

Chain CR2319 contains:
1000 1001 CUR CR23191 1002 1003

Beginning chain CR2319 description

Point 1000		N	6,846,560.16	E	2,780,864.28	Sta	10+00.00

Course from 1000 to 1001 N 74° 27′ 29.25" E Dist 90.35

Point 1001		N	6,846,584.37	E	2,780,951.33	Sta	10+90.35

Course from 1001 to PC CR23191 N 75° 26′ 55.77" E Dist 227.51

Curve Data

Curve CR23191							
P.I. Station		14+51.43	N	6,846,675.09	E	2,781,300.83	
Delta	=	47° 19′ 09.36"	(RT)				
Degree	=	18° 47′ 39.22"					
Tangent	=	133.57					
Length	=	251.78					
Radius	=	304.86					
External	=	27.98					
Long Chord	=	244.68					
Mid. Ord.	=	25.62					
P.C. Station		13+17.86	N	6,846,641.53	E	2,781,171.54	
P.T. Station		15+69.64	N	6,846,602.80	E	2,781,413.14	
C.C.			N	6,846,346.45	E	2,781,248.14	
Back	= N	75° 26′ 55.77" E					
Ahead	= S	57° 13′ 54.87" E					
Chord Bear	= S	80° 53′ 29.55" E					

Course from PT CR23191 to 1002 S 57° 13′ 54.87" E Dist 36.57

Point 1002		N	6,846,583.00	E	2,781,443.89	Sta	16+06.21

Course from 1002 to 1003 N 32° 46′ 05.13" E Dist 34.68

Point 1003		N	6,846,612.16	E	2,781,462.66	Sta	16+40.89

Ending chain CR2319 description

℄ CR 2708

Chain CR2708 contains:
2000 2001 CUR CR27081 CUR CR27082 2002 2003 2004

Beginning chain CR2708 description

Point 2000		N	6,849,313.22	E	2,727,941.60	Sta	20+00.00

Course from 2000 to 2001 S 30° 30′ 09.14" E Dist 117.41

Point 2001		N	6,849,212.06	E	2,728,001.19	Sta	21+17.41

Course from 2001 to PC CR27081 S 30° 00′ 15.01" E Dist 34.19

Curve Data

Curve CR27081							
P.I. Station		22+30.45	N	6,849,114.17	E	2,728,057.72	
Delta	=	53° 24′ 52.75"	(LT)				
Degree	=	36° 33′ 43.09"					
Tangent	=	78.84					
Length	=	146.09					
Radius	=	156.71					
External	=	18.72					
Long Chord	=	140.86					
Mid. Ord.	=	16.72					
P.C. Station		21+51.61	N	6,849,182.45	E	2,728,018.29	
P.T. Station		22+97.70	N	6,849,105.13	E	2,728,136.04	
C.C.			N	6,849,260.81	E	2,728,154.00	
Back	= S	30° 00′ 15.01" E					
Ahead	= S	83° 25′ 07.76" E					
Chord Bear	= S	56° 42′ 41.38" E					

Course from PT CR27081 to PC CR27082 S 83° 25′ 07.76" E Dist 69.20

Curve Data

Curve CR27082							
P.I. Station		23+88.21	N	6,849,094.76	E	2,728,225.95	
Delta	=	4° 53′ 03.78"	(LT)				
Degree	=	11° 27′ 56.41"					
Tangent	=	21.31					
Length	=	42.60					
Radius	=	499.72					
External	=	0.45					
Long Chord	=	42.59					
Mid. Ord.	=	0.45					
P.C. Station		23+66.90	N	6,849,097.20	E	2,728,204.78	
P.T. Station		24+09.50	N	6,849,094.13	E	2,728,247.26	
C.C.			N	6,849,593.63	E	2,728,262.05	
Back	= S	83° 25′ 07.76" E					
Ahead	= S	88° 18′ 11.53" E					
Chord Bear	= S	85° 51′ 39.65" E					

Course from PT CR27082 to 2002 S 88° 18′ 11.53" E Dist 95.51

Point 2002		N	6,849,091.30	E	2,728,342.73	Sta	25+05.01

Course from 2002 to 2003 S 88° 50′ 51.86" E Dist 73.12

Point 2003		N	6,849,089.83	E	2,728,415.83	Sta	25+78.12
Point 2004		N	6,849,089.83	E	2,728,415.83	Sta	25+78.12

Ending chain CR2708 description

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	36

CONTROL	SECTION	JOB
0910	12	134,ETC

FILENAME: ...\TYL*HAD01.dgn
DRAWING DATE: 11/11/2019

℄ CR 2918

Chain CR2918 contains:
5000 CUR CR29181 CUR CR29182 CUR CR29183 5001 5002 5003

Beginning chain CR2918 description

Point 5000 N 6,832,439.18 E 2,782,661.21 Sta 30+00.00

Course from 5000 to PC CR29181 N 11° 49′ 44.78" E Dist 34.36

		Curve Data				
Curve CR29181						
P.I. Station		31+09.04	N	6,832,545.91	E	2,782,683.56
Delta	=	13° 47′ 31.26"	(RT)			
Degree	=	9° 16′ 43.89"				
Tangent	=	74.68				
Length	=	148.64				
Radius	=	617.49				
External	=	4.50				
Long Chord	=	148.28				
Mid. Ord.	=	4.47				
P.C. Station		30+34.36	N	6,832,472.82	E	2,782,668.25
P.T. Station		31+83.00	N	6,832,613.25	E	2,782,715.86
C.C.			N	6,832,346.24	E	2,783,272.63
Back	= N	11° 49′ 44.78" E				
Ahead	= N	25° 37′ 16.04" E				
Chord Bear	= N	18° 43′ 30.41" E				

Course from PT CR29181 to PC CR29182 N 25° 37′ 16.04" E Dist 177.76

		Curve Data				
Curve CR29182						
P.I. Station		33+80.70	N	6,832,791.51	E	2,782,801.34
Delta	=	1° 20′ 35.82"	(LT)			
Degree	=	3° 22′ 13.22"				
Tangent	=	19.93				
Length	=	39.86				
Radius	=	1,700.00				
External	=	0.12				
Long Chord	=	39.86				
Mid. Ord.	=	0.12				
P.C. Station		33+60.77	N	6,832,773.54	E	2,782,792.72
P.T. Station		34+00.62	N	6,832,809.67	E	2,782,809.54
C.C.			N	6,833,508.65	E	2,781,259.88
Back	= N	25° 37′ 16.04" E				
Ahead	= N	24° 16′ 40.22" E				
Chord Bear	= N	24° 56′ 58.13" E				

Course from PT CR29182 to PC CR29183 N 24° 16′ 40.22" E Dist 277.00

℄ CR 2918 (CONT'D)

		Curve Data				
Curve CR29183						
P.I. Station		37+58.18	N	6,833,134.95	E	2,782,957.97
Delta	=	5° 17′ 12.06"	(LT)			
Degree	=	3° 17′ 00.33"				
Tangent	=	80.56				
Length	=	161.01				
Radius	=	1,745.00				
External	=	1.86				
Long Chord	=	160.95				
Mid. Ord.	=	1.86				
P.C. Station		36+77.62	N	6,833,062.17	E	2,782,923.43
P.T. Station		38+38.63	N	6,833,210.61	E	2,782,985.66
C.C.			N	6,833,810.43	E	2,781,347.00
Back	= N	25° 23′ 29.48" E				
Ahead	= N	20° 06′ 17.42" E				
Chord Bear	= N	22° 44′ 53.45" E				

Course from PT CR29183 to 5001 N 19° 54′ 48.01" E Dist 50.87

Point 5001 N 6,833,258.43 E 2,783,002.99 Sta 38+89.50

Course from 5001 to 5002 S 19° 54′ 48.01" W Dist 50.87

Point 5002 N 6,833,210.61 E 2,782,985.66 Sta 39+40.36

Course from 5002 to 5003 N 19° 54′ 48.01" E Dist 50.87

Point 5003 N 6,833,258.43 E 2,783,002.99 Sta 39+91.23

Ending chain CR2918 description

FILENAME: ...\TYL*HAD02.dgn
DRAWING DATE: 11/11/2019

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

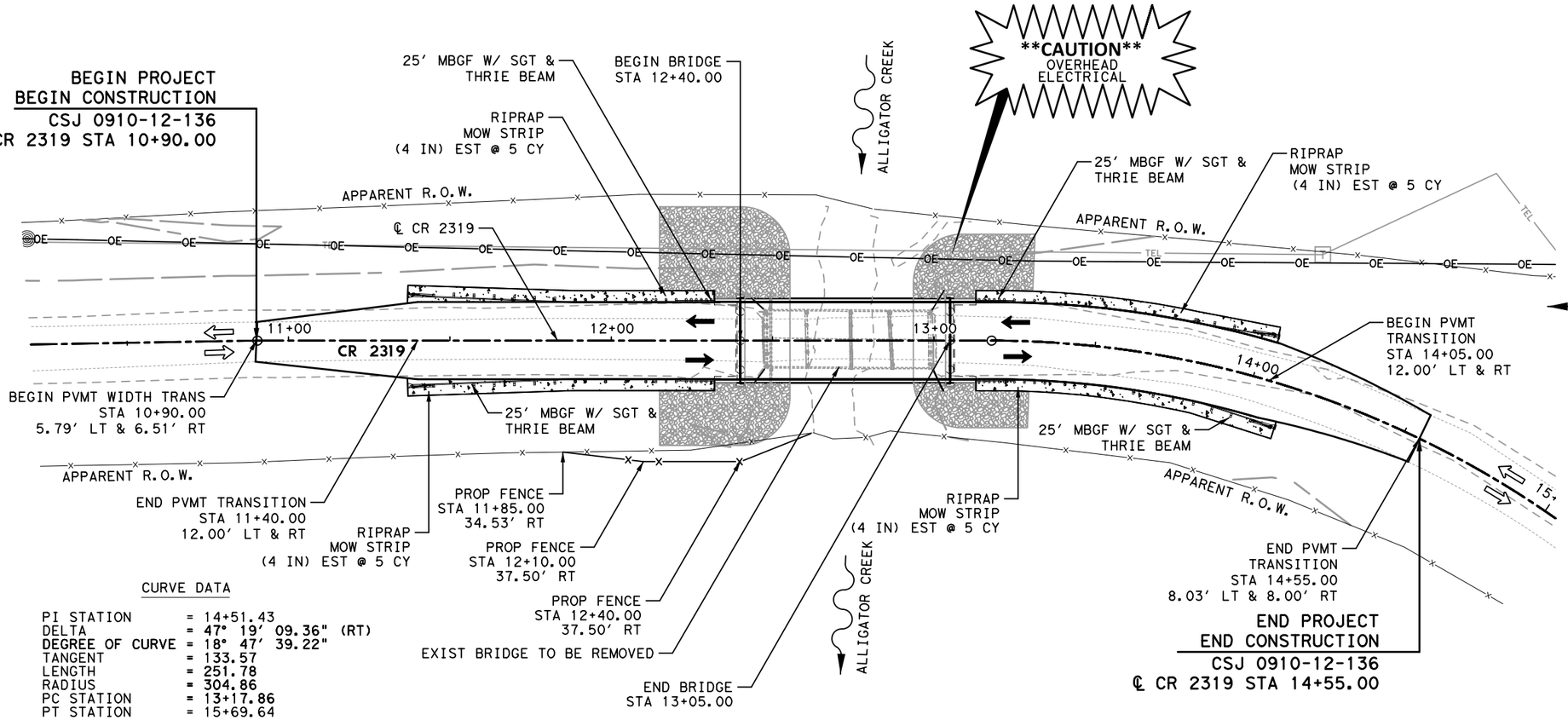
CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	37
CONTROL	SECTION	JOB	
0910	12	134,ETC	

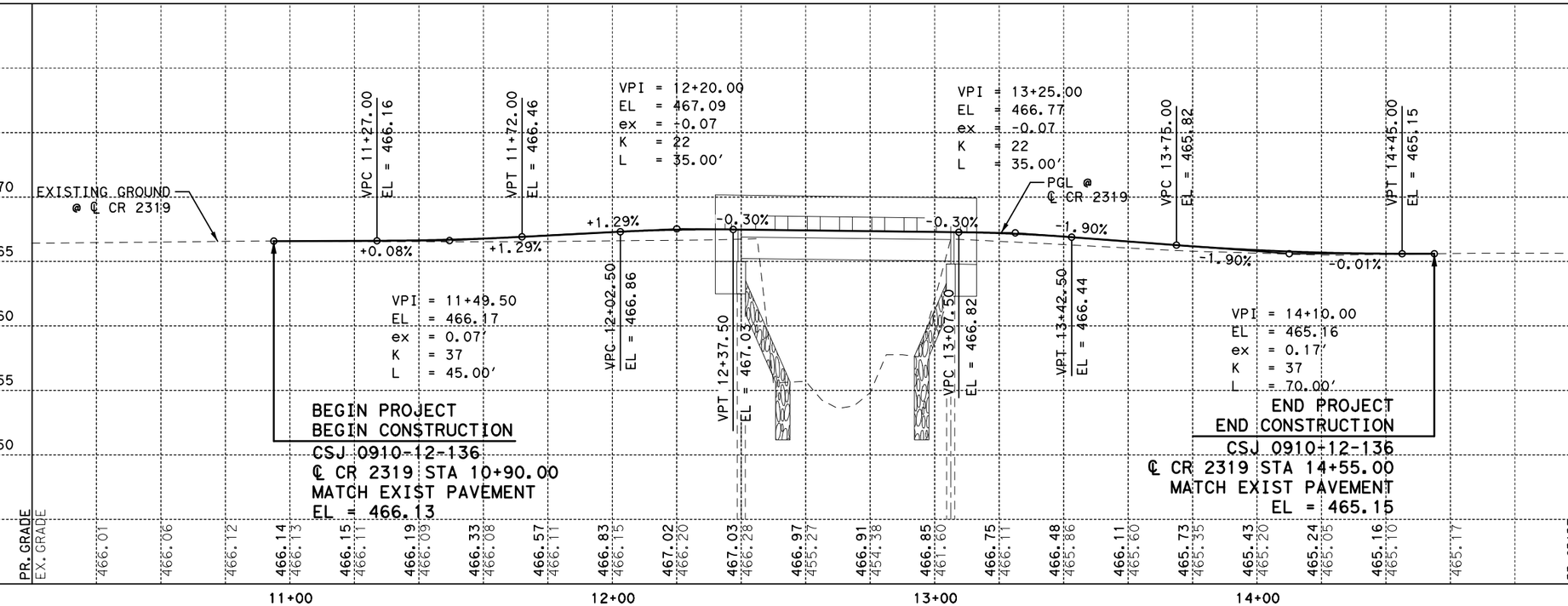


CURVE DATA

PI STATION	= 14+51.43
DELTA	= 47° 19' 09.36" (RT)
DEGREE OF CURVE	= 18° 47' 39.22"
TANGENT	= 133.57
LENGTH	= 251.78
RADIUS	= 304.86
PC STATION	= 13+17.86
PT STATION	= 15+69.64

NOTES:

1. THE CONTRACTOR SHALL NOTIFY UTILITY OWNERS AND VERIFY THE EXACT LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
2. REFER TO SURVEY CONTROL SHEETS FOR BENCHMARK INFORMATION.
3. REFER TO BRIDGE LAYOUT FOR ADDITIONAL INFORMATION.



0' 20' 40'
SCALE: 1"=40' H
1"=10' V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

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CR 2319 @ ALLIGATOR CREEK

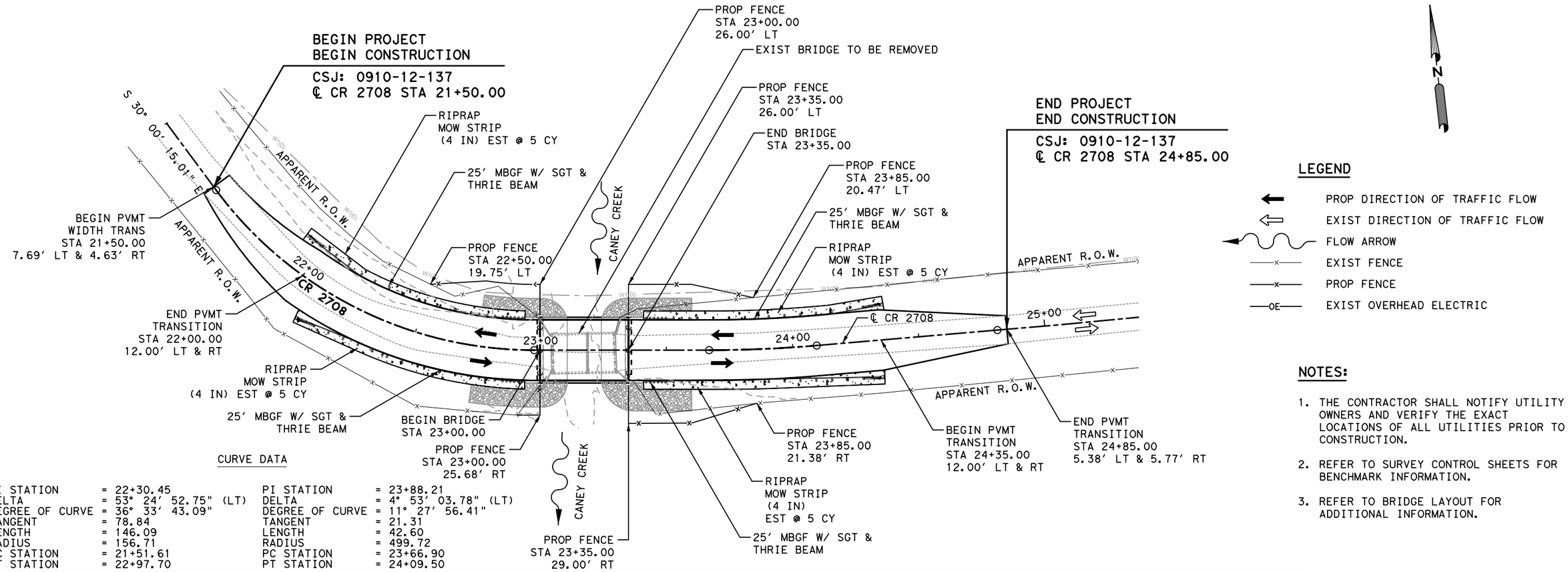
PLAN AND PROFILE

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	38
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2319xPP01.dgn
DRAWING DATE: 11/11/2019

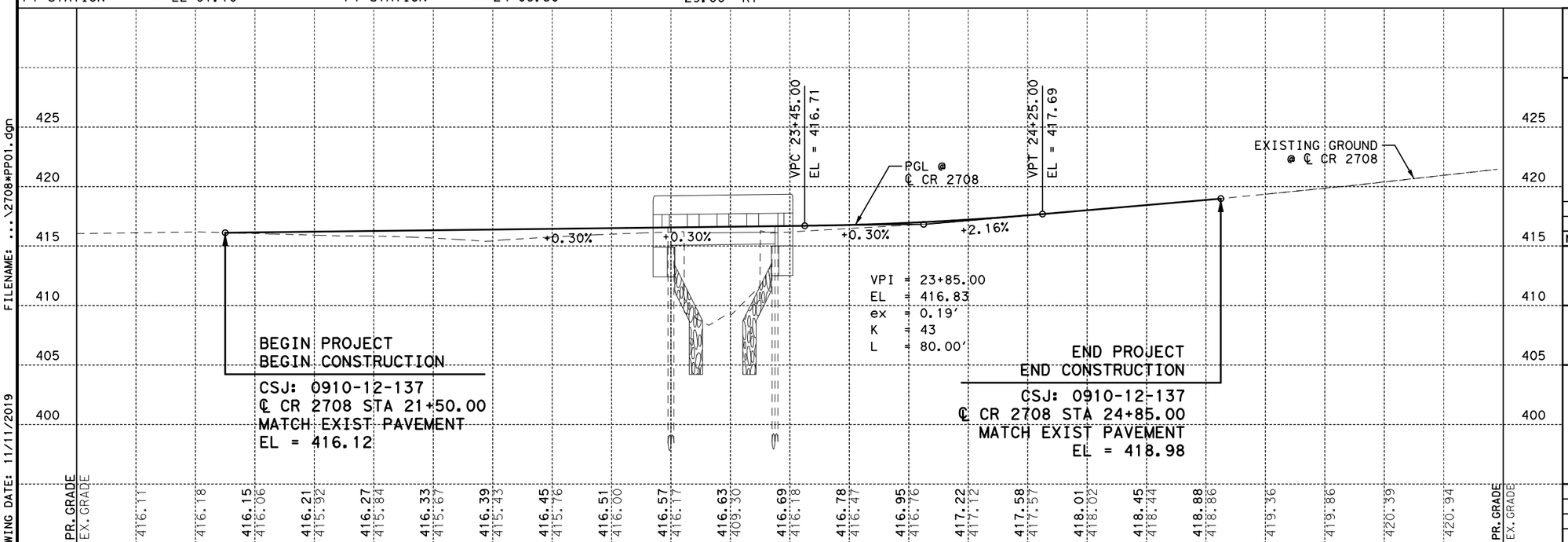


CURVE DATA

PI STATION	= 22+30.45	PI STATION	= 23+88.21
DELTA	= 53° 24' 52.75" (LT)	DELTA	= 4° 53' 03.78" (LT)
DEGREE OF CURVE	= 36° 33' 43.09"	DEGREE OF CURVE	= 11° 27' 56.41"
TANGENT	= 78.84	TANGENT	= 21.31
LENGTH	= 146.09	LENGTH	= 42.60
RADIUS	= 156.71	RADIUS	= 499.72
PC STATION	= 21+51.61	PC STATION	= 23+66.90
PT STATION	= 22+97.70	PT STATION	= 24+09.50

NOTES:

1. THE CONTRACTOR SHALL NOTIFY UTILITY OWNERS AND VERIFY THE EXACT LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
2. REFER TO SURVEY CONTROL SHEETS FOR BENCHMARK INFORMATION.
3. REFER TO BRIDGE LAYOUT FOR ADDITIONAL INFORMATION.



FILENAME: ...\2708*PP01.dgn

DRAWING DATE: 11/11/2019

0' 20' 40'

SCALE: 1"=40' H
1"=10' V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
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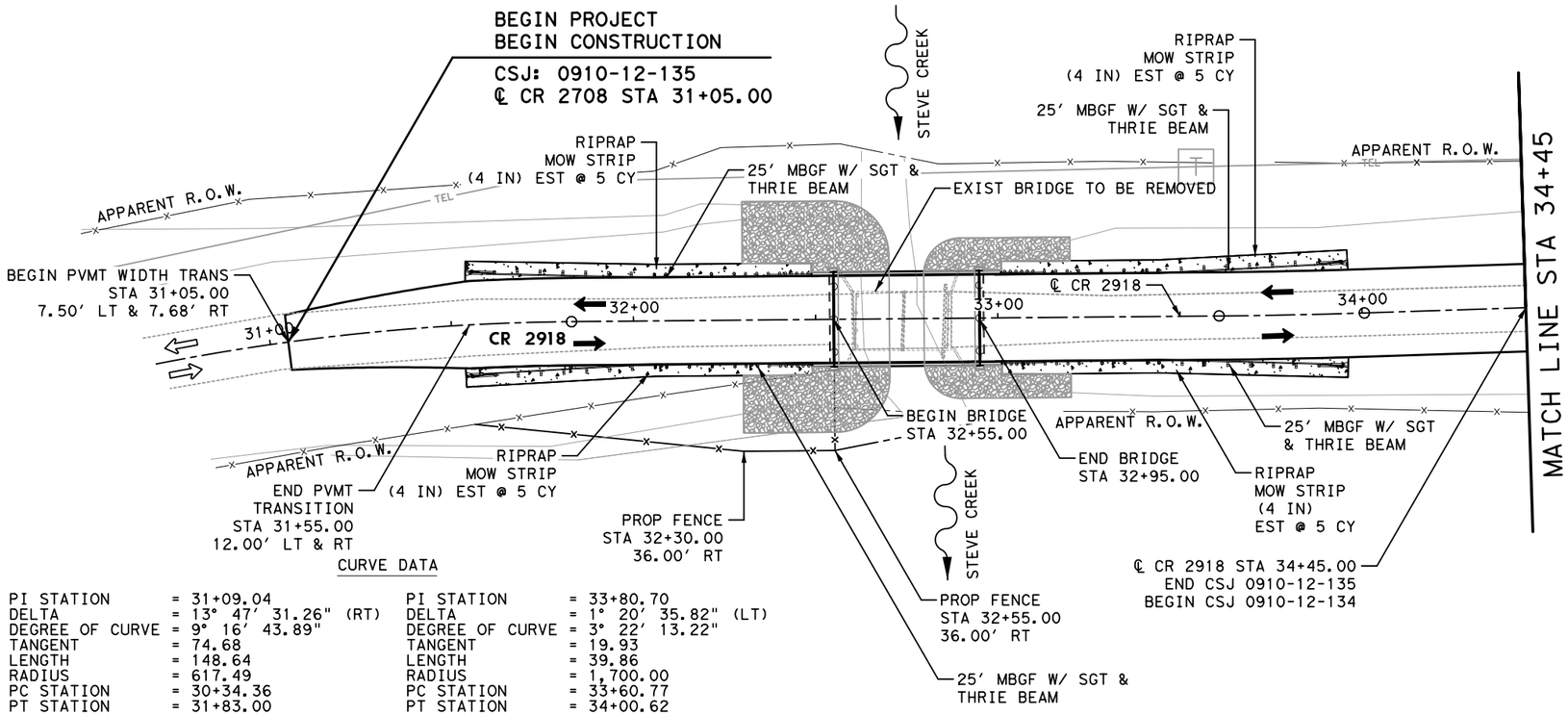
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

CR 2708 @ CANEY CREEK

PLAN AND PROFILE

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	BR 2019 (360), ETC.		CR 2918,ETC
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	39
CONTROL	SECTION	JOB	
0910	12	134,ETC	



CURVE DATA

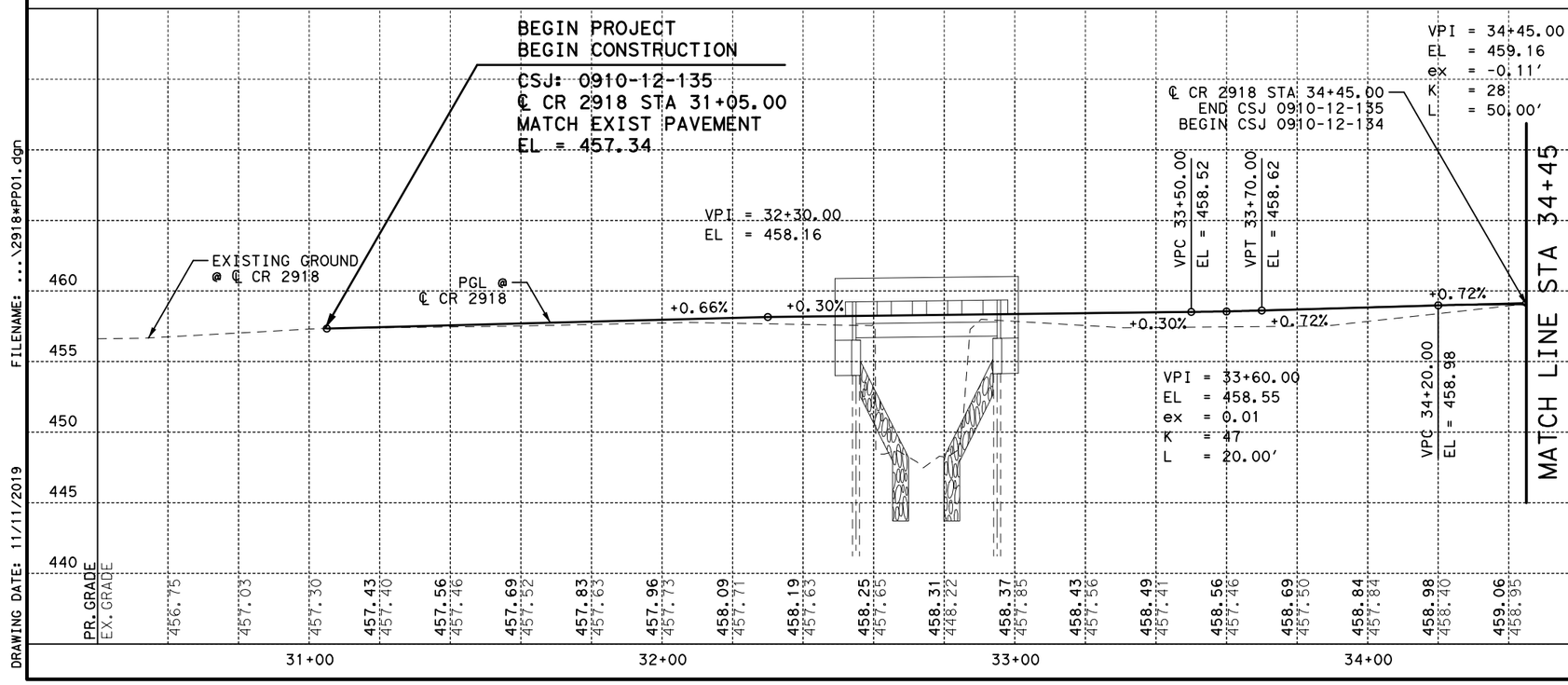
PI STATION	= 31+09.04	PI STATION	= 33+80.70
DELTA	= 13° 47' 31.26" (RT)	DELTA	= 1° 20' 35.82" (LT)
DEGREE OF CURVE	= 9° 16' 43.89"	DEGREE OF CURVE	= 3° 22' 13.22"
TANGENT	= 74.68	TANGENT	= 19.93
LENGTH	= 148.64	LENGTH	= 39.86
RADIUS	= 617.49	RADIUS	= 1,700.00
PC STATION	= 30+34.36	PC STATION	= 33+60.77
PT STATION	= 31+83.00	PT STATION	= 34+00.62

LEGEND

- PROP DIRECTION OF TRAFFIC FLOW
- EXIST DIRECTION OF TRAFFIC FLOW
- FLOW ARROW
- EXIST FENCE
- PROP FENCE
- OE — EXIST OVERHEAD ELECTRIC

NOTES:

1. THE CONTRACTOR SHALL NOTIFY UTILITY OWNERS AND VERIFY THE EXACT LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
2. REFER TO SURVEY CONTROL SHEETS FOR BENCHMARK INFORMATION.
3. REFER TO BRIDGE LAYOUT FOR ADDITIONAL INFORMATION.



0' 20' 40'

SCALE: 1"=40' H
1"=10' V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2918 @ STEVE CREEK

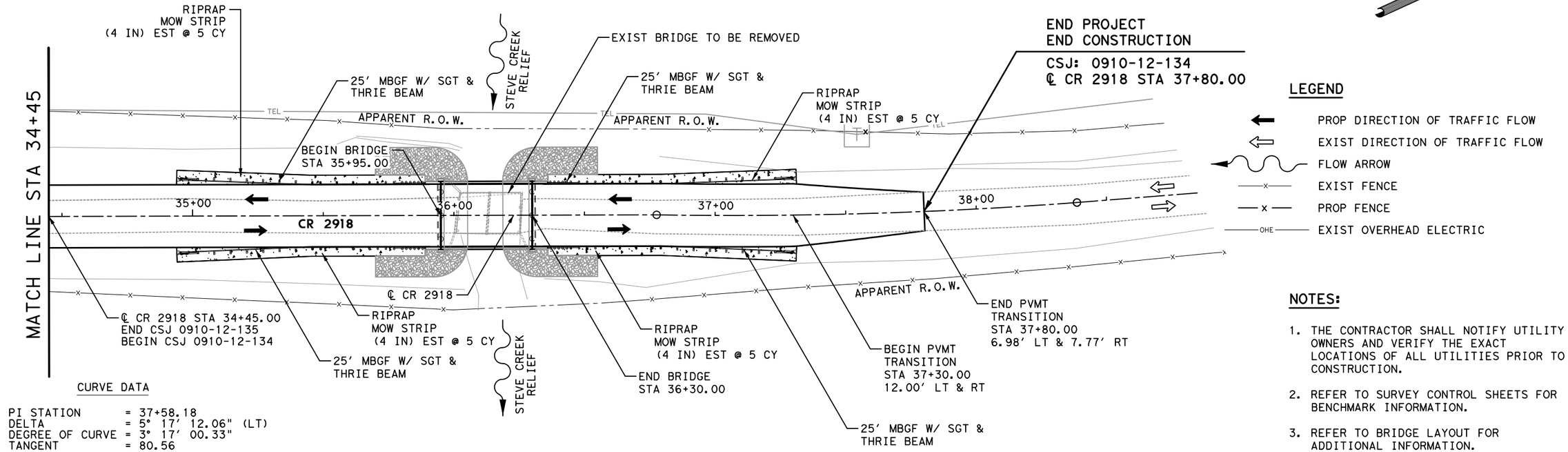
PLAN AND PROFILE

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	BR 2019 (360), ETC.		CR 2918,ETC
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	40
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\2918*PP01.dgn

DRAWING DATE: 11/11/2019



LEGEND

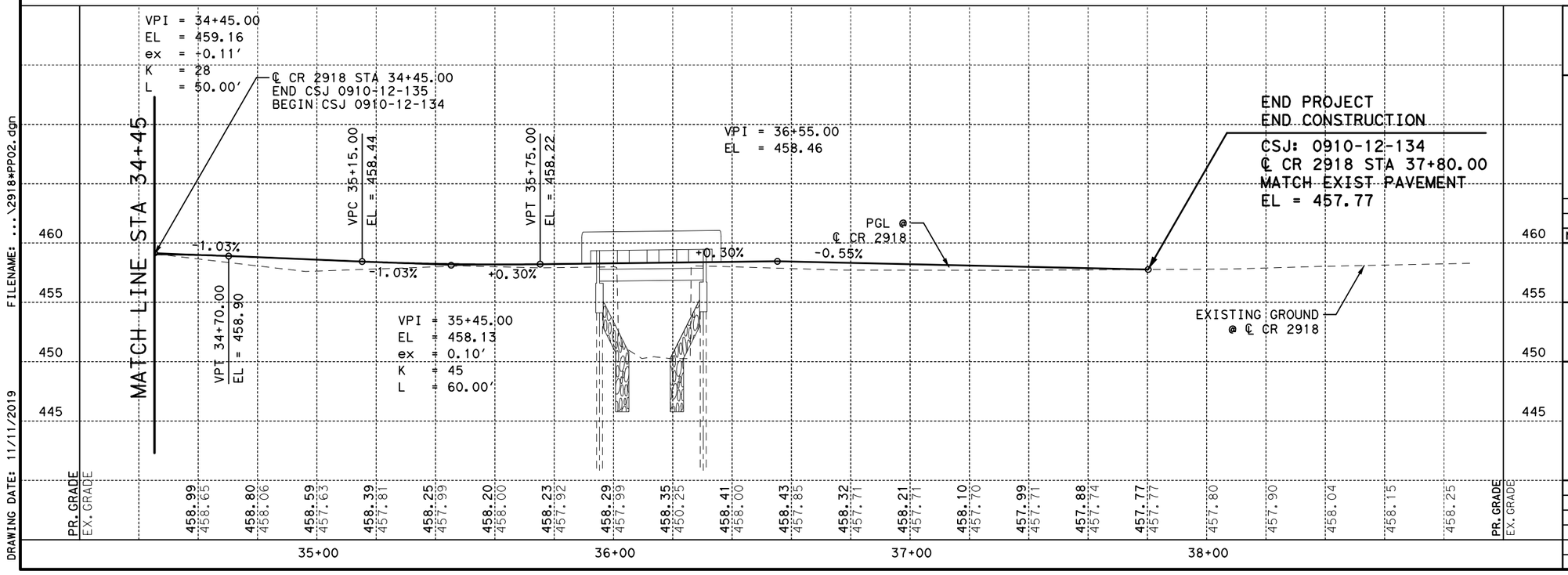
- PROP DIRECTION OF TRAFFIC FLOW
- EXIST DIRECTION OF TRAFFIC FLOW
- FLOW ARROW
- EXIST FENCE
- PROP FENCE
- EXIST OVERHEAD ELECTRIC

NOTES:

1. THE CONTRACTOR SHALL NOTIFY UTILITY OWNERS AND VERIFY THE EXACT LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
2. REFER TO SURVEY CONTROL SHEETS FOR BENCHMARK INFORMATION.
3. REFER TO BRIDGE LAYOUT FOR ADDITIONAL INFORMATION.

CURVE DATA

PI STATION	= 37+58.18
DELTA	= 5° 17' 12.06" (LT)
DEGREE OF CURVE	= 3° 17' 00.33"
TANGENT	= 80.56
LENGTH	= 161.01
RADIUS	= 1,745.00
PC STATION	= 36+77.62
PT STATION	= 38+38.63



0' 20' 40'
SCALE: 1"=40' H
1"=10' V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2918 @ STEVE CREEK RELIEF

PLAN AND PROFILE

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	41
CONTROL	SECTION	JOB	
0910	12	134,ETC	

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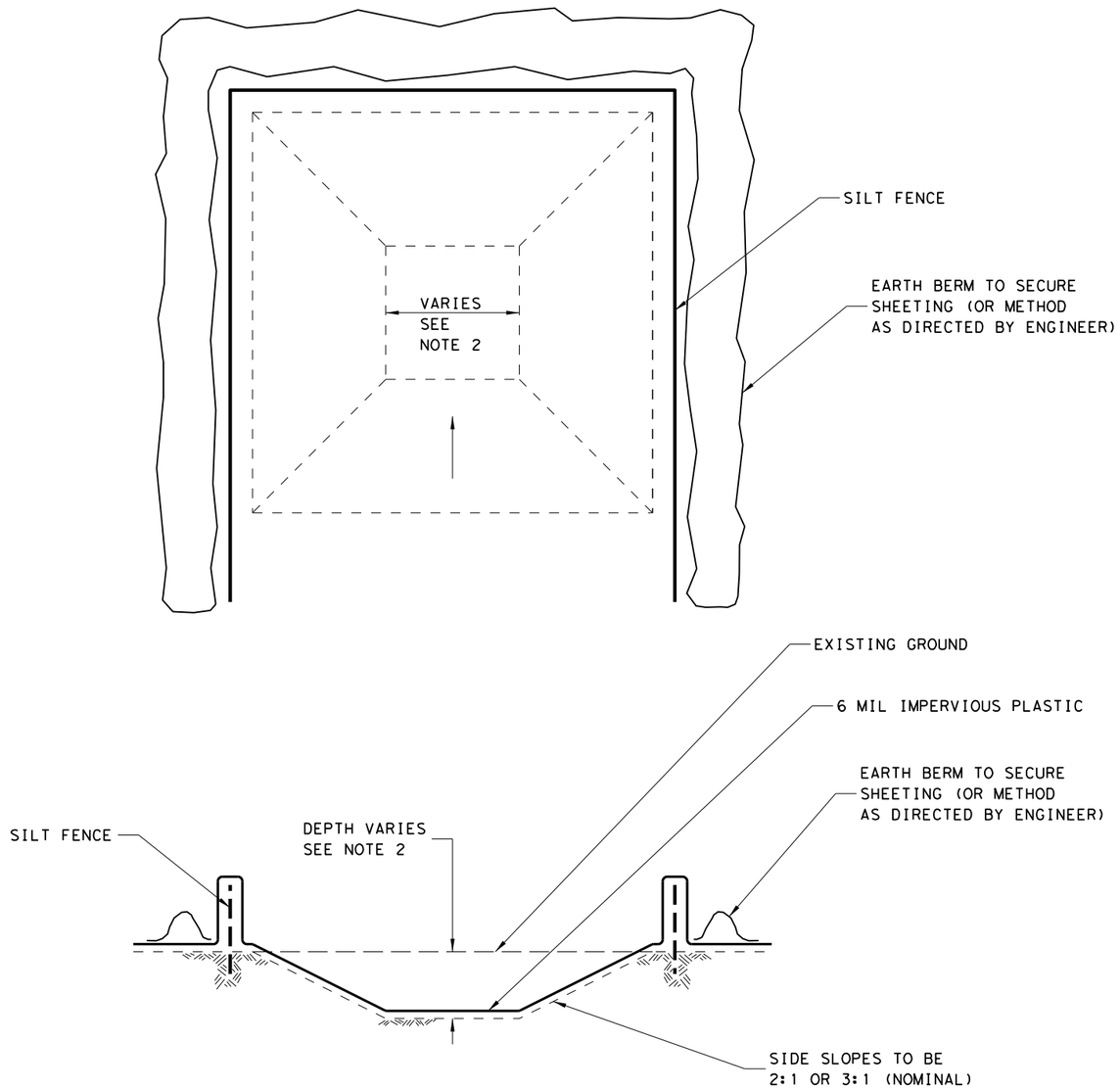
DRAWING DATE: 11/11/2019



CONCRETE WASHOUT AREA

NOT TO SCALE
(SEE NOTE 2)

NOTES

1. CONCRETE WASHOUT AREA(S) SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE. THE CONCRETE WASHOUT AREA SHALL BE ENTIRELY SELF-CONTAINED.

2. THE CONTRACTOR SHALL SUBMIT THE DESIGN, LOCATION AND SIZING OF OF THE CONCRETE WASHOUT AREA(S) WITH THE PROJECT'S EROSION AND SEDIMENTATION CONTROL PLAN AND SHALL BE APPROVED BY THE ENGINEER.

LOCATION: WASHOUT AREA(S) ARE TO BE LOCATED AT LEAST 50 FEET FROM ANY STREAM, WETLAND, STORM DRAINS, OR OTHER SENSITIVE RESOURCE. THE FLOOD CONTINGENCY PLAN MUST ADDRESS THE CONCRETE WASHOUT IF THE WASHOUT IS TO BE LOCATED WITHIN THE FLOODPLAN.

SIZE: THE WASHOUT MUST HAVE SUFFICIENT VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS INCLUDING, BUT NOT LIMITED TO, OPERATIONS ASSOCIATED WITH GROUT AND MORTAR.

3. SURFACE DISCHARGE IS UNACCEPTABLE, THERFORE EARTH BERM OR OTHER CONTROL MEASURES, AS APPROVED BY THE ENGINEER, SHOULD BE USED AROUND THE PERIMETER OF THE CONCRETE WASHOUT AREA FOR CONTAINMENT.

4. SIGNS SHOULD BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CONCRETE AREA(S) AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS. WASHOUT AREA(S) SHOULD BE FLAGGED WITH SAFETY FENCING OR OTHER APPROVED METHOD.

5. CONCRETE WASH-OUT AREAS SHALL BE LINED WITH IMPERVIOUS PLASTIC WITH A MINIMUM THICKNESS OF 6 MILS AND BE REPLACED IF DAMAGED DURING CLEAN-OUT OF HARDENED CONCRETE FROM THE WASH-OUT AREA.

6. WASHOUT AREA(S) ARE TO BE INSPECTED AT LEAST ONCE A WEEK FOR STRUCTURAL INTEGRITY, ADEQUATE HOLDING CAPACITY AND CHECKED FOR LEAKS, TEARS, OR OVERFLOWS. (AS DIRECTED BY THE CONSTRUCTION SITE ENVIRONMENTAL INSPECTION REPORT) WASHOUT AREA(S) SHOULD BE CHECKED AFTER HEAVY RAINS.

7. HARDENED CONCRETE WASTE SHOULD BE REMOVED AND DISPOSED OF WHEN THE WASTE HAS ACCUMULATED TO HALF OF THE CONCRETE WASHOUT'S HEIGHT. THE WASTE CAN BE STORED AT AN UPLAND LOCATION, AS APPROVED BY THE ENGINEER. ALL CONCRETE WASTE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH ALL APPLICABLE LAWS, REGULATIONS, AND GUIDELINES.

8. PAYMENT FOR THIS ITEM IS TO BE INCLUDED UNDER THE GENERAL COST OF THE WORK FOR THE PROJECT, INCLUDING SITE RESTORATION.

Civil Consulting Group, PLLC
FIRM NO. F-9356

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

12/14/2020

Trevor L. Castilla

MISCELLANEOUS DETAILS

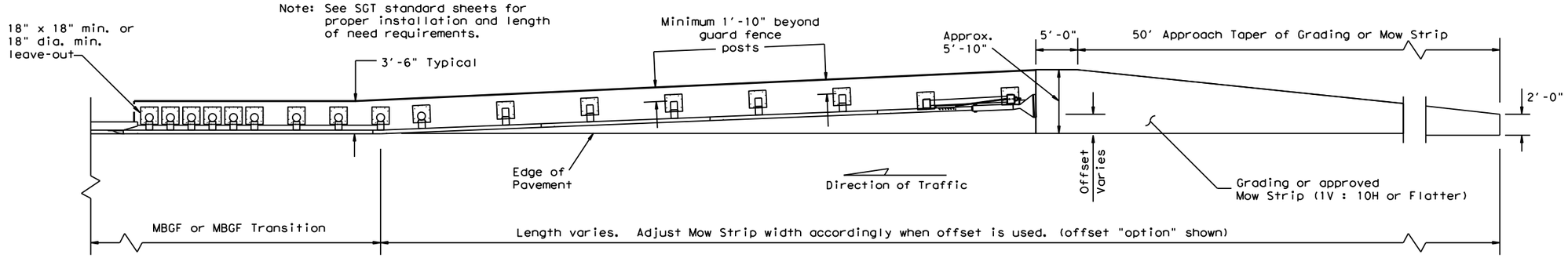
Texas Department of Transportation

SHEET OF

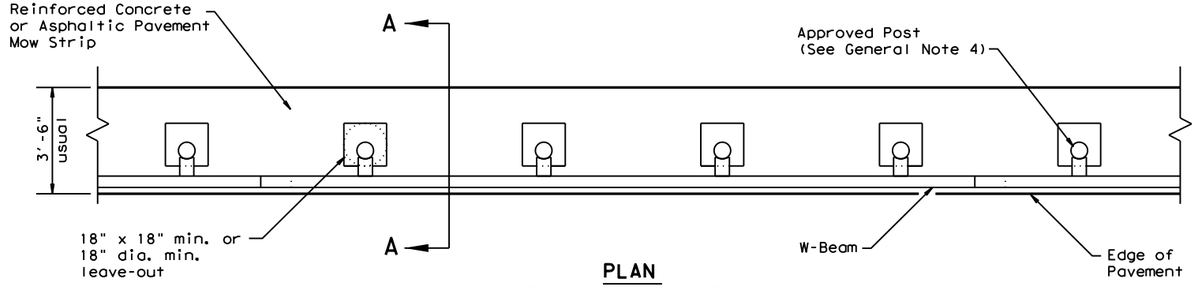
CONT	SECT	JOB	HIGHWAY
0910	12	134, Etc.	CR 2918, Etc.
DIST	COUNTY		SHEET NO.
TYL	VAN ZANDT		41A

DATE: $DATE$ $TIME$
FILE: $FILE$
DN: CK: DW: CK:

DATE:
FILE:

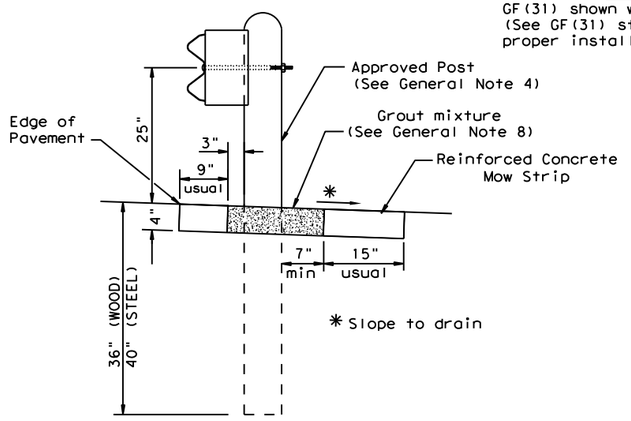


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



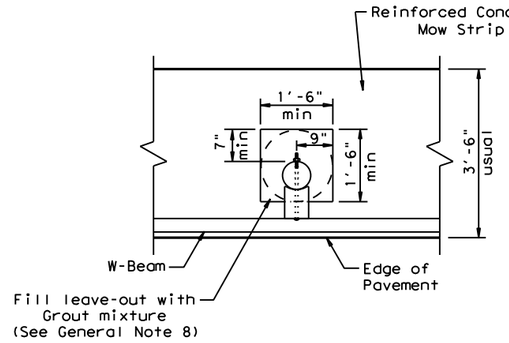
PLAN

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



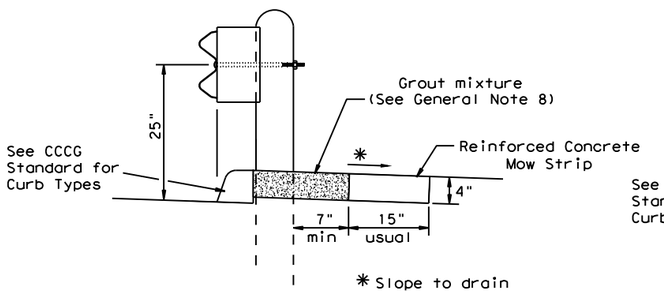
SECTION A-A

Typical



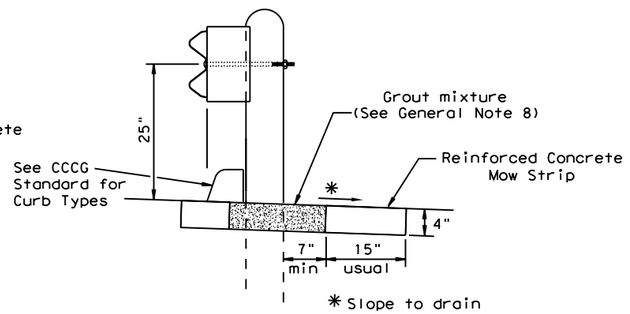
MOW STRIP DETAIL

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



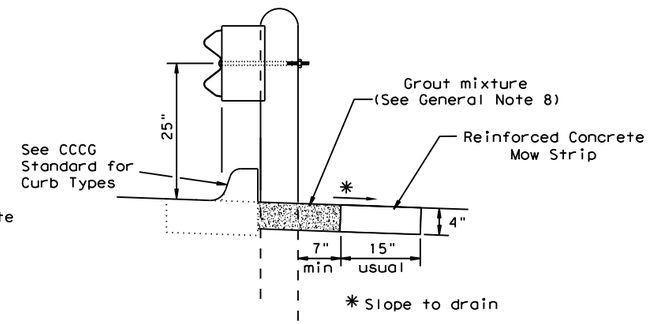
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation

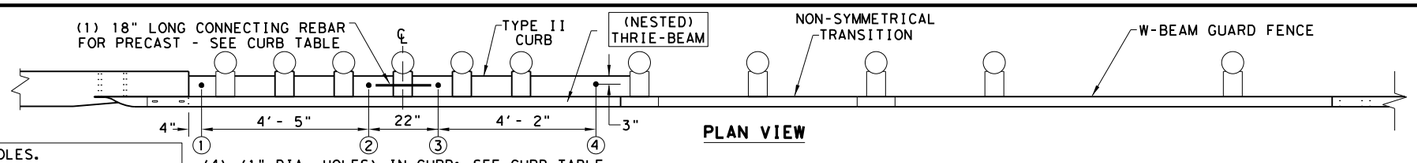
Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0910	12	134, Etc	CR 2918, Etc	
	DIST	COUNTY		SHEET NO.	
	TYL	Van Zandt		42	

DATE:
FILE:

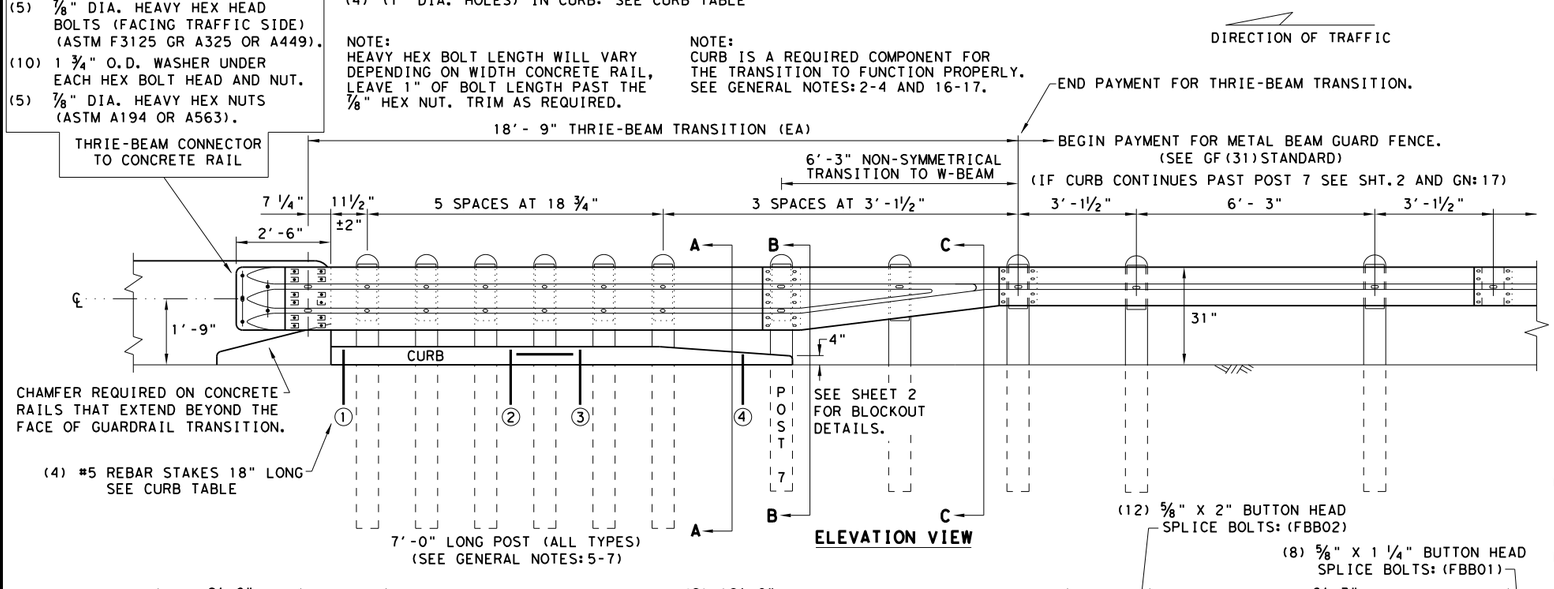


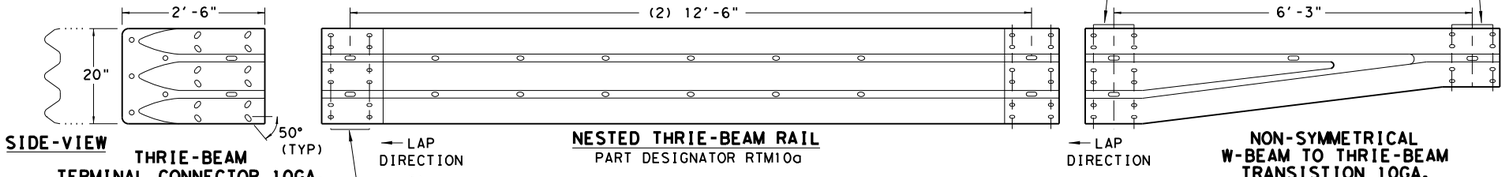
(5) 1" DIA. HOLES.
(5) ⅞" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
(10) 1 ¾" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
(5) ⅞" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE ⅞" HEX NUT. TRIM AS REQUIRED.

NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.

