100% SUBMITTAL

INDEX OF SHEETS

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

FINAL PLANS

DATE CONTRACT LETTING: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK COMPLETED & ACCEPTED: _____

CONTRACTOR: _____

USED ____ OF ____ ALLOTTED DAYS _____

FINAL CONTRACT COST : $ _____

FINAL AS BUILT PLANS

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

_____ DATE

_____ AREA ENGINEER

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT BR 2020 (895), ETC.

NET LENGTH OF PROJECT = 735.000 FT. = 0.139 MI.

A — WHITTLE ST: CSJ 0910-16-147

ROADWAY:	= 30.667 FT.	=	0.005 MI.
BRIDGE:	= 29.333 FT.	=	0.006 MI.
TOTAL	= 60.000 FT.	=	0.011 MI.

B — CR 2110: CSJ 0910-16-148

ROADWAY:	= 260.000 FT.	=	0.049 MI.
BRIDGE:	= 50.000 FT.	=	0.010 MI.
TOTAL	= 310.000 FT.	=	0.059 MI.

C — CR 289: CSJ 0910-16-149

ROADWAY:	= 340.000 FT.	=	0.064 MI.
BRIDGE:	= 40.000 FT.	=	0.008 MI.
TOTAL	= 380.000 FT.	=	0.072 MI.

SMITH COUNTY

WHITTLE ST AT WEST MUD CREEK TRIBUTARY
CR 2110 AT KICKAPOO CREEK
CR 289 AT PRAIRIE CREEK

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT

CONSISTING OF REPLACING BRIDGE AND APPROACHES, GRADING, ACP BASE & SURFACE, AND MBGF

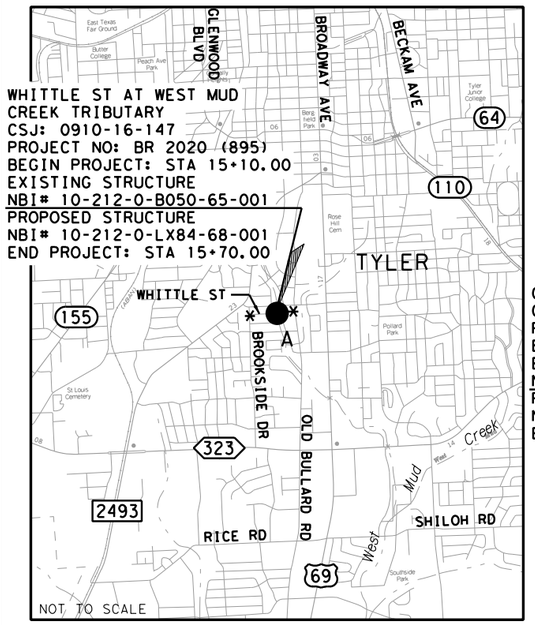
PROJECT NO.			
BR 2020 (895), ETC.			
CONT	SECT	JOB	HIGHWAY
0910	16	147,ETC	WHITTLE, ETC.
DIST	COUNTY		SHEET NO.
TYL	SMITH		1

DESIGN SPEED:
- WHITTLE ST = 30 MPH (MOECC)
- CR 2110 = 35 MPH (MOECC)
- CR 289 = 20 MPH (MOECC)

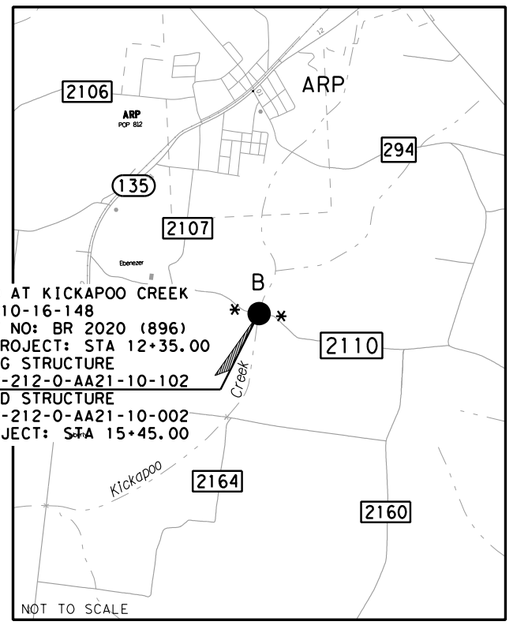
MOECC = MEETS OR EXCEEDS CURRENT CONDITIONS

FUNCTIONAL CLASS: LOCAL ROAD

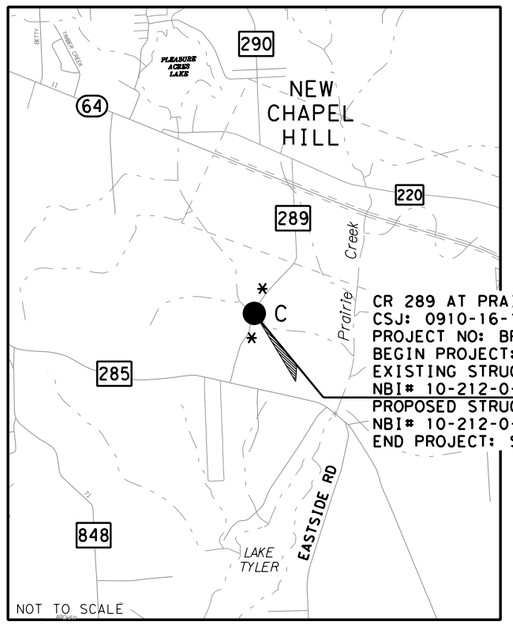
ADT:
- WHITTLE ST
  - EXIST: 104 (2018)
  - PROP: 146 (2038)
- CR 2110
  - EXIST: 77 (2018)
  - PROP: 108 (2038)
- CR 289
  - EXIST: 1643 (2018)
  - PROP: 2300 (2038)



EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE



EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE



EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

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

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)

PREPARED BY: 9/7/2021

Bradley M. Tiemann, P.E.

BRADLEY M. TIEMANN, P.E.
ATKINS PROJECT MANAGER

Texas Department of Transportation

SUBMITTED FOR LETTING: 10/26/2021

DocuSigned by: Gilbert Ortega
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 11/1/2021

DocuSigned by: Vernon M. Webb
DISTRICT ENGINEER

DATE: 9/7/2021 11:21:19 AM
FILE: ...\GEN\TBR_TYL_SMITH_TITLE.dgn

100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:35:00 AM

SUPPLEMENTAL INDEX OF SHEETS

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

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021
Bradley M. Tiemann, P.E.

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

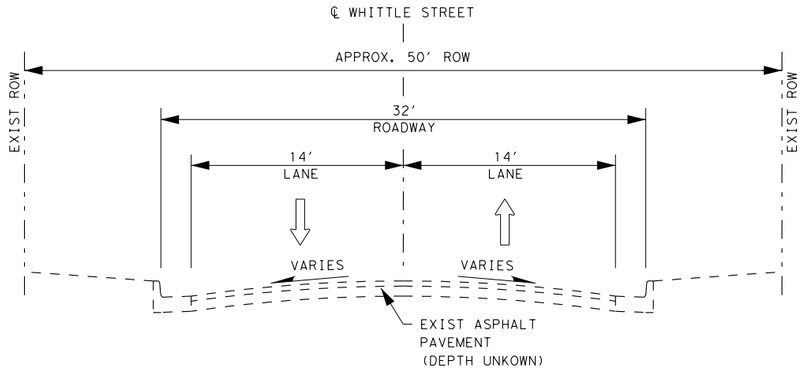
SUPPLEMENTAL INDEX OF SHEETS

SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			WHITTLE ST, ETC
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	2

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_INDEX.dgn

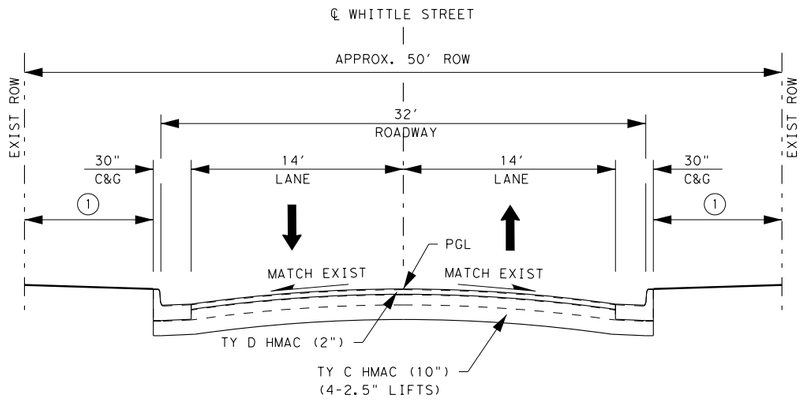
100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:35:07 AM



EXISTING TYPICAL SECTION

WHITTLE STREET

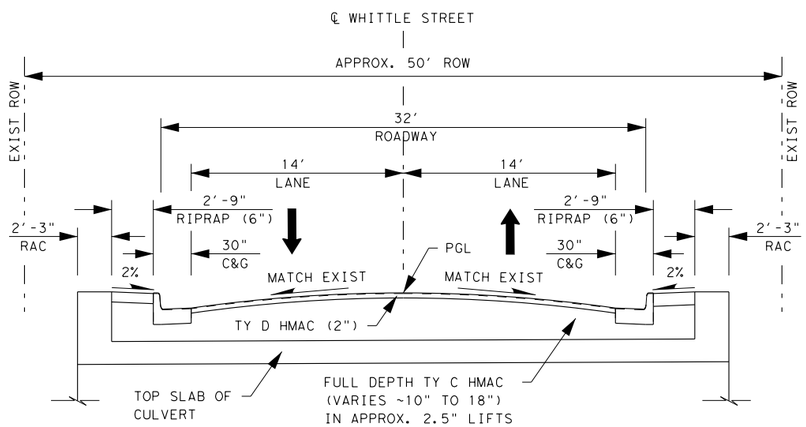
STA 15+10.00 TO STA 15+70.00



PROPOSED TYPICAL SECTION

WHITTLE STREET

STA 15+10.00 TO STA 15+23.75
STA 15+56.25 TO STA 15+70.00



PROPOSED TYPICAL SECTION

WHITTLE STREET

STA 15+23.75 TO STA 15+56.25

NOTES:

1. SEE BRIDGE LAYOUT SHEETS FOR BRIDGE TYPICAL SECTIONS.
2. SEE PLAN & PROFILE SHEET FOR TAPER LOCATIONS AND LIMITS OF GUARD FENCE.
3. STOCKPILE AND REUSE 100% EXISTING TOPSOIL INSIDE RIGHT OF WAY.
4. FOR CURB AND GUTTER INFORMATION SEE MISCELLANEOUS DETAILS.

(1) VARIES
TOPSOIL AND BLOCK SODDING

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

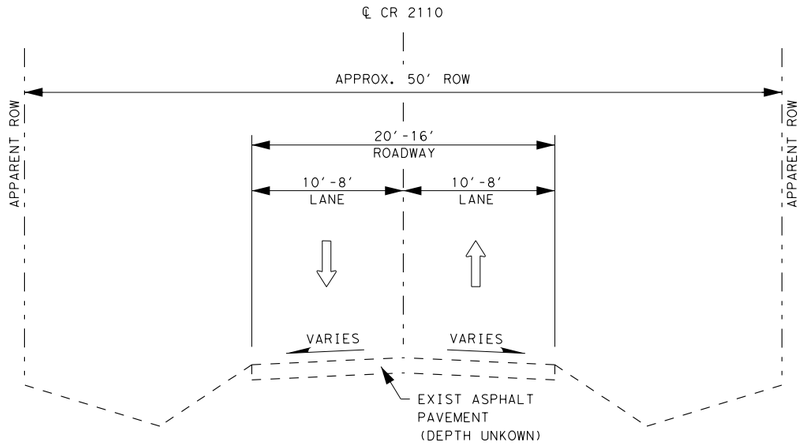
TYPICAL SECTIONS
WHITTLE STREET

SCALE: 1"=10' H, 1"=5' V SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	3

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_WHITTLE_TYP.dgn

100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:35:17 AM



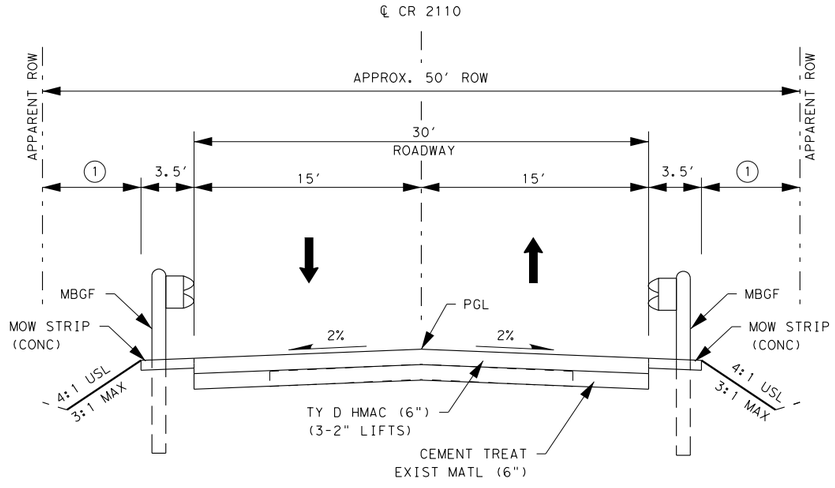
EXISTING TYPICAL SECTION

CR 2110

STA 12+35.00 TO STA 15+45.00
EXISTING BRIDGE: STA 13+55.00 TO STA 13+94.00

NOTES:

1. SEE BRIDGE LAYOUT SHEETS FOR BRIDGE TYPICAL SECTIONS.
2. SEE PLAN & PROFILE SHEET FOR TAPER LOCATIONS AND LIMITS OF GUARD FENCE.
3. STOCKPILE AND REUSE 100% EXISTING TOPSOIL INSIDE RIGHT OF WAY.
4. AT GUARD FENCE LOCATIONS SEE STD. GF (31)MS-19.



PROPOSED TYPICAL SECTION

CR 2110

(TRANSITION FROM EXISTING: STA 12+35.00 TO STA 13+00.00)
STA 13+00.00 TO STA 13+50.00
PROPOSED BRIDGE: STA 13+50.00 TO STA 14+00.00
STA 14+00.00 TO STA 14+95.00
(TRANSITION TO EXISTING: STA 14+95.00 TO STA 15+45.00)

(1) VARIES
TOPSOIL AND BONDED FIBER MATRIX SEED

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

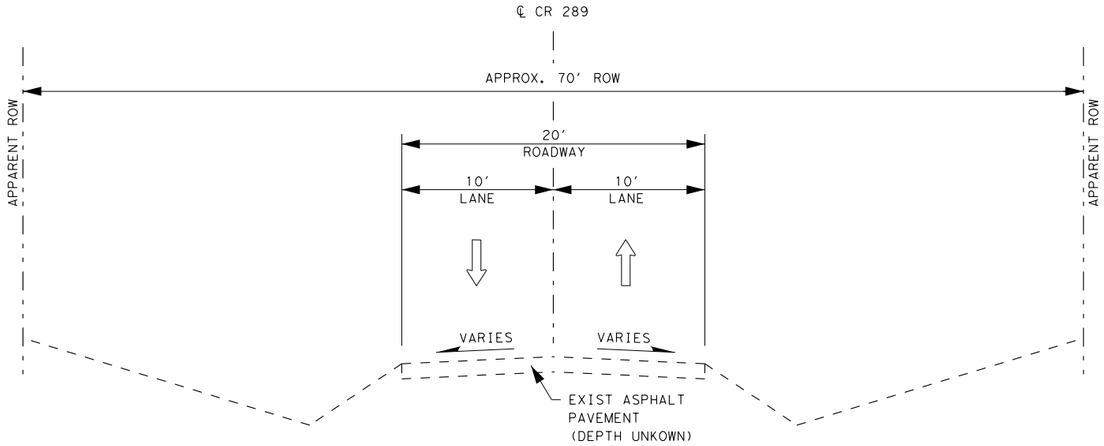
TYPICAL SECTIONS
CR 2110

SCALE: 1"=10' H, 1"=5' V SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 2110
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	4

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR2110_TYP.dgn

100% SUBMITTAL
DATE: 9/7/2021
TIME: 9:35:27 AM



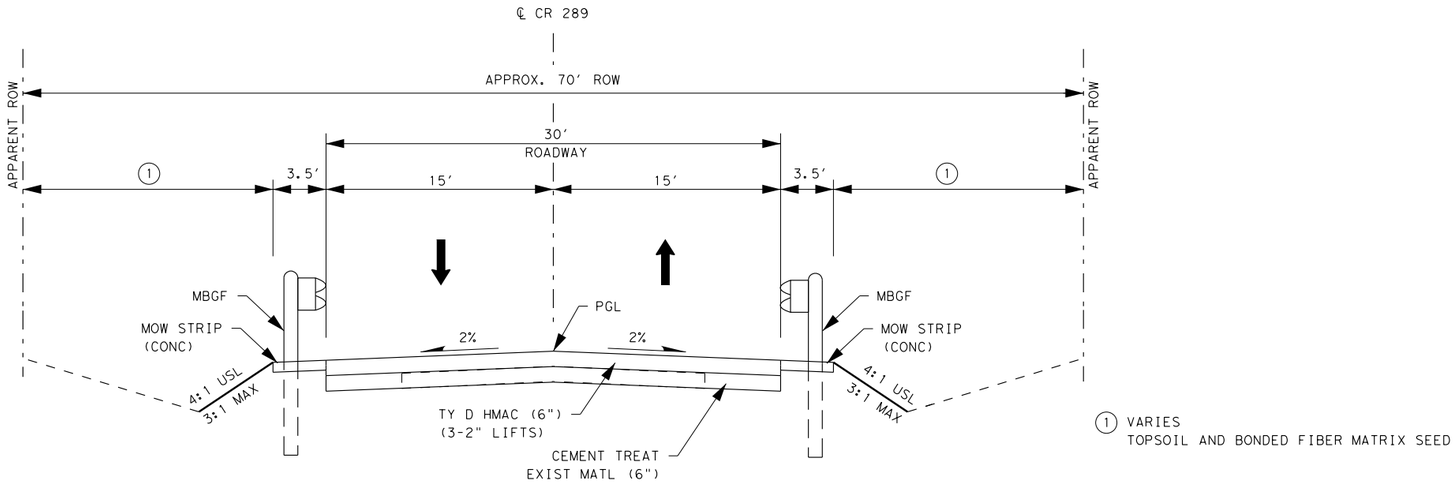
EXISTING TYPICAL SECTION

CR 289

STA 12+35.00 TO STA 16+15.00
EXISTING BRIDGE: STA 14+09.80 TO STA 14+38.37

NOTES:

1. SEE BRIDGE LAYOUT SHEETS FOR BRIDGE TYPICAL SECTIONS.
2. SEE PLAN & PROFILE SHEET FOR TAPER LOCATIONS AND LIMITS OF GUARD FENCE.
3. STOCKPILE AND REUSE 100% EXISTING TOPSOIL INSIDE RIGHT OF WAY.
4. AT GUARD FENCE LOCATIONS SEE STD. GF (31)MS-19.



(1) VARIES
TOPSOIL AND BONDED FIBER MATRIX SEED

PROPOSED TYPICAL SECTION

CR 289

(TRANSITION FROM EXISTING: STA 12+35.00 TO STA 12+85.00)
STA 12+85.00 TO STA 14+05.00
PROPOSED BRIDGE: STA 14+05.00 TO STA 14+45.00
STA 14+45.00 TO STA 15+65.00
(TRANSITION TO EXISTING: STA 15+65.00 TO STA 16+15.00)

9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

TYPICAL SECTIONS
CR 289

SCALE: 1"=10' H, 1"=5' V
SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 289
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	5

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR289_TYP.dgn

GENERAL NOTES:

GENERAL.

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

Paul Schneider paul.schneider@txdot.gov

Travis Singleton travis.singleton@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.

For this contract, the following standards have been modified:

RAC (MOD)

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.

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

ITEM 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.

Project Number: **Sheet 6**

County: SMITH **Control:** 0910-16-147, ETC

Highway: WHITTLE ST, ETC

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.

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.

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

ITEM 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 0.445 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.

Construction sequence shall be as follows unless otherwise approved by the Engineer. Begin construction on CR 289 at Prairie Creek. Prairie Creek must be substantially complete and open to traffic prior to road closure and start of construction on CR 2110 at Kickapoo Creek. Kickapoo Creek must be substantially complete and open to traffic prior to road closure and start of construction on Whittle St. at West Mud Creek Tributary.

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.

Project Number: **Sheet 7**

County: SMITH **Control:** 0910-16-147, ETC

Highway: WHITTLE ST, ETC

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. 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.

Excavation and embankment for driveways, intersections, mailbox turnouts and crossovers will not be paid for directly, but will be subsidiary to the various bid items unless otherwise shown on the plans.

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."

When excavation is required to adjust stream flow lines at culvert ends, flatten the side slopes of channels and the backslopes of parallel ditches to the maximum extent possible within the existing right of way and channel easements.

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 162. SODDING FOR EROSION CONTROL

Use Cynodon dactylon (Bermudagrass) for block sod.

Blade and rake smooth the area before laying block sod. Refer to the plans and details for areas to receive the sod. Remove 1 in. of soil along paved edges and curb lines before laying sod and

dress the slope to match all exposed edges after placing the sod. Fertilize the ground with a slow-release homogeneous coated fertilizer at a rate of 1 lb. per 9 sq. yd. before installation of the sod.

ITEM 164. SEEDING FOR EROSION CONTROL

The rates, types of seed, asphalt, and locations for the straw mulch and broadcast seed items will be determined if temporary erosion control is needed.

Mow tall vegetation prior to placement of erosion control measures in order to provide optimal growing conditions. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

The season and seed mixture for “Broadcast Seeding (Temporary Erosion Control) (Cool Season)” and “Broadcast Seeding (Temporary Erosion Control) (Warm Season)” is specified below:

Cool Season - September 1 thru November 30
Warm Season - May 15 thru August 31

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
(Season: September 1 to February 1)	
Bermuda (unhulled)	12
Crimson Clover	10

Project Number: **Sheet 8**

County: SMITH **Control:** 0910-16-147, ETC

Highway: WHITTLE ST, ETC

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 Bahia grass.

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.

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.

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.”

Place the level of soil at a 6:1 slope or flatter, where possible, and extend it from the top of the concrete foundation to the established grades. This work will not be paid for directly, but will be subsidiary to this Item.

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

Do not use membrane curing for structural elements.

Provide an ordinary 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.

Project Number: **Sheet 9**

County: SMITH **Control:** 0910-16-147, ETC

Highway: WHITTLE ST, ETC

ITEM 496. REMOVING STRUCTURES

All materials removed under this Item are the property of the Contractor.

The existing bridge at CR 289 at Prairie Creek has Trestle Piles with coatings that were tested and confirmed to contain lead-based paint. These piles are deemed non-salvageable and are required to be disposed of at a recycler entity with current certifications and registrations according to local, state, and federal laws. Provide invoices to the Engineer verifying proof of delivery.

Demolition of the piles should be by the mechanical shear or other approved method, not associated with torches or heat, to avoid the potential for lead fume hazards. Submit for approval a plan following this criterion.

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.

When operations require a lane closure, provide cones, vertical panels, drums, signs, flaggers, and flashing arrow panels as necessary to route traffic around the closed lane as shown on the plans and as directed. Lane closures will be limited to one specific lane as directed.

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

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.

Project Number: **Sheet 10**

County: SMITH **Control:** 0910-16-147, ETC

Highway: WHITTLE ST, ETC

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 529. CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER

Provide steel reinforcement for all curb and curb and gutter unless otherwise directed.

ITEM 540. METAL BEAM GUARD FENCE

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

Do not paint treated timber posts.

ITEM 545. CRASH CUSHION ATTENUATORS

Provide crash cushion attenuators meeting TL-3 requirements.

ITEM 552. WIRE FENCE

Any temporary fencing required during construction of the proposed structure extensions or bridge replacements will not be paid for directly, but will be subsidiary to the various bid items.

Construct and maintain temporary fencing and gates at the locations and limits shown on the plans. Furnish temporary fencing and gates with material and design equal to or better than the present fencing, and adequate to properly control livestock for the duration of the project.

ITEM 3076 DENSE-GRADED HOT-MIX ASPHALT (EXEMPT PRODUCTION)

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 3076. 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 driveways designated by the Engineer to be reconstructed, scarify, blade smooth, sprinkle, and compact to the extent necessary to produce a firm, stable foundation prior to placement of ACP. This work will not be paid for directly, but will be subsidiary to Item 3076.

When using crushed gravel as a coarse aggregate for ACP, use 1% lime as an antistripping agent.

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.

Provide a facility at the asphalt concrete pavement plant for use by the Engineer as a laboratory. This is an existing requirement of Item 6, Article 5, “Plant Inspection and Testing,” of the Standard Specifications. Provide a facility meeting the requirements of Item 504. At a minimum meet the requirements of 504.2.2.4, “Ty D Structure (Asphalt Mix Control Laboratory)” and 504.2.2.4.1, “Asphalt Content by Ignition Method.” In addition, provide the following: At least one exterior door opening with a 48-in. minimum width. If steps are required to gain access to the facility’s 48-in. door, provide a landing dock with minimum dimensions of 60 in. wide by 60 in. deep. The strong floor and landing of the facility should support the weight of all equipment and personnel providing a stable, essentially zero deflection during testing operations, acceptable to the Engineer. This facility will be required of all projects with plant produced asphalt concrete pavement.

No direct payment will be made for Engineer field labs. All construction, maintenance, utilities, custodial services, security, and permits necessary to establish and maintain readiness of this facility is the responsibility of the Contractor. This building/facility is required by the standard specifications and is considered a standard part of any asphalt concrete pavement plant producing materials for Department projects.

Furnish a Superpave Gyratory Compactor calibrated in accordance with Tex-241-F for molding production samples. The Superpave Gyratory Compactor will not be paid for directly, but will be subsidiary to the asphalt concrete pavement Items of work.

Project Number: **Sheet 10A**

County: SMITH **Control:** 0910-16-147, ETC

Highway: WHITTLE ST, ETC

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 0910-16-147 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY CR 2110, CR 289, WHITTLE ST

			CONTROL SECTION JOB	**0910-16-147**		**0910-16-148**		**0910-16-149**		TOTAL EST.	TOTAL FINAL
			PROJECT ID								
			COUNTY	**Smith**		**Smith**		**Smith**			
			HIGHWAY	**WHITTLE ST**		**CR 2110**		**CR 289**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	0.600		3.100		3.800		7.500	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	120.000						120.000	
	105-6011	REMOVING STAB BASE AND ASPH PAV (2"-6")	SY	188.000						188.000	
	110-6001	EXCAVATION (ROADWAY)	CY	53.000		97.000		125.000		275.000	
	132-6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	48.000		172.000		203.000		423.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	38.000		195.000		530.000		763.000	
	162-6002	BLOCK SODDING	SY	38.000						38.000	
	164-6054	BOND FBR MTRX SEED (PERM)(RURAL)(SAND)	SY			195.000		530.000		725.000	
	164-6055	BONDED FBR MTRX SEED (TEMP)(WARM)	SY	19.000		98.000		265.000		382.000	
	164-6056	BONDED FBR MTRX SEED (TEMP)(COOL)	SY	19.000		98.000		265.000		382.000	
	168-6001	VEGETATIVE WATERING	MG	0.800		4.200		11.700		16.700	
	275-6001	CEMENT	TON			12.000		15.000		27.000	
	275-6002	CEMENT TREAT (EXIST MATL) (6")	SY			870.000		1,133.000		2,003.000	
	400-6005	CEM STABIL BKFL	CY	367.000		33.400		30.300		430.700	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	43.000						43.000	
	416-6002	DRILL SHAFT (24 IN)	LF			204.000		183.000		387.000	
	420-6013	CL C CONC (ABUT)	CY			24.000		23.200		47.200	
	420-6057	CL C CONC (WINGWALLS)	CY	0.600						0.600	
	420-6076	CL E CONC (SEAL SLAB)	CY	17.300						17.300	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF			1,606.000		1,285.000		2,891.000	
	425-6009	PRESTR CONC SLAB BEAM (4SB12)	LF					316.000		316.000	
	425-6011	PRESTR CONC SLAB BEAM (4SB15)	LF			396.000				396.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	1.800						1.800	
	432-6003	RIPRAP (CONC)(6 IN)	CY	5.400						5.400	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY			390.000		254.000		644.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY			10.400		18.600		29.000	
	442-6007	STR STEEL (MISC NON - BRIDGE)	LB	1,776.000						1,776.000	
	450-6006	RAIL (TY T223)	LF			124.000		104.000		228.000	
	450-6030	RAIL (TY C221)	LF	111.000						111.000	
	462-6028	CONC BOX CULV (9 FT X 9 FT)	LF	129.000						129.000	
	466-6173	WINGWALL (PW - 1) (HW=12 FT)	EA	2.000						2.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000		1.000		1.000		3.000	
	500-6001	MOBILIZATION	LS	0.335		0.350		0.315		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		4.000		4.000		11.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	40.000		16.000		40.000		96.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	40.000		16.000		40.000		96.000	
	506-6027	EXCAV (EROSN & SEDMT CONT, IN VEH)	CY	5.000		10.000		10.000		25.000	

TxDOTCONNECT

DISTRICT	COUNTY	CCSJ	SHEET
Tyler	Smith	0910-16-147	11

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0910-16-147 **DISTRICT** Tyler **COUNTY** Smith
HIGHWAY CR 2110, CR 289, WHITTLE ST

			CONTROL SECTION JOB	**0910-16-147**		**0910-16-148**		**0910-16-149**		TOTAL EST.	TOTAL FINAL
			PROJECT ID								
			COUNTY	**Smith**		**Smith**		**Smith**			
			HIGHWAY	**WHITTLE ST**		**CR 2110**		**CR 289**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	506-6030	BACKHOE WORK (EROSION & SEDMT CONT)	HR	10.000		10.000		10.000		30.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	130.000		706.000		904.000		1,740.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	130.000		706.000		904.000		1,740.000	
	506-6046	TRACKHOE WORK (EROSION & SEDMT CONT)	HR	10.000		10.000		10.000		30.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	120.000						120.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF			50.000		150.000		200.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)	EA			2.000		4.000		6.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA			2.000		4.000		6.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA			2.000				2.000	
	552-6003	WIRE FENCE (TY C)	LF			224.000				224.000	
	552-6004	WIRE FENCE (TY D)	LF			98.000				98.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	5.000				2.000		7.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA			6.000		6.000		12.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA			4.000		4.000		8.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA			12.000		12.000		24.000	
	3076-6015	D-GR HMA TY-C PG64-22	TON	161.000						161.000	
	3076-6035	D-GR HMA TY-D PG64-22	TON	21.000		287.000		374.000		682.000	
	5070-6001	STEEL FENCE (REMOVE)	LF			86.000				86.000	
	5070-6002	STEEL FENCE (INSTALL)	LF			92.000				92.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	14.000		14.000		14.000		42.000	
	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	

TxDOTCONNECT

DISTRICT	COUNTY	CCSJ	SHEET
Tyler	Smith	0910-16-147	12

100% SUBMITTAL
DATE: 9/7/2021
TIME: 9:35:40 AM

BASIS OF ESTIMATE

	ITEM	DESCRIPTION	RATE	CSJ 0910-16-147 AMOUNT	CSJ 0910-16-148 AMOUNT	CSJ 0910-16-149 AMOUNT	UNIT	CSJ 0910-16-147 QUANTITY	CSJ 0910-16-148 QUANTITY	CSJ 0910-16-149 QUANTITY	PROJECT TOTAL	PAY UNIT
(1)	166	FERTILIZER	1 LB/9 SY	38	195	530	SY	0.01	0.01	0.03	0.05	TON
	168	VEGETATIVE WATERING	11 GAL/SY	76	390	1060	SY	0.8	4.2	11.7	16.7	MG
	275	CEMENT (5%) (120 LB/CF)	27.0 LB/SY		870	1133	SY		12	15	27	TON
	500	MOBILIZATION									1	LS
	502	BARRICADES, SIGNS AND TRAFFIC HANDLING						3	4	4	11	MO
	3076	D-GR HMA TY-C PG 64-22 (10")	1100 LB/SY	96			SY	53			53	TON
	3076	D-GR HMA TY-C PG 64-22 (15")(AVG.)	1650 LB/SY	131			SY	108			108	TON
	3076	D-GR HMA TY-D PG 64-22 (2")	220 LB/SY	187			SY	21			21	TON
	3076	D-GR HMA TY-D PG 64-22 (6")	660 LB/SY		870	1,133	SY		287	374	661	TON

(1) FOR CONTRACTOR'S INFORMATION ONLY.

TABULATION OF SURFACE AREAS

LOCATION	FROM	TO	LENGTH	ITEM 3076 (1) D-GR HMA TY-C PG64-22 (10")		(1) D-GR HMA TY-C PG64-22 (15")(AVG.)		(1) D-GR HMA TY-D PG64-22 (2")		(1) D-GR HMA TY-D PG64-22 (6")	
	STA	STA	FT	WIDTH	AREA (SY)	WIDTH	AREA (SY)	WIDTH	AREA (SY)	WIDTH	AREA (SY)
CSJ 0910-16-147											
WHITTLE ST. @ MUD CREEK	15+10.00	15+23.75	14	31 AVG	48			28	43		
WHITTLE ST. @ MUD CREEK	15+23.75	15+56.25	33			35.7 AVG	131	28	101		
WHITTLE ST. @ MUD CREEK	15+56.25	15+70.00	14	31 AVG	48			28	43		
CSJ 0910-16-147 SUBTOTAL					96		131		187		
CSJ 0910-16-148											
CR 2110 @ KICKAPOO CREEK	12+35.00	15+45.00	310							30	870
CSJ 0910-16-148 SUBTOTAL											870
CSJ 0910-16-149											
CR 289 @ PRAIRIE CREEK	12+35.00	16+15.00	380							30	1,133
CSJ 0910-16-149 SUBTOTAL											1,133
PROJECT TOTAL					96		131		187		2,003

(1) QUANTITIES INCLUDED IN BASIS OF ESTIMATE.

ROADWAY SUMMARY

LOCATION	BEGINNING STATION	ENDING STATION	ITEM 110 EXCAVATION (ROADWAY)	ITEM 132 EMBANKMENT (FINAL)(ORD COMP)(TY A)	ITEM 275 CEMENT TREAT (EXIST MATL) (6")	ITEM 529 CONC CURB & GUTTER (TY II)
			CY	CY	SY	LF
WHITTLE ST. @ MUD CREEK	15+10.00	15+70.00	53	48		120
CSJ 0910-16-147 SUBTOTAL			53	48	0	120
CR 2110 @ KICKAPOO CREEK	12+35.00	15+45.00	97	172	870	
CSJ 0910-16-148 SUBTOTAL			97	172	870	0
CR 289 @ PRAIRIE CREEK	12+35.00	16+15.00	125	203	1133	
CSJ 0910-16-149 SUBTOTAL			125	203	1133	0
PROJECT TOTAL			275	423	2003	120

METAL BEAM GUARD FENCE SUMMARY

LOCATION	BEGINNING STATION	ENDING STATION	ITEM 432 RIPRAP (MOW STRIP)(4 IN)	ITEM 540 MTL W-BEAM GD FEN (TIM POST)	ITEM 540 MTL BEAM GD FEN TRANS (TL2)	ITEM 544 GUARDRAIL END TREATMENT (INSTALL)	ITEM 545 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	ITEM 658 INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	ITEM 658 INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 (BI)
			CY	LF	EA	EA	EA	EA	EA
WHITTLE ST. @ MUD CREEK	15+10.00	15+70.00							
CSJ 0910-16-147 SUBTOTAL			0	0	0	0	0	0	0
CR 2110 @ KICKAPOO CREEK	12+35.00	15+45.00	10.4	50	2	2	2	6	12
CSJ 0910-16-148 SUBTOTAL			10.4	50	2	2	2	6	12
CR 289 @ PRAIRIE CREEK	12+35.00	16+15.00	18.6	150	4	4		6	12
CSJ 0910-16-149 SUBTOTAL			18.6	150	4	4	0	6	12
PROJECT TOTAL			29.0	200	6	6	2	12	24

PORTABLE CHANGEABLE MESSAGE SIGN

(1) SIGN	LOCATION	ITEM 6001 PORTABLE CHANGEABLE MESSAGE SIGN
		DAY
CSJ 0910-16-147		
SIGN #1	WHITTLE ST. @ MUD CREEK	7
SIGN #2	WHITTLE ST. @ MUD CREEK	7
CSJ 0910-16-147 SUBTOTAL		14
CSJ 0910-16-148		
SIGN #1	CR 2110 @ KICKAPOO CREEK	7
SIGN #2	CR 2110 @ KICKAPOO CREEK	7
CSJ 0910-16-148 SUBTOTAL		14
CSJ 0910-16-149		
SIGN #1	CR 289 @ PRAIRIE CREEK	7
SIGN #2	CR 289 @ PRAIRIE CREEK	7
CSJ 0910-16-149 SUBTOTAL		14
PROJECT TOTAL		42

(1) SIGN PLACEMENT AS DIRECTED

FENCE SUMMARY

LOCATION	BEGINNING STATION	ENDING STATION	ITEM 552 WIRE FENCE (TY C)	ITEM 552 WIRE FENCE (TY D)	ITEM 5070 STEEL FENCE (REMOVE)	ITEM 5070 STEEL FENCE (INSTALL)
			LF	LF	LF	LF
WHITTLE ST. @ MUD CREEK	15+10.00	15+70.00				
CSJ 0910-16-147 SUBTOTAL			0	0	0	0
CR 2110 @ KICKAPOO CREEK	12+35.00	15+45.00	224	98	86	92
CSJ 0910-16-148 SUBTOTAL			224	98	86	92
CR 289 @ PRAIRIE CREEK	12+35.00	16+15.00				
CSJ 0910-16-149 SUBTOTAL			0	0	0	0
PROJECT TOTAL			224	98	86	92

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

QUANTITY SUMMARY

SHEET 1 OF 2

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST, ETC	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	13

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_QTY_01.dgn

100% SUBMITTAL
DATE: 9/7/2021
TIME: 9:36:36 AM

BRIDGE SUMMARY

LOCATION	ITEM 400	ITEM 416	ITEM 420	ITEM 422	ITEM 425		ITEM 432	ITEM 450	ITEM 496
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB12)	PRESTR CONC SLAB BEAM (4SB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY T223)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	SF	LF	LF	CY	LF	EA
CR 2110 @ KICKAPOO CREEK	33.4	204	24.0	1606		396.00	390.0	124	1
CSJ 0910-16-148 SUBTOTAL	33.4	204	24.0	1606	0	396.00	390.0	124	1
CR 289 @ PRAIRIE CREEK	30.3	183	23.2	1285	316.00		254.0	104	1
CSJ 0910-16-149 SUBTOTAL	30.3	183	23.2	1285	316.00	0	254.0	104	1
PROJECT TOTAL	63.7	387	47.2	2891	316.00	396.00	644.0	228	2

EROSION CONTROL SUMMARY

LOCATION		ITEM 160	ITEM 162	ITEM 164			ITEM 168		ITEM 506						
FROM	TO	FURNISHING AND PLACING TOPSOIL (4")	BLOCK SODDING	BOND FBR MTRX SEED (PERM) (RURAL) (SAND)	BONDED FBR MTRX SEED (TEMP) (WARM)	BONDED FBR MTRX SEED (TEMP) (COOL)	(1) VEGETATIVE WATERING (PERM)	(1) VEGETATIVE WATERING (TEMP)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	EXCAV (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)
STA	STA	SY	SY	SY	SY	SY	SY	SY	LF	LF	CY	HR	LF	LF	HR
CSJ 0910-16-147															
WHITTLE ST. @ MUD CREEK															
15+10.00	15+70.00	38	38		19	19	38	38	40	40	5	10	130	130	10
CSJ 0910-16-147 SUBTOTAL		38	38	0	19	19	38	38	40	40	5	10	130	130	10
CSJ 0910-16-148															
CR 2110 @ KICKAPOO CREEK															
12+35.00	15+45.00	195		195	98	98	195	195	16	16	10	10	706	706	10
CSJ 0910-16-148 SUBTOTAL		195	0	195	98	98	195	195	16	16	10	10	706	706	10
CSJ 0910-16-149															
CR 289 @ PRAIRIE CREEK															
12+35.00	16+15.00	530		530	265	265	530	530	40	40	10	10	904	904	10
CSJ 0910-16-149 SUBTOTAL		530	0	530	265	265	530	530	40	40	10	10	904	904	10
PROJECT TOTAL		763	38	725	382	382	763	763	96	96	25	30	1740	1740	30

(1) QUANTITIES INCLUDED IN BASIS OF ESTIMATE.

REMOVAL SUMMARY

LOCATION		ITEM 100	ITEM 104	ITEM 105	ITEM 644	ITEM 658
FROM	TO	PREPARING ROW	REMOVING CONC (CURB AND GUTTER)	REMOVING STAB BASE AND ASPH PAV (2"-6")	REMOVE SM RD SN SUP&AM	REMOVE DELIN & OBJECT MARKER ASSMS
STA	STA	STA	LF	SY	EA	EA
CSJ 0910-16-147						
WHITTLE ST. @ MUD CREEK						
15+10.00	15+70.00	0.6	120	188	5	
CSJ 0910-16-147 SUBTOTAL		0.6	120	188	5	0
CSJ 0910-16-148						
CR 2110 @ KICKAPOO CREEK						
12+35.00	15+45.00	3.1				4
CSJ 0910-16-148 SUBTOTAL		3.1	0	0	0	4
CSJ 0910-16-149						
CR 289 @ PRAIRIE CREEK						
12+35.00	16+15.00	3.8			2	4
CSJ 0910-16-149 SUBTOTAL		3.8	0	0	2	4
PROJECT TOTAL		7.5	120	188	7	8

BRIDGE CLASS CULVERT SUMMARY

LOCATION	ITEM 400	ITEM 402	ITEM 420	ITEM 420	ITEM 432	ITEM 432	ITEM 442	ITEM 450	ITEM 462	ITEM 466	ITEM 496
	CEM STABIL BKFL	TRENCH EXCAVATION PROTECTION	CL C CONC (WINGWALLS)	CL E CONC (SEAL SLAB)	RIPRAP (CONC) (4 IN)	RIPRAP (CONC) (6 IN)	STR STEEL (MISC NON - BRIDGE)	RAIL (TY C221)	CONC BOX CULV (9 FT X 9 FT)	WINGWALL (PW - 1) (HW=12 FT)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)
	CY	LF	CY	CY	CY	CY	LB	LF	LF	EA	EA
WHITTLE ST. @ MUD CREEK	367.0	43	0.6	17.3	1.8	5.4	1776	111	129	2	1
CSJ 0910-16-147 SUBTOTAL	367.0	43	0.6	17.3	1.8	5.4	1776	111	129	2	1
PROJECT TOTAL	367.0	43	0.6	17.3	1.8	5.4	1776	111	129	2	1

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

QUANTITY SUMMARY

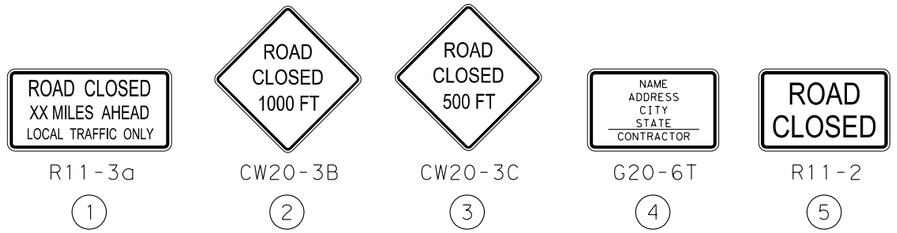
SHEET 2 OF 2

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.
6	TEXAS	SEE TITLE SHEET		WHITTLE ST, ETC
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	14

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_QTY_02.dgn

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:36:47 AM



LEGEND

- CONSTRUCTION SIGN
- TYPE III BARRICADE

SEQUENCE OF WORK

1. ROAD CLOSED FOR DURATION OF CONSTRUCTION.
2. INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUT.
3. CONSTRUCT NEW STRUCTURE AND APPROACHES.
4. OPEN ROAD TO TRAFFIC.
5. REMOVE EROSION CONTROL DEVICES, ESTABLISH FINAL VEGETATION, AND CLEAN UP LIMITS OF PROJECT.