DIRECTION OF TRAFFIC

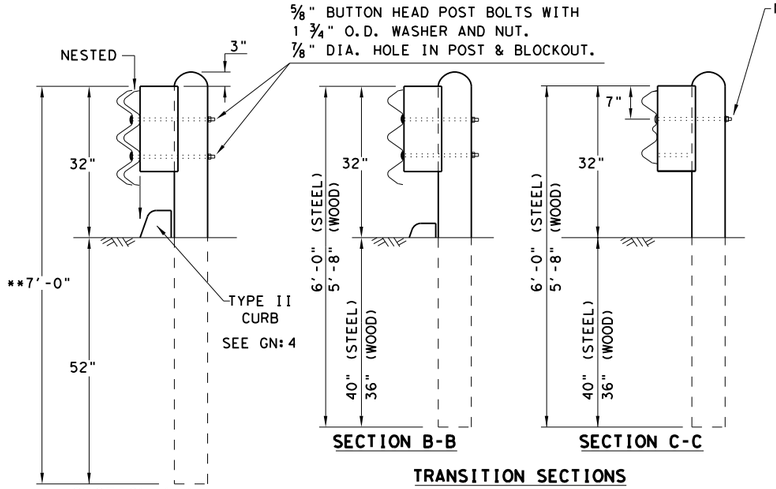




(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

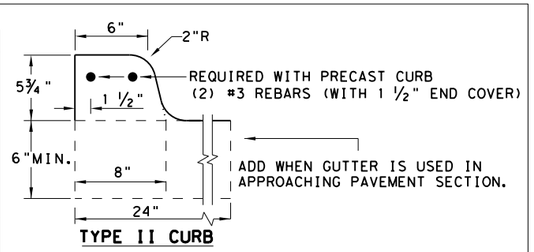
PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



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

THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



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

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

TYPE II CURB DETAILS

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0910	12	134, Etc	CR 2918. Etc	
	DIST	COUNTY		SHEET NO.	
	TYL	Van Zandt		43	

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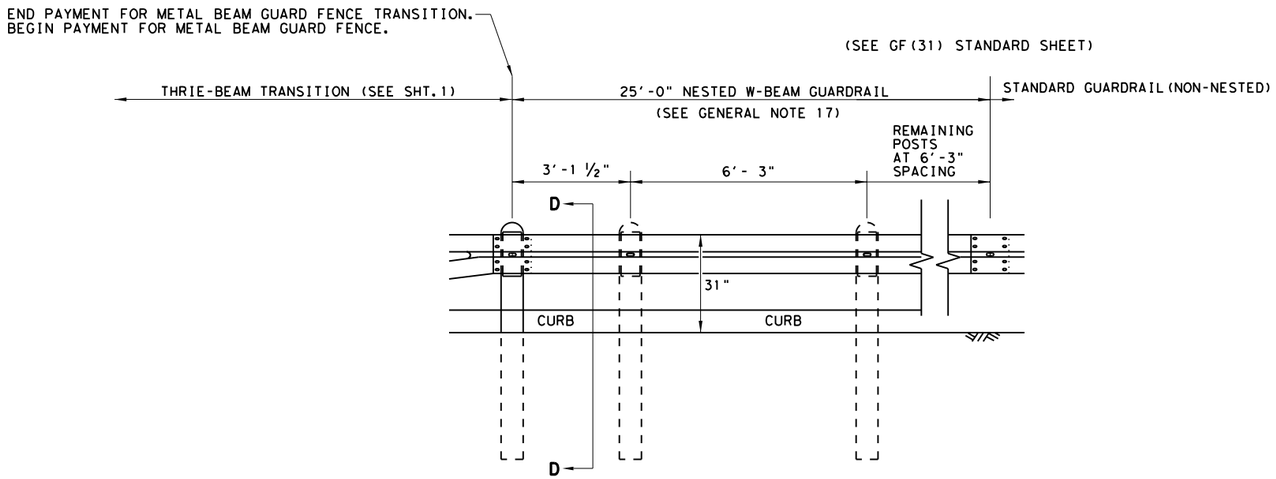
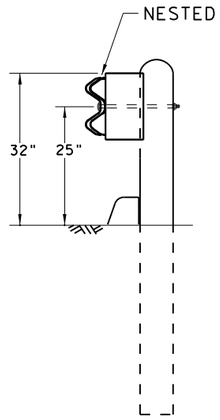
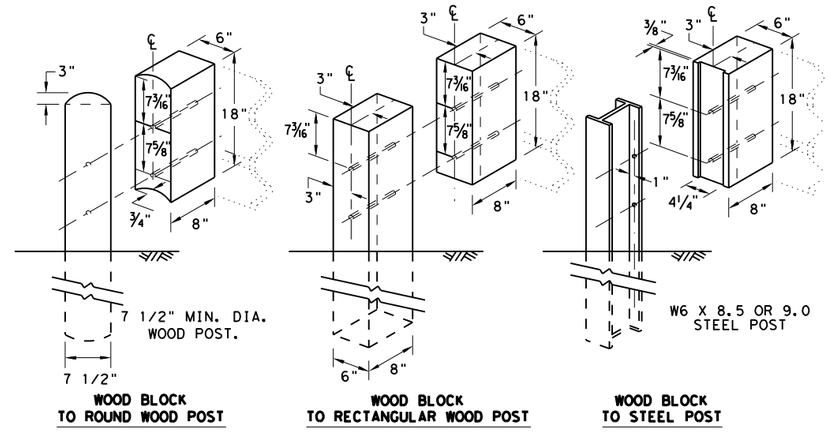
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0910	12	134, Etc	CR 2918, Etc	
	DIST	COUNTY		SHEET NO.	
	TYL	Van Zandt		43A	

DATE:
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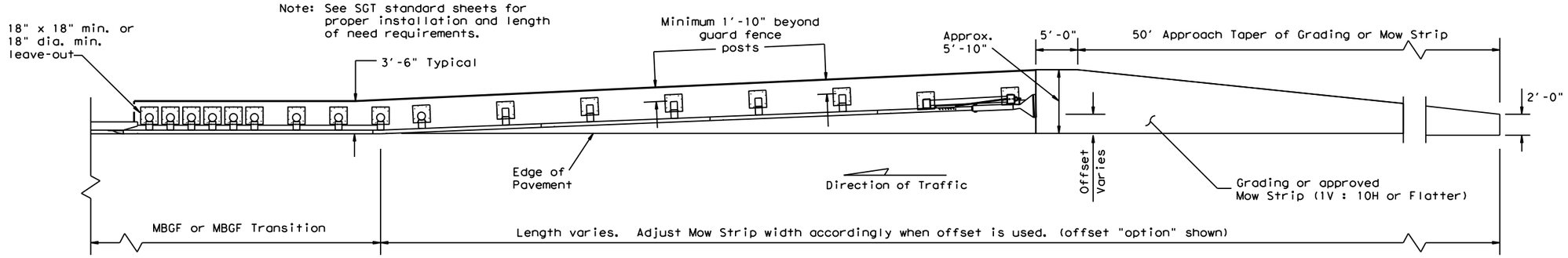
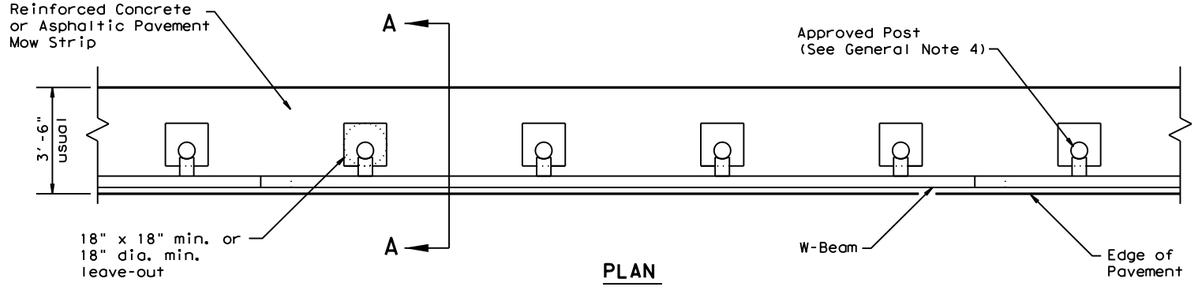
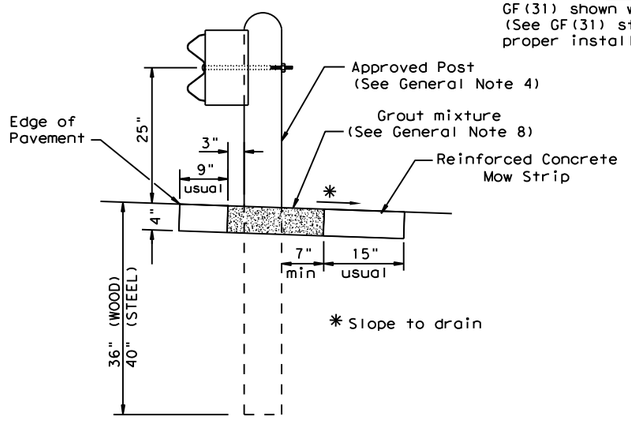


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



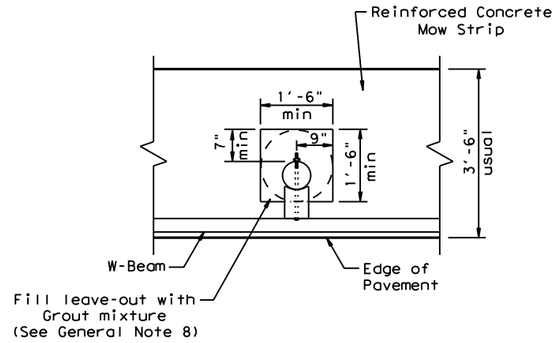
PLAN

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



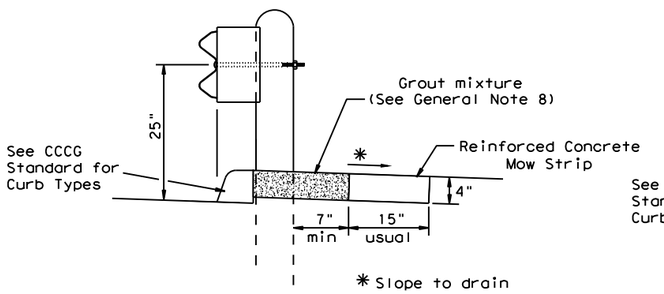
SECTION A-A

Typical



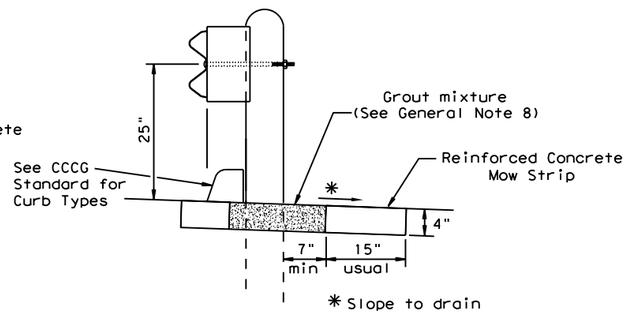
MOW STRIP DETAIL

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



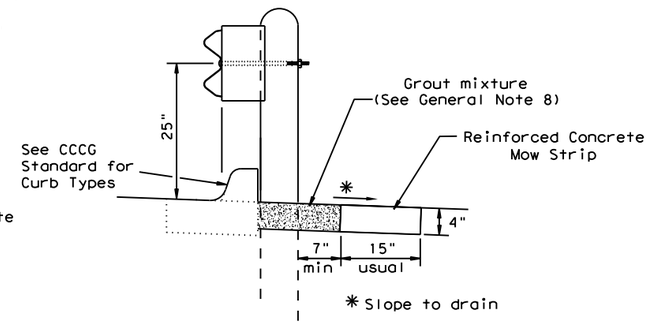
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

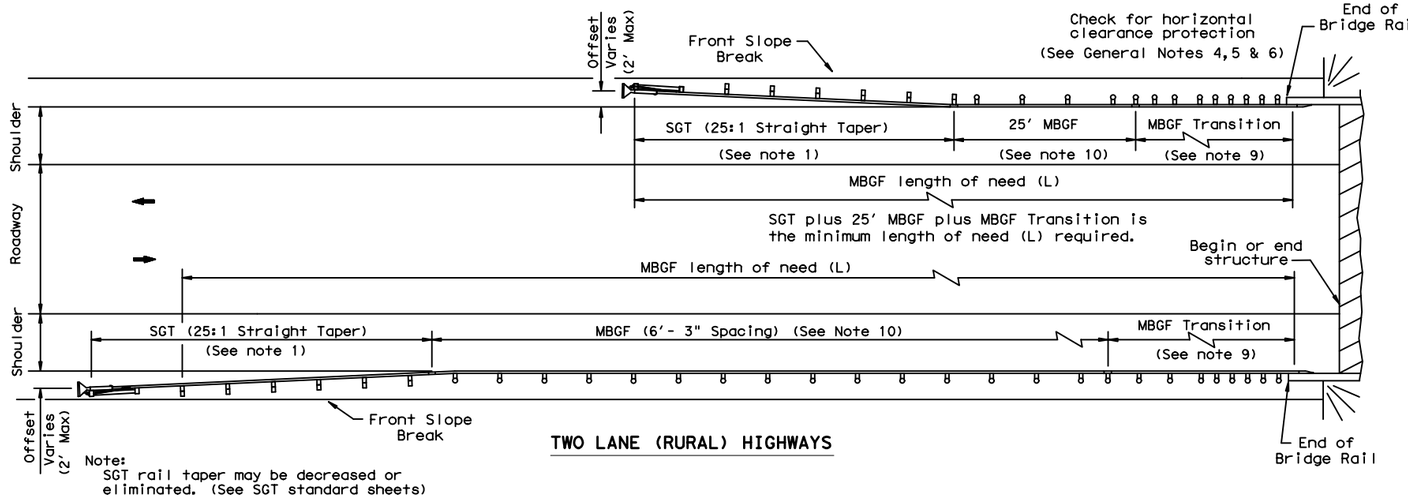
Texas Department of Transportation

Design Division Standard

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

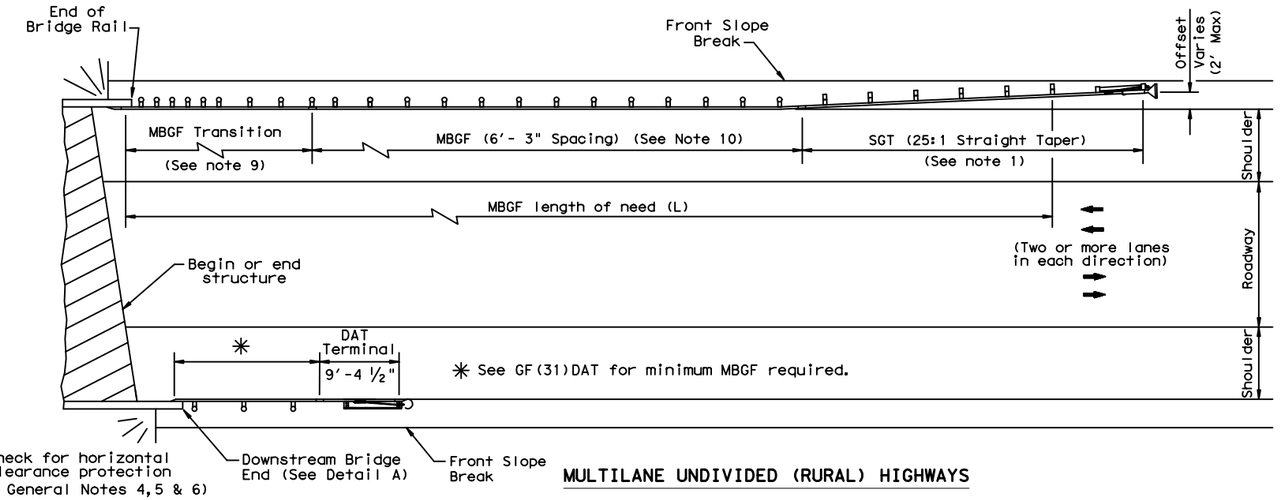
GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0910	12	134, Etc	CR 2918, Etc	
	DIST	COUNTY		SHEET NO.	
	TYL	Van Zandt		44	

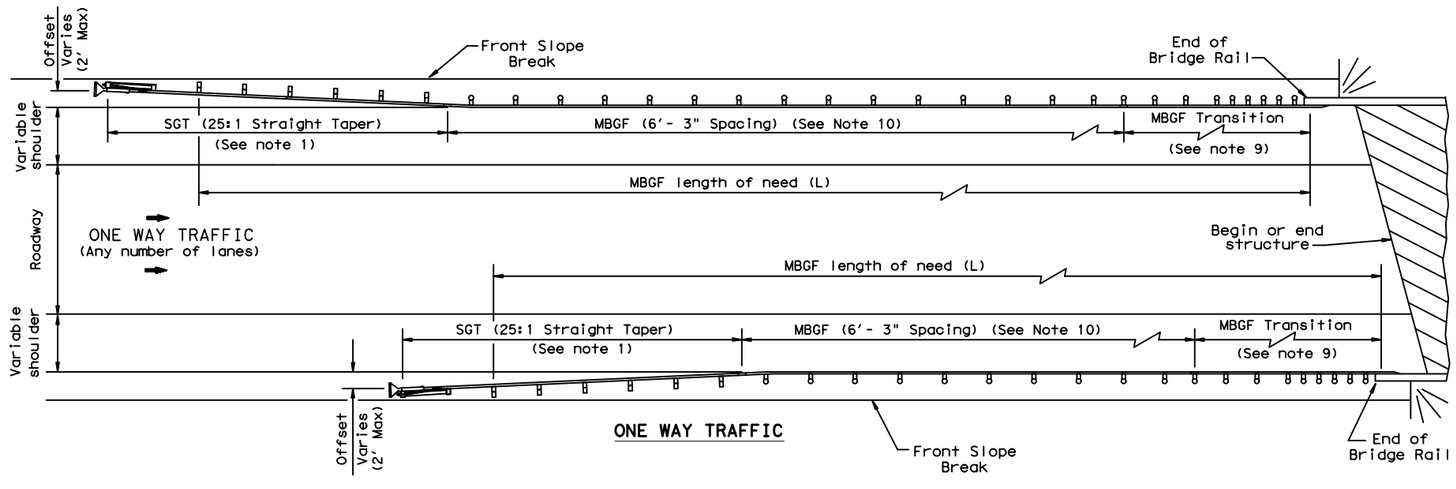


TWO LANE (RURAL) HIGHWAYS

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



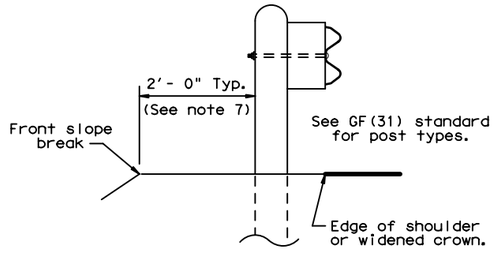
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



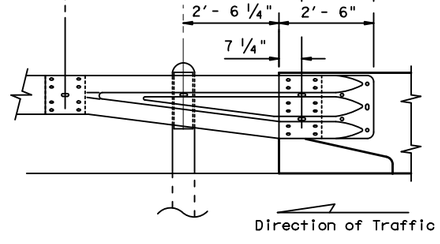
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		45

DATE: 11/11/2019 $TIME$
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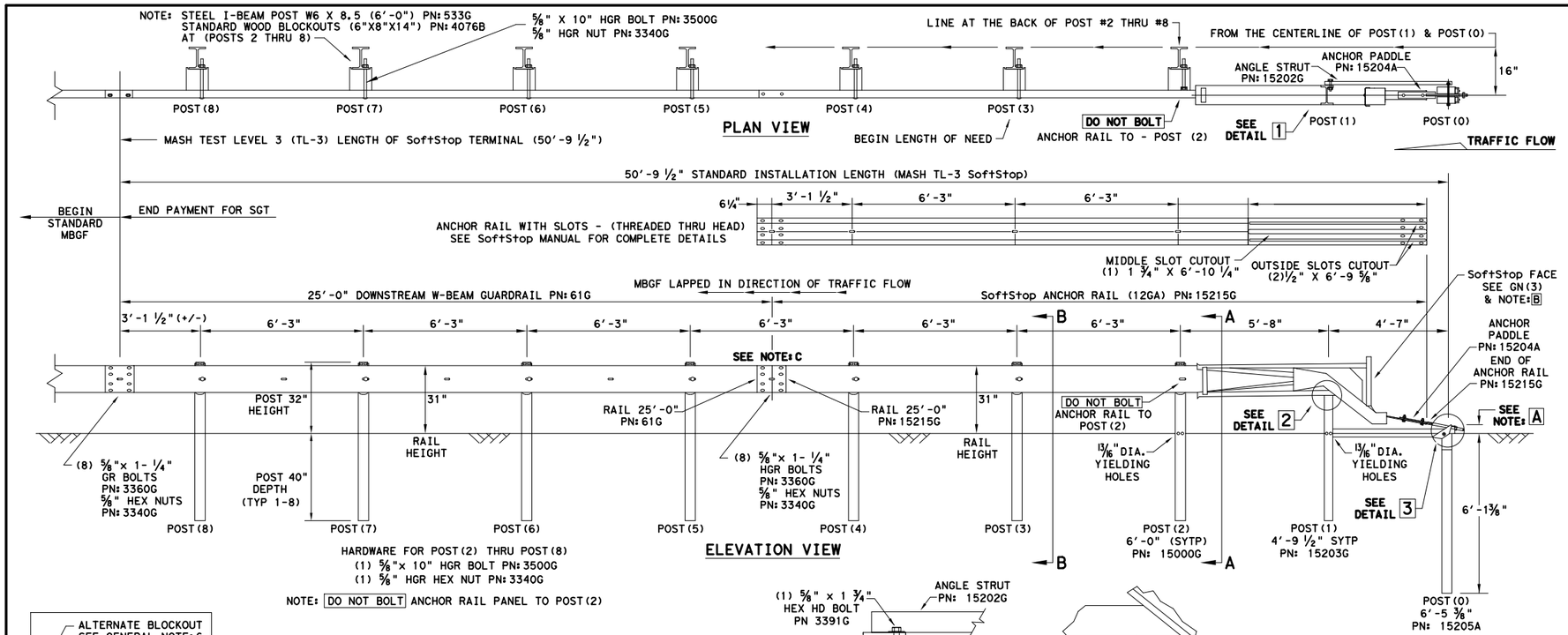

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR. DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR. DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR. DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP	
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0910	12	134, ETC	CR 2918, ETC	
	DIST	COUNTY		SHEET NO.	
	TYL	VAN ZANDT		46	

DATE: 11/11/2019
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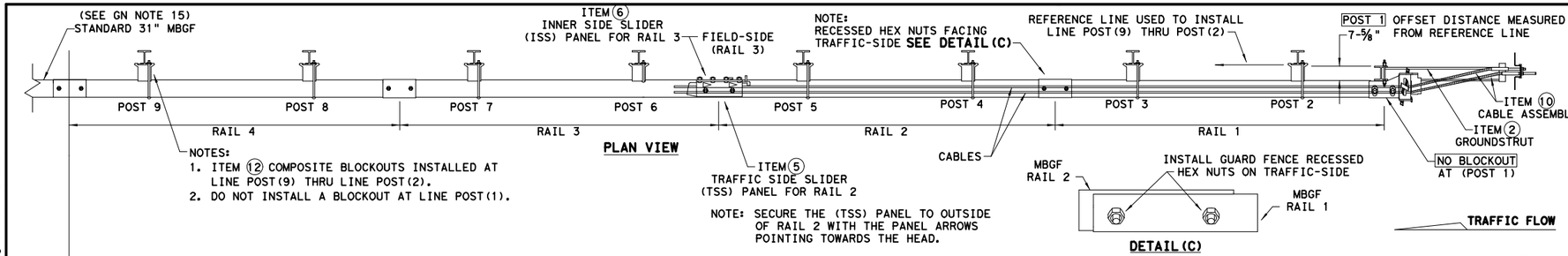
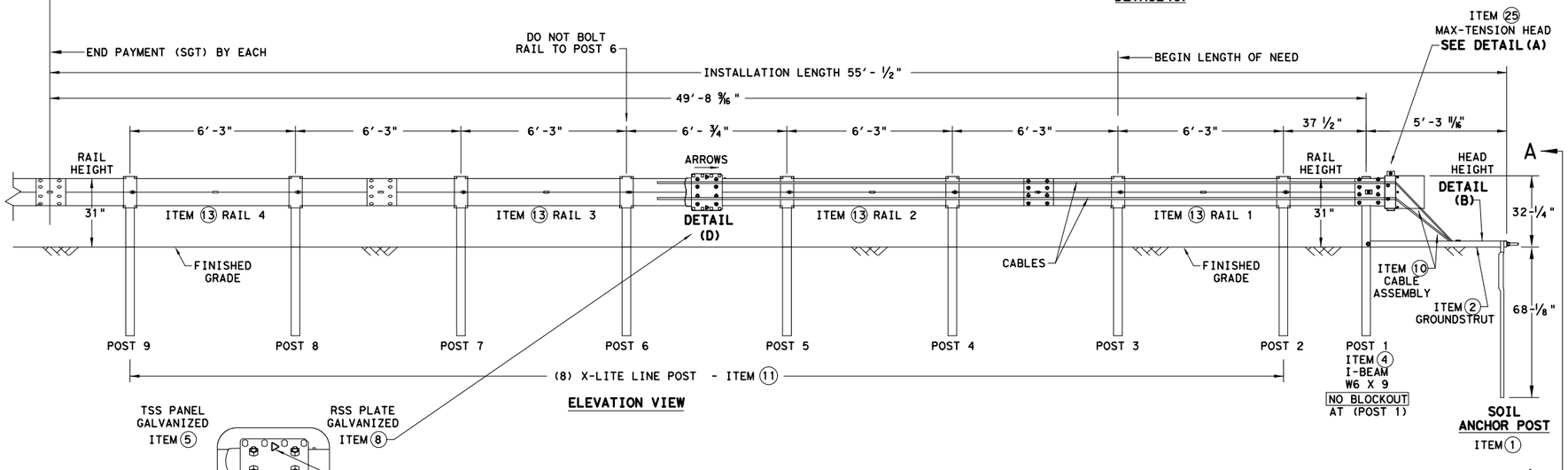
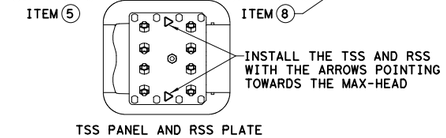
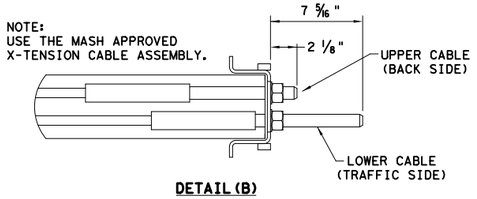




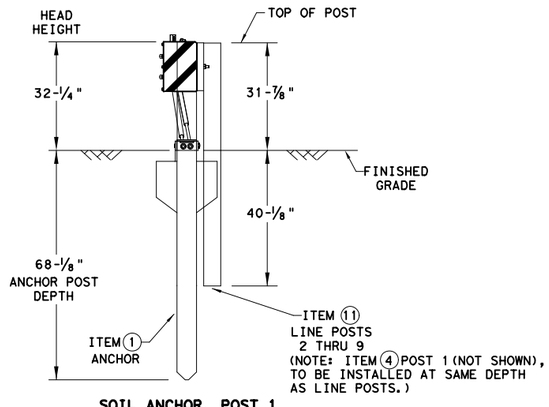


TSS PANEL AND RSS PLATE

DETAIL (D)

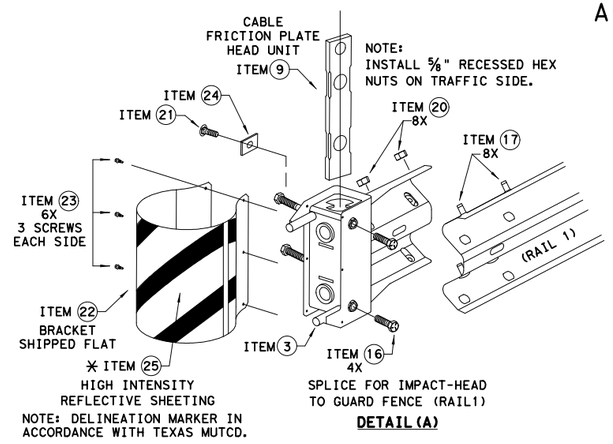


DETAIL (B)



SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9

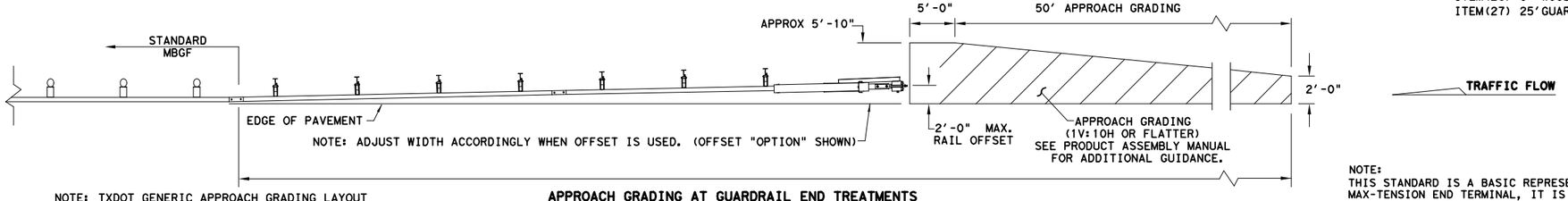
SECTION VIEW A-A



DETAIL (A)

✳ TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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



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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
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	TYL	VAN ZANDT		47

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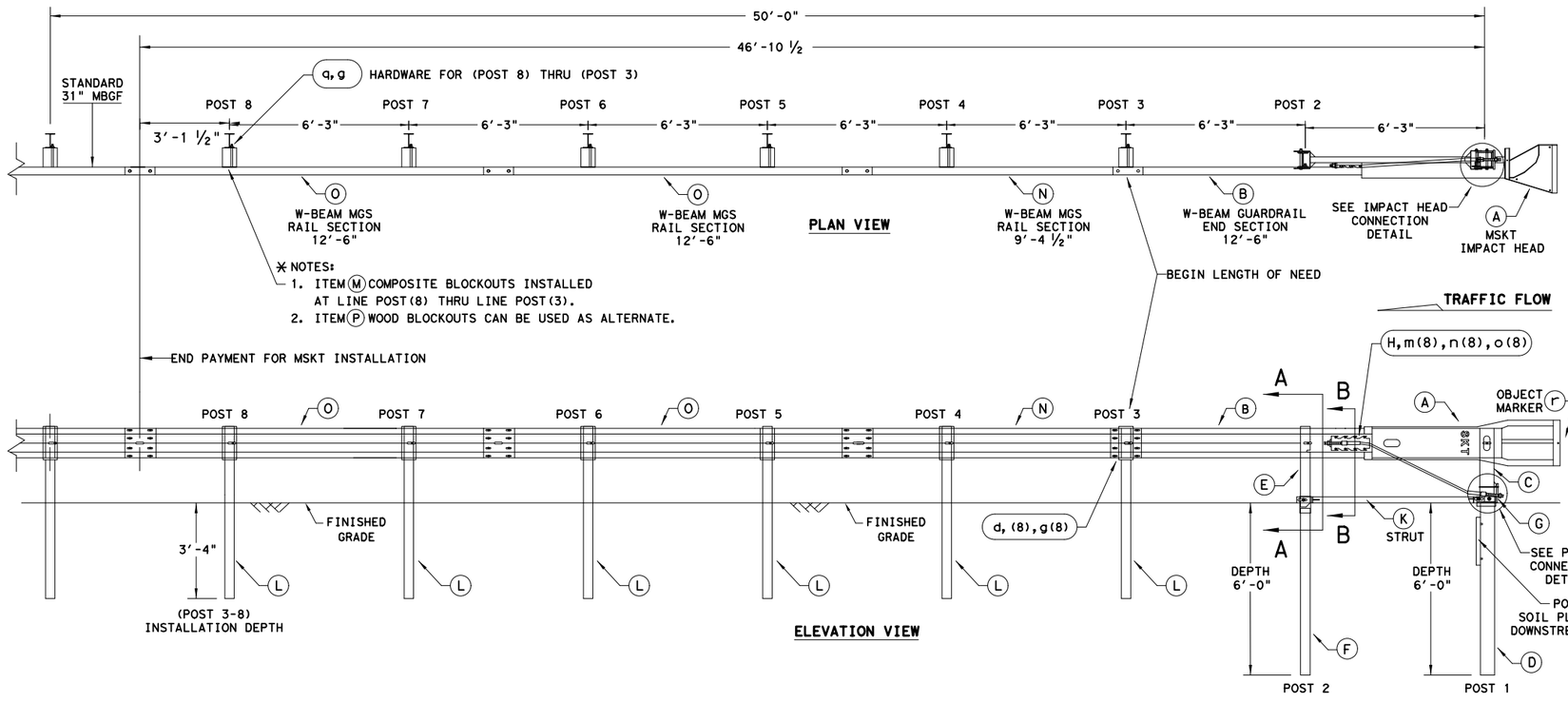
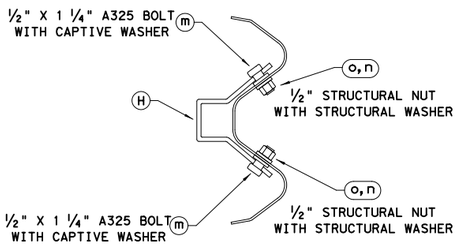
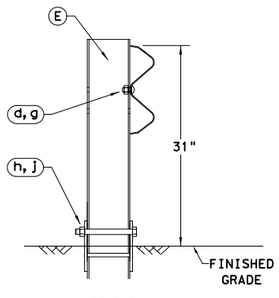
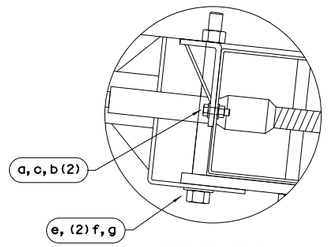
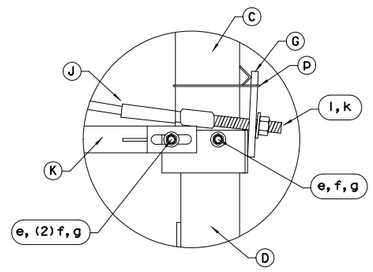


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









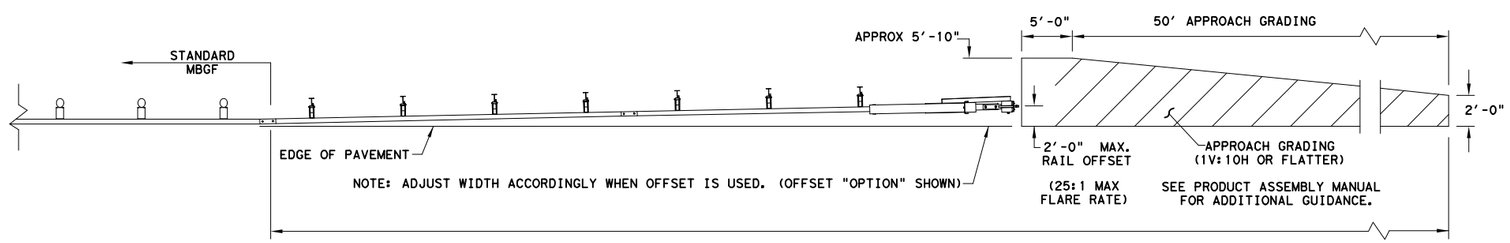
GENERAL NOTES

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

SEE NOTES: ✳

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

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



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

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	TYL	VAN ZANDT		48	

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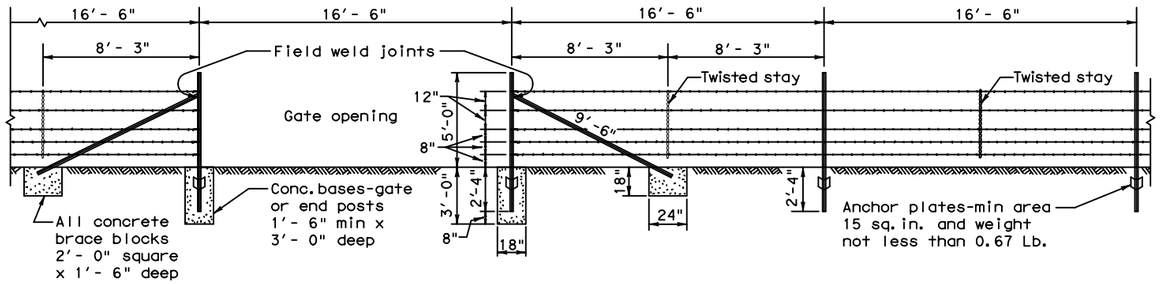
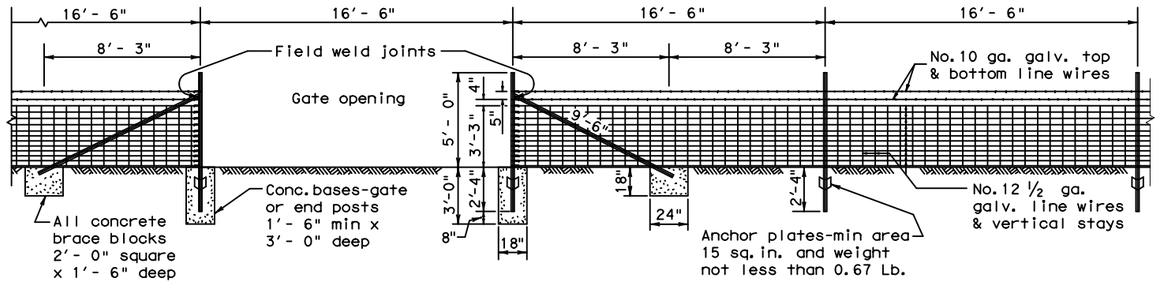
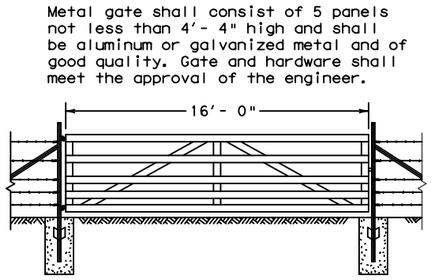


SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS
BRACING DETAIL USED AT ENDS AND GATES
TYPE "C" FENCE
(See General Note 8)

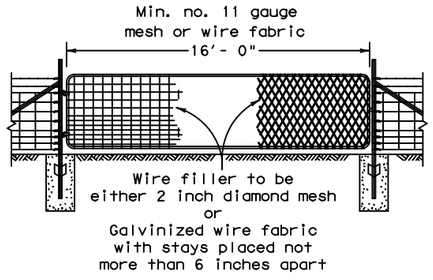


SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS
BRACING DETAIL USED AT ENDS AND GATES
TYPE "D" FENCE
(See General Note 8)

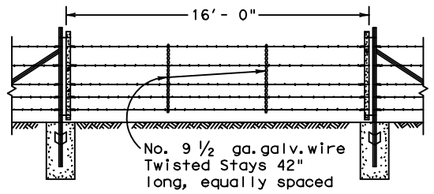
Note:
For Steel pipe and T-Post requirements. (See General Notes 6 & 7)



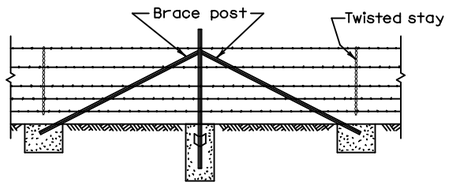
DETAIL TYPE 1 GATE



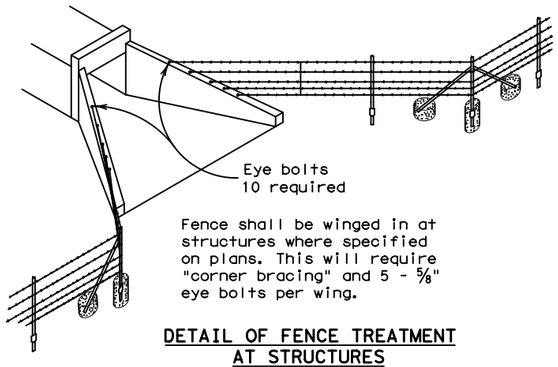
DETAIL TYPE 2 GATE



DETAIL TYPE 3 GATE

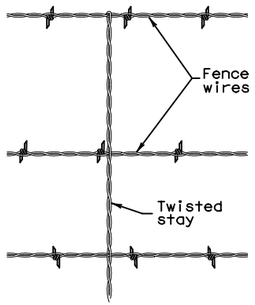


CORNER OR PULL POST ASSEMBLY

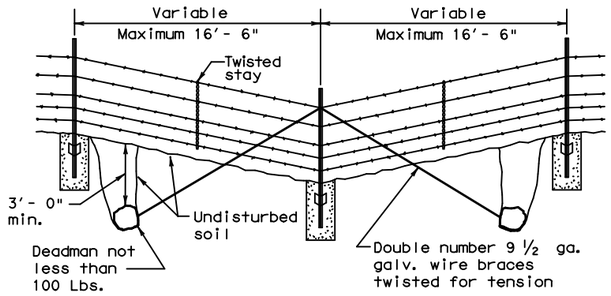


Fence shall be winged in at structures where specified on plans. This will require "corner bracing" and 5 - ⅝" eye bolts per wing.

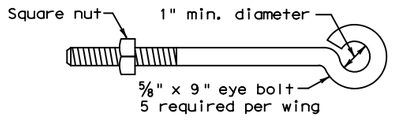
DETAIL OF FENCE TREATMENT AT STRUCTURES



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:
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	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		49

DATE: 11/11/2019
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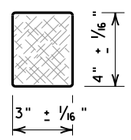
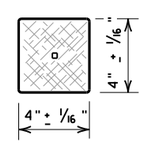
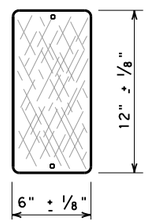
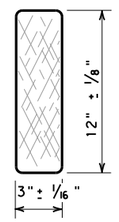
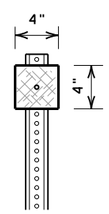
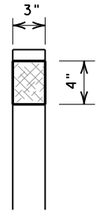
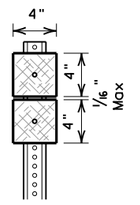
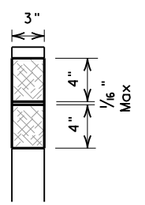
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

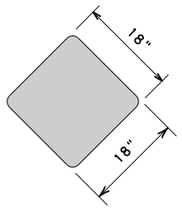
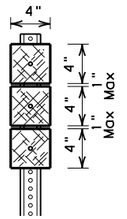
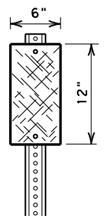
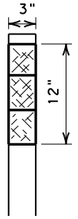
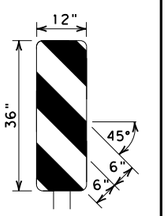
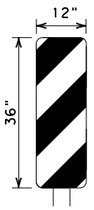
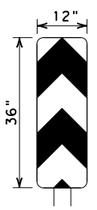
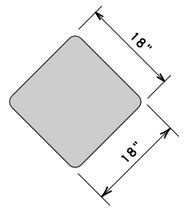
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

DIRECTION
If Required
BI = Bi-Directional

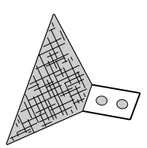
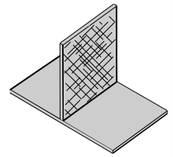
OBJECT MARKERS

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

BARRIER REFLECTORS (BRF)

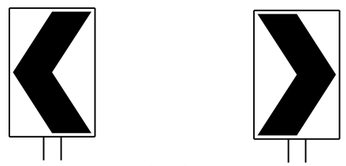
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING: Yellow, White, Red

NOTE: 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

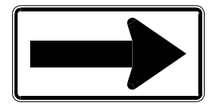
CHEVRONS

DEVICE:  W1-8

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

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

ONE DIRECTION LARGE ARROW

DEVICE:  W1-6

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

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, Etc	CR 2918, Etc
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	Van Zandt		50

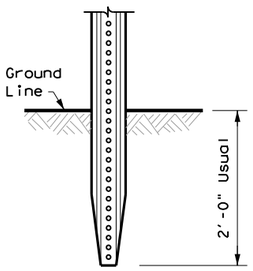
20A

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

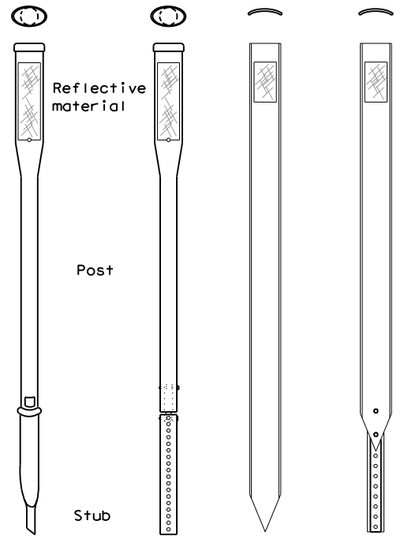


NOTES

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

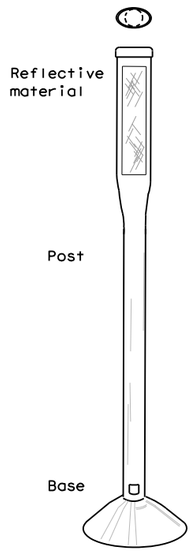
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



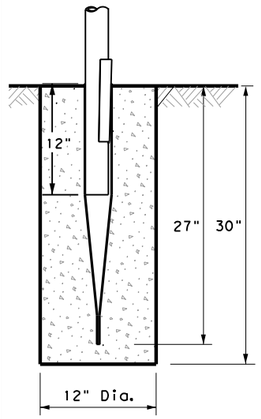
SURFACE MOUNT

NOTES

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

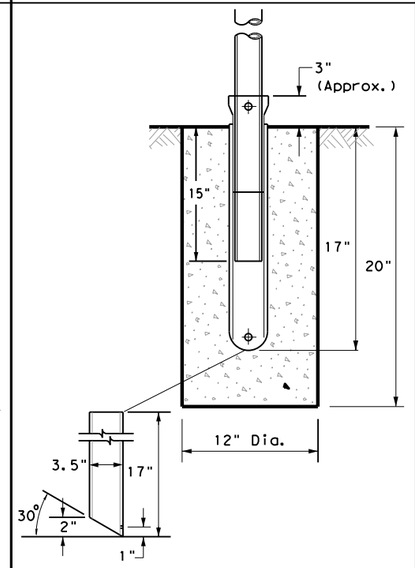
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

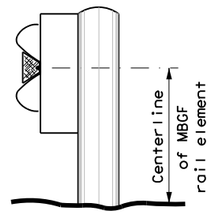
NOTE

1. Install per manufacturer's recommendations.

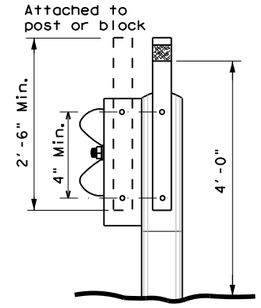
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

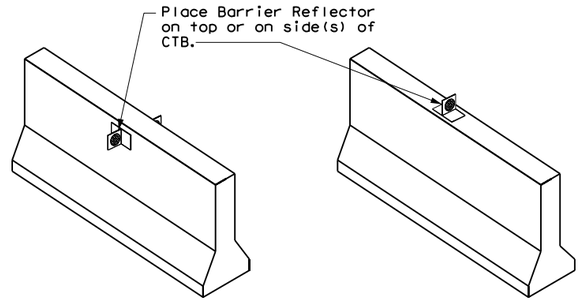
GF1



GF2



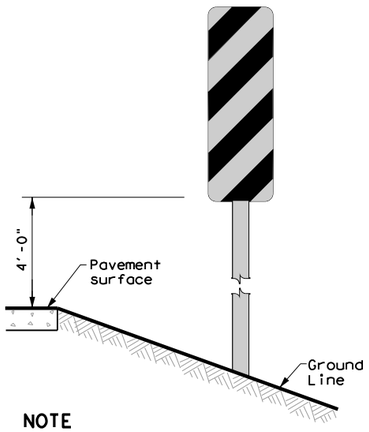
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

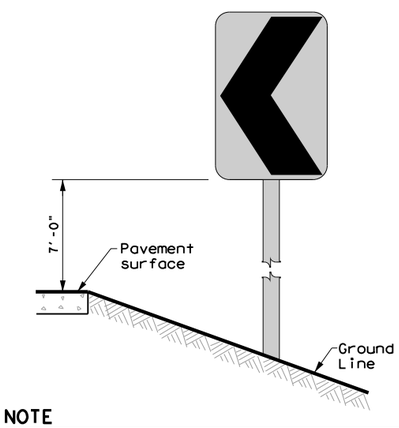
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

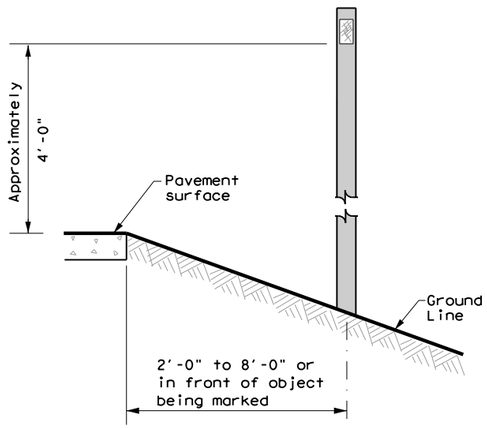
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, Etc	CR 2918, Etc
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	Van Zandt		51

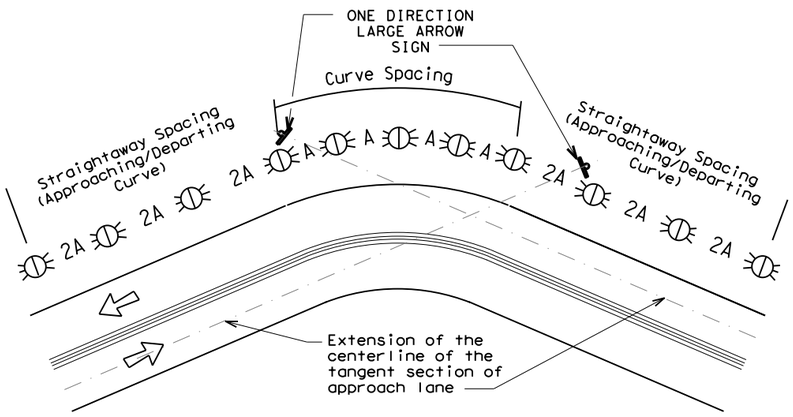
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

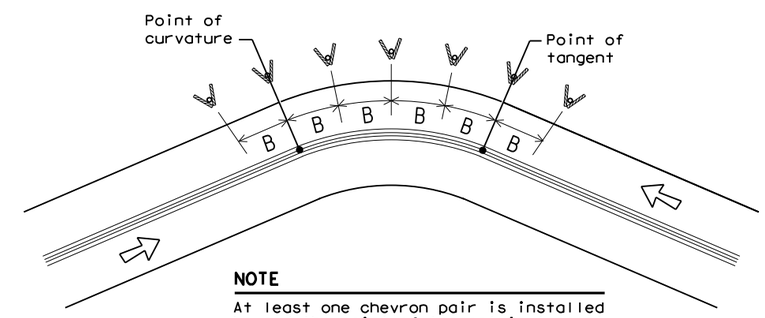
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

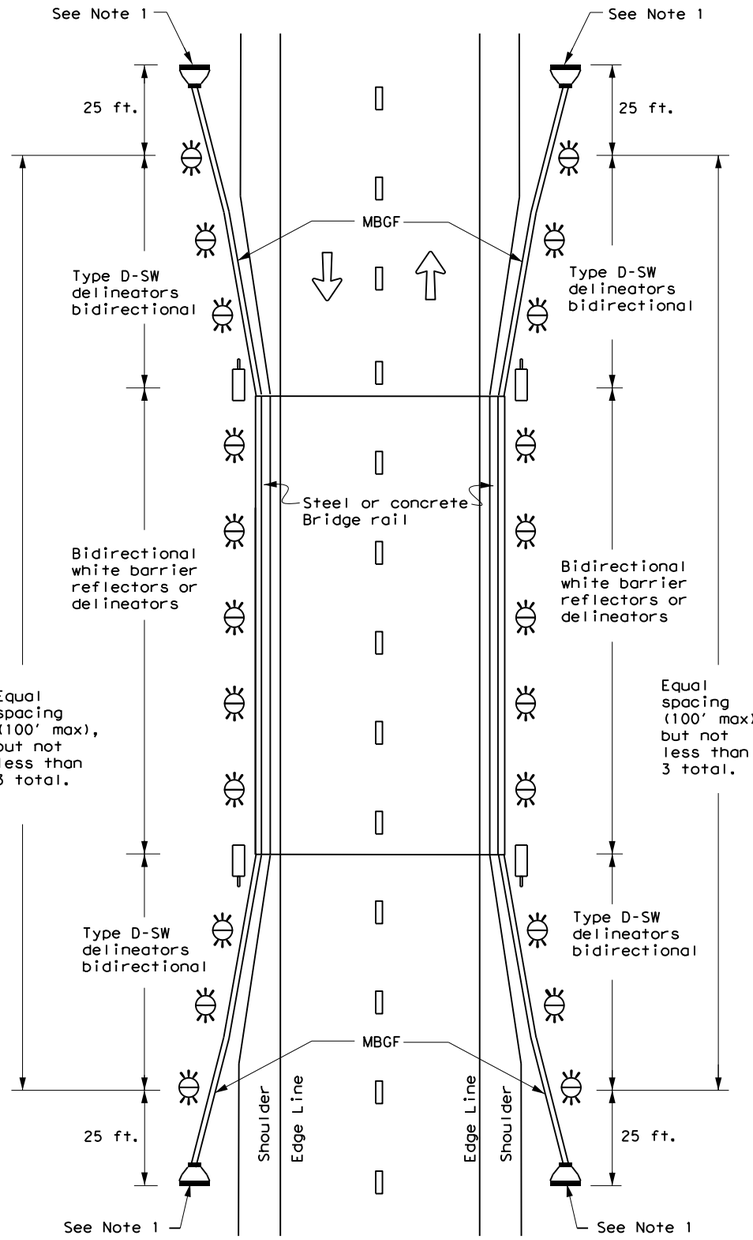
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, Etc	CR 2918, Etc
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	TYL	Van Zandt		52

20C

DATE:
FILE:

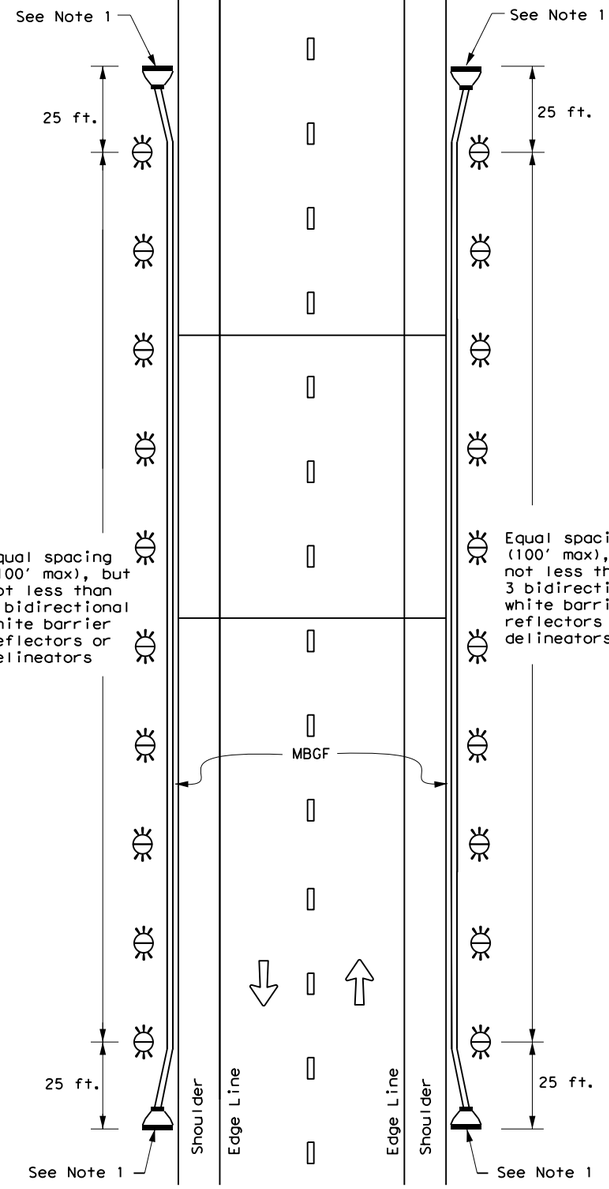
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

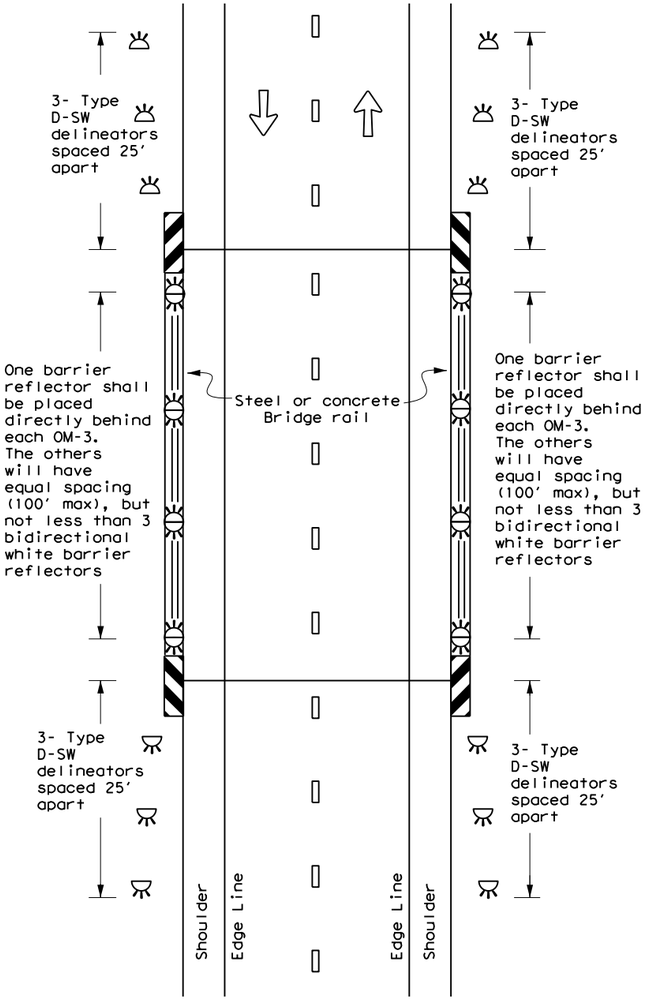
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

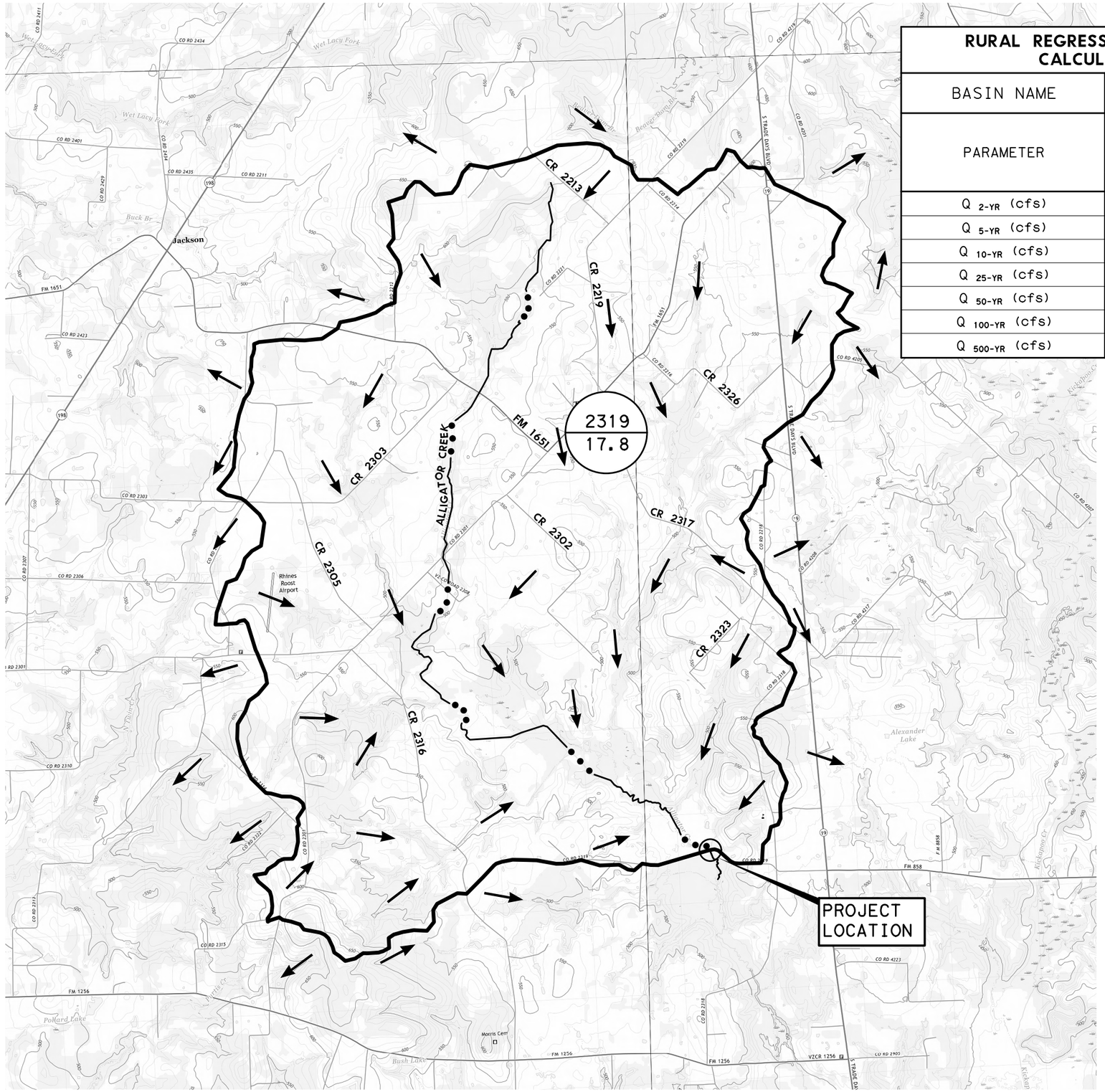
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, Etc	CR 2918, Etc
7-20	DIST	COUNTY		SHEET NO.
	TYL	Van Zandt		53

DATE:
FILE:

20E



RURAL REGRESSION EQUATION CALCULATIONS		
BASIN NAME	ALLIGATOR CREEK AT CR 2319	
PARAMETER	A (mi^2)	17.8
	S	0.0040
	P (in)	45
	Ω	-0.015
$Q_{2\text{-YR}}$ (cfs)	1460	
$Q_{5\text{-YR}}$ (cfs)	2992	
$Q_{10\text{-YR}}$ (cfs)	4107	
$Q_{25\text{-YR}}$ (cfs)	5937	
$Q_{50\text{-YR}}$ (cfs)	7535	
$Q_{100\text{-YR}}$ (cfs)	9425	
$Q_{500\text{-YR}}$ (cfs)	14779	

N

LEGEND

ID / XXX — DRAINAGE AREA SQUARE MILES

DRAINAGE AREA BOUNDARY

STREAM CENTERLINE

DIRECTION OF FLOW

TOPOGRAPHY SOURCE - USGS QUAD MAPS (SCALE 1:24000)

QUAD MAPS: PHALBA, MARTINS, CANTON, AND MYRTLE SPRINGS

NOTES:

1. THE 100 YEAR FLOODPLAIN ALONG ALLIGATOR CREEK IS ZONE A. THE CR 2319 CROSSING OF ALLIGATOR CREEK IS LOCATED IN A FEMA DESIGNATED ZONE A SPECIAL HAZARD FLOOD AREA IN VAN ZANDT COUNTY ON MAP NUMBER 48467C0425C, EFFECTIVE DECEMBER 17, 2010.

0′ 2000′ 4000′

SCALE: 1"=4000′

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

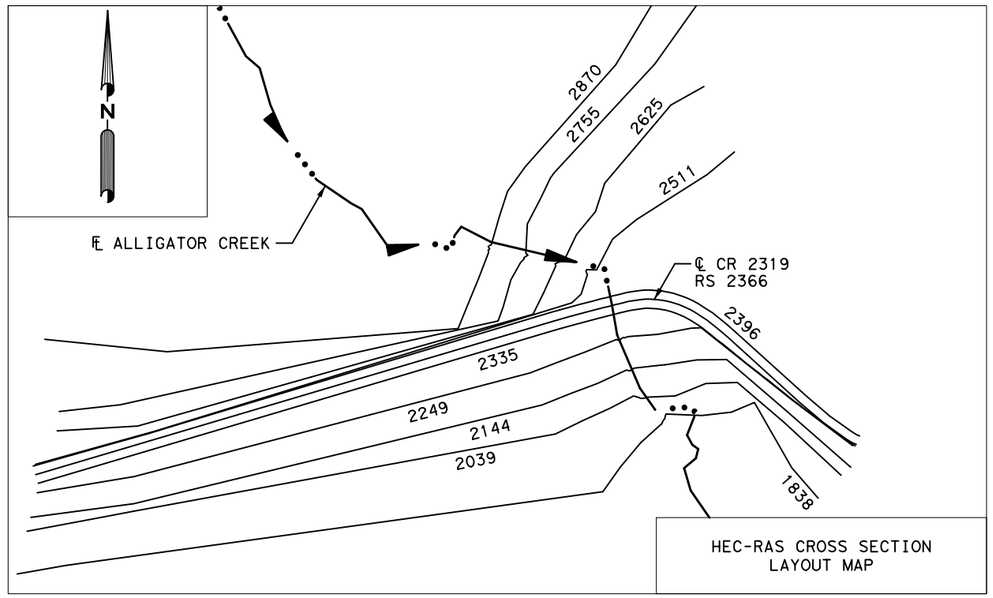
CR 2319 @ ALLIGATOR CREEK

DRAINAGE AREA MAP

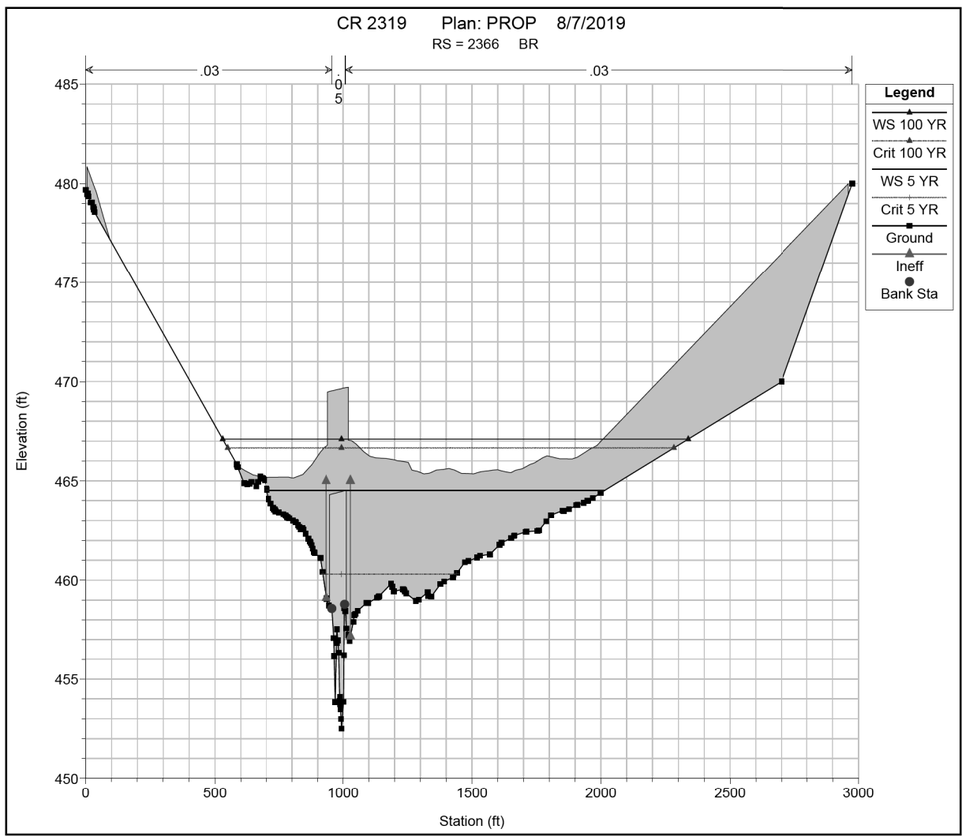
SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	BR 2019 (360), ETC.		CR 2918,ETC
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	54
CONTROL	SECTION	JOB	
0910	12	134,ETC	

DRAWING DATE: 11/11/2019 FILENAME: ...\2319*DMAP01.dgn



HEC-RAS CROSS SECTION LAYOUT MAP



Reach	River Sta	Profile	Plan	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)	
ALLIGATOR_CREEK	2870	5 YR	EXIST	2992.00	453.51	465.73		465.75	0.000088	1.11	3374.19	1150.65	0.07
ALLIGATOR_CREEK	2870	5 YR	PROP	2992.00	453.51	465.26		465.28	0.000139	1.34	2851.63	1056.10	0.08
ALLIGATOR_CREEK	2870	100 YR	EXIST	9425.00	453.51	467.17		467.22	0.000267	2.15	5233.01	1437.41	0.12
ALLIGATOR_CREEK	2870	100 YR	PROP	9425.00	453.51	467.16		467.22	0.000268	2.15	5225.29	1436.34	0.12
ALLIGATOR_CREEK	2755	5 YR	EXIST	2992.00	453.37	465.70	461.45	465.73	0.000177	1.31	2086.28	1252.33	0.09
ALLIGATOR_CREEK	2755	5 YR	PROP	2992.00	453.37	465.22	461.45	465.26	0.000244	1.46	1903.84	1134.41	0.11
ALLIGATOR_CREEK	2755	100 YR	EXIST	9425.00	453.37	467.15	463.32	467.19	0.000226	1.71	5846.81	1607.97	0.11
ALLIGATOR_CREEK	2755	100 YR	PROP	9425.00	453.37	467.15	463.29	467.19	0.000227	1.71	5838.03	1606.64	0.11
ALLIGATOR_CREEK	2625	5 YR	EXIST	2992.00	451.97	465.65	461.51	465.70	0.000227	1.98	1675.52	1237.36	0.11
ALLIGATOR_CREEK	2625	5 YR	PROP	2992.00	451.97	465.16	461.50	465.22	0.000296	2.19	1562.85	1124.15	0.12
ALLIGATOR_CREEK	2625	100 YR	EXIST	9425.00	451.97	467.12	463.62	467.16	0.000213	2.10	5788.61	1563.89	0.11
ALLIGATOR_CREEK	2625	100 YR	PROP	9425.00	451.97	467.12	463.61	467.16	0.000214	2.11	5779.83	1562.65	0.11
ALLIGATOR_CREEK	2511	5 YR	EXIST	2992.00	451.90	465.56	459.01	465.65	0.000514	2.40	1266.65	1473.87	0.16
ALLIGATOR_CREEK	2511	5 YR	PROP	2992.00	451.90	465.06	459.02	465.16	0.000642	2.56	1203.27	1384.91	0.18
ALLIGATOR_CREEK	2511	100 YR	EXIST	9425.00	451.90	467.11	463.30	467.14	0.000126	1.36	7117.31	1692.46	0.08
ALLIGATOR_CREEK	2511	100 YR	PROP	9425.00	451.90	467.11	463.31	467.13	0.000126	1.36	7107.75	1691.68	0.08
ALLIGATOR_CREEK	2396	5 YR	EXIST	2992.00	452.50	465.60	460.06	465.60	0.000017	0.53	6052.43	1560.28	0.03
ALLIGATOR_CREEK	2396	5 YR	PROP	2992.00	452.50	465.10	459.95	465.10	0.000024	0.61	5288.14	1464.68	0.03
ALLIGATOR_CREEK	2396	100 YR	EXIST	9425.00	452.50	467.10	464.02	467.12	0.000064	1.13	8580.01	1809.15	0.06
ALLIGATOR_CREEK	2396	100 YR	PROP	9425.00	452.50	467.10	463.57	467.11	0.000064	1.14	8569.80	1808.19	0.06
ALLIGATOR_CREEK	2366			Bridge									
ALLIGATOR_CREEK	2335	5 YR	EXIST	2992.00	452.62	464.61	460.59	464.63	0.000210	1.75	4097.97	1409.98	0.11
ALLIGATOR_CREEK	2335	5 YR	PROP	2992.00	452.62	464.51	460.69	464.53	0.000231	1.82	3955.04	1399.56	0.11
ALLIGATOR_CREEK	2335	100 YR	EXIST	9425.00	452.62	465.72	464.46	465.79	0.000830	3.78	5719.53	1520.22	0.21
ALLIGATOR_CREEK	2335	100 YR	PROP	9425.00	452.62	465.72	464.46	465.79	0.000830	3.78	5719.53	1520.22	0.21
ALLIGATOR_CREEK	2249	5 YR	EXIST	2992.00	450.98	463.74	461.95	464.39	0.004442	7.01	517.44	980.73	0.45
ALLIGATOR_CREEK	2249	5 YR	PROP	2992.00	450.98	463.70	462.01	464.30	0.004243	6.83	544.43	970.46	0.44
ALLIGATOR_CREEK	2249	100 YR	EXIST	9425.00	450.98	465.50	464.27	465.66	0.001964	5.36	3927.60	1317.25	0.31
ALLIGATOR_CREEK	2249	100 YR	PROP	9425.00	450.98	465.50	464.27	465.66	0.001964	5.36	3927.60	1317.25	0.31
ALLIGATOR_CREEK	2144	5 YR	EXIST	2992.00	451.49	463.29	462.30	463.88	0.004804	7.42	590.41	861.96	0.45
ALLIGATOR_CREEK	2144	5 YR	PROP	2992.00	451.49	463.27	462.29	463.81	0.004526	7.19	621.27	858.89	0.43
ALLIGATOR_CREEK	2144	100 YR	EXIST	9425.00	451.49	465.28	464.07	465.44	0.002228	5.81	3741.49	1246.62	0.32
ALLIGATOR_CREEK	2144	100 YR	PROP	9425.00	451.49	465.28	464.07	465.44	0.002228	5.81	3741.49	1246.62	0.32
ALLIGATOR_CREEK	2039	5 YR	EXIST	2992.00	451.58	462.93	461.72	463.40	0.003721	6.32	675.37	756.17	0.41
ALLIGATOR_CREEK	2039	5 YR	PROP	2992.00	451.58	462.93	461.73	463.36	0.003553	6.17	706.00	755.62	0.40
ALLIGATOR_CREEK	2039	100 YR	EXIST	9425.00	451.58	464.93	463.79	465.18	0.002813	6.45	3324.89	1180.15	0.37
ALLIGATOR_CREEK	2039	100 YR	PROP	9425.00	451.58	464.93	463.79	465.18	0.002813	6.45	3324.89	1180.15	0.37
ALLIGATOR_CREEK	1838	5 YR	EXIST	2992.00	451.31	462.27	461.97	462.71	0.004001	6.64	1021.93	739.38	0.42
ALLIGATOR_CREEK	1838	5 YR	PROP	2992.00	451.31	462.27	461.97	462.71	0.004001	6.64	1021.93	739.38	0.42
ALLIGATOR_CREEK	1838	100 YR	EXIST	9425.00	451.31	464.32	463.43	464.66	0.004002	7.76	3036.46	1224.44	0.44
ALLIGATOR_CREEK	1838	100 YR	PROP	9425.00	451.31	464.32	463.43	464.66	0.004002	7.76	3036.46	1224.44	0.44

NOTES:

1. PROPOSED BRIDGE IS LOCATED AT HEC-RAS STA 2366. UPSTREAM CROSS SECTION IS AT HEC-RAS STA 2396 & DOWNSTREAM CROSS SECTION IS AT HEC-RAS STA 2335.
2. PROPOSED BRIDGE WIDTH IS 26 FEET.
3. PROPOSED BRIDGE LENGTH IS 65 FEET.
4. THE EXISTING STRUCTURE CONVEYS THE 5-YEAR STORM FREQUENCY.
5. TAILWATER CALCULATED FROM HEC-RAS MODEL USING NORMAL DEPTH AT A SLOPE OF 0.004 FT/FT.

HYDRAULIC METHOD:

WATER SURFACE ELEVATIONS, COMPUTED USING A HEC-RAS (V.5.0.3) MODEL, WERE CREATED FOR ALLIGATOR CREEK, FILE: "CR 2319.PRJ". THIS PROJECT HEC-RAS MODEL WAS DEVELOPED USING USGS TOPOGRAPHY, AERIALS, FIELD INVESTIGATION, AND PROPOSED BRIDGE LAYOUT.

EXISTING CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "EXIST".

PROPOSED CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "PROP".

HYDROLOGIC METHOD:

FLOWS WERE COMPUTED USING OMEGA EM REGRESSION EQUATIONS FOR TEXAS. ANNUAL PRECIPITATION OF 45 INCHES AND OMEGA EM (Ω) OF -0.015 FOR VAN ZANDT COUNTY WAS USED.

H&H DATA WAS SUBMITTED TO THE LOCAL FLOODPLAIN ADMINISTRATOR, SUSAN STRICKLAND ON AUGUST 30, 2019.

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

HYDRAULIC DATA SHEET

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	BR 2019 (360), ETC.		CR 2918,ETC
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	55
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\2319*H&H01.dgn
DRAWING DATE: 11/11/2019

SCOUR ANALYSIS - 25-YR (DESIGN)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

SCOUR ANALYSIS - 50 YR (CHECK)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

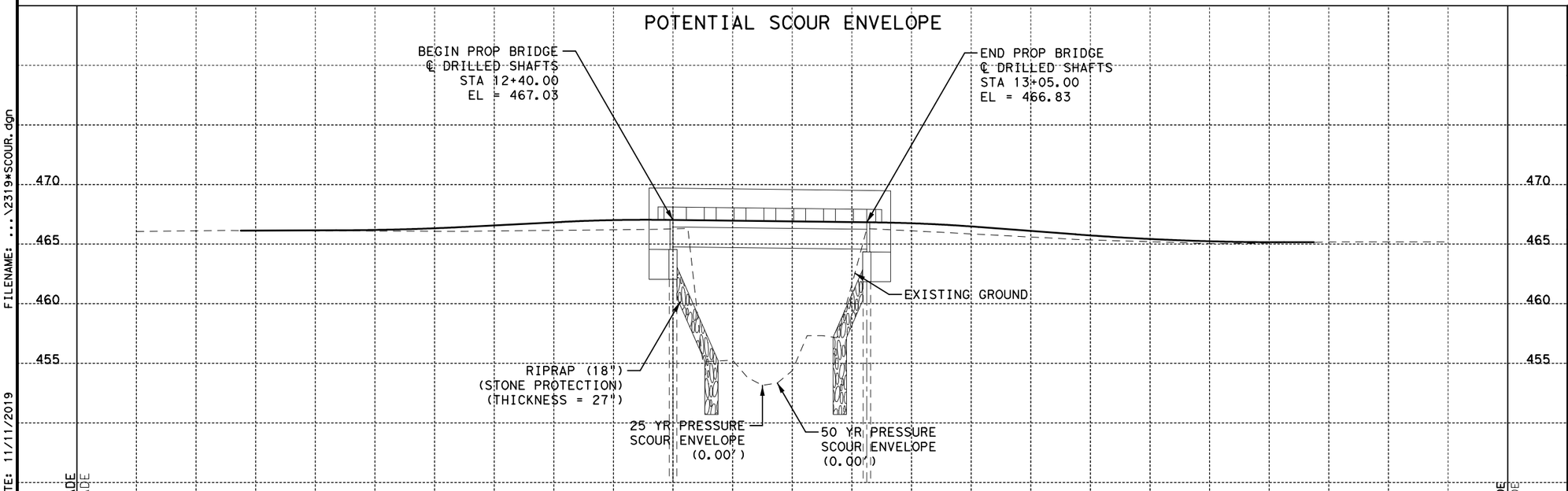
PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

NOTES:

1. THERE IS NO EVIDENCE OF SCOUR FOR THE EXIST BRIDGE.
2. ABUTMENTS TO BE PROTECTED WITH ROCK RIPRAP. ABUTMENT SCOUR ANALYSIS IS NOT REQUIRED PER TXDOT GEOTECHNICAL MANUAL.
3. VAN ZANDT COUNTY MAINTENANCE SHOULD REGULARLY INSPECT THE STONE RIPRAP PROTECTION TO ENSURE SLOPE STABILITY.



0′ 20′ 40′
SCALE: 1"=40′ H
1"=10′ V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
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MCKINNEY, TEXAS 75069
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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

CR 2319 @ ALLIGATOR CREEK

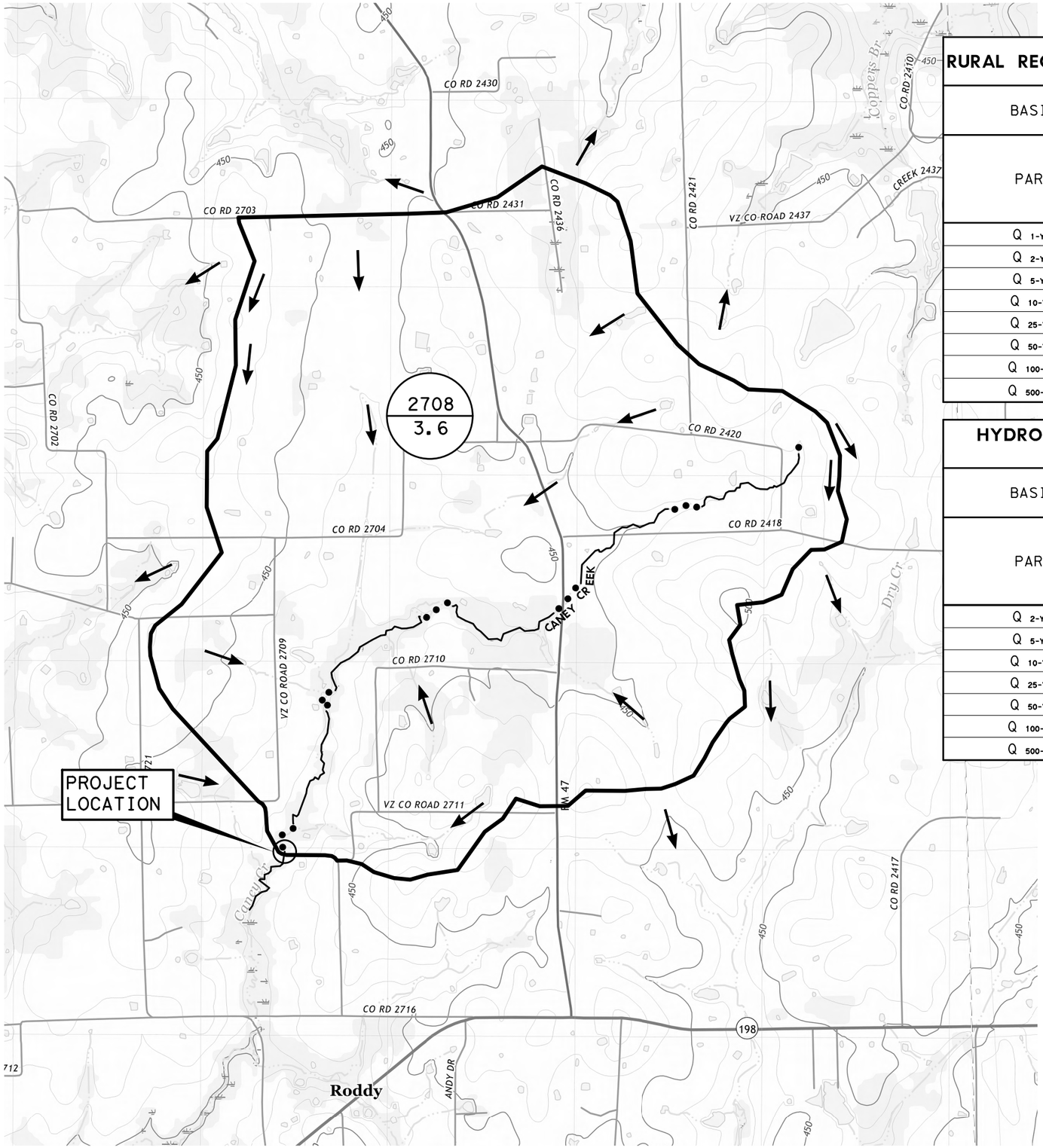
SCOUR PROFILE

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	56
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2319*SCOUR.dgn
DRAWING DATE: 11/11/2019



RURAL REGRESSION EQUATION CALCULATIONS

BASIN NAME	CANEY CREEK AT CR 2708	
PARAMETER	A (mi^2)	3.6
	S	0.0113
	P (in)	45
	Ω	-0.015
$Q_{1\text{-YR}}$ (cfs)	550	
$Q_{2\text{-YR}}$ (cfs)	671	
$Q_{5\text{-YR}}$ (cfs)	1385	
$Q_{10\text{-YR}}$ (cfs)	1887	
$Q_{25\text{-YR}}$ (cfs)	2709	
$Q_{50\text{-YR}}$ (cfs)	3425	
$Q_{100\text{-YR}}$ (cfs)	4285	
$Q_{500\text{-YR}}$ (cfs)	6720	

HYDROGRAPH METHOD CALCULATIONS (CHECK METHOD)

BASIN NAME	CANEY CREEK AT CR 2708	
PARAMETER	A (mi^2)	3.6
	Tc (hr)	2.33
	CN	79
	t_L (min)	84
$Q_{2\text{-YR}}$ (cfs)	1319	
$Q_{5\text{-YR}}$ (cfs)	1917	
$Q_{10\text{-YR}}$ (cfs)	2480	
$Q_{25\text{-YR}}$ (cfs)	3321	
$Q_{50\text{-YR}}$ (cfs)	4029	
$Q_{100\text{-YR}}$ (cfs)	4823	
$Q_{500\text{-YR}}$ (cfs)	6808	

N

LEGEND

ID / XXX — DRAINAGE AREA SQUARE MILES

DRAINAGE AREA BOUNDRY

STREAM CENTERLINE

DIRECTION OF FLOW

TOPOGRAPHY SOURCE - USGS QUAD MAPS (SCALE 1:24000)

QUAD MAPS: PRAIRIEVILLE, CEDARVALE, MYRTLE SPRINGS, AND PHALBA

NOTES:

1. THE 100 YEAR FLOODPLAIN ALONG CANEY CREEK IS ZONE A. THE CR 2708 CROSSING OF CANEY CREEK IS LOCATED IN A FEMA DESIGNATED ZONE A SPECIAL HAZARD FLOOD AREA IN VAN ZANDT COUNTY ON MAP NUMBER 48467C0375C, EFFECTIVE DECEMBER 17, 2010.

0' 1000' 2000'

SCALE: 1"=2000'

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
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TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2708 @ CANEY CREEK

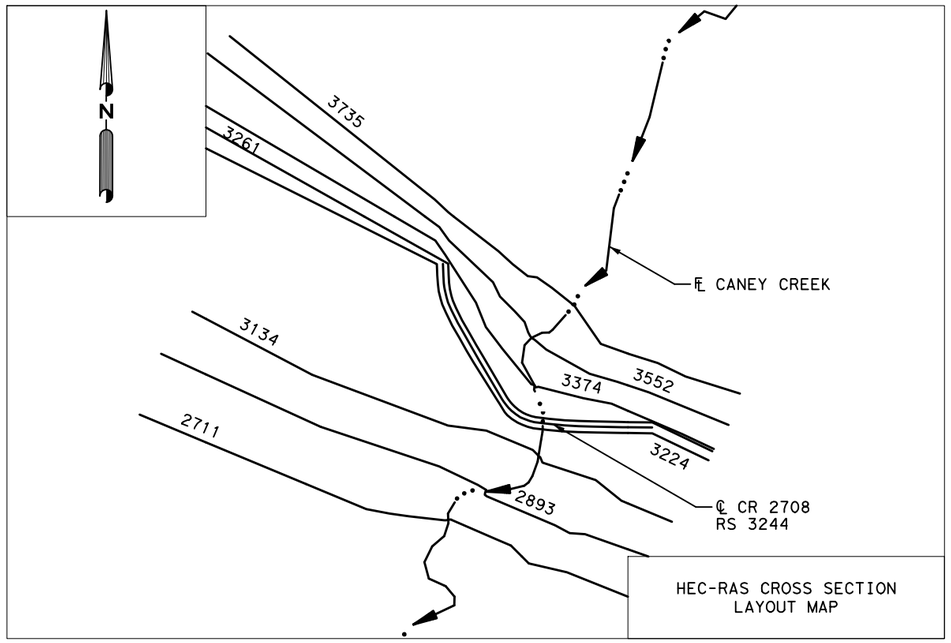
DRAINAGE AREA MAP

SHEET 1 OF 3

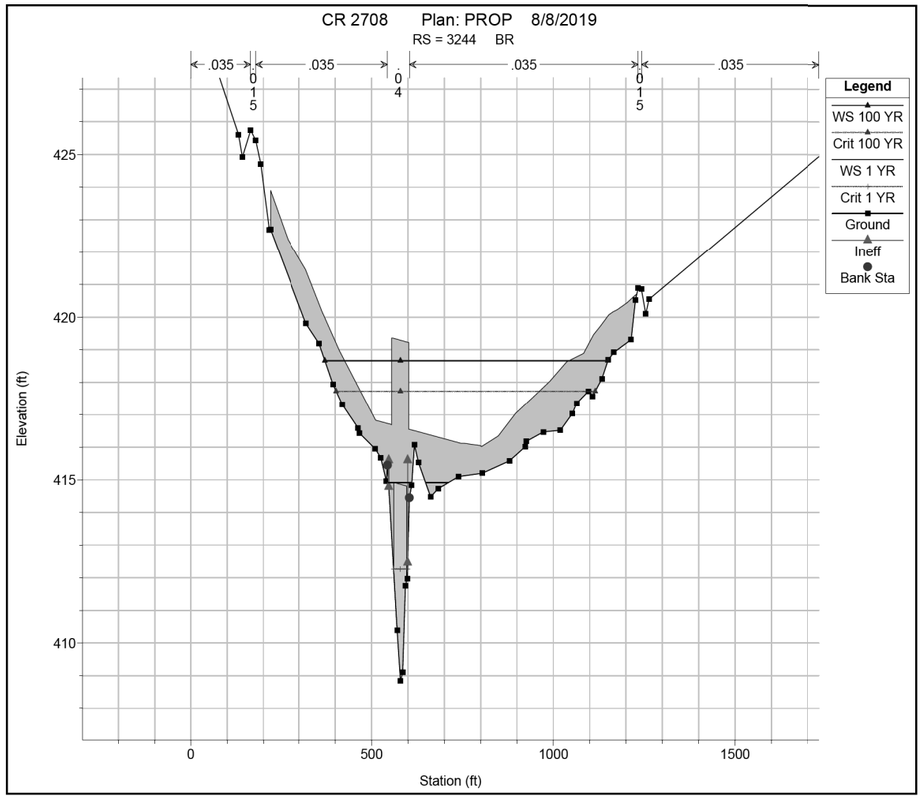
FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	57
CONTROL	SECTION	JOB	
0910	12	134, ETC	

DRAWING DATE: 11/11/2019 FILENAME: ...\2708*DMAP01.dgn



HEC-RAS CROSS SECTION
LAYOUT MAP



Reach	River Sta	Profile	Plan	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)	
CR 2708	3895	1 YR	EXIST	550.00	410.06	416.48		416.96	0.004034	5.57	98.82	22.33	0.47
CR 2708	3895	1 YR	PROP	550.00	410.06	416.43		416.92	0.004159	5.63	97.71	22.23	0.47
CR 2708	3895	100 YR	EXIST	4285.00	410.06	419.77		420.25	0.004369	8.05	930.18	476.40	0.52
CR 2708	3895	100 YR	PROP	4285.00	410.06	419.77		420.26	0.004345	8.03	932.14	476.70	0.52
CR 2708	3735	1 YR	EXIST	550.00	409.36	415.86		416.33	0.003836	5.46	100.68	22.51	0.46
CR 2708	3735	1 YR	PROP	550.00	409.36	415.78		416.26	0.004025	5.56	98.91	22.34	0.47
CR 2708	3735	100 YR	EXIST	4285.00	409.36	419.05		419.55	0.004441	8.11	924.39	475.52	0.53
CR 2708	3735	100 YR	PROP	4285.00	409.36	419.11		419.57	0.004117	7.85	951.46	479.63	0.51
CR 2708	3552	1 YR	EXIST	550.00	408.07	415.81		415.94	0.000862	3.09	272.11	160.92	0.23
CR 2708	3552	1 YR	PROP	550.00	408.07	415.71		415.85	0.000954	3.21	256.16	152.22	0.24
CR 2708	3552	100 YR	EXIST	4285.00	408.07	418.89		419.12	0.001725	5.88	1523.17	601.85	0.35
CR 2708	3552	100 YR	PROP	4285.00	408.07	418.96		419.17	0.001607	5.71	1565.30	608.99	0.34
CR 2708	3374	1 YR	EXIST	550.00	408.14	415.44		415.71	0.002054	4.17	131.89	29.81	0.35
CR 2708	3374	1 YR	PROP	550.00	408.14	415.31	412.51	415.60	0.002222	4.29	128.11	29.41	0.36
CR 2708	3374	100 YR	EXIST	4285.00	408.14	418.50		418.82	0.002905	6.91	1392.74	635.17	0.45
CR 2708	3374	100 YR	PROP	4285.00	408.14	418.64	417.93	418.91	0.002467	6.45	1482.09	648.67	0.42
CR 2708	3261	1 YR	EXIST	550.00	408.84	415.37	412.27	415.50	0.000809	2.87	191.88	284.56	0.24
CR 2708	3261	1 YR	PROP	550.00	408.84	415.25	412.31	415.37	0.000819	2.64	208.18	253.67	0.23
CR 2708	3261	100 YR	EXIST	4285.00	408.84	418.53	416.68	418.62	0.000531	3.04	2121.62	771.08	0.20
CR 2708	3261	100 YR	PROP	4285.00	408.84	418.66	416.47	418.74	0.000464	2.88	2222.83	778.98	0.19
CR 2708	3244			Bridge									
CR 2708	3224	1 YR	EXIST	550.00	408.37	415.01	412.31	415.21	0.001381	3.57	154.12	112.85	0.30
CR 2708	3224	1 YR	PROP	550.00	408.37	415.06	412.33	415.21	0.001239	3.14	175.40	115.64	0.28
CR 2708	3224	100 YR	EXIST	4285.00	408.37	418.40	416.75	418.50	0.000801	3.71	1830.30	730.10	0.25
CR 2708	3224	100 YR	PROP	4285.00	408.37	418.40	416.75	418.50	0.000801	3.71	1830.30	730.10	0.25
CR 2708	3134	1 YR	EXIST	550.00	407.90	414.76		415.04	0.002137	4.18	131.83	38.37	0.35
CR 2708	3134	1 YR	PROP	550.00	407.90	414.76	411.74	415.04	0.002137	4.18	131.74	38.47	0.35
CR 2708	3134	100 YR	EXIST	4285.00	407.90	418.20		418.34	0.001171	4.10	1580.64	655.29	0.28
CR 2708	3134	100 YR	PROP	4285.00	407.90	418.20	416.77	418.34	0.001171	4.10	1580.64	655.29	0.28
CR 2708	2893	1 YR	EXIST	550.00	407.35	413.78		414.27	0.004186	5.63	97.74	22.42	0.48
CR 2708	2893	1 YR	PROP	550.00	407.35	413.78		414.27	0.004186	5.63	97.74	22.42	0.48
CR 2708	2893	100 YR	EXIST	4285.00	407.35	417.61		417.94	0.003554	7.12	1436.53	673.19	0.48
CR 2708	2893	100 YR	PROP	4285.00	407.35	417.61		417.94	0.003554	7.12	1436.53	673.19	0.48

NOTES:

1. PROPOSED BRIDGE IS LOCATED AT HEC-RAS STA 3244. UPSTREAM CROSS SECTION IS AT HEC-RAS STA 3261 & DOWNSTREAM CROSS SECTION IS AT HEC-RAS STA 3224.
2. PROPOSED BRIDGE WIDTH IS 26 FEET.
3. PROPOSED BRIDGE LENGTH IS 35 FEET.
4. THE EXISTING STRUCTURE CONVEYS THE 1-YEAR STORM FREQUENCY.
5. TAILWATER CALCULATED FROM HEC-RAS MODEL USING NORMAL DEPTH AT A SLOPE OF 0.0113 FT/FT.

HYDRAULIC METHOD:

WATER SURFACE ELEVATIONS, COMPUTED USING A HEC-RAS (V.5.0.3) MODEL, WERE CREATED FOR CANEY CREEK, FILE: "CR 2708.PRJ". THIS PROJECT HEC-RAS MODEL WAS DEVELOPED USING USGS TOPOGRAPHY, AERIALS, FIELD INVESTIGATION, AND PROPOSED BRIDGE LAYOUT.

EXISTING CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "EXIST".

PROPOSED CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "PROP".

HYDROLOGIC METHOD:

FLOWS WERE COMPUTED USING OMEGA EM REGRESSION EQUATIONS FOR TEXAS AND CHECKED USING THE HYDROGRAPH METHOD WITH HEC-HMS (V.4.2.1). ANNUAL PRECIPITATION OF 45 INCHES AND OMEGA EM (Ω) OF -0.015 FOR VAN ZANDT COUNTY WAS USED.

H&H DATA WAS SUBMITTED TO THE LOCAL FLOODPLAIN ADMINISTRATOR, SUSAN STRICKLAND ON AUGUST 30, 2019.

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2708 @ CANEY CREEK

HYDRAULIC DATA SHEET

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	58
CONTROL	SECTION	JOB	
0910	12	134,ETC	

DRAWING DATE: 11/11/2019 FILENAME: ...\2708*H&H01.dgn

SCOUR ANALYSIS - 25-YR (DESIGN)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

SCOUR ANALYSIS - 50 YR (CHECK)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

PRESSURE SCOUR:

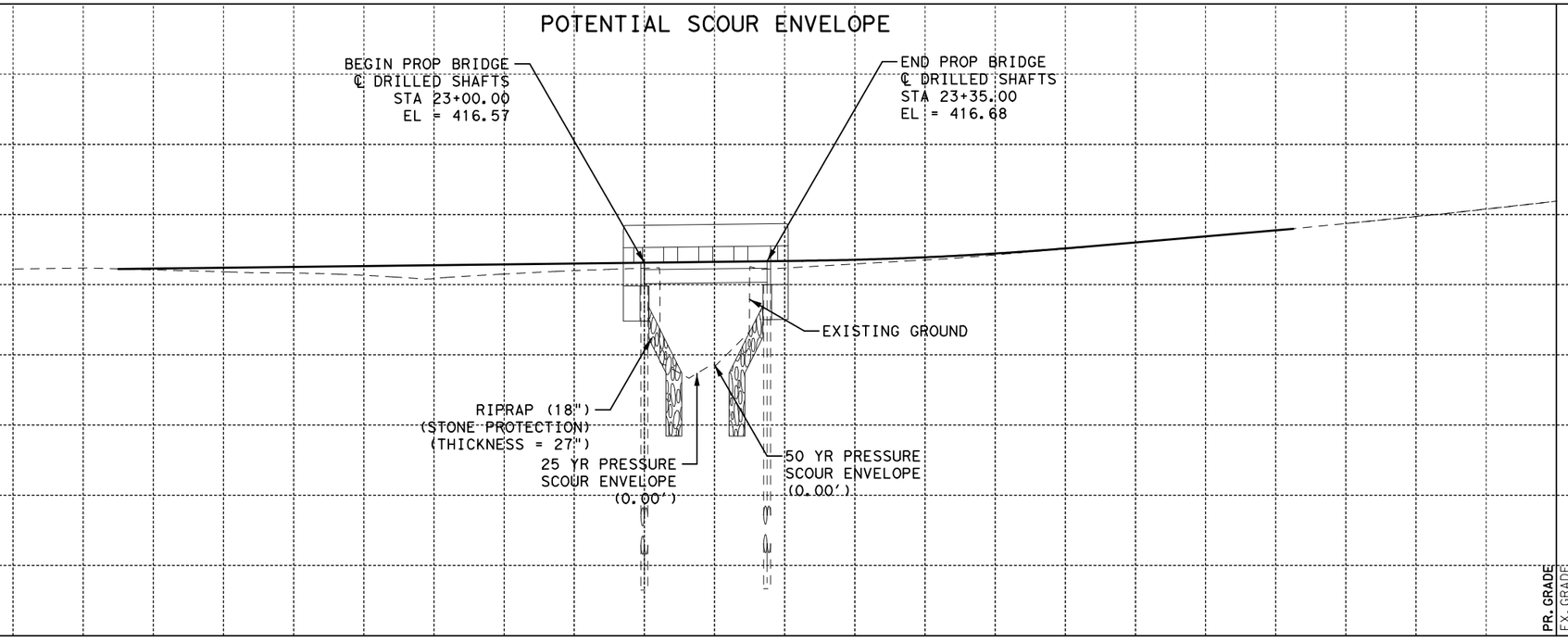
LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

NOTES:

1. THERE IS NO EVIDENCE OF SCOUR FOR THE EXIST BRIDGE.
2. ABUTMENTS TO BE PROTECTED WITH ROCK RIPRAP. ABUTMENT SCOUR ANALYSIS IS NOT REQUIRED PER TXDOT GEOTECHNICAL MANUAL.
3. VAN ZANDT COUNTY MAINTENANCE SHOULD REGULARLY INSPECT THE STONE RIPRAP PROTECTION TO ENSURE SLOPE STABILITY.

POTENTIAL SCOUR ENVELOPE



0' 20' 40'
SCALE: 1"=40' H
1"=10' V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

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Texas Department of Transportation

CR 2708 @ CANEY CREEK

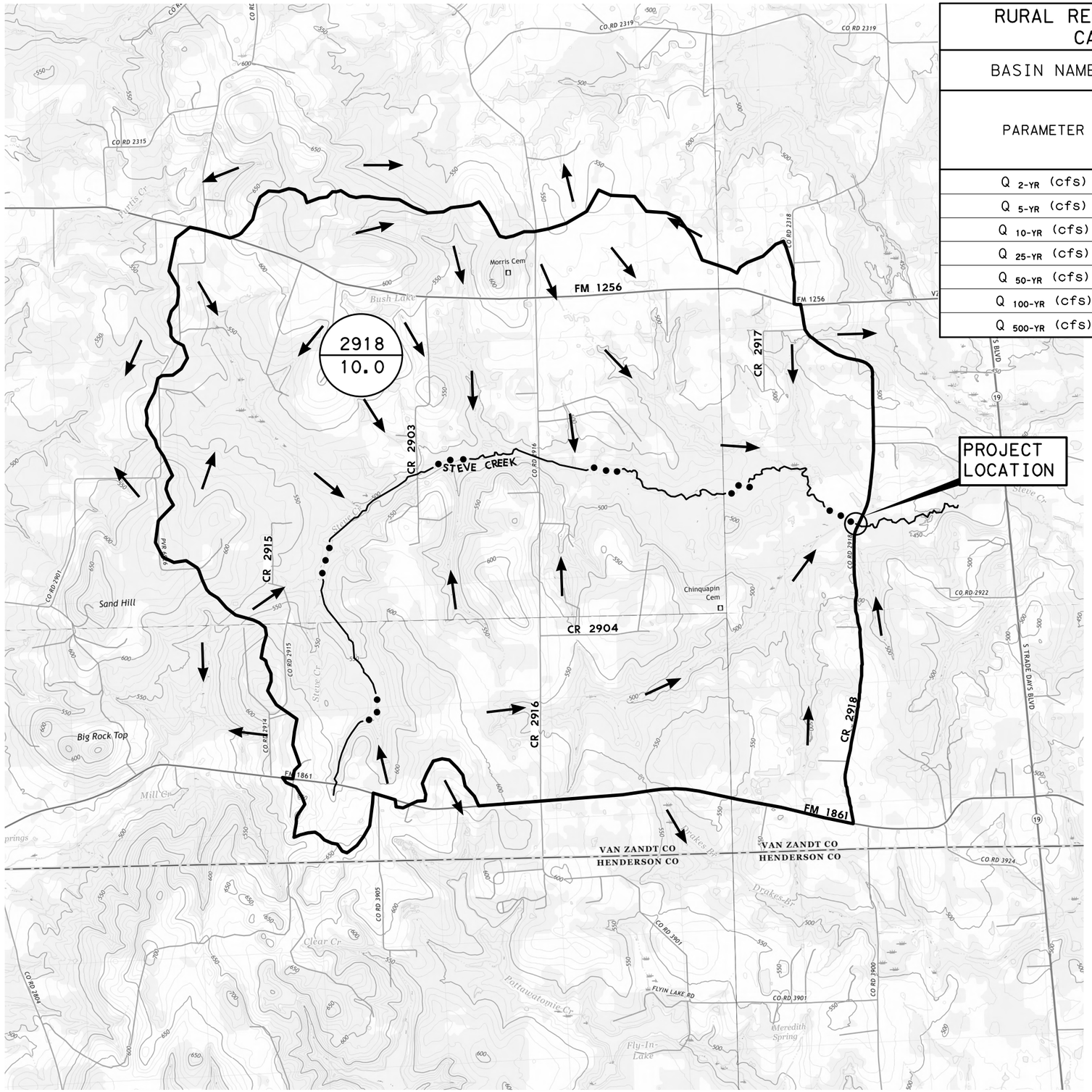
SCOUR PROFILE

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	59
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2708*SCOUR.dgn
DRAWING DATE: 11/11/2019



RURAL REGRESSION EQUATION CALCULATIONS		
BASIN NAME	STEVE CREEK AT CR 2918	
PARAMETER	A (mi^2)	10.0
	S	0.0054
	P (in)	45
	Ω	-0.015
$Q_{2\text{-YR}}$ (cfs)	1082	
$Q_{5\text{-YR}}$ (cfs)	2213	
$Q_{10\text{-YR}}$ (cfs)	3029	
$Q_{25\text{-YR}}$ (cfs)	4362	
$Q_{50\text{-YR}}$ (cfs)	5524	
$Q_{100\text{-YR}}$ (cfs)	6903	
$Q_{500\text{-YR}}$ (cfs)	10826	

N

LEGEND

ID / XXX — DRAINAGE AREA SQUARE MILES

DRAINAGE AREA BOUNDRY

STREAM CENTERLINE

DIRECTION OF FLOW

TOPOGRAPHY SOURCE - USGS QUAD MAPS
(SCALE 1:24000)
QUAD MAPS: PHALBA, MARTINS, MURCHISON WEST, AND STOCKARD

NOTES:

1. THE 100 YEAR FLOODPLAIN ALONG ALLIGATOR CREEK IS ZONE A. THE CR 2918 CROSSING OF STEVE CREEK IS LOCATED IN A FEMA DESIGNATED ZONE A SPECIAL HAZARD FLOOD AREA IN VAN ZANDT COUNTY ON MAP NUMBER 48467C0425C, EFFECTIVE DECEMBER 17, 2010.