NOTES:
1. ALL SIGNS, DEVICES. LOCATION AND SPACING SHALL CONFORM TO TMUTCD. REFER TO BC STANDARDS FOR ADDITIONAL DETAILS.
2. TY 3 BARRICADES TO BE PLACED AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

WHITTLE ST AT MUD CREEK TRIB.

TCP ADVANCE WARNING SIGNS

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	15

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_TCP_WHITTLE.dgn

100% SUBMITTAL

DATE: 9/7/2021

TIME: 9:36:57 AM

R11-3a

(1)

CW20-3B

(2)

CW20-3C

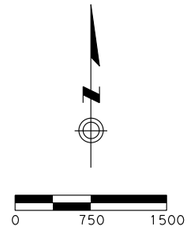
(3)

G20-6T

(4)

R11-2

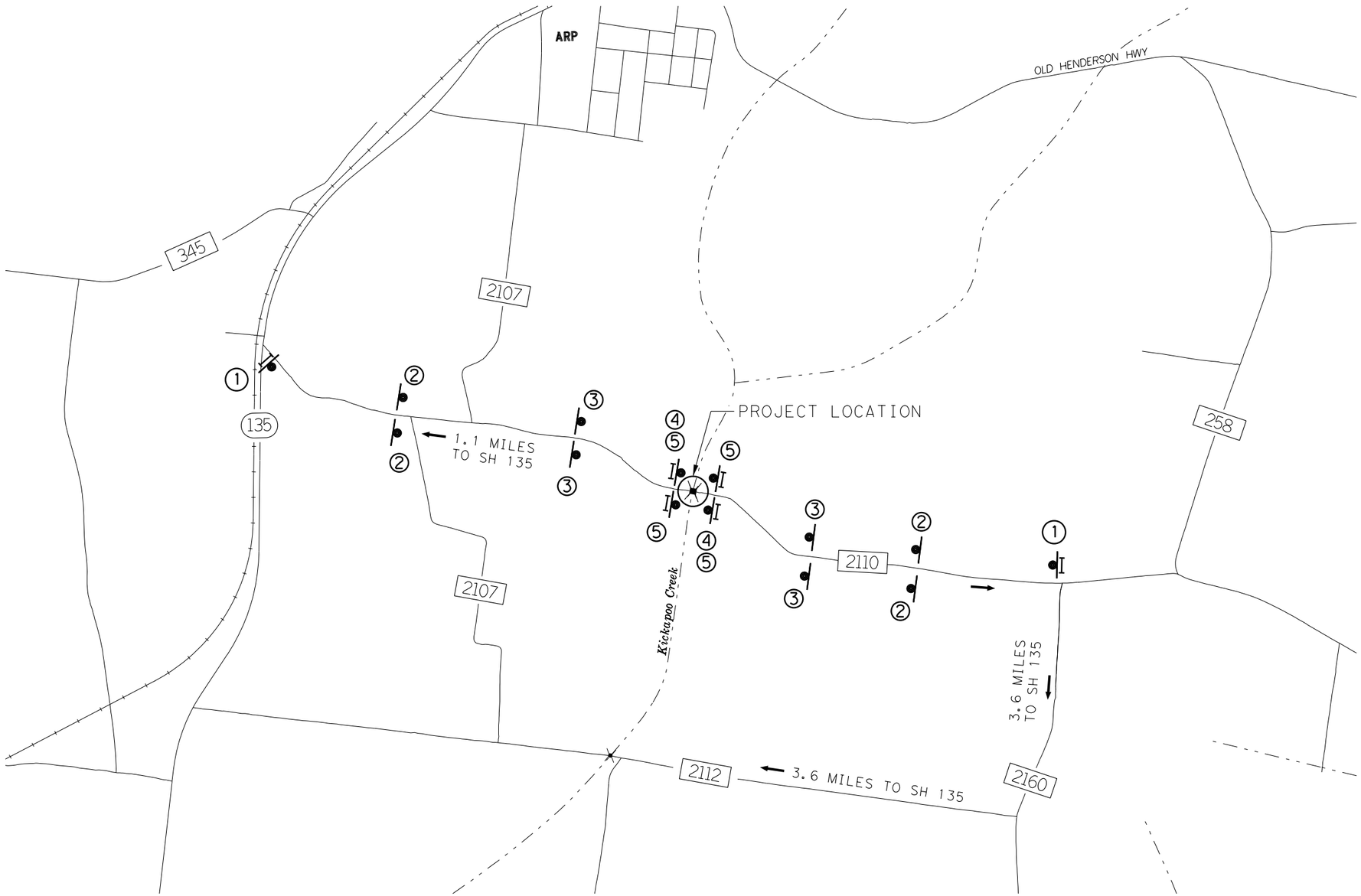
(5)



LEGEND

CONSTRUCTION SIGN

TYPE III BARRICADE



SEQUENCE OF WORK

1. ROAD CLOSED FOR DURATION OF CONSTRUCTION.
2. INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUT.
3. CONSTRUCT NEW STRUCTURE AND APPROACHES.
4. OPEN ROAD TO TRAFFIC.
5. REMOVE EROSION CONTROL DEVICES, ESTABLISH FINAL VEGETATION, AND CLEAN UP LIMITS OF PROJECT.

NOTES:

1. ALL SIGNS, DEVICES. LOCATION AND SPACING SHALL CONFORM TO TMUTCD. REFER TO BC STANDARDS FOR ADDITIONAL DETAILS.
2. TY 3 BARRICADES TO BE PLACED AS DIRECTED BY THE ENGINEER.

9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS

TBPE REG. # F-474

Texas Department of Transportation

Tyler District

CR 2110 AT KICKAPOO CREEK

TCP ADVANCE WARNING SIGNS

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 2110
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	16

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_TCP_CR2110.dgn

100% SUBMITTAL
DATE: 9/7/2021
TIME: 9:37:07 AM

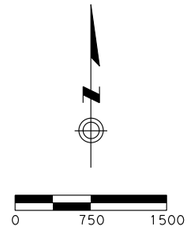
R11-3a
(1)

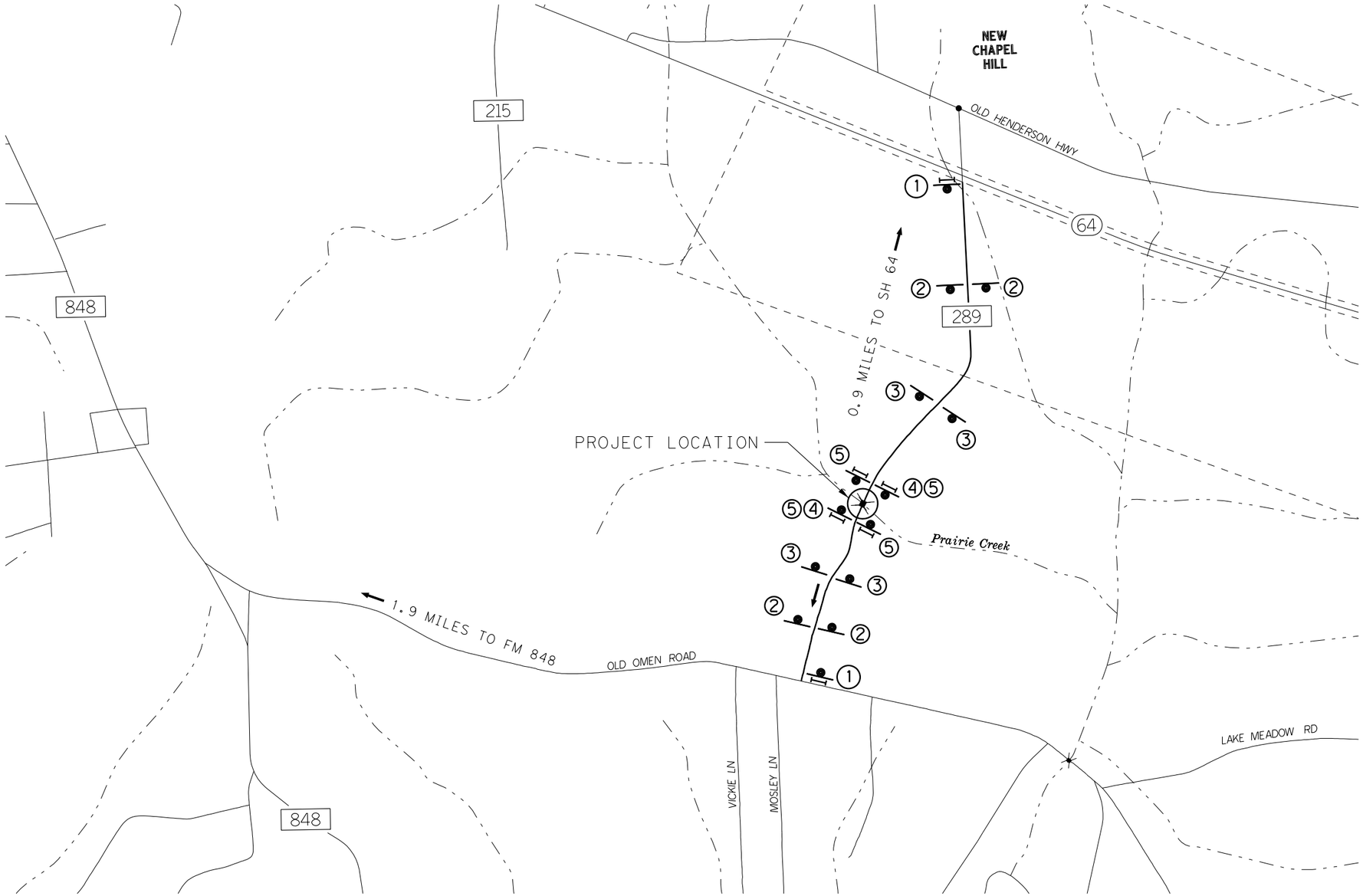
CW20-3B
(2)

CW20-3C
(3)

G20-6T
(4)

R11-2
(5)





LEGEND

- CONSTRUCTION SIGN
- TYPE III BARRICADE

SEQUENCE OF WORK

1. ROAD CLOSED FOR DURATION OF CONSTRUCTION.
2. INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUT.
3. CONSTRUCT NEW STRUCTURE AND APPROACHES.
4. OPEN ROAD TO TRAFFIC.
5. REMOVE EROSION CONTROL DEVICES, ESTABLISH FINAL VEGETATION, AND CLEAN UP LIMITS OF PROJECT.

NOTES:
1. ALL SIGNS, DEVICES. LOCATION AND SPACING SHALL CONFORM TO TMUTCD. REFER TO BC STANDARDS FOR ADDITIONAL DETAILS.
2. TY 3 BARRICADES TO BE PLACED AS DIRECTED BY THE ENGINEER.

9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

CR 289 AT PRAIRIE CREEK

TCP ADVANCE WARNING SIGNS

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 289
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	17

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_TCP_CR289.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

DATE: 9/7/2021 10:20:13 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

SHEET 1 OF 12

Texas Department of Transportation

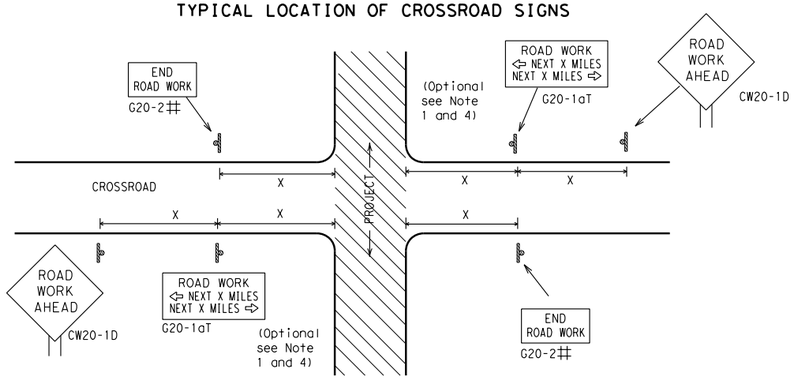
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	TYL	SMITH		18

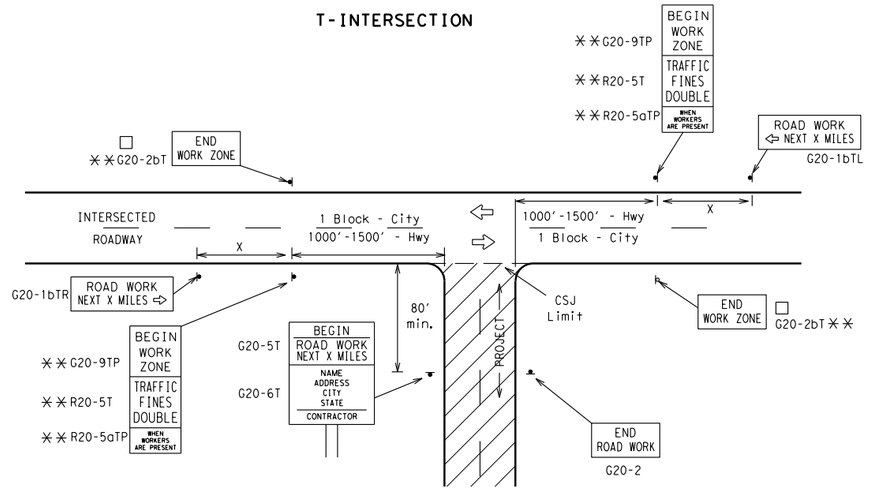
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

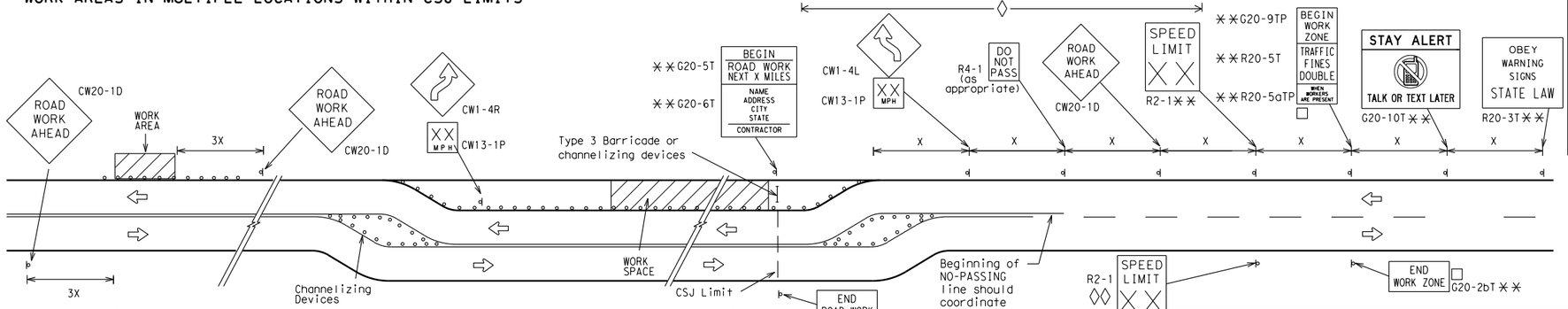
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

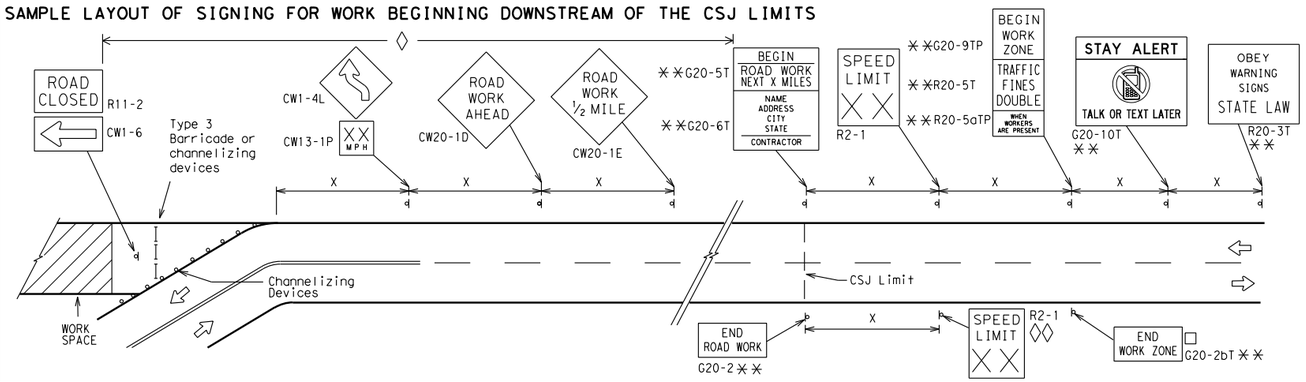
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		19

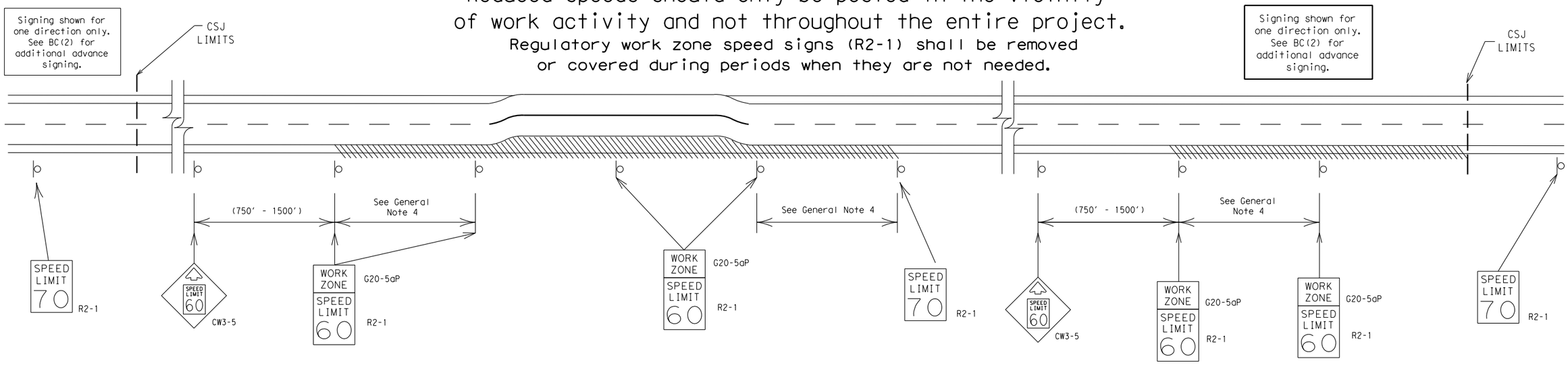
DATE: 9/7/2021 10:20:14 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

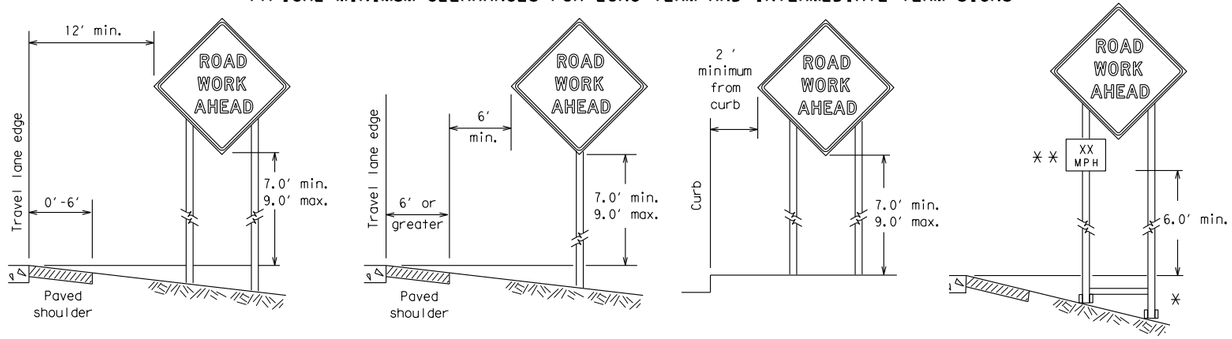
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		20

DATE: 9/7/2021 10:20:15 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

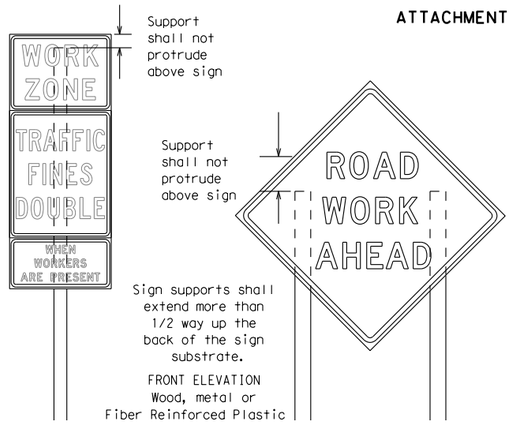
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



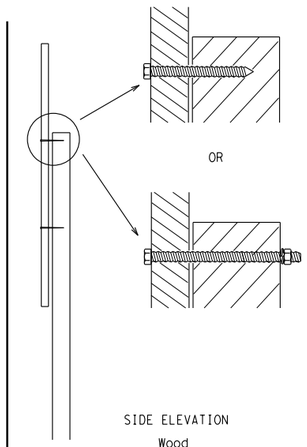
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

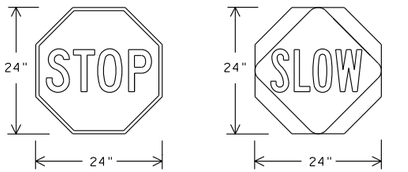
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

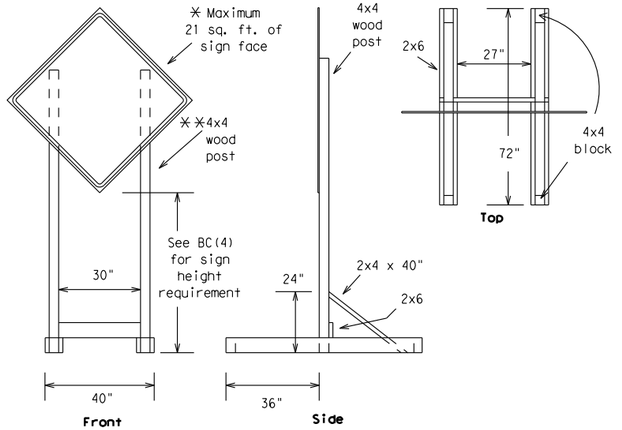
Traffic Safety Division Standard

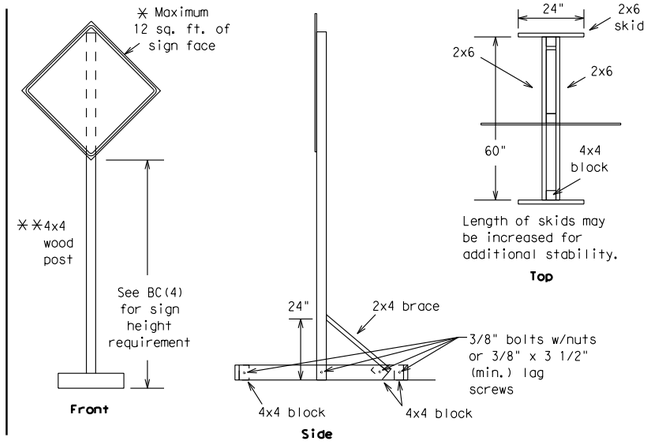
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		TYL	SMITH		21

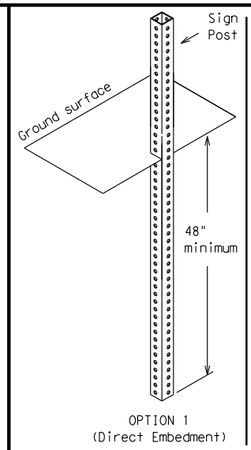
DATE: 9/7/2021 10:20:15 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

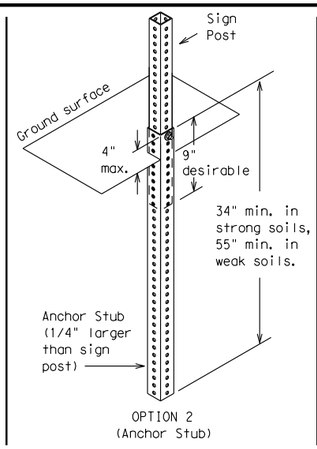


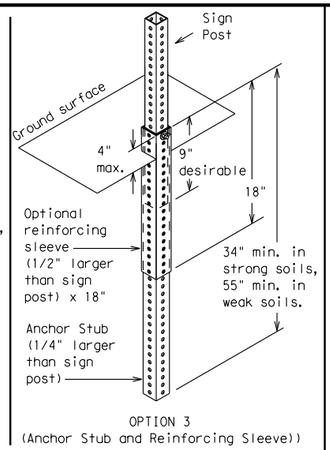


SKID MOUNTED WOOD SIGN SUPPORTS

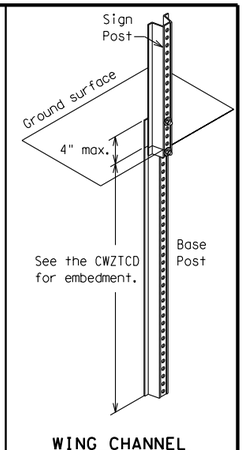
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







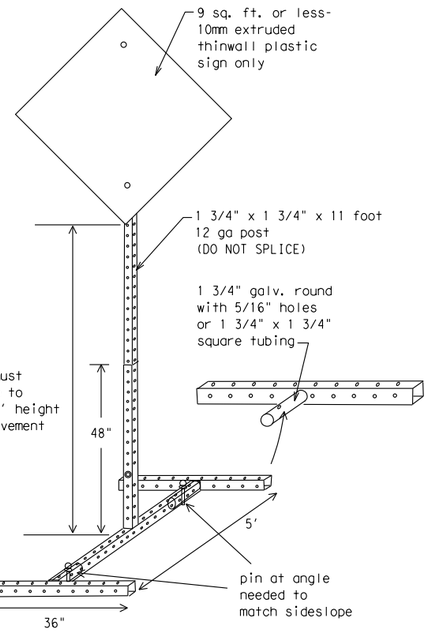
PERFORATED SQUARE METAL TUBING

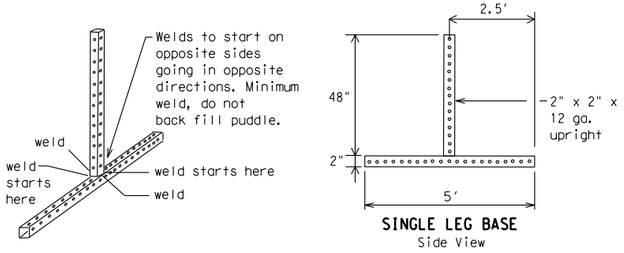


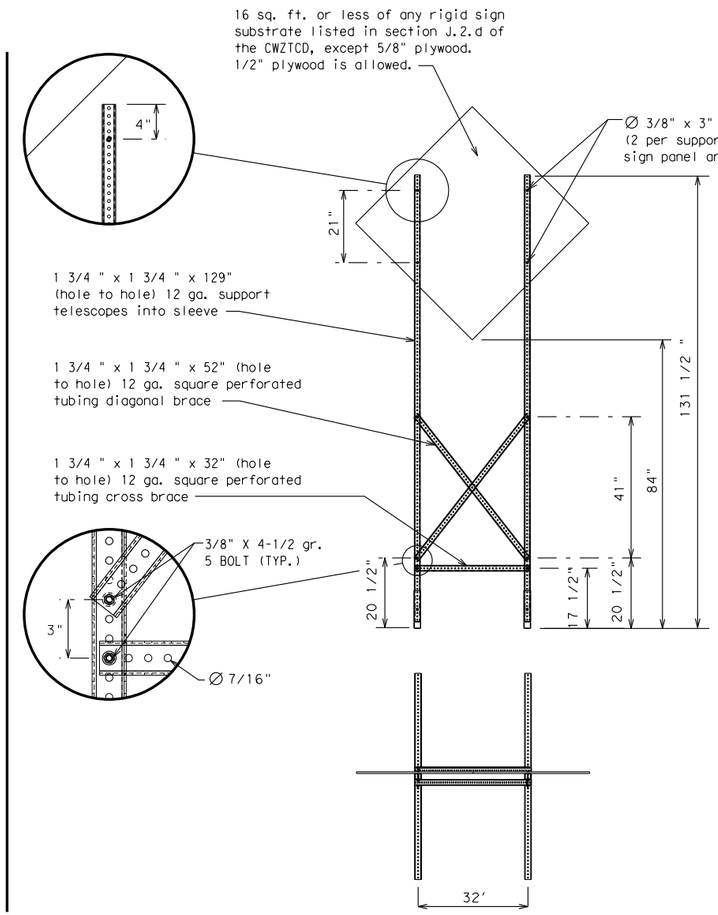
WING CHANNEL
Lap-splice/base bolted anchor

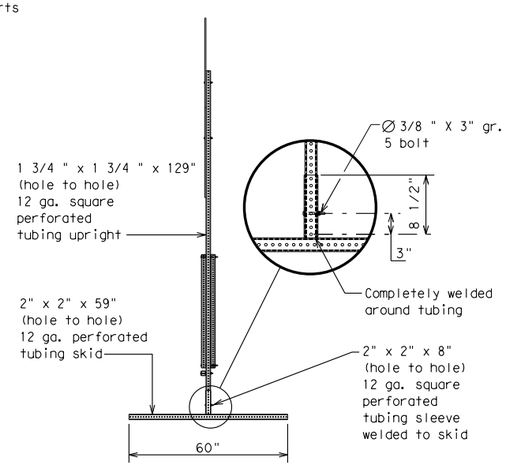
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		22

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		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

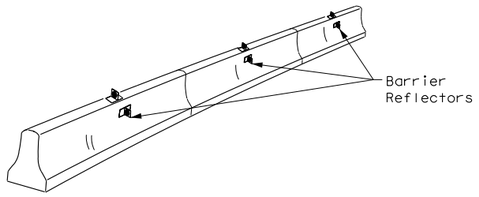
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		TYL	SMITH		23

100

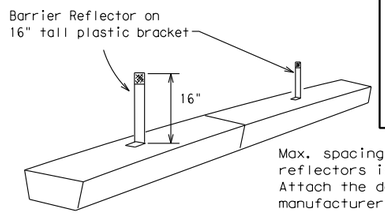
DATE: 9/7/2021 10:20:17 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

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



CONCRETE TRAFFIC BARRIER (CTB)

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

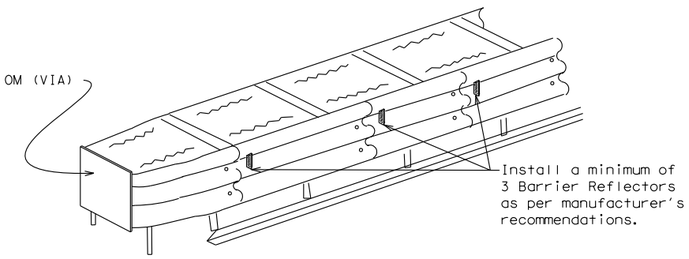


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

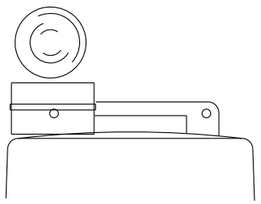


DELINEATION OF END TREATMENTS

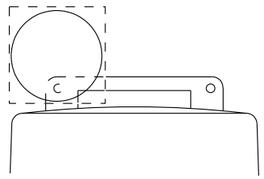
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

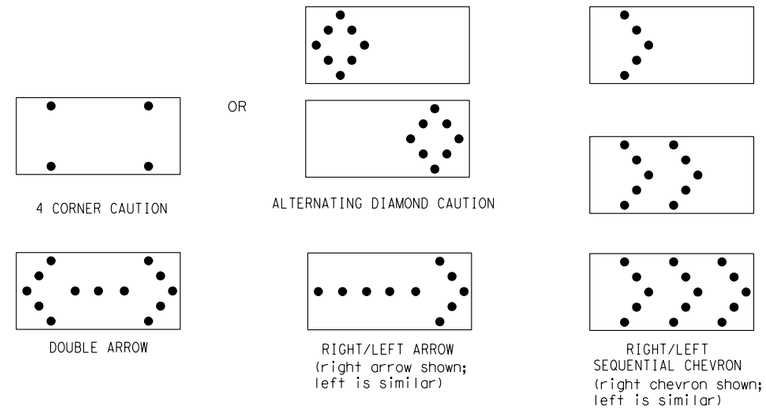
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

SHEET 7 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		24

101

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

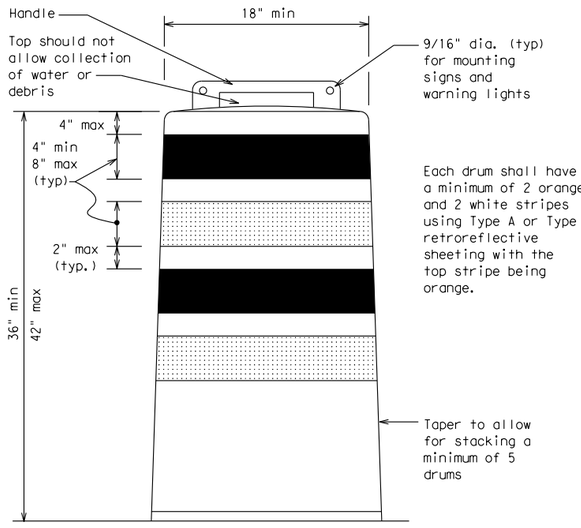
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

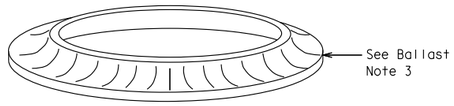
RETROREFLECTIVE SHEETING

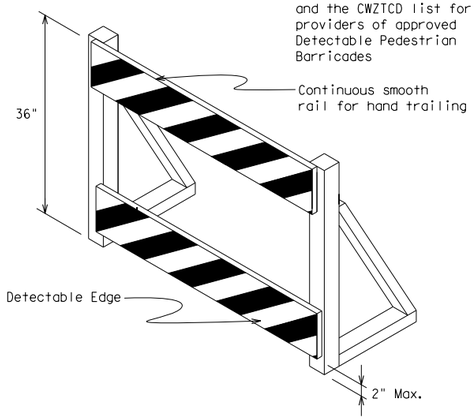
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

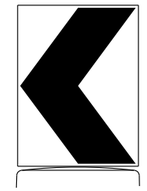




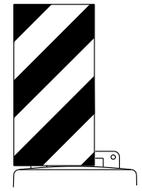


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

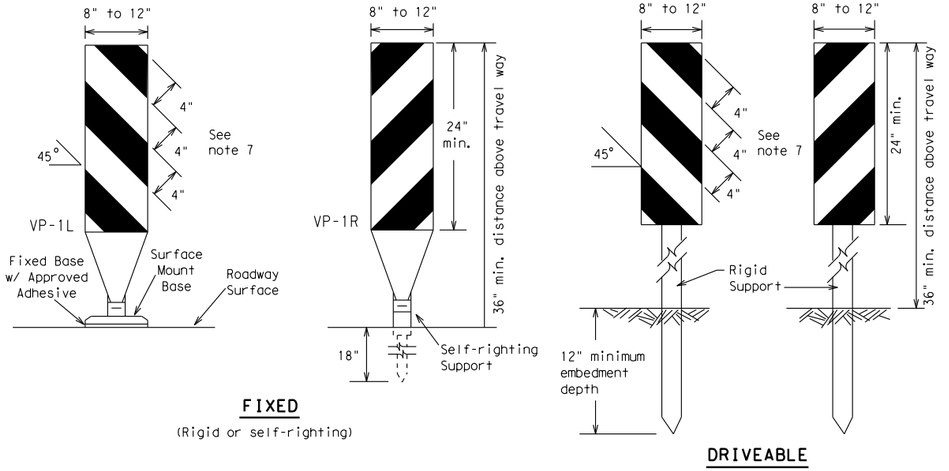
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	TYL	SMITH		25
7-13				

102

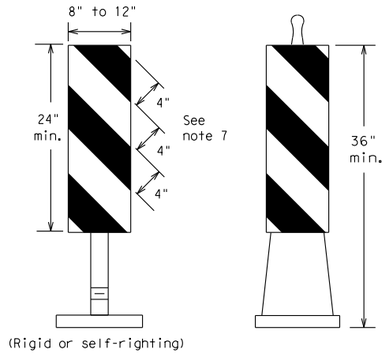
DATE: 9/7/2021 10:20:19 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn



FIXED

(Rigid or self-righting)

DRIVEABLE

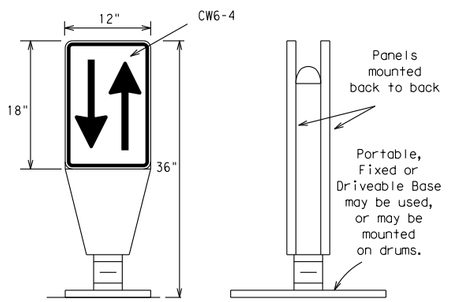


(Rigid or self-righting)

PORTABLE

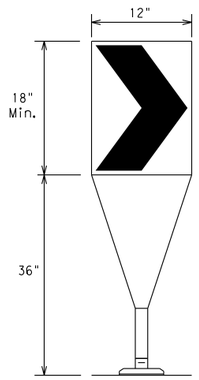
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



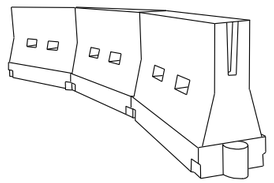
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳			Suggested Maximum Spacing of Channelizing Devices	
		10′ Offset	11′ Offset	12′ Offset	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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

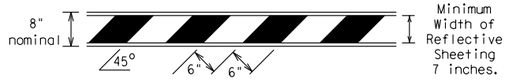
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		26

DATE: 9/7/2021 10:20:20 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

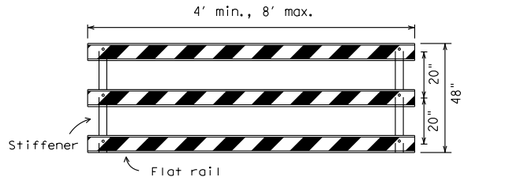
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



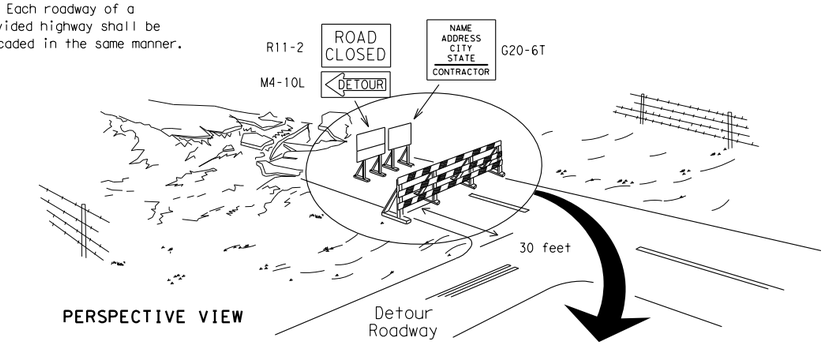
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

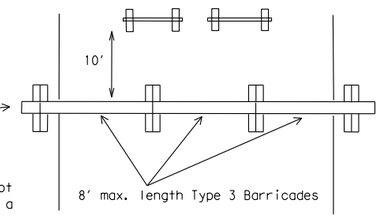
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

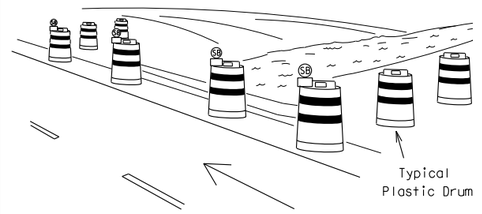
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

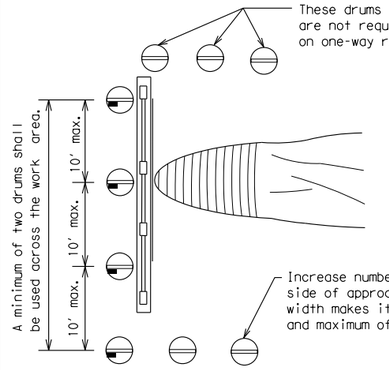
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

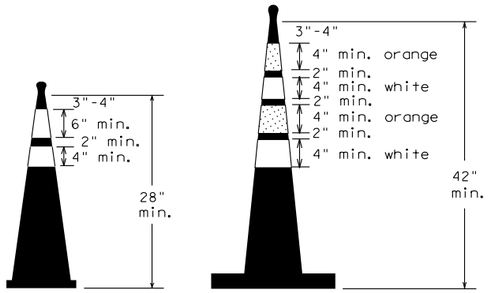
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



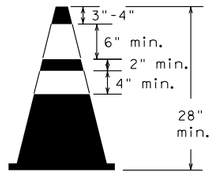
PLAN VIEW

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

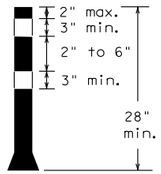
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