0' 1500' 3000'
SCALE: 1"=3000'

STATE OF TEXAS
TREVOR L. CASTILLA
85405
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NO.	REVISION	BY	DATE

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Texas Department of Transportation

CR 2918 @ STEVE CREEK

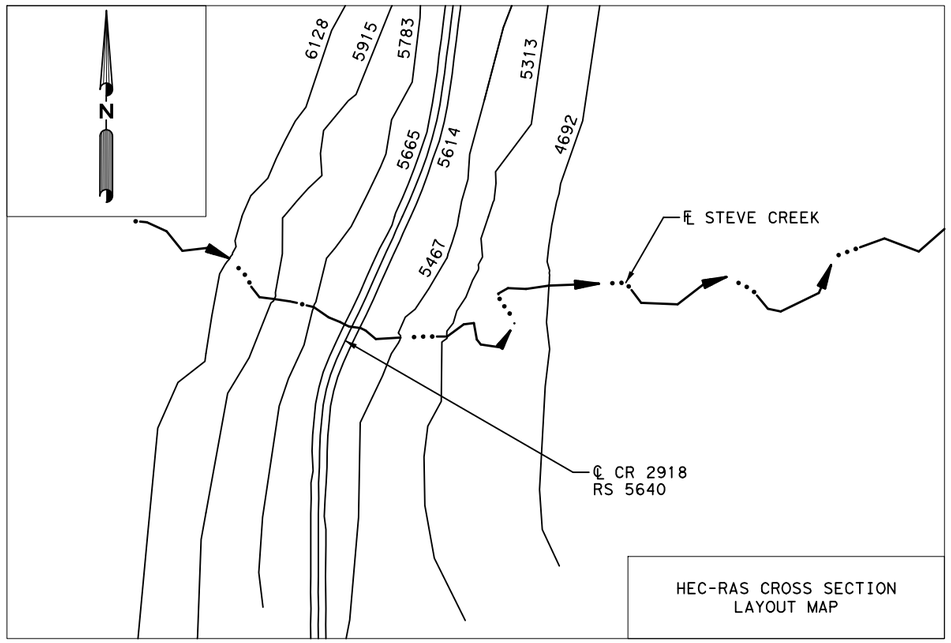
DRAINAGE AREA MAP

SHEET 1 OF 3

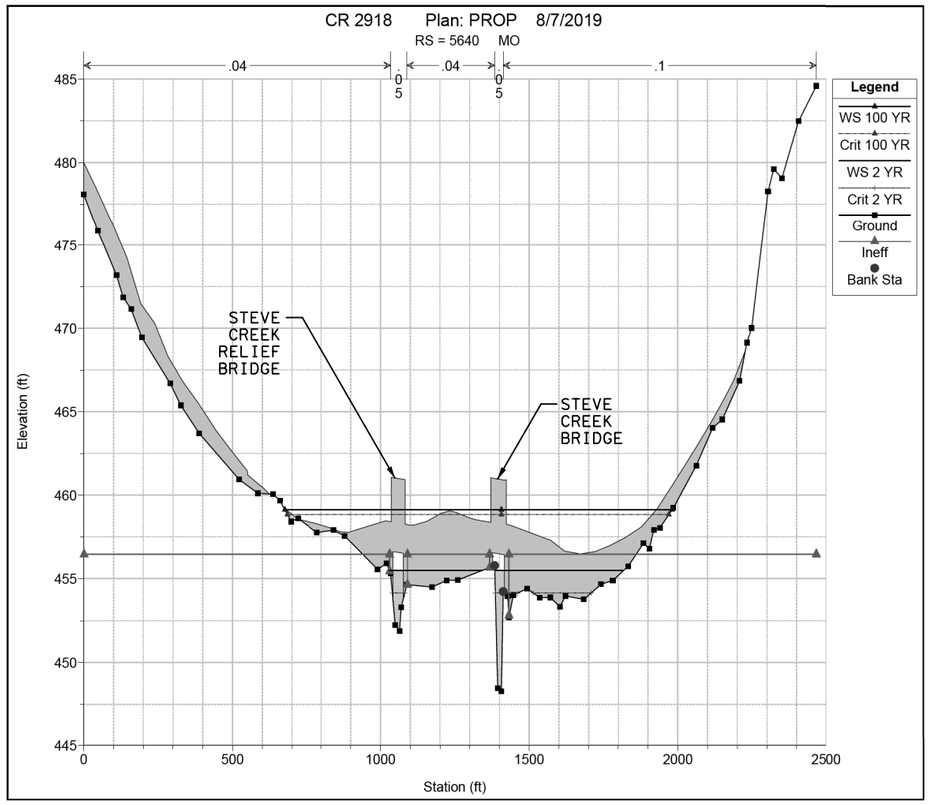
FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	60
CONTROL	SECTION	JOB	
0910	12	134,ETC	

DRAWING DATE: 11/11/2019 FILENAME: ...\2918*DMAP01.dgn



HEC-RAS CROSS SECTION
LAYOUT MAP



Reach	River Sta	Profile	Plan	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)	
CR 2918	6628	2 YR	EXIST	1082.00	452.41	459.32	457.67	459.50	0.003190	4.33	610.50	840.65	0.35
CR 2918	6628	2 YR	PROP	1082.00	452.41	459.32	457.67	459.49	0.003218	4.35	607.19	827.58	0.35
CR 2918	6628	100 YR	EXIST	6903.00	452.41	460.62		460.89	0.007275	7.25	2062.57	1279.34	0.53
CR 2918	6628	100 YR	PROP	6903.00	452.41	460.62		460.89	0.007200	7.22	2069.95	1280.26	0.53
CR 2918	6128	2 YR	EXIST	1082.00	448.76	456.45		456.47	0.000484	1.80	1434.88	1147.54	0.14
CR 2918	6128	2 YR	PROP	1082.00	448.76	456.42		456.44	0.000522	1.86	1394.82	1139.61	0.14
CR 2918	6128	100 YR	EXIST	6903.00	448.76	459.20		459.23	0.000439	2.22	5336.66	1685.90	0.14
CR 2918	6128	100 YR	PROP	6903.00	448.76	459.33		459.35	0.000391	2.12	5555.36	1712.05	0.13
CR 2918	5915	2 YR	EXIST	1082.00	448.48	456.32		456.35	0.000619	2.11	1128.95	914.10	0.16
CR 2918	5915	2 YR	PROP	1082.00	448.48	456.27		456.31	0.000675	2.19	1086.61	899.50	0.17
CR 2918	5915	100 YR	EXIST	6903.00	448.48	459.08		459.12	0.000579	2.64	4634.40	1596.13	0.17
CR 2918	5915	100 YR	PROP	6903.00	448.48	459.22		459.26	0.000501	2.49	4865.35	1617.37	0.15
CR 2918	5783	2 YR	EXIST	1082.00	448.19	455.98	453.52	456.18	0.002699	4.25	361.01	775.87	0.32
CR 2918	5783	2 YR	PROP	1082.00	448.19	455.92	453.51	456.13	0.002815	4.32	360.95	760.62	0.32
CR 2918	5783	100 YR	EXIST	6903.00	448.19	458.99	457.00	459.04	0.000659	2.75	4508.40	1443.93	0.17
CR 2918	5783	100 YR	PROP	6903.00	448.19	459.15	456.51	459.19	0.000568	2.58	4733.27	1458.74	0.16
CR 2918	5665	2 YR	EXIST	1082.00	448.27	455.56	453.63	455.82	0.003170	4.60	289.65	765.01	0.35
CR 2918	5665	2 YR	PROP	1082.00	448.27	455.51	453.65	455.76	0.003218	4.61	305.47	750.69	0.35
CR 2918	5665	100 YR	EXIST	6903.00	448.27	458.90	456.46	458.96	0.000629	2.82	4488.63	1290.10	0.17
CR 2918	5665	100 YR	PROP	6903.00	448.27	459.07	456.46	459.12	0.000547	2.66	4704.25	1301.33	0.16
CR 2918	5640			Mult Open									
CR 2918	5614	2 YR	EXIST	1082.00	448.14	455.34	452.04	455.52	0.001426	3.68	329.66	667.14	0.26
CR 2918	5614	2 YR	PROP	1082.00	448.14	455.36	451.98	455.51	0.001317	3.32	363.54	670.61	0.24
CR 2918	5614	100 YR	EXIST	6903.00	448.14	457.54	456.18	457.70	0.002120	5.11	2734.40	1063.91	0.32
CR 2918	5614	100 YR	PROP	6903.00	448.14	457.54	456.18	457.70	0.002119	5.11	2734.56	1063.94	0.32
CR 2918	5467	2 YR	EXIST	1082.00	447.69	454.87	452.75	455.17	0.003707	4.83	269.31	469.18	0.38
CR 2918	5467	2 YR	PROP	1082.00	447.69	454.87	452.75	455.16	0.003633	4.78	274.18	470.78	0.38
CR 2918	5467	100 YR	EXIST	6903.00	447.69	457.29	456.05	457.39	0.001692	4.11	3009.77	1261.38	0.27
CR 2918	5467	100 YR	PROP	6903.00	447.69	457.29	456.05	457.40	0.001692	4.11	3010.00	1261.40	0.27
CR 2918	5313	2 YR	EXIST	1082.00	447.51	454.67		454.73	0.001321	2.83	781.47	722.10	0.23
CR 2918	5313	2 YR	PROP	1082.00	447.51	454.67		454.73	0.001321	2.83	781.47	722.10	0.23
CR 2918	5313	100 YR	EXIST	6903.00	447.51	457.04		457.13	0.001660	3.98	3264.24	1178.78	0.28
CR 2918	5313	100 YR	PROP	6903.00	447.51	457.04		457.13	0.001660	3.97	3264.46	1178.79	0.28

NOTES:

1. IN THE HEC-RAS MODEL, PROPOSED BRIDGE 1 AND 2 REFER TO STRUCTURES OVER STEVE CREEK RELIEF AND STEVE CREEK RESPECTIVELY. BOTH ARE ANALYZED USING THE SAME MODEL, WHICH ALLOWS THEM TO SHARE HEC-RAS STATIONING.
2. PROPOSED BRIDGES ARE LOCATED AT HEC-RAS STA 5640. UPSTREAM CROSS SECTION IS AT HEC-RAS STA 5665 & DOWNSTREAM CROSS SECTION IS AT HEC-RAS STA 5614.
3. PROPOSED STEVE CREEK RELIEF BRIDGE WIDTH IS 26 FEET.
4. PROPOSED STEVE CREEK RELIEF BRIDGE LENGTH IS 35 FEET.
5. PROPOSED STEVE CREEK BRIDGE WIDTH IS 26 FEET.
6. PROPOSED STEVE CREEK BRIDGE LENGTH IS 40 FEET.
7. THE EXISTING STRUCTURES CONVEY THE 2-YEAR STORM FREQUENCY.
8. TAILWATER CALCULATED FROM HEC-RAS MODEL USING NORMAL DEPTH AT A SLOPE OF 0.0054 FT/FT.

HYDRAULIC METHOD:

WATER SURFACE ELEVATIONS, COMPUTED USING A HEC-RAS (V.5.0.3) MODEL, WERE CREATED FOR STEVE CREEK, FILE: "2918HECRAS.PRJ". THIS PROJECT HEC-RAS MODEL WAS DEVELOPED USING USGS TOPOGRAPHY, AERIALS, FIELD INVESTIGATION, AND PROPOSED BRIDGE LAYOUT.

EXISTING CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "EXIST".

PROPOSED CONDITION WATER SURFACE ELEVATIONS COMPUTED FROM HEC-RAS MODEL PLAN "PROP".

HYDROLOGIC METHOD:

FLOWS WERE COMPUTED USING OMEGA EM REGRESSION EQUATIONS FOR TEXAS. ANNUAL PRECIPITATION OF 45 INCHES AND OMEGA EM (Ω) OF -0.015 FOR VAN ZANDT COUNTY WAS USED.

H&H DATA WAS SUBMITTED TO THE LOCAL FLOODPLAIN ADMINISTRATOR, SUSAN STRICKLAND ON AUGUST 30, 2019.

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2918 @ STEVE CREEK

HYDRAULIC DATA SHEET

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	61
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\2918*H&H01.dgn
DRAWING DATE: 11/11/2019

STEVE CREEK

SCOUR ANALYSIS - 25-YR (DESIGN)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

SCOUR ANALYSIS - 50 YR (CHECK)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

STEVE CREEK RELIEF

SCOUR ANALYSIS - 25-YR (DESIGN)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

SCOUR ANALYSIS - 50 YR (CHECK)

SCOUR ANALYSIS DETERMINED BY UTILIZING EQUATIONS FROM HEC-18 MANUAL, 5TH EDITION HYDRAULIC TOOLBOX VERSION 4.2

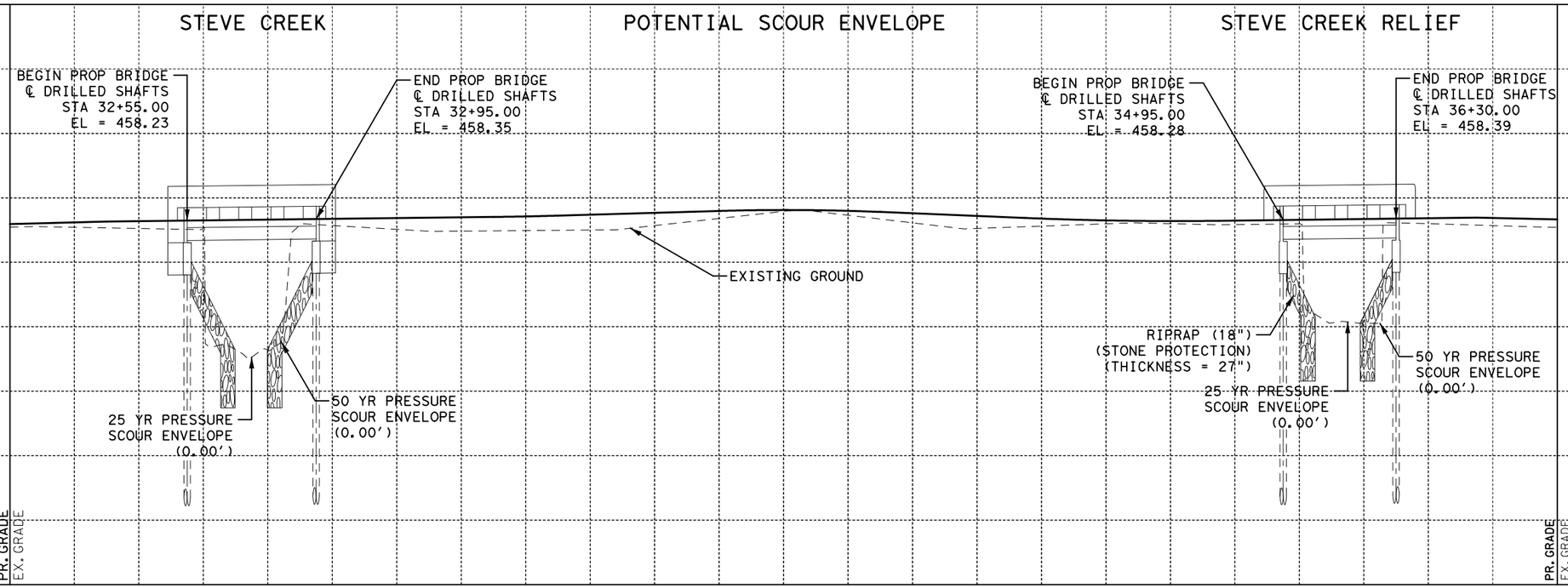
PRESSURE SCOUR:

LIVE-BED CONTRACTION SCOUR EQUATIONS
(EQNS. 6.1 & 6.2)
D50 = 0.20 MM
K1 = 0.69

SCOUR DEPTH Y_S (CHANNEL) = 0.00 FT

NOTES:

1. THERE IS NO EVIDENCE OF SCOUR FOR THE EXIST BRIDGE.
2. ABUTMENTS TO BE PROTECTED WITH ROCK RIPRAP. ABUTMENT SCOUR ANALYSIS IS NOT REQUIRED PER TXDOT GEOTECHNICAL MANUAL.
3. VAN ZANDT COUNTY MAINTENANCE SHOULD REGULARLY INSPECT THE STONE RIPRAP PROTECTION TO ENSURE SLOPE STABILITY.



0' 20' 40'
SCALE: 1"=40' H
1"=10' V

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

CCG CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

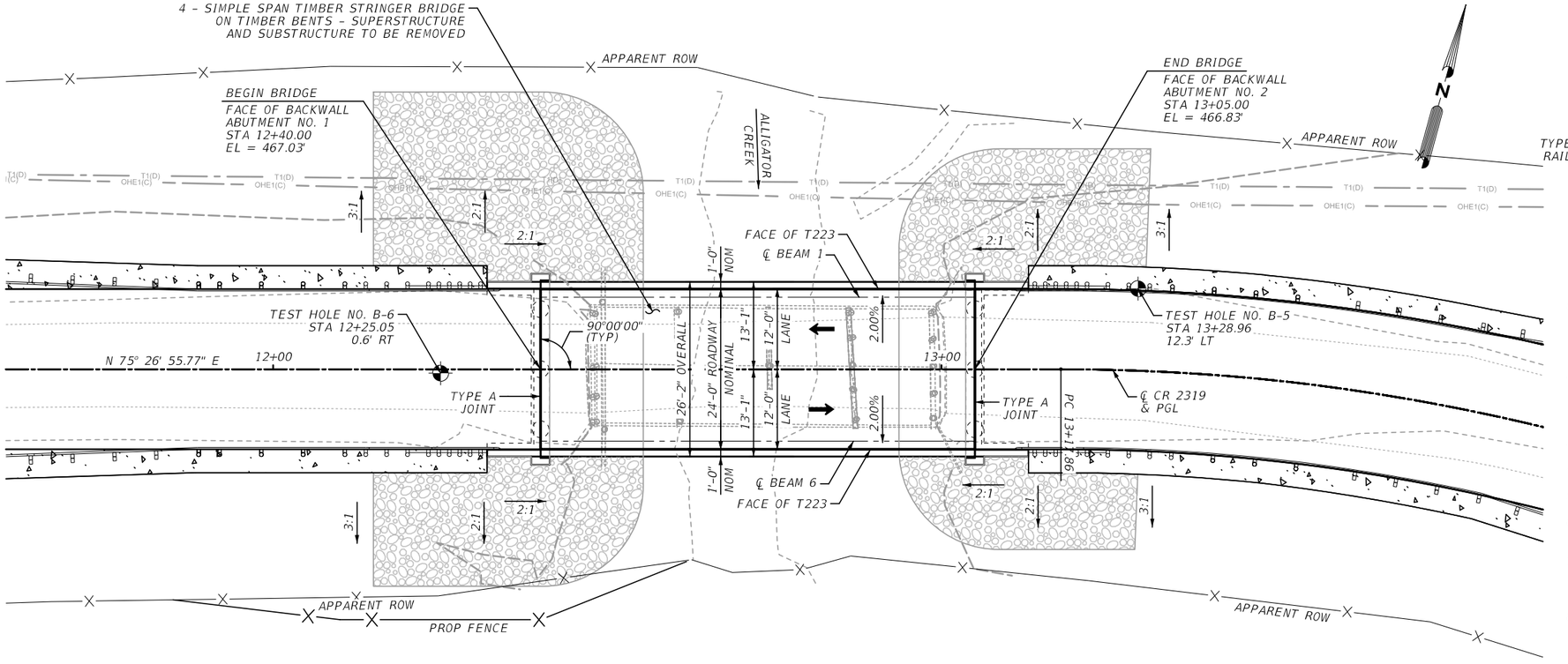
CR 2918 @ STEVE CREEK

SCOUR PROFILE

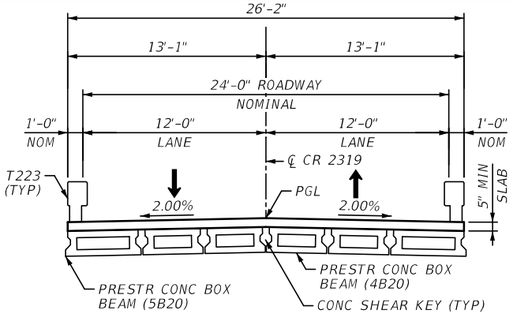
SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	BR 2019 (360), ETC.		CR 2918, ETC
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	62
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\2918*SCOUR.dgn
DRAWING DATE: 11/11/2019



PLAN

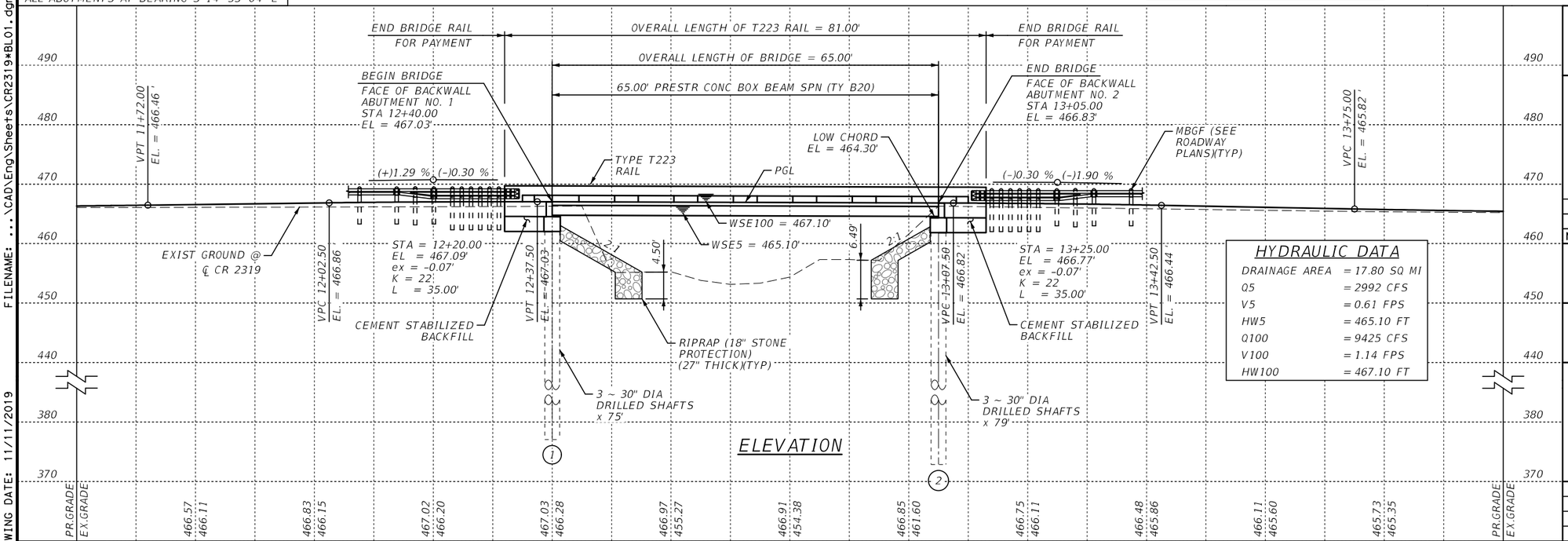


TYPICAL TRANSVERSE SECTION

DESIGN SPEED = 30 MPH
FUNCTIONAL CLASS = RURAL LOCAL
EXISTING ADT (2015) = 70
EXIST NBI NO: AA23-19-101
PROP NBI NO: AA23-19-001

HL 93 LOADING

ALL ABUTMENTS AT BEARING S 14° 33' 04" E



ELEVATION

HYDRAULIC DATA

DRAINAGE AREA	= 17.80 SQ MI
Q5	= 2992 CFS
V5	= 0.61 FPS
HW5	= 465.10 FT
Q100	= 9425 CFS
V100	= 1.14 FPS
HW100	= 467.10 FT

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 8TH EDITION: 2017 AASHTO LRFD SPECIFICATIONS WITH CURRENT INTERIMS FOR HL-93 LOADING.
2. THE MAXIMUM FLOOD EVENT THAT DOES NOT OVERTOP THE PROPOSED BRIDGE DECK IS THE PROPOSED CAPACITY EVENT. THE HEC-RAS CROSS SECTION USED TO ESTIMATE THE HYDRAULIC DATA FOR THE BRIDGE LAYOUT IS LOCATED AT THE UPSTREAM BOUNDING SECTION.
3. SEE ROADWAY PLAN AND PROFILE SHEETS FOR MBGF DETAILS.
4. SEE BORING LOGS SHEET FOR TEST HOLES.
5. CUT EXISTING PILE FOUNDATION 2'-0" (MIN) BELOW EXISTING GRADE.
6. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF UTILITIES PRIOR TO ORDERING MATERIALS OR DRILLING FOUNDATIONS.
7. DRILLED SHAFTS SHALL BE FOUNDED AT TIP ELEVATION SHOWN OR DEEPER TO OBTAIN A MINIMUM 10 FEET PENETRATION INTO UNWEATHERED MUDSTONE LAYER.
8. CONTRACTOR ATTENTION DIRECTED TO THE WATER BEARING SAND MATERIAL SHOWN IN THE BORING LOGS. THE CONTRACTOR IS SOLEY RESPONSIBLE TO MAINTAIN THE STABILITY OF THE HOLES. CASING MUST BE REMOVED, IF UTILIZED: OTHERWISE THE ENGINEER MUST BE CONTACTED IMMEDIATELY.
9. CONTRACTOR SHALL COORDINATE WITH VAN ZANDT COUNTY TO ALLOW PERSONNEL TO BE PRESENT DURING BRIDGE DEMOLITION TO COLLECT THE EXISTING BRIDGE DECK FOR SALVAGING.

0' 10' 20'
SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

CR 2319 @ ALLIGATOR CREEK

BRIDGE LAYOUT

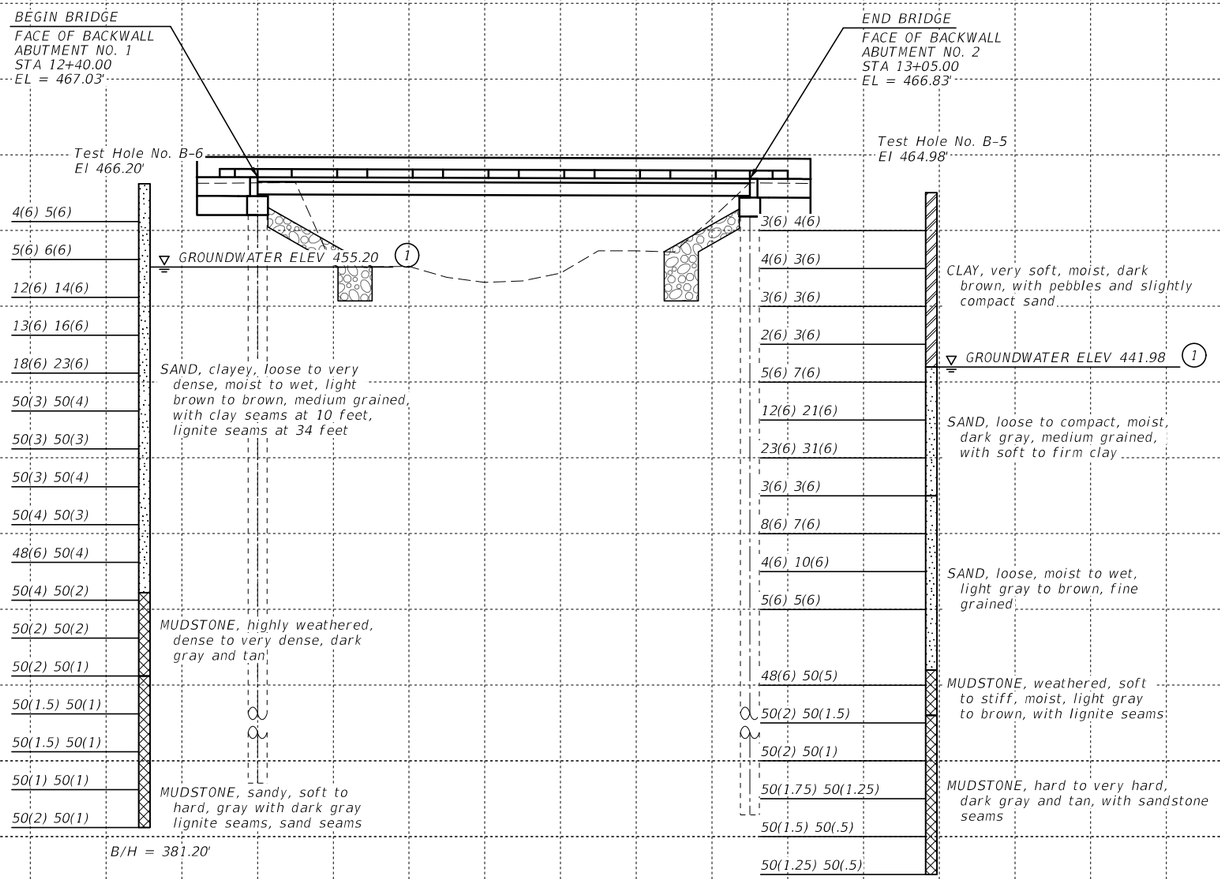
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	63

CONTROL	SECTION	JOB
0910	12	134,ETC

FILENAME: ...\CAD\Eng\Sheets\CR2319-BL01.dgn
DRAWING DATE: 11/11/2019



(1) GROUND WATER LEVELS SHOULD FLUCTUATE DUE TO SEASONAL VARIATION IN CLIMATE CONDITIONS. FIELD TESTING WAS PERFORMED FROM 08/12/2019 TO 09/16/2019

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

BORING LOGS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

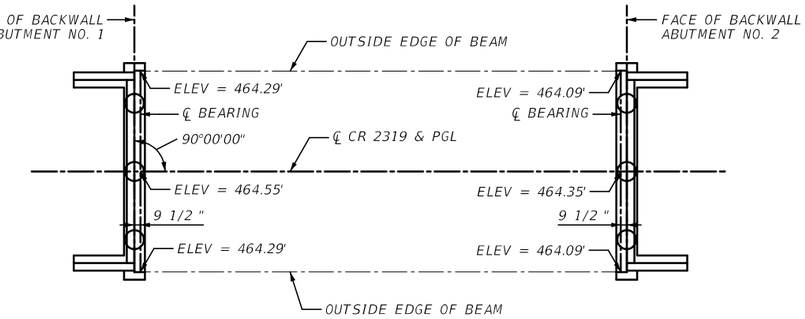
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	64

CONTROL	SECTION	JOB
0910	12	134,ETC

DRAWING DATE: 11/11/2019 FILENAME: ...\CAD\Eng\Sheets\CR2319*GT01.dgn

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE SUMMARY										
BID CODE DESCRIPTION / BRIDGE ELEMENT	400 6005 CEMENT STABILIZED ABUTMENT BACKFILL	416 6003 DRILL SHAFT (30 IN)	420 6013 CL C CONC (ABUT)	422 6005 REINF CONC SLAB (BOX BEAM)	422 6023 SHEAR KEY	425 6001 PRESTR CONC BOX BEAM (4B20)	425 6002 PRESTR CONC BOX BEAM (5B20)	432 6033 RIPRAP (STONE PROTECTION) (18 IN)	450 6006 RAIL (TY T223)	496 6009 REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	SF	CY	LF	LF	CY	LF	EA
2-ABUTMENTS	44	462	27.2					378	32.0	
1-65.00' PRESTR CONC BOX BEAM SPAN				1701	8.6	258.00	129.00		130.0	
PROJECT TOTAL	44	462	27.2	1701	8.6	258.00	129.00	378	162.0	1



CAP ELEVATIONS

SEE ABB-24 STANDARD FOR CAP ELEVATION LOCATIONS AT OUTSIDE EDGE OF BEAM

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED PROFESSIONAL ENGINEER

11/25/2019

NO.	REVISION	BY	DATE

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

ESTIMATED QUANTITIES AND CONTROL ELEVATIONS

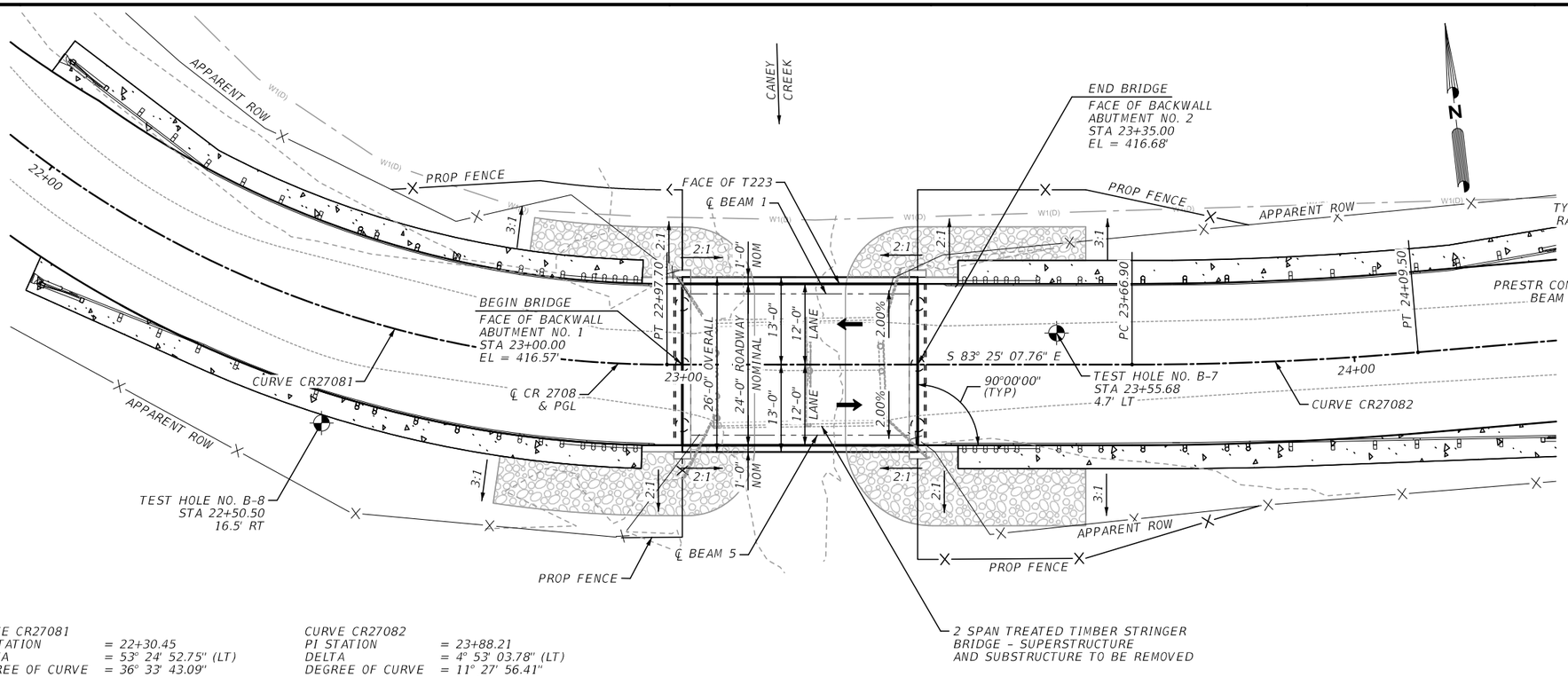
SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	65
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\CAD\Eng\Sheets\CR2319*BQ01.dgn

DRAWING DATE: 11/25/2019



PLAN

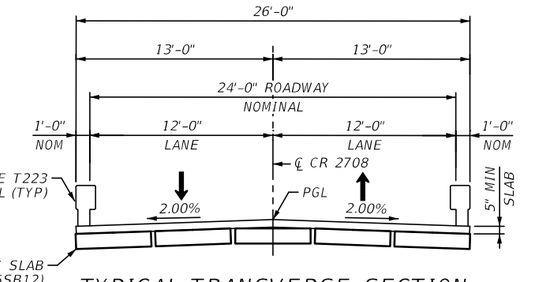
CURVE CR27081

PI STATION	= 22+30.45
DELTA	= 53° 24' 52.75" (LT)
DEGREE OF CURVE	= 36° 33' 43.09"
TANGENT	= 78.84
LENGTH	= 146.09
RADIUS	= 156.71
PC STATION	= 21+51.61
PT STATION	= 22+97.70

CURVE CR27082

PI STATION	= 23+88.21
DELTA	= 4° 53' 03.78" (LT)
DEGREE OF CURVE	= 11° 27' 56.41"
TANGENT	= 21.31
LENGTH	= 42.60
RADIUS	= 499.72
PC STATION	= 23+66.90
PT STATION	= 24+09.50

DESIGN SPEED = 30 MPH
FUNCTIONAL CLASS = RURAL LOCAL
EXISTING ADT (2015) = 50
EXIST NBI NO: AA27-08-101
PROP NBI NO: AA27-08-001



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 8TH EDITION: 2017 AASHTO LRFD SPECIFICATIONS WITH CURRENT INTERIMS FOR HL-93 LOADING.
2. THE MAXIMUM FLOOD EVENT THAT DOES NOT OVERTOP THE PROPOSED BRIDGE DECK IS THE PROPOSED CAPACITY EVENT. THE HEC-RAS CROSS SECTION USED TO ESTIMATE THE HYDRAULIC DATA FOR THE BRIDGE LAYOUT IS LOCATED AT THE UPSTREAM BOUNDING SECTION.
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4. SEE BORING LOGS SHEET FOR TEST HOLES.
5. CUT EXISTING PILE FOUNDATION 2'-0" (MIN) BELOW EXISTING GRADE.
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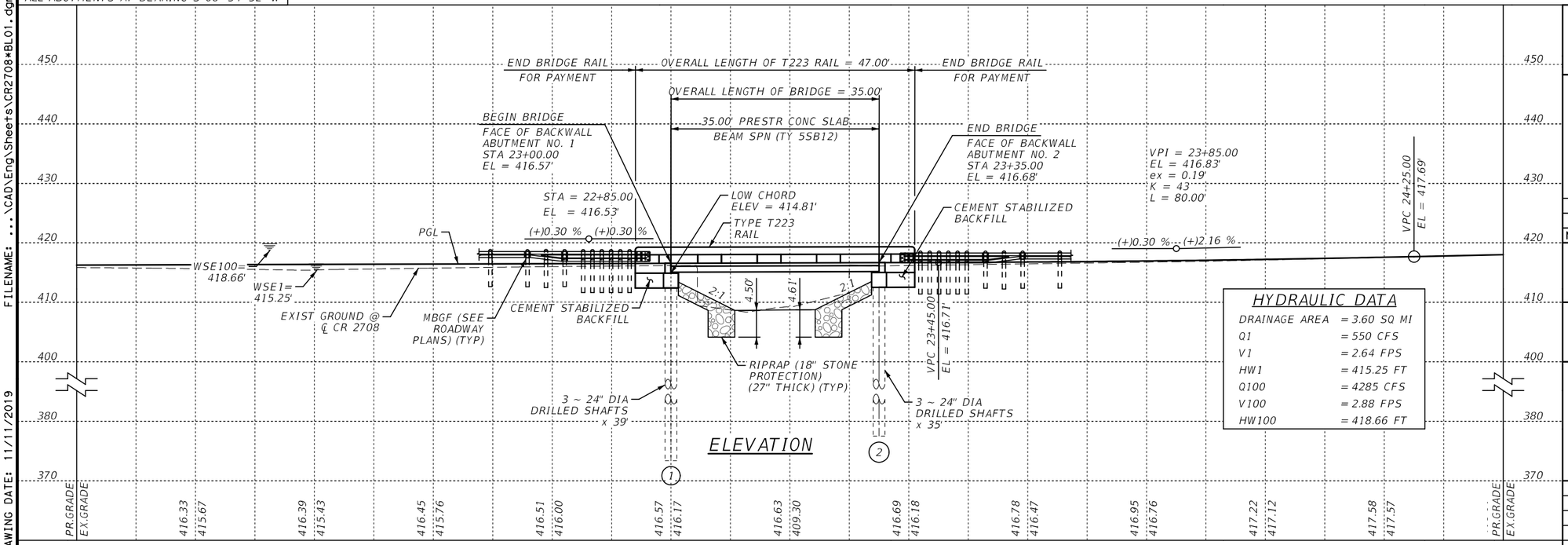
ALL ABUTMENTS AT BEARING S 06° 34' 52" W

HL 93 LOADING



ELEVATION

HYDRAULIC DATA

DRAINAGE AREA	= 3.60 SQ MI
Q1	= 550 CFS
V1	= 2.64 FPS
HW1	= 415.25 FT
Q100	= 4285 CFS
V100	= 2.88 FPS
HW100	= 418.66 FT

0' 10' 20'
SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation
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CR 2708 @ CANEY CREEK

BRIDGE LAYOUT

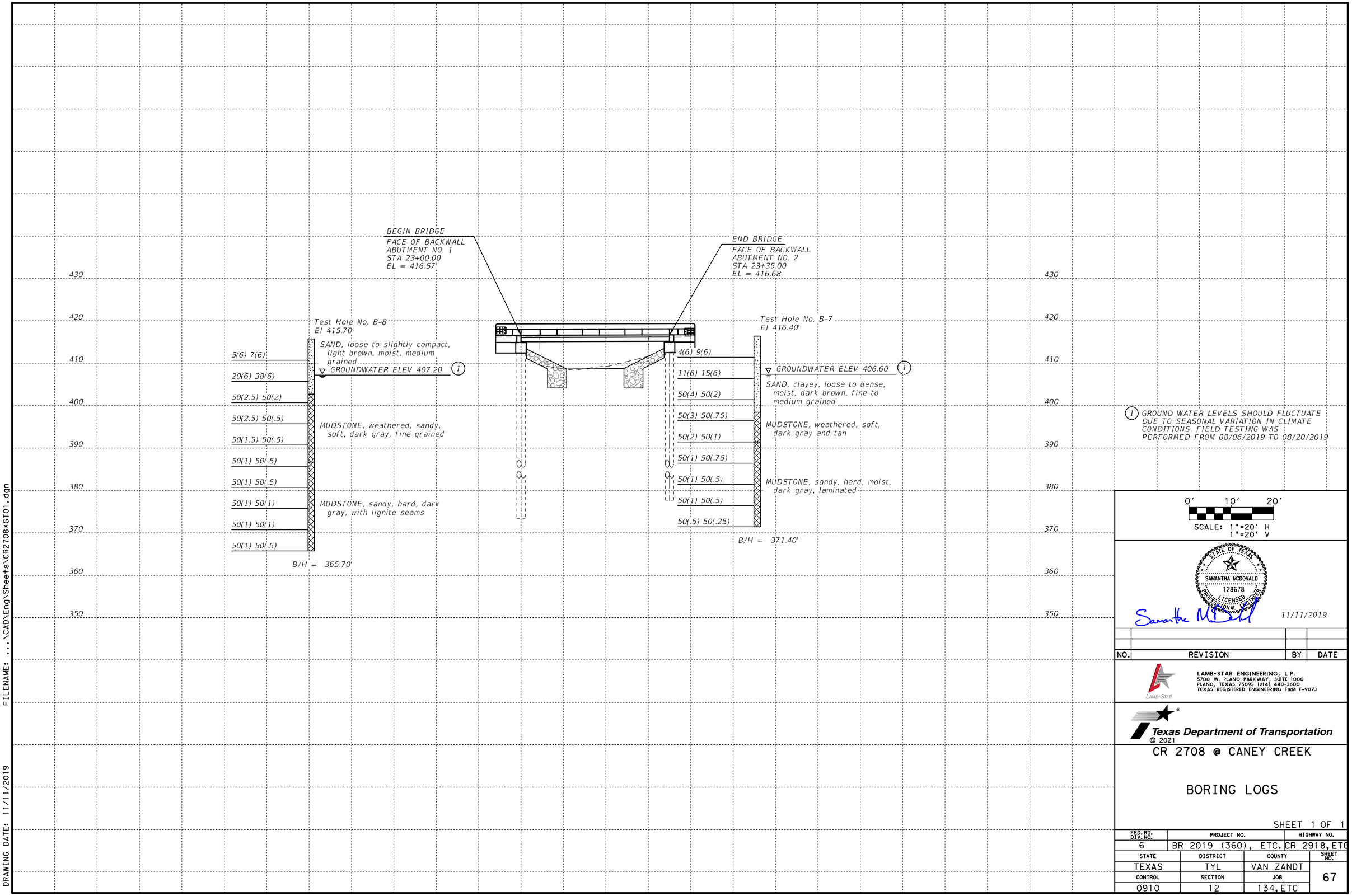
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	66

CONTROL	SECTION	JOB
0910	12	134, ETC

FILENAME: ...\CAD\Eng\Sheets\CR2708*BL01.dgn
DRAWING DATE: 11/11/2019



(1) GROUND WATER LEVELS SHOULD FLUCTUATE DUE TO SEASONAL VARIATION IN CLIMATE CONDITIONS. FIELD TESTING WAS PERFORMED FROM 08/06/2019 TO 08/20/2019

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
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PROFESSIONAL ENGINEER

11/11/2019

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TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2708 @ CANEY CREEK

BORING LOGS

SHEET 1 OF 1

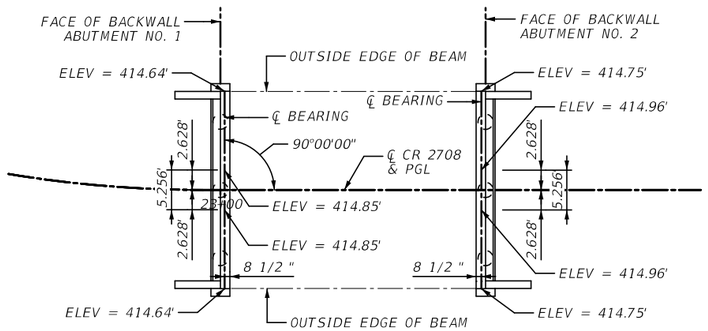
FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	67
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\CAD\Eng\Sheets\CR2708*GT01.dgn
DRAWING DATE: 11/11/2019

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE SUMMARY								
BID CODE DESCRIPTION / BRIDGE ELEMENT	400 6005 CEMENT STABILIZED ABUTMENT BACKFILL	416 6002 DRILLED SHAFT (24 IN)	420 6013 CL C CONC (ABUT)	422 6007 REINF CONC SLAB (SLAB BEAM)	425 6010 PRESTR CONC SLAB BEAM (5SB12)	432 6033 RIPRAP (STONE PROTECTION) (18 IN)	450 6006 RAIL (TY T223)	496 6117 REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	SF	LF	CY	LF	EA
2-ABUTMENTS	30	222	19.6			222	24.0	
1-35.00' PRESTR CONC SLAB BEAM SPAN				910	172.50		70.0	
PROJECT TOTAL	30	222	19.6	910	172.50	222	94.0	1



CAP ELEVATIONS

SEE APSB-24 STANDARD FOR CAP ELEVATION LOCATIONS AT OUTSIDE EDGE OF BEAM

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2708 @ CANEY CREEK

ESTIMATED QUANTITIES AND CONTROL ELEVATIONS

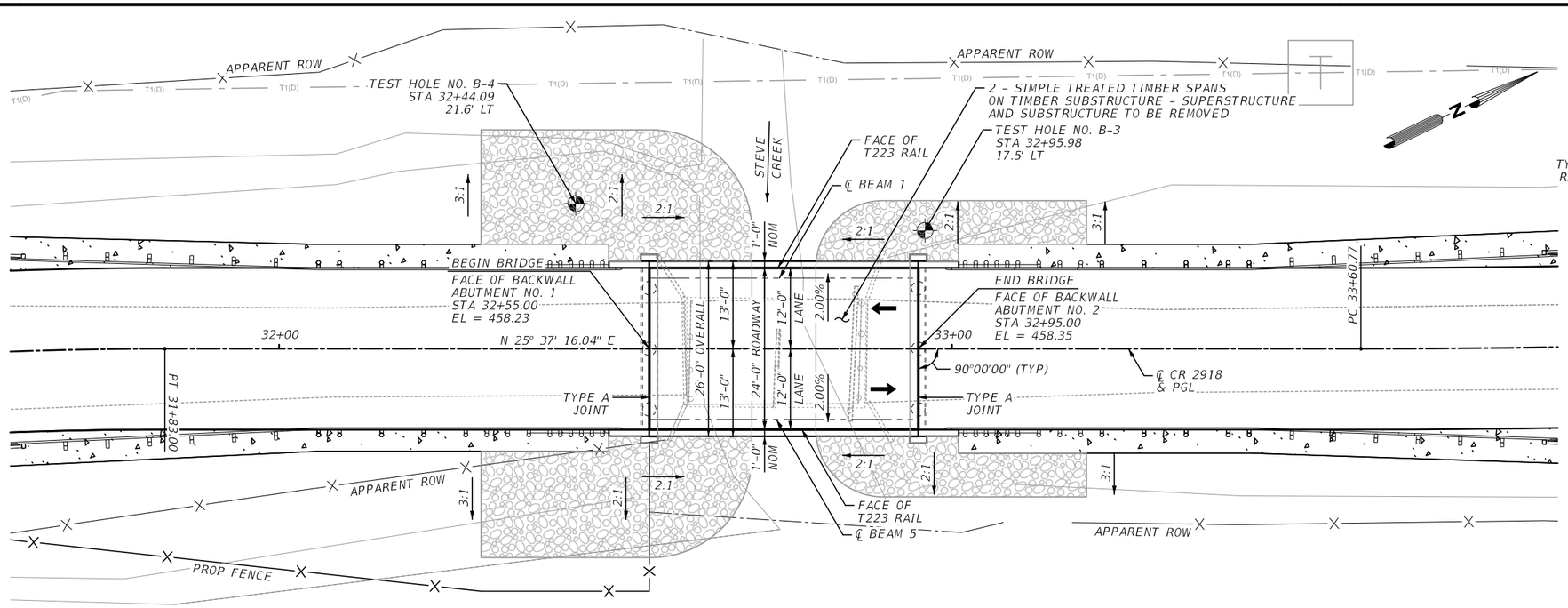
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

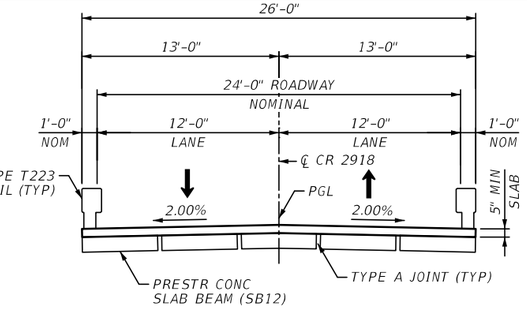
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	68
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\CAD\Eng\Sheets\CR2708*BQ01.dgn

DRAWING DATE: 11/11/2019



PLAN



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 8TH EDITION: 2017 AASHTO LRFD SPECIFICATIONS WITH CURRENT INTERIMS FOR HL-93 LOADING.
2. THE MAXIMUM FLOOD EVENT THAT DOES NOT OVERTOP THE PROPOSED BRIDGE DECK IS THE PROPOSED CAPACITY EVENT. THE HEC-RAS CROSS SECTION USED TO ESTIMATE THE HYDRAULIC DATA FOR THE BRIDGE LAYOUT IS LOCATED AT THE UPSTREAM BOUNDING SECTION.
3. SEE ROADWAY PLAN AND PROFILE SHEETS FOR MBGF DETAILS.
4. SEE BORING LOGS SHEET FOR TEST HOLES.
5. CUT EXISTING PILE FOUNDATION 2'-0" (MIN) BELOW EXISTING GRADE.
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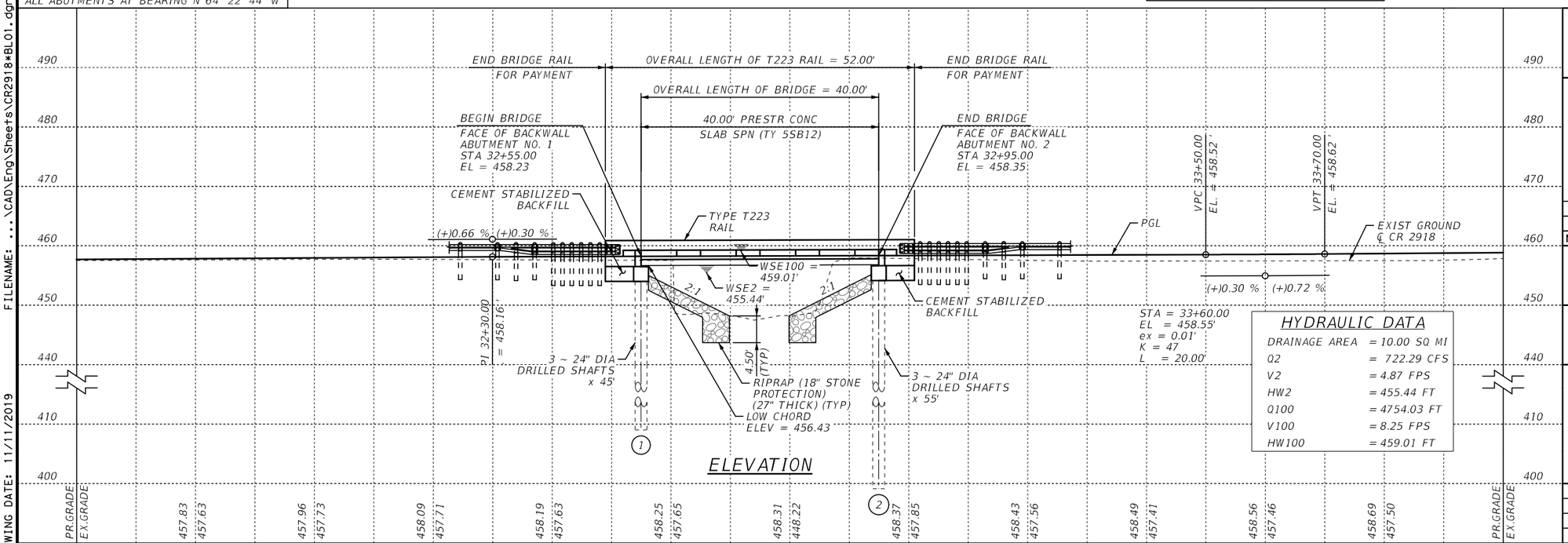
9. CONTRACTOR SHALL COORDINATE WITH VAN ZANDT COUNTY TO ALLOW PERSONNEL TO BE PRESENT DURING BRIDGE DEMOLITION TO COLLECT THE EXISTING BRIDGE DECK FOR SALVAGING.

DESIGN SPEED = 30 MPH
FUNCTIONAL CLASS = RURAL LOCAL
EXISTING ADT (2015) = 100
EXIST NBI NO: AA29-18-102
PROP NBI NO: AA29-18-001

HL 93 LOADING

ALL ABUTMENTS AT BEARING N 64° 22' 44" W



ELEVATION

HYDRAULIC DATA

DRAINAGE AREA	= 10.00 SQ MI
Q2	= 722.29 CFS
V2	= 4.87 FPS
HW2	= 455.44 FT
Q100	= 4754.03 FT
V100	= 8.25 FPS
HW100	= 459.01 FT

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

CR 2918 @ STEVE CREEK

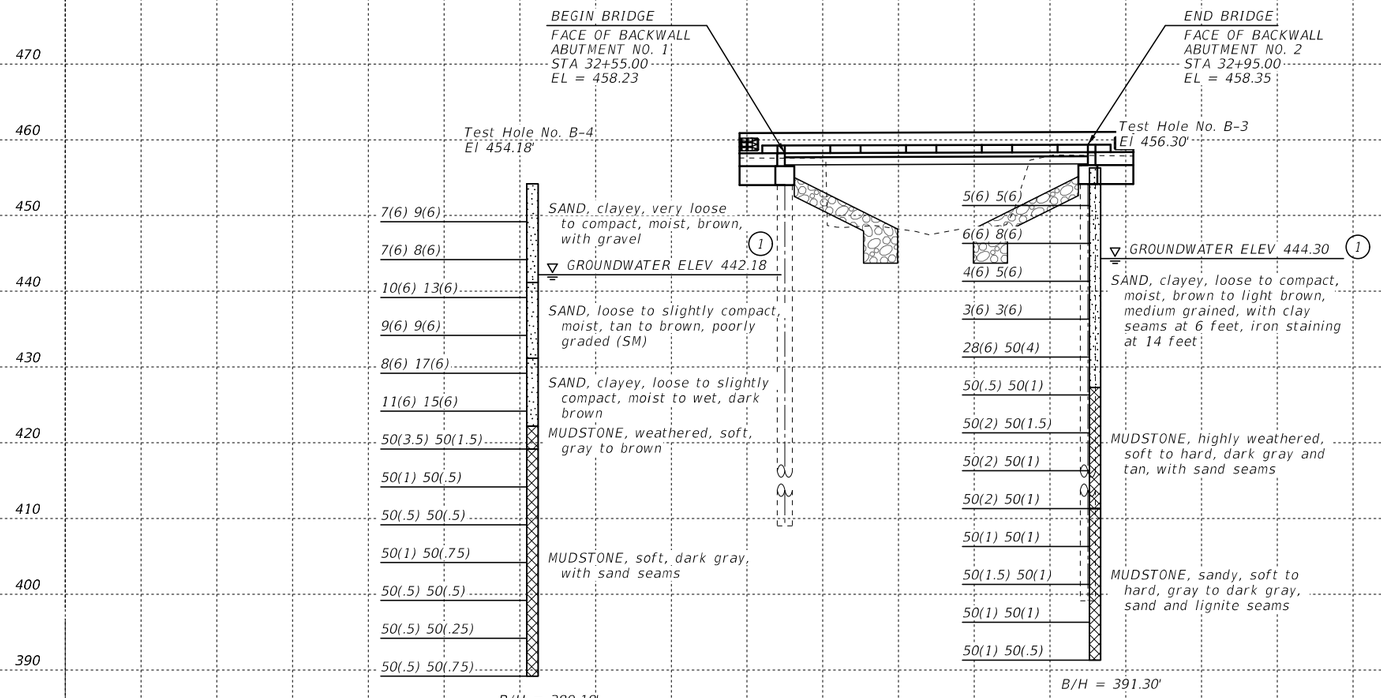
BRIDGE LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	69
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\CAD\Eng\Sheets\CR2918*BL01.dgn
DRAWING DATE: 11/11/2019



1 GROUND WATER LEVELS SHOULD FLUCTUATE DUE TO SEASONAL VARIATION IN CLIMATE CONDITIONS. FIELD TESTING WAS PERFORMED FROM 08/14/2019 TO 09/16/2019

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
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PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2918 @ STEVE CREEK

BORING LOGS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

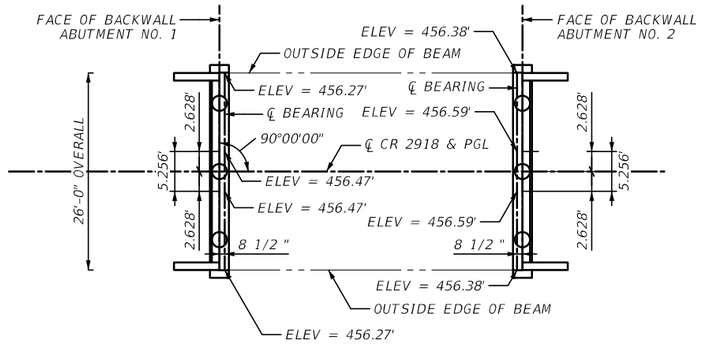
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	70
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\CAD\Eng\Sheets\CR2918*GT01.dgn

DRAWING DATE: 11/11/2019

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE SUMMARY								
BID CODE DESCRIPTION / BRIDGE ELEMENT	400 6005 CEMENT STABILIZED ABUTMENT BACKFILL	416 6002 DRILL SHAFT (24 IN)	420 6013 CL C CONC (ABUT)	422 6007 REINF CONC SLAB (SLAB BEAM)	425 6010 PRESTR CONC SLAB BEAM (5SB12)	432 6033 RIPRAP (STONE PROTECTION) (18 IN)	450 6006 RAIL (TY T223)	496 6009 REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	SF	LF	CY	LF	EA
2-ABUTMENTS	31	300	19.6			294	24.0	
1-40.00' PRESTR CONC SLAB BEAM SPAN				1040	197.50		80.0	
PROJECT TOTAL	31	300	19.6	1040	197.50	294	104.0	1



CAP ELEVATIONS

SEE APSB-24 STANDARD FOR CAP ELEVATION LOCATIONS AT OUTSIDE EDGE OF BEAM

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
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11/11/2019

NO.	REVISION	BY	DATE

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PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2918 @ STEVE CREEK

ESTIMATED QUANTITIES AND CONTROL ELEVATIONS

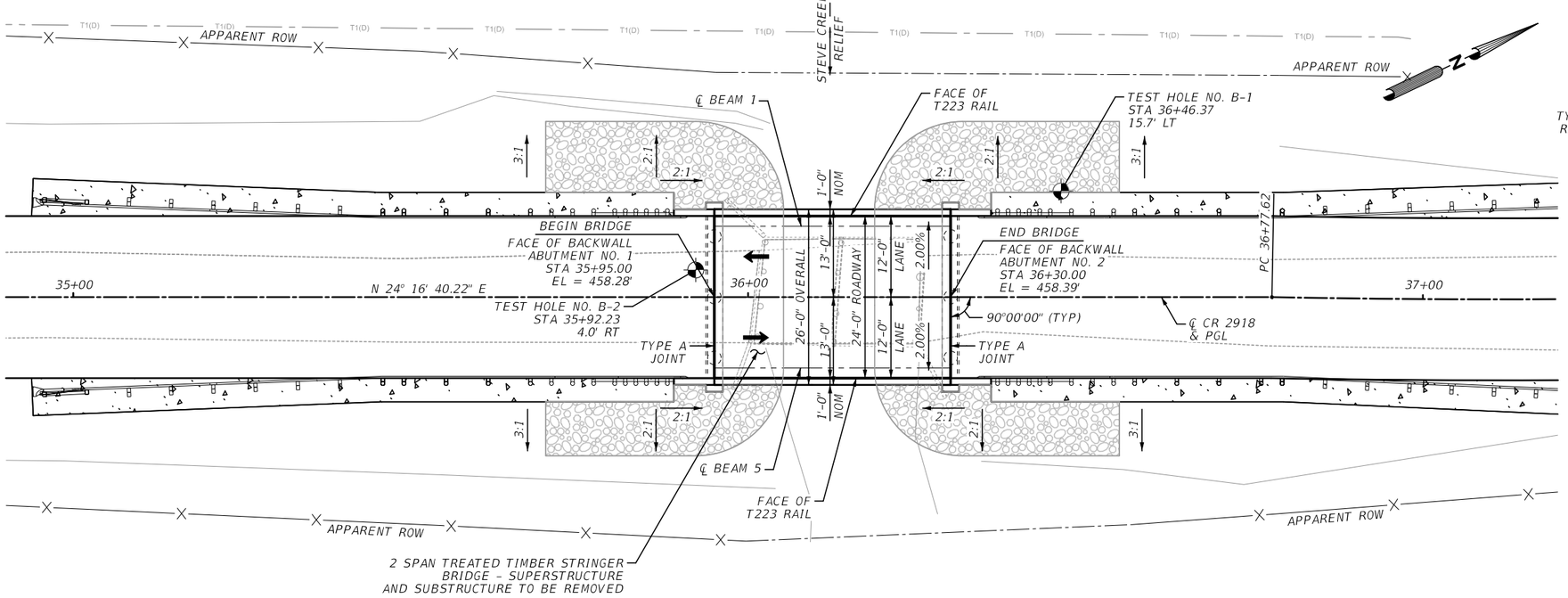
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	71
CONTROL	SECTION	JOB	
0910	12	134,ETC	

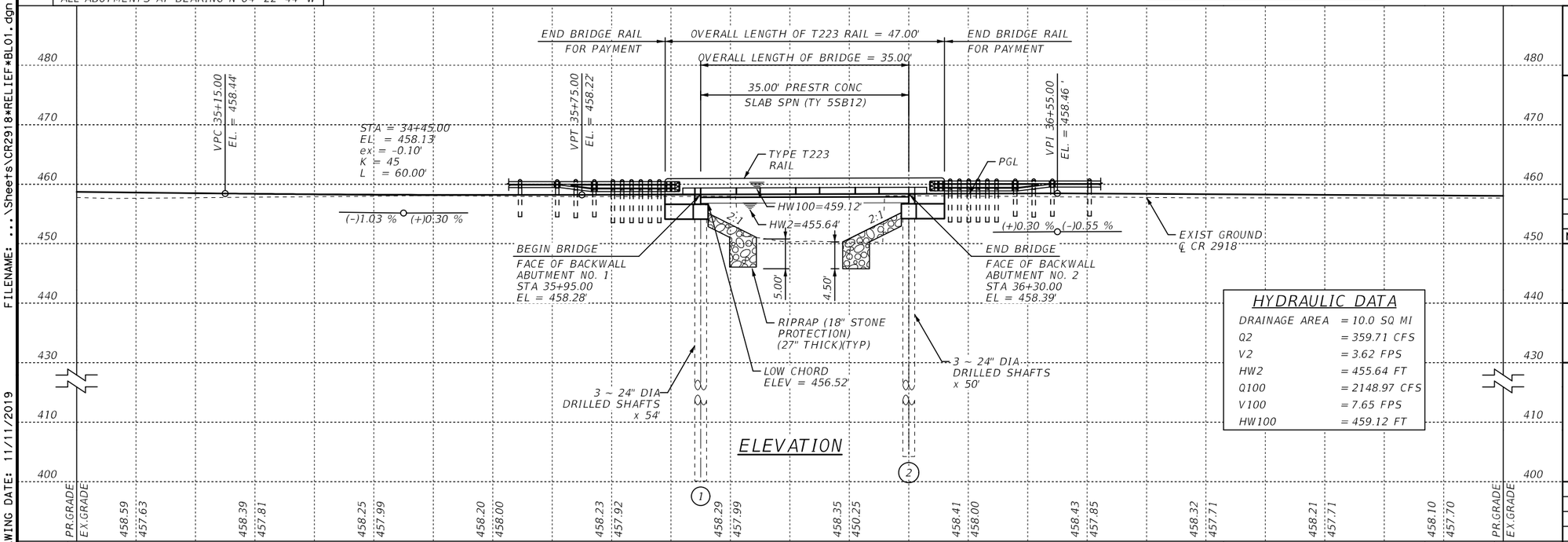
FILENAME: ...\CAD\Eng\Sheets\CR2918*BQ01.dgn

DRAWING DATE: 11/11/2019



PLAN

ALL ABUTMENTS AT BEARING N 64° 22' 44" W

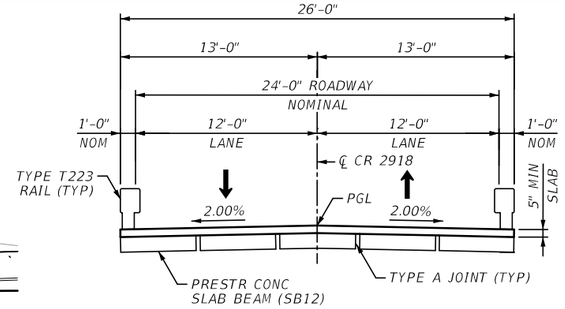


ELEVATION

HYDRAULIC DATA	
DRAINAGE AREA	= 10.0 SQ MI
Q2	= 359.71 CFS
V2	= 3.62 FPS
HW2	= 455.64 FT
Q100	= 2148.97 CFS
V100	= 7.65 FPS
HW100	= 459.12 FT

DESIGN SPEED = 30 MPH
FUNCTIONAL CLASS = RURAL LOCAL
EXISTING ADT (2015) = 100
EXIST NBI NO: AA29-18-101
PROP NBI NO: AA29-18-002

HL 93 LOADING



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH 8TH EDITION: 2017 AASHTO LRFD SPECIFICATIONS WITH CURRENT INTERIMS FOR HL-93 LOADING.
2. THE MAXIMUM FLOOD EVENT THAT DOES NOT OVERTOP THE PROPOSED BRIDGE DECK IS THE PROPOSED CAPACITY EVENT. THE HEC-RAS CROSS SECTION USED TO ESTIMATE THE HYDRAULIC DATA FOR THE BRIDGE LAYOUT IS LOCATED AT THE UPSTREAM BOUNDING SECTION.
3. SEE ROADWAY PLAN AND PROFILE SHEETS FOR MBGF DETAILS.
4. SEE BORING LOGS SHEET FOR TEST HOLES.
5. CUT EXISTING PILE FOUNDATION 2'-0" (MIN) BELOW EXISTING GRADE.
6. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF UTILITIES PRIOR TO ORDERING MATERIALS OR DRILLING FOUNDATIONS.
7. DRILLED SHAFTS SHALL BE FOUNDED AT TIP ELEVATION SHOWN OR DEEPER TO OBTAIN A MINIMUM 10 FEET PENETRATION INTO UNWEATHERED MUDSTONE LAYER.
8. CONTRACTOR ATTENTION DIRECTED TO THE WATER BEARING SAND MATERIAL SHOWN IN THE BORING LOGS. THE CONTRACTOR IS SOLEY RESPONSIBLE TO MAINTAIN THE STABILITY OF THE HOLES. CASING MUST BE REMOVED, IF UTILIZED: OTHERWISE THE ENGINEER MUST BE CONTACTED IMMEDIATELY.
9. CONTRACTOR SHALL COORDINATE WITH VAN ZANDT COUNTY TO ALLOW PERSONNEL TO BE PRESENT DURING BRIDGE DEMOLITION TO COLLECT THE EXISTING BRIDGE DECK FOR SALVAGING.

0' 10' 20'
SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

CR 2918 @ STEVE CREEK RELIEF

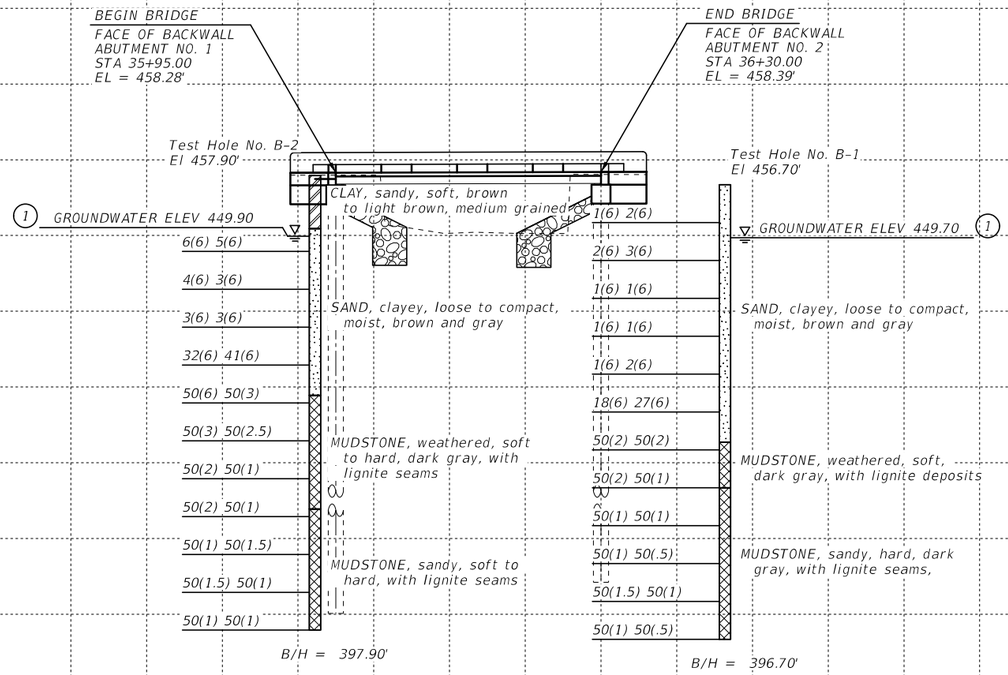
BRIDGE LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	72
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\Sheets\CR2918*RELIEF*BL01.dgn
DRAWING DATE: 11/11/2019



1 GROUND WATER LEVELS SHOULD FLUCTUATE DUE TO SEASONAL VARIATION IN CLIMATE CONDITIONS. FIELD TESTING WAS PERFORMED FROM 08/15/2019 TO 08/21/2019.

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED
PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

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5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

Texas Department of Transportation

CR 2918 @ STEVE CREEK RELIEF

BORING LOGS

SHEET 1 OF 1

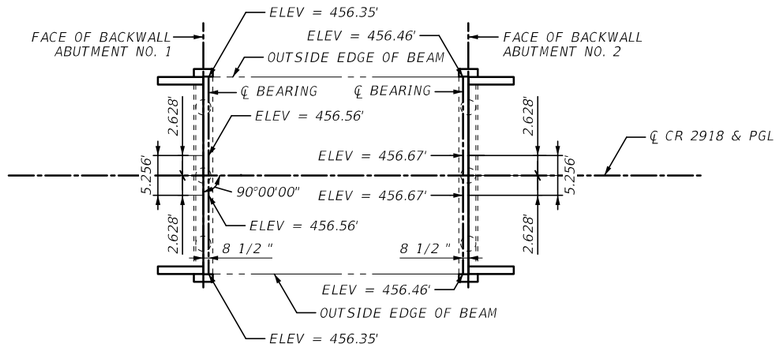
FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	73
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\Sheets\CR2918*RELIEF*GT01.dgn
DRAWING DATE: 11/11/2019

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE SUMMARY								
BID CODE / DESCRIPTION / BRIDGE ELEMENT	400 6005 CEMENT STABILIZED ABUTMENT BACKFILL	416 6002 DRILL SHAFT (24 IN)	420 6013 CL C CONC (ABUT)	422 6007 REINF CONC SLAB (SLAB BEAM)	425 6010 PRESTR CONC SLAB BEAM (5SB12)	432 6033 RIPRAP (STONE PROTECTION) (18 IN)	450 6006 RAIL (TY T223)	496 6009 REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	SF	LF	CY	LF	EA
2-ABUTMENTS	30	312	19.6			240	24.0	
1-35.00' PRESTR CONC SLAB BEAM SPAN				910	172.50		70.0	
PROJECT TOTAL	30	312	19.6	910	172.50	240	94.0	1



CAP ELEVATIONS

SEE APSB-24 STANDARD FOR CAP ELEVATION LOCATIONS AT OUTSIDE EDGE OF BEAM

0' 10' 20'

SCALE: 1"=20' H
1"=20' V

STATE OF TEXAS
SAMANTHA MCDONALD
128678
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TEXAS 75093 (214) 440-3600
TEXAS REGISTERED ENGINEERING FIRM F-9073

CR 2918 @ STEVE CREEK RELIEF

ESTIMATED QUANTITIES AND CONTROL ELEVATIONS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	74
CONTROL	SECTION	JOB	
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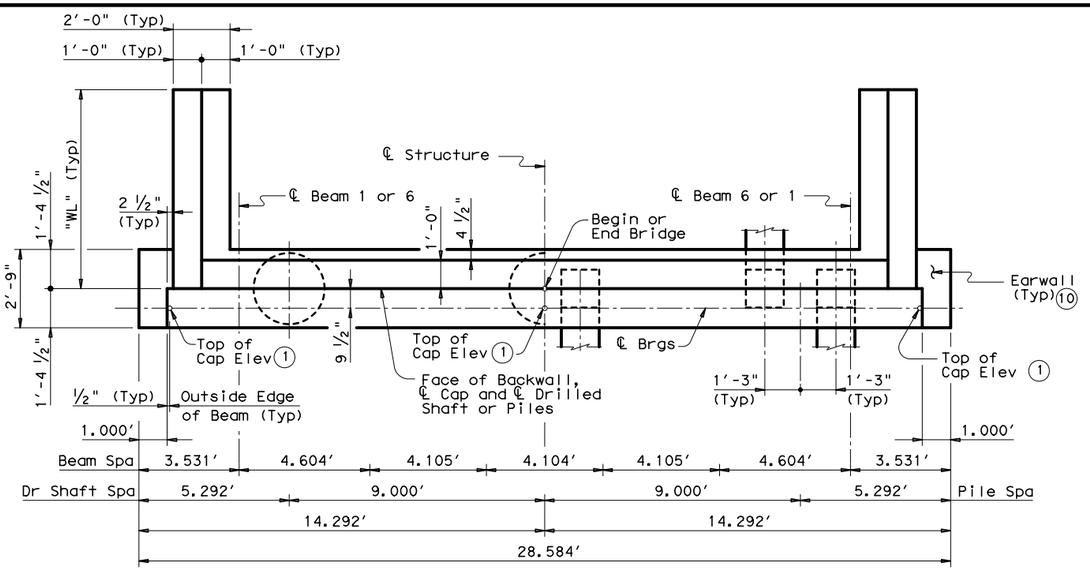
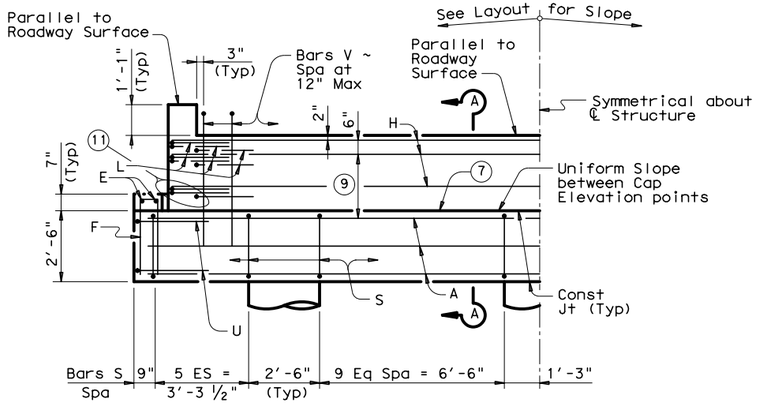
DRAWING DATE: 11/11/2019 FILENAME: ...\Sheets\CR2918*RELIEF*BQ01.dgn



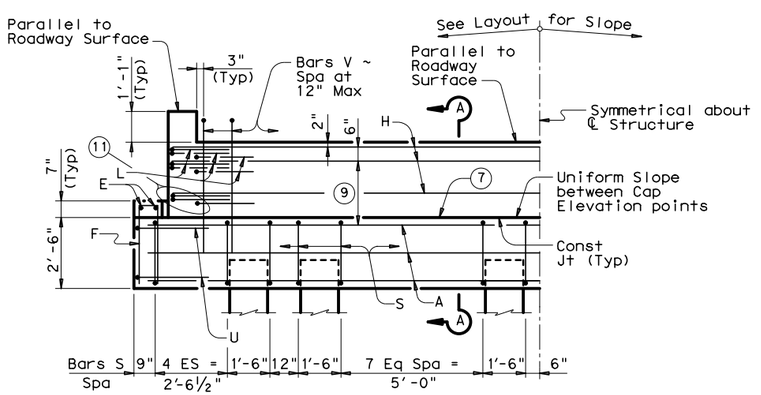
SHOWING DRILLED SHAFTS

PLAN

SHOWING BATTERED PILES

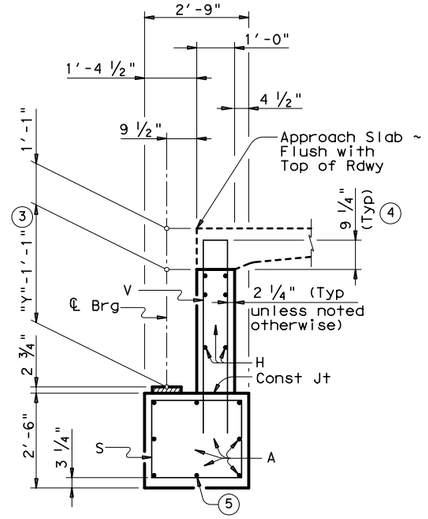


HALF ELEVATION ~ DRILLED SHAFT ABUTMENT



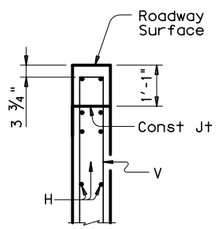
HALF ELEVATION ~ PILE ABUTMENT

(Showing 16" Piles ~ for Piles larger than 16", adjust Bars S spacing as required to avoid Piling)



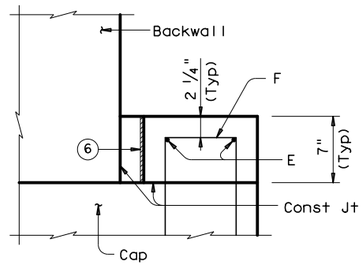
SECTION A-A

(Showing Approach Slab) (2)



BACKWALL DETAIL

(Without Approach Slab) (2)



EARWALL ELEVATION DETAIL (10)

(Slope top of earwall away from beams)

TABLE OF WINGWALL LENGTHS "WL"

Beam Type	"WL"
B20	8.000'
B28	10.000'
B34	11.000'

TABLE OF FOUNDATION LOADS (8)

Span Length	Drilled Shaft Load	Battered Pile Load
Ft	Tons/DS	Tons/Pile
30	50	38
35	55	41
40	60	43
45	64	45
50	68	47
55	73	50
60	77	52
65	81	54
70	85	56
75	89	58
80	93	60
85	97	62
90	101	64
95	105	66

(1) Top of Cap Elevations are based on section depths shown on Span Details.

(2) See Bridge Layout for Joint type and to determine if Approach Slab is present.

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

(4) Increase as required to maintain 3 ¾" from Finished Grade.

(5) With pile foundations, replace Bar A, located at bottom centerline of cap with 2 ~ #11 x 5'-0" bars placed between pile groups. Deduct 93 Lbs from reinforcing steel total.

(6) ½" Preformed Bituminous Fiber material between beam and earwall. Bond to beam with an approved adhesive. Inside face of earwall to be cast with vertical side of beam.

(7) Surface finish for the top of Cap will be a textured wood float finish. The surface must be level in the direction of the centerline of Beams.

(8) Foundation loads are based on B34 beams.

(9) Use 2 Eq Spa for B28 and B34 beams. Use 1 space for B20 beams.

(10) Do not cast earwalls until beams are erected in their final position.

(11) This set of Bars L only required for B28 and B34 beams.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
Concrete strength f'c = 3,600 psi.
All reinforcing must be Grade 60.
Designed for normal embankment header slope of 3:1 or 2:1.
See Bridge Layout for beam type and foundation type, size and length.
See standard FD for all foundation details and notes.
See applicable rail details for rail anchorage cast in wingwalls.
See standard CRR for riprap attachment details, if applicable.
These abutment details may be used only with the following standards:
SBBS-B20-24 or SBBO-B20-24
SBBS-B28-24 or SBBO-B28-24
SBBS-B34-24 or SBBO-B34-24

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS
PRESTR CONC BOX BEAMS
24' RDWY

ABB-24

FILE: bbstde17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS 04-11: Span length.	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		75

DATE: 11/11/2019 $TIME$
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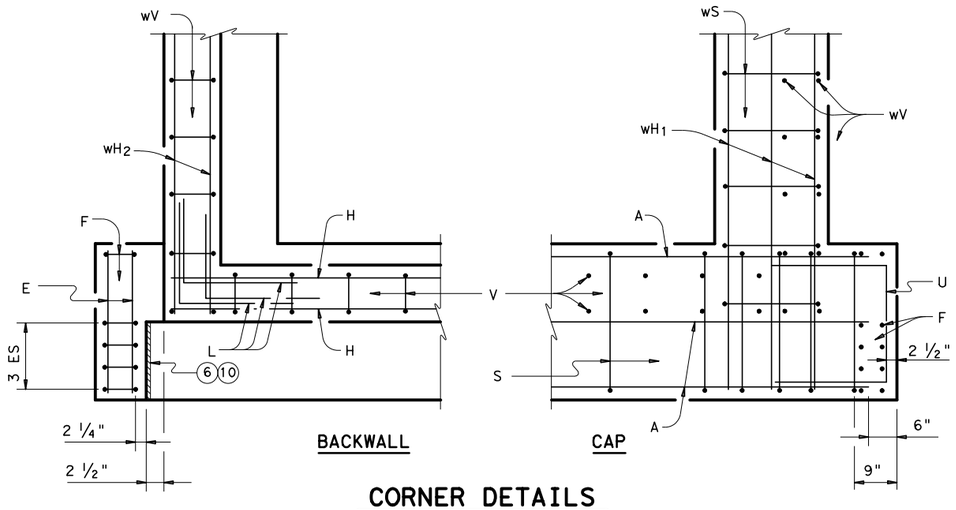
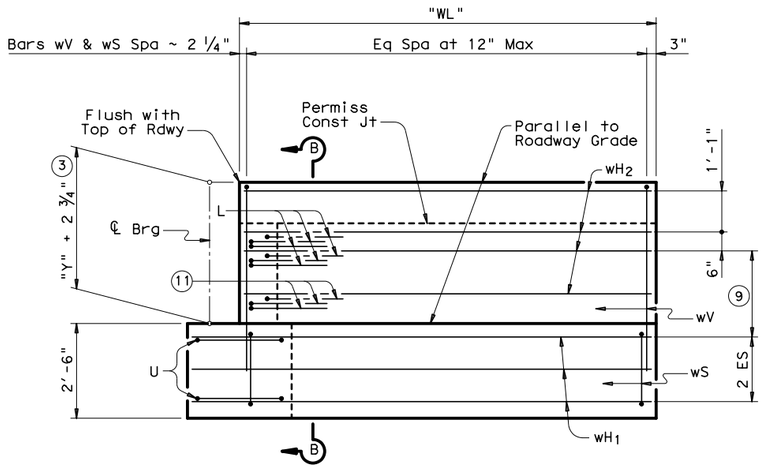


CORNER DETAILS



WINGWALL ELEVATION

(Earwall omitted for clarity)

SECTION B-B

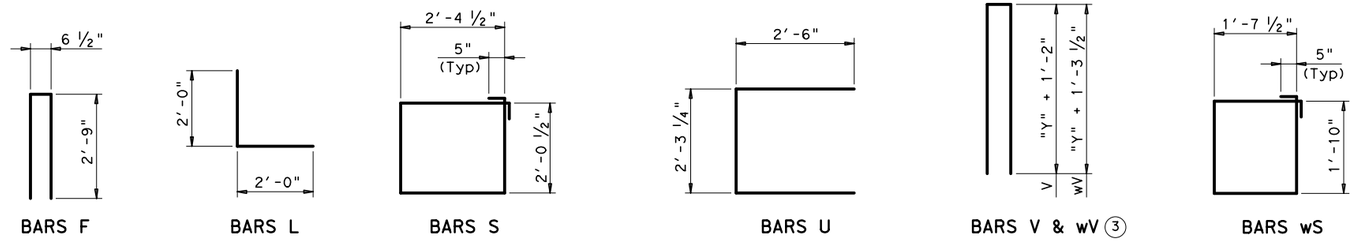


TABLE OF ESTIMATED QUANTITIES (TYPE B20 BEAMS)12

BAR	NO.	SIZE	LENGTH	WEIGHT
A 5	8	#11	27'- 7"	1,172
E	4	# 5	2'- 5"	10
F	10	# 5	6'- 1"	63
H	4	# 6	25'-10"	155
L	12	# 6	4'- 0"	72
S	32	# 4	9'- 8"	207
U	4	# 6	7'- 3"	44
V	25	# 5	7'- 6"	191
wH1	14	# 6	9'- 0"	189
wH2	12	# 6	7'- 8"	138
wS	18	# 4	7'- 9"	93
wV	18	# 5	7'- 9"	145
Reinforcing Steel			Lb	2,479
Class "C" Concrete (w/Slab)			CY	12.6
Class "C" Concrete (w/ACP)			CY	12.3

TABLE OF ESTIMATED QUANTITIES (TYPE B28 BEAMS)12

BAR	NO.	SIZE	LENGTH	WEIGHT
A 5	8	#11	27'- 7"	1,172
E	4	# 5	2'- 5"	10
F	10	# 5	6'- 1"	63
H	6	# 6	25'-10"	233
L	18	# 6	4'- 0"	108
S	32	# 4	9'- 8"	207
U	4	# 6	7'- 3"	44
V	25	# 5	8'- 9"	226
wH1	14	# 6	11'- 0"	231
wH2	16	# 6	9'- 8"	232
wS	22	# 4	7'- 9"	114
wV	22	# 5	9'- 0"	207
Reinforcing Steel			Lb	2,847
Class "C" Concrete (w/Slab)			CY	14.7
Class "C" Concrete (w/ACP)			CY	14.4

TABLE OF ESTIMATED QUANTITIES (TYPE B34 BEAMS)12

BAR	NO.	SIZE	LENGTH	WEIGHT
A 5	8	#11	27'- 7"	1,172
E	4	# 5	2'- 5"	10
F	10	# 5	6'- 1"	63
H	6	# 6	25'-10"	233
L	18	# 6	4'- 0"	108
S	32	# 4	9'- 8"	207
U	4	# 6	7'- 3"	44
V	25	# 5	9'-10"	254
wH1	14	# 6	12'- 0"	252
wH2	16	# 6	10'- 8"	256
wS	24	# 4	7'- 9"	124
wV	24	# 5	10'- 1"	252
Reinforcing Steel			Lb	2,975
Class "C" Concrete (w/Slab)			CY	16.2
Class "C" Concrete (w/ACP)			CY	15.9

3 See Span details for "Y" value.

5 With pile foundations, replace Bar A, located at bottom centerline of cap, with 2 ~ #11 x 5'-0" bars placed between pile groups. Deduct 93 Lbs from reinforcing steel total.

6 ½" Preformed Bituminous Fiber material between beam and earwall. Bond to beam with an approved adhesive. Inside face of earwall to be cast with vertical side of beam.

9 Use 2 Eq Spa for B28 and B34 beams and 1 space for B20 beams.

10 Do not cast earwalls until beams are erected in their final position.

11 This set of Bars L only required for B28 and B34 beams.

12 Quantities shown are for one Abutment only (with Approach Slab). With no Approach Slab, add 1.0 CY Class "C" concrete and 78 Lb reinforcing steel for 2 additional Bars H.

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

ABUTMENTS
PRESTR CONC BOX BEAMS
24' RDWY

ABB-24

FILE: bbstde17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
04-11: Span length.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		76

DATE: 11/11/2019 $TIME$
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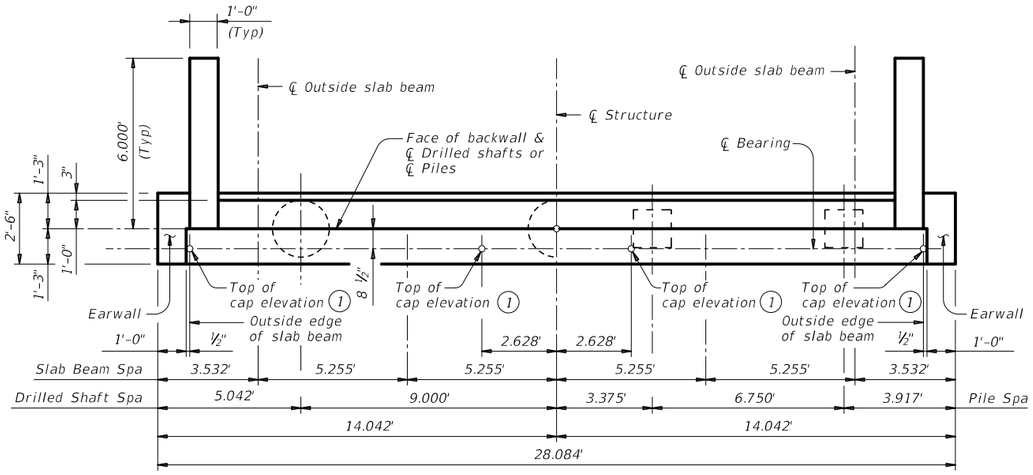
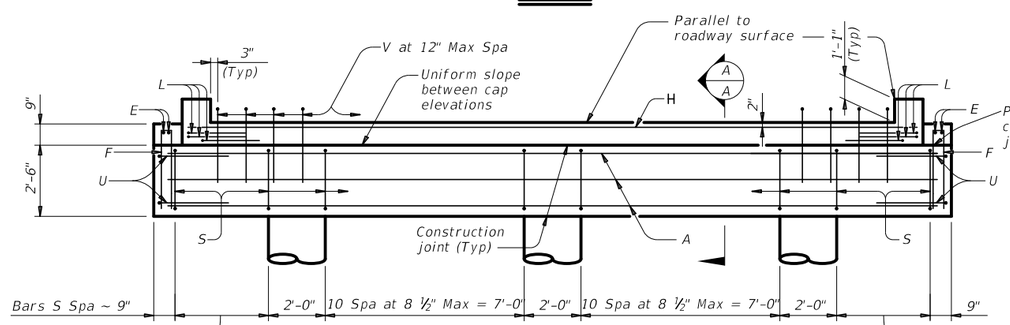


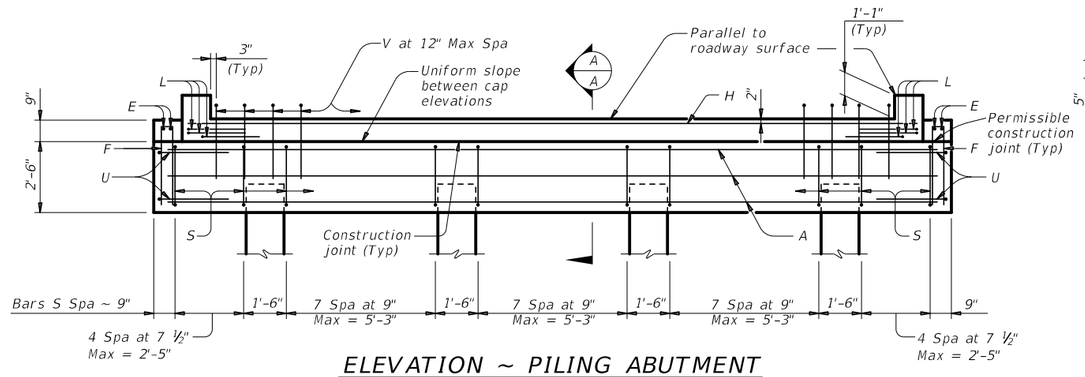
SHOWING DRILLED SHAFTS

PLAN

SHOWING PILES

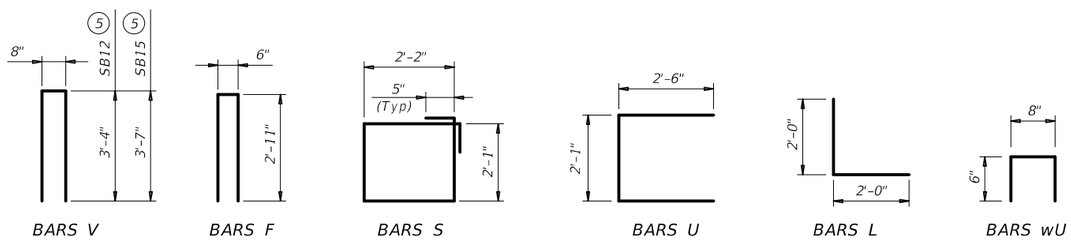


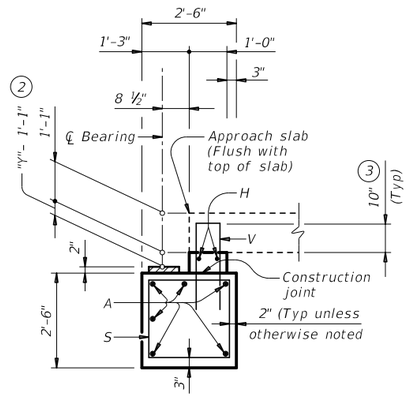
ELEVATION ~ DRILLED SHAFT ABUTMENT



ELEVATION ~ PILING ABUTMENT

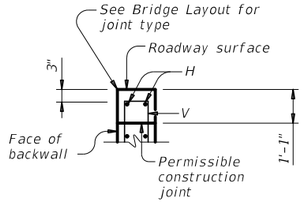
Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.





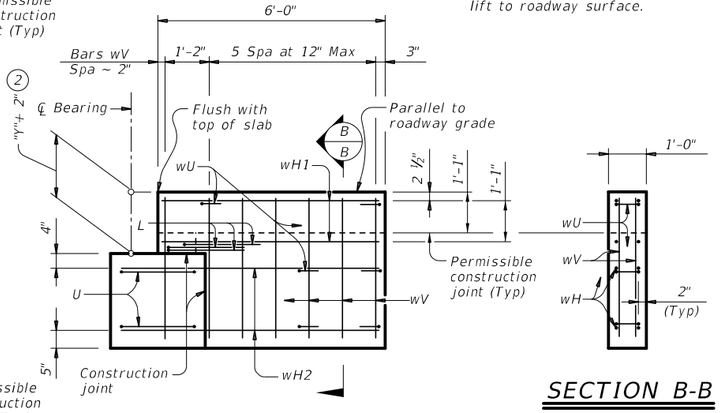
SECTION A-A (4)

(With approach slab)
Note: At Contractor's option, backwall may be cast with approach slab.



BACKWALL DETAIL (4)

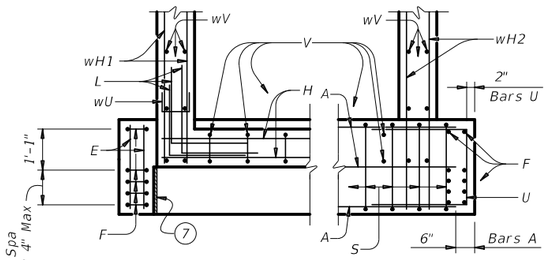
(Without approach slab)
Note: At Contractor's option, backwall may be cast in one lift to roadway surface.



WINGWALL ELEVATION

(Earwall not shown for clarity.)

SECTION B-B



BACKWALL CAP

CORNER DETAILS

FOUNDATION LOADS

Span Length	Drilled Shaft Loads		Vertical Pile Loads	
Ft	Tons/DS		Tons/Pile	
	5SB12	5SB15	5SB12	5SB15
25	39	41	29	31
30	43	46	33	34
35	48	51	36	38
40	52	55	39	41
45		59		44
50		63		47

TABLE OF ESTIMATED QUANTITIES (6)

Bar	No.	Size	Length (5)		Weight (5)	
			5SB12	5SB15	5SB12	5SB15
A	6	#11	27'-1"	27'-1"	863	863
E	4	#4	2'-2"	2'-2"	6	6
F	10	#4	6'-4"	6'-4"	43	43
H	2	#5	25'-8"	25'-8"	54	54
L	6	#6	4'-0"	4'-0"	36	36
S	34	#4	9'-4"	9'-4"	212	212
U	4	#6	7'-1"	7'-1"	43	43
V	25	#5	7'-4"	7'-10"	191	204
wH1	8	#6	5'-8"	5'-8"	68	68
wH2	8	#6	6'-11"	6'-11"	83	83
wU	12	#4	1'-8"	1'-8"	14	14
wV	28	#5	3'-10"	4'-1"	112	119
Reinforcing Steel				Lb	1,725	1,745
Cl "C" Conc (Abut)				CY	8.8	9.2

(1) *Top of cap elevations are based on section depths shown on Span Details.*

(2) *See Span Details for "Y".*

(3) *Increase as required to maintain 3" from finished grade.*

(4) *See Bridge Layout to determine if approach slab is present.*

(5) *See Bridge Layout for beam type used in the superstructure.*

(6) *Quantities shown are for one abutment only (with approach slab). Without approach slab, add 1.0 CY Class "C" concrete and 54 Lb reinforcing steel for 2 additional Bars H.*

(7) *½" preformed bituminous fiber material between slab beam and earwall. Bond to earwall with an approved adhesive. Cast inside face of earwall perpendicular to cap. (Typ)*

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Designed for a normal embankment header slope of 3:1 and a maximum span length of 50 feet.
See Bridge Layout for header slope and foundation type, size, and length.
See Common Foundation Details (FD) standard sheet for all foundation details and notes.
See Concrete Riprap (CRR) standard sheet or Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.
See applicable rail details for rail anchorage in wingwalls.
These abutment details may be used with standard SPSB-24 only.

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

MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).
Provide Class C (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

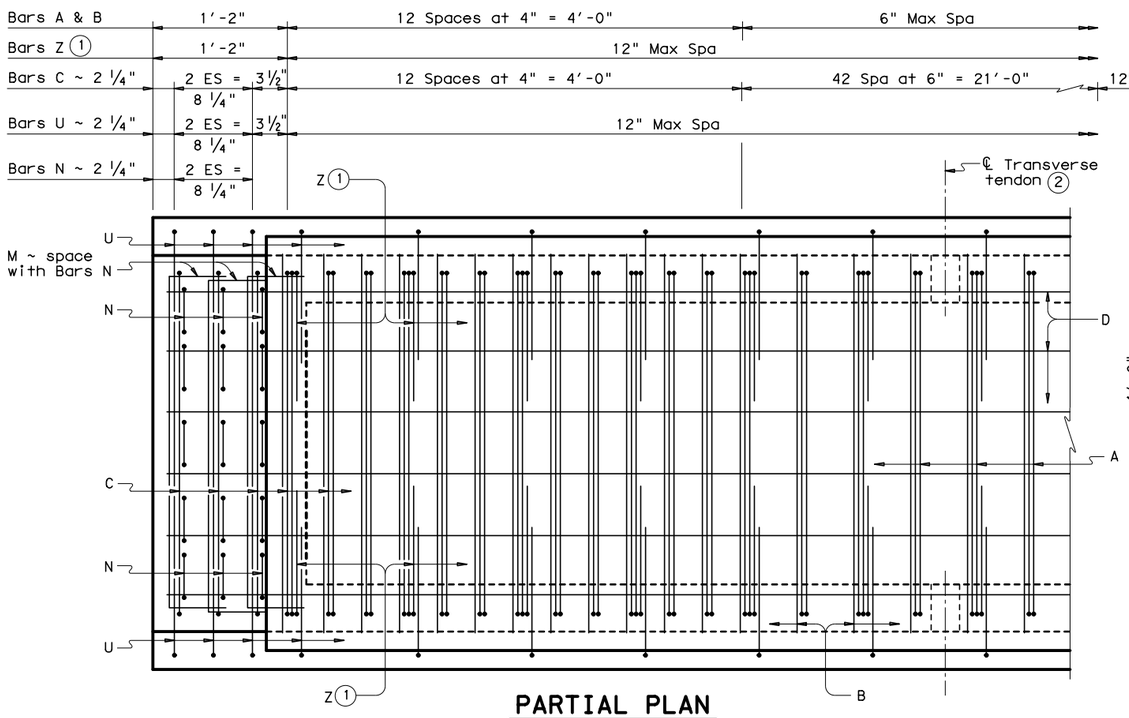
ABUTMENTS

PRESTR CONCRETE SLAB BEAM

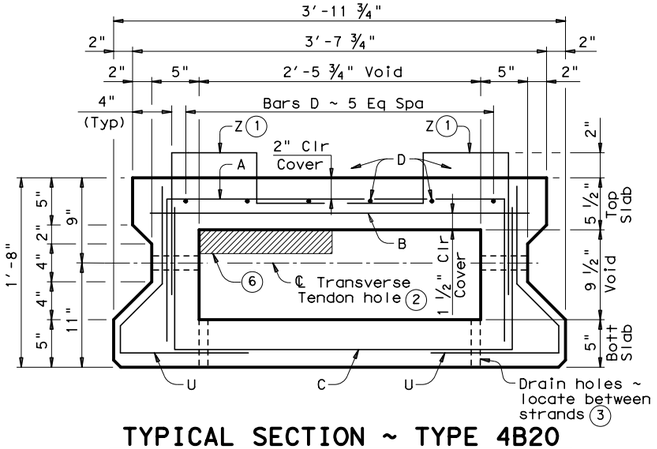
24' ROADWAY

APSB-24

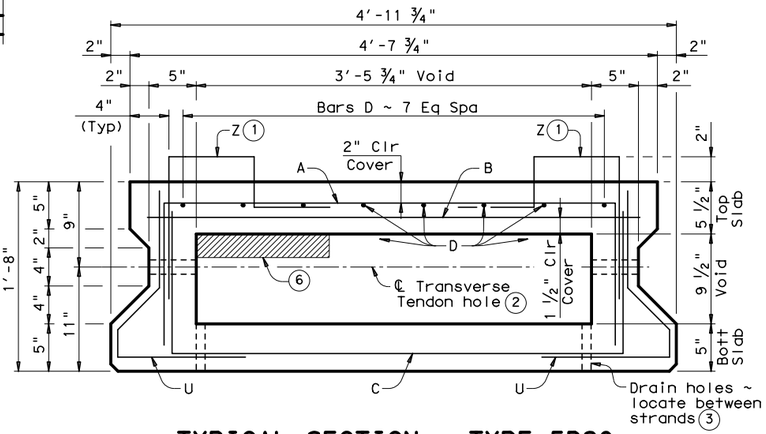
FILE: psbste09-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		77



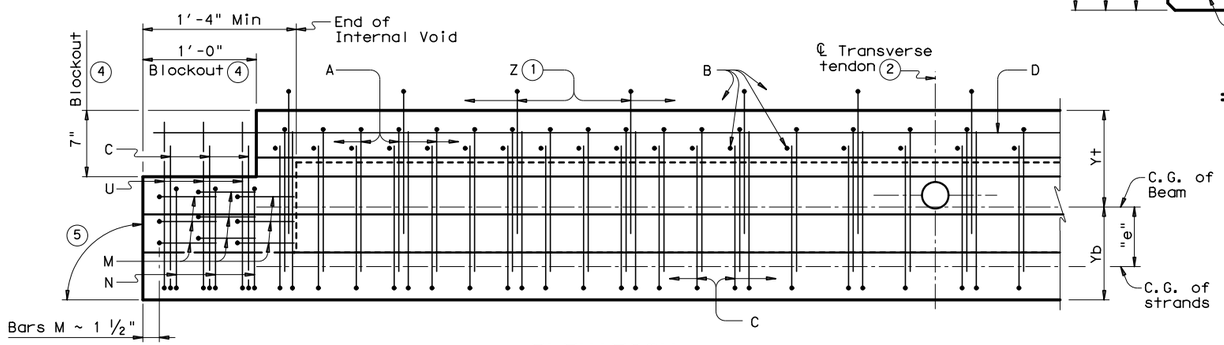
PARTIAL PLAN
(Showing Type 4B20)



TYPICAL SECTION ~ TYPE 4B20



TYPICAL SECTION ~ TYPE 5B20



ELEVATION

BEAM PROPERTIES			
		Type 4B20	Type 5B20
Area	in^2	591.8	717.8
Y top	in	10.19	10.12
Y bott	in	9.81	9.88
I	in^4	28,086	35,234
Weight (7)	lb/ft	616	748

(1) Bars Z are required for beams topped with a cast-in-place concrete slab only.

(2) Post-tensioning tendons are required for beams not topped with a Min 5" cast-in-place concrete slab. See span details for number and spacing of transverse tendons. Cast interior diaphragms in exterior beams and beams that serve temporarily as exterior beams in staged constructed bridges. See "Blockout, Interior Diaphragm, and Drain Details". Form 3" Dia holes in interior beams. See standard BBPT for details.

(3) Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details".

(4) Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.

(5) 90° at conventional Interior Bents. Ends of beams shall be vertical at Abutment backwall and Inverted Tee Bent Stems.

(6) Showing void modification required in exterior beams not topped with a Min 5" cast-in-place concrete slab. See standard BBRAO for void modification dimensions.

(7) Based on 150 pcf weight density of concrete. Weight of end blocks and interior diaphragms is not included.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Use Class H concrete. Use Class H (HPC) if required elsewhere in plans. All reinforcing steel must be Grade 60.

Two-stage monolithic casting is required. The concrete in the first stage cast (bottom beam flange) must remain plastic until the second stage cast (webs and top beam flange) is placed. Vibrate as required to ensure consolidation between the two casts.

1 1/4" clear cover to reinforcement is required unless noted otherwise.

See standard BBRAS or BBRAO for railing anchorage at bridge edges to be cast in beams.

An equal area of welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be substituted for Bars A, B, C, and D.

These details are applicable for skews up to 30 degrees only.

Chamfer bottom beam corners 3/4" or round to a 3/4" radius.

HL93 LOADING

SHEET 1 OF 3

Texas Department of Transportation

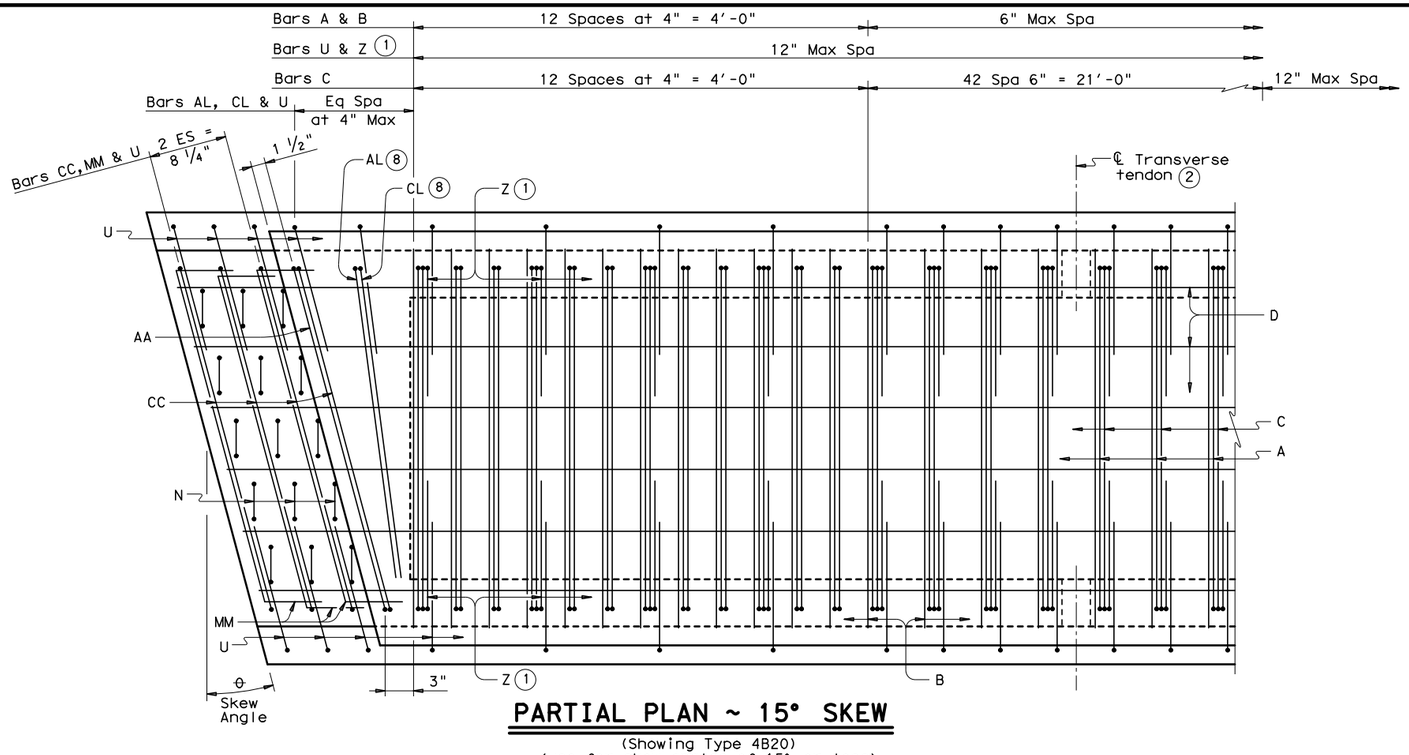
Bridge Division Standard

PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B20)

BB-B20

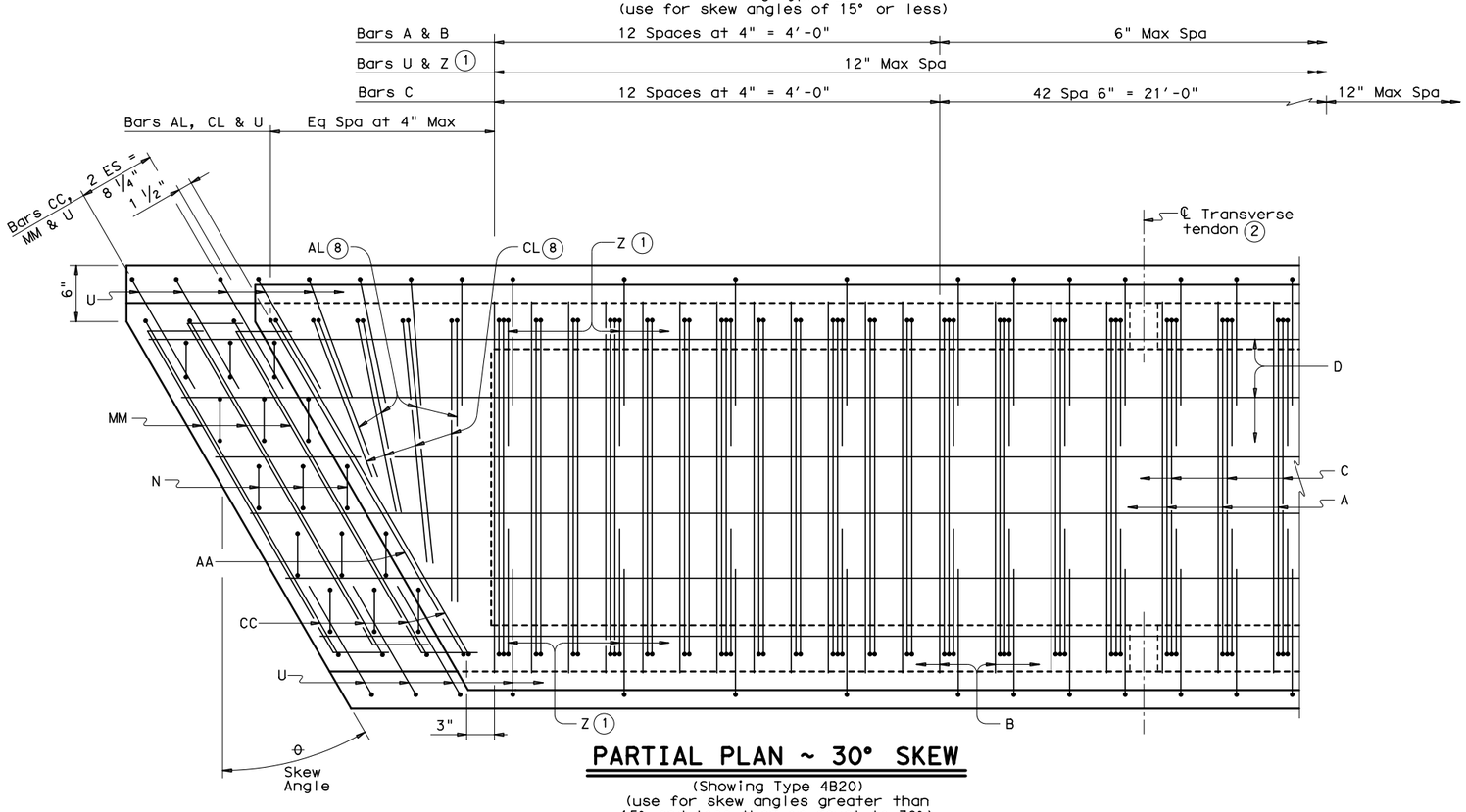
FILE: bbstds01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
01-12: Bars Z.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		78

DATE: 11/11/2019 $TIME$
FILE: ...\Eng\Standards\bbstds01-1.dgn



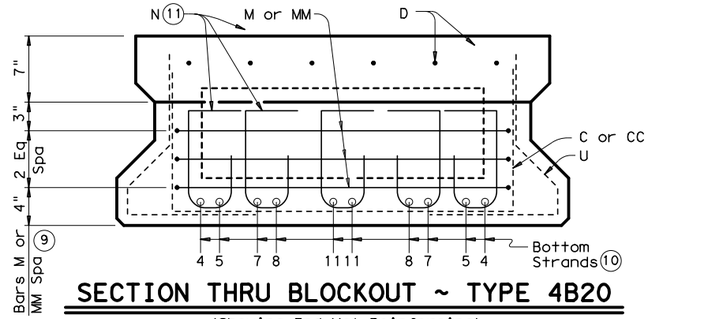
PARTIAL PLAN ~ 15° SKEW

(Showing Type 4B20)
(use for skew angles of 15° or less)



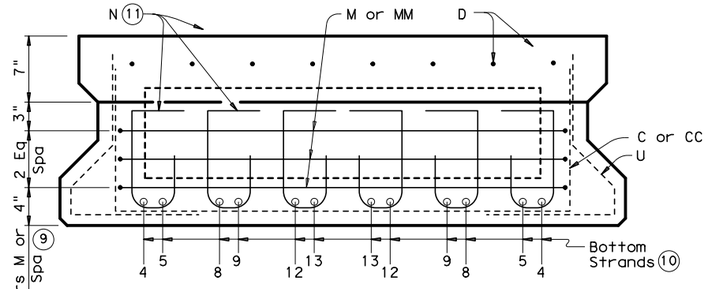
PARTIAL PLAN ~ 30° SKEW

(Showing Type 4B20)
(use for skew angles greater than 15° and less than or equal to 30°)



SECTION THRU BLOCKOUT ~ TYPE 4B20

(Showing End Mat Reinforcing)



SECTION THRU BLOCKOUT ~ TYPE 5B20

(Showing End Mat Reinforcing)

(1) Bars Z are required for beams topped with a cast-in-place concrete slab only.