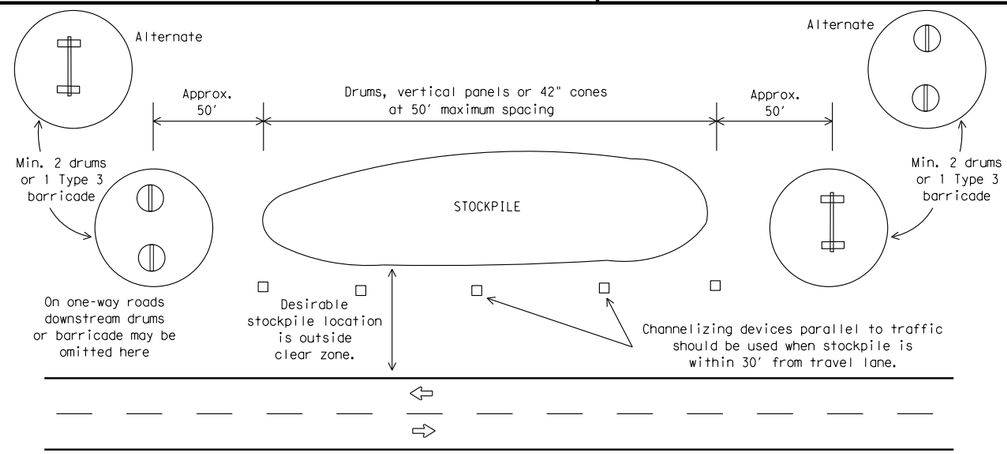


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE: 9/7/2021 10:20:21 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	TYL	SMITH		27

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

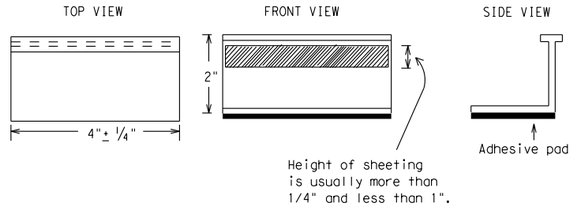
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

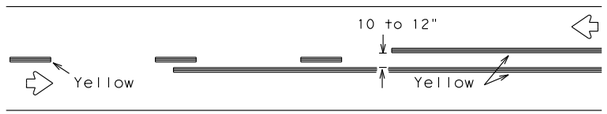
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	0910	16	147,ETC	WHITTLE ST,ETC
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	TYL	SMITH		28

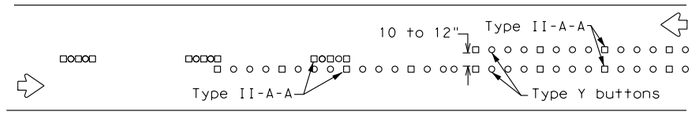
105

DATE: 9/7/2021 10:20:21 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn

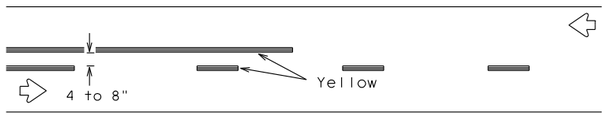
PAVEMENT MARKING PATTERNS



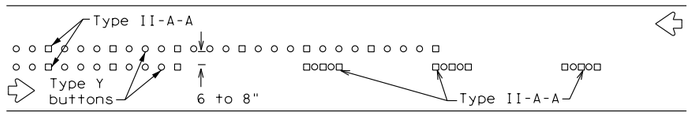
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



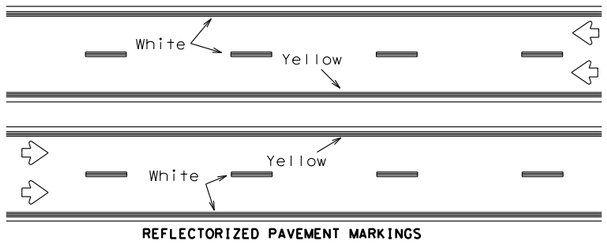
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



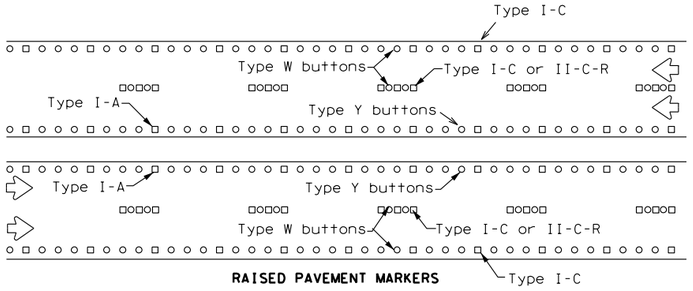
RAISED PAVEMENT MARKERS - PATTERN B

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



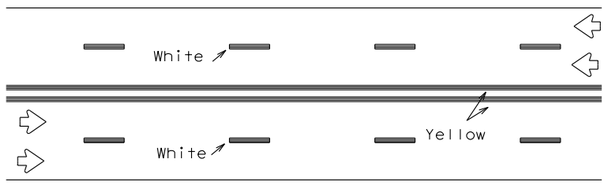
REFLECTORIZED PAVEMENT MARKINGS



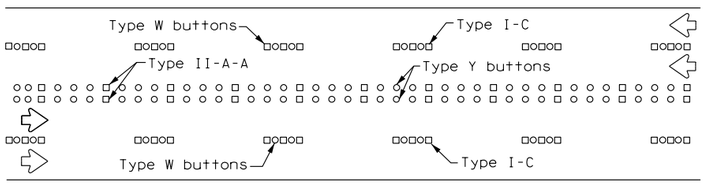
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



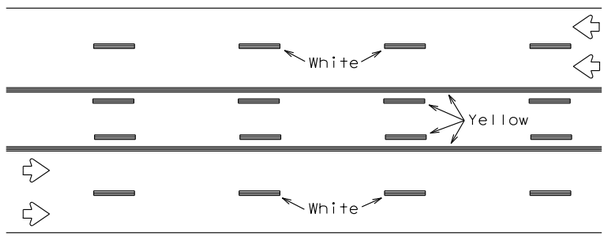
REFLECTORIZED PAVEMENT MARKINGS



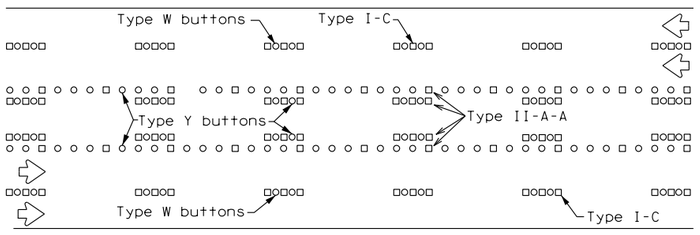
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

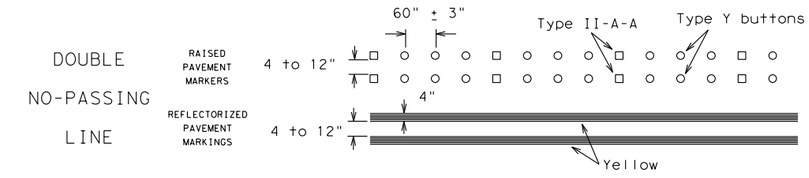
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

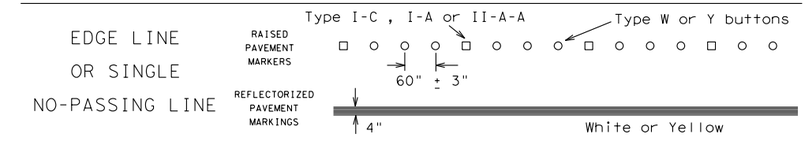
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

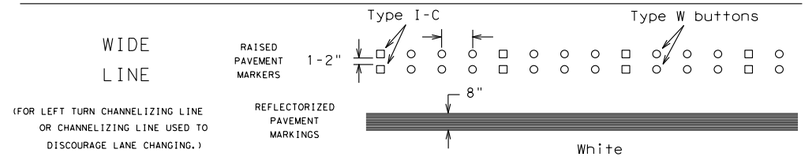


EDGE LINE OR SINGLE NO-PASSING LINE



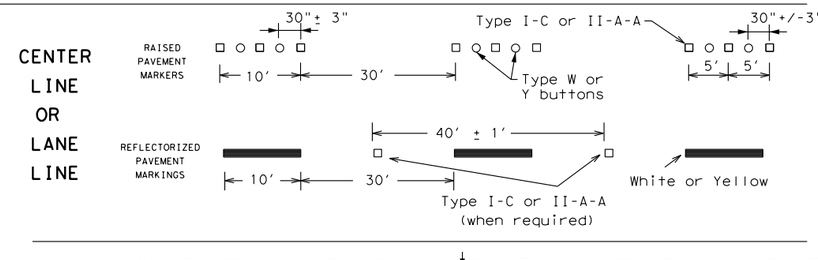
WIDE LINE

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

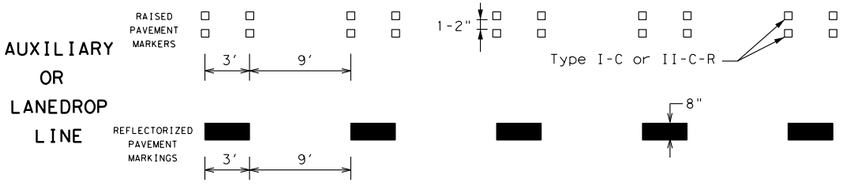


BROKEN LINES

CENTER LINE OR LANE LINE

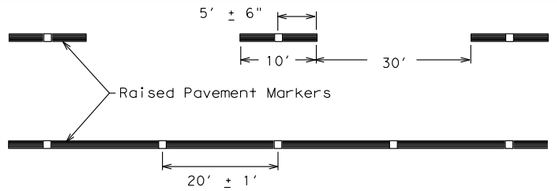


AUXILIARY OR LANEDROP LINE



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 Safety Division Standard

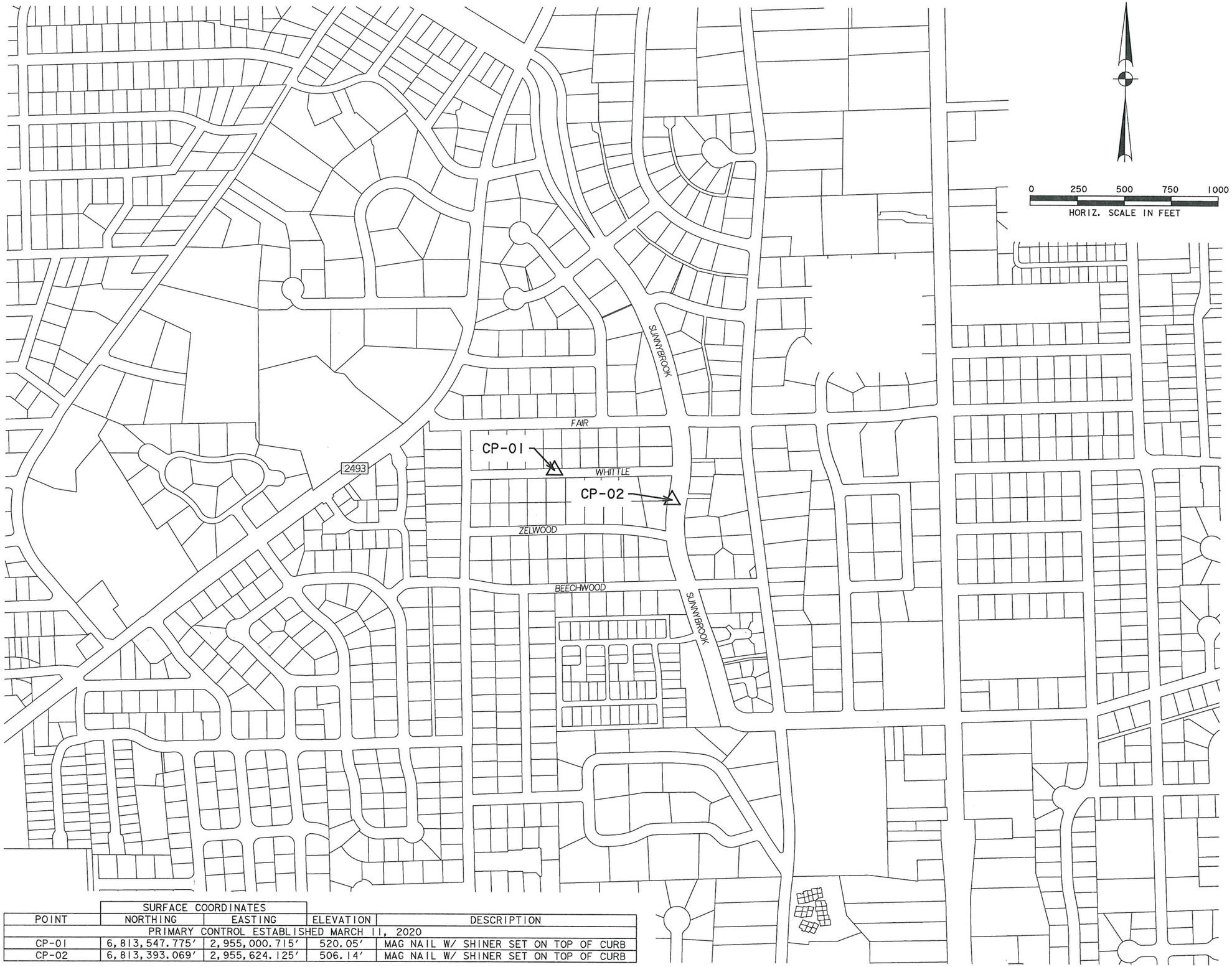
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		29

106

DATE: 9/7/2021 10:20:22 AM
FILE: ...\SMITH STD TCP\bc-21_Smith.dgn



POINT	SURFACE COORDINATES NORTHING	EASTING	ELEVATION	DESCRIPTION
PRIMARY CONTROL ESTABLISHED MARCH 11, 2020				
CP-01	6,813,547.775'	2,955,000.715'	520.05'	MAG NAIL W/ SHINER SET ON TOP OF CURB
CP-02	6,813,393.069'	2,955,624.125'	506.14'	MAG NAIL W/ SHINER SET ON TOP OF CURB

NOTES:

HORIZONTAL COORDINATES ARE IN U.S. SURVEY FEET BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4202, NORTH AMERICAN DATUM OF 1983 (NAD83) (2011 ADJ.), EPOCH 2010.00, GEOID 12B MODEL, WITH A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.000120 (SMITH COUNTY). PRIMARY CONTROL VALUES ARE DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS. ELEVATIONS ARE IN U.S. SURVEY FEET BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS.

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

STATE OF TEXAS
REGISTERED
HEATH W. BROWN
6189
PROFESSIONAL
LAND SURVEYOR

Heath W. Brown 8-31-2020

HEATH W. BROWN DATE
RPLS NO. 6189

NO.	REVISIONS	BY	DATE

AZ&B
ARREDONDO, ZEPEDA & BRUNZ, LLC
11355 McCree Road - Dallas, Texas 75238
(214) 341-9900
FIRM REGISTRATION No. F-10098
TBPLS REGISTRATION No. 10088700

Texas Department of Transportation

SURVEY CONTROL INDEX SHEET

SHEET 1 OF 2

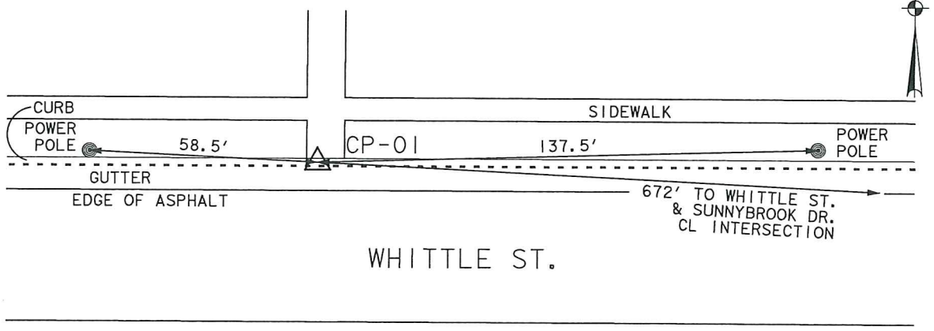
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		30
STATE	DISTRICT	COUNTY	
TEXAS	TYLER	SMITH	
CONTROL	SECTION	JOB	HIGHWAY NO.
0910	16	147	WHITTLE ST.

CONTROL POINT CP-01

APPROXIMATE LOCATION:

A MAG NAIL WITH SHINER SET ON TOP OF CURB LOCATED APPROXIMATELY 672' NORTHWEST OF THE CENTERLINE INTERSECTION OF WHITTLE STREET AND SUNNYBROOK DRIVE, 58.5' EAST OF A POWER POLE AND 137.5' WEST OF ANOTHER POWER POLE.

SKETCH
(NOT TO SCALE)



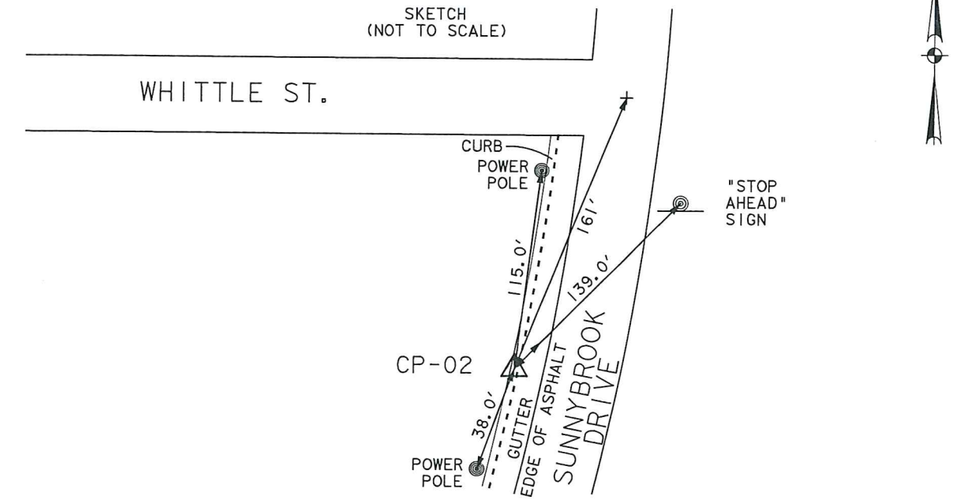
GRID NORTHING:	6,812,730.247'	SURFACE NORTHING:	6,813,547.775'
GRID EASTING:	2,954,646.158'	SURFACE EASTING:	2,955,000.715'
NAVD88 ELEVATION:	520.05'	NAVD88 ELEVATION:	520.05'

CONTROL POINT CP-02

APPROXIMATE LOCATION:

A MAG NAIL WITH SHINER SET ON TOP OF CURB LOCATED APPROXIMATELY 161' SOUTHWEST OF THE CENTERLINE INTERSECTION OF WHITTLE STREET AND SUNNYBROOK DRIVE, 38.0' NORTHEAST OF A POWER POLE, 139.0' SOUTHWEST OF A "STOP AHEAD" SIGN AND 115.0' SOUTHWEST OF ANOTHER POWER POLE.

SKETCH
(NOT TO SCALE)



GRID NORTHING:	6,812,575.560'	SURFACE NORTHING:	6,813,393.069'
GRID EASTING:	2,955,269.492'	SURFACE EASTING:	2,955,624.125'
NAVD88 ELEVATION:	506.14'	NAVD88 ELEVATION:	506.14'

NOTES:

HORIZONTAL COORDINATES ARE IN U.S. SURVEY FEET BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4202, NORTH AMERICAN DATUM OF 1983 (NAD83) (2011 ADJ.), EPOCH 2010.00, GEOID 12B MODEL, WITH A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.000120 (SMITH COUNTY). PRIMARY CONTROL VALUES ARE DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS. ELEVATIONS ARE IN U.S. SURVEY FEET BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS.

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

STATE OF TEXAS
REGISTERED
HEATH W. BROWN
6189
PROFESSIONAL
LAND SURVEYOR

Heath W. B 8-31-2020

HEATH W. BROWN
RPLS NO. 6189

DATE

NO.	REVISIONS	BY	DATE

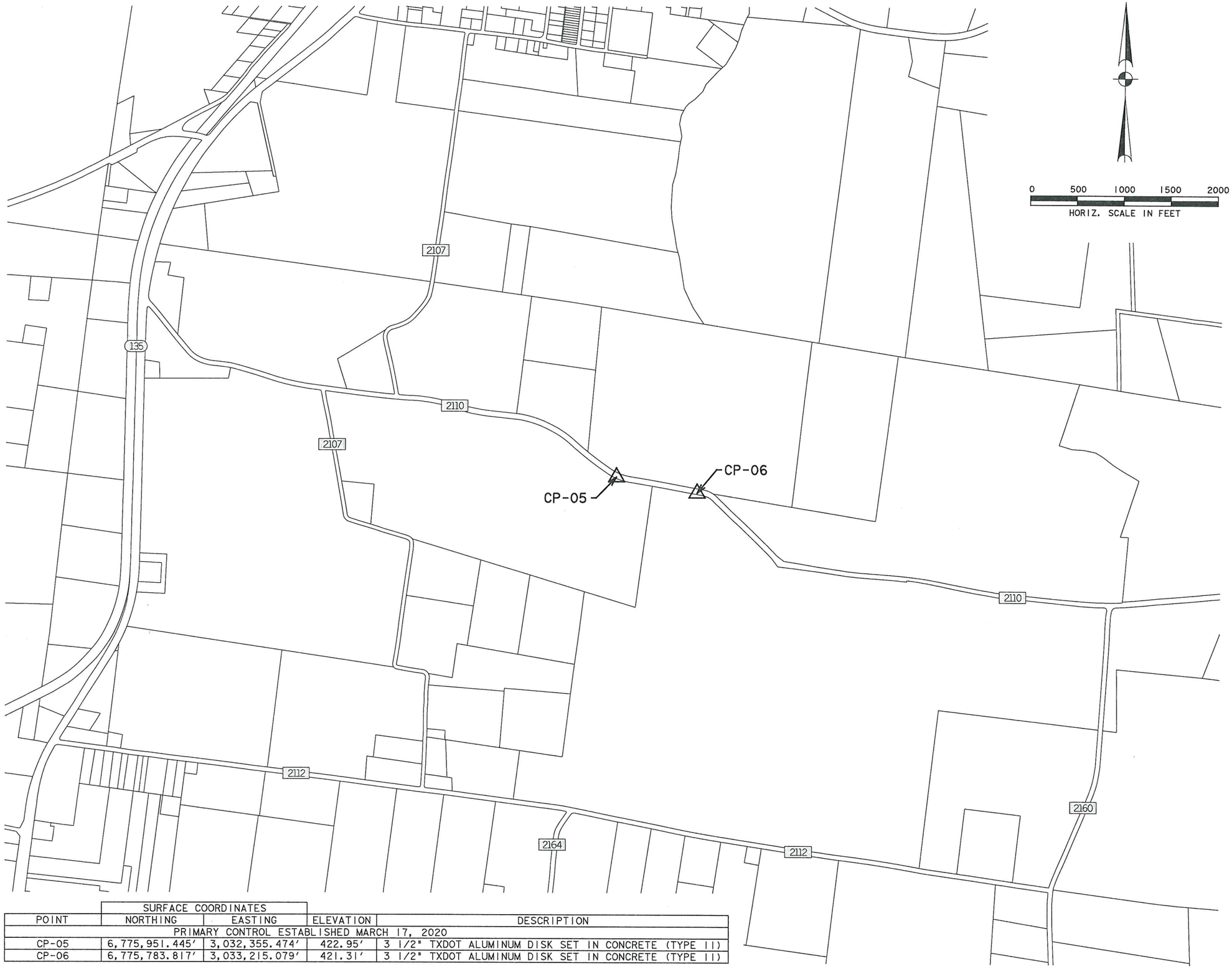
AZ&B
ARREDONDO, ZEPEDA & BRUNZ, LLC
11355 McCree Road - Dallas, Texas 75238
(214) 341-9900
FIRM REGISTRATION No. F-10098
TBPLS REGISTRATION No. 10088700

Texas Department of Transportation

HORIZONTAL AND VERTICAL CONTROL SHEET

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		31
STATE	DISTRICT	COUNTY	
TEXAS	TYLER	SMITH	
CONTROL	SECTION	JOB	HIGHWAY NO.
0910	16	147	WHITTLE ST.



0 500 1000 1500 2000

HORIZ. SCALE IN FEET

POINT	SURFACE COORDINATES NORTHING	EASTING	ELEVATION	DESCRIPTION
PRIMARY CONTROL ESTABLISHED MARCH 17, 2020				
CP-05	6,775,951.445'	3,032,355.474'	422.95'	3 1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II)
CP-06	6,775,783.817'	3,033,215.079'	421.31'	3 1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II)

NOTES:

HORIZONTAL COORDINATES ARE IN U.S. SURVEY FEET BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4202, NORTH AMERICAN DATUM OF 1983 (NAD83) (2011 ADJ.), EPOCH 2010.00, GEOID 12B MODEL, WITH A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.000120 (SMITH COUNTY). PRIMARY CONTROL VALUES ARE DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS. ELEVATIONS ARE IN U.S. SURVEY FEET BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS.

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

STATE OF TEXAS
REGISTERED
HEATH W. BROWN
6189
PROFESSIONAL
LAND SURVEYOR

Heath W. B 8-31-2020

HEATH W. BROWN
RPLS NO. 6189

DATE

NO.	REVISIONS	BY	DATE

AZ&B
ARREDONDO, ZEPEDA & BRUNZ, LLC
11355 McCree Road - Dallas, Texas 75238
(214) 341-9900
FIRM REGISTRATION No. F-10098
TBPLS REGISTRATION No. 10088700

Texas Department of Transportation

SURVEY CONTROL INDEX SHEET

SHEET 1 OF 2

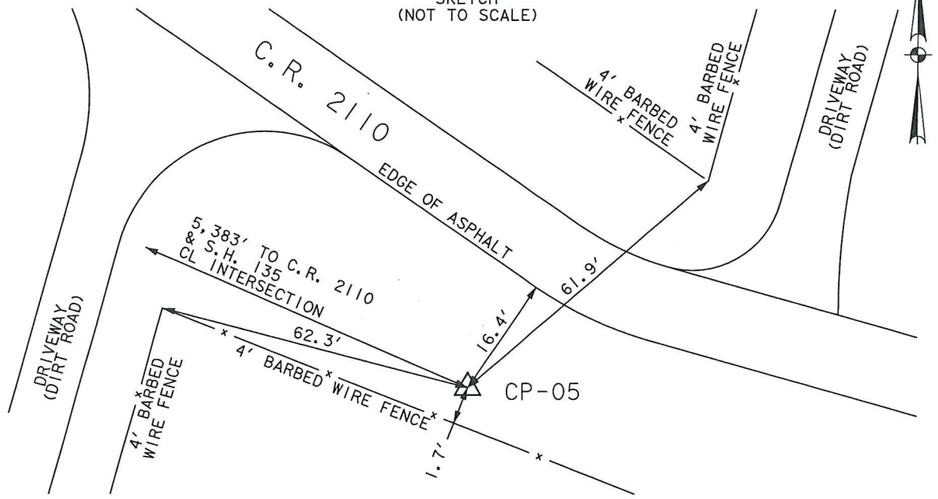
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		32
STATE	DISTRICT	COUNTY	
TEXAS	TYLER	SMITH	
CONTROL	SECTION	JOB	HIGHWAY NO.
0910	16	147	C.R. 2110

CONTROL POINT CP-05

APPROXIMATE LOCATION:

A 3-1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II) LOCATED APPROXIMATELY 5,383' SOUTHEAST OF THE CENTERLINE INTERSECTION OF C.R. 2110 AND S.H. 135, 62.3' SOUTHEAST OF A FENCE CORNER, 16.4' SOUTHWEST OF AN EDGE OF ASPHALT, 61.9' SOUTHWEST OF ANOTHER FENCE CORNER AND 1.7' NORTHEAST OF A 4' BARBED WIRE FENCE.

SKETCH
(NOT TO SCALE)



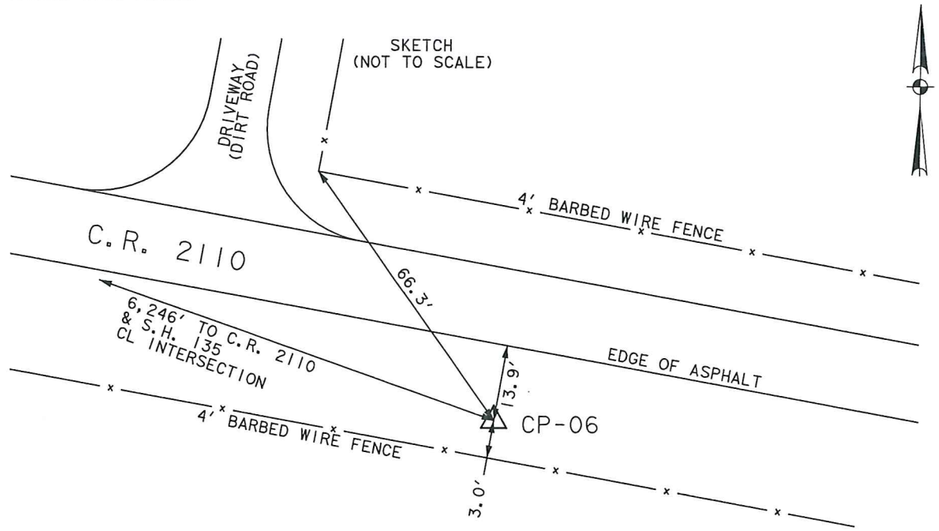
GRID NORTHING:	6,775,138.429'	SURFACE NORTHING:	6,775,951.445'
GRID EASTING:	3,031,991.635'	SURFACE EASTING:	3,032,355.474'
NAVD88 ELEVATION:	422.95'	NAVD88 ELEVATION:	422.95'

CONTROL POINT CP-06

APPROXIMATE LOCATION:

A 3-1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II)LOCATED APPROXIMATELY 6,246' SOUTHEAST OF THE CENTERLINE INTERSECTION OF C.R. 2110 AND S.H. 135, 66.3' SOUTHEAST OF A FENCE CORNER, 13.9' SOUTHWEST OF AN EDGE OF ASPHALT AND 3.0' NORTHEAST OF A 4' BARBED WIRE FENCE.

SKETCH
(NOT TO SCALE)



GRID NORTHING:	6,774,970.820'	SURFACE NORTHING:	6,775,783.817'
GRID EASTING:	3,032,851.137'	SURFACE EASTING:	3,033,215.079
NAVD88 ELEVATION:	421.31'	NAVD88 ELEVATION:	421.31'

NOTES:

HORIZONTAL COORDINATES ARE IN U.S. SURVEY FEET BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4202, NORTH AMERICAN DATUM OF 1983 (NAD83) (2011 ADJ.), EPOCH 2010.00, GEOID 12B MODEL, WITH A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.000120 (SMITH COUNTY). PRIMARY CONTROL VALUES ARE DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS. ELEVATIONS ARE IN U.S. SURVEY FEET BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS.

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

Heath W. B 8-31-2020

HEATH W. BROWN
RPLS NO. 6189

DATE

NO.	REVISIONS	BY	DATE

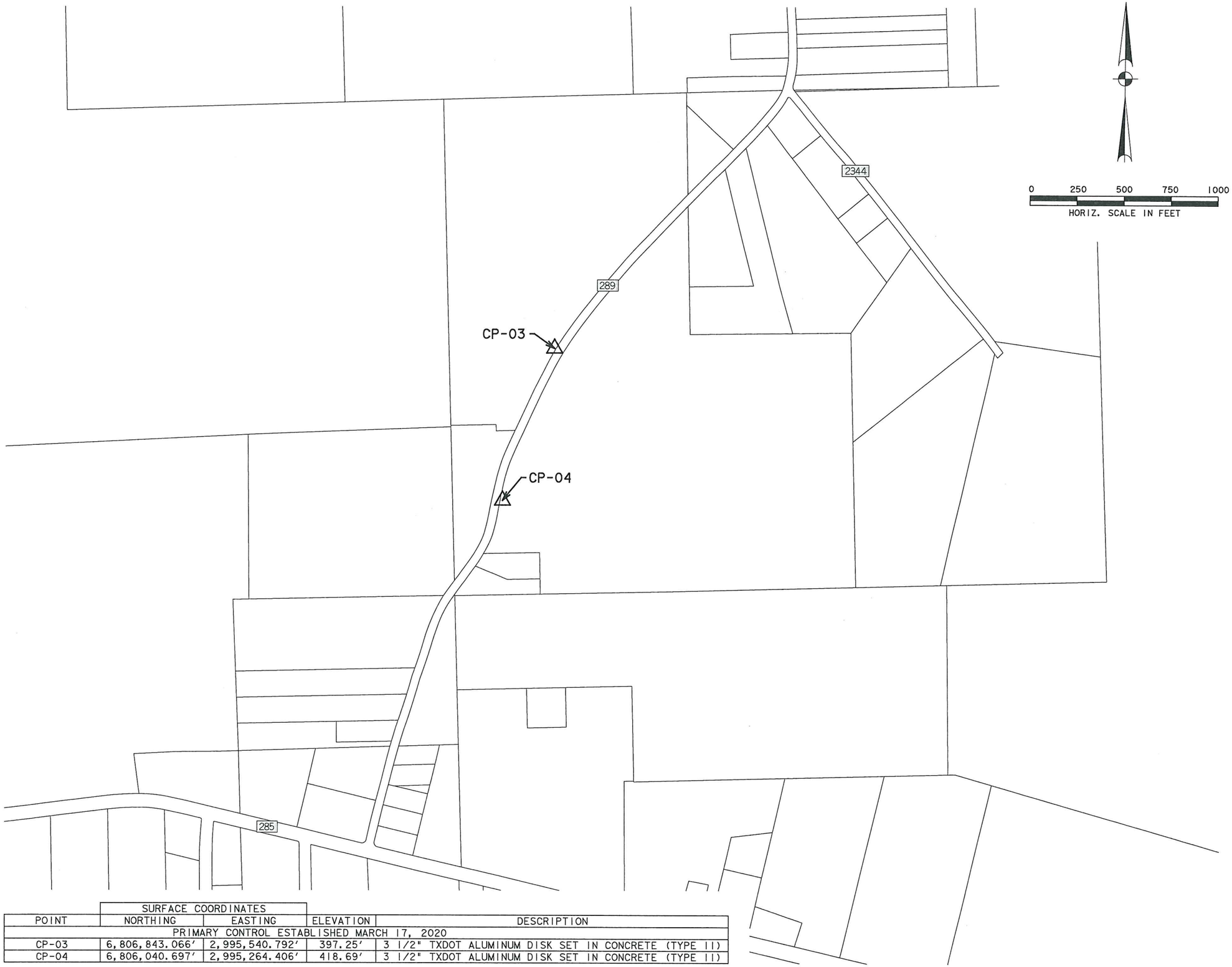
AZ&B
ARREDONDO, ZEPEDA & BRUNZ, LLC
11355 McCree Road - Dallas, Texas 75238
(214) 341-9900
FIRM REGISTRATION No. F-10098
TBPLS REGISTRATION No. 10088700

Texas Department of Transportation

HORIZONTAL AND VERTICAL CONTROL SHEET

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		33
STATE	DISTRICT	COUNTY	
TEXAS	TYLER	SMITH	
CONTROL	SECTION	JOB	HIGHWAY NO.
0910	16	147	C.R. 2110



POINT	SURFACE COORDINATES NORTHING	EASTING	ELEVATION	DESCRIPTION
PRIMARY CONTROL ESTABLISHED MARCH 17, 2020				
CP-03	6,806,843.066'	2,995,540.792'	397.25'	3 1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II)
CP-04	6,806,040.697'	2,995,264.406'	418.69'	3 1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II)

NOTES:

HORIZONTAL COORDINATES ARE IN U.S. SURVEY FEET BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4202, NORTH AMERICAN DATUM OF 1983 (NAD83) (2011 ADJ.), EPOCH 2010.00, GEOID 12B MODEL, WITH A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.000120 (SMITH COUNTY). PRIMARY CONTROL VALUES ARE DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS. ELEVATIONS ARE IN U.S. SURVEY FEET BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS.

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

STATE OF TEXAS
REGISTERED
HEATH W. BROWN
6189
PROFESSIONAL
LAND SURVEYOR

Heath W. B 8-31-2020

HEATH W. BROWN
RPLS NO. 6189

DATE

NO.	REVISIONS	BY	DATE

ARREDONDO, ZEPEDA & BRUNZ, LLC
11355 McCree Road - Dallas, Texas 75238
(214) 341-9900
FIRM REGISTRATION No. F-10098
TBPLS REGISTRATION No. 10088700

Texas Department of Transportation

SURVEY CONTROL INDEX SHEET

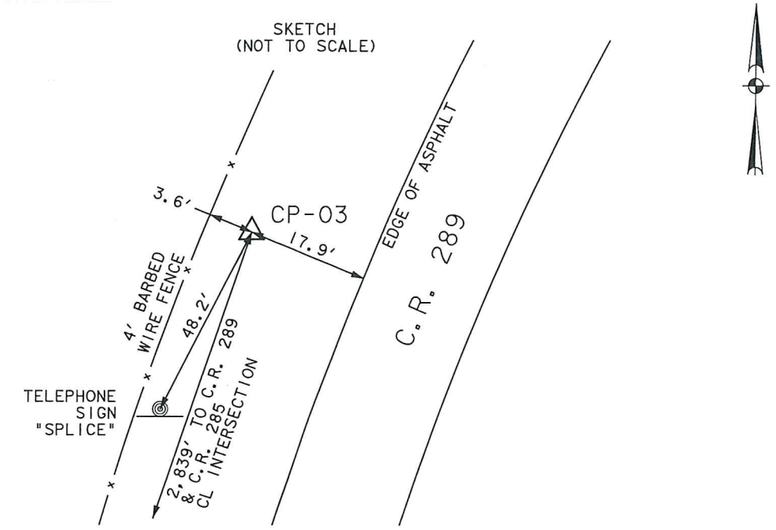
SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		34
STATE	DISTRICT	COUNTY	
TEXAS	TYLER	SMITH	
CONTROL	SECTION	JOB	HIGHWAY NO.
0910	16	147	C.R. 289

CONTROL POINT CP-03

APPROXIMATE LOCATION:

A 3-1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II) LOCATED APPROXIMATELY 2,839' NORTHEAST OF THE CENTERLINE INTERSECTION OF C.R. 289 AND C.R. 285, 48.2' NORTHEAST OF A TELEPHONE SIGN "SPLICE", 17.9' NORTHWEST OF AN EDGE OF ASPHALT AND 3.6' SOUTHEAST OF A 4' BARBED WIRE FENCE.

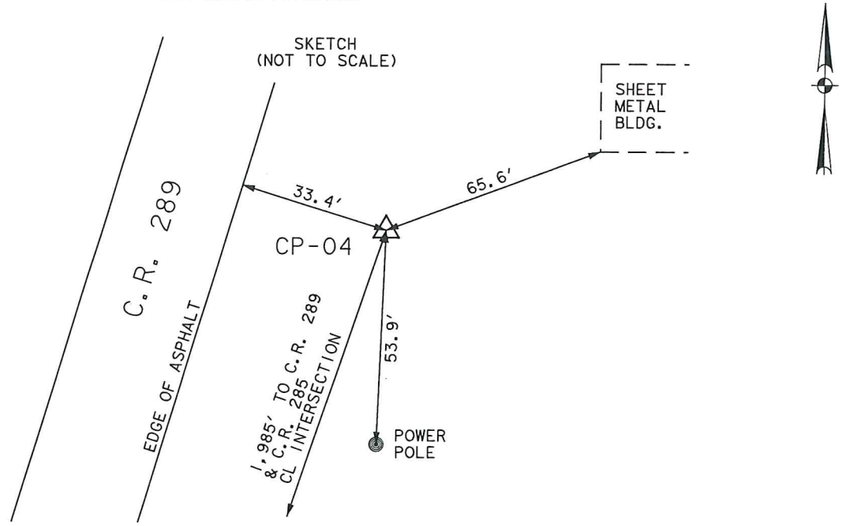


GRID NORTHING:	6,806,026.343'	SURFACE NORTHING:	6,806,843.066'
GRID EASTING:	2,995,181.370'	SURFACE EASTING:	2,995,540.792'
NAVD88 ELEVATION:	397.25'	NAVD88 ELEVATION:	397.25'

CONTROL POINT CP-04

APPROXIMATE LOCATION:

A 3-1/2" TXDOT ALUMINUM DISK SET IN CONCRETE (TYPE II) LOCATED APPROXIMATELY 1,985' NORTHEAST OF THE CENTERLINE INTERSECTION OF C.R. 289 AND C.R. 285, 53.9' NORTH OF A POWER POLE, 33.4' SOUTHEAST OF AN EDGE OF ASPHALT AND 65.6' SOUTHWEST OF THE SOUTHWEST CORNER OF A SHEET METAL BUILDING.



GRID NORTHING:	6,805,224.070'	SURFACE NORTHING:	6,806,040.697'
GRID EASTING:	2,994,905.017'	SURFACE EASTING:	2,995,264.406'
NAVD88 ELEVATION:	418.69'	NAVD88 ELEVATION:	418.69'

NOTES:

HORIZONTAL COORDINATES ARE IN U.S. SURVEY FEET BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4202, NORTH AMERICAN DATUM OF 1983 (NAD83) (2011 ADJ.), EPOCH 2010.00, GEOID 12B MODEL, WITH A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.000120 (SMITH COUNTY). PRIMARY CONTROL VALUES ARE DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS. ELEVATIONS ARE IN U.S. SURVEY FEET BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED FROM LEVEL 3 TXDOT RTN GPS OBSERVATIONS.

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

STATE OF TEXAS
REGISTERED
HEATH W. BROWN
6189
PROFESSIONAL
LAND SURVEYOR

Heath W. B 8-31-2020

HEATH W. BROWN
RPLS NO. 6189

DATE

NO.	REVISIONS	BY	DATE

AZ&B
ARREDONDO, ZEPEDA & BRUNZ, LLC
11355 McCree Road - Dallas, Texas 75238
(214) 341-9900
FIRM REGISTRATION No. F-10098
TBPLS REGISTRATION No. 10088700

Texas Department of Transportation

HORIZONTAL AND VERTICAL CONTROL SHEET

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		35
STATE	DISTRICT	COUNTY	
TEXAS	TYLER	SMITH	
CONTROL	SECTION	JOB	HIGHWAY NO.
0910	16	147	C.R. 289

100% SUBMITTAL
DATE: 9/7/2021
TIME: 10:35:50 AM

WHITTLE ST ℄ ALIGNMENT

Beginning chain WHITTLE description

Point 100	N 6,813,529.0550	E 2,954,906.9830	Sta	10+00.00
Course from 100 to 101 N 88° 37′ 06.39" E Dist 740.7912				
Point 101	N 6,813,546.9158	E 2,955,647.5589	Sta	17+40.79
Course from 101 to 102 N 88° 37′ 06.39" E Dist 26.8896				
Point 102	N 6,813,547.5641	E 2,955,674.4407	Sta	17+67.68

Ending chain WHITTLE description

CR 2110 ℄ ALIGNMENT

Beginning chain CR2110 description
Feature: Road_Centerline

Point CR21101 N 6,775,920.0464 E 3,032,558.3351 Sta 11+00.00

Course from CR21101 to PC CR2110_3 S 80° 31′ 54.43" E Dist 450.0000

Curve Data

Curve CR2110_3					
P.I. Station	15+60.00	N	6,775,844.3761	E	3,033,012.0688
Delta =	1° 02′ 30.27" (RT)				
Degree =	5° 12′ 31.35"				
Tangent =	10.0003				
Length =	20.0000				
Radius =	1,100.0000				
External =	0.0455				
Long Chord =	19.9997				
Mid. Ord. =	0.0455				
P.C. Station	15+50.00	N	6,775,846.0212	E	3,033,002.2048
P.T. Station	15+70.00	N	6,775,842.5520	E	3,033,021.9013
C.C.		N	6,774,761.0065	E	3,032,821.2543
Back = S 80° 31′ 54.43" E					
Ahead = S 79° 29′ 24.16" E					
Chord Bear = S 80° 00′ 39.29" E					

Course from PT CR2110_3 to CR21105 S 79° 29′ 24.16" E Dist 80.0000

Point CR21105 N 6,775,827.9595 E 3,033,100.5592 Sta 16+50.00

Ending chain CR2110 description

CR 289 ℄ ALIGNMENT

Beginning chain CR289 description
Feature: Road_Centerline

Curve Data

Curve CR289_1					
P.I. Station	11+45.01	N	6,806,724.0086	E	2,995,505.1423
Delta =	3° 26′ 15.89" (LT)				
Degree =	3° 49′ 10.99"				
Tangent =	45.0135				
Length =	90.0000				
Radius =	1,500.0000				
External =	0.6753				
Long Chord =	89.9865				
Mid. Ord. =	0.6749				
P.C. Station	11+00.00	N	6,806,763.3522	E	2,995,527.0123
P.T. Station	11+90.00	N	6,806,683.4244	E	2,995,485.6707
C.C.		N	6,806,034.5687	E	2,996,838.0709
Back = S 29° 04′ 06.77" W					
Ahead = S 25° 37′ 50.89" W					
Chord Bear = S 27° 20′ 58.83" W					

Course from PT CR289_1 to PC CR289_4 S 25° 37′ 50.89" W Dist 360.0000

Curve Data

Curve CR289_4					
P.I. Station	16+22.56	N	6,806,293.4314	E	2,995,298.5596
Delta =	5° 32′ 18.93" (LT)				
Degree =	3° 49′ 10.99"				
Tangent =	72.5565				
Length =	145.0000				
Radius =	1,500.0000				
External =	1.7538				
Long Chord =	144.9436				
Mid. Ord. =	1.7517				
P.C. Station	15+50.00	N	6,806,358.8484	E	2,995,329.9454
P.T. Station	16+95.00	N	6,806,225.2906	E	2,995,273.6341
C.C.		N	6,805,709.9926	E	2,996,682.3455
Back = S 25° 37′ 50.89" W					
Ahead = S 20° 05′ 31.95" W					
Chord Bear = S 22° 51′ 41.42" W					

Ending chain CR289 description

9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation

Tyler District

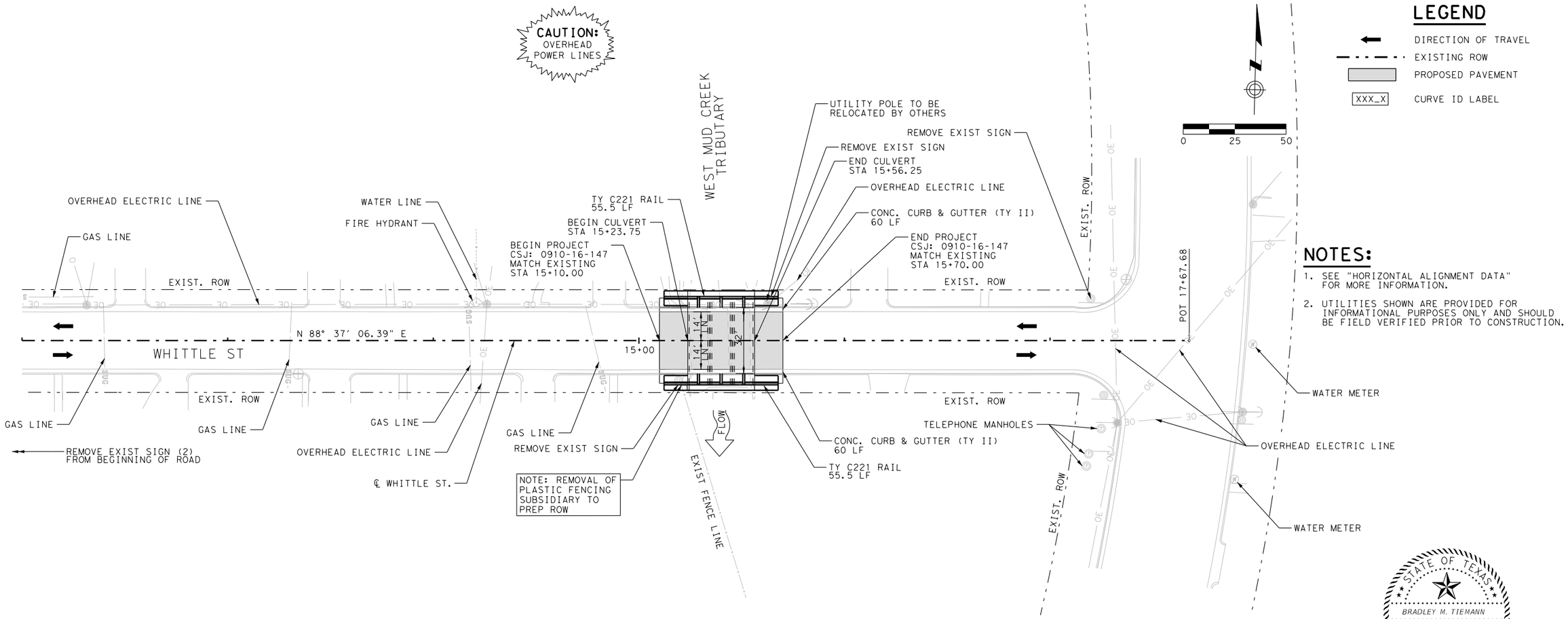
HORIZONTAL ALIGNMENT DATA

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST, ETC	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	36

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_HD01.dgn

100% SUBMITTAL

DATE: 9/7/2021 TIME: 10:35:58 AM

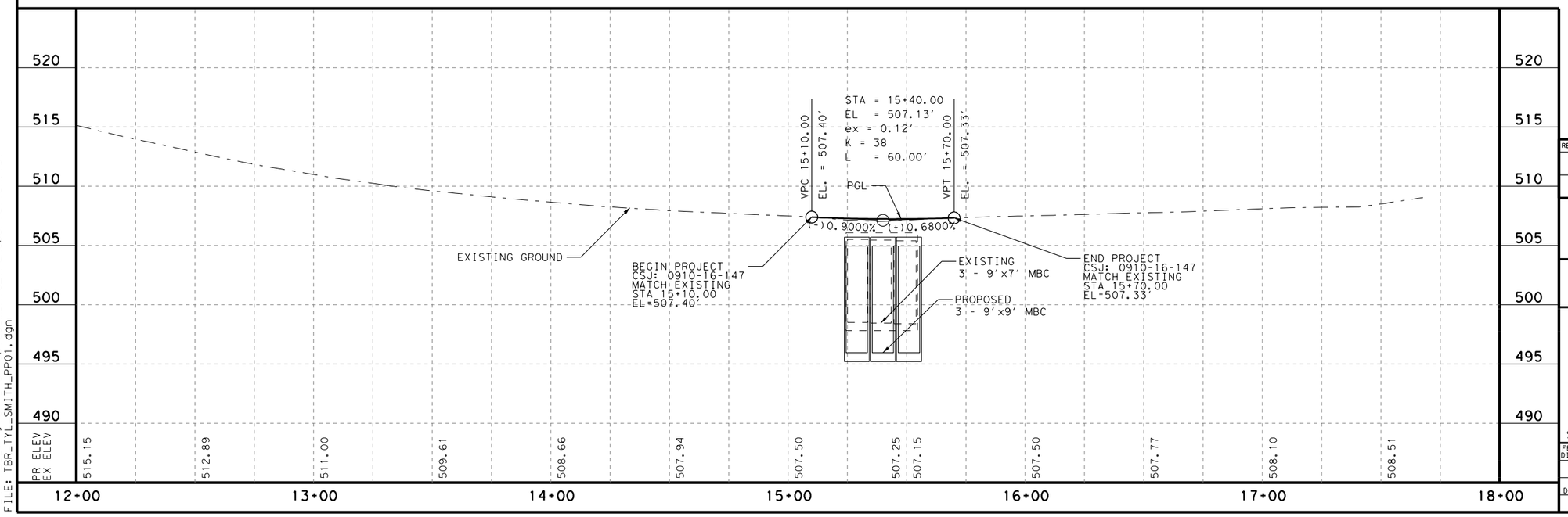


LEGEND

- DIRECTION OF TRAVEL
- EXISTING ROW
- PROPOSED PAVEMENT
- XXX_X CURVE ID LABEL

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" FOR MORE INFORMATION.
2. UTILITIES SHOWN ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION.



BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

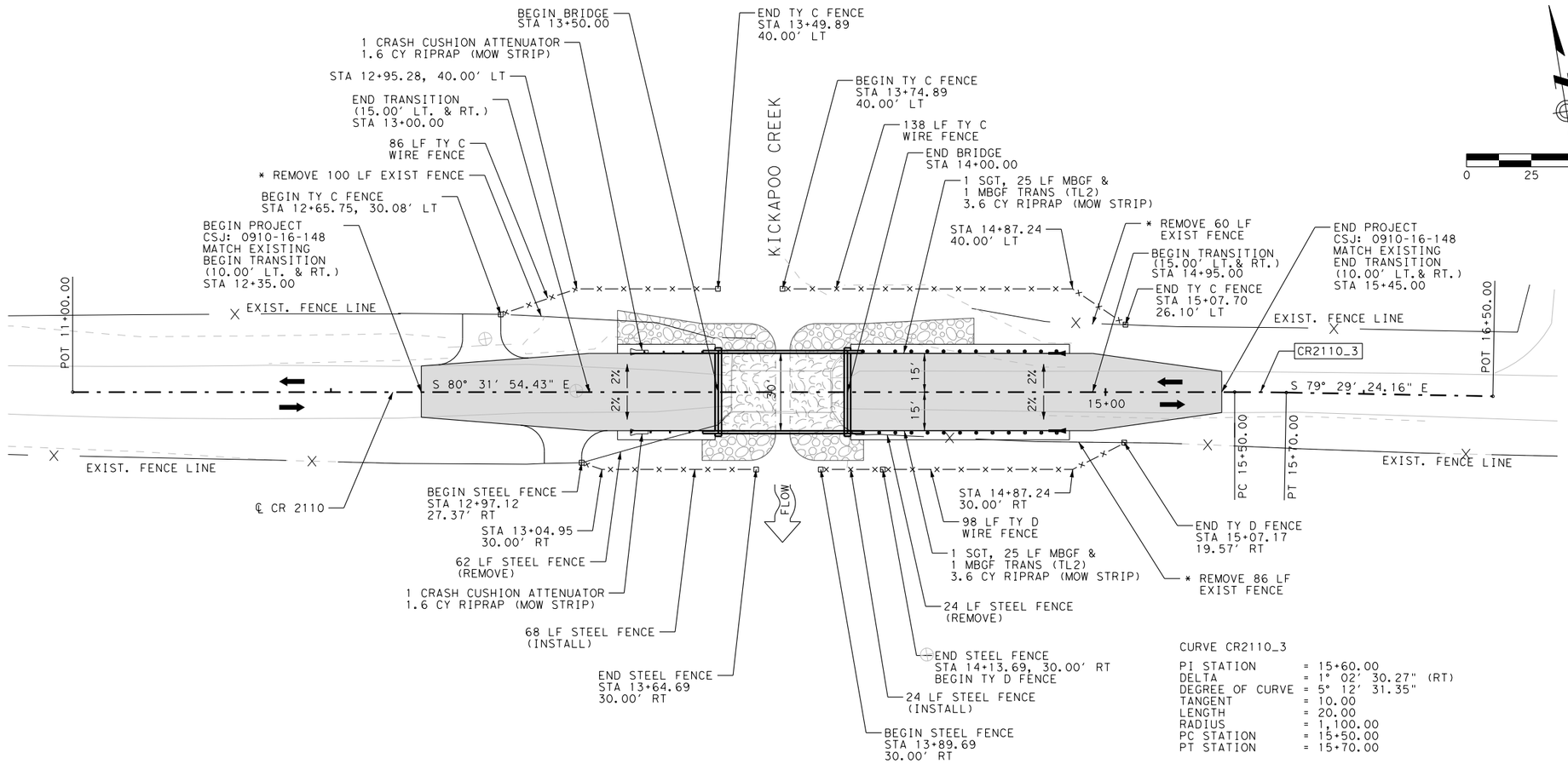
PLAN & PROFILE
WHITTLE ST BRIDGE @ WEST MUD CREEK TRIBUTARY

SCALE: 1"=50'H, 1"=10'V SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	37

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_PP01.dgn

100% SUBMITTAL
DATE: 9/7/2021
TIME: 10:36:05 AM



LEGEND

- DIRECTION OF TRAVEL
- EXISTING ROW
- PROPOSED PAVEMENT
- XXX_X — CURVE ID LABEL

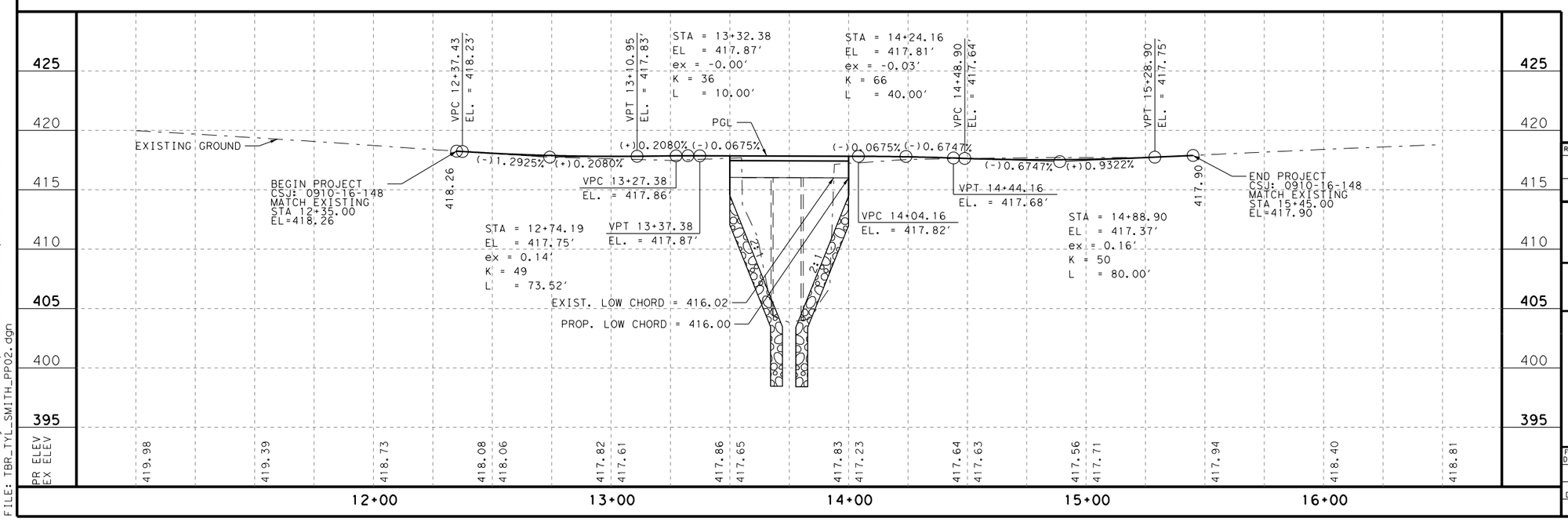
* SUBSIDIARY TO PREP ROW

NOTES:

1. SEE "HORIZONTAL ALIGNMENT DATA" FOR MORE INFORMATION.
2. UTILITIES SHOWN ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION.

CURVE CR2110_3

PI STATION	= 15+60.00
DELTA	= 1° 02' 30.27" (RT)
DEGREE OF CURVE	= 5° 12' 31.35"
TANGENT	= 10.00
LENGTH	= 20.00
RADIUS	= 1,100.00
PC STATION	= 15+50.00
PT STATION	= 15+70.00



9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District
©2021 by TxDOT

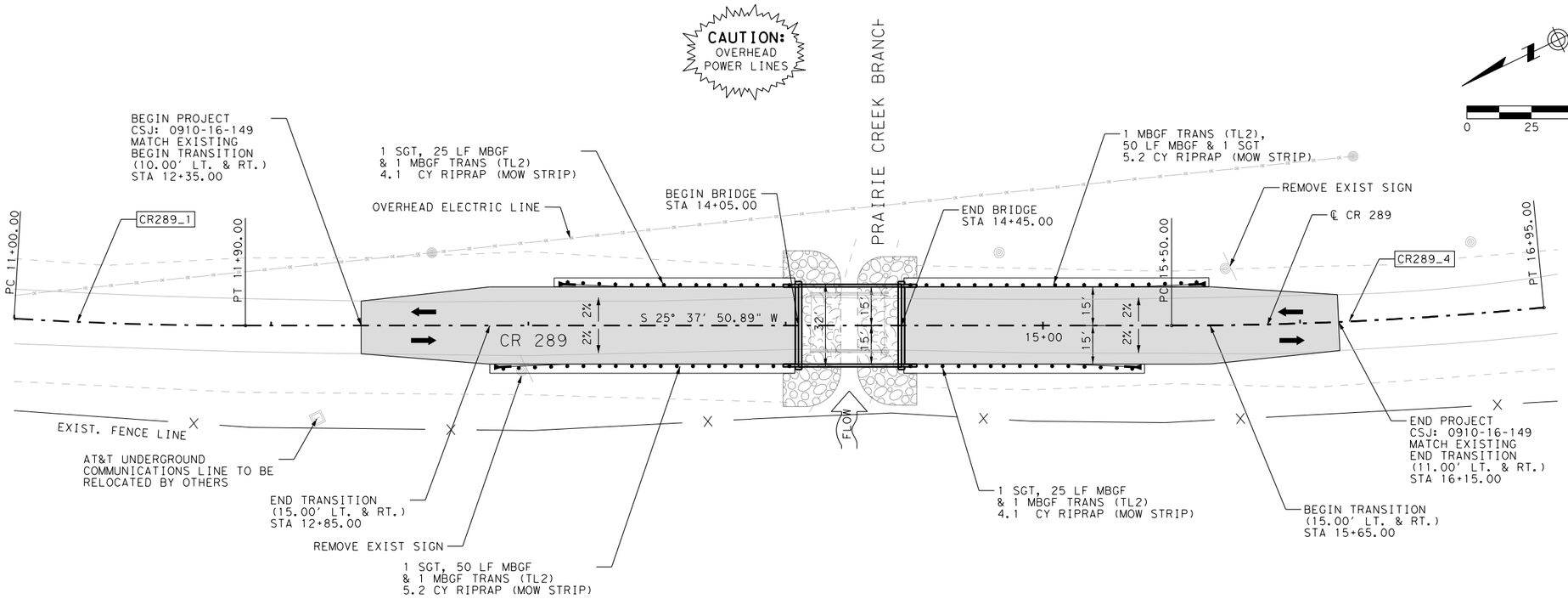
PLAN & PROFILE
CR 2110 BRIDGE @ KICKAPOO CREEK

SCALE: 1"=50'H, 1"=10'V — SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET			CR 2110	
STATE DISTRICT	COUNTY		CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH		0910	16	147,ETC	38

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_PP02.dgn

100% SUBMITTAL
DATE: 9/7/2021
TIME: 10:36:12 AM



LEGEND

- DIRECTION OF TRAVEL
- EXISTING ROW
- PROPOSED PAVEMENT
- XXX_X — CURVE ID LABEL

NOTES:

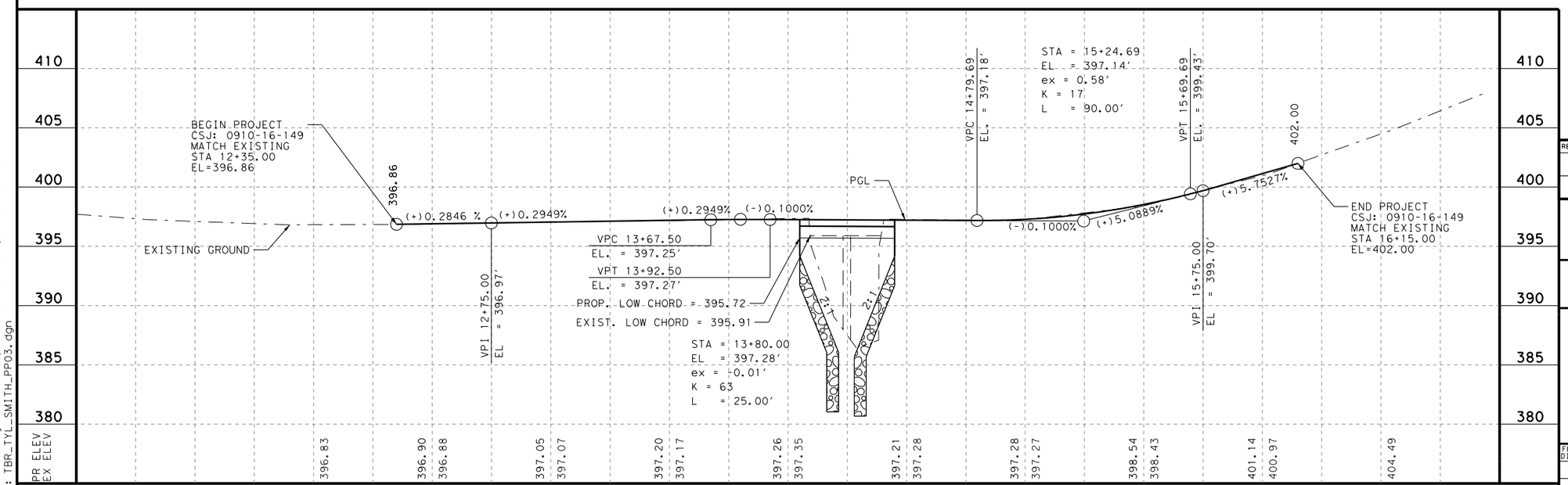
1. SEE "HORIZONTAL ALIGNMENT DATA" FOR MORE INFORMATION.
2. UTILITIES SHOWN ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND SHOULD BE FIELD VERIFIED PRIOR TO CONSTRUCTION.

CURVE CR289_1

PI STATION	= 11+45.01
DELTA	= 3° 26' 15.89" (LT)
DEGREE OF CURVE	= 3° 49' 10.99"
TANGENT	= 45.01
LENGTH	= 90.00
RADIUS	= 1,500.00
PC STATION	= 11+00.00
PT STATION	= 11+90.00

CURVE CR289_4

PI STATION	= 16+22.56
DELTA	= 5° 32' 18.93" (LT)
DEGREE OF CURVE	= 3° 49' 10.99"
TANGENT	= 72.56
LENGTH	= 145.00
RADIUS	= 1,500.00
PC STATION	= 15+50.00
PT STATION	= 16+95.00



9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

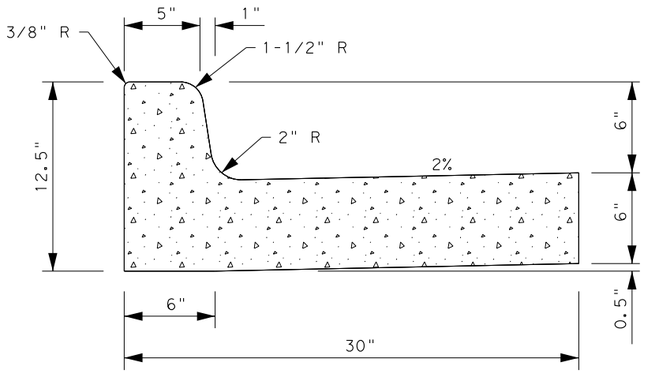
PLAN & PROFILE
CR 289 BRIDGE @ PRAIRIE CREEK

SCALE: 1"=50'H, 1"=10'V SHEET 1 OF 1

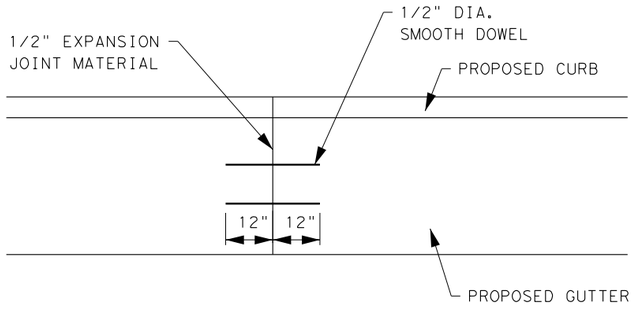
FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 289	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	39

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_PP03.dgn

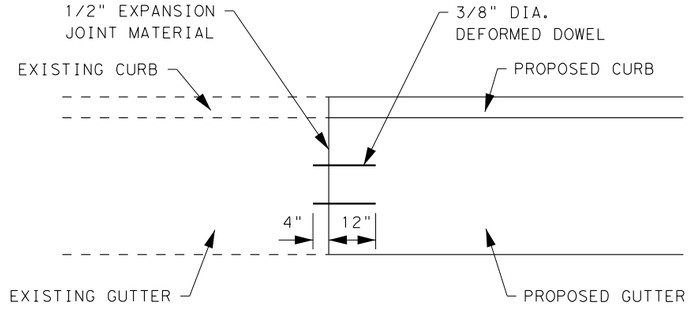
100% SUBMITTAL
DATE: 9/7/2021 TIME: 10:36:18 AM



CURB AND GUTTER SECTION



DOWEL DETAIL "A"
NEW CURB AND GUTTER
PLAN VIEW



DOWEL DETAIL "B"
EXTENSION OF EXISTING CURB AND GUTTER
PLAN VIEW

NOTES:

1. INSERT #3 DOWEL (3/8" DIA DEFORMED BARS) TO A MINIMUM 4" DEPTH IN EXISTING CONCRETE CURB AND GUTTER.
2. EXPANSION JOINTS SHALL BE SEALED WITH APPROVED MATERIAL.

CURB AND GUTTER DETAILS (TYPE II)

N.T.S.

NOTES:

1. 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.

STEEL FENCE DETAIL

N.T.S.

PLAN VIEW

SECTION A-A

NOTES:

1. PROVIDE CEMENT STABILIZED BACKFILL (CSB) MEETING THE REQUIREMENTS OF ITEM 400, "EXCAVATION AND BACKFILL FOR STRUCTURES", TO THE LIMITS SHOWN.

CSB DETAIL - WHITTLE ST.

N.T.S.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation

Tyler District

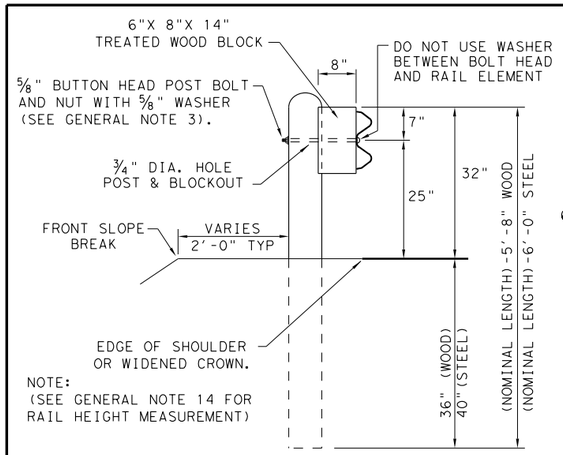
MISCELLANEOUS DETAILS

SCALE: N.T.S. SHEET 1 OF 1

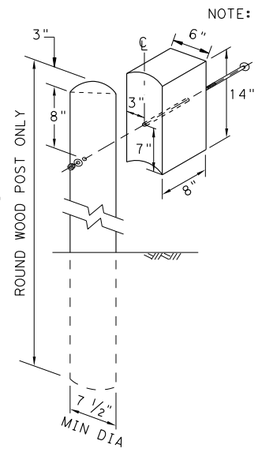
FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.
6	TEXAS	SEE TITLE SHEET		WHITTLE ST, ETC
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No. / SHEET No.
TYL	SMITH	0910	16	147, ETC / 40

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_MISC_DETAILS.dgn

DATE: 9/7/2021
FILE: ...\PAV\SMITH STD PAV\gf3119.dgn

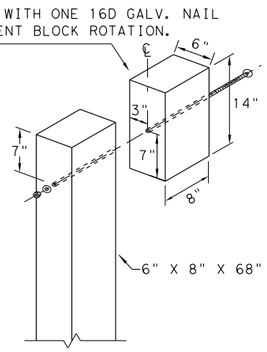


TYPICAL POST PLACEMENT

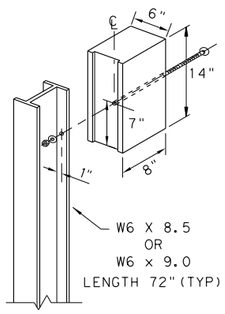


WOOD BLOCK TO ROUND WOOD POST

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

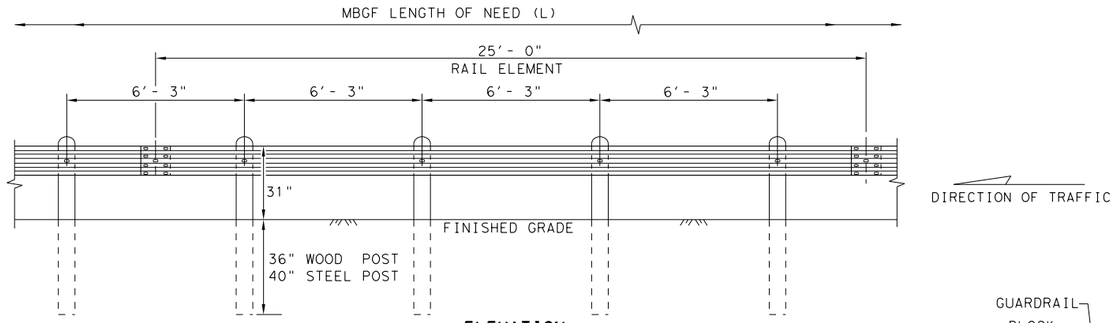


WOOD BLOCK TO RECTANGULAR WOOD POST



ROUTED WOOD BLOCK TO I-BEAM STEEL POST

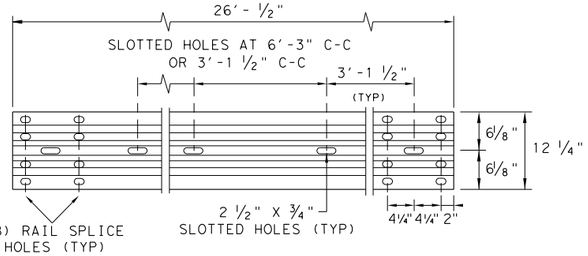
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION MID-SPAN RAIL SPLICE

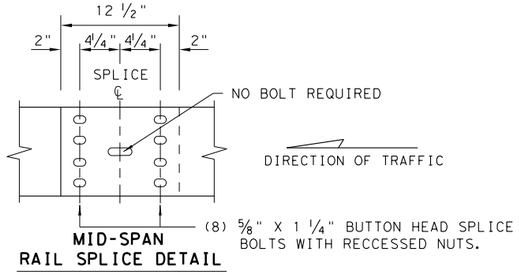
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)

DIRECTION OF TRAFFIC



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

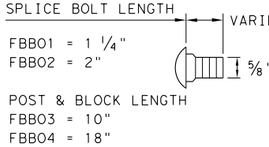
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



MID-SPAN RAIL SPLICE DETAIL

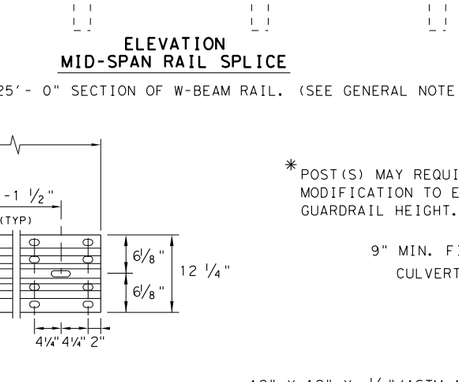
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

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



BUTTON HEAD BOLT

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



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

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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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

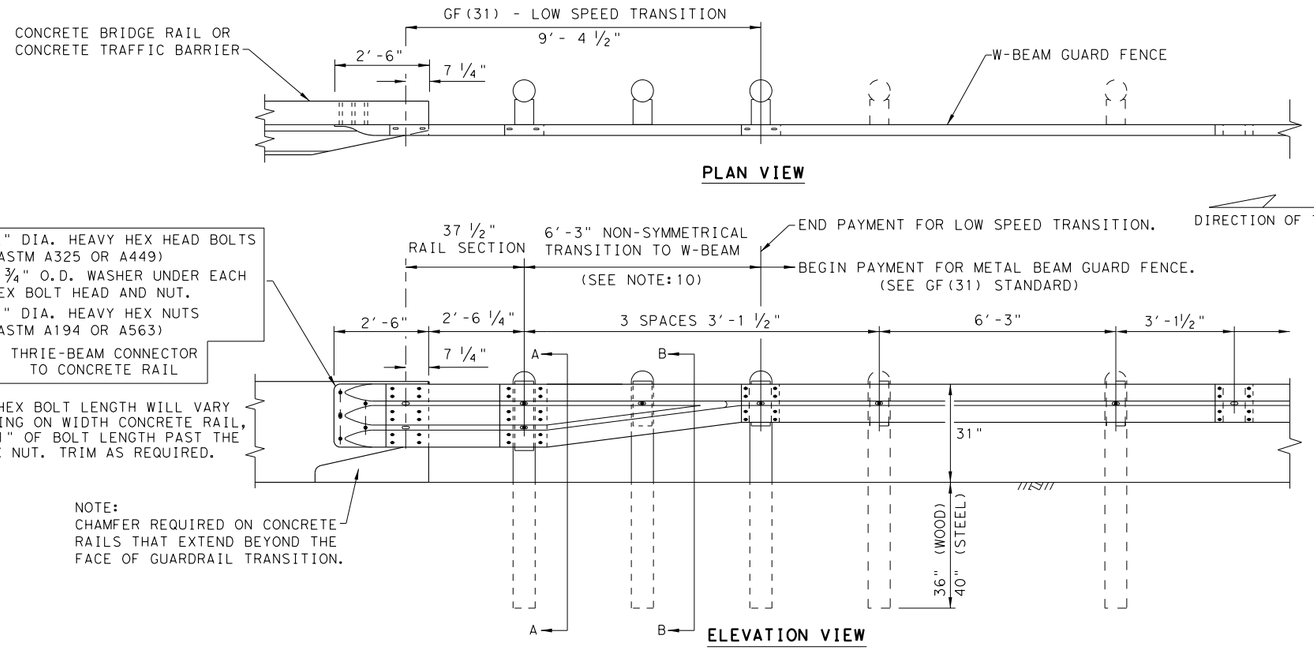
GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

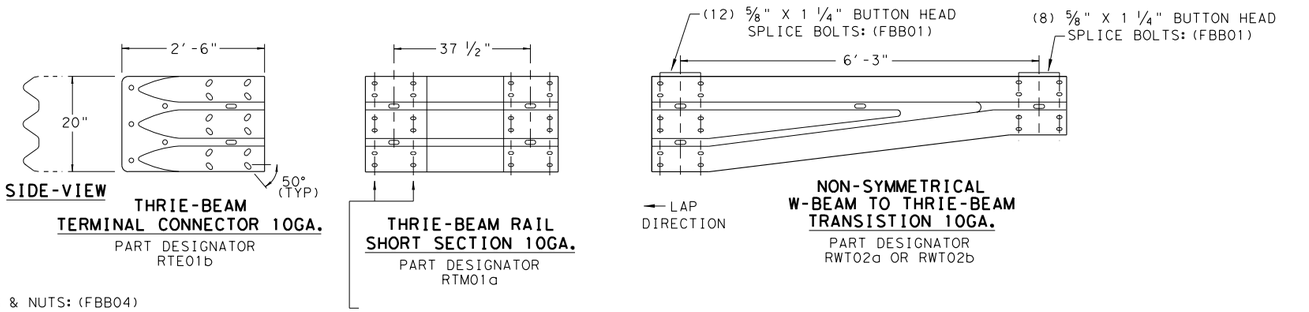
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		41



GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a)AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT, MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE TRANSITION.



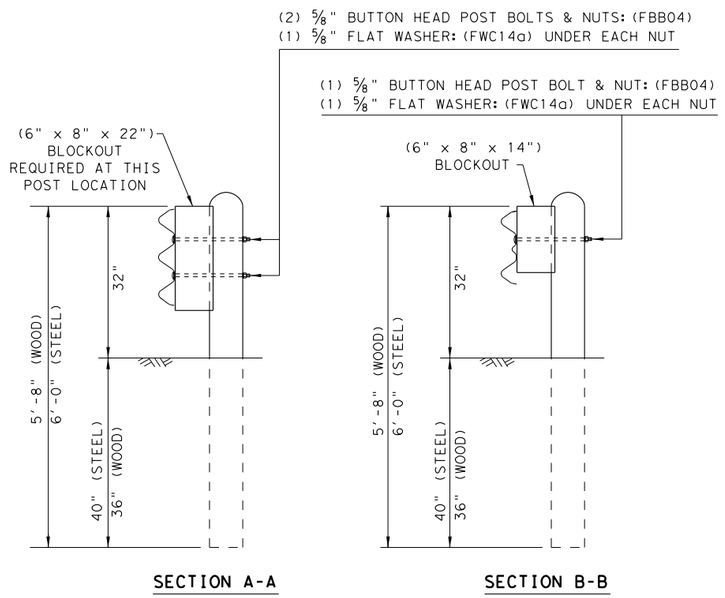
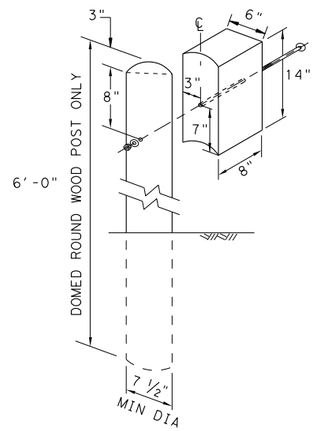
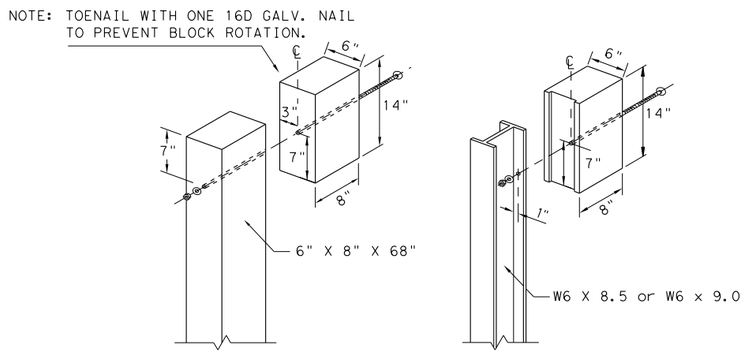


PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE SHORT 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.