(2) Post-tensioning tendons are required for beams not topped with a Min 5" cast-in-place concrete slab. See span details for number and spacing of transverse tendons. Cast interior diaphragms in exterior beams and beams that serve temporarily as exterior beams in staged constructed bridges. See "Blockout, Interior Diaphragm, and Drain Details". Form 3" Dia hole in interior beams. See standard BBPT for details.

(8) Cut as required to maintain one inch clear between bars.

(9) Bars M may be adjusted vertically as required to avoid pretensioning strands in web.

(10) See standard BBND or appropriate Prestressed Concrete Box Beam Standard Designs sheet for locations of pretensioning strands.

(11) For Type 4B20 Box Beams: Bars N may be reduced to 4 bars per row when beam design contains fewer than 22 strands. In this case, place Bars N at the 5-6 and 8-9 strand locations.

For Type 5B20 Box Beams: Bars N may be reduced to 5 bars per row when beam design contains fewer than 28 strands. In this case, place Bars N at the 4-5, 9-10 and 14-14 strand locations.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B20)

BB-B20

FILE: bbstds01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
01-12: Bars Z.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		79

DATE: 11/11/2019 $TIME$
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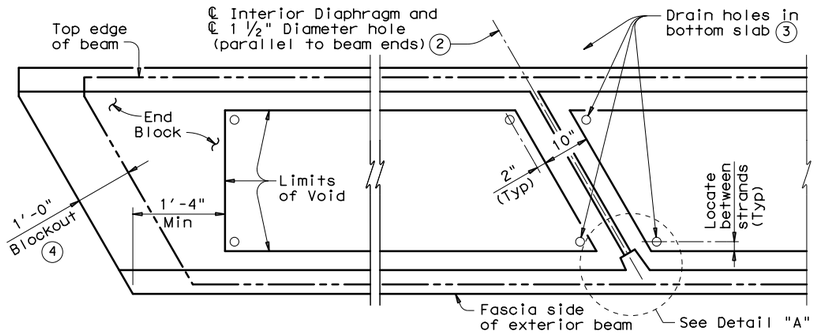
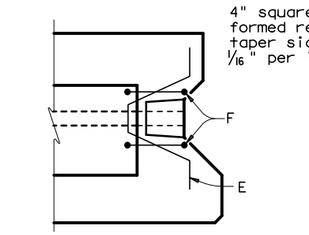
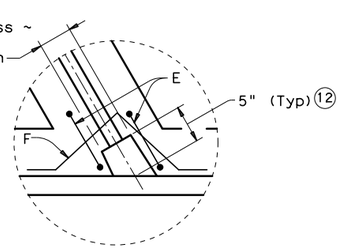


BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

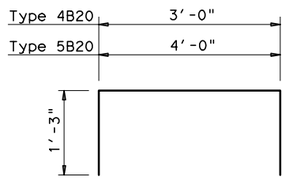
(Showing 30° skew)



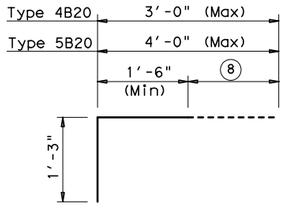
POST-TENSION ANCHORAGE DETAIL



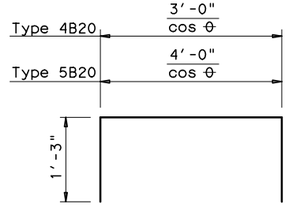
DETAIL A



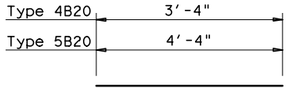
BARS A & C (#4)



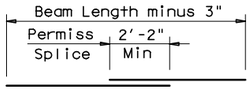
BARS AL & CL (#4)



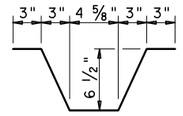
BARS AA & CC (#4)



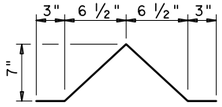
BARS B (#4)



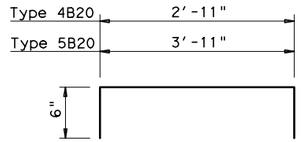
BARS D (#5)
Permissible splices to be placed in middle third of span



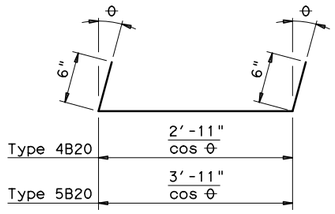
BARS E (#4)



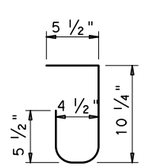
BARS F (#4)



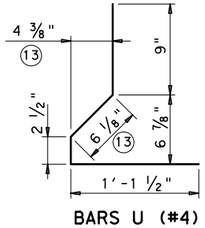
BARS M (#4)



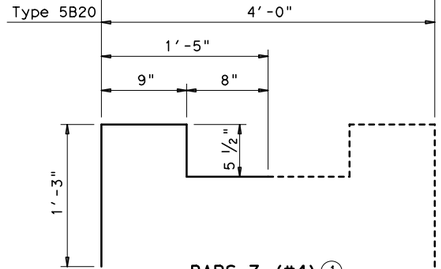
BARS MM (#4)



BARS N (#4)



BARS U (#4)



BARS Z (#4) (1)

At fabricator's option, Bars Z pairs may be fabricated using one continuous bar. If this option is used, Bars B at Bar Z locations (only) may be omitted.

(1) Bars Z are required for beams topped with a cast-in-place concrete slab only.

(2) Post-tensioning tendons are required for beams not topped with a Min 5" cast-in-place concrete slab. See span details for number and spacing of transverse tendons. Cast interior diaphragms in exterior beams and beams that serve temporarily as exterior beams in staged constructed bridges. Form 3" Dia holes in interior beams. See "Blockout, Interior Diaphragm, and Drain Details". See standard BBPT for details.

(3) Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details".

(4) Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.

(8) Cut as required to maintain one inch clear between bars.

(12) 5" (Typ) or sufficient depth to provide 1" Cover on cut-off tendon. See BBPT for details.

(13) Dimension will vary slightly with skew. Adjust as necessary.

HL93 LOADING

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B20)

BB-B20

FILE: bbstds01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
01-12: Bars Z.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		80

DATE: 11/11/2019 $TIME$
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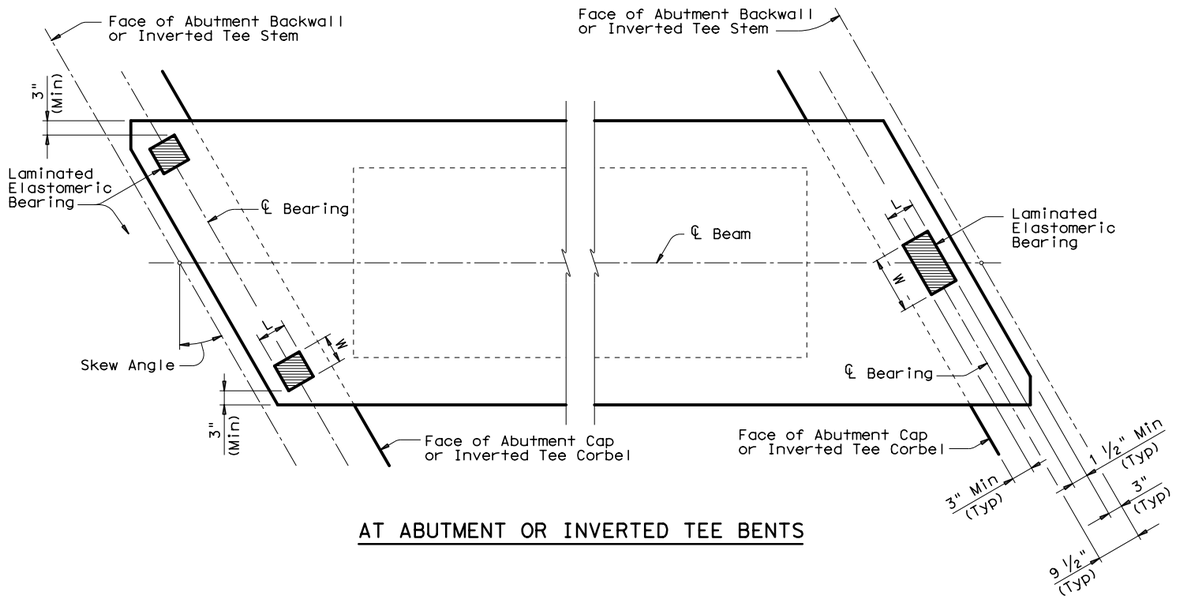
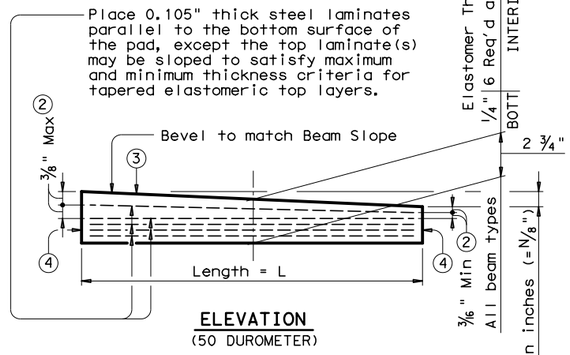


AT ABUTMENT OR INVERTED TEE BENTS



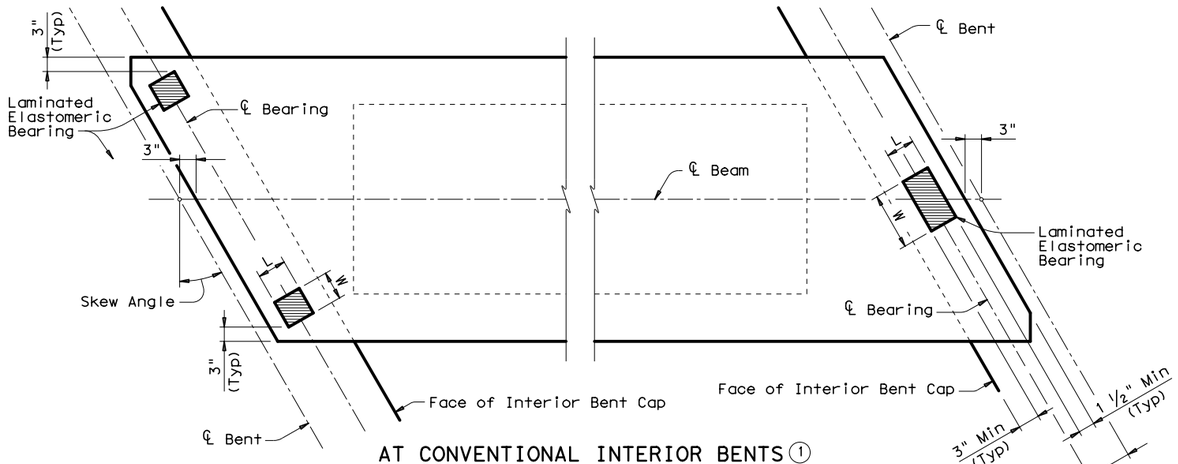
ELEVATION
(50 DUROMETER)

ELASTOMERIC BEARING SECTION

(50 DUROMETER)
The use of Polyisoprene (natural rubber), for the manufacture of bearing pads, is not permitted.

ELASTOMETRIC BEARING DIMENSIONS

BEARING TYPE	BEAM TYPE	ONE BEARING		TWO BEARINGS	
		L	W	L	W
B20-"N"	4B20	6"	12"	6"	6"
	5B20	6"	12"	6"	6"
B28-"N"	4B28	6"	14"	6"	7"
	5B28	6"	14"	6"	7"
B34-"N"	4B34	6"	16"	6"	8"
	5B34	6"	16"	6"	8"
B40-"N"	4B40	6"	20"	6"	10"
	5B40	6"	20"	6"	10"



AT CONVENTIONAL INTERIOR BENTS ①

ELASTOMERIC BEARING PLACEMENT DIAGRAMS

The Forward Station Beam End will have one bearing and the Back Station Beam End will have two bearings.

① For Transition Bents with backwall, beams and elastomeric bearings will receive the same treatment as shown for Abutment Bents.

② Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

③ Indicate BEARING TYPE on all pads.
For tapered pads, BEARING TYPE will be located on the high side. The Fabricator will include the value of "N" (amount of taper in 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{\text{Length}}\right)$ IN/IN.

④ Locate Permanent Mark here.

GENERAL NOTES:

Set beams on elastomeric bearings of the dimensions shown. Center bearings as near nominal ℄ bearing as possible within limits shown.

Constant thickness bearings may be used for moderate beam slopes up to 0.0113 ft/ft.

For skewed supports, Bearings beveled for beam slope may not provide uniform contact. However, predicted contact is considered within allowable tolerances.

Shop drawings for approval are required.

A bearing layout which identifies location and orientation of all bearings will be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings is to be included in unit price bid for "Prestressed Concrete Box Beams".

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

These details are applicable for skews up to 30 degrees only.

HL93 LOADING

Texas Department of Transportation

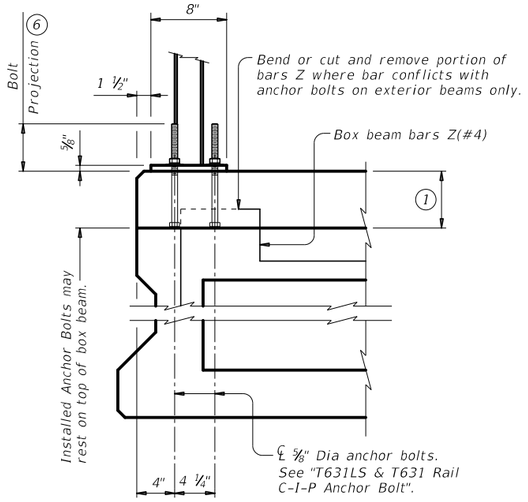
Bridge Division Standard

ELASTOMERIC BEARING DETAILS

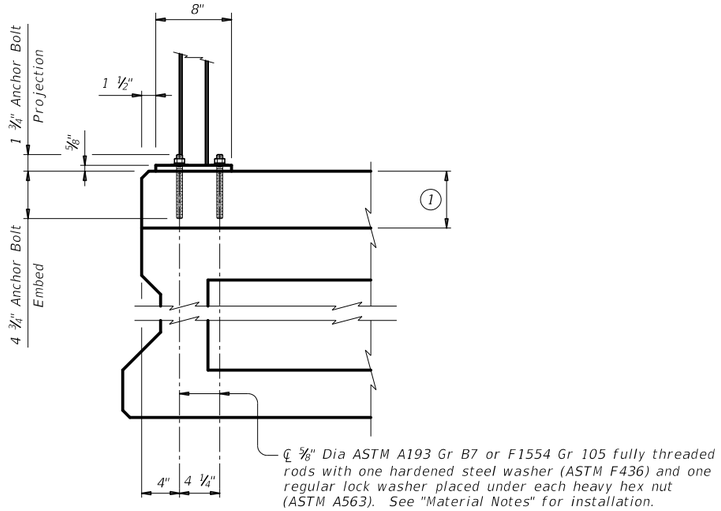
PRESTR CONC BOX BEAMS

BBEB

FILE: bbstde08.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		81



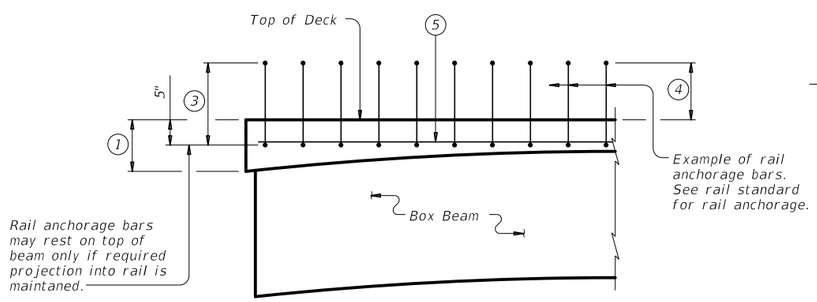
CAST-IN-PLACE ANCHORAGE OPTION



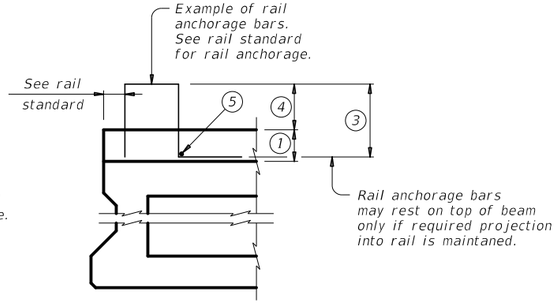
ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2)(7)

1. Cast-in-place slab thickness varies due to beam camber (5" minimum).
2. Replace cast-in-place anchor bolts shown on T631LS or T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
3. Bar length shown on rail standard, minus 1 ½". Adjust bar length for a raised sidewalk.
4. See Rail standard for projection from finished grade or top of sidewalk.
5. Place additional (#5) longitudinal bar.
6. Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 10", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
7. Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
   30° Skew: 1'-3" (acute corner only)
8. Location of Rail Expansion Joint must be at the intersection of ℄ Slab Expansion Joint, ℄ Rail Footprint and perpendicular to slab outside edge.
9. Cross-hatched area must have ½" Preformed Bitumuminous Fiber Material under concrete rail, as shown.



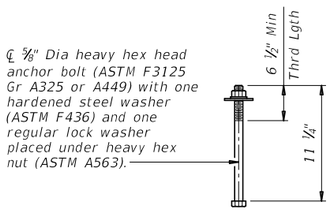
PART SPAN ELEVATION



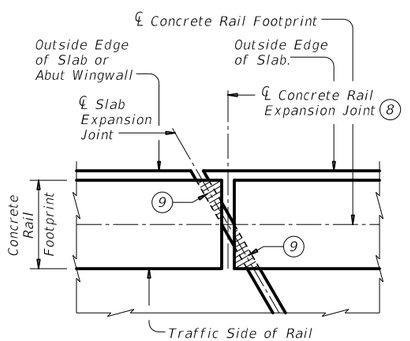
SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on box beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONC BOX BEAMS (WITH SLAB)

BBRAS

FILE: bbstde09-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS 04-90: Updated for new rails. 01-12: Rails anchor bars. 07-14: Removed T101 & T6. Added T631. 03-16: Class D, E, or F epoxy in material notes. T221P & T224 in general notes. 03-18: Updated adhesive anchor notes.	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		82

DATE: 11/11/2019 $TIME$
FILE: ...\Eng\Standards\bbstde09-18.dgn

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

DATE: 11/11/2019 $TIME$
FILE: ...\CAD\Eng\Standards\bbstds11.dgn

STANDARD SBBS-B20-24	DESIGNED BEAMS (STRAIGHT STRANDS)																		OPTIONAL DESIGN				
	PRESTRESSING STRANDS									DEBONDED STRAND PATTERN PER ROW								CONCRETE				
	SPAN LENGTH (ft)	BEAM NO.	BEAM TYPE	NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB	DIST FROM BOTTOM (in)	NO.OF STRANDS TOTAL	NO.OF STRANDS DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end) 3	6	9	12	15	RELEASE STRGTH ① f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (ft-kips)	LIVE LOAD DISTRIBUTION FACTOR ② Moment	LIVE LOAD DISTRIBUTION FACTOR ② Shear
	30	1&6	5B20		8	0.6	270	7.38	7.38	0	2.50	8	0	0	0	0	0	0	4.000	5.000	0.640	-0.808	704	0.454	0.691
	30	2-5	4B20		6	0.6	270	7.31	7.31	0	2.50	6	0	0	0	0	0	0	4.000	5.000	0.693	-0.860	601	0.379	0.511
	35	1&6	5B20		8	0.6	270	7.38	7.38	0	2.50	8	0	0	0	0	0	0	4.000	5.000	0.838	-1.041	795	0.440	0.680
	35	2-5	4B20		6	0.6	270	7.31	7.31	0	2.50	6	0	0	0	0	0	0	4.000	5.000	0.911	-1.111	615	0.367	0.498
	40	1&6	5B20		10	0.6	270	7.38	7.38	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.061	-1.297	889	0.427	0.671
24' Roadway	40	2-5	4B20		8	0.6	270	7.31	7.31	0	2.50	8	0	0	0	0	0	0	4.000	5.000	1.156	-1.388	712	0.356	0.488
5" Slab	45	1&6	5B20		10	0.6	270	7.38	7.38	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.316	-1.590	960	0.417	0.663
	45	2-5	4B20		10	0.6	270	7.31	7.31	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.437	-1.706	824	0.348	0.481
	50	1&6	5B20		12	0.6	270	7.38	7.38	0	2.50	12	0	0	0	0	0	0	4.000	5.000	1.606	-1.927	1147	0.408	0.655
	50	2-5	4B20		12	0.6	270	7.31	7.31	0	2.50	12	0	0	0	0	0	0	4.000	5.000	1.755	-2.070	985	0.340	0.476
	55	1&6	5B20		16	0.6	270	7.38	7.38	0	2.50	16	0	0	0	0	0	0	4.000	5.000	1.921	-2.289	1344	0.400	0.649
	55	2-5	4B20		14	0.6	270	7.31	7.31	0	2.50	14	0	0	0	0	0	0	4.000	5.000	2.104	-2.464	1157	0.334	0.471
	60	1&6	5B20		18	0.6	270	7.38	7.38	0	2.50	18	0	0	0	0	0	0	4.000	5.000	2.262	-2.677	1551	0.393	0.643
	60	2-5	4B20		18	0.6	270	7.31	7.31	2	2.50	18	2	0	2	0	0	0	4.000	5.000	2.487	-2.899	1347	0.333	0.467
	65	1&6	5B20		24	0.6	270	7.38	7.38	6	2.50	24	6	2	2	0	2	0	4.000	5.000	2.627	-3.091	1769	0.387	0.638
	65	2-5	4B20		20	0.6	270	7.31	7.31	4	2.50	20	4	0	2	0	2	0	4.000	5.800	2.903	-3.368	1551	0.333	0.463

DESIGN NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

Beam designs are applicable for 5" concrete slabs without overlay and 0 degree skew.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

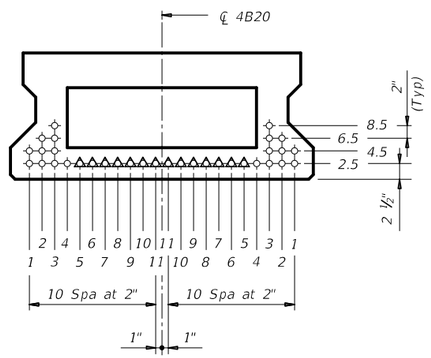
Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard stand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:

1) Locate a strand in each "1" position.
2) Place strand symmetrically about vertical centerline of box.
3) Space strands as equally as possible across the entire width.

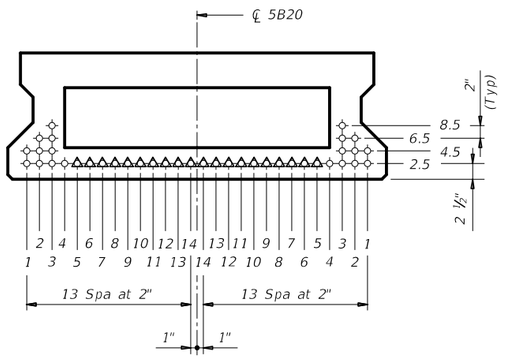
Strand debonding must comply with Item 424.4.2.2.2.4.

Do not debond strands in position "1". Distribute debonded strands equally about the vertical centerline. Decrease debonded lengths working inward, with debonding staggered in each row.

Full-length debonded strands are only permitted in positions marked △.



TxDOT 4B20 BOX BEAM



TxDOT 5B20 BOX BEAM

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

② Portion of full HL93.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

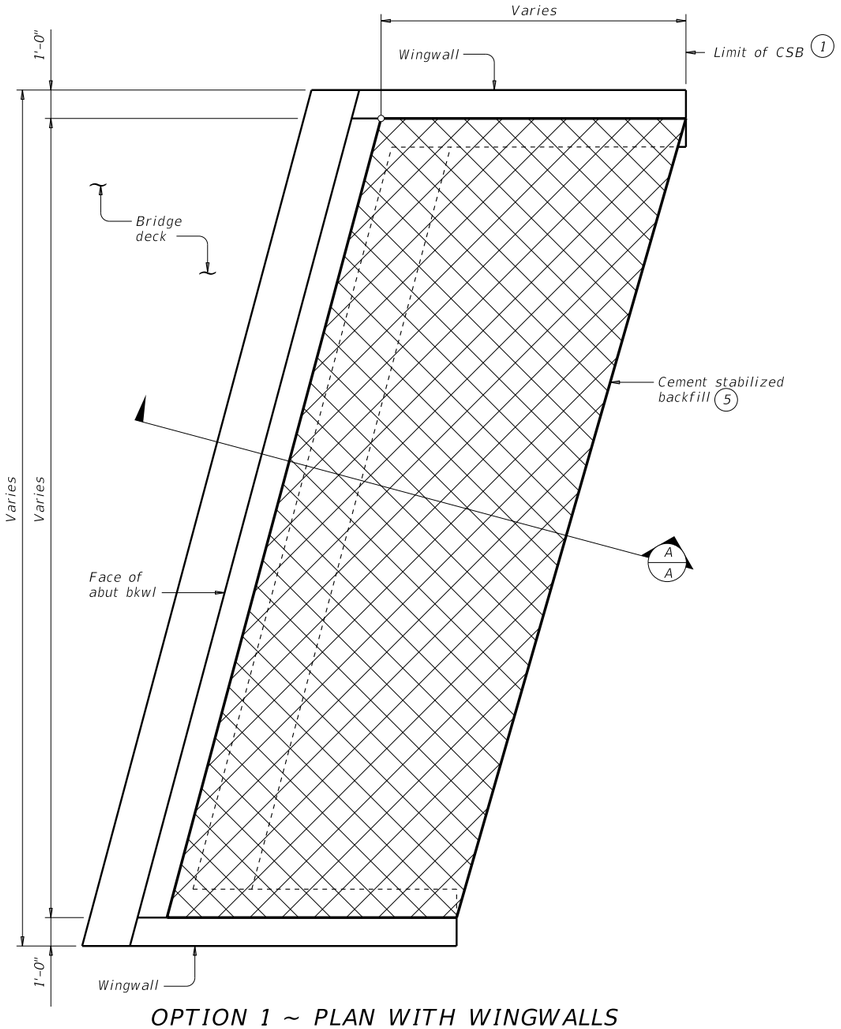
PRESTR CONC BOX BEAM STANDARD DESIGNS

TYPE B20 24' RDWY (WITH SLAB)

BBSDS-B20-24

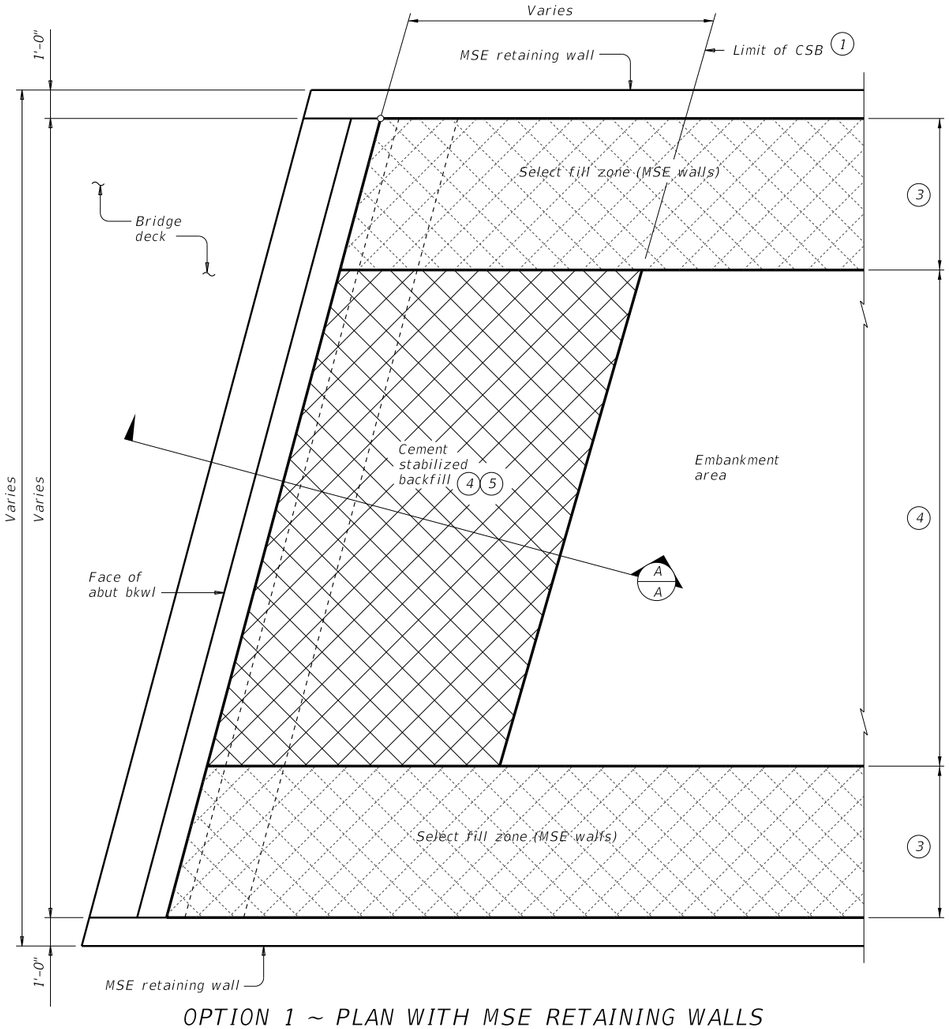
FILE: bbstds11.dgn	DN: SRW	CK: BMP	DN: SFS	CK: SDB
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
04-11: f'ci and LLDF. 01-16: Notes, 0.6" strand designs.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		83

DATE:
FILE:



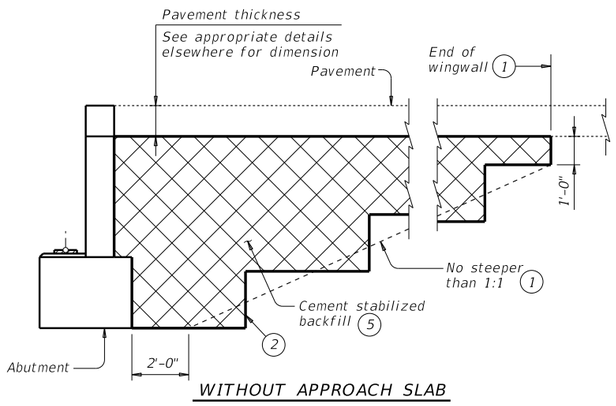
OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

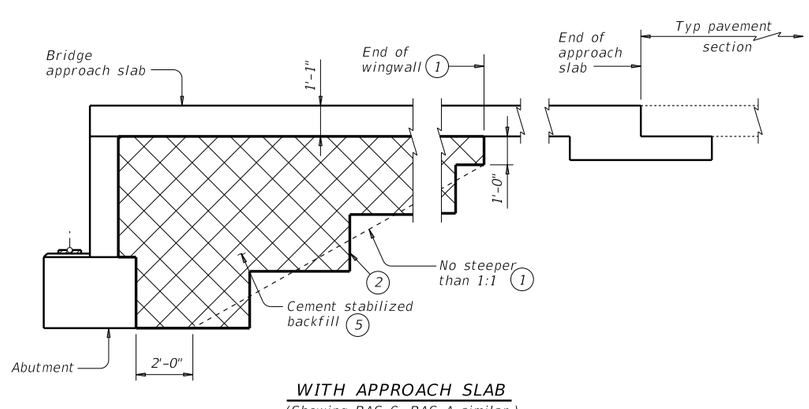


OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

1. Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
2. Bench backfill as shown with 12" (approximate) bench depths.
3. Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
4. When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
5. If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
   a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
   b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment.

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.

Texas Department of Transportation

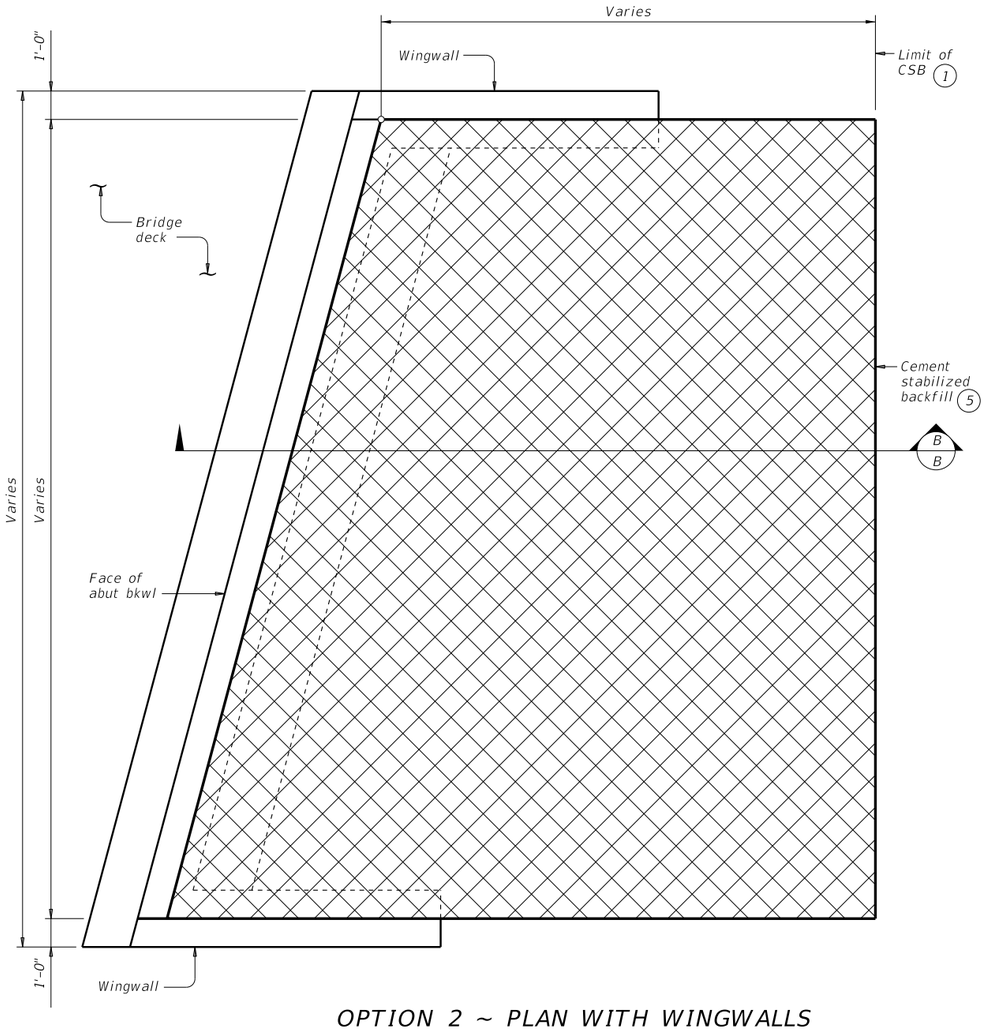
Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

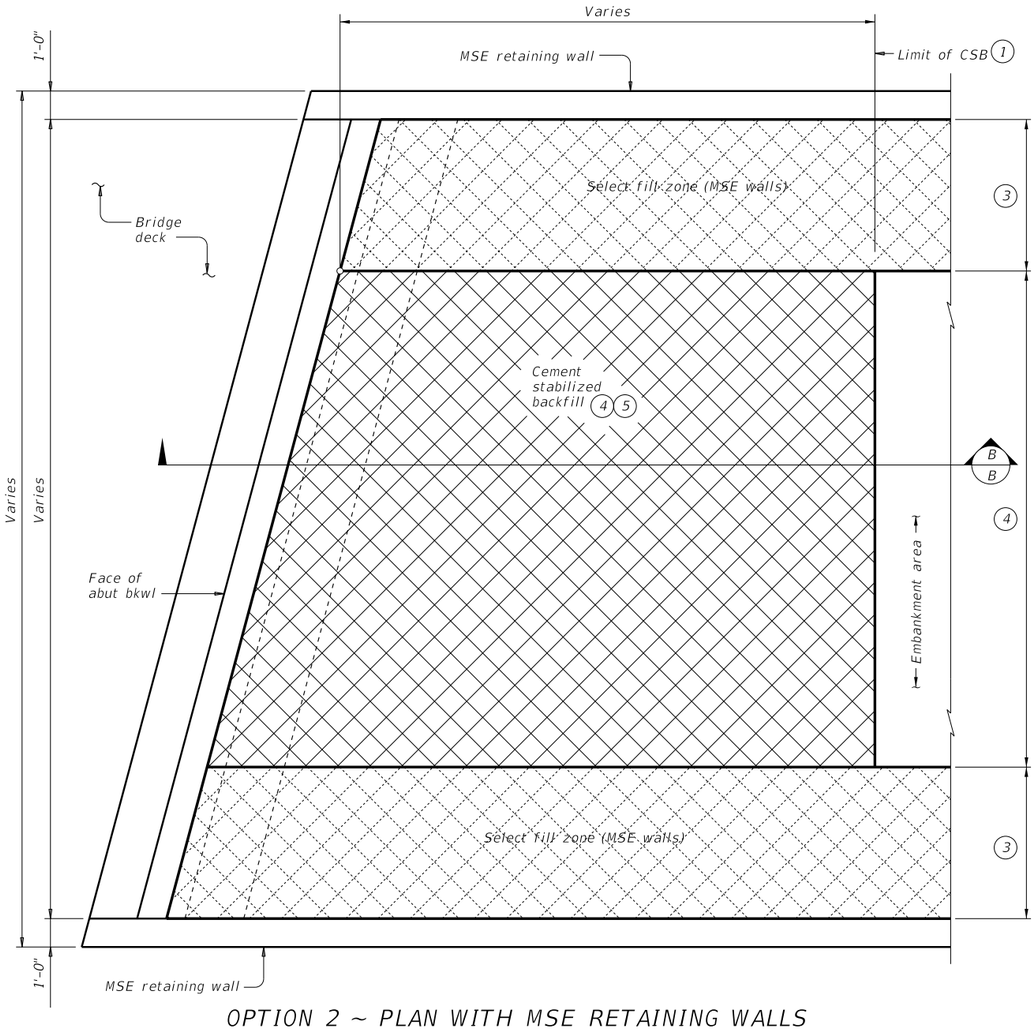
CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		84



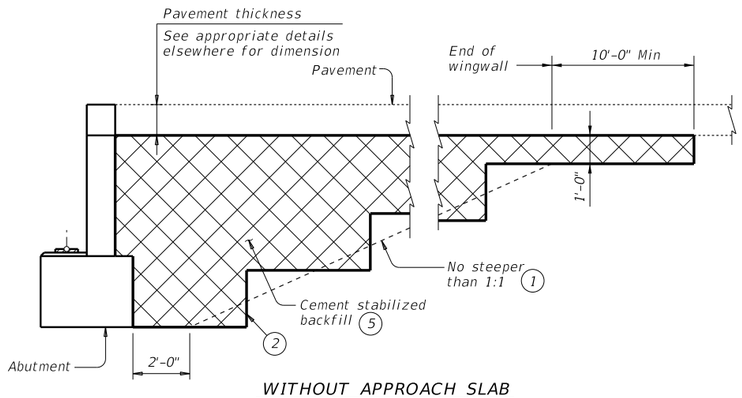
OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

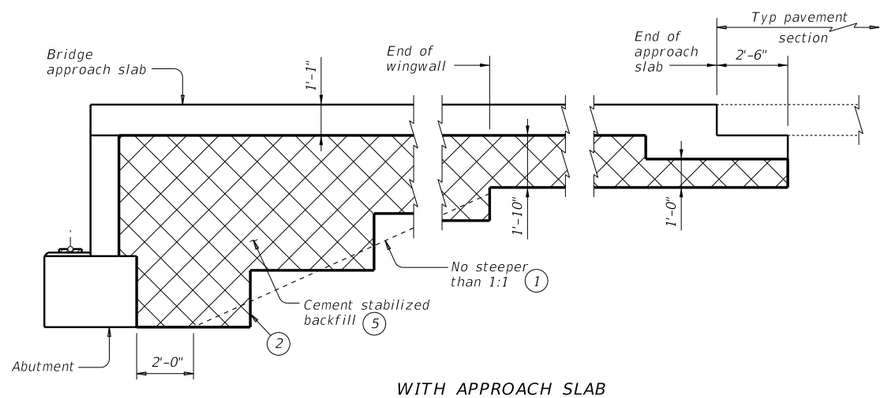


OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

1. Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
2. Bench backfill as shown with 12" (approximate) bench depths.
3. Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
4. When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
5. If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
   a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
   b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		84A

DATE:
FILE:

DATE:
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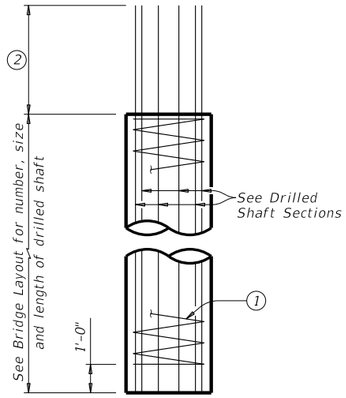
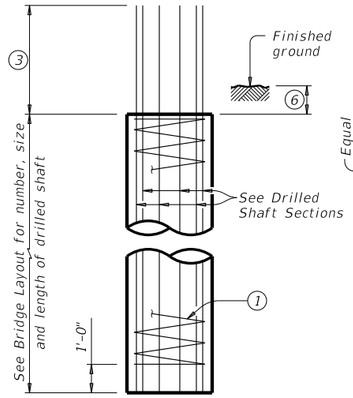
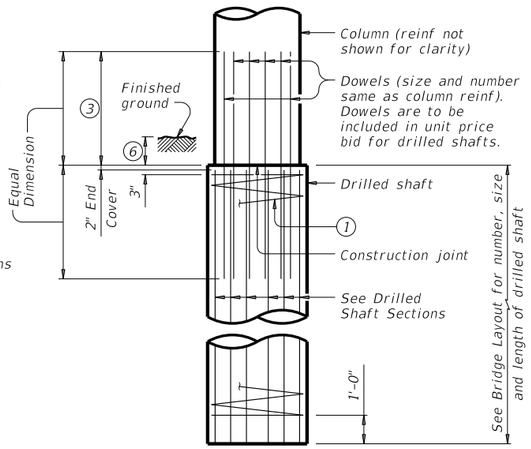


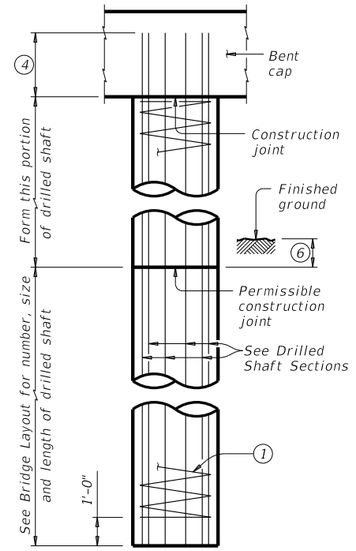
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



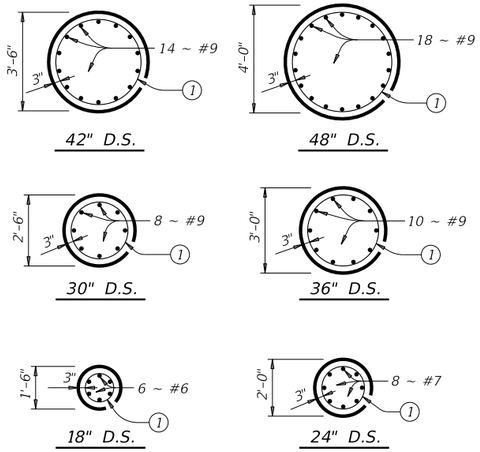
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

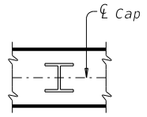


DRILLED SHAFT SECTIONS

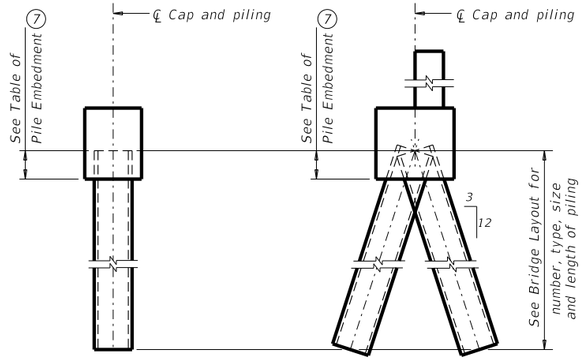
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.

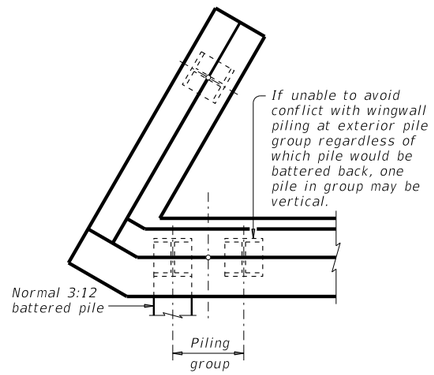


ORIENTATION OF STEEL H-PILING



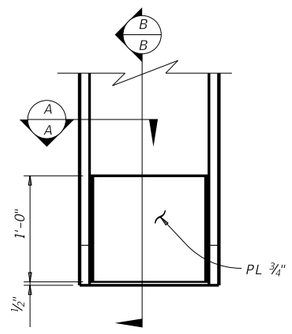
PILING DETAILS

(Concrete or steel H)

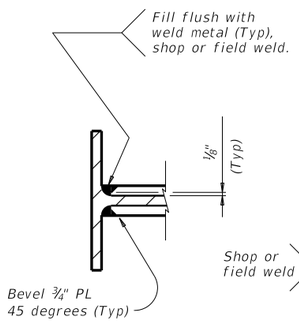


DETAIL "A"

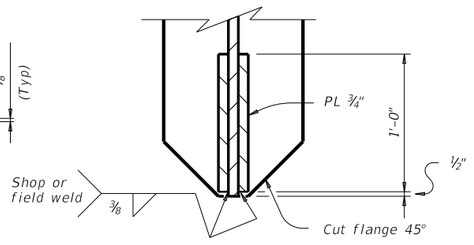
(Showing plan view of a 30° skewed abutment)



ELEVATION



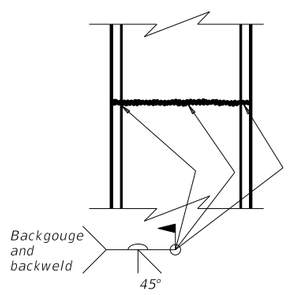
SECTION A-A

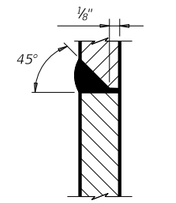


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

Texas Department of Transportation

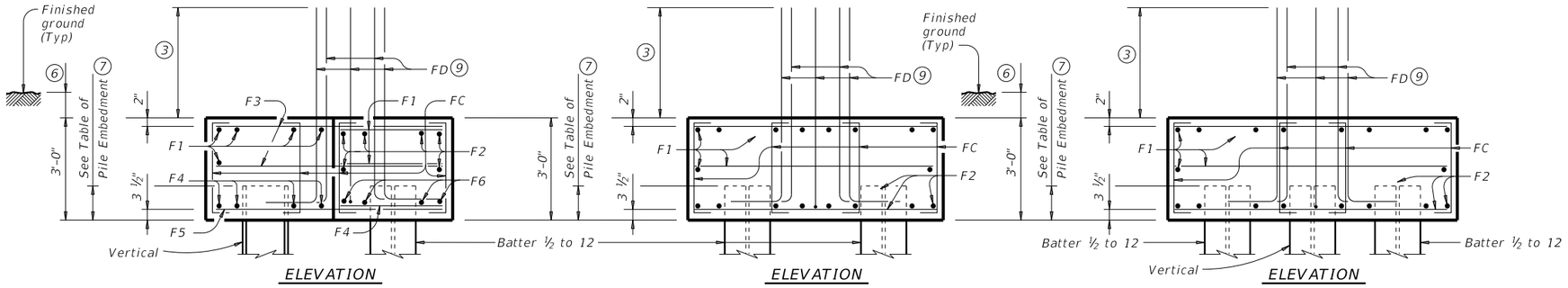
Bridge Division Standard

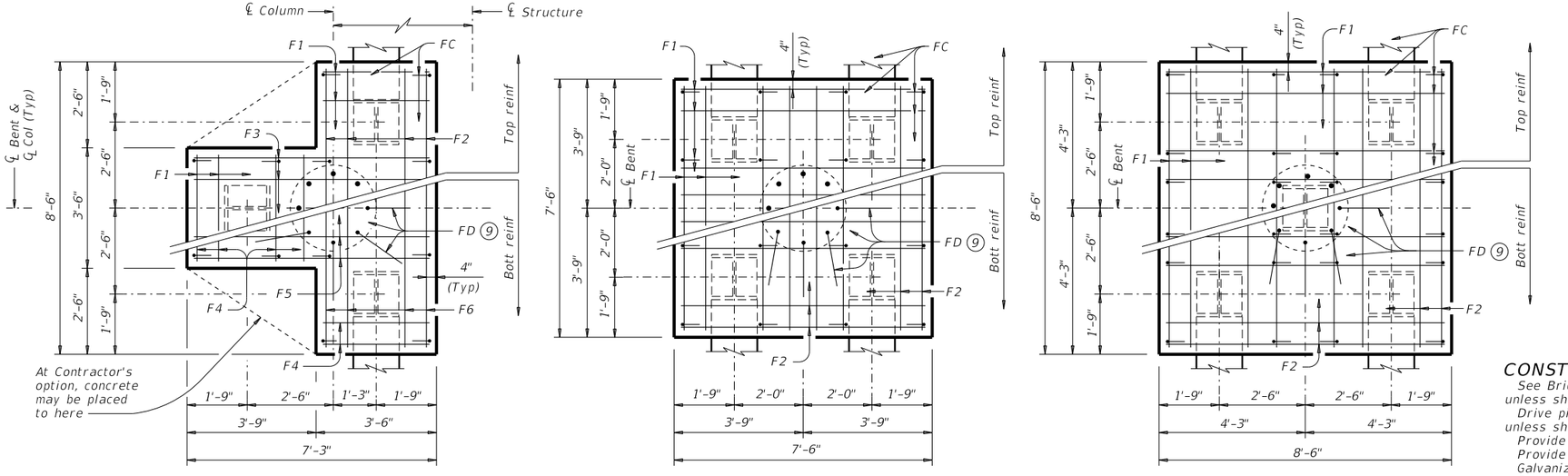
COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		85

DATE:
FILE:





THREE PILE FOOTING (8)

For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

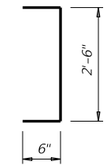
DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

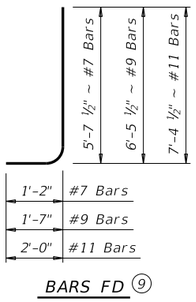
Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns



BARS FC



BARS FD (9)

(3) Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

(8) See Bridge Layout for type, size and length of piling.

(9) Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) Adjust FD quantity, size and weight as needed to match column reinforcing.

Texas Department of Transportation

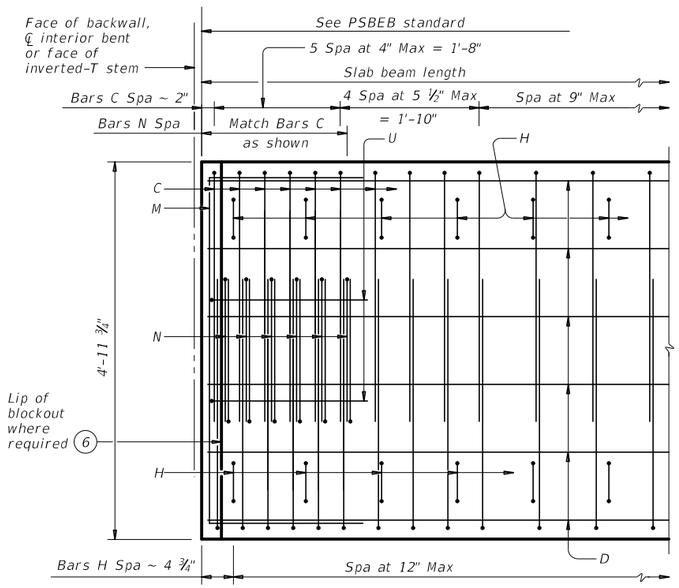
Bridge Division Standard

COMMON FOUNDATION DETAILS

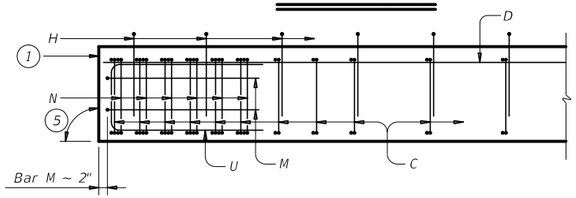
FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2618, ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		86

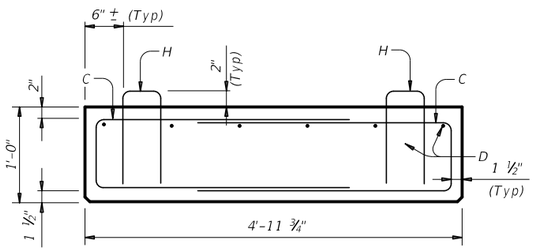
DATE: 11/11/2019 $TIME$
FILE: ...\Engr\Standards\psbsts03-17.dgn



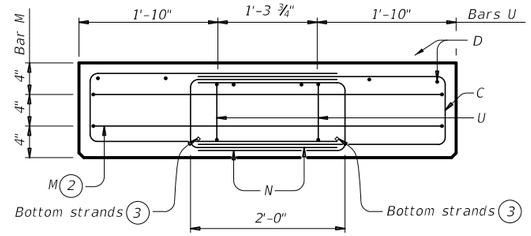
PART PLAN



ELEVATION

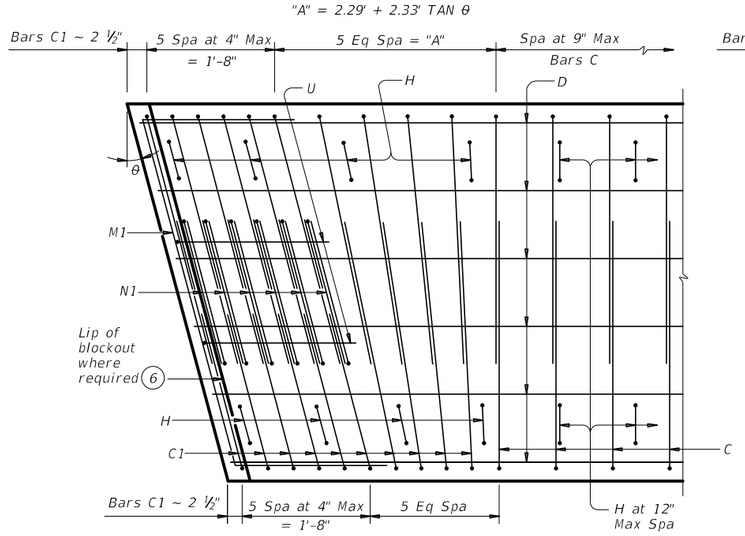


SECTION



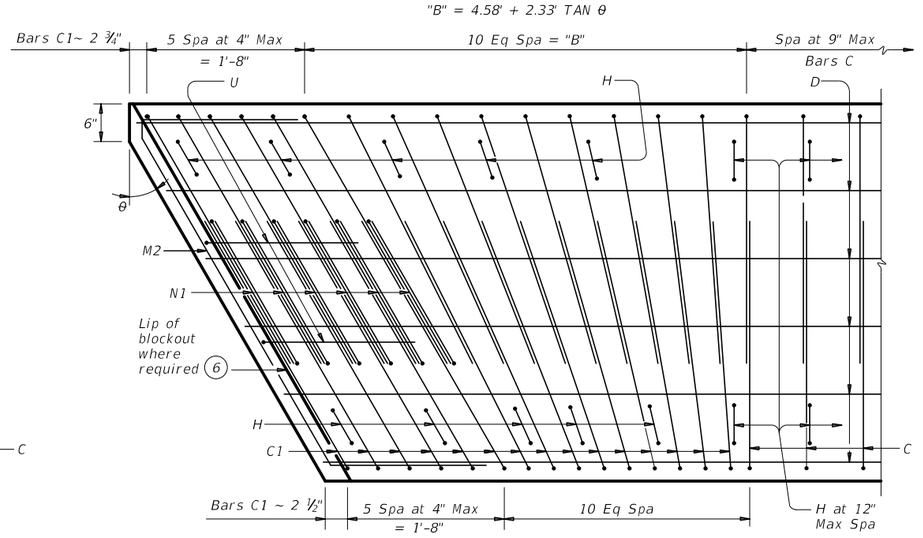
END MAT REINFORCING

Bars H not shown for clarity.