LOW-SPEED TRANSITION

Texas Department of Transportation | Design Division Standard

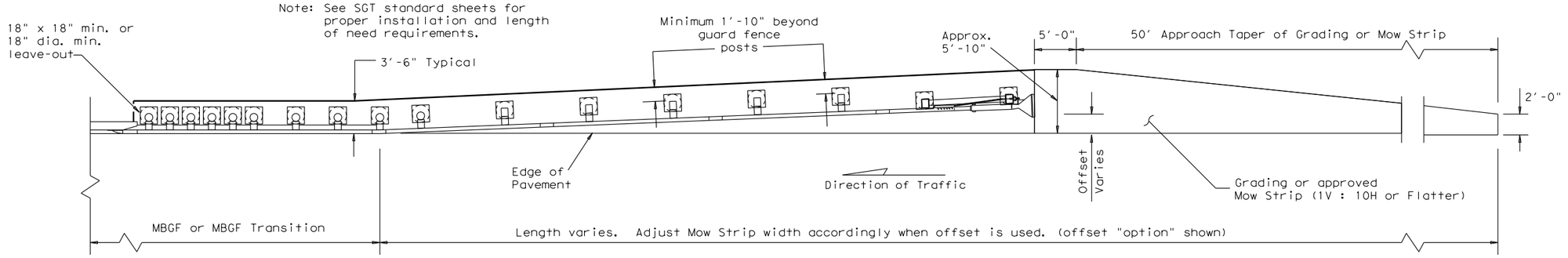
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

GF(31)TR TL2-19

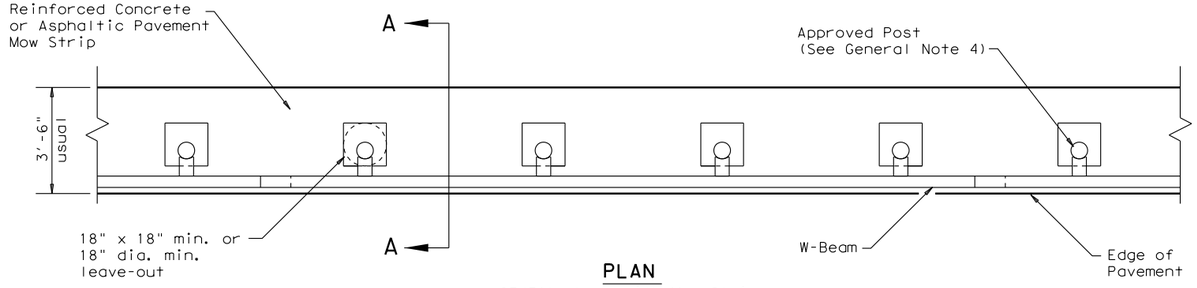
FILE: gf31tr1219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147, ETC	WHITTLE ST, ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		42

DATE: 9/7/2021 9:38:00 AM
FILE: ...\SMITH STD PAV\gf31tr1219.dgn

DATE: 9/7/2021
FILE: ...\PAV\SMITH STD PAV\gf31ms19.dgn

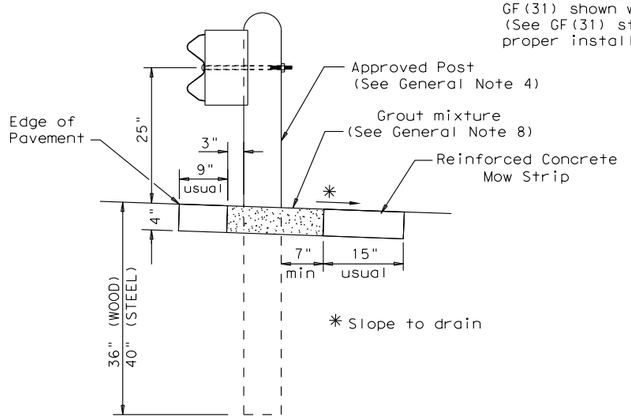


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



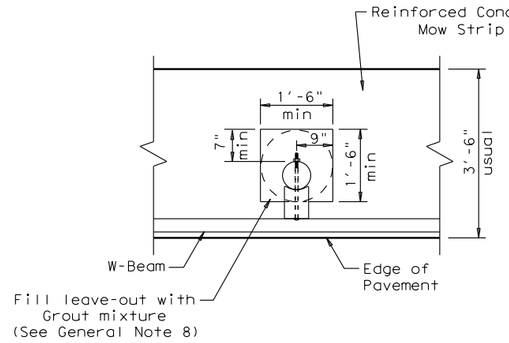
PLAN

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



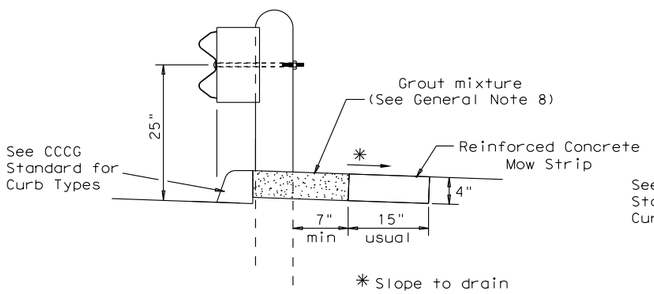
SECTION A-A

Typical



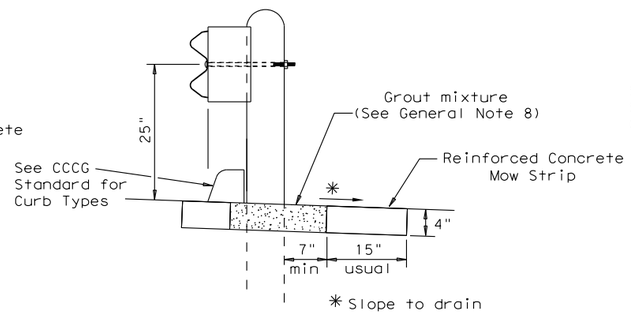
MOW STRIP DETAIL

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



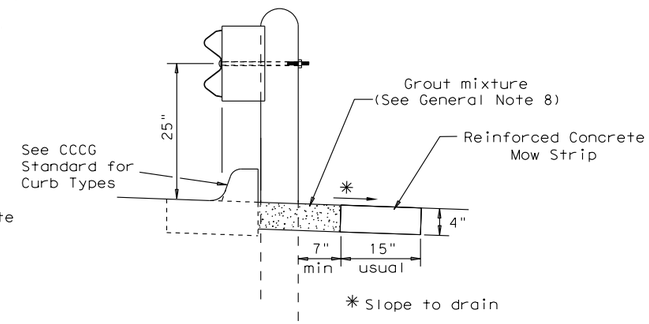
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

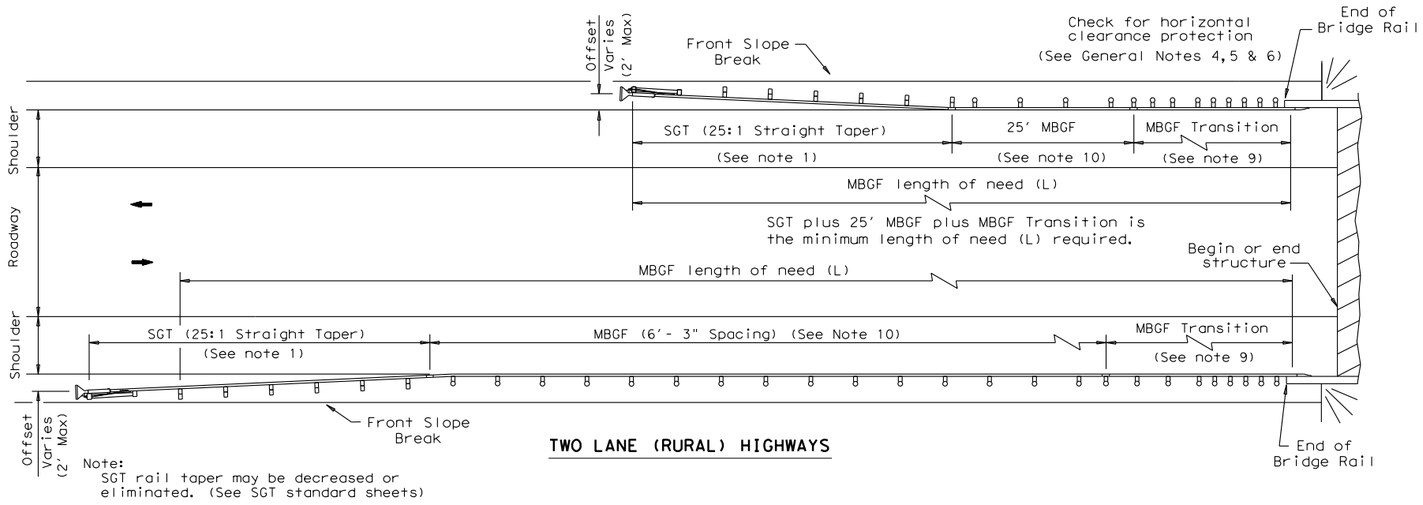
Texas Department of Transportation

Design Division Standard

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

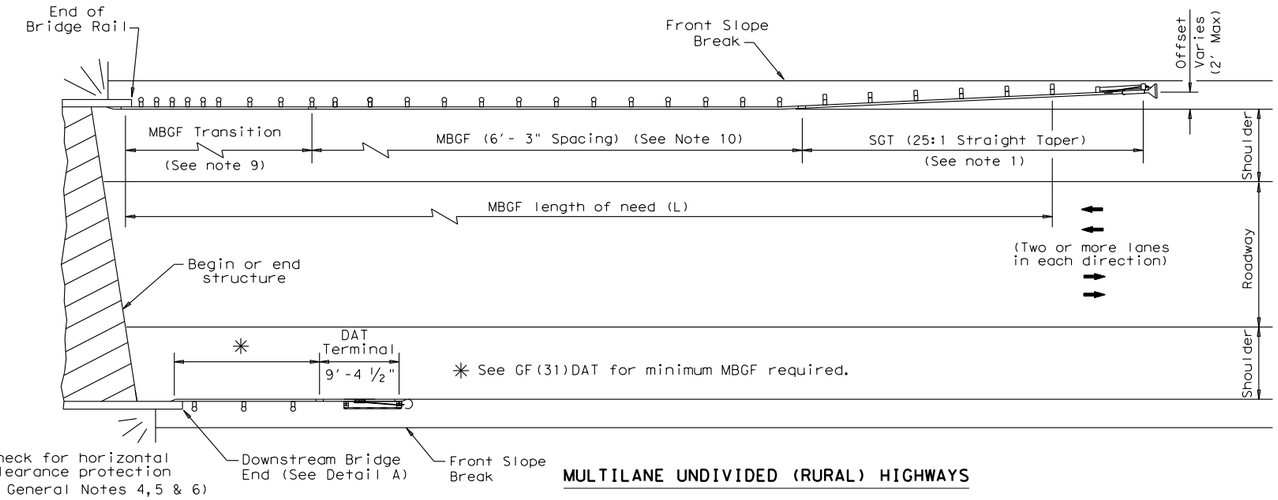
GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		43

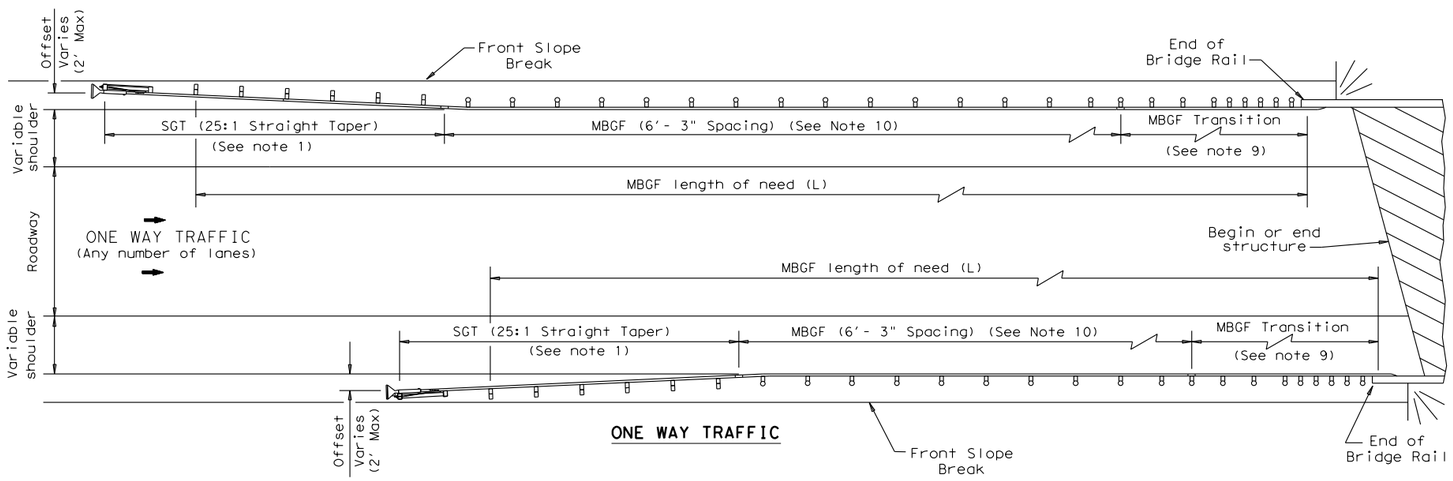


TWO LANE (RURAL) HIGHWAYS

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



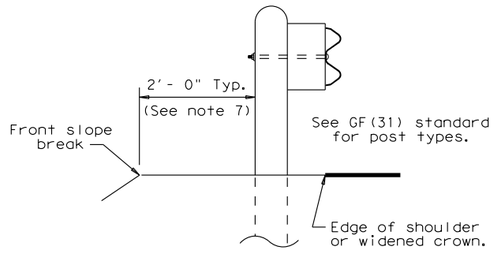
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



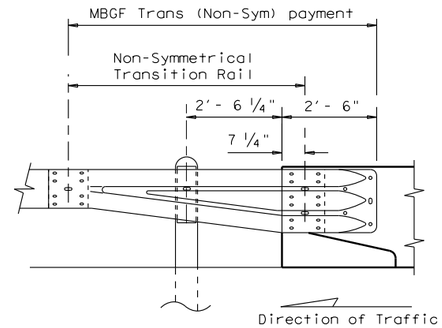
ONE WAY TRAFFIC

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

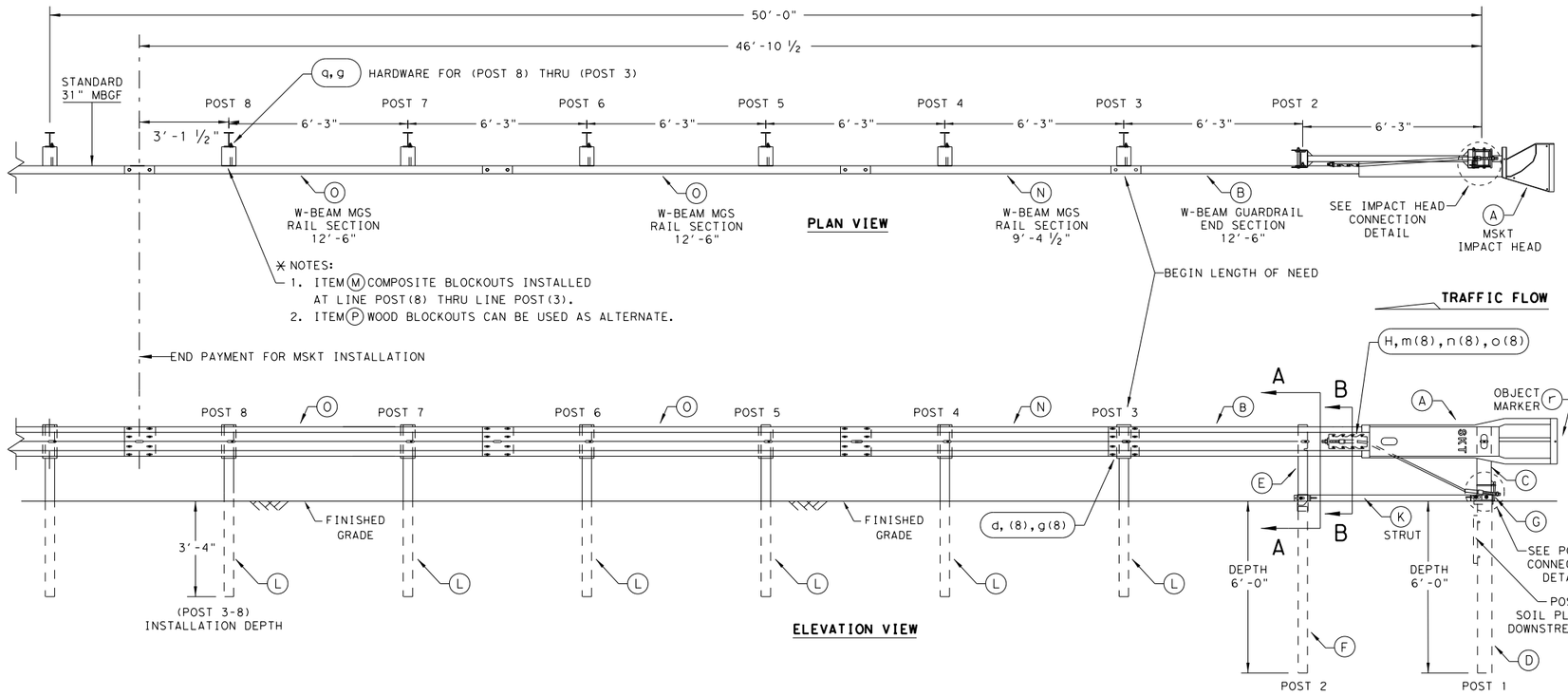
BRIDGE END DETAILS

(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	16	147, ETC	WHITTLE ST, ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		44

DATE: 9/7/2021 9:38:15 AM
FILE: ...\PAV\SMITH STD PAV\bed14.dgn



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

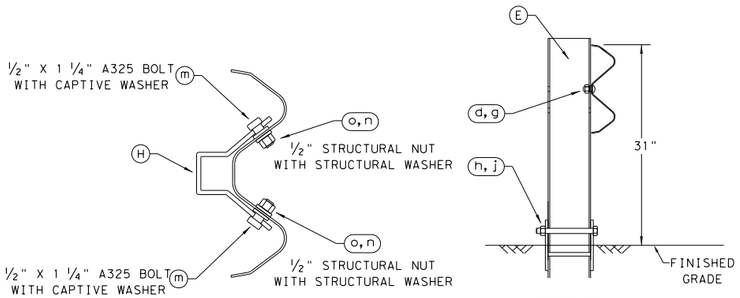
GENERAL NOTES

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.

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 1/8" 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 1/2")	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	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 3/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

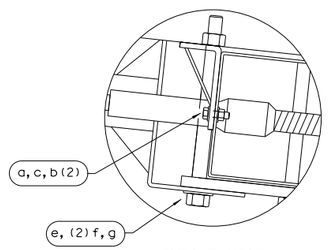
SEE NOTES: ✳

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

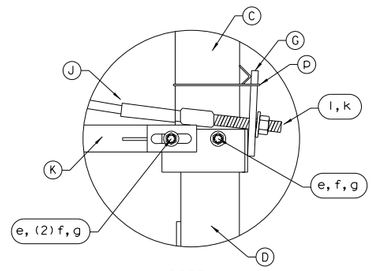


SECTION B-B
ANCHOR BRACKET

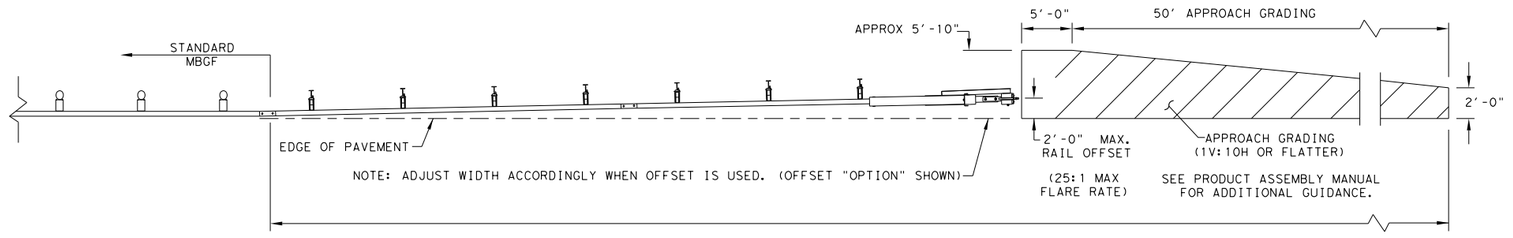
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



TRAFFIC FLOW

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

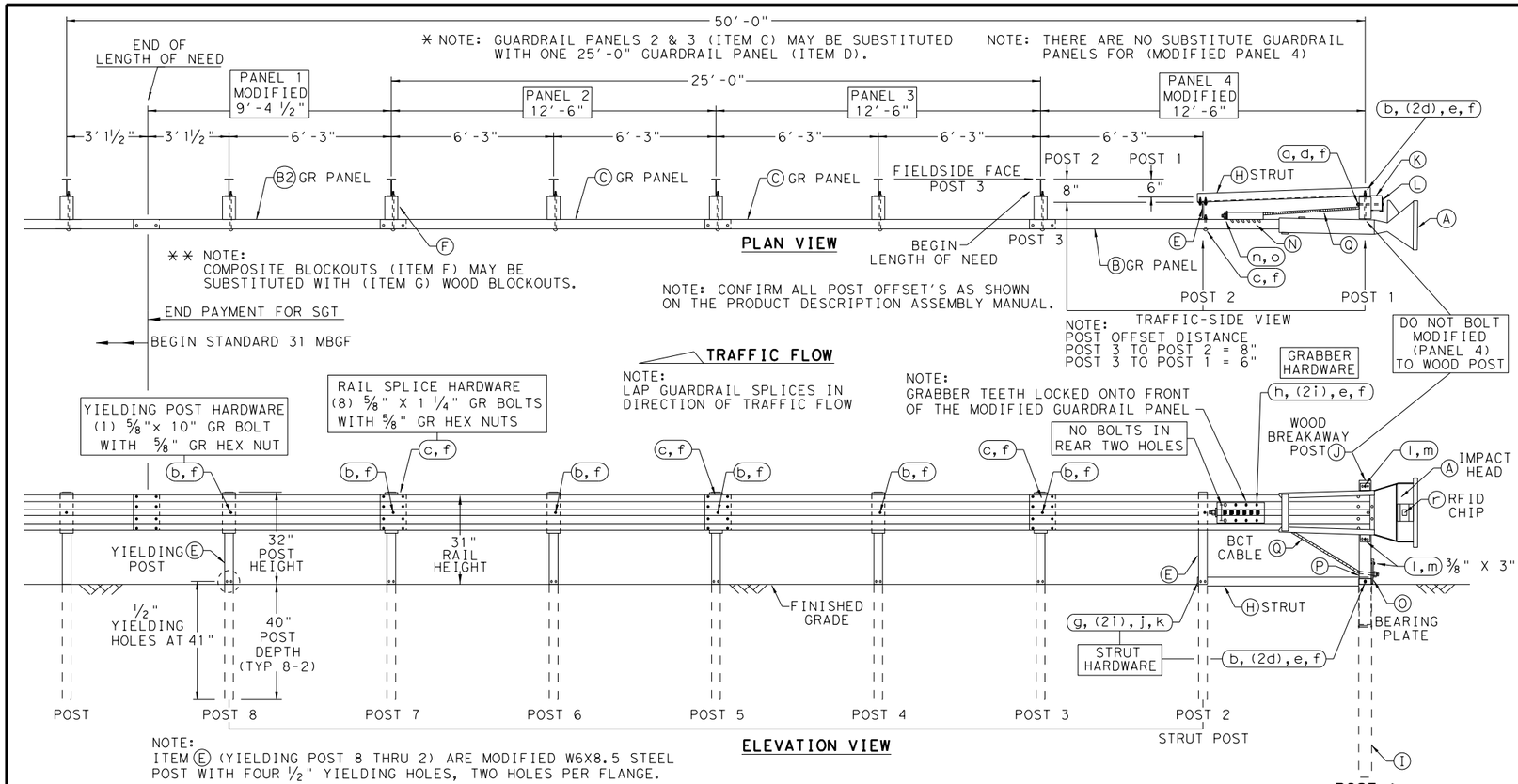
Design Division Standard

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

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL		
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC		
	DIST	COUNTY		SHEET NO.		
	TYL	SMITH		45		

DATE: 9/7/2021
FILE: ...\SMITH STD PAV\sgt12s3118.dgn

DATE: 9/7/2021
FILE: ...\SMITH STD PAV\sgt153120.dgn

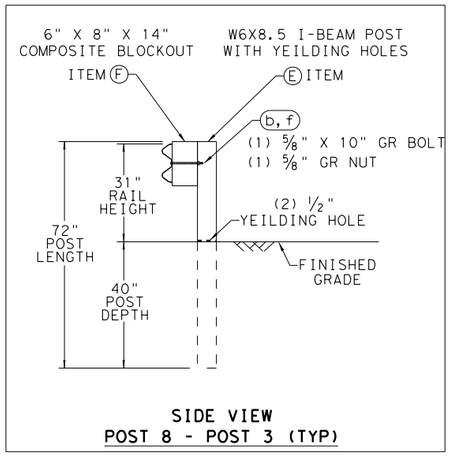


GENERAL NOTES

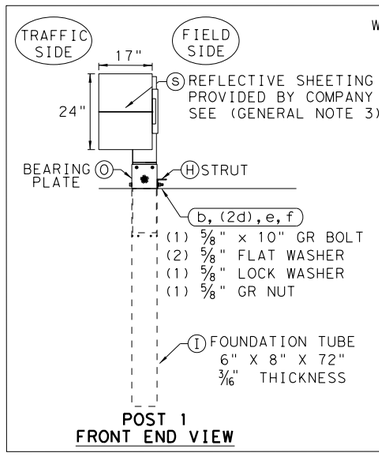
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

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

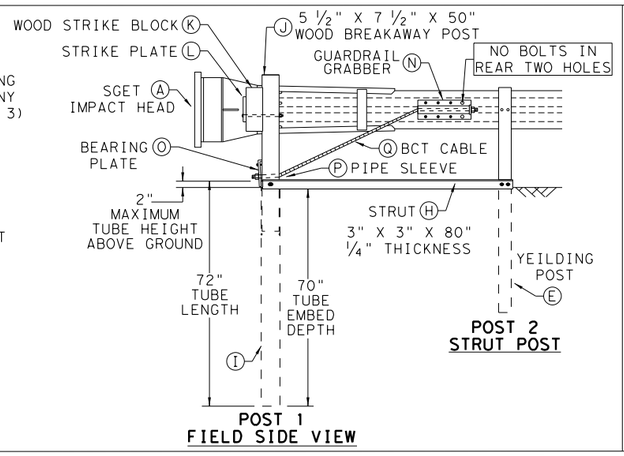
ALTERNATIVE ITEMS * D
ALTERNATIVE ITEMS ** G
NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

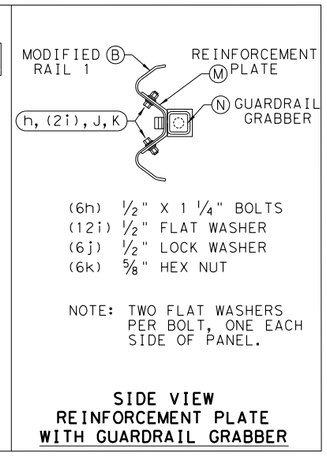


POST 1
FRONT END VIEW

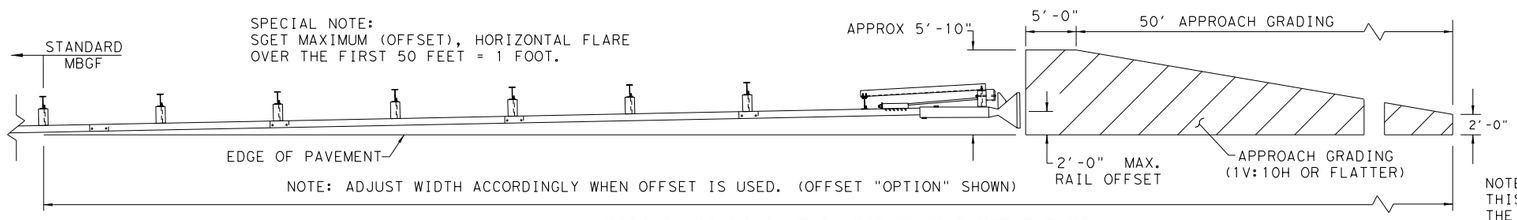


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

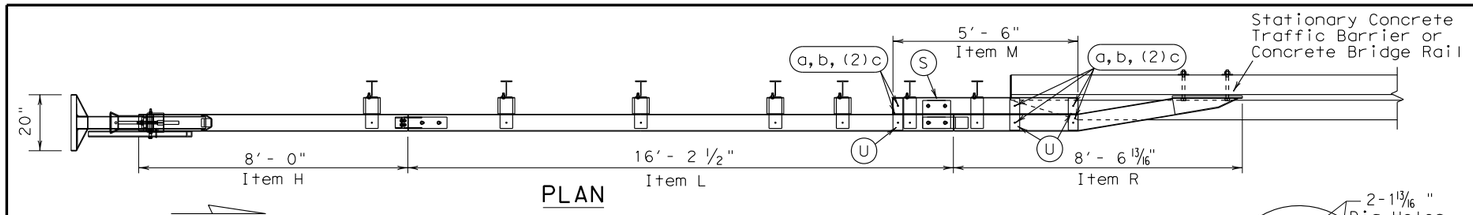
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

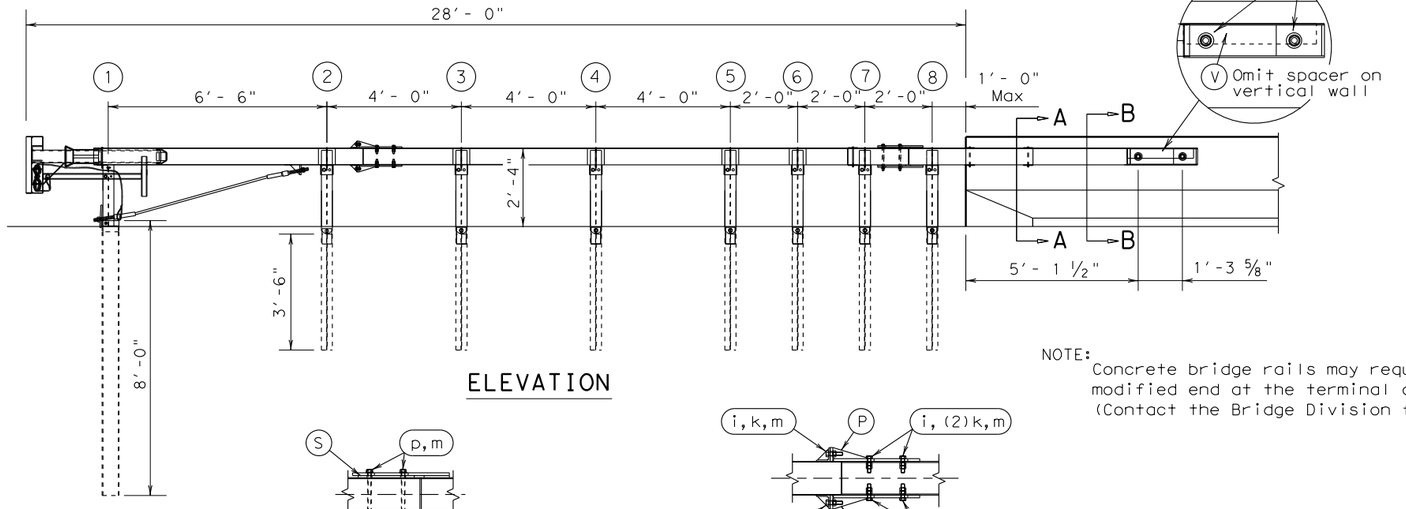
FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP		
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC		
	DIST	COUNTY		SHEET NO.		
	TYL	SMITH		46		

DATE: 9/7/2021
FILE: ...\PAV\SMITH STD PAV\sscc16.dgn



PLAN

Direction of Traffic

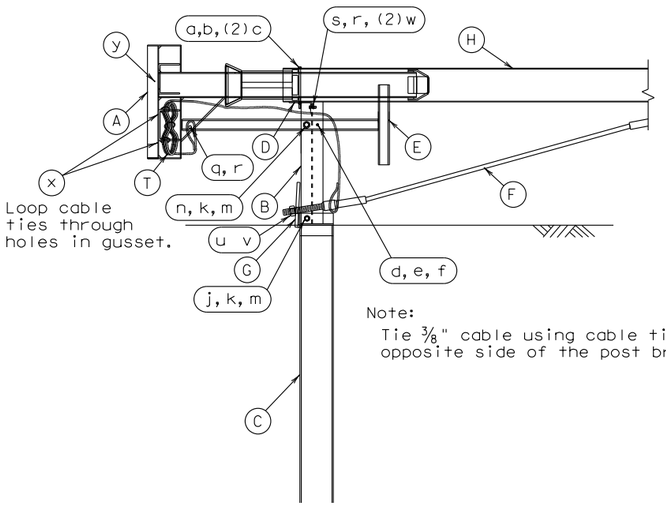


ELEVATION

NOTE:
Concrete bridge rails may require a modified end at the terminal connection. (Contact the Bridge Division for details.)

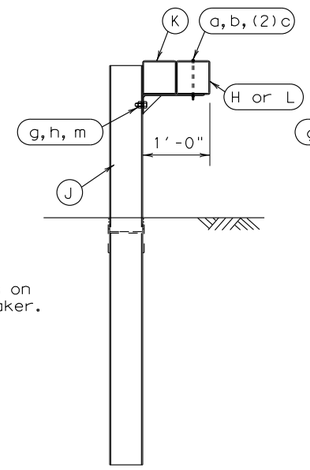
SPLICE PLATE DETAIL

END SPLICE PLATE DETAIL

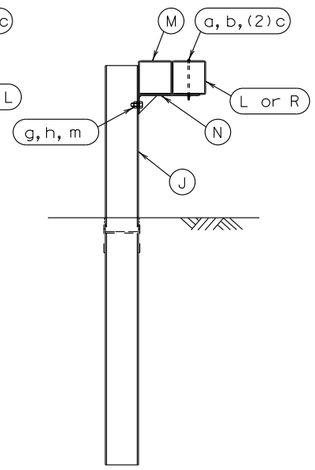


Note:
Tie ⅜" cable using cable ties on opposite side of the post breaker.

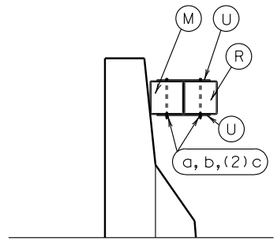
POSTS 1
IMPACT HEAD DETAIL



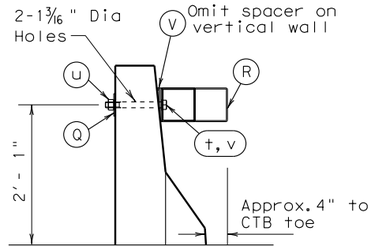
POSTS 2 THRU 6



POSTS 7 & 8



SECTION A-A



SECTION B-B

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Road Systems, Inc., at (330)346-0721. 3616 Old Howard County Airport. Big Springs, TX 79720
2. Due to the Single-Sided design, the BEAT-SSCC is not appropriate for use at locations where backside hits towards the rigid concrete barrier are possible, e.g. In gore areas, or in narrow median locations where backside opposite direction hits are likely.
3. All bolts, nuts, cable assemblies, cable anchors, bearing plate, tubing, post, impact heads, and other steel components shall be galvanized, unless otherwise noted.
4. The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
5. When site conditions permit, posts may be driven. The lower section of post #1 should not be driven with the upper post section attached. If posts are placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
6. If rock excavation is encountered, see manufacturer's installation booklet for installation recommendations.
7. Post shall not be set full depth in concrete.
8. The appropriate connection of the SSCC to the stationary rigid structure is a critical component to insure proper performance of the system. The length of the 1" bolts used to attach the system to the rigid structure will vary with the wall thickness and will need to be determined in the field.
9. The approach area in front of the SSCC and the area within the system itself shall be free of fixed obstacles greater than 4 inches in height and have a fill slope or a cut slope of 1V:10H or flatter.
10. Unless otherwise shown in the plans, SSCC rail placed in the vicinity of curbs shall be blocked out so that the face of curb is located directly below the face of rail. The steel posts shall be installed at the proper ground elevation above the gutter pan or roadway surface. Curbs located along or in front of the SSCC system shall not be greater than 4 inches in height.
11. An object marker shall be installed on the front of the impact head as detailed on D & OM(VIA).

ITEM	QTY	DESCRIPTION
A	1	Box-Beam Impact Head
B	1	Upper End Post (A1) W6 x 9 x 1′-9 ½" LG.
C	1	Lower End Post (A4) W6 x 15 x 8′-0" LG.
D	1	Support Bracket (B1) L4 x 2 x 4" LG.
E	1	Post Breaker (A2) Welded TS2 x 2 x ¼"
F	1	Cable Anchor Assembly
G	1	Cable Anchor Bearing Plate
H	1	End Tube Rail (A5) x 8′-0" LG.
J	7	Steel Breakaway Post W6 x 9 x 6′-0" LG.
K	5	Support Bracket w/ Blockout (A9) TS6 x 6 w/ Bent PL.
L	1	Second Rail (A11) x 16′-2 ½" LG.
M	1	Transition Blockout (A6) x 5′-6" LG.
N	2	Trans. Support Bracket (A10) ⅜" Bent PL. w/ Gusset
P	2	End Section Splice Plate (A3) - Detail Below
Q	2	1" Square Washer (B10) PL 4 x 4 x ¼"
R	1	Anchor Rail (A13) x 8′-6 13/16 "LG.
S	2	Splice Plate (A12) PL 10 x 10 x ⅜" Detail Below
T	1	⅜" GALV. Cable x 20′-0" (A14)
U	6	Tie Plate (C10) PL 11 ½" x 3 ½"x ⅜"
V	1	Spacer (D10) (OMIT ON VERTICAL WALL)
		HARDWARE
a	14	⅝" x 7 ½" Hex Bolt (A449)
b	14	⅝" Hex Nut
c	28	⅝" Washer
d	1	¼" x 3" Hex Bolt (A449)
e	1	¼" Hex Nut
f	1	¼" Washer
g	7	⅝" x 1 ½" Bolt (A307)
h	7	⅝" Recess Nut
j	8	⅝" x 2" Hex Bolt (A325 or A449)
j	1	⅝" x 8" Hex Bolt (A325 or A449)
k	18	⅝" Hex Nut
m	25	⅝" Washer
n	1	⅝" x 3" Hex Bolt (A325 or A449)
p	4	⅝" x 9" Hex Bolt (A325 or A449)
q	1	½" x 5" Hex Bolt (A325 or A449)
r	2	½" Hex Nut
s	1	½" x 2" Hex Bolt (A307, A325 or A449)
t	2	1" x 10"Hex Bolt(A325 or A449)(Length Varies w/Wall Sect)
u	4	1" Hex Nut (2H Heavy Hex Nut)
v	4	1" Washer Structural Washer
w	2	½" Washer
x	2	Cable Tie
y	1	Object Marker

Texas Department of Transportation

Design Division Standard

ROAD SYSTEMS INC CRASH CUSHION (BEAT)

SSCC-16

FILE: sscc16.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
©TxDOT April 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
REVISED 03,2016 (VP)	DIST	COUNTY		SHEET NO.
	TYL	SMITH		47

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC. #	N	W	N	W	N	W
1	N/A	39	CR 2110 BRIDGE WINGWALL	13+44 LT	TL-3	UNI	N/A	N/A	T223 BRIDGE RAIL	24"	2'-4"	28'	X								X	
2	N/A	39	CR 2110 BRIDGE WINGWALL	13+44 RT	TL-3	UNI	N/A	N/A	T223 BRIDGE RAIL	24"	2'-4"	28'	X								X	
												TOTALS										

LEGEND:

L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

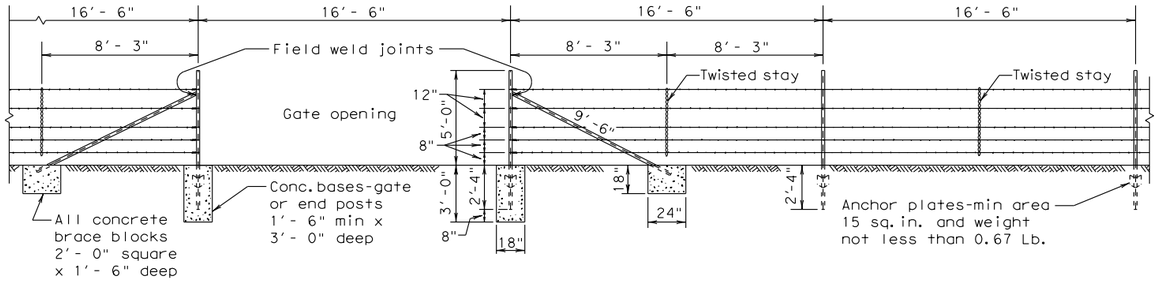
FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

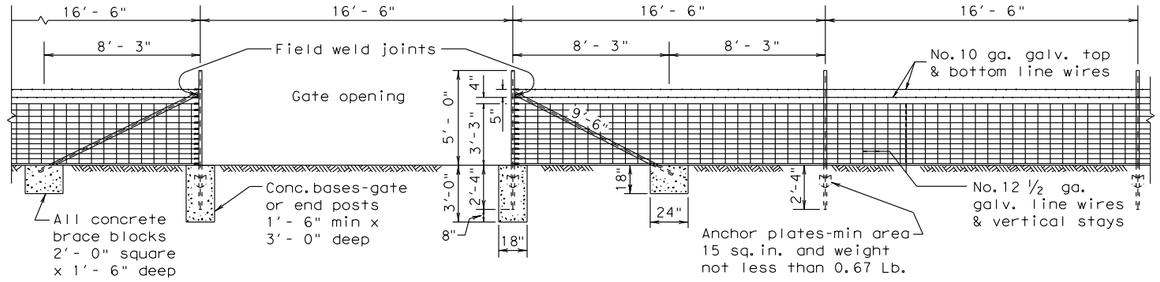
CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147, ETC	CR 2110
	DIST	COUNTY		
	TYL	SMITH		
	FEDERAL AID PROJECT			SHEET NO.
				48

FILE: ccss.dgn



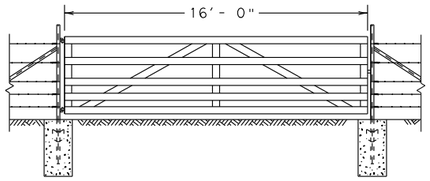
SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS
BRACING DETAIL USED AT ENDS AND GATES
TYPE "C" FENCE
(See General Note 8)



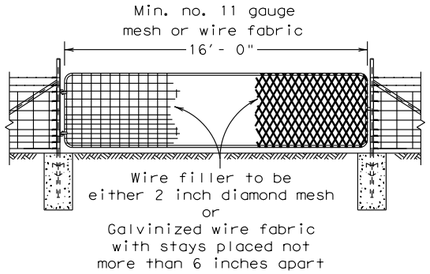
SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS
BRACING DETAIL USED AT ENDS AND GATES
TYPE "D" FENCE
(See General Note 8)

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

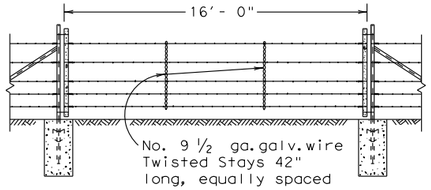
Metal gate shall consist of 5 panels not less than 4′- 4" high and shall be aluminum or galvanized metal and of good quality. Gate and hardware shall meet the approval of the engineer.



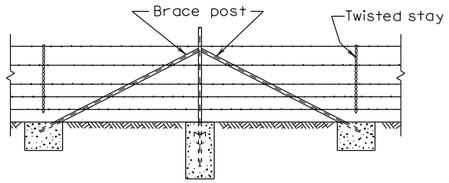
DETAIL TYPE 1 GATE



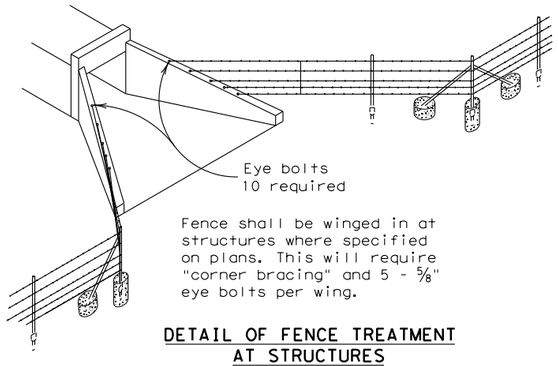
DETAIL TYPE 2 GATE



DETAIL TYPE 3 GATE

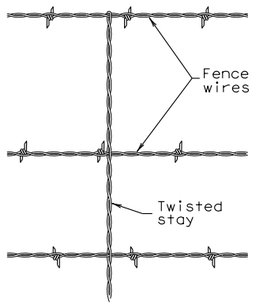


CORNER OR PULL POST ASSEMBLY

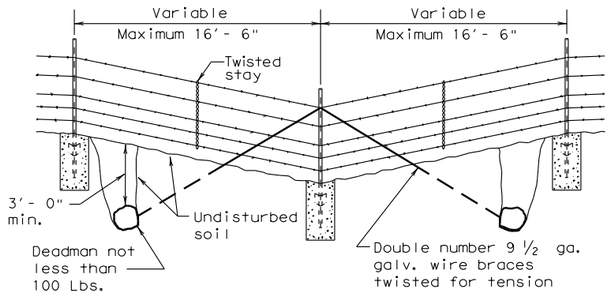


Fence shall be winged in at structures where specified on plans. This will require "corner bracing" and 5 - ⅝" eye bolts per wing.