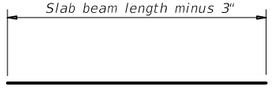
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

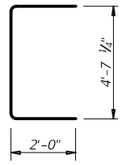


PART SKEW PLAN

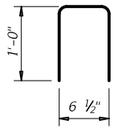
(Showing θ over 15° to 30° Skew)



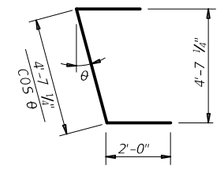
BARS D(#6)



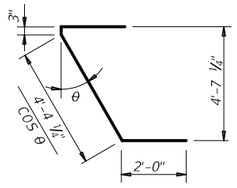
BARS M(#4)



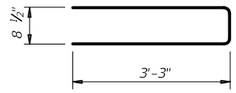
BARS H(#4)



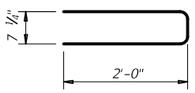
BARS M1(#4)



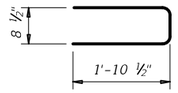
BARS M2(#4)



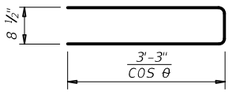
BARS C(#4)



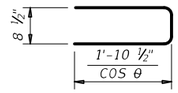
BARS U(#5)



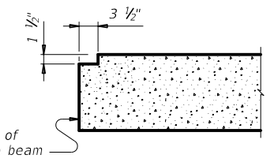
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	717.0
Y top	in	6.00
Y bott	in	6.00
I	in^4	8,604
Weight (4)	lb/ft	747

(1) See End Mat Reinforcing detail.

(2) Adjust bars M vertically to avoid strands.

(3) See sheet PSBND or PSBSD for strand locations.

(4) Assumes 150 pcf weight density of concrete.

(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.

(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

Provide Grade 60 reinforcing steel.

An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.

These details can be used for any skew angle up to a maximum of 30 degrees.

Chamfer all exposed corners ¾" or round to a ¾" radius.

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.

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

HL93 LOADING

Texas Department of Transportation

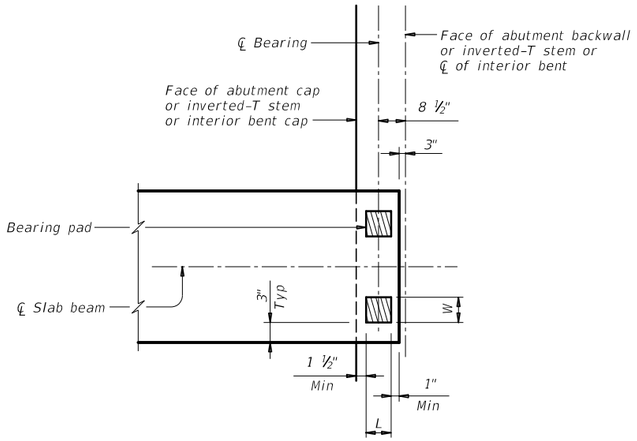
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

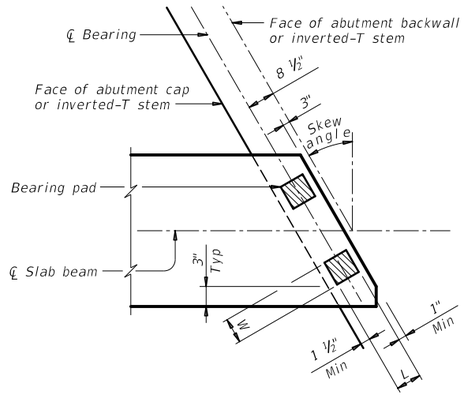
(TYPE 5SB12)

PSB-5SB12

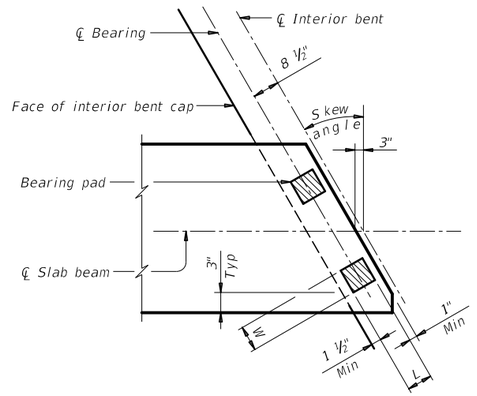
FILE: psbsts03-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		87



TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



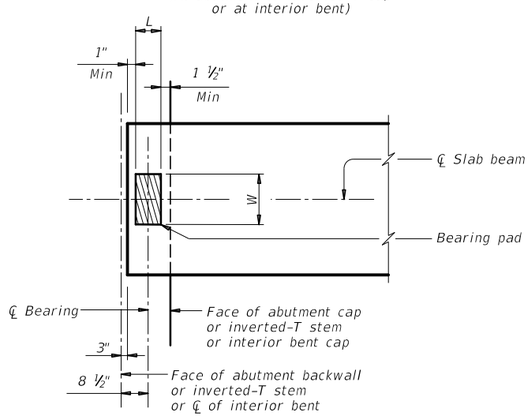
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

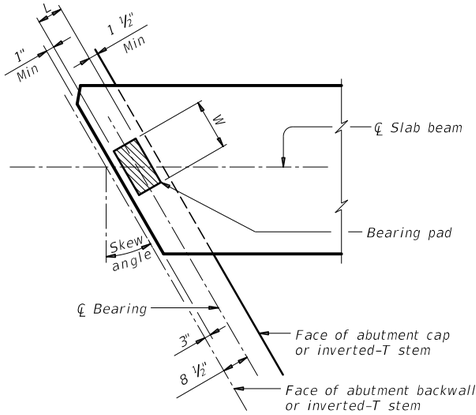
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

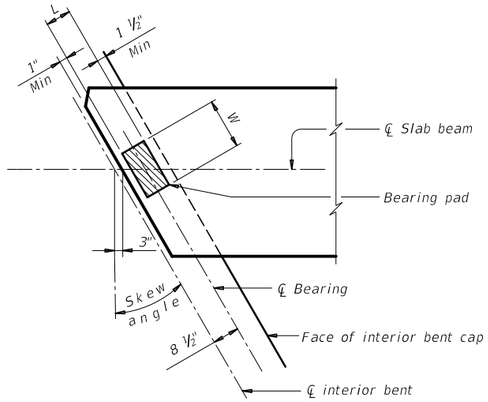
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



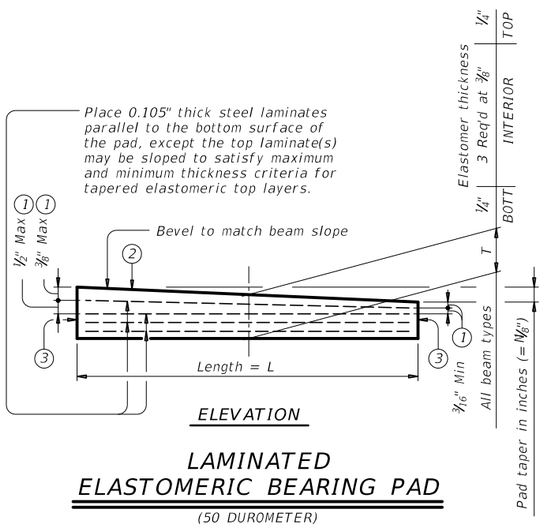
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



ONE-PAD DETAIL SKEW PLAN
(At interior bent)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

(1) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(2) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{Length}\right)$ IN/IN.

(3) Locate permanent mark here.

GENERAL NOTES:

These details accommodate skew angles up to 30°.

Shop drawings for approval are required.

A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings must be included in unit price bid for "Prestressed Concrete Slab Beams".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		88

DATE: 11/11/2019 $TIME$
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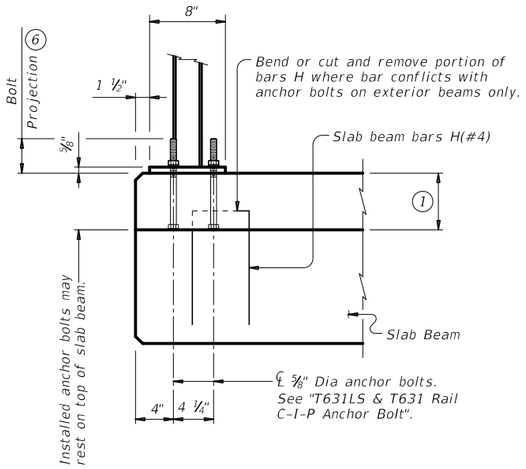
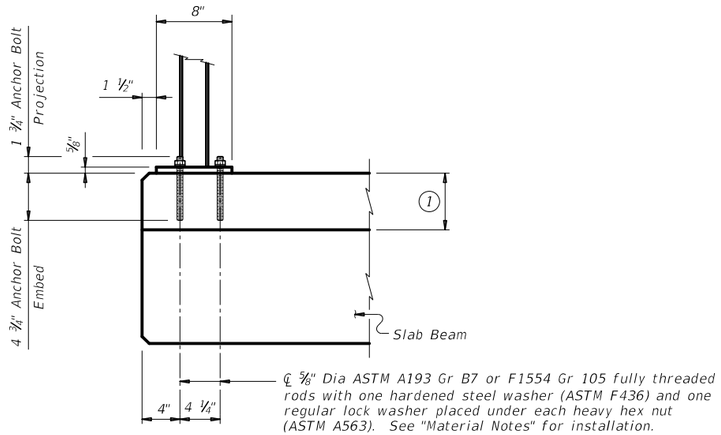


CAST-IN-PLACE ANCHORAGE OPTION



ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT 2 7

PART SPAN ELEVATION

SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

T631LS & T631 RAIL C-I-P ANCHOR BOLT

PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

1. Cast-in-place slab thickness varies due to beam camber (5" minimum).
2. Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
3. Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.
4. See rail standard for projection from finished grade or top of sidewalk.
5. Place additional (#5) longitudinal bar.
6. Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
7. Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
   30° Skew: 1'-3" (acute corner only)
8. Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.
9. Cross-hatched area must have ½" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		89

DATE: 11/11/2019 $TIME$
FILE: ...\Eng\Standards\psbste07-18.dgn

STRUCTURE	DESIGNED BEAMS (STRAIGHT STRANDS)																		OPTIONAL DESIGN				
	PRESTRESSING STRANDS									DEBONDED STRANDS PER ROW								CONCRETE		DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR ②	
	SPAN LENGTH	BEAM NO.	BEAM TYPE	NON-STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH	"e" ℄	"e" END	TOT NO. DEB	DIST FROM BOTTOM	NO. OF STRANDS		NUMBER OF STRANDS DEBONDED TO (ft from end)					RELEASE STRGTH ①	MINIMUM 28 DAY COMP STRGTH				Moment	Shear
	(ft)					(in)	fpu (ksi)	(in)	(in)		(in)	TOTAL	DE-BONDED	3	6	9	12	15	f'ci (ksi)	f'c (ksi)	fct (ksi)	fcb (ksi)	(kip-ft)		
24' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.50	8	0	0	0	0	0	0	4.000	5.000	0.914	-1.217	448	0.450	0.450
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.292	-1.685	530	0.450	0.450
	35	ALL	5SB12		14	0.6	270	3.50	3.50	0	2.50	14	0	0	0	0	0	0	4.000	5.000	1.730	-2.219	675	0.450	0.450
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.50	18	0	0	0	0	0	0	4.000	5.000	2.218	-2.796	820	0.440	0.440
24' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.50	8	0	0	0	0	0	0	4.000	5.000	0.725	-0.897	551	0.450	0.450
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.50	8	0	0	0	0	0	0	4.000	5.000	1.020	-1.244	574	0.450	0.450
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.361	-1.640	708	0.450	0.450
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.50	14	0	0	0	0	0	0	4.000	5.000	1.739	-2.068	864	0.440	0.440
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.50	18	2	2	0	0	0	0	4.000	5.000	2.179	-2.574	1054	0.440	0.440
	50	ALL	5SB15		24	0.6	270	5.00	5.00	8	2.50	24	8	4	4	0	0	0	4.000	5.000	2.680	-3.153	1276	0.440	0.440
28' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.50	8	0	0	0	0	0	0	4.000	5.000	0.903	-1.184	444	0.430	0.430
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.276	-1.639	508	0.430	0.430
	35	ALL	5SB12		12	0.6	270	3.50	3.50	0	2.50	12	0	0	0	0	0	0	4.000	5.000	1.708	-2.159	647	0.430	0.430
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.50	18	0	0	0	0	0	0	4.000	5.000	2.200	-2.744	799	0.430	0.430
28' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.50	8	0	0	0	0	0	0	4.000	5.000	0.716	-0.874	529	0.430	0.430
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.50	8	0	0	0	0	0	0	4.000	5.000	1.007	-1.212	570	0.430	0.430
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.343	-1.598	680	0.430	0.430
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.50	14	0	0	0	0	0	0	4.000	5.000	1.725	-2.032	842	0.430	0.430
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.50	18	2	2	0	0	0	0	4.000	5.000	2.149	-2.508	1013	0.420	0.420
	50	ALL	5SB15		22	0.6	270	5.00	5.00	6	2.50	22	6	4	2	0	0	0	4.000	5.000	2.643	-3.073	1227	0.420	0.420
30' ROADWAY SB12 BEAM	25	ALL	4SB12		6	0.6	270	3.50	3.50	0	2.50	6	0	0	0	0	0	0	4.000	5.000	0.904	-1.187	341	0.340	0.340
	30	ALL	4SB12		8	0.6	270	3.50	3.50	0	2.50	8	0	0	0	0	0	0	4.000	5.000	1.277	-1.646	407	0.340	0.340
	35	ALL	4SB12		10	0.6	270	3.50	3.50	0	2.50	10	0	0	0	0	0	0	4.000	5.000	1.711	-2.169	518	0.340	0.340
	40	ALL	4SB12		14	0.6	270	3.50	3.50	0	2.50	14	0	0	0	0	0	0	4.000	5.000	2.205	-2.758	640	0.340	0.340
30' ROADWAY SB15 BEAM	25	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.50	6	0	0	0	0	0	0	4.000	5.000	0.723	-0.888	431	0.350	0.350
	30	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.50	6	0	0	0	0	0	0	4.000	5.000	1.017	-1.231	438	0.350	0.350
	35	ALL	4SB15		8	0.6	270	5.00	5.00	0	2.50	8	0	0	0	0	0	0	4.000	5.000	1.346	-1.605	545	0.340	0.340
	40	ALL	4SB15		12	0.6	270	5.00	5.00	0	2.50	12	0	0	0	0	0	0	4.000	5.000	1.729	-2.043	675	0.340	0.340
	45	ALL	4SB15		14	0.6	270	5.00	5.00	2	2.50	14	2	2	0	0	0	0	4.000	5.000	2.166	-2.542	823	0.340	0.340
	50	ALL	4SB15		18	0.6	270	5.00	5.00	4	2.50	18	4	2	2	0	0	0	4.000	5.000	2.665	-3.115	998	0.340	0.340

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

② Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Full-length debonded strands are not permitted in positions "A" and "B".

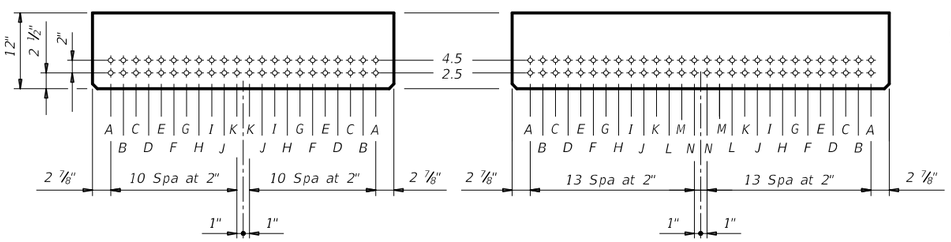
Strand debonding must comply with Item 424.4.2.2.2.4.

When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:

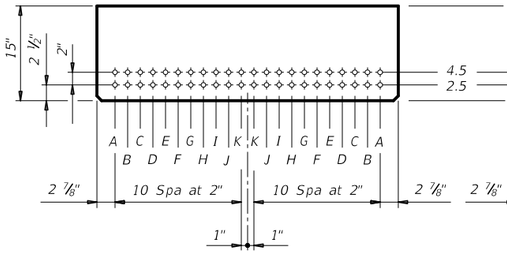
1) Locate a strand in each "A" position.
2) Place strand symmetrically about vertical centerline of beam.
3) Space strands as equally as possible across the entire width.

Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

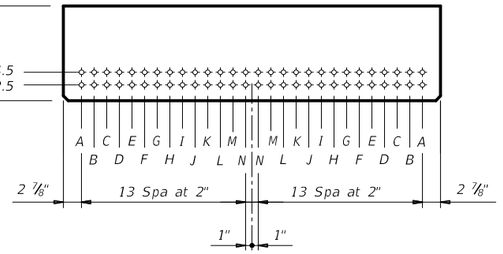


TxDOT 4SB12 SLAB BEAM

TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM STD DESIGNS

(TY SB12 OR SB15)

24', 28' & 30' ROADWAY

PSBSD

FILE: psbsts08-17.dgn	DN: SRW	CK: BMP	DW: SFS	CK: SDB
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		90

DATE: 11/11/2019 $TIME$
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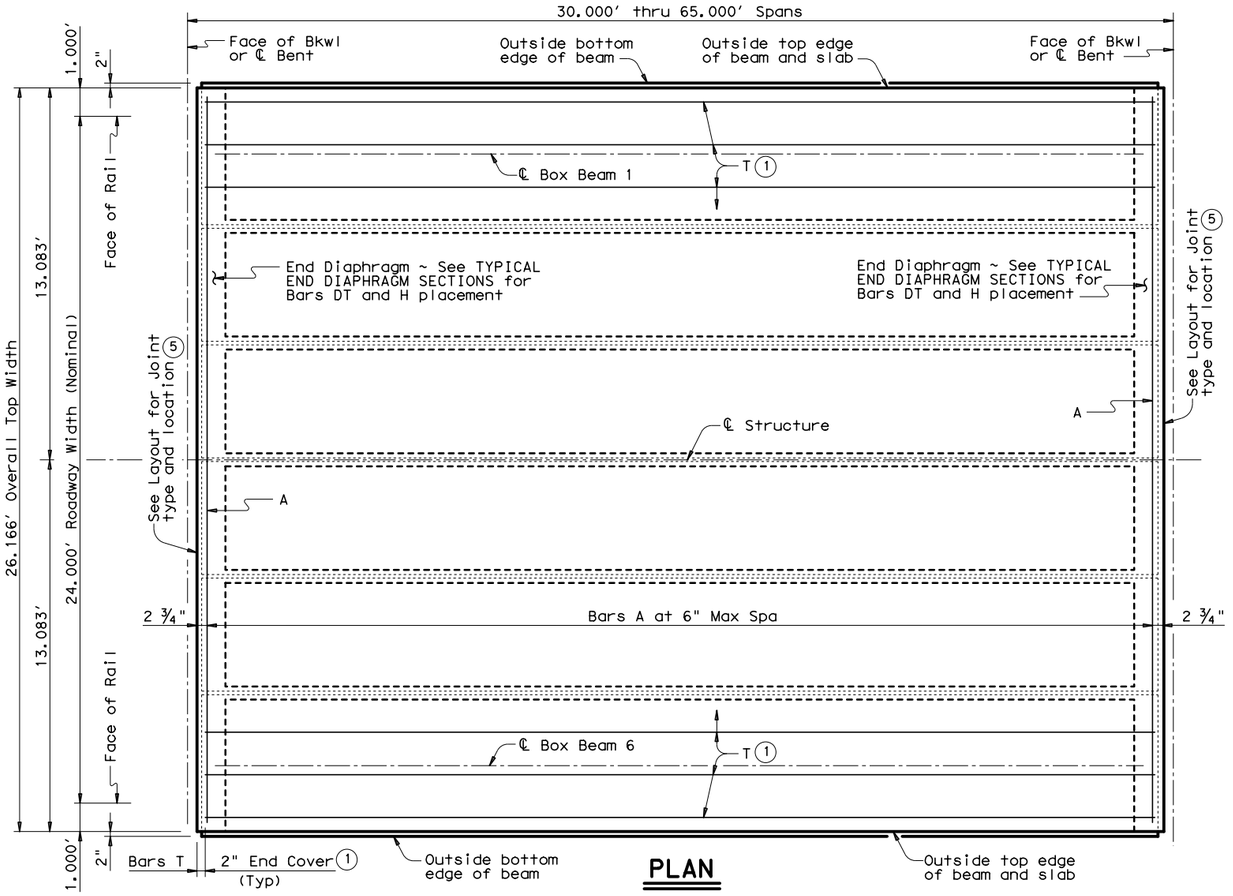
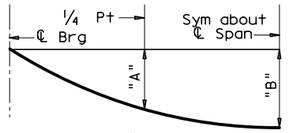


PLAN



Note: Deflections shown are due to shear key and concrete slab only, (Ec = 5 x 10^3 ksi). Calculated deflections shown are theoretical and actual dimension may be less. Deflections may be adjusted based on field observation.

DEAD LOAD DEFLECTION DIAGRAM

TABLE OF DEFLECTIONS AND SECTION DEPTHS

SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS (FT) SHEAR KEY	SLAB	TOTAL	SECTION DEPTHS "X" AT ℄ BRG (2)	"Y" AT ℄ BRG (2)
30	ALL	"A"	0.000	0.002	0.002	5 1/4"	2'-1 1/4"
		"B"	0.001	0.002	0.003		
35	ALL	"A"	0.001	0.003	0.004	5 1/4"	2'-1 1/4"
		"B"	0.001	0.004	0.005		
40	ALL	"A"	0.002	0.005	0.007	5 1/4"	2'-1 1/4"
		"B"	0.003	0.007	0.010		
45	ALL	"A"	0.003	0.009	0.012	5 1/2"	2'-1 1/2"
		"B"	0.004	0.012	0.016		
50	ALL	"A"	0.005	0.013	0.018	5 3/4"	2'-1 3/4"
		"B"	0.006	0.019	0.025		
55	ALL	"A"	0.007	0.019	0.026	6 1/4"	2'-2 1/4"
		"B"	0.010	0.027	0.037		
60	ALL	"A"	0.010	0.028	0.038	6 3/4"	2'-2 3/4"
		"B"	0.014	0.039	0.053		
65	ALL	"A"	0.013	0.039	0.052	7"	2'-3"
		"B"	0.019	0.054	0.073		

(1) If multi-span units (with slab continuous over Interior Bents) are indicated on the Bridge Layout, Bars T must be continuous through joint. See Continuous Slab Detail.

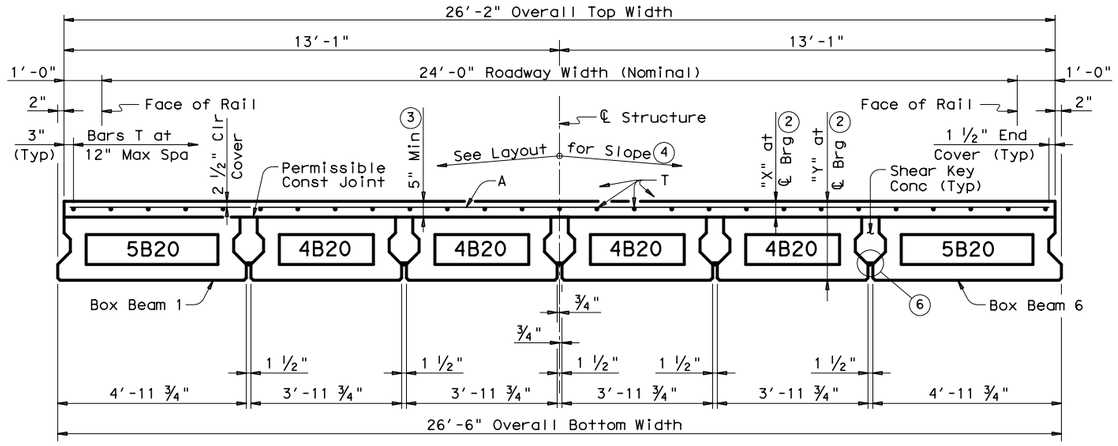
(2) Based on theoretical beam camber, dead load deflections of 5" Cast-in-place slab, shear key dead load and a constant grade. The contractor must adjust these values for any vertical curve.

(3) Slab thickness at midspan of Beams may not exceed 7 inches.

(4) This standard does not provide for changes in roadway cross slopes within the structure.

(5) If using Type A expansion joints, the maximum distance between joints is 100 feet.

(6) Form bottom of shear keys with foam backer rod or other material acceptable to the Engineer.



TYPICAL TRANSVERSE SECTION

BAR TABLE	
BAR	SIZE
A	#4
DT	#4
H	#5
T	#4

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Provide Class S concrete (f'c = 4,000 psi) for slab and shear key. Provide Class S (HPC) concrete if shown elsewhere in the plans.

All reinforcing must be Grade 60.

Two-span or three-span units, with the slab continuous over Interior Bents, may be formed with the details on this standard. Unit Length cannot exceed 3.5 times length of the shortest end span.

Bar laps, where required, will be as follows:

Uncoated ~ #4 = 1'-5"

Epoxy coated ~ #4 = 2'-1"

It is recommended, with crown cross-slope, to erect beams adjacent to crown point first. For structures without a crown point, it is recommended to erect beams on the high side of cross-slope first and progress to the low side.

This sheet does not support the use of Transition Bents.

See railing details and standard BBRAS for rail anchorage.

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE BOX BEAM SPANS

TYPE B20 24' RDWY (WITH SLAB)

SBBS-B20-24

FILE: bbstds19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS 01-12: Cover. 10-15: Table of Est Quantities, Notes.	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		91

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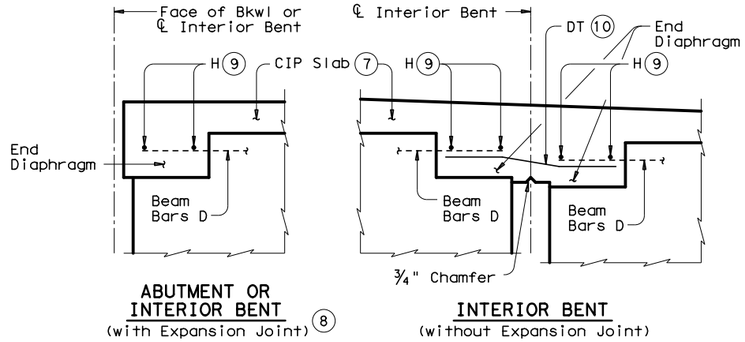
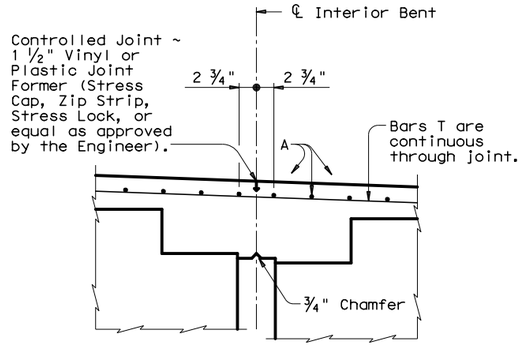


ABUTMENT OR INTERIOR BENT (with Expansion Joint) (8)

INTERIOR BENT (without Expansion Joint)

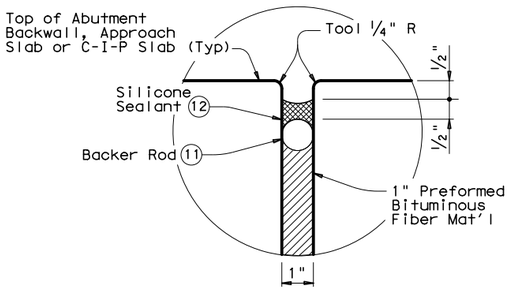
TYPICAL END DIAPHRAGM SECTIONS

(along centerline of Box Beam)



CONTINUOUS SLAB DETAIL

(Diaphragm reinforcing not shown for clarity)



TYPE A JOINT DETAIL (5)

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	SHEAR KEY	REINF CONC SLAB (BOX BEAM)	PRESTR CONCRETE BOX BEAMS (TY 4B20) (13)	PRESTR CONCRETE BOX BEAMS (TY 5B20) (13)	TOTAL REINF STEEL (14)
FT	CY	SF	LF	LF	Lb
30	4.0	785	118.00	59.00	1,570
35	4.6	916	138.00	69.00	1,832
40	5.3	1,047	158.00	79.00	2,094
45	6.0	1,177	178.00	89.00	2,354
50	6.6	1,308	198.00	99.00	2,616
55	7.3	1,439	218.00	109.00	2,878
60	8.0	1,570	238.00	119.00	3,140
65	8.6	1,701	258.00	129.00	3,402

(5) If using Type A expansion joints, the maximum distance between joints is 100 ft.

(7) Slab reinforcing omitted for clarity.

(8) See Bridge Layout for Joint type.

(9) Provide 1 ½" end cover to Bars H. After all beams have been placed, weld one Bar H to two Bars D at each end of all beams.

(10) Lap Bars DT 9" Min with each Beam Bar D at Interior Bents without Expansion Joints. Bars DT shown bent for clarity only.

(11) Backer rod must be 25% larger than joint opening and must be compatible with the sealant.

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

(13) Fabricator must adjust beam lengths for beam slopes as required.

(14) Reinforcing steel weight is based on an approximate factor of 2.0 lbs per square foot of slab.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE BOX BEAM SPANS

TYPE B20 24' RDWY (WITH SLAB)

SBBS-B20-24

FILE: bbstds19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December, 2006	CONT	SECT	JOB	HIGHWAY
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01-12: Cover, Table of Est Quantities, Notes.	DIST	COUNTY		SHEET NO.
10-15:	TYL	VAN ZANDT		92

DATE: 11/11/2019 $TIME$
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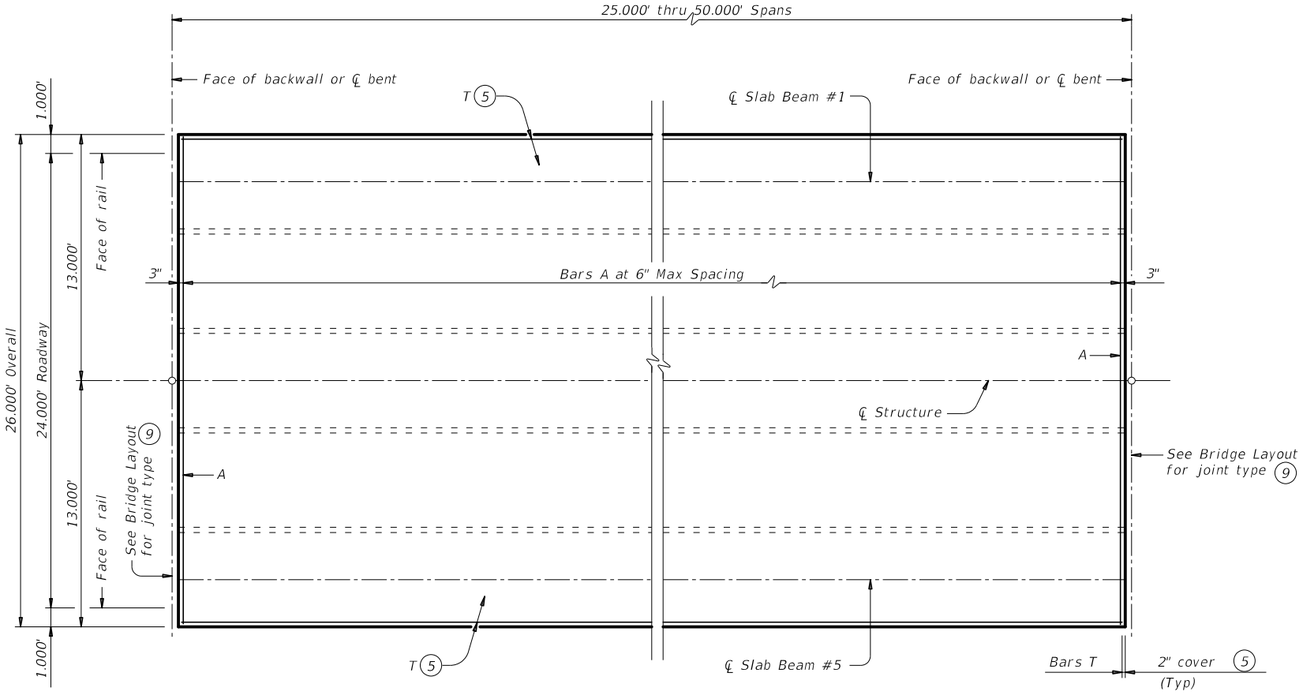
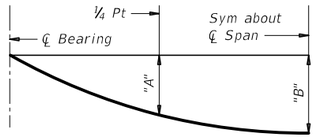


PLAN

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection		Section (3) Depths	
		"A"	"B"	"X"	"Y"
Ft	(1)	Ft	Ft	In	Ft/In
25	5SB12	0.004	0.005	5 ¼"	1'-5 ¼"
30	5SB12	0.008	0.011	5 ½"	1'-5 ½"
35	5SB12	0.015	0.021	6"	1'-6"
40	5SB12	0.026	0.036	6 ½"	1'-6 ½"
25	5SB15	0.002	0.003	5 ¼"	1'-8 ¼"
30	5SB15	0.004	0.006	5 ½"	1'-8 ½"
35	5SB15	0.008	0.011	5 ½"	1'-8 ½"
40	5SB15	0.013	0.019	5 ¾"	1'-8 ¾"
45	5SB15	0.022	0.030	6 ½"	1'-9 ½"
50	5SB15	0.034	0.047	7"	1'-10"



DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only (E_C = 5,000 ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (5SB12 OR 5SB15) (1)			TOTAL REINF STEEL (2)
		ABUT TO INT BT	INT BT TO INT BT	ABUT TO ABUT	
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	650	122.50	122.50	122.50	1,820
30	780	147.50	147.50	147.50	2,180
35	910	172.50	172.50	172.50	2,550
40	1,040	197.50	197.50	197.50	2,910
45	1,170	222.50	222.50	222.50	3,280
50	1,300	247.50	247.50	247.50	3,640

(1) See Bridge Layout for beam type used in the superstructure. These standards do not provide for the use of both SB12 and SB15 beams within the same structure.

(2) Reinforcing steel weight is calculated using an approximate factor of 2.8 Lbs/SF.

(3) Based on theoretical beam camber, dead load deflections of 5" cast-in-place concrete slab and a constant grade. The Contractor will adjust these values for any vertical curve.

(4) Fabricator will adjust beam lengths for beam slopes as required.

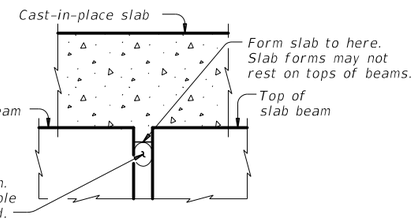
(5) Where slab is continuous over Interior Bents, Bars T are continuous through Joint. See "Continuous Slab Detail".

(6) This standard does not provide for changes in roadway cross-slopes within the structure.

(7) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(8) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

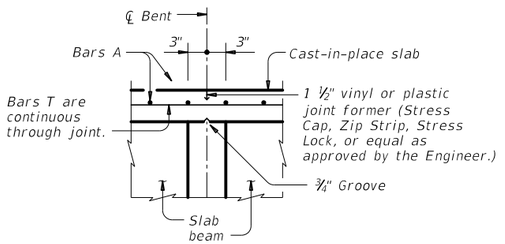
(9) See Bridge Layout for expansion joint locations. If using Type A expansion joints, the maximum distance between joints is 100 feet. Type A joints are subsidiary to Item 422, "Concrete Superstructures".



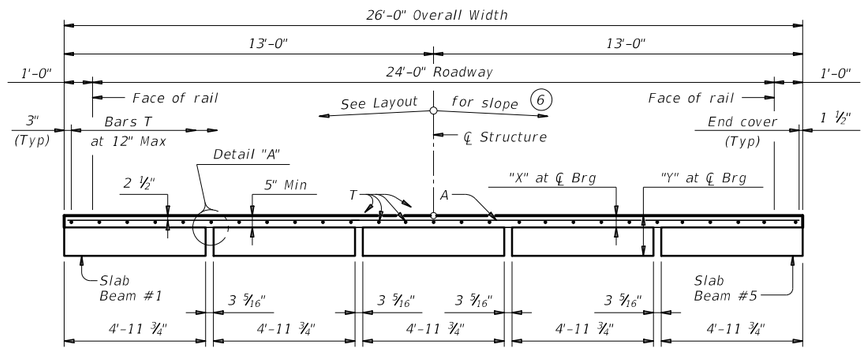
DETAIL "A"

BAR TABLE

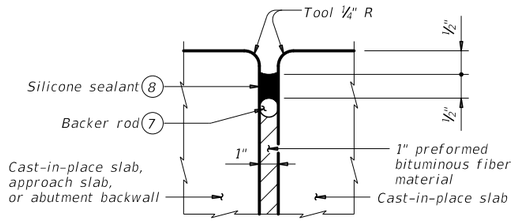
BAR	SIZE
A	#5
T	#4



CONTINUOUS SLAB DETAIL



TYPICAL TRANSVERSE SECTION



TYPE A JOINT DETAIL (9)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Two- or three-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet.
See applicable rail details for rail anchorage in slab.
This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:

Provide Class S concrete (f'c = 4,000 psi).
Provide Class S (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
~ #5 = 3'-0"

Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

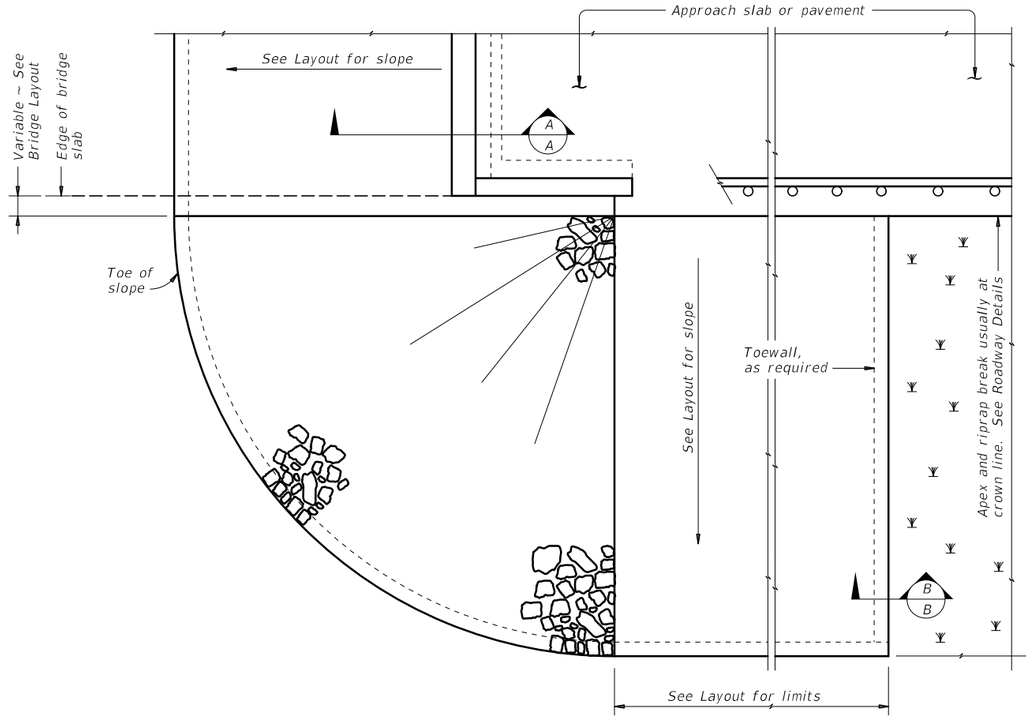
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

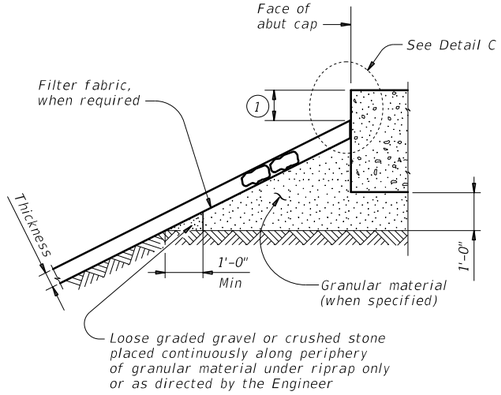
24' ROADWAY

SPSB-24

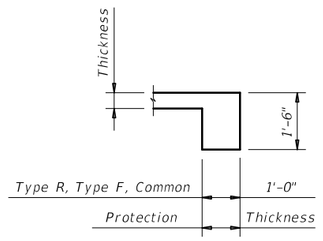
FILE: psbste30-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		93



PLAN

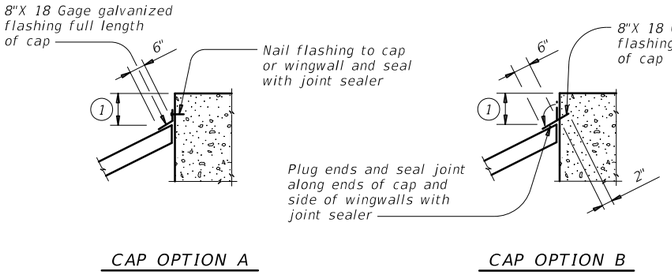


SECTION A-A AT CAP



SECTION B-B

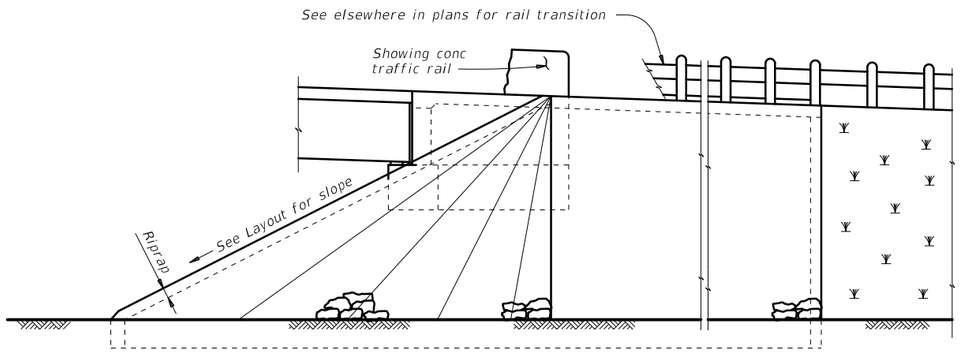
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

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

GENERAL NOTES:

Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.

See elsewhere in plans for locations and details of shoulder drains.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES		
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0910	12	134, ETC	CR 2918, ETC		
	DIST	COUNTY		SHEET NO.		
	TYL	VAN ZANDT		94		

DATE: 11/11/2019 $TIME$
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DATE: 11/11/2019 $TIME$
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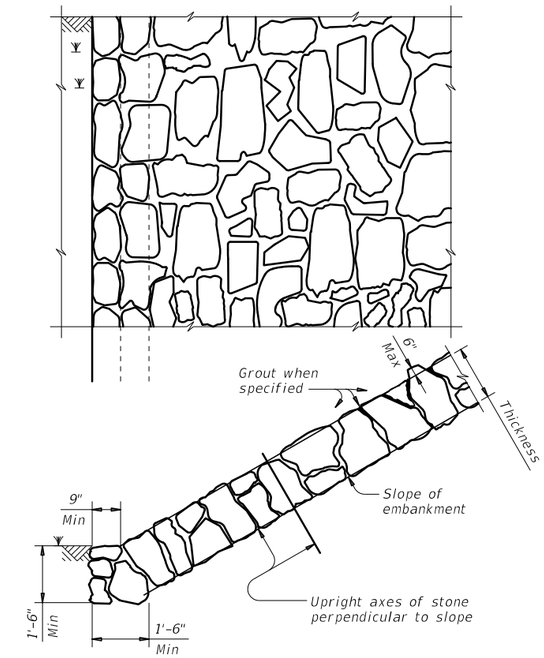


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

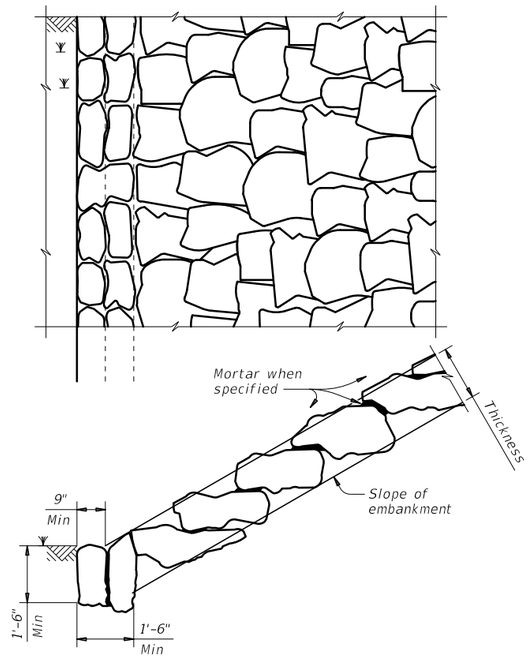


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

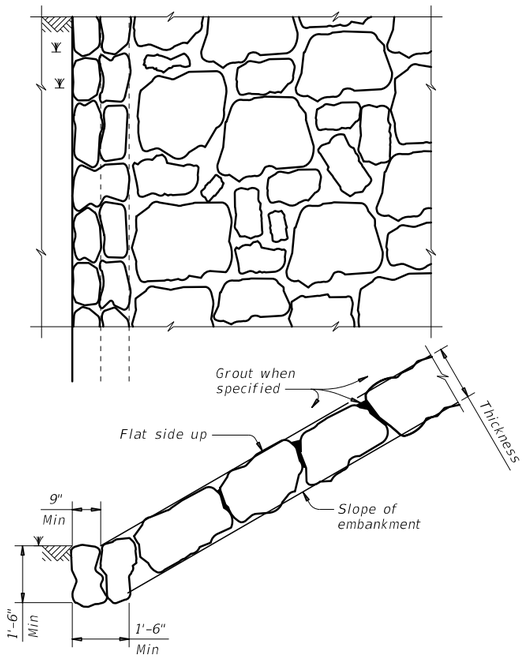


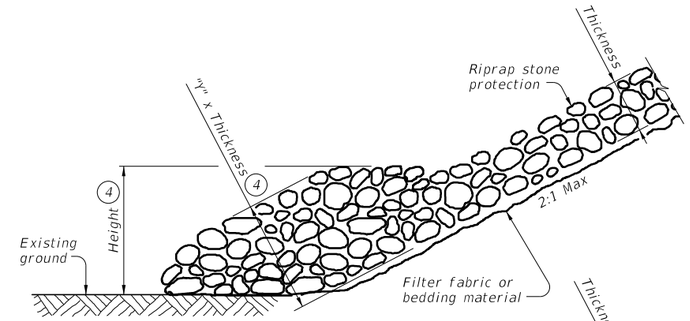
FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

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

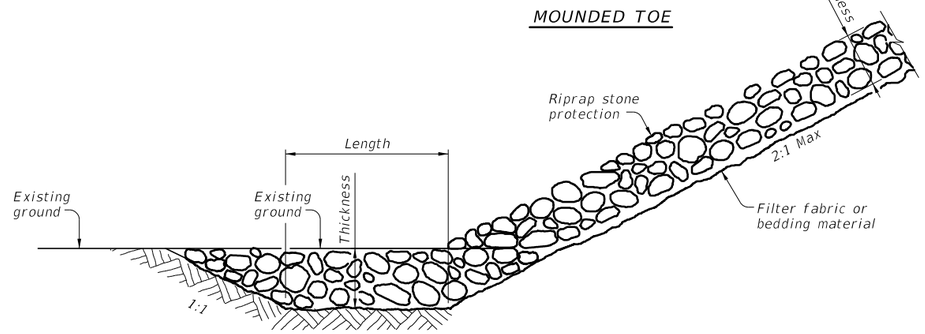
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(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.

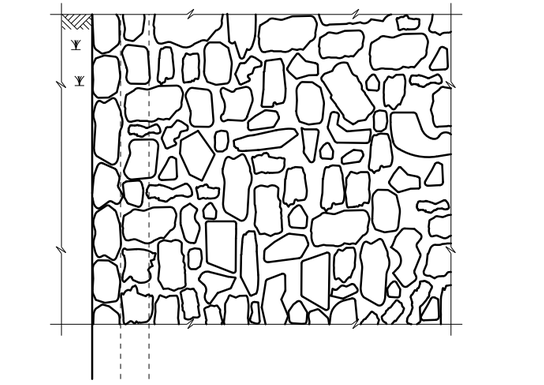


MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)



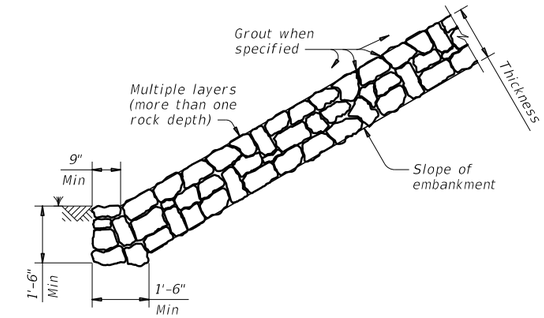
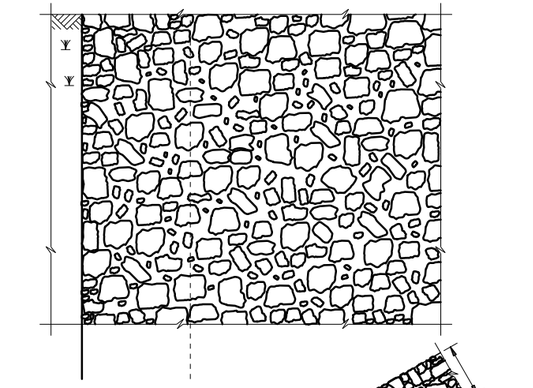


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted



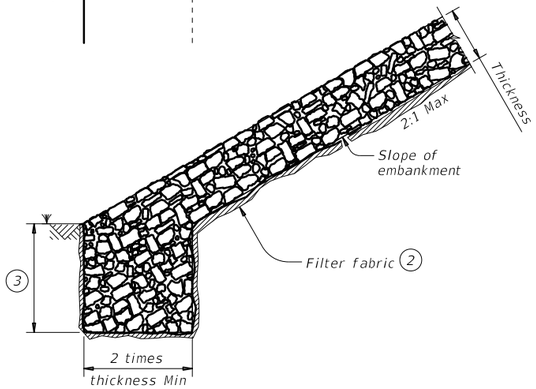


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

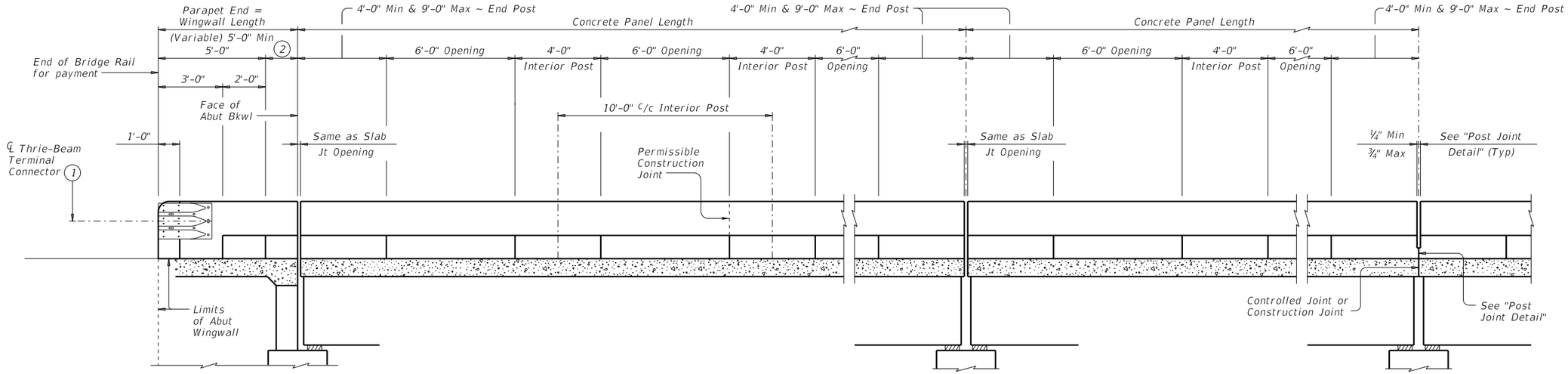
Texas Department of Transportation | Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		95

DATE:
FILE:

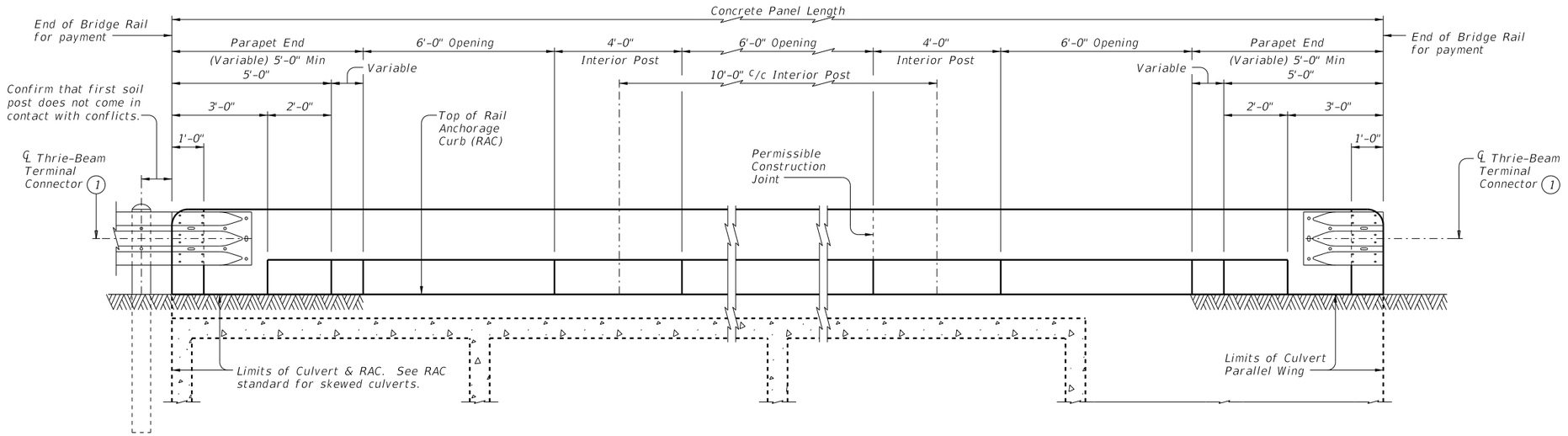


AT ABUTMENTS

AT BENTS WITH SLAB EXP JOINTS

AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL ON BRIDGE



AT STRAIGHT OR FLARED WINGS

AT PARALLEL WINGS

ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

(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) Wingwall Length minus 5'-0" (Varies)

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
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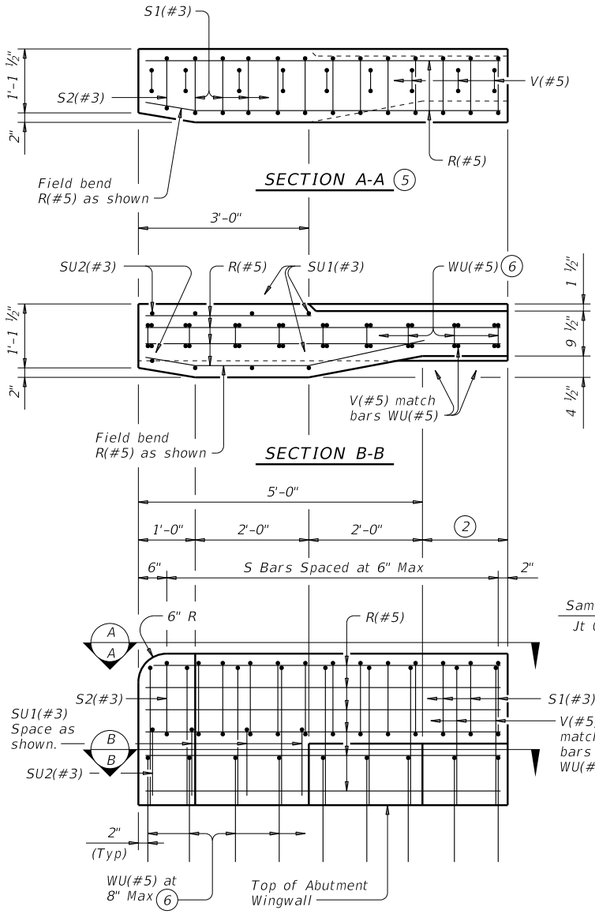
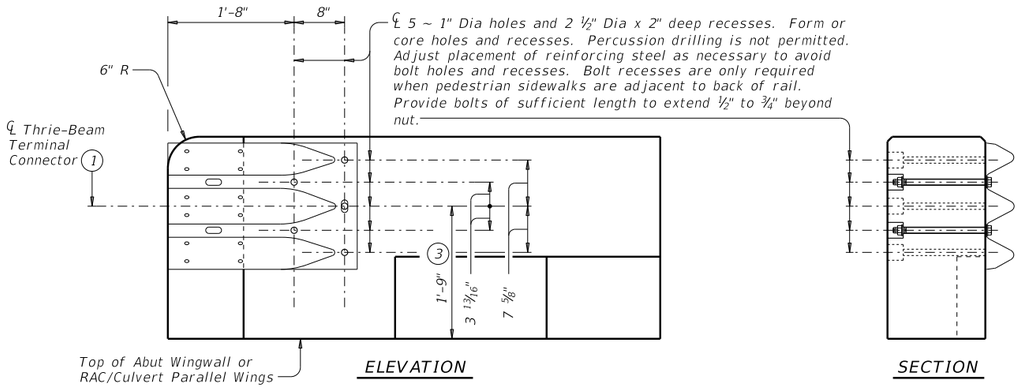
REVISIONS	0910	12	134, ETC	CR 2918, ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		96

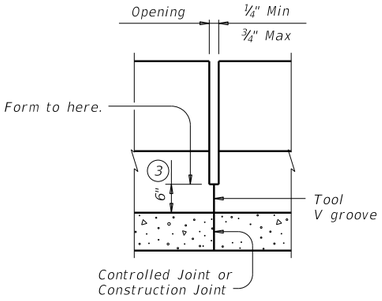
DATE:
FILE:



PARAPET END AT ABUT WINGWALL (6)

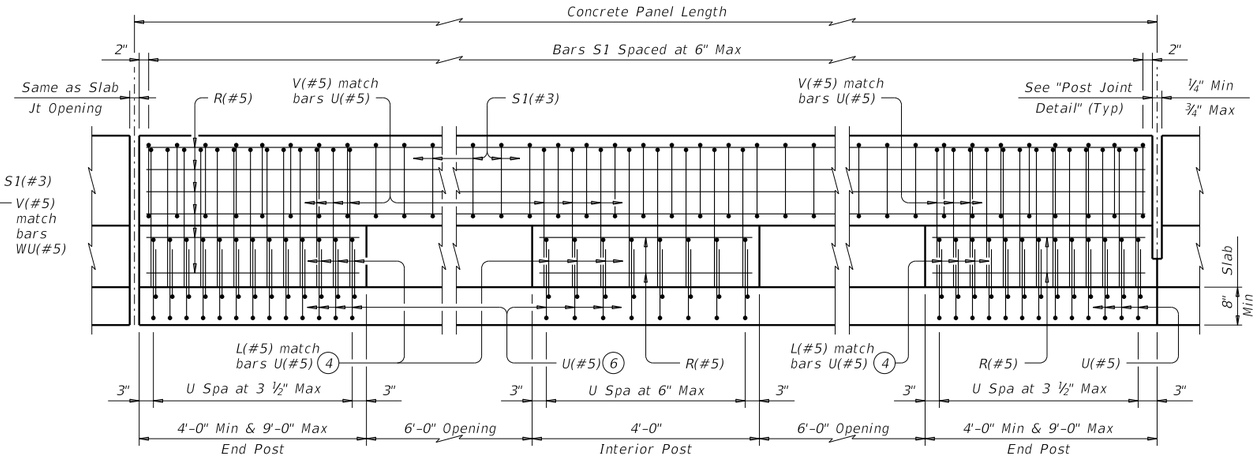


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

AT BENTS WITHOUT SLAB EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

(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) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(5) Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on achorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

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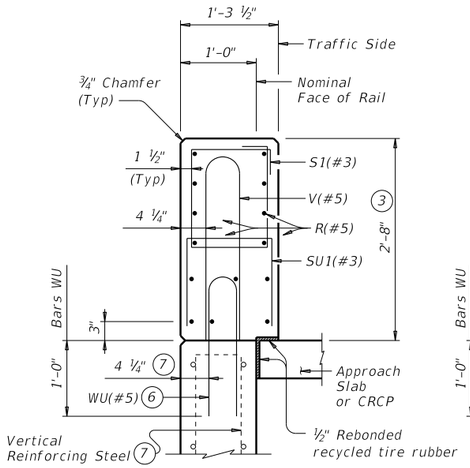
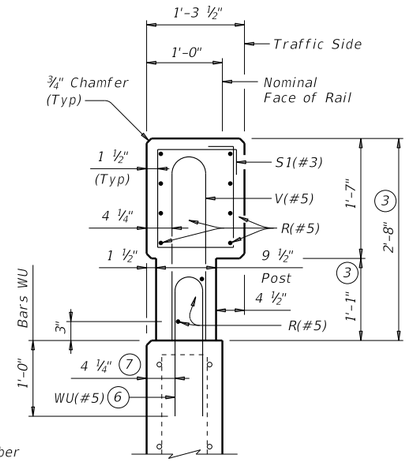
REVISIONS	0910	12	134, ETC	CR 2918, ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		97

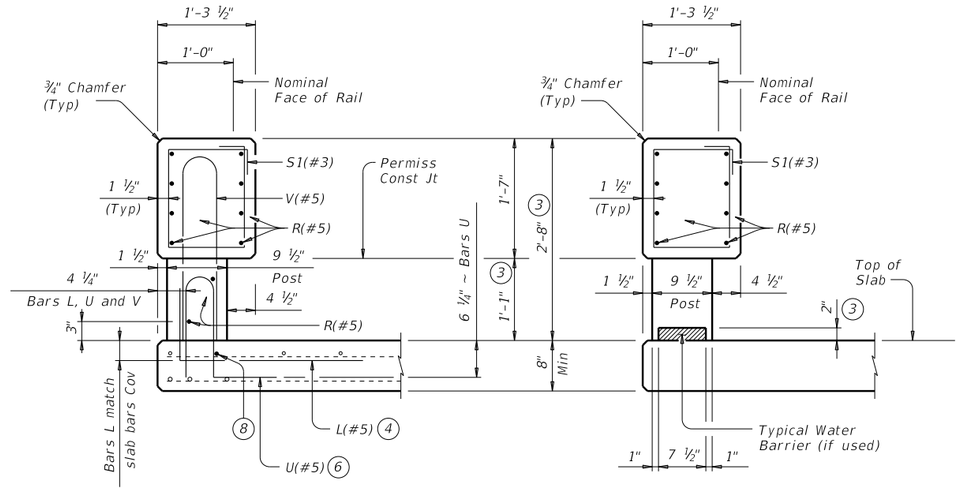
DATE:
FILE:



SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

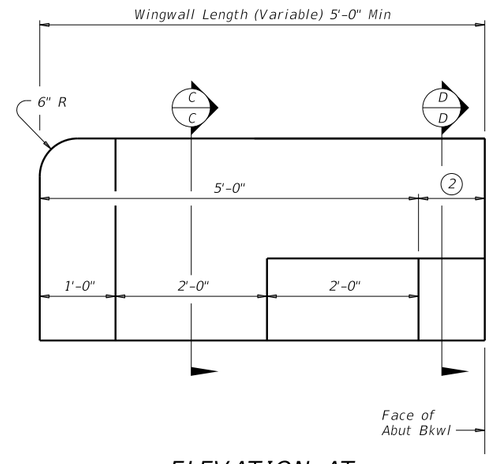


AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB

SECTIONS THRU RAIL

Sections on box culverts similar.



ELEVATION AT ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.

(2) *Wingwall Length minus 5'-0" (Varies)*

(3) *Increase 2" for structures with overlay.*

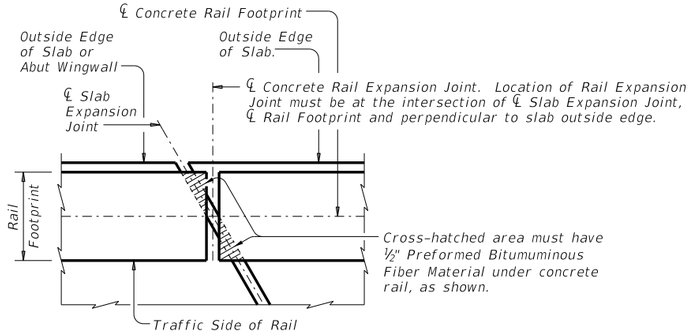
(4) *Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.*

(6) *Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.*

(7) *When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.*

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

(9) *At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway surface without overlay.*



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

Chamfer all exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

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

Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

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

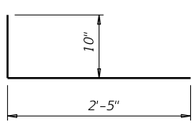
Do not use this railing on bridges with expansion joints providing more than 5" movement.

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

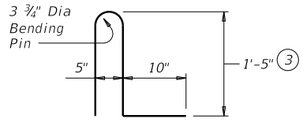
Shop drawings are not required for this rail.

Average weight of railing with no overlay is 358 plf.

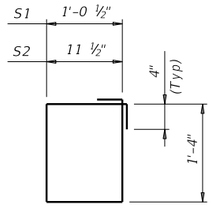
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



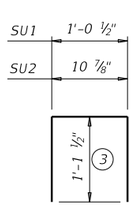
BARS L (#5)



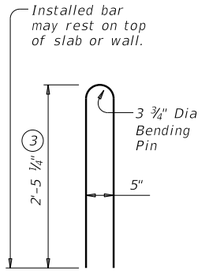
BARS U (#5) (9)



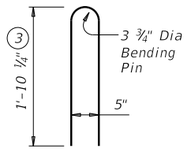
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134, ETC	CR 2918, ETC
	DIST	COUNTY		SHEET NO.
	TYL	VAN ZANDT		98

DATE: 11/11/2019
FILE: ...\Sheets\10 SW3P\2319_EPIC01.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. There are no MS4 Operators in the project area.

☐ No Action Required ☒ Required Action

Action No.

1. Comply with TPDES CGP. Contractor must COMPLY WITH SW3P AS STATED IN THE PLANS

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to specs listed above in IV.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Follow Migratory Bird Treaty Act guidance as listed below.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☒ Yes ☐ No

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

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

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. During design phase notify local floodplain administrator as necessary and comply with all applicable rules and regulations regarding the hydraulic design of the project.

2.

3.

CR 2319 @ ALLIGATOR CREEK

Texas Department of Transportation | 0910-12-136 | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0910	12	134,ETC	CR 2918,ETC
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	TYL	VAN ZANDT		99

A. GENERAL SITE DATA

1. PROJECT LIMITS:
CR 2319 AT ALLIGATOR CREEK 0.9 MILES WEST OF SH 19
PROJECT LENGTH = 365 FT. = 0.069 MILES
PROJECT LOCATION:
SEE TITLE SHEET

PROJECT COORDINATES:
BEG LATITUDE: +32.419580 BEG LONGITUDE: -95.867901
END LATITUDE: +32.419723 END LONGITUDE: -95.866735

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: SEE TITLE SHEET
* DRAINAGE PATTERNS: SEE DRAINAGE AREA MAP
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: SEE TYPICAL SECTIONS
* LOCATION OF EROSION AND SEDIMENT CONTROLS: SEE SW3P LAYOUT
* SURFACE WATERS AND DISCHARGE LOCATIONS: SEE SW3P LAYOUT
* PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY THE PROJECT FIELD OFFICE DURING CONSTRUCTION AND LOCATED IN THE PROJECT SW3P FILE. REFERENCE ITEM #10 BELOW

3. PROJECT DESCRIPTION: REPLACE BRIDGE AND APPROACHES

4. MAJOR SOIL DISTURBING ACTIVITIES:

MAJOR SOIL DISTURBING ACTIVITIES MAY INCLUDE BUT ARE NOT LIMITED TO: RIGHT-OF-WAY PREPARATION, CUT AND FILL TO IMPROVE ROADWAY PROFILE, REPLACING THE BRIDGE, FINAL GRADING AND TOPSOIL, AND PLACEMENT OF STONE RIPRAP.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: REDSPRINGS VERY GRAVELLY SANDY LOAM. NATIVE GRASSES, BRUSH, AND TREES COVER THE EXISTING SOIL WITH APPROXIMATELY 90% OF COVER.

6. TOTAL PROJECT AREA: 0.64 ACRES

7. TOTAL AREA TO BE DISTURBED: 0.46 ACRES

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: 0.33
AFTER CONSTRUCTION: 0.45

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
THE CR 2319 BRIDGE IS LOCATED APPROXIMATELY 0.9 MILES WEST OF SH 19. ALLIGATOR CREEK IS A FEMA DESIGNATED ZONE A STREAM AT THIS DRAINAGE STRUCTURE (FIRM NO. 84867C0425C). ALLIGATOR CREEK FLOWS SOUTH TO KICKAPOO CREEK (SEGMENT NO. 0605A).

10. PROJECT SW3P FILE: FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN AN SW3P FILE WITH ALL PERTINENT ENVIRONMENTAL DOCUMENTS, CORRESPONDENCE, ETC. AT THE PROJECT FIELD OFFICE. IF NO FIELD OFFICE IS AVAILABLE THEN THE SW3P FILE SHALL BE KEPT IN THE INSPECTOR'S TRUCK.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

_X_ TEMPORARY SEEDING
_X_ PERMANENT PLANTING, SODDING, OR SEEDING
___ MULCHING
___ SOIL RETENTION BLANKET
___ BUFFER ZONES
_X_ PRESERVATION OF NATURAL RESOURCES

OTHER:

2. STRUCTURAL PRACTICES:

_X_ SILT FENCES
_X_ ROCK FILTER DAMS
___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
___ DIVERSION DIKE AND SWALE COMBINATIONS
___ PIPE SLOPE DRAINS
___ PAVED FLUMES
___ ROCK BEDDING AT CONSTRUCTION EXIT
___ TIMBER MATTING AT CONSTRUCTION EXIT
___ CHANNEL LINERS
___ SEDIMENT TRAPS
___ SEDIMENT BASINS
___ STORM INLET SEDIMENT TRAP
___ STONE OUTLET STRUCTURES
___ CURBS AND GUTTERS
___ STORM SEWERS
___ VELOCITY CONTROL DEVICES

OTHER:

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
MAINTENANCE WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

2. INSPECTION:
INSPECTION WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

3. WASTE MATERIALS:
ALL WASTE MATERIALS WILL BE COLLECTED, STORED IN A LIDDED CONTAINER AND DISPOSED OF IN A LEGAL AND PROPER MANNER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS. PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR MUST BE CONTACTED IMMEDIATELY.

5. SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFFSITE VEHICLE TRACKING:

___ HAUL ROADS DAMPENED FOR DUST CONTROL
_X_ LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
___ EXCESS DIRT ON ROAD REMOVED DAILY
___ STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL SEDIMENT FROM ENTERING RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED TO MINIMIZE THE RUNOFF OF POLLUTANTS.

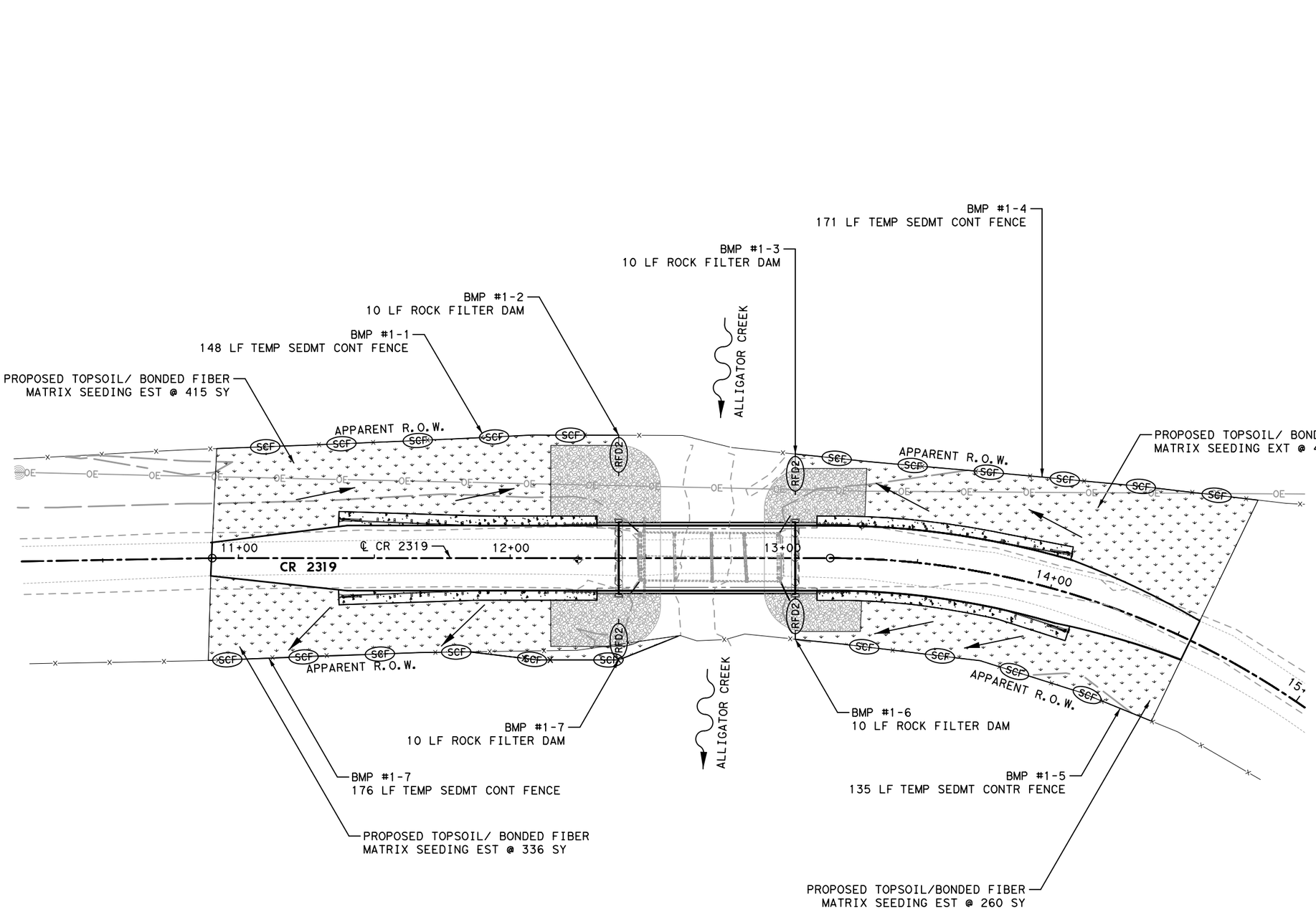
Civil Consulting Group, PLLC
FIRM NO. F-9356

12/14/2020

CR 2319
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0910	12	134,ETC	CR 2918,ETC
DIST	COUNTY		SHEET NO.
TYL	VAN ZANDT		100



LEGEND

- TOPSOIL/ BONDED FIBER MATRIX SEEDING
- DITCH FLOW ARROW
- FLOW ARROW
- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)

0′ 20′ 40′

SCALE: 1"=40′ H

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER

11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2319 @ ALLIGATOR CREEK

SW3P LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918, ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	101
CONTROL	SECTION	JOB	
0910	12	134, ETC	

FILENAME: ...\Sheets\10 SW3P\2319*SW3P.dgn

DRAWING DATE: 11/11/2019

DATE: 11/11/2019
FILE: ...\Sheets\10 SW3P\2708_EPIC01.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. There are no MS4 Operators in the project area.

☐ No Action Required ☒ Required Action

Action No.

1. Comply with TPDES CGP. Contractor must COMPLY WITH SW3P AS STATED IN THE PLANS

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☐ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☒ Other Nationwide Permit Required: NWP# 3(i)

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

1. COMPLY WITH GENERAL CONDITIONS OF NWP 3(i)
2.
3.
4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to specs listed above in IV.
2.
3.
4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Follow Migratory Bird Treaty Act guidance as listed below.
2.
3.
4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

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

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

☒ Yes ☐ No

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

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

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. During design phase notify local floodplain administrator as necessary and comply with all applicable rules and regulations regarding the hydraulic design of the project.
2.
3.

CR 2708 @ CANEY CREEK

Texas Department of Transportation | 0910-12-137 | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0910	12	134,ETC	CR 2918,ETC
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	TYL	VAN ZANDT		102

A. GENERAL SITE DATA

1. PROJECT LIMITS:
CR 2708 AT CANEY CREEK 0.6 MILES EAST OF CR 2721
PROJECT LENGTH = 335 FT. = 0.063 MILES
PROJECT LOCATION:
SEE TITLE SHEET

PROJECT COORDINATES:
BEG LATITUDE: +32.430252 BEG LONGITUDE: -96.039176
END LATITUDE: +32.429977 END LONGITUDE: -95.038189

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: SEE TITLE SHEET
* DRAINAGE PATTERNS: SEE DRAINAGE AREA MAP
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: SEE TYPICAL SECTIONS
* LOCATION OF EROSION AND SEDIMENT CONTROLS: SEE SW3P LAYOUT
* SURFACE WATERS AND DISCHARGE LOCATIONS: SEE SW3P LAYOUT
* PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY THE PROJECT FIELD OFFICE DURING CONSTRUCTION AND LOCATED IN THE PROJECT SW3P FILE. REFERENCE ITEM #10 BELOW

3. PROJECT DESCRIPTION: REPLACE BRIDGE AND APPROACHES

4. MAJOR SOIL DISTURBING ACTIVITIES:

MAJOR SOIL DISTURBING ACTIVITIES MAY INCLUDE BUT ARE NOT LIMITED TO: RIGHT-OF-WAY PREPARATION, CUT AND FILL TO IMPROVE ROADWAY PROFILE, REPLACING THE BRIDGE, FINAL GRADING AND TOPSOIL, AND PLACEMENT OF STONE RIPRAP.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: REDSPRINGS VERY GRAVELLY SANDY LOAM. NATIVE GRASSES, BRUSH, AND TREES COVER THE EXISTING SOIL WITH APPROXIMATELY 90% OF COVER.

6. TOTAL PROJECT AREA: 0.33 ACRES

7. TOTAL AREA TO BE DISTURBED: 0.24 ACRES

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: 0.38
AFTER CONSTRUCTION: 0.58

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
THE CR 2708 BRIDGE IS LOCATED APPROXIMATELY 0.6 MILES EAST OF CR 2721. CANEY CREEK IS A FEMA DESIGNATED ZONE A STREAM AT THIS DRAINAGE STRUCTURE (FIRM NO. 48467C0375C). CANEY CREEK FLOWS SOUTHWEST TO CEDAR CREEK RESERVOIR (SEGMENT NO. 0818).

10. PROJECT SW3P FILE: FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN AN SW3P FILE WITH ALL PERTINENT ENVIRONMENTAL DOCUMENTS, CORRESPONDENCE, ETC. AT THE PROJECT FIELD OFFICE. IF NO FIELD OFFICE IS AVAILABLE THEN THE SW3P FILE SHALL BE KEPT IN THE INSPECTOR'S TRUCK.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [ ] SOIL RETENTION BLANKET
- [ ] BUFFER ZONES
- [X] PRESERVATION OF NATURAL RESOURCES

OTHER:

2. STRUCTURAL PRACTICES:

- [X] SILT FENCES
- [X] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [ ] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER:

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
MAINTENANCE WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

2. INSPECTION:
INSPECTION WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

3. WASTE MATERIALS:
ALL WASTE MATERIALS WILL BE COLLECTED, STORED IN A LIDDED CONTAINER AND DISPOSED OF IN A LEGAL AND PROPER MANNER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS. PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR MUST BE CONTACTED IMMEDIATELY.

5. SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFFSITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [ ] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL SEDIMENT FROM ENTERING RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED TO MINIMIZE THE RUNOFF OF POLLUTANTS.

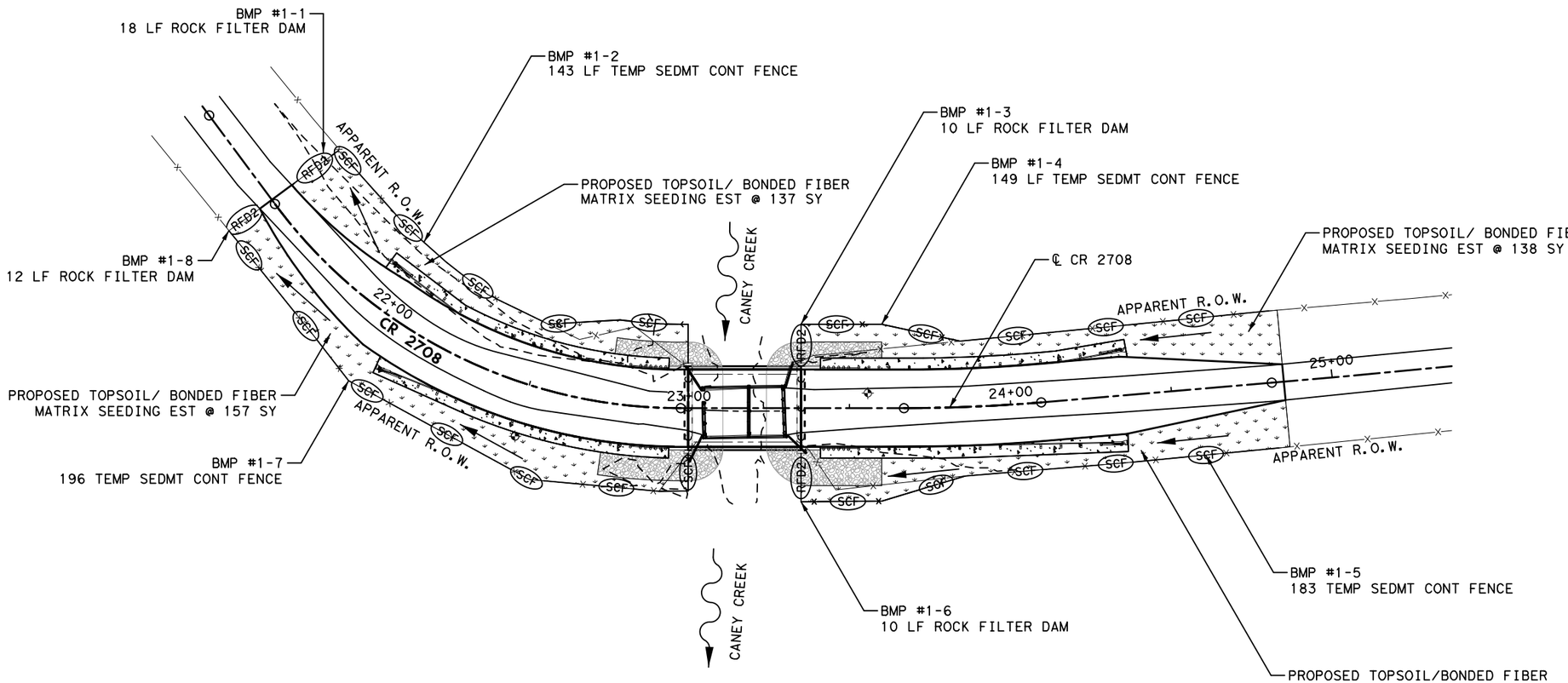
Civil Consulting Group, PLLC
FIRM NO. F-9356

12/14/2020

CR 2708 STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0910	12	134,ETC	CR 2918,ETC
DIST	COUNTY		SHEET NO.
TYL	VAN ZANDT		103



0′ 20′ 40′
SCALE: 1"=40′ H

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

CIVIL CONSULTING GROUP
1575 HERITAGE DRIVE, STE. 308
MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
TEXAS REGISTERED ENGINEERING FIRM NO. F-9356

Texas Department of Transportation

CR 2708 @ CANEY CREEK

SW3P LAYOUT

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	104
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\Sheets\10 SW3P\2708*SW3P.dgn
DRAWING DATE: 11/11/2019

DATE: 11/11/2019
FILE: ...\Sheets\10 SW3P\2918_EPIC01.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. There are no MS4 Operators in the project area.

☐ No Action Required ☒ Required Action

Action No.

1. Comply with TPDES CGP. Contractor must COMPLY WITH SW3P AS STATED IN THE PLANS

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Contractor to adhere to specs listed above in IV.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Follow Migratory Bird Treaty Act guidance as listed below.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☒ Yes ☐ No

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

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

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. During design phase notify local floodplain administrator as necessary and comply with all applicable rules and regulations regarding the hydraulic design of the project.

2.

3.

CR 2918 @ STEVE CREEK

Texas Department of Transportation | 0910-12-135 | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0910	12	134,ETC	CR 2918,ETC
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	TYL	VAN ZANDT		105

DATE: 11/11/2019
FILE: ...\Sheets\10 SW3P\2918_EPIC02.dgn

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Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. During design phase notify local floodplain administrator as necessary and comply with all applicable rules and regulations regarding the hydraulic design of the project.

2.

3.

CR 2918 @ STEVE CREEK RELIEF

Texas Department of Transportation | 0910-12-134 | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	12	134,ETC	CR 2918,ETC
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	TYL	VAN ZANDT		106
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

A. GENERAL SITE DATA

1. PROJECT LIMITS:
CR 2918 AT STEVE CREEK 1.3 MILES SOUTH OF FM 1256
PROJECT LENGTH = 675 FT. = 0.128 MILES
PROJECT LOCATION:
SEE TITLE SHEET

PROJECT COORDINATES:
BEG LATITUDE: +32.380875 BEG LONGITUDE: -95.863418
END LATITUDE: +32.382549 END LONGITUDE: -95.862466

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: SEE TITLE SHEET
* DRAINAGE PATTERNS: SEE DRAINAGE AREA MAP
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: SEE TYPICAL SECTIONS
* LOCATION OF EROSION AND SEDIMENT CONTROLS: SEE SW3P LAYOUT
* SURFACE WATERS AND DISCHARGE LOCATIONS: SEE SW3P LAYOUT
* PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY THE PROJECT FIELD OFFICE DURING CONSTRUCTION AND LOCATED IN THE PROJECT SW3P FILE. REFERENCE ITEM #10 BELOW

3. PROJECT DESCRIPTION: REPLACE BRIDGE AND APPROACHES

4. MAJOR SOIL DISTURBING ACTIVITIES:

MAJOR SOIL DISTURBING ACTIVITIES MAY INCLUDE BUT ARE NOT LIMITED TO: RIGHT-OF-WAY PREPARATION, CUT AND FILL TO IMPROVE ROADWAY PROFILE, REPLACING THE BRIDGE, FINAL GRADING AND TOPSOIL, AND PLACEMENT OF STONE RIPRAP.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: REDSPRINGS VERY GRAVELLY SANDY LOAM. NATIVE GRASSES, BRUSH, AND TREES COVER THE EXISTING SOIL WITH APPROXIMATELY 90% OF COVER.

6. TOTAL PROJECT AREA: 1.03 ACRES

7. TOTAL AREA TO BE DISTURBED: 0.64 ACRES

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: 0.35
AFTER CONSTRUCTION: 0.49

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
THE CR 2918 BRIDGE IS LOCATED APPROXIMATELY 1.3 MILES SOUTH OF FM 1256. STEVE CREEK IS A FEMA DESIGNATED ZONE A STREAM AT THIS DRAINAGE STRUCTURE (FIRM NO. 48467C0425C). STEVE CREEK FLOWS EAST TO KICKAPOO CREEK (SEGMENT NO. 0605A).

10. PROJECT SW3P FILE: FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN AN SW3P FILE WITH ALL PERTINENT ENVIRONMENTAL DOCUMENTS, CORRESPONDENCE, ETC. AT THE PROJECT FIELD OFFICE. IF NO FIELD OFFICE IS AVAILABLE THEN THE SW3P FILE SHALL BE KEPT IN THE INSPECTOR'S TRUCK.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

_X_ TEMPORARY SEEDING
_X_ PERMANENT PLANTING, SODDING, OR SEEDING
___ MULCHING
___ SOIL RETENTION BLANKET
___ BUFFER ZONES
_X_ PRESERVATION OF NATURAL RESOURCES

OTHER:

2. STRUCTURAL PRACTICES:

_X_ SILT FENCES
_X_ ROCK FILTER DAMS
___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
___ DIVERSION DIKE AND SWALE COMBINATIONS
___ PIPE SLOPE DRAINS
___ PAVED FLUMES
___ ROCK BEDDING AT CONSTRUCTION EXIT
___ TIMBER MATTING AT CONSTRUCTION EXIT
___ CHANNEL LINERS
___ SEDIMENT TRAPS
___ SEDIMENT BASINS
___ STORM INLET SEDIMENT TRAP
___ STONE OUTLET STRUCTURES
___ CURBS AND GUTTERS
___ STORM SEWERS
___ VELOCITY CONTROL DEVICES

OTHER:

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
MAINTENANCE WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

2. INSPECTION:
INSPECTION WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

3. WASTE MATERIALS:
ALL WASTE MATERIALS WILL BE COLLECTED, STORED IN A LIDDED CONTAINER AND DISPOSED OF IN A LEGAL AND PROPER MANNER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS. PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR MUST BE CONTACTED IMMEDIATELY.

5. SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFFSITE VEHICLE TRACKING:

___ HAUL ROADS DAMPENED FOR DUST CONTROL
_X_ LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
___ EXCESS DIRT ON ROAD REMOVED DAILY
___ STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL SEDIMENT FROM ENTERING RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED TO MINIMIZE THE RUNOFF OF POLLUTANTS.

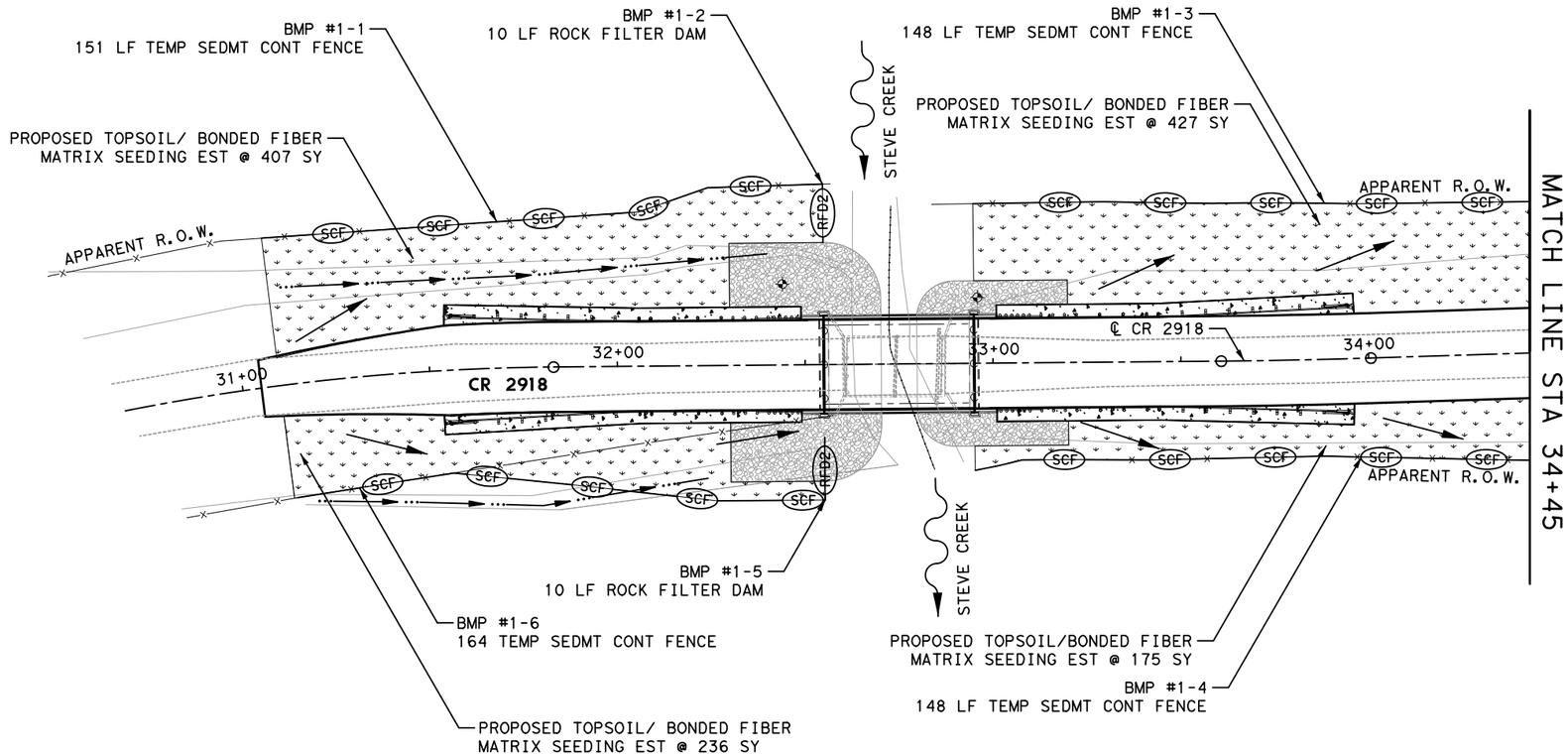
Civil Consulting Group, PLLC
FIRM NO. F-9356

12/14/2020

CR 2918 STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0910	12	134,ETC	CR 2918,ETC
DIST	COUNTY		SHEET NO.
TYL	VAN ZANDT		107



LEGEND

- TOPSOIL/ BONDED FIBER MATRIX SEEDING
- DITCH FLOW ARROW
- FLOW ARROW
- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)

0′ 20′ 40′
SCALE: 1"=40′ H

STATE OF TEXAS
TREVOR L. CASTILLA
85405
LICENSED PROFESSIONAL ENGINEER
11/11/2019

NO.	REVISION	BY	DATE

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MCKINNEY, TEXAS 75069
P 972.569.9193 F 972.569.9197
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Texas Department of Transportation

CR 2918 @ STEVE CREEK

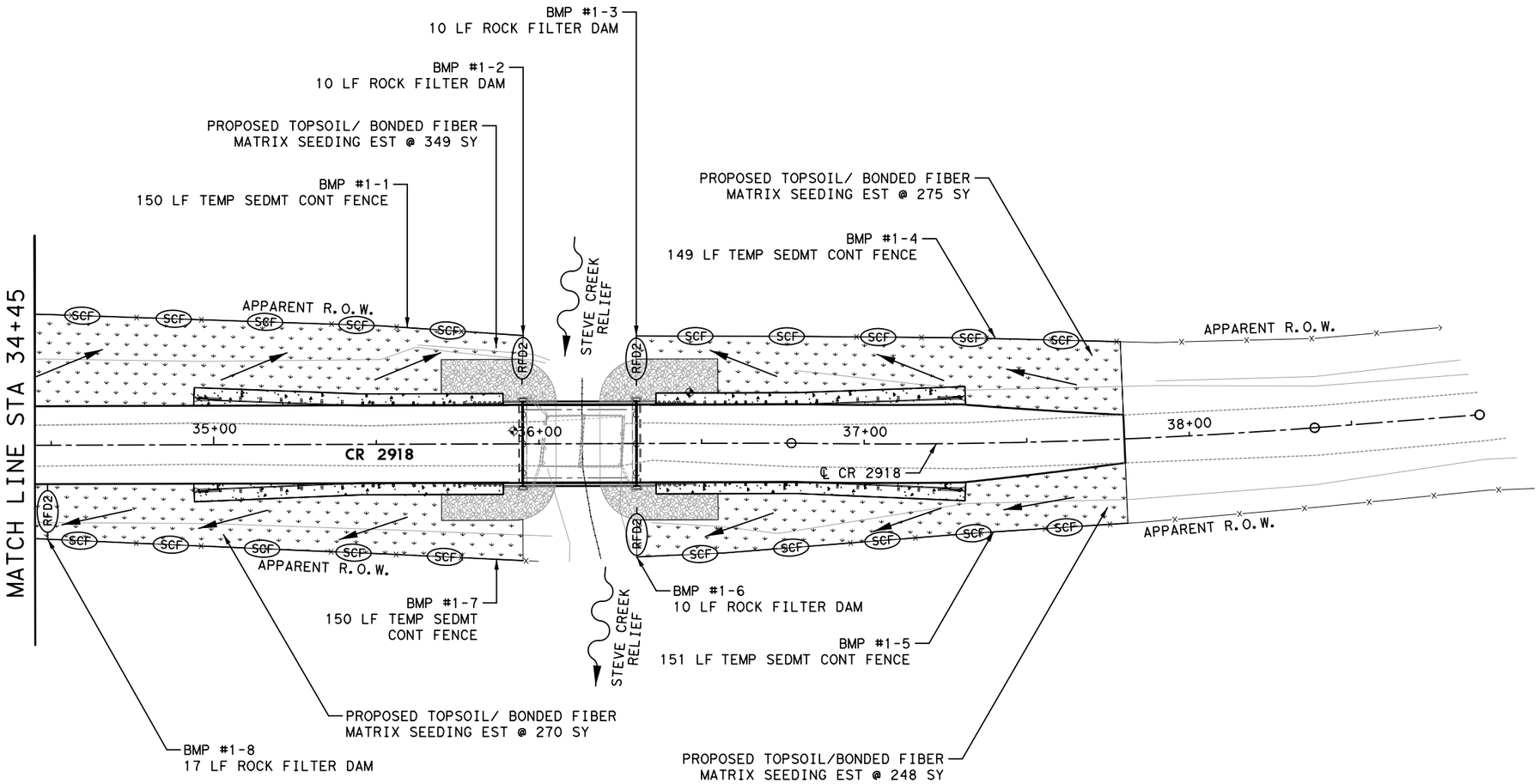
SW3P LAYOUT

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
6	BR 2019 (360), ETC.	CR 2918,ETC

STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	TYL	VAN ZANDT	108
CONTROL	SECTION	JOB	
0910	12	134,ETC	

FILENAME: ...\Sheets\10 SW3P\2918*SW3P01.dgn
DRAWING DATE: 11/11/2019



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SW3P LAYOUT

SHEET 2 OF 2

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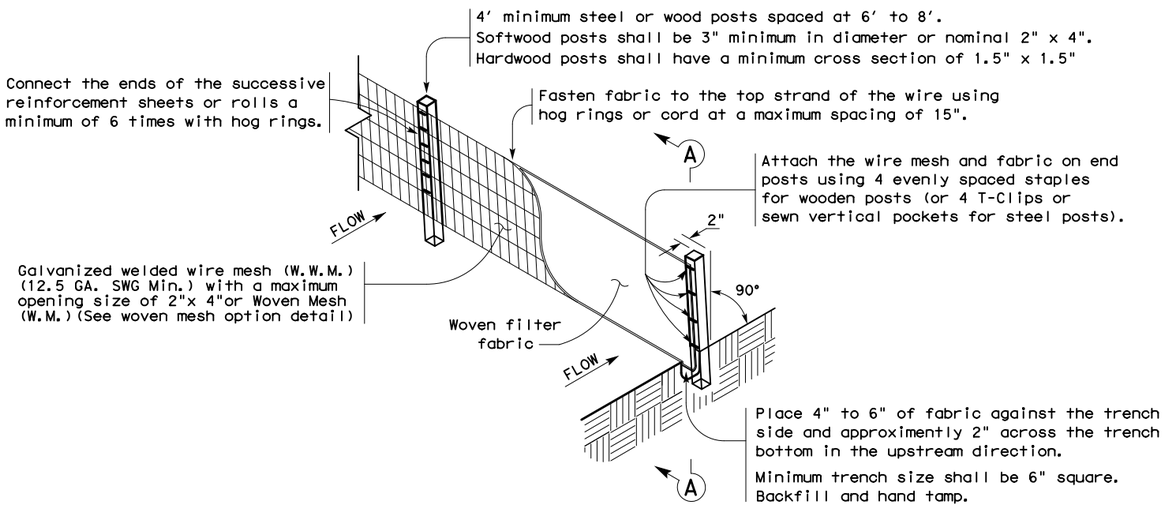
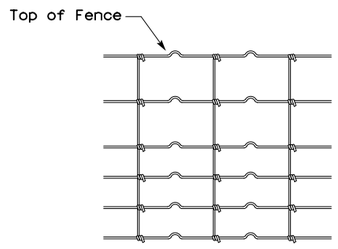
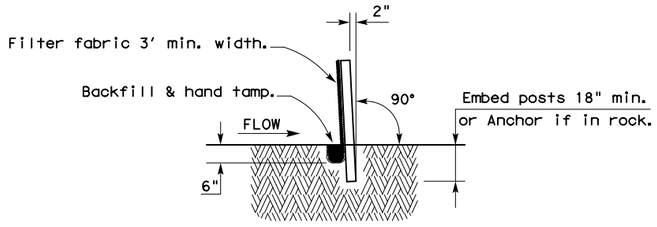


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

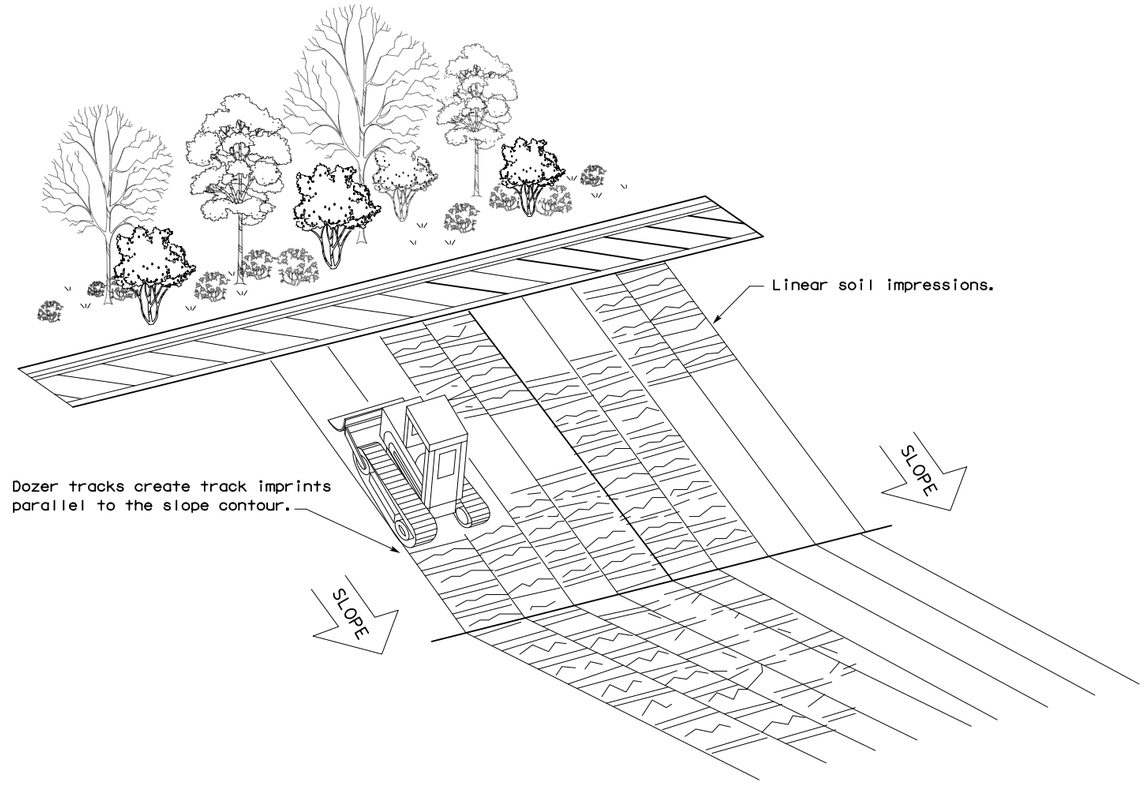
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

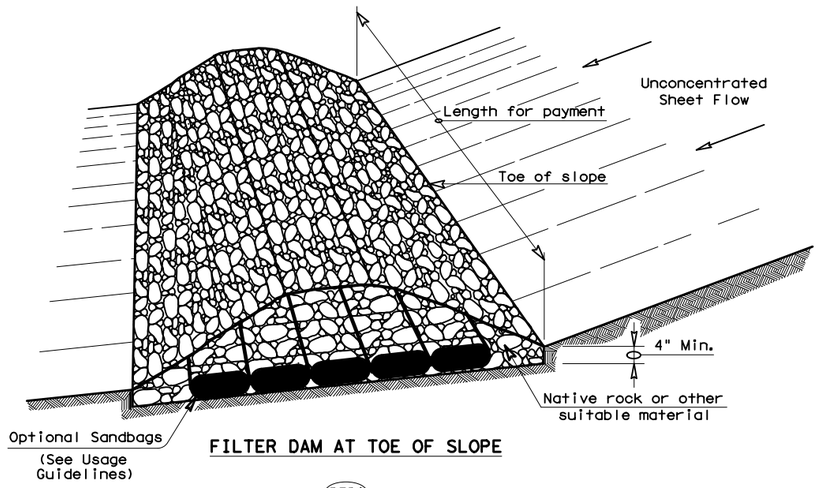
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

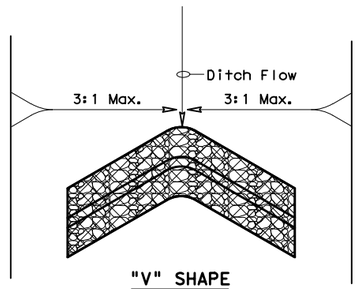
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS		
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0910	12	134,ETC	CR 2918,ETC		
	DIST	COUNTY		SHEET NO.		
	TYL	VAN ZANDT		110		

DATE/2019
FILE: SW3P\STANDARDS\ec116.dgn

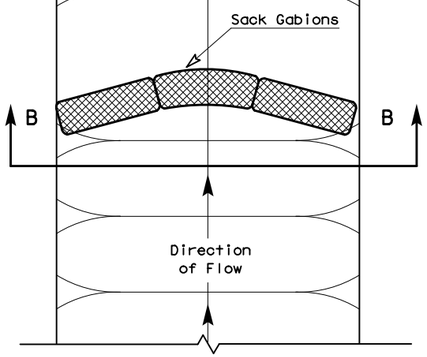


FILTER DAM AT TOE OF SLOPE

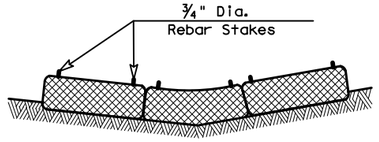
RFD1



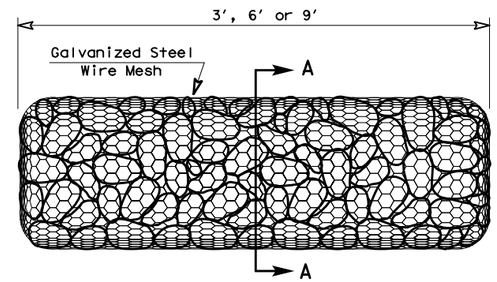
"V" SHAPE
PLAN VIEW



PLAN VIEW

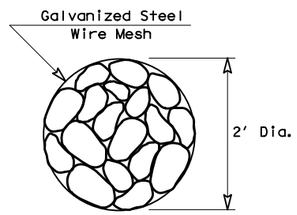


SECTION B-B

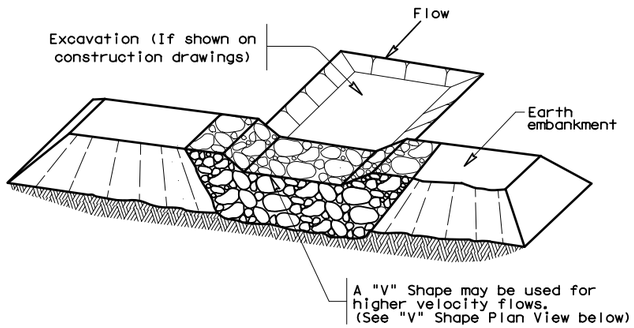


TYPE 4 (SACK GABIONS)

RFD4

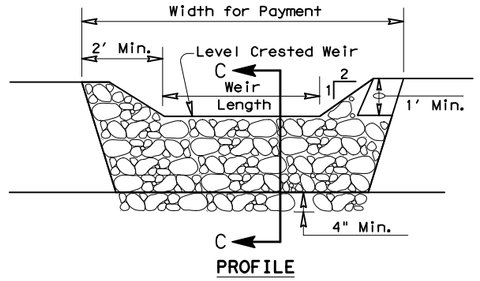


SECTION A-A

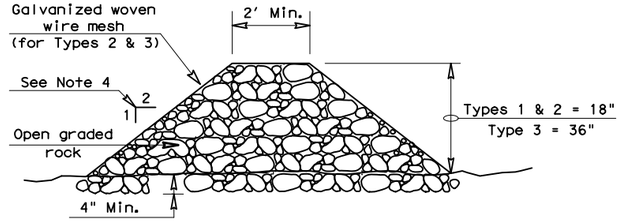


FILTER DAM AT SEDIMENT TRAP

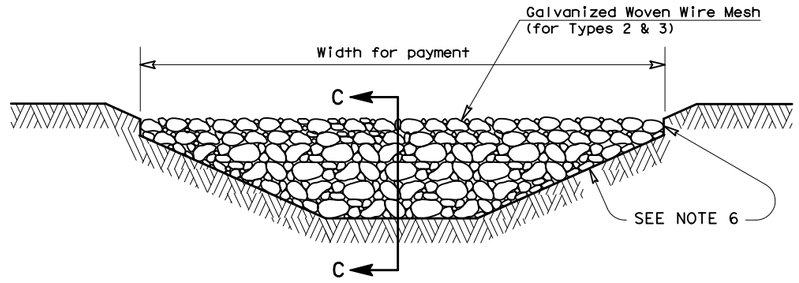
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
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REVISIONS	0910	12	134,ETC	CR 2918,ETC
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