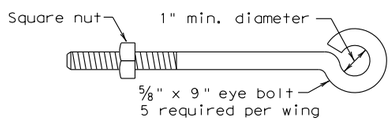
DETAIL OF FENCE TREATMENT AT STRUCTURES



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

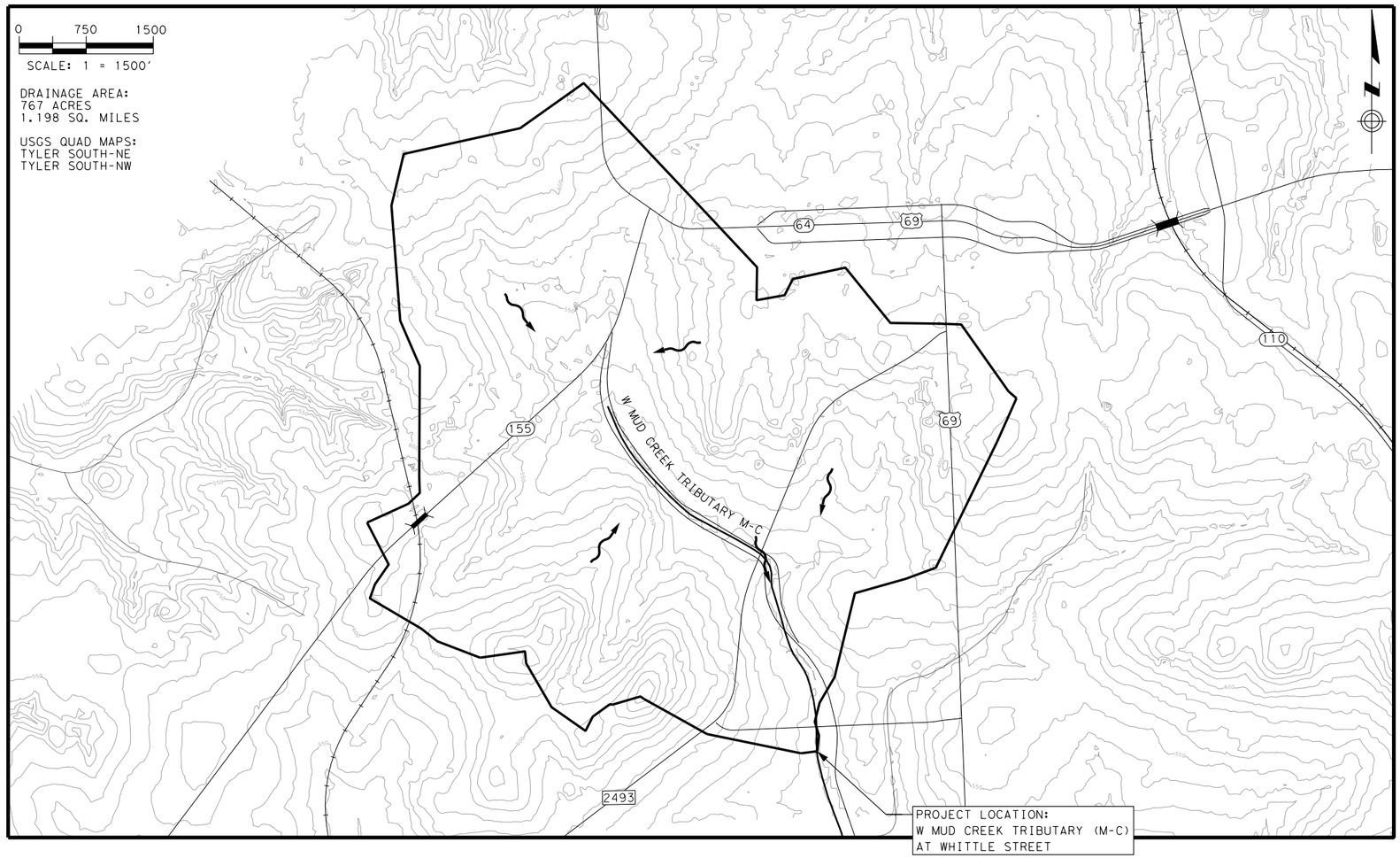
FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		49

DATE: 9/7/2021
FILE: ...\PAV\SMITH STD PAV\wf210.dgn

100% SUBMITTAL
DATE: 4/15/2021 TIME: 5:09:50 PM

HYDROLOGIC COMPUTATIONS																				
DRAINAGE AREA DATA							TR-55						REGIONAL REGRESSION							USED IN MODEL
DESIGN YEAR	AREA (SF)	AREA (ACRE)	AREA (SQ. MI)	L (MI)	DELTA ELEV (FT)	SL (FT/MI)	RAINFALL TYPE	SOIL GROUP	CURVE NUMBER	Tc (HR)	P (IN)	TR-55 Q (CFS)	a	b	c	d	e	*	REGRESSION Q (CFS)	FIS REPORT (CFS)
2	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	4.14	1300	50.98	-50.30	1.40	0.27	0.78	-0.006	300	1300
5	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	5.26	1800	16.62	-15.32	1.31	0.37	0.89	-0.022	500	1800
10	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	6.26	2100	13.62	-11.97	1.20	0.40	0.92	-0.029	600	2000
25	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	7.73	2900	11.79	-9.82	1.14	0.45	0.95	-0.037	900	2300
50	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	8.93	3400	11.17	-9.00	1.11	0.48	0.96	-0.042	1000	2600
100	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	10.30	4100	10.82	-8.45	1.07	0.51	0.97	-0.047	1900	2800
500	33425330	767	1.20	0.95	30.0	31.58	III	D	85	0.5	14.00	5700	10.40	-7.61	0.99	0.57	0.98	-0.055	2800	3400

DRAINAGE AREA MAP



NOTES:

1. WEST MUD CREEK TRIBUTARY M-C AT WHITTLE STREET IS A FEMA MAPPED ZONE AE SPECIAL FLOOD HAZARD AREA (SFHA) AS SHOWN ON FEMA PANEL 48423C0360D, EFFECTIVE DATE APRIL 16, 2014.
2. RATIONAL METHOD NOT COMPUTED BECAUSE DRAINAGE AREA > 200 ACRES.
3. OMEGA EM REGIONAL REGRESSION EQUATIONS FROM TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019.
4. WIN TR-55 VERSION 1.00.10 USED.
5. FIS REPORT 48423CV001B FLOW VALUES USED TO MATCH TYLER MASTER DRAINAGE PLAN.

STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED
PROFESSIONAL ENGINEER

APRIL 15, 2021

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

DRAINAGE AREA MAP AND HYDROLOGIC DATA
(WHITTLE ST @ W MUD CREEK TRIBUTARY M-C)

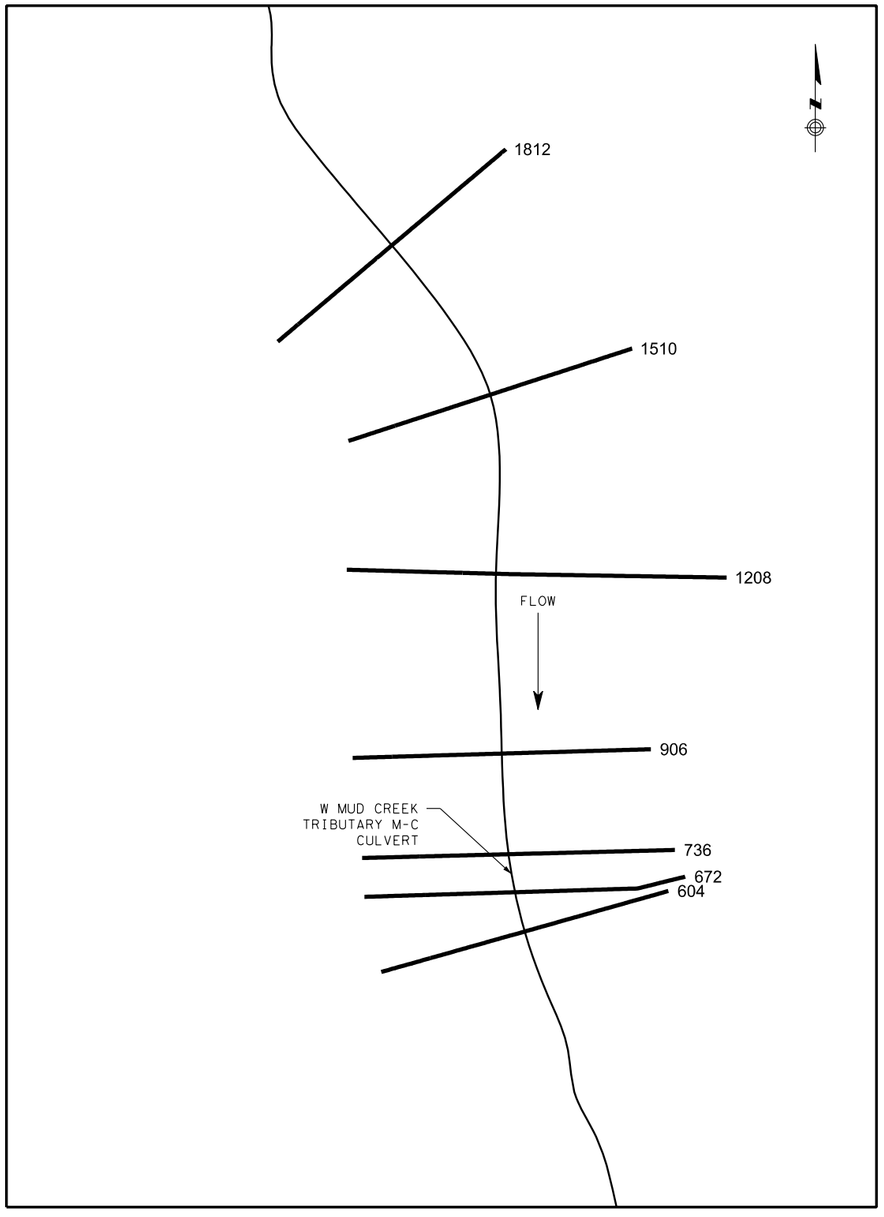
SHEET 1 OF 2

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST.	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	50

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_WHITTLE_DAM.dgn

100% SUBMITTAL

DATE: 4/15/2021 TIME: 5:09:54 PM

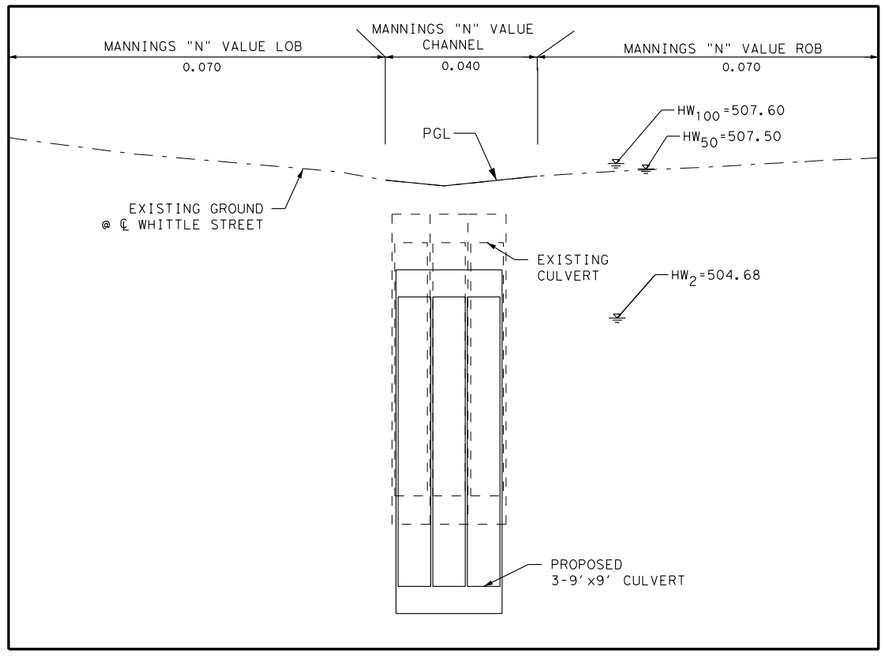


HEC-RAS CROSS SECTION LOCATIONS

CULVERT AT STATION 706

HYDRAULIC ANALYSIS												
	PROPOSED MODEL						EXISTING MODEL					
STATION	2 YEAR FLOW Q = 1300 CFS		50 YEAR FLOW Q = 2600 CFS		100 YEAR FLOW Q = 2800 CFS		2 YEAR FLOW Q = 1300 CFS		50 YEAR FLOW Q = 2600 CFS		100 YEAR FLOW Q = 2800 CFS	
	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)
1812	5.65	509.44	9.04	511.05	9.39	511.27	5.57	509.52	8.97	511.09	9.36	511.29
1510	6.03	508.82	8.96	510.18	9.34	510.36	5.80	508.97	8.75	510.29	9.19	510.43
1208	6.26	508.01	6.07	510.05	6.05	510.32	4.94	508.58	5.75	510.23	5.87	510.42
736	6.23	504.68	7.82	507.50	8.34	507.60	4.07	508.10	6.47	509.12	6.90	509.17
706 (CV U)	6.53	504.68	10.80	507.50	10.84	507.60	5.82	508.10	4.40	509.12	4.17	509.17
706 (CV D)	6.37	504.34	10.80	506.15	10.84	506.36	6.76	504.34	4.40	506.15	4.17	506.36
672	7.08	504.34	10.07	506.15	10.45	506.36	7.08	504.34	10.07	506.15	10.45	506.36
604	6.63	504.18	9.98	505.86	10.49	506.03	6.63	504.18	9.98	505.86	10.49	506.03

EXISTING HYDRAULIC OPENING AT W MUD CREEK TRIBUTARY (M-C) 189.00 SF
PROPOSED HYDRAULIC OPENING AT W MUD CREEK TRIBUTARY (M-C): 243.00 SF
EXISTING THRU CULVERT VELOCITY AT W MUD CREEK TRIBUTARY (M-C): 5.82 FT/SEC (2 YR)
PROPOSED THRU CULVERT VELOCITY AT W MUD CREEK TRIBUTARY (M-C): 6.53 FT/SEC (2 YR)



PROPOSED WHITTLE STREET PROFILE

NOTES:

1. ELEVATIONS SHOWN ARE BASED ON NAVD 88.
2. CRITICAL DEPTH COMPUTATION USED FOR DOWNSTREAM BOUNDARY CONDITION, SLOPE = 0.005981 FOR BOTH EXISTING AND PROPOSED MODELS.
3. THE MANNING'S N VALUES WERE DETERMINED BY IMAGING, AVAILABLE MAPPING, AND FIS REPORT 48423CV001B. THE CHANNEL IS LINED WITH CONCRETE, AND THE OVERBANKS ARE MOSTLY SHORT GRASS, WITH TREES NEAR WHITTLE ST.
4. GEO HEC-RAS VER 4.1.0 USED FOR ANALYSIS AND DESIGN.
5. HYDROLOGY AND HYDRAULICS FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR DOUG NICHOLSON ON SEPTEMBER 17TH, 2020.

STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED
PROFESSIONAL ENGINEER

APRIL 15, 2021

NOT TO SCALE

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

HYDRAULIC DATA SHEET
(WHITTLE ST @ W MUD CREEK TRIBUTARY M-C)

SHEET 2 OF 2

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST.	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC.	51

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_WHITTLE_HDS.dgn

100% SUBMITTAL
DATE: 4/15/2021 TIME: 5:24:06 PM

HYDROLOGIC COMPUTATIONS																				
DRAINAGE AREA DATA							TR-55						REGIONAL REGRESSION							USED IN MODEL
DESIGN YEAR	AREA (SF)	AREA (ACRE)	AREA (SQ. MI)	L (MI)	DELTA ELEV (FT)	SL (FT/MI)	RAINFALL TYPE	SOIL GROUP	CURVE NUMBER	Tc (HR)	P (IN)	TR-55 Q (CFS)	a	b	c	d	e	*	REGRESSION Q (CFS)	REGRESSION Q (CFS)
2	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	4.13	3100	50.98	-50.30	1.40	0.27	0.78	-0.006	750	750
5	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	5.27	4200	16.62	-15.32	1.31	0.37	0.89	-0.022	1500	1500
10	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	6.31	5200	13.62	-11.97	1.20	0.40	0.92	-0.029	2050	2050
25	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	7.85	6600	11.79	-9.82	1.14	0.45	0.95	-0.037	2950	2950
50	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	9.15	7700	11.17	-9.00	1.11	0.48	0.96	-0.042	3700	3700
100	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	10.60	9000	10.82	-8.45	1.07	0.51	0.97	-0.047	4600	4600
500	128589120	2952	4.61	2.92	120.0	41.10	III	C	89	1.5	14.70	12500	10.40	-7.61	0.99	0.57	0.98	-0.055	7100	7100

NOTES:

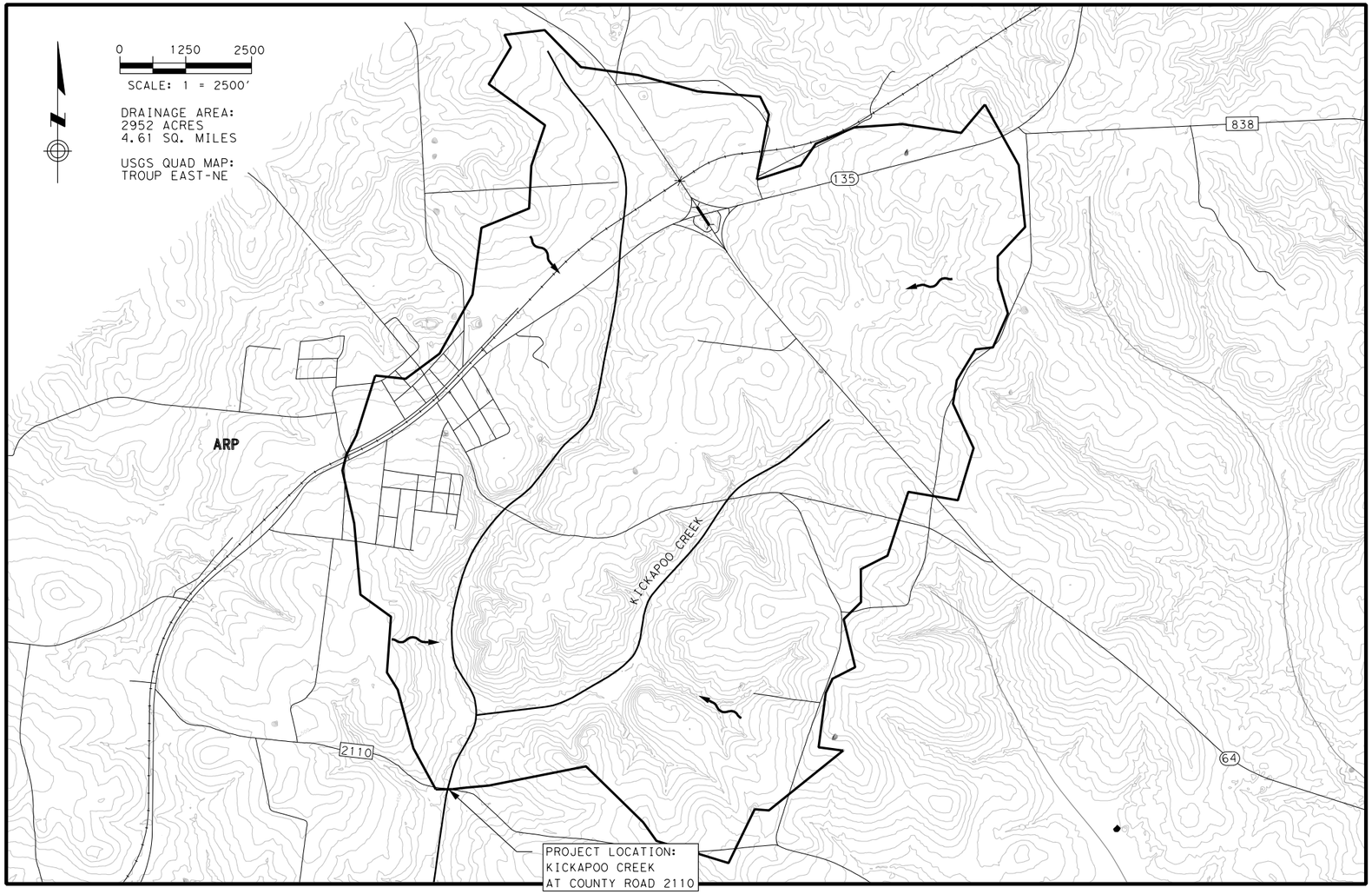
1. KICKAPOO CREEK AT COUNTY ROAD 2110 IS A FEMA MAPPED ZONE A SPECIAL FLOOD HAZARD AREA (SFHA) AS SHOWN ON FEMA PANEL 48423C0550C, EFFECTIVE DATE SEPTEMBER 26, 2008.

2. RATIONAL METHOD NOT COMPUTED BECAUSE DRAINAGE AREA > 200 ACRES.

3. OMEGA EM REGIONAL REGRESSION EQUATIONS FROM TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019.

4. WIN TR-55 VERSION 1.00.10 USED.

DRAINAGE AREA MAP



STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED PROFESSIONAL ENGINEER

APRIL 15, 2021

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

DRAINAGE AREA MAP AND HYDROLOGIC DATA (CR 2110 @ KICKAPOO CREEK)

SHEET 1 OF 3

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 2110	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	52

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR2110_DAM.dgn

100% SUBMITTAL

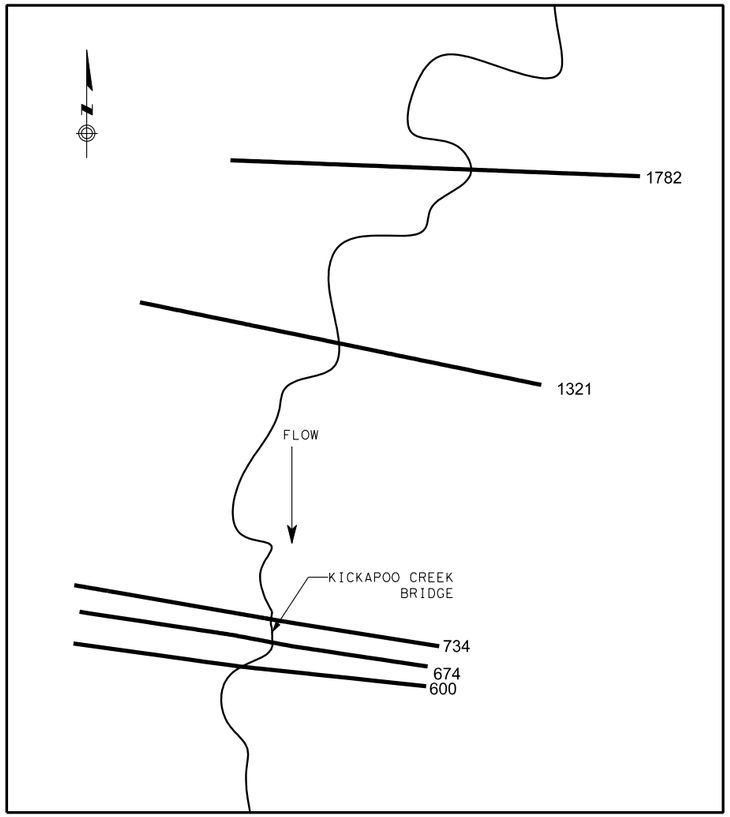
DATE: 4/15/2021 TIME: 5:10:12 PM

HYDRAULIC ANALYSIS												
	PROPOSED MODEL						EXISTING MODEL					
STATION	2 YEAR FLOW Q = 750 CFS		50 YEAR FLOW Q = 3700 CFS		100 YEAR FLOW Q = 4600 CFS		2 YEAR FLOW Q = 750 CFS		50 YEAR FLOW Q = 3700 CFS		100 YEAR FLOW Q = 4600 CFS	
	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)
1782	4.53	416.28	8.28	419.92	8.59	420.71	4.53	416.28	8.17	419.99	7.63	421.22
1321	4.79	415.04	7.26	418.77	7.10	419.86	4.80	415.04	6.86	419.02	6.00	420.72
734	5.95	410.43	8.05	417.07	6.78	419.16	4.75	410.66	6.55	418.08	5.12	420.48
709 (BR U)	5.68	410.44	10.01	416.25	12.44	416.76	5.17	410.56	10.50	416.62	12.33	417.80
709 (BR D)	6.05	410.19	10.07	415.97	12.44	416.03	6.47	410.15	12.99	415.09	15.67	415.32
674	10.34	408.70	12.48	414.81	12.48	415.82	10.34	408.70	12.48	414.81	12.48	415.82
600	2.85	408.07	4.66	414.50	4.98	415.63	2.94	407.93	5.12	413.79	5.51	414.86

EXISTING HYDRAULIC OPENING AT KICKAPOO CREEK: 320.00 SF
PROPOSED HYDRAULIC OPENING AT KICKAPOO CREEK: 369.18 SF
EXISTING THRU VELOCITY AT KICKAPOO CREEK: 5.17 FT/SEC (2 YR)
PROPOSED THRU VELOCITY AT KICKAPOO CREEK: 5.68 FT/SEC (2 YR)

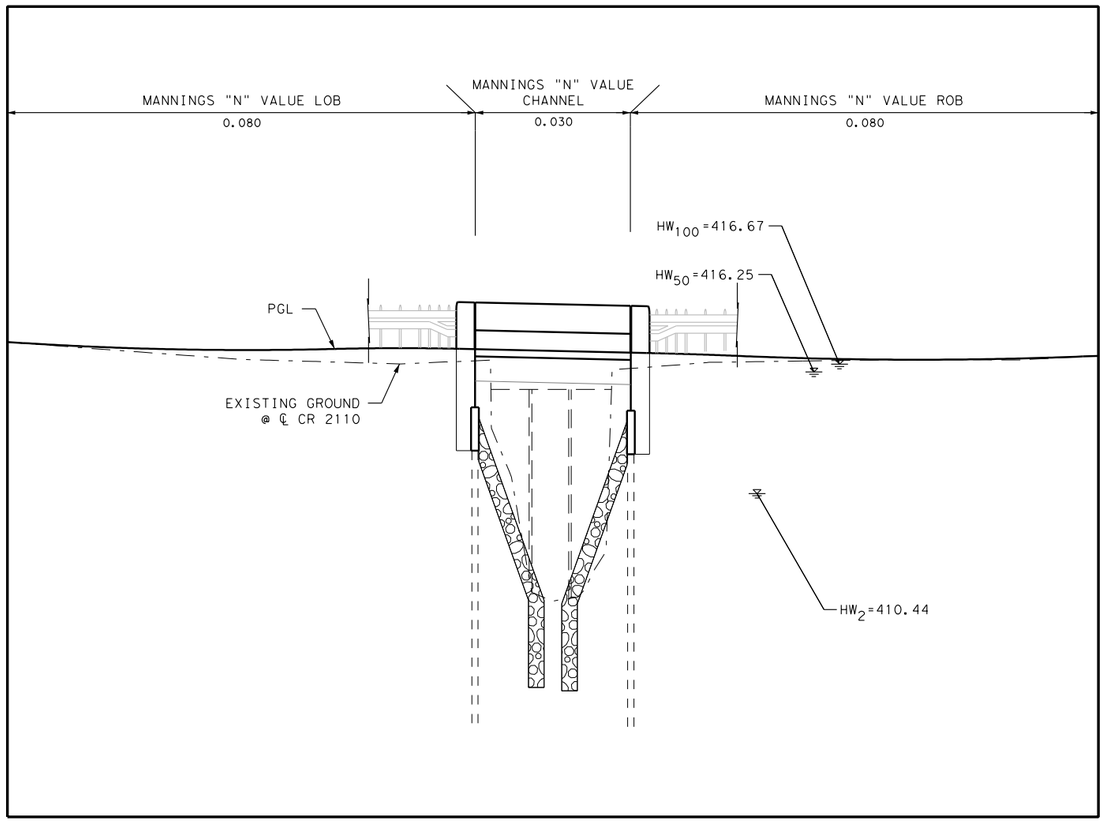
NOTES:

1. ELEVATIONS SHOWN ARE BASED ON NAVD 88.
2. CRITICAL DEPTH COMPUTATION USED FOR DOWNSTREAM BOUNDARY CONDITION, SLOPE = 0.007772 FOR BOTH EXISTING AND PROPOSED MODELS.
3. THE MANNING'S N VALUES WERE DETERMINED BY IMAGING, AVAILABLE MAPPING, AND FIS REPORT 48423CV001B. THE CHANNEL IS A NATURAL WINDING STREAM WITH SOME WEEDS AND STONES, AND THE OVERBANKS ARE MOSTLY GRASS AND TREES.
4. GEO HEC-RAS VER 4.1.0 USED FOR ANALYSIS AND DESIGN.
5. HYDROLOGY AND HYDRAULICS FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR DOUG NICHOLSON ON SEPTEMBER 17TH, 2020.



HEC-RAS CROSS SECTION LOCATIONS

BRIDGE AT STATION 709



PROPOSED COUNTY ROAD 2110 PROFILE

STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED
PROFESSIONAL ENGINEER

APRIL 15, 2021

NOT TO SCALE

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

HYDRAULIC DATA SHEET

(CR 2110 @ KICKAPOO CREEK)

SHEET 2 OF 3

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 2110	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC.	53

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR2110_HDS.dgn

100% SUBMITTAL

DATE: APR 15 2021 TIME: 5:10:31 PM

CRITICAL VELOCITY VARIABLES

INPUT	
UPSTREAM DEPTH OF FLOW (FT)	y
AVERAGE GRAIN SIZE (FT)	D50
COEFFICIENT	Ku
UPSTREAM VELOCITY (FT/S)	V
RESULT	
CRITICAL VELOCITY (FT/S)	Vc

CLEAR WATER IF Vc > V , LIVE BED IF Vc < V

LIVE-BED CONTRACTION SCOUR VARIABLES

INPUT	
UPSTREAM DEPTH OF FLOW (FT)	y1
BRIDGE DEPTH OF FLOW BEFORE SCOUR(FT)	y0
UPSTREAM FLOW (CFS)	Q1
BRIDGE FLOW (CFS)	Q2
UPSTREAM WIDTH	W1
BRIDGE WIDTH	W2
UPSTREAM SHEAR VELOCITY (G*Y1*S1)1/2 (FT/S)	V*
SLOPE OF ENERGY GRADE LINE	S1
FALL VELOCITY OF BED MATERIAL (FPS)	w
RATIO USED TO DETERMINE K1	V*/w
COEFFICIENT	k1
RESULT	
BRIDGE DEPTH OF FLOW AFTER SCOUR (FT)	y2
AVERAGE CONTRACTION SCOUR DEPTH (FT)	ys

CRITICAL VELOCITY CALCULATIONS

INPUT					RESULT	
FREQ	y	D50	Ku	V	Vc	SCOUR TYPE
2 YR	2.47	0.000656	11.17	4.79	1.13	LIVE BED
5 YR	3.09	0.000656	11.17	5.74	1.17	LIVE BED
10 YR	3.24	0.000656	11.17	6.17	1.18	LIVE BED
25 YR	3.79	0.000656	11.17	6.84	1.21	LIVE BED
50 YR	4.47	0.000656	11.17	7.26	1.25	LIVE BED
100 YR	5.56	0.000656	11.17	7.10	1.29	LIVE BED

LIVE-BED CONTRACTION SCOUR CALCULATIONS

INPUT												RESULT	
FREQ	y1	y0	Q1	Q2	W1	W2	V*	S1	w	V*/w	k1	y2	ys
2 YR	2.47	4.06	750	750	63.68	32.71	0.48	0.002838	0.0892	5.3812	0.69	3.91	**0.0#**
5 YR	3.09	5.33	1500	1500	83.27	42.21	0.55	0.003017	0.0892	6.1659	0.69	4.95	**0.0#**
10 YR	3.24	5.98	2050	2050	102.84	47.07	0.58	0.003268	0.0892	6.5022	0.69	5.56	**0.0#**
25 YR	3.79	7.43	2950	2950	113.31	47.50	0.63	0.003264	0.0892	7.0628	0.69	6.90	**0.0#**
50 YR	4.47	7.38	3700	3700	113.31	50.00	0.65	0.002954	0.0892	7.2870	0.69	7.86	**0.5**
100 YR	5.56	7.38	4500	4600	113.31	50.00	0.61	0.002107	0.0892	6.8386	0.69	9.96	**2.6**

NOTES:

1. SCOUR COMPUTATIONS PERFORMED ACCORDING TO FHWA HEC-18 PROCEDURES (APRIL 2012).

2. SECTION AT RIVER STATION 1321 USED AS UPSTREAM SECTION.

3. ABUTMENTS WILL BE PROTECTED AGAINST SCOUR WITH RIPRAP - ABUTMENT SCOUR WAS NOT CALCULATED PER TxDOT GEOTECHNICAL MANUAL (03/2018).

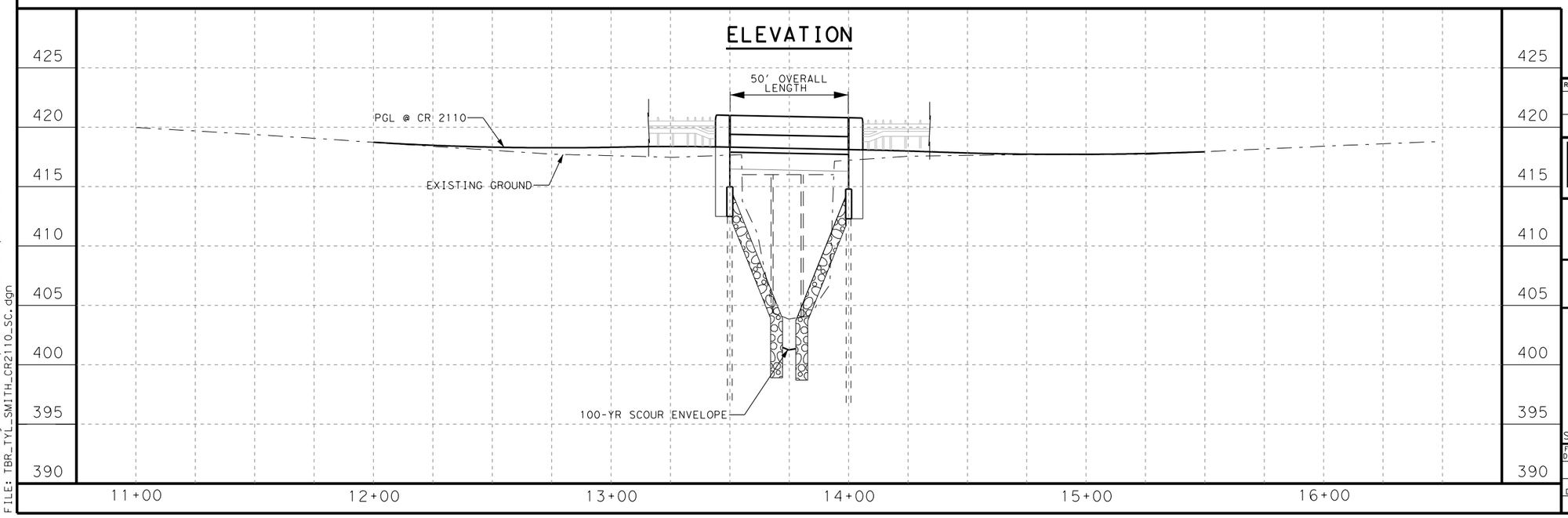
4. LEFT AND RIGHT OUTERBANK SCOUR WAS NOT CALCULATED BECAUSE BRIDGE DOES NOT SPAN LEFT OR RIGHT OUTERBANKS.

5. BRIDGE FOUNDATION DESIGNED TO WITHSTAND 100-YEAR FLOOD.

6. D50 LIMITED TO 0.000656 FT FOR COHESIVE MATERIALS PER TxDOT GEOTECHNICAL MANUAL (03/2018).

CALCULATED CONTRACTION SCOUR IS NEGATIVE.

ELEVATION



STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED
PROFESSIONAL ENGINEER

APRIL 15, 2021

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

SCOUR COMPUTATIONS (CR 2110 @ KICKAPOO CREEK)

SCALE: 1"=50'H, 1"=10'V SHEET 3 OF 3

FED. RD DIV. No.	STATE	PROJECT No.	HIGHWAY No.
6	TEXAS	SEE TITLE SHEET	CR 2110

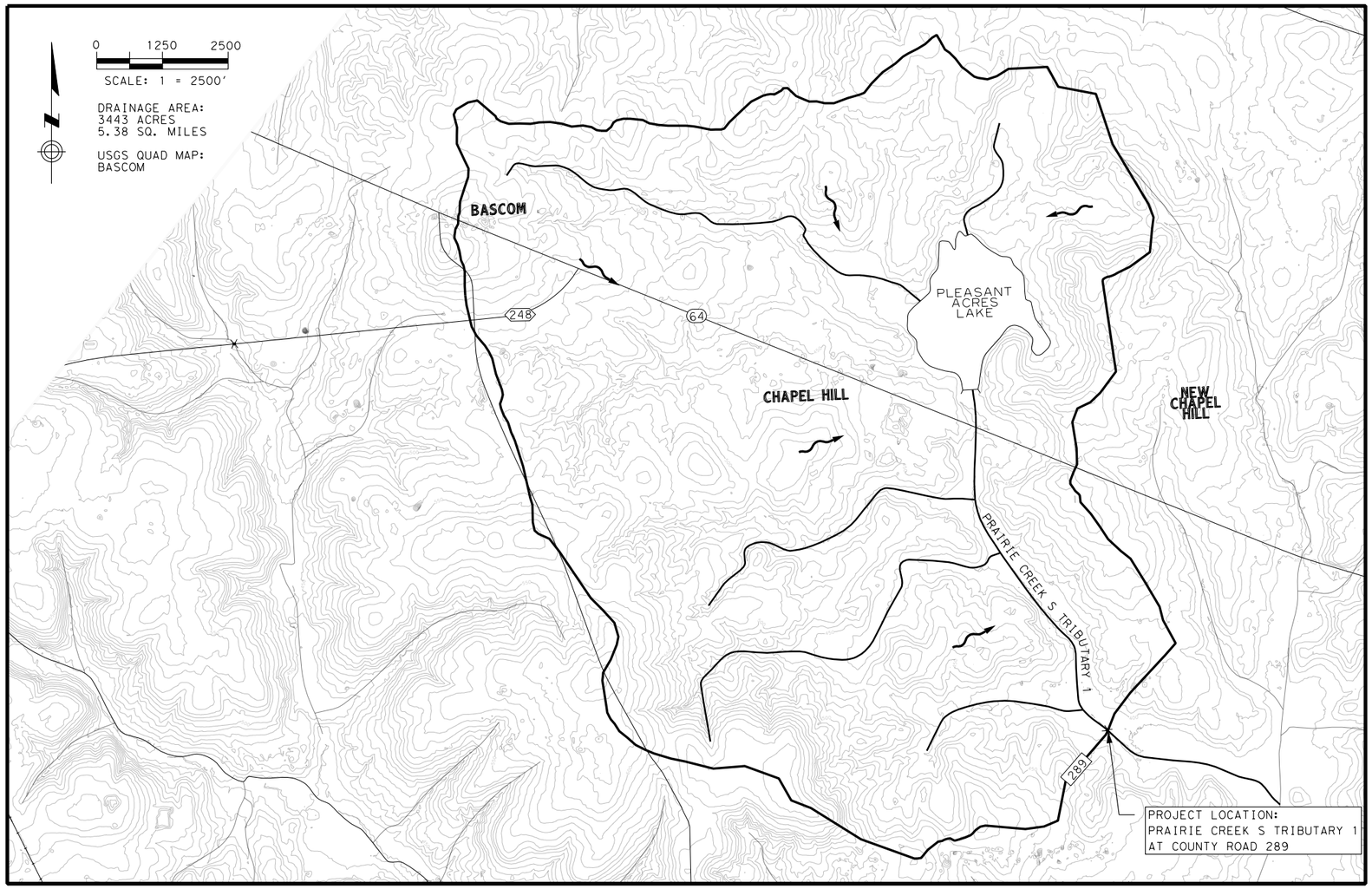
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	54

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR2110_SC.dgn

100% SUBMITTAL
DATE: 4/15/2021 TIME: 5:10:42 PM

HYDROLOGIC COMPUTATIONS																				
DRAINAGE AREA DATA							TR-55						REGIONAL REGRESSION							USED IN MODEL
DESIGN YEAR	AREA (SF)	AREA (ACRE)	AREA (SQ. MI)	L (MI)	DELTA ELEV (FT)	SL (FT/MI)	RAINFALL TYPE	SOIL GROUP	CURVE NUMBER	Tc (HR)	P (IN)	TR-55 Q (CFS)	a	b	c	d	e	*	REGRESSION Q (CFS)	REGRESSION Q (CFS)
2	149977080	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	4.14	1023	50.98	-50.30	1.40	0.27	0.78	-0.006	800	800
5	132174979	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	5.26	1821	16.62	-15.32	1.31	0.37	0.89	-0.022	1600	1600
10	132174979	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	6.28	2630	13.62	-11.97	1.20	0.40	0.92	-0.029	2200	2200
25	132174979	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	7.78	3903	11.79	-9.82	1.14	0.45	0.95	-0.037	3150	3150
50	132174979	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	9.02	5012	11.17	-9.00	1.11	0.48	0.96	-0.042	4000	4000
100	132174979	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	10.40	6325	10.82	-8.45	1.07	0.51	0.97	-0.047	5000	5000
500	132174979	3443	5.38	3.35	150.0	44.79	III	B	64	1.7	14.30	9984	10.40	-7.61	0.99	0.57	0.98	-0.055	7800	7800

DRAINAGE AREA MAP



NOTES:

1. PRAIRIE CREEK S TRIBUTARY 1 AT COUNTY ROAD 289 IS A FEMA MAPPED ZONE AE SPECIAL FLOOD HAZARD AREA (SFHA) AS SHOWN ON FEMA PANEL 48423C0395D, EFFECTIVE DATE APRIL 16, 2014.
2. RATIONAL METHOD NOT COMPUTED BECAUSE DRAINAGE AREA > 200 ACRES.
3. OMEGA EM REGIONAL REGRESSION EQUATIONS FROM TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019.
4. WIN TR-55 VERSION 1.00.10 USED.

STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED
PROFESSIONAL ENGINEER
APRIL 15, 2021

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

DRAINAGE AREA MAP AND HYDROLOGIC DATA

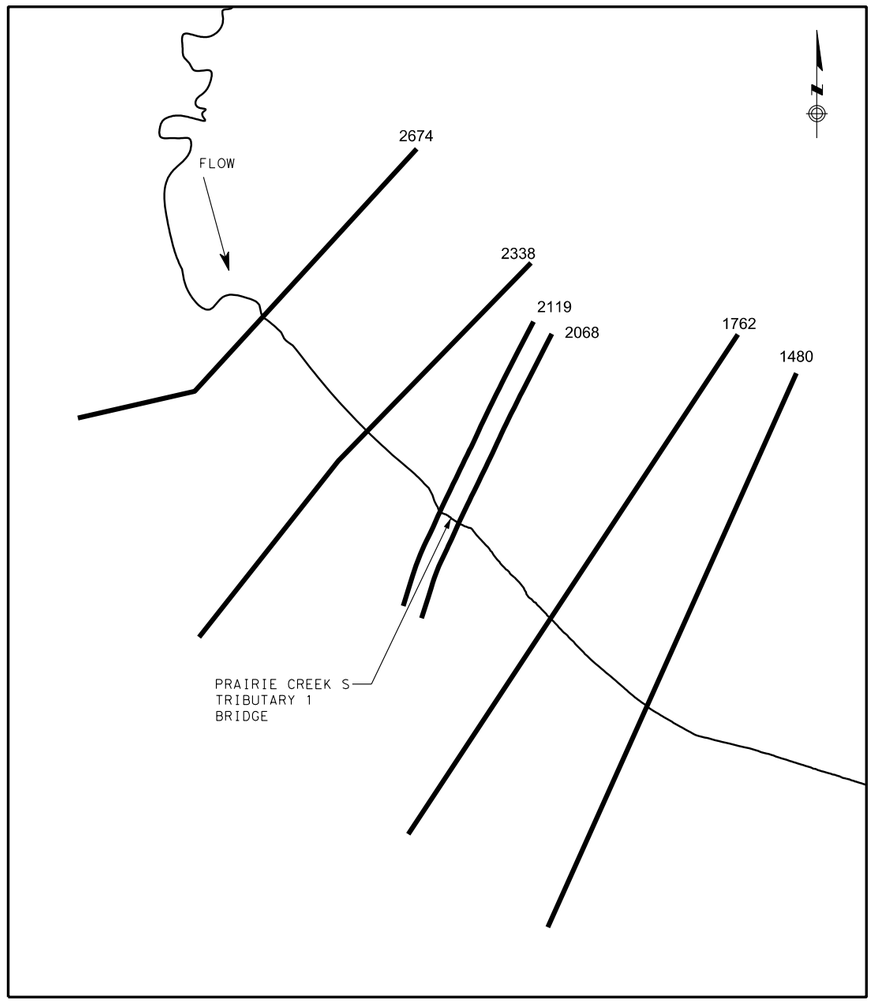
(CR 289 @ PRAIRIE CREEK S TRIBUTARY 1)

SHEET 1 OF 3

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 289	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	55

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR289_DAM.dgn

100% SUBMITTAL
DATE: 4/15/2021 TIME: 5:10:55 PM

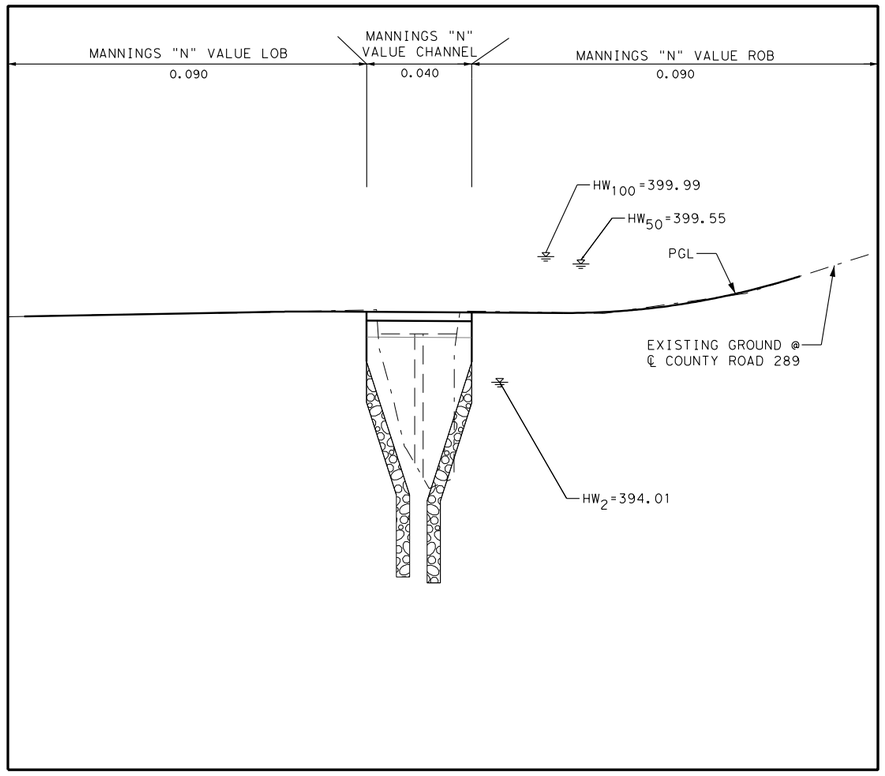


HEC-RAS CROSS SECTION LOCATIONS

BRIDGE AT STATION 2086

HYDRAULIC ANALYSIS												
	PROPOSED MODEL						EXISTING MODEL					
STATION	2 YEAR FLOW Q = 800 CFS		50 YEAR FLOW Q = 4000 CFS		100 YEAR FLOW Q = 5000 CFS		2 YEAR FLOW Q = 800 CFS		50 YEAR FLOW Q = 4000 CFS		100 YEAR FLOW Q = 5000 CFS	
	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)	V (FT/S)	WSEL (FT)
2674	2.85	396.94	3.88	399.96	4.23	400.46	2.92	396.91	3.78	400.05	4.20	400.50
2338	3.48	394.79	2.60	399.70	2.97	400.18	3.33	394.84	2.54	399.82	2.95	400.22
2119	4.51	394.01	3.83	399.55	4.37	399.99	4.33	394.14	3.71	399.67	4.31	400.04
2086 (BR U)	4.31	393.92	3.33	399.43	3.43	399.84	5.44	393.86	5.31	399.47	5.75	399.82
2086 (BR D)	4.79	393.42	4.93	398.59	7.63	398.31	5.39	393.73	8.52	398.55	9.28	398.80
2068	3.92	393.48	12.43	395.90	10.36	397.37	5.18	393.73	9.99	397.03	10.82	397.44
1762	0.38	392.79	4.16	394.76	4.76	395.17	0.38	392.79	4.16	394.76	4.76	395.17
1480	1.10	391.79	3.13	393.55	3.72	393.91	1.10	391.79	3.13	393.55	3.72	393.91

EXISTING HYDRAULIC OPENING AT PRAIRE CREEK S TRIBUTARY 1: 218.32 SF
PROPOSED HYDRAULIC OPENING AT PRAIRE CREEK S TRIBUTARY 1: 253.72 SF
EXISTING THRU VELOCITY AT PRAIRE CREEK S TRIBUTARY 1: 5.44 FT/SEC (2 YR)
PROPOSED THRU VELOCITY AT PRAIRE CREEK S TRIBUTARY 1: 4.31 FT/SEC (2 YR)



PROPOSED COUNTY ROAD 289 PROFILE

NOTES:

1. ELEVATIONS SHOWN ARE BASED ON NAVD 88.
2. CRITICAL DEPTH COMPUTATION USED FOR DOWNSTREAM BOUNDARY CONDITION, SLOPE = 0.008483 FOR BOTH EXISTING AND PROPOSED MODELS.
3. THE MANNING'S N VALUES WERE DETERMINED BY IMAGING, AVAILABLE MAPPING, AND FIS REPORT 48423CV001B. THE CHANNEL IS A NATURAL WINDING STREAM WITH SOME WEEDS AND STONES AND POOLS, AND THE OVERBANKS ARE MOSTLY GRASS AND TREES.
4. GEO HEC-RAS VER 4.1.0 USED FOR ANALYSIS AND DESIGN.
5. EXISTING AND PROPOSED ROADWAYS OVERTOPPED IN 50-YEAR AND 100-YEAR EVENTS.
6. HYDROLOGY AND HYDRAULICS FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR DOUG NICHOLSON ON SEPTEMBER 17TH, 2020.

STATE OF TEXAS
AMBER R. MCCULLOUGH
132954
LICENSED PROFESSIONAL ENGINEER
APRIL 15, 2021

NOT TO SCALE

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

HYDRAULIC DATA SHEET

(CR 289 @ PRAIRIE CREEK S TRIBUTARY 1)

SHEET 2 OF 3

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET			CR 289	
STATE DISTRICT	COUNTY		CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH		0910	16	147,ETC.	56

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR289_HDS.dgn

100% SUBMITTAL

DATE: 5/19/2021 TIME: 10:33:08 AM

CRITICAL VELOCITY VARIABLES

INPUT	
UPSTREAM DEPTH OF FLOW (FT)	y
AVERAGE GRAIN SIZE (FT)	D50
COEFFICIENT	Ku
UPSTREAM VELOCITY (FT/S)	V
RESULT	
CRITICAL VELOCITY (FT/S)	Vc

CLEAR WATER IF Vc > V , LIVE BED IF Vc < V

LIVE-BED CONTRACTION SCOUR VARIABLES

INPUT	
UPSTREAM DEPTH OF FLOW (FT)	y1
BRIDGE DEPTH OF FLOW BEFORE SCOUR(FT)	y0
UPSTREAM FLOW (CFS)	Q1
BRIDGE FLOW (CFS)	Q2
UPSTREAM WIDTH	W1
BRIDGE WIDTH	W2
UPSTREAM SHEAR VELOCITY (G*Y1*S1)1/2 (FT/S)	V*
SLOPE OF ENERGY GRADE LINE	S1
FALL VELOCITY OF BED MATERIAL (FPS)	w
RATIO USED TO DETERMINE K1	V*/w
COEFFICIENT	k1
RESULT	
BRIDGE DEPTH OF FLOW AFTER SCOUR (FT)	y2
AVERAGE CONTRACTION SCOUR DEPTH (FT)	ys

CRITICAL VELOCITY CALCULATIONS

INPUT					RESULT	
FREQ	y	D50	Ku	V	Vc	SCOUR TYPE
2 YR	2.19	0.000656	11.17	3.48	1.11	LIVE BED
5 YR	4.00	0.000656	11.17	2.47	1.22	LIVE BED
10 YR	5.76	0.000656	11.17	1.93	1.30	LIVE BED
25 YR	6.97	0.000656	11.17	2.11	1.34	LIVE BED
50 YR	7.11	0.000656	11.17	2.60	1.35	LIVE BED
100 YR	7.58	0.000656	11.17	2.97	1.36	LIVE BED

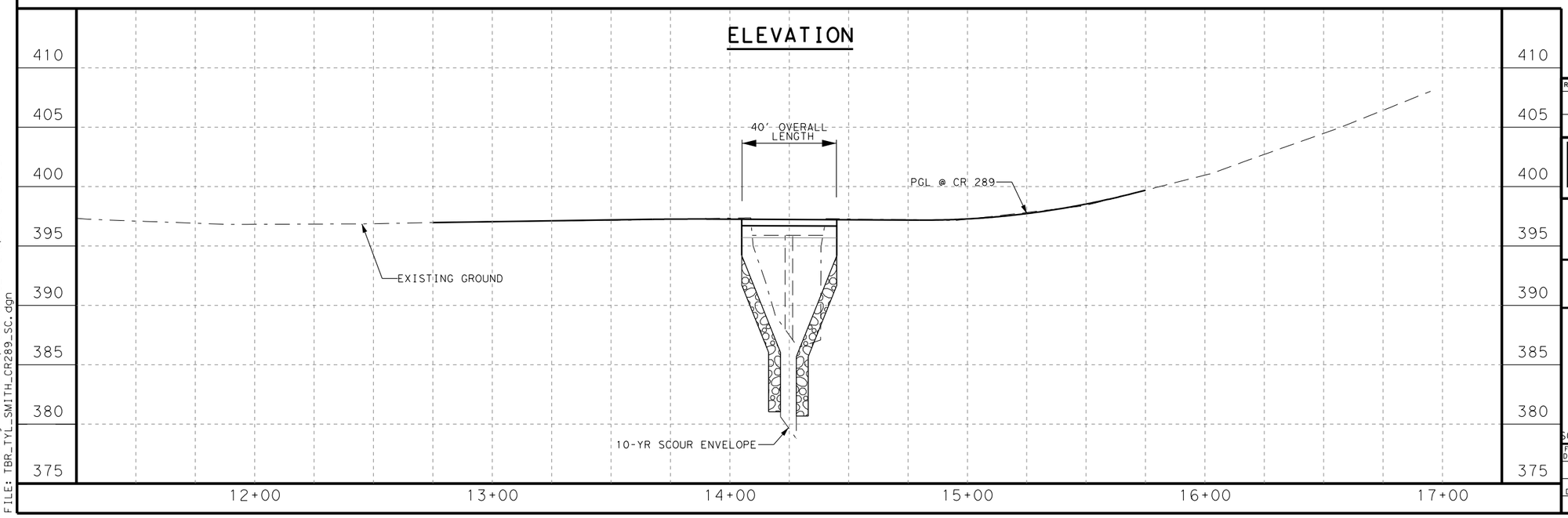
LIVE-BED CONTRACTION SCOUR CALCULATIONS

INPUT												RESULT	
FREQ	y1	y0	Q1	Q2	W1	W2	V*	S1	w	V*/w	k1	y2	**ys**
2 YR	2.19	4.68	350	800	46.68	38.85	0.48	0.003221	0.0197	24.3655	0.69	5.05	**0.4**
5 YR	4.00	6.30	450	1600	46.68	40.00	0.31	0.000728	0.0197	15.7360	0.69	13.19	**6.9**
10 YR	5.76	5.29	500	1500	46.48	55.10	0.22	0.000273	0.0197	11.1675	0.69	13.13	**7.9**
25 YR	6.97	6.75	700	1000	46.48	55.10	0.24	0.000255	0.0197	12.1827	0.69	8.41	**1.7**
50 YR	7.11	6.79	850	1250	46.48	55.10	0.29	0.000374	0.0197	14.7208	0.69	8.80	**2.1**
100 YR	7.58	7.21	1050	1350	46.48	55.10	0.33	0.000450	0.0197	16.7513	0.69	8.36	**1.2**

NOTES:

1. SCOUR COMPUTATIONS PERFORMED ACCORDING TO FHWA HEC-18 PROCEDURES (APRIL 2012).
2. SECTION AT RIVER STATION 2338 USED AS UPSTREAM SECTION.
3. ABUTMENTS WILL BE PROTECTED AGAINST SCOUR WITH RIPRAP - ABUTMENT SCOUR WAS NOT CALCULATED PER TxDOT GEOTECHNICAL MANUAL (03/2018).
4. LEFT AND RIGHT OUTERBANK SCOUR WAS NOT CALCULATED BECAUSE BRIDGE DOES NOT SPAN LEFT OR RIGHT OUTERBANKS.
5. BRIDGE FOUNDATION DESIGNED TO WITHSTAND 100-YEAR FLOOD.
6. D50 LIMITED TO 0.000656 FT FOR COHESIVE MATERIALS PER TxDOT GEOTECHNICAL MANUAL (03/2018).

ELEVATION



STATE OF TEXAS
ZACHARY VERMILLION
113558
LICENSED
PROFESSIONAL ENGINEER

MAY 19, 2021

REV. No.	DATE	REVISION	BY

Ramos Consulting, LLC
6720 VAUGHT RANCH RD, SUITE 140
AUSTIN, TEXAS 78730
(512) 291-1700
TBPE REG. # F-14256

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

SCOUR COMPUTATIONS

(CR 289 @ PRAIRIE CREEK S TRIBUTARY 1)

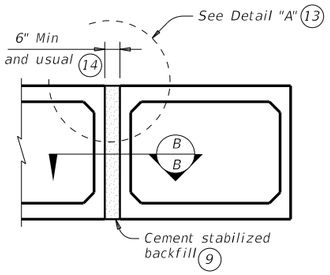
SCALE: 1"=50'H, 1"=10'V SHEET 3 OF 3

FED. RD DIV. No.	STATE	PROJECT No.	HIGHWAY No.
6	TEXAS	SEE TITLE SHEET	CR 289

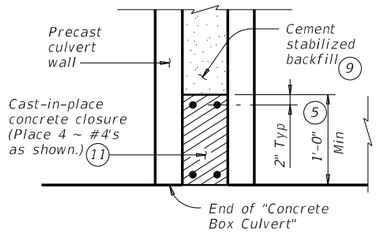
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	57

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR289_SC.dgn

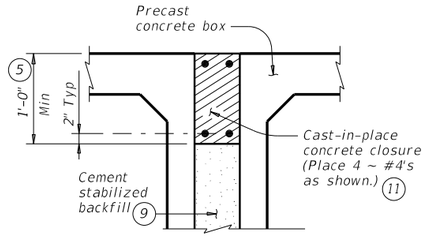
DATE: 5/20/2021 8:53:36 AM
FILE: scpmdsts-20.dgn



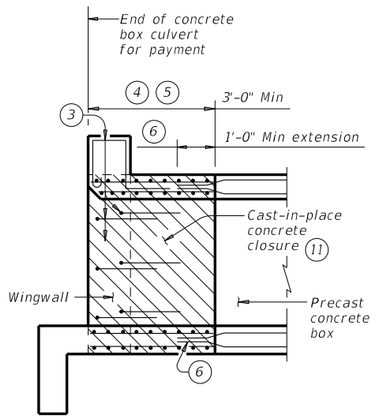
MULTIPLE UNIT PLACEMENT



SECTION B-B

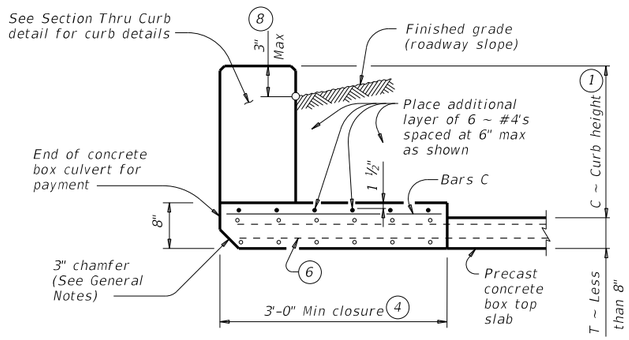


DETAIL "A" (13)

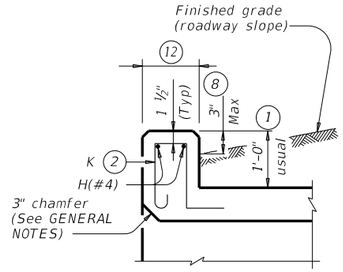


WINGWALL CONNECTION

(Also applies to safety end treatment.)

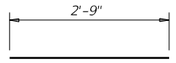


SECTION THRU TOP SLABS LESS THAN 8"

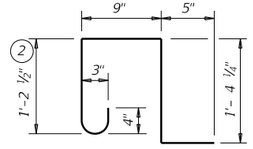


SECTION THRU CURB

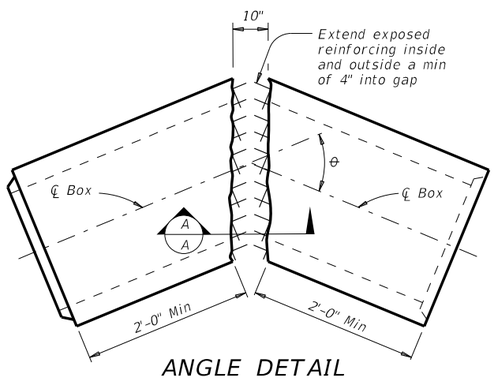
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



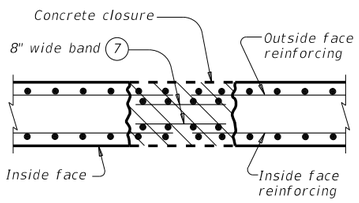
BARS C (#4)
(Spa = 1'-0" Max)



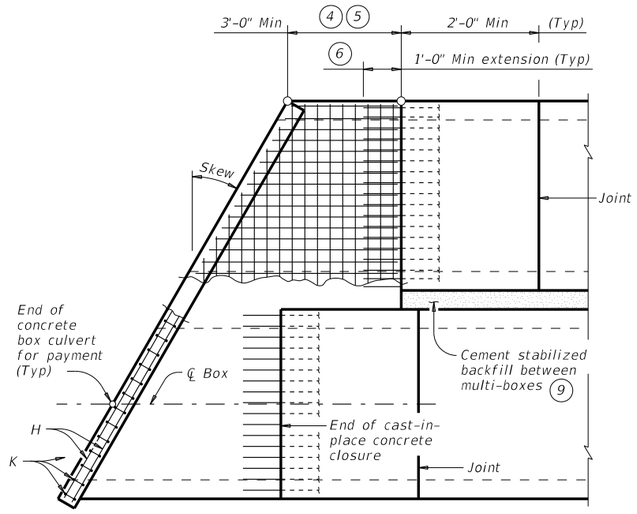
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
4. Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
6. Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is considered part of the box culvert for payment.
11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
12. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		58

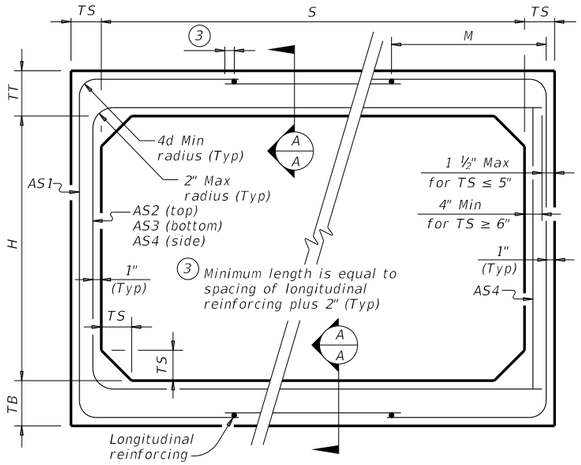
DATE: 5/20/2021 8:53:43 AM
FILE: scp09sts-20.dgn

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
9	4	9	9	9	< 2	–	0.30	0.36	0.28	0.22	0.22	0.22	0.22	13.7
9	4	9	9	9	2 < 3	54	0.35	0.34	0.31	0.22	–	–	–	13.7
9	4	9	9	9	3 – 5	50	0.28	0.27	0.27	0.22	–	–	–	13.7
9	4	9	9	9	10	49	0.31	0.30	0.31	0.22	–	–	–	13.7
9	4	9	9	9	15	49	0.40	0.40	0.41	0.22	–	–	–	13.7
9	4	9	9	9	20	44	0.52	0.51	0.52	0.22	–	–	–	13.7
9	4	9	9	9	25	44	0.65	0.64	0.65	0.22	–	–	–	13.7
9	5	9	9	9	< 2	–	0.28	0.38	0.31	0.22	0.22	0.22	0.22	14.6
9	5	9	9	9	2 < 3	54	0.32	0.38	0.34	0.22	–	–	–	14.6
9	5	9	9	9	3 – 5	49	0.25	0.30	0.30	0.22	–	–	–	14.6
9	5	9	9	9	10	49	0.28	0.33	0.34	0.22	–	–	–	14.6
9	5	9	9	9	15	44	0.36	0.43	0.45	0.22	–	–	–	14.6
9	5	9	9	9	20	44	0.47	0.56	0.57	0.22	–	–	–	14.6
9	5	9	9	9	25	44	0.58	0.69	0.71	0.22	–	–	–	14.6
9	6	9	9	9	< 2	–	0.25	0.40	0.34	0.22	0.22	0.22	0.22	15.5
9	6	9	9	9	2 < 3	54	0.29	0.41	0.38	0.22	–	–	–	15.5
9	6	9	9	9	3 – 5	49	0.23	0.33	0.33	0.22	–	–	–	15.5
9	6	9	9	9	10	49	0.26	0.35	0.37	0.22	–	–	–	15.5
9	6	9	9	9	15	44	0.33	0.46	0.48	0.22	–	–	–	15.5
9	6	9	9	9	20	44	0.42	0.60	0.61	0.22	–	–	–	15.5
9	6	9	9	9	25	44	0.52	0.74	0.75	0.22	–	–	–	15.5
9	7	9	9	9	< 2	–	0.23	0.42	0.36	0.22	0.22	0.22	0.22	16.4
9	7	9	9	9	2 < 3	59	0.26	0.44	0.41	0.22	–	–	–	16.4
9	7	9	9	9	3 – 5	54	0.22	0.35	0.35	0.22	–	–	–	16.4
9	7	9	9	9	10	49	0.24	0.37	0.39	0.22	–	–	–	16.4
9	7	9	9	9	15	44	0.31	0.48	0.51	0.22	–	–	–	16.4
9	7	9	9	9	20	44	0.39	0.62	0.65	0.22	–	–	–	16.4
9	8	9	9	9	< 2	–	0.22	0.43	0.39	0.22	0.22	0.22	0.22	17.3
9	8	9	9	9	2 < 3	59	0.24	0.46	0.43	0.22	–	–	–	17.3
9	8	9	9	9	3 – 5	59	0.22	0.37	0.38	0.22	–	–	–	17.3
9	8	9	9	9	10	54	0.22	0.39	0.41	0.22	–	–	–	17.3
9	8	9	9	9	15	44	0.29	0.50	0.53	0.22	–	–	–	17.3
9	8	9	9	9	20	44	0.36	0.64	0.67	0.22	–	–	–	17.3
9	9	9	9	9	< 2	–	0.22	0.44	0.42	0.22	0.22	0.22	0.22	18.2
9	9	9	9	9	2 < 3	72	0.23	0.49	0.46	0.22	–	–	–	18.2
9	9	9	9	9	3 – 5	72	0.22	0.39	0.40	0.22	–	–	–	18.2
9	9	9	9	9	10	59	0.22	0.40	0.43	0.22	–	–	–	18.2
9	9	9	9	9	15	49	0.27	0.51	0.55	0.22	–	–	–	18.2
9	9	9	9	9	20	49	0.34	0.66	0.69	0.22	–	–	–	18.2

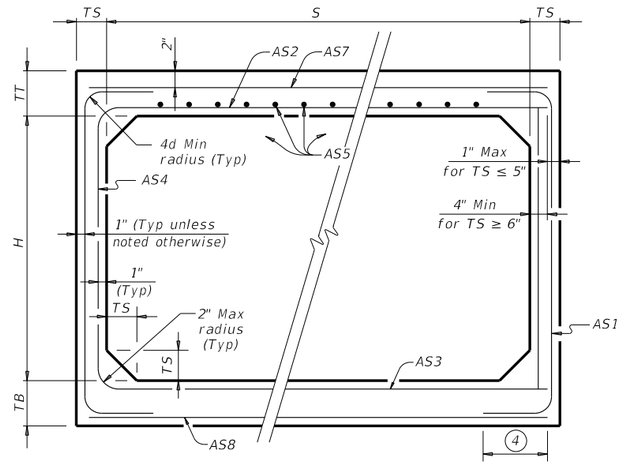
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

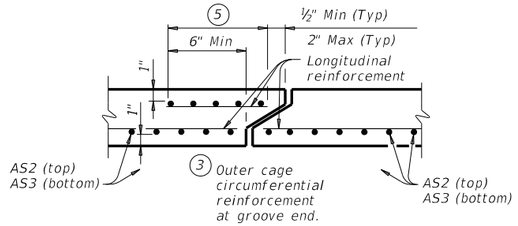
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

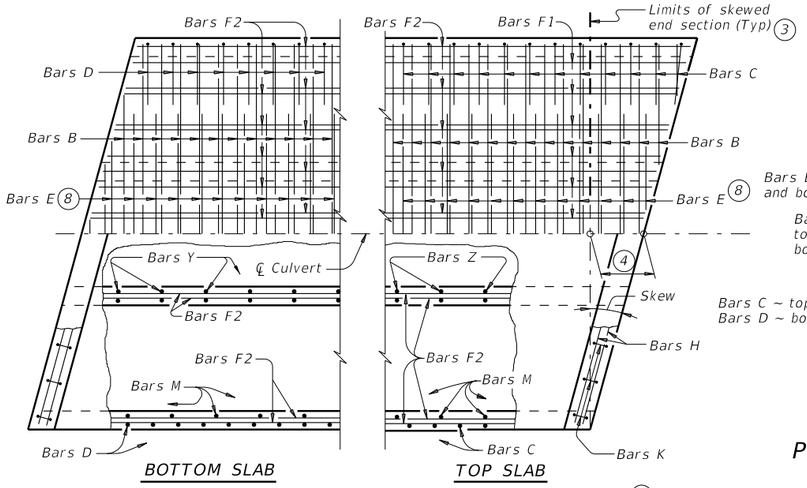
Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

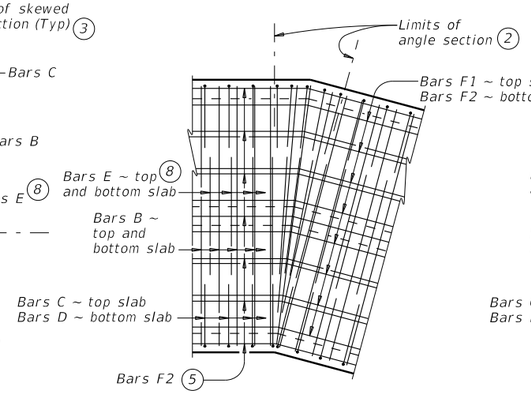
9'-0" SPAN

SCP-9

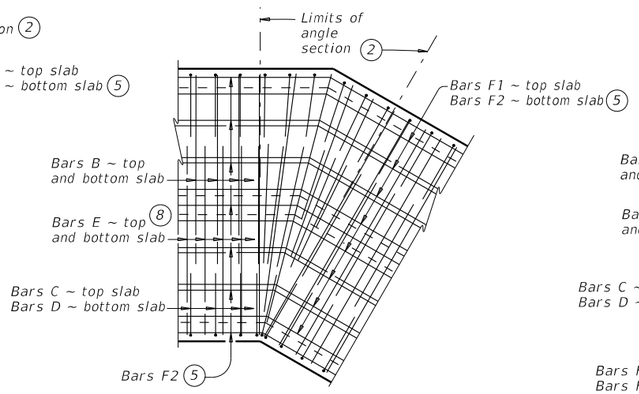
FILE: scp09sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		59



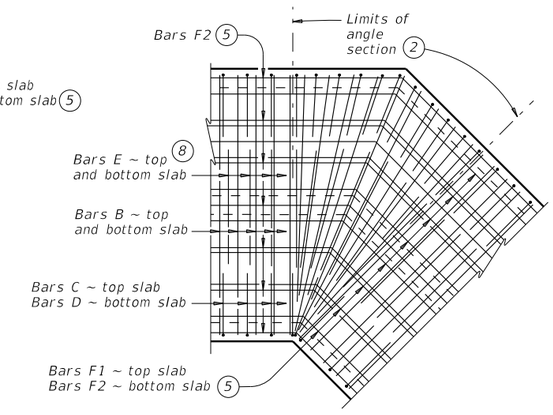
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7



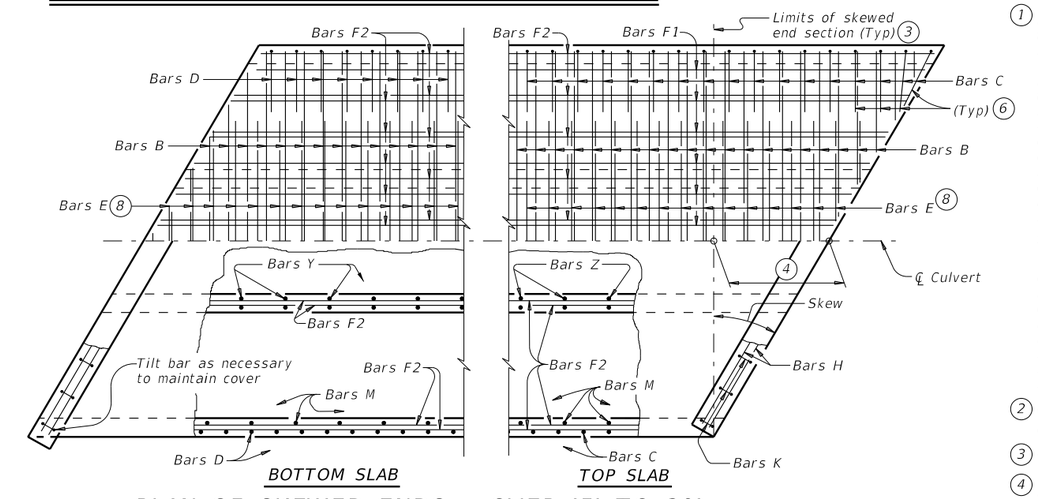
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



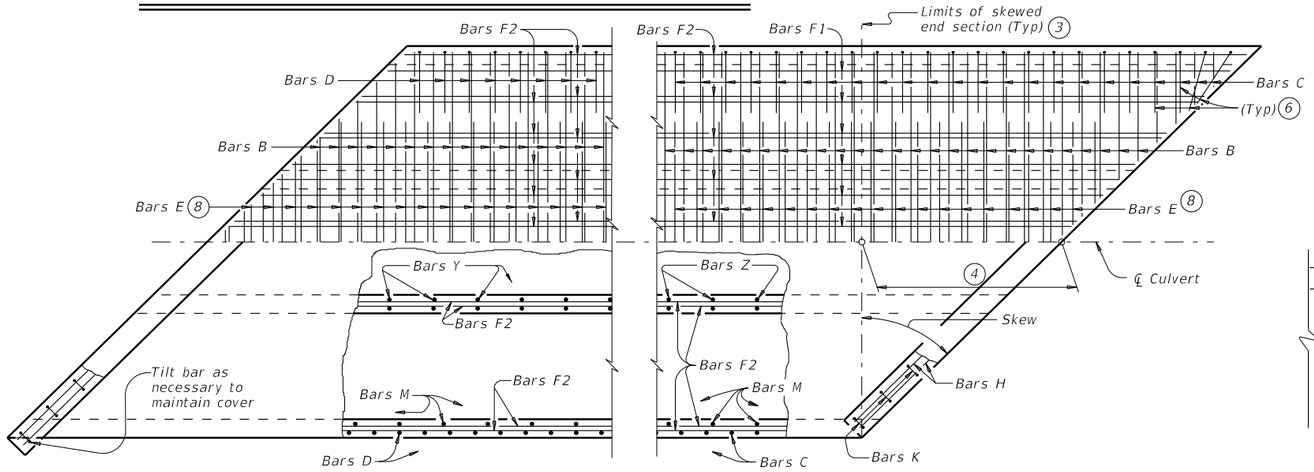
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



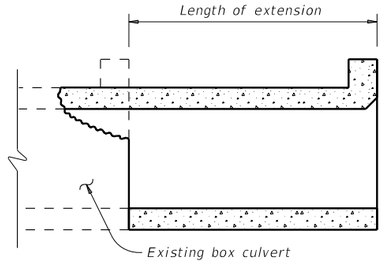
PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



LENGTHENING DETAIL 1

1. For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
   For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.
   Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.
2. When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.
3. The length of Bars B and Bars E will vary in the skewed end sections.
4. [One half of overall width] x [tangent of the skew angle]
5. Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.
6. When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.
7. At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.
8. Extend Bars E as shown on the MC standard sheet for direct traffic culverts.

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

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

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

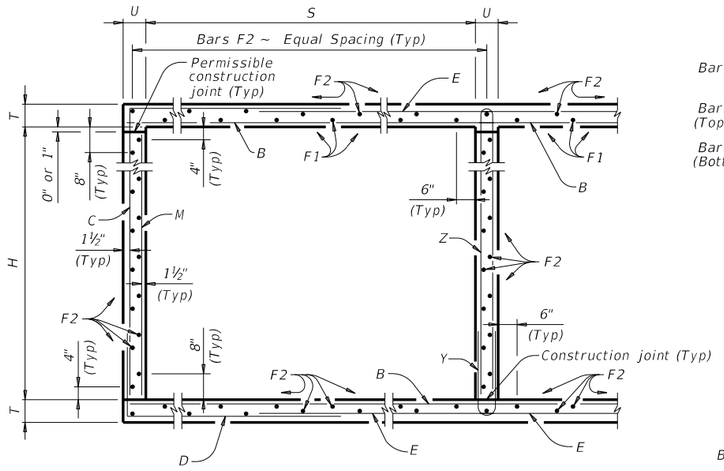
MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

MC-MD

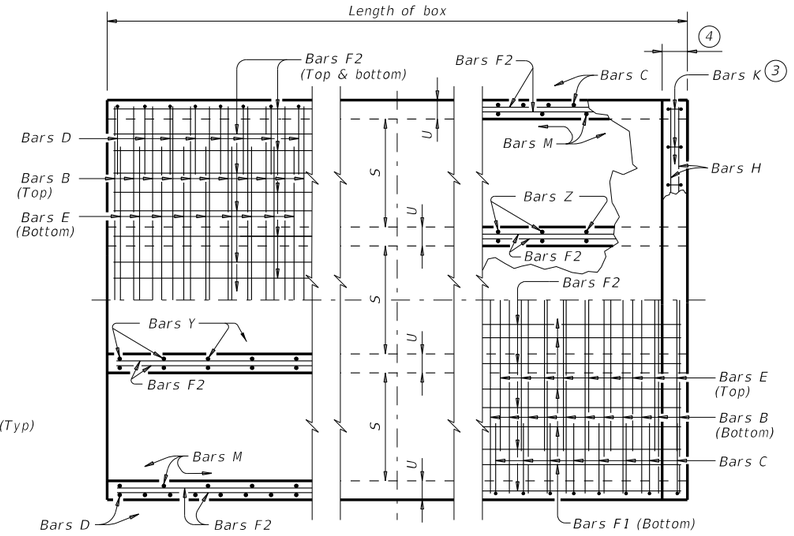
FILE: mc-mdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		60

DATE: 5/20/2021 8:53:52 AM
FILE: mc-mdste-20.dgn

DATE: 5/20/2021 8:54:00 AM
FILE: mc910ste-20.dgn

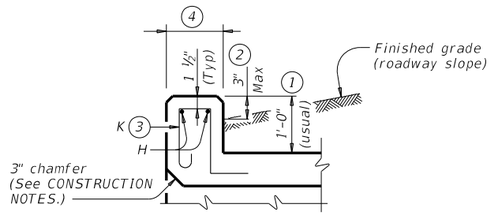


TYPICAL SECTION



BOTTOM SLAB TOP SLAB

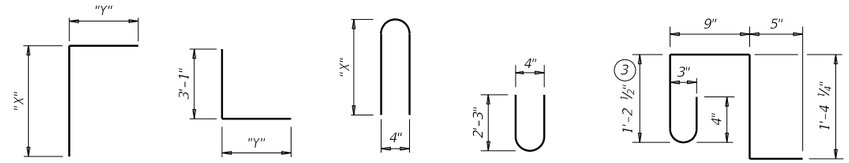
PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS

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



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

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

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

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

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

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

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

CONSTRUCTION NOTES:

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

MATERIAL NOTES:

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

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

GENERAL NOTES:

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

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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

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

MC-9-10

FILE: mc910ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		61

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

DATE: 5/20/2021 8:54:00 AM
FILE: mc910ste-20.dgn

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

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

MC-9-10

FILE: mc910ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		62

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" (2) Conc (Curb) (CY)	Class "C" (3) Conc (Wingwall) (CY)	Total Wingwall Area (SF)
W. MUD CREEK @ WHITTLE STREET CIP (LT)	3 ~ 9' x 9'	10'	MC-9-10	PW-1	0°	1:1	9"	7"	1.708'	11.458'	N/A	N/A	11.500'	29.333'	N/A	0.0	1.8	21.4	264
W. MUD CREEK @ WHITTLE STREET CIP (RT)	3 ~ 9' x 9'	10'	MC-9-10	PW-1	0°	1:1	9"	7"	1.708'	11.458'	N/A	N/A	11.500'	29.333'	N/A	0.0	1.8	21.4	264
W. MUD CREEK @ WHITTLE STREET PRECAST (LT)	3 ~ 9' x 9'	10'	SCP-9	PW-1	0°	1:1	9"	7"	1.708'	11.458'	N/A	N/A	11.500'	32.500'	N/A	0.0	2.0	22.0	264
W. MUD CREEK @ WHITTLE STREET PRECAST (RT)	3 ~ 9' x 9'	10'	SCP-9	PW-1	0°	1:1	9"	7"	1.708'	11.458'	N/A	N/A	11.500'	32.500'	N/A	0.0	2.0	22.0	264

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

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

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

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

C = Curb height

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

Hw = Height of wingwall

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

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

Lw = Length of longest wingwall.

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

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

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

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

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

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

5/20/2021

J. Bryan Hodges

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		63

DATE: 5/20/2021 9:13:39 AM
FILE: bcsstde1-20.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

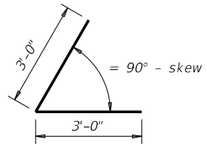
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

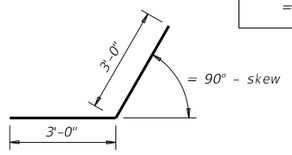
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2

WING DIMENSION FORMULAS:
(All values are in feet.)

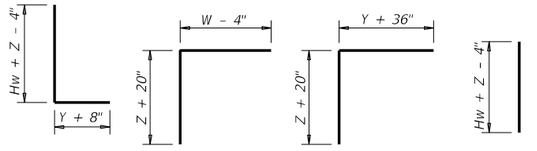
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

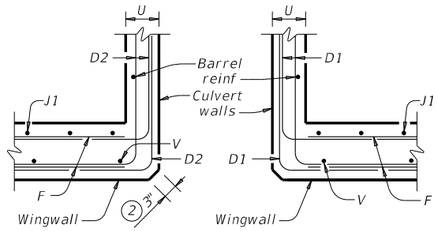
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

See applicable box culvert standard sheet for S, H, T, and U values.



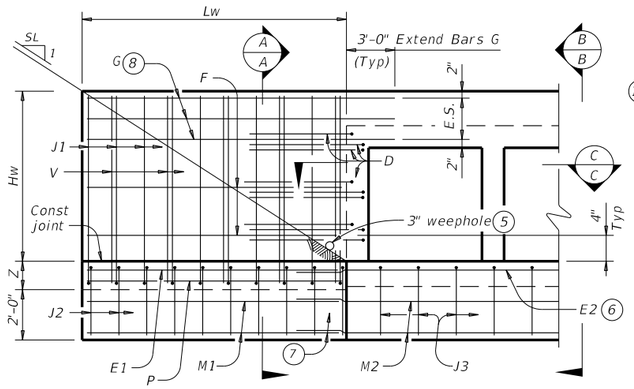
BARS J1 BARS J2 BARS J3 BARS V



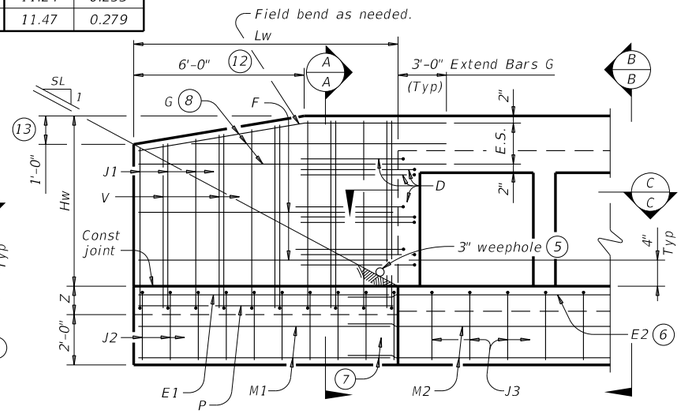
SECTION C-C - PW-1

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

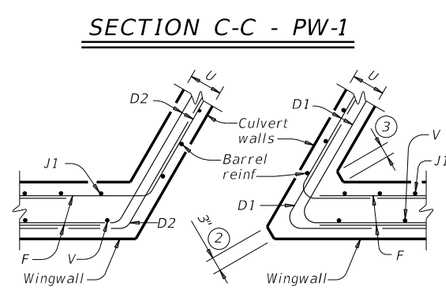
    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.



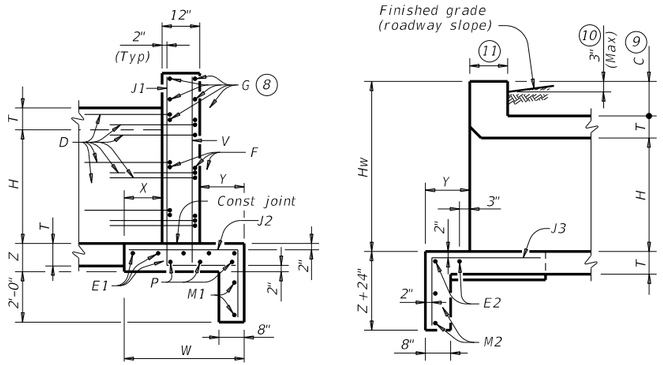
PARTIAL ELEVATION - PW-1



PARTIAL ELEVATION - PW-2

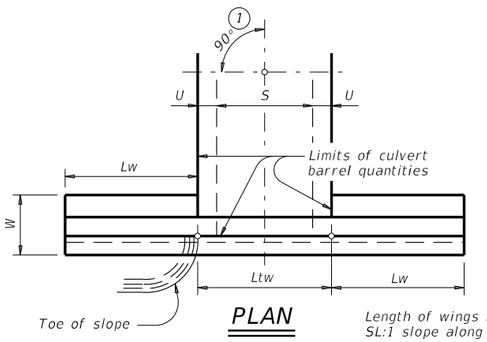


SECTION C-C - PW-2



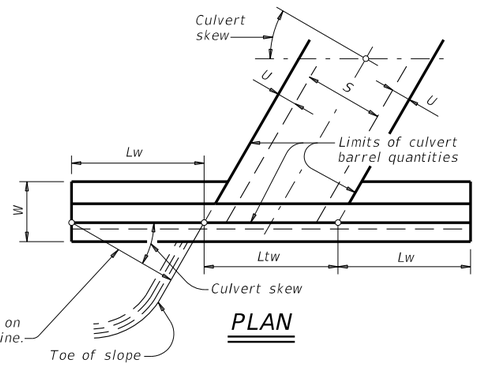
SECTION A-A
(Showing wing reinforcement.)

SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

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

Texas Department of Transportation

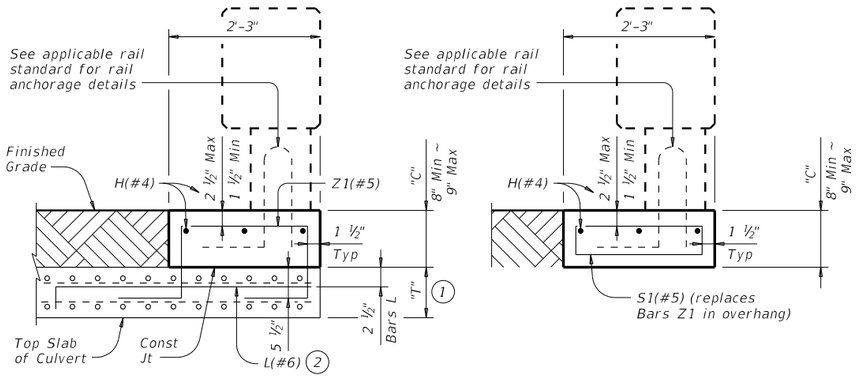
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		64

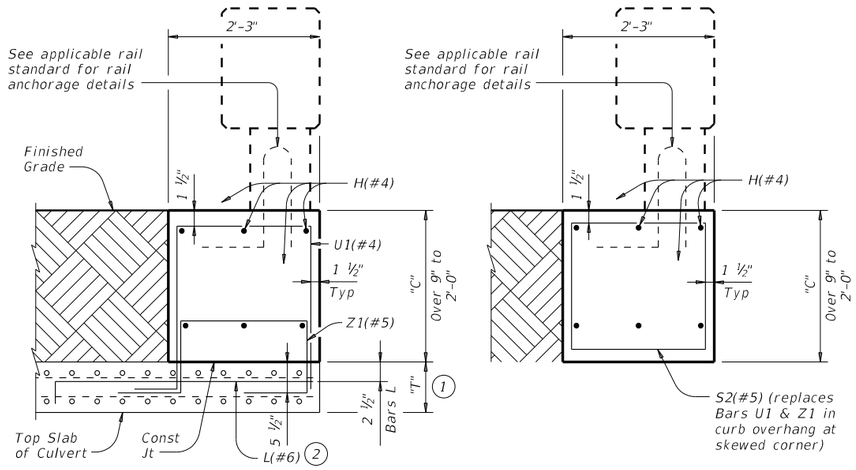
DATE: 5/20/2021 8:54:14 AM
FILE: pwstde01-20.dgn



SECTION A-A SECTION B-B

TYPE 1 CURB

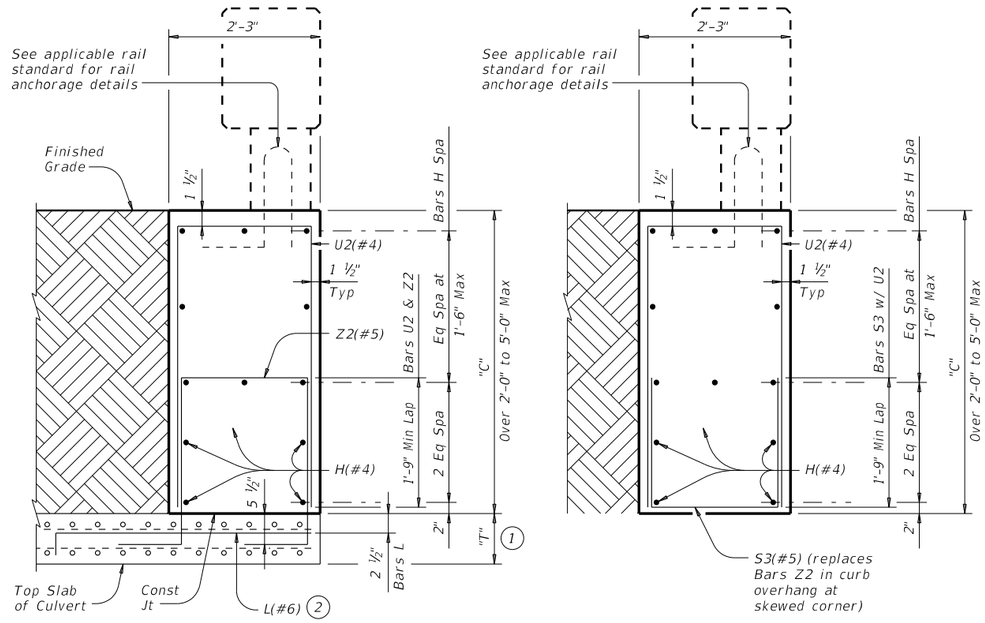
Used for curbs from 8" to 9" (Showing "C" = 9"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



SECTION A-A SECTION B-B

TYPE 2 CURB

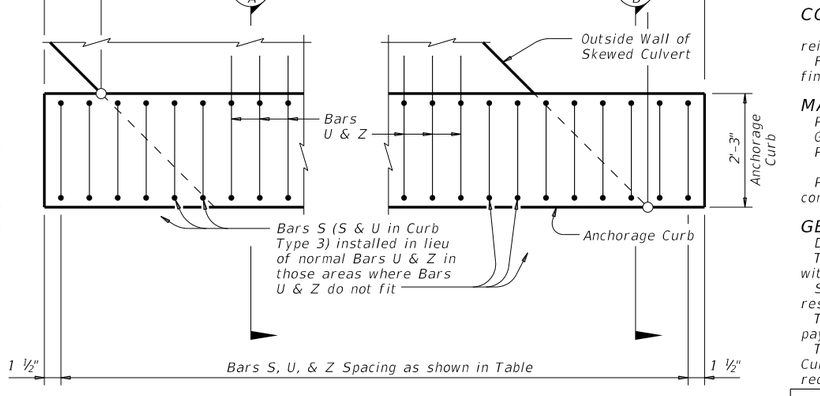
Used for curbs over 9" to 2'-0" (Showing "C" = 2'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



SECTION A-A SECTION B-B

TYPE 3 CURB

Used for curbs over 2'-0" to 5'-0" (Showing "C" = 4'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



TYPICAL CURB PLAN

Showing typical installation on skewed culvert. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.

TABLE OF REINFORCING SPACING

Curb Height "C"	Section Type	Bars S, U, & Z Spa
8" to 9"	1	12"
Over 9" to 2'-0"	2	9"
Over 2'-0" to 3'-0"	3	7"
Over 3'-0" to 5'-0"	3	5"

TABLE OF ESTIMATED QUANTITIES (4)

Curb Height "C"	Section Type	Reinf Steel (Lb/LF)	Class "C" Concrete (CY/LF)
8"	1	21.5	0.056
9"	1	21.5	0.063
1'-0"	2	29.7	0.083
1'-6"	2	30.6	0.125
2'-0"	2	31.5	0.167
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

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

(2) *Tilt Bars L hook as necessary to maintain cover.*

(3) *Optional Bars L are to be used only for Precast Box Culverts with 3'-0" closure pours.*

(4) *Quantities shown are for Contractor's information only. Quantities are per Linear Foot of curb length. The values for each section type in table can be interpolated for intermediate values of Curb Height, "C".*

CONSTRUCTION NOTES:

When using this anchorage curb, omit normal culvert curb reinforcing bars K and H shown on the culvert standard sheets.

For vehicle safety, the top of the curb must be flush with the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Galvanize all reinforcing steel if required elsewhere.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-11"

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

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

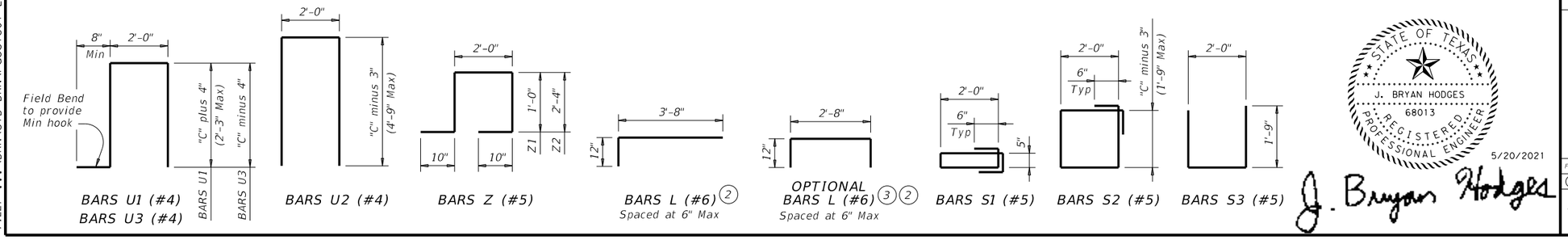
The rail anchorage curb details have sufficient strength for use with all standard rail types.

See appropriate rail standard for approved design speed restrictions, notes and details not shown.

This anchorage curb is considered part of the Box Culvert for payment.

These details are for use with curbs that are 8" to 5'-0" tall only. Curb heights that are less than or greater than those shown will require special design.

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



STATE OF TEXAS
J. BRYAN HODGES
68013
REGISTERED PROFESSIONAL ENGINEER
5/20/2021

J. Bryan Hodges

SHEET 1 OF 2

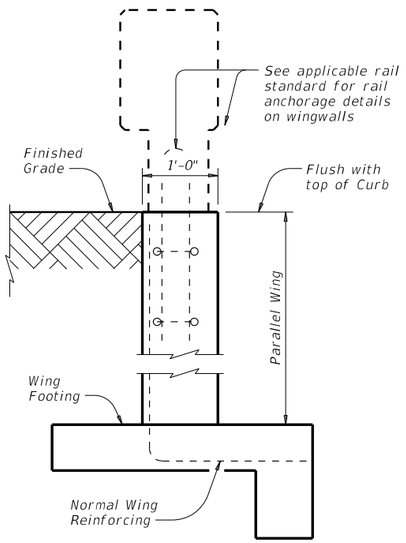
Texas Department of Transportation — Bridge Division Standard

RAIL ANCHORAGE CURB
BOX CULVERT
RAIL MOUNTING DETAILS
(CURBS 8" TO 5'-0" TALL ONLY)

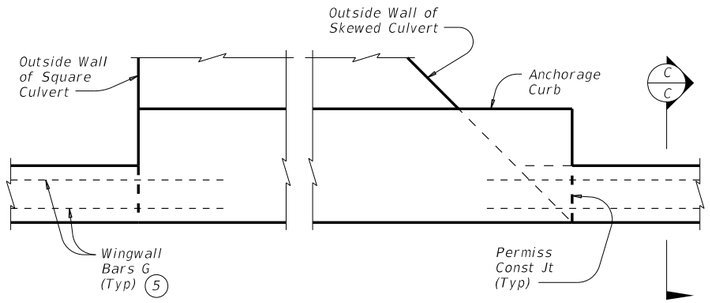
RAC (MOD)

FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/20 JBH - DRAIN DETAILS AND REINF.	0910	16	147,ETC	WHITTLE ST
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		65

DATE: 5/20/2021 9:14:15 AM
FILE: ...\DRN\STD DRN\racste01-20.dgn



SECTION C-C



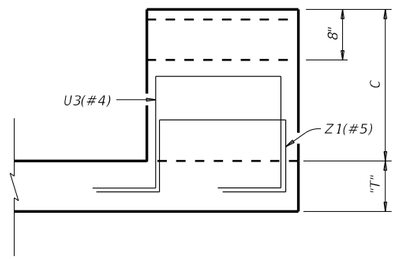
TYPICAL CURB PLAN

Curb reinforcing and footings not shown for clarity

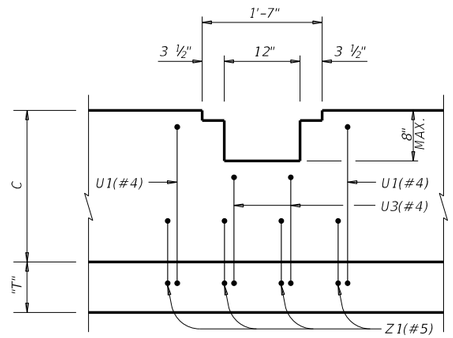
INSTALLATION AT PARALLEL CULVERT WINGWALLS

See culvert wingwall standard for bars and details not shown.

(5) Bars G (#5), as identified on the PARALLEL WINGS PW standard sheet, must extend 1'-6" into the Anchorage Curb similar to that shown for a normal culvert curb.



SECTION THRU DRAIN



Bars U & Z Spaced @ 9"

ELEVATION AT DRAIN

DATE: 5/20/2021 9:14:15 AM
FILE: ...\DRN\STD DRN\racste01-20.dgn

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE CURB
BOX CULVERT
RAIL MOUNTING DETAILS
(CURBS 8" TO 5'-0" TALL ONLY)

RAC (MOD)

STATE OF TEXAS
J. BRYAN HODGES
68013
REGISTERED PROFESSIONAL ENGINEER
5/20/2021

J. Bryan Hodges

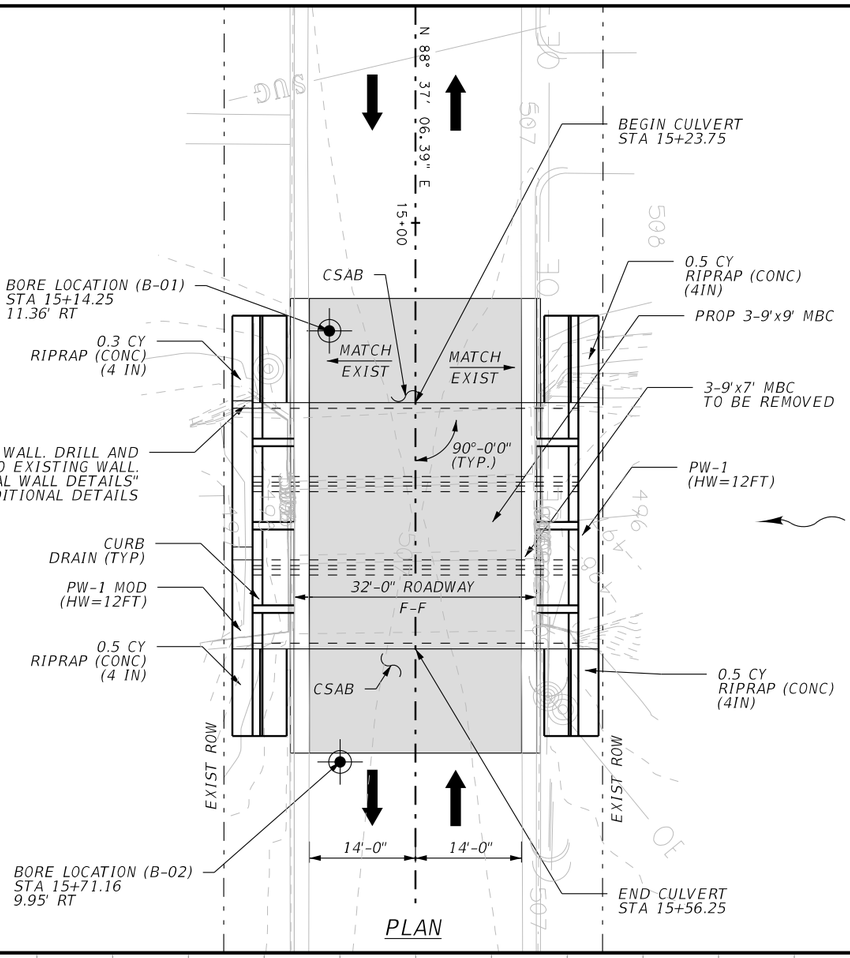
FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/20 JBH - DRAIN DETAILS AND REINF.	0910	16	147,ETC	WHITTLE ST
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		66

100% SUBMITTAL

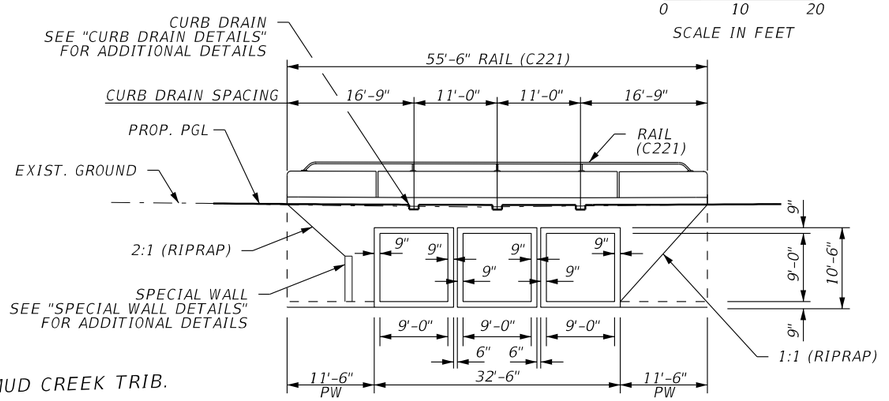
DATE: 9/7/2021 TIME: 9:39:03 AM

NOTES:

1. DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017), AS MODIFIED BY THE TXDOT BDM, 2020.
2. HORIZONTAL DIMENSIONS ARE SHOWN. LENGTHS MUST BE CORRECTED FOR GRADE OR CROSS-SLOPE WHERE APPROPRIATE.
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
4. SEE TEST HOLE DATA SHEET FOR DRILLING LOGS.
5. DESIGN SPEED: 30 MPH (MEET EXISTING CONDITIONS)
   ADT = 104 (2018)
   FUNCT CLASS: LOCAL ROAD
   EXIST NBI: 10-212-0-B050-65-001
   PROP NBI: 10-212-0-LX84-68-001
6. TEST HOLE LOCATIONS ARE APPROXIMATE.
7. SEE SCP-9 STANDARD FOR DETAILS.



PLAN



EXIST: 3- 9'X7'X33' MBC

PROP: 3-9'X9'X43' MBC WITH WINGWALLS (PW-1)((HW=12FT)

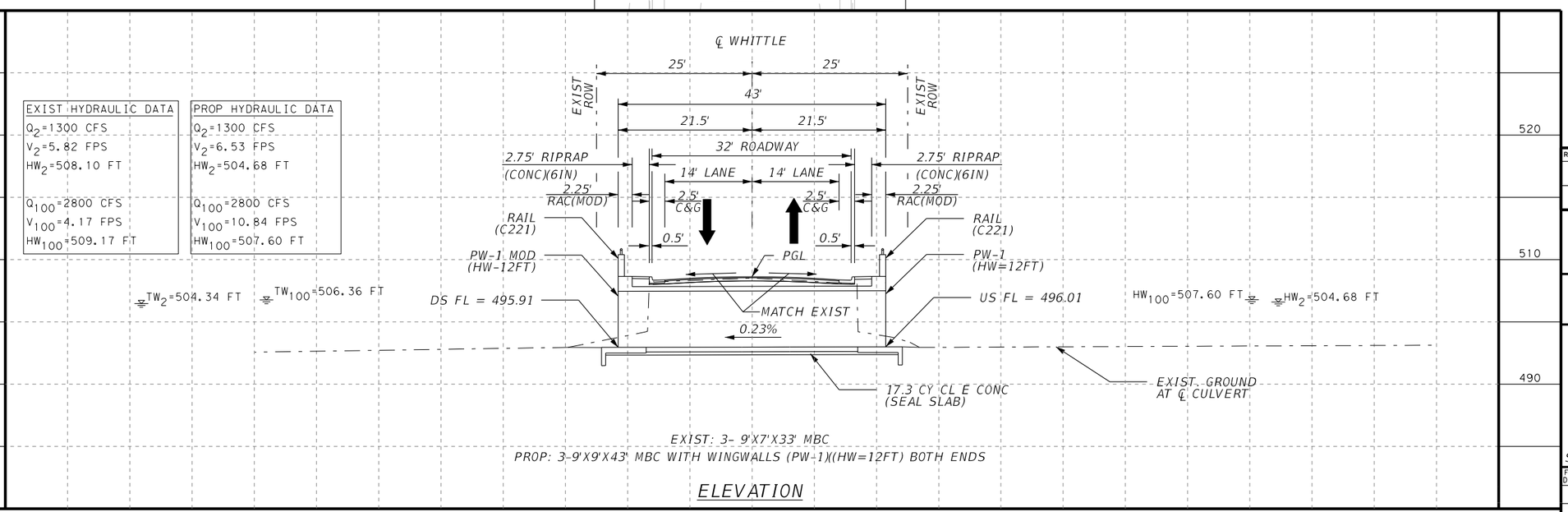
TRANSVERSE TYPICAL SECTION

N.T.S.

0 10 20

SCALE IN FEET

EXIST HYDRAULIC DATA	PROP HYDRAULIC DATA
Q_2=1300 CFS	Q_2=1300 CFS
V_2=5.82 FPS	V_2=6.53 FPS
HW_2=508.10 FT	HW_2=504.68 FT
Q_{100}=2800 CFS	Q_{100}=2800 CFS
V_{100}=4.17 FPS	V_{100}=10.84 FPS
HW_{100}=509.17 FT	HW_{100}=507.60 FT



EXIST: 3- 9'X7'X33' MBC

PROP: 3-9'X9'X43' MBC WITH WINGWALLS (PW-1)((HW=12FT) BOTH ENDS

ELEVATION

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS

TBPE REG. # F-474

Texas Department of Transportation

Tyler District

BRIDGE LAYOUT

WHITTLE ST @ W. MUD CREEK TRIB.

SCALE: 1"=20'H, 1"=20'V SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			WHITTLE ST
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	67

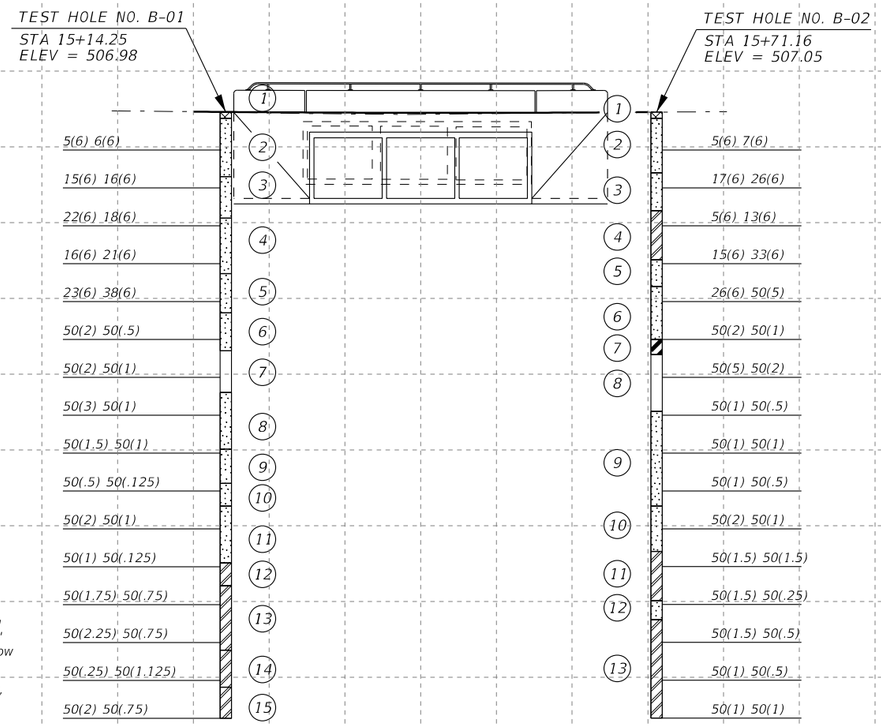
STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_BL01.dgn

100% SUBMITTAL

DATE: 9/7/2021

TIME: 9:39:10 AM



1. ASPHALT (5.75 IN.)
2. SAND, Silty, loose, moist, brown, fine grained, trace ferrous staining and deposits, trace Gravel from 3.5' to 5', gray and brown Sandy CL below 7.5' (SM)
3. SAND, Clayey, slightly compact, moist, gray and brown, fine grained, few ferrous staining (SC)
4. SAND, Clayey, slightly compact, wet, gray and brown, fine grained (SC)
5. SAND, Silty, compact, wet, brown, fine to coarse grained, few Gravel (SM)
6. SAND, Poorly Graded with Silt, very dense, wet, brown, fine grained to 27.9', fine to coarse grained below 30.5', few Gravel and ferrous deposits below 30.5' (SP-SM)
7. LIGNITE, hard, black
8. SAND, Clayey, very dense, wet, dark brown, fine grained, trace lignite deposits (SC)
9. SAND, Silty, very dense, wet, gray, fine grained (SM)
10. SAND, Silty, very dense, wet, gray, fine grained, few lignite deposits below 50.6 (SM)
11. SAND, Silty, very dense, wet, gray, fine grained, few CL lenses (SM)
12. CLAY, Sandy Lean, very hard, moist, gray, few SM lenses (CL)
13. CLAY, Sandy Lean, very hard, moist, gray, few SM lenses (CL)
14. CLAY, Lean with Sand, very hard, moist, gray, few SM lenses (CL)
15. CLAY, Sandy Lean, very hard, moist, gray (CL)

1. ASPHALT (4.0 IN.)
2. SAND, Silty, loose, moist, brown, fine grained, brown SC from 2' to 3', fine grained, trace Gravel (SM)
3. SAND, Clayey, compact, moist, brown and gray, fine grained, SM lenses below 11.4', brown Sandy ML to 10', trace ferrous deposits (SC)
4. CLAY, Sandy Lean, soft, moist, brown and gray, some SC lenses (CL)
5. SAND, Silty, Clayey with Gravel, compact, wet, reddish brown, fine to coarse grained, trace lignite deposits (SC-SM)
6. SAND, Poorly Graded with Clay, dense, wet, brown, fine to coarse grained, trace Gravel (SP-SC)
7. CLAY, Fat, very hard, moist, dark brown, some lignite deposits (CH)
8. LIGNITE, very soft, black, few CH lenses to 35.9'
9. SAND, Silty, very dense, wet, dark brown to 40.7', gray below 45.3', fine to medium grained to 45.9', fine grained below 50.2', trace Gravel from 45.3' to 45.9', few SC lenses (SM)
10. SAND, Clayey, very dense, wet, gray, fine grained, few CL lenses (SC)
11. CLAY, Sandy Lean, very hard, moist, brown, few SM lenses (CL)
12. SAND, Clayey, very dense, wet, gray, fine grained, few CL lenses (SC)
13. CLAY, Lean with Sand, very hard, moist, gray, few SM lenses (CL)

DRILLING CONTRACTOR:
CORSAIR CONSULTING LLC.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

TEST HOLE DATA

WHITTLE ST. @ W. MUD CREEK TRIB.

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

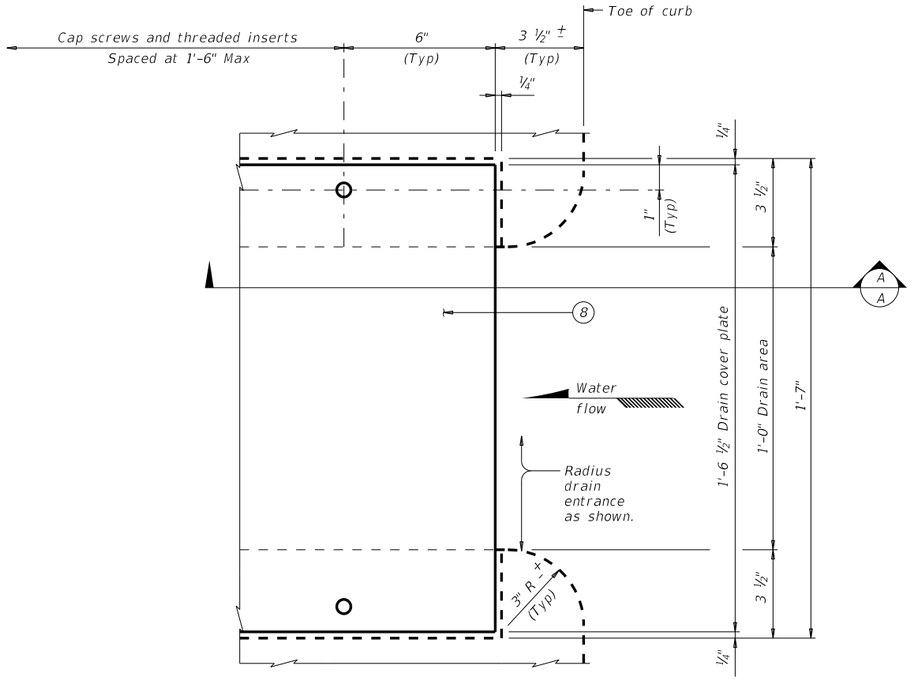
SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.
6	TEXAS	SEE TITLE SHEET		WHITTLE ST
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	68

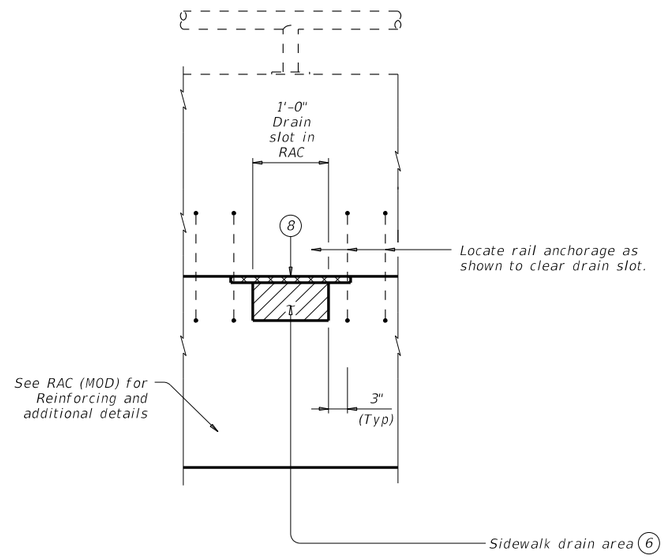
PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_TH01.dgn

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:39:19 AM



PARTIAL PLAN CURB DRAIN



SECTION B-B

MATERIAL NOTES:

Provide Class S concrete. f'c = 4,000 psi

Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Chamfer or round edges approximately 1/16" prior to galvanizing.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 8th Edition (2017), as modified by the TxDOT BDM, 2020.

Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.

Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide drain cover plates fabricated with a product from this list. No exceptions are permitted.

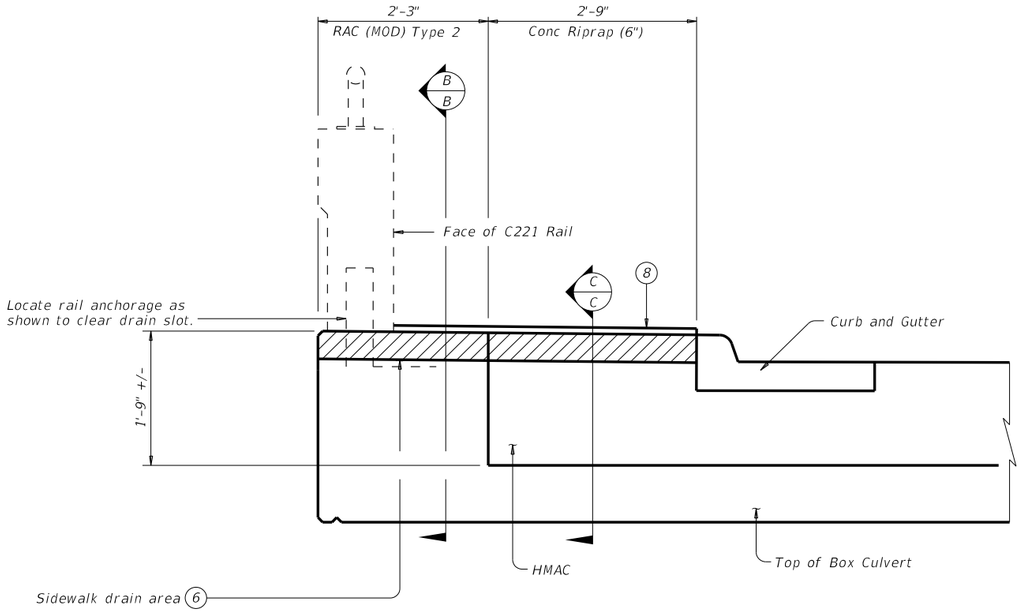
(1) Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.

(4) 3'-0" Min at deck expansion joints, deck construction joints or controlled joints, rail intermediate wall joints or from face of substructure.

(6) Steel trowel top surface of RAC (MOD) in drain locations.

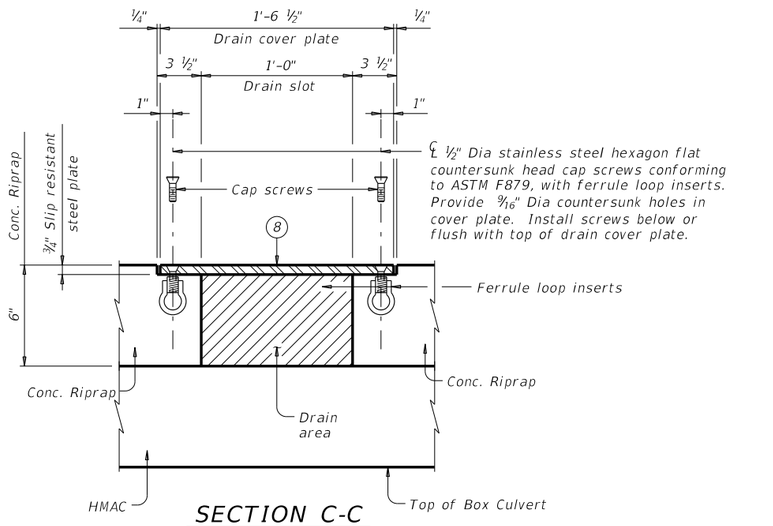
(7) Provide drains where shown elsewhere on the plans or as directed by the Engineer. Place drain and cover plate perpendicular to toe of rail.

(8) Drain cover plate (PL ¾ x 18 ½ slip resistant steel plate). Install flush with top of RAC/Riprap/Curb.



SECTION A-A

DRAIN DETAILS (7)



SECTION C-C

Reinforcing not shown for clarity.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

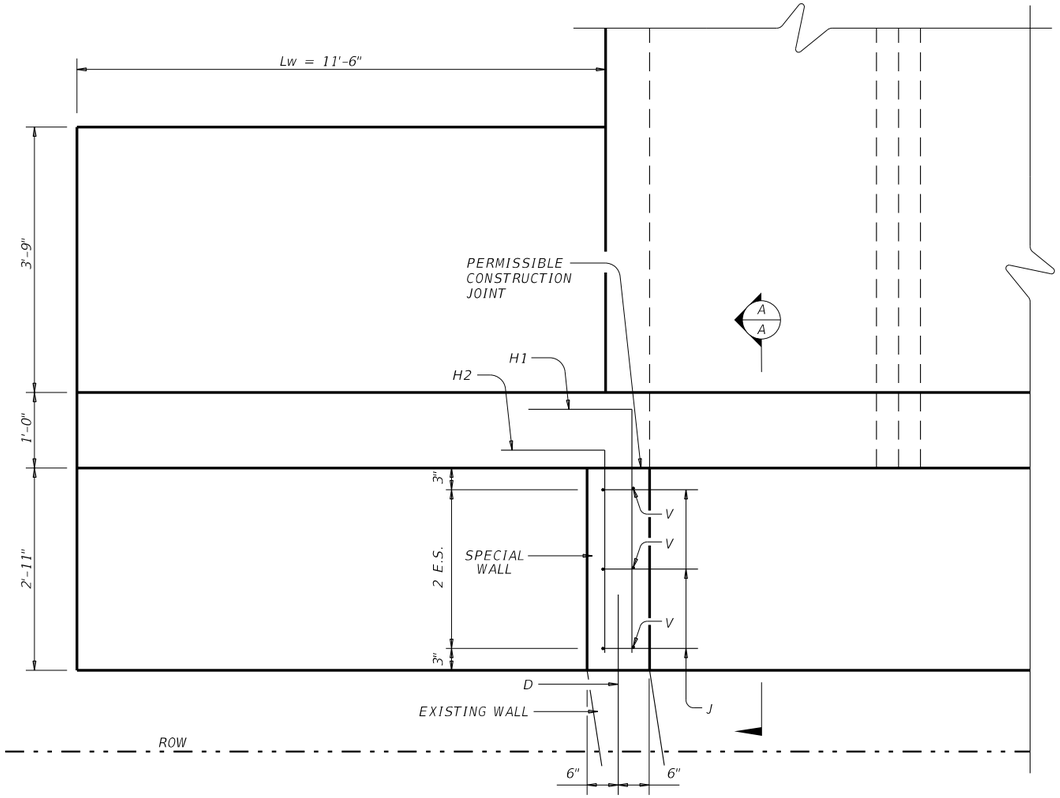
CURB DRAIN DETAILS

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	69

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: CURB_DRAIN_DETAIL.dgn

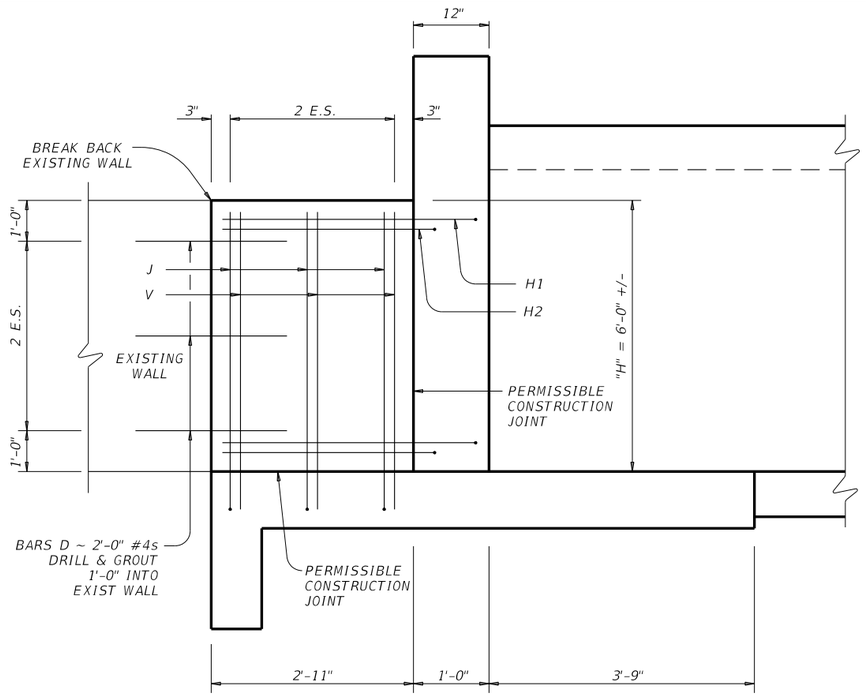
100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:39:30 AM



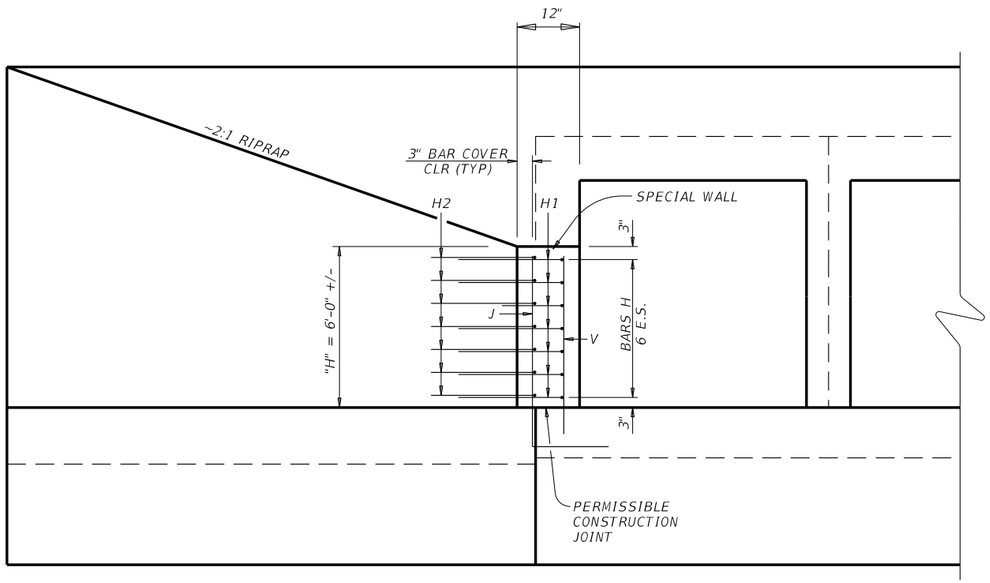
PLAN VIEW (SW CORNER)

(Wingwall Reinf. Omitted for Clarity)



SECTION A-A

(Wingwall Reinf. Omitted for Clarity)

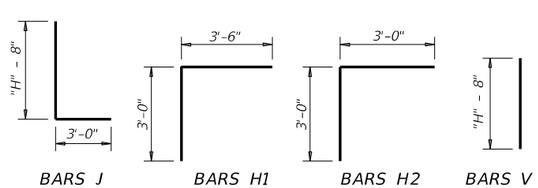


ELEVATION

(Wingwall Reinf. Omitted for Clarity)

TABLE OF SPECIAL WALL REINFORCING

Bar	Size	No.
D	#4	3
H1	#4	7
H2	#4	7
J	#5	3
V	#4	3



DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017), AS MODIFIED BY THE TXDOT BDM, 2020.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications, 8th Edition (2017), as modified by the TxDOT BDM, 2020.
Payment for Special Wall shall be under Item 420' "Class C Concrete (Wingwalls)".

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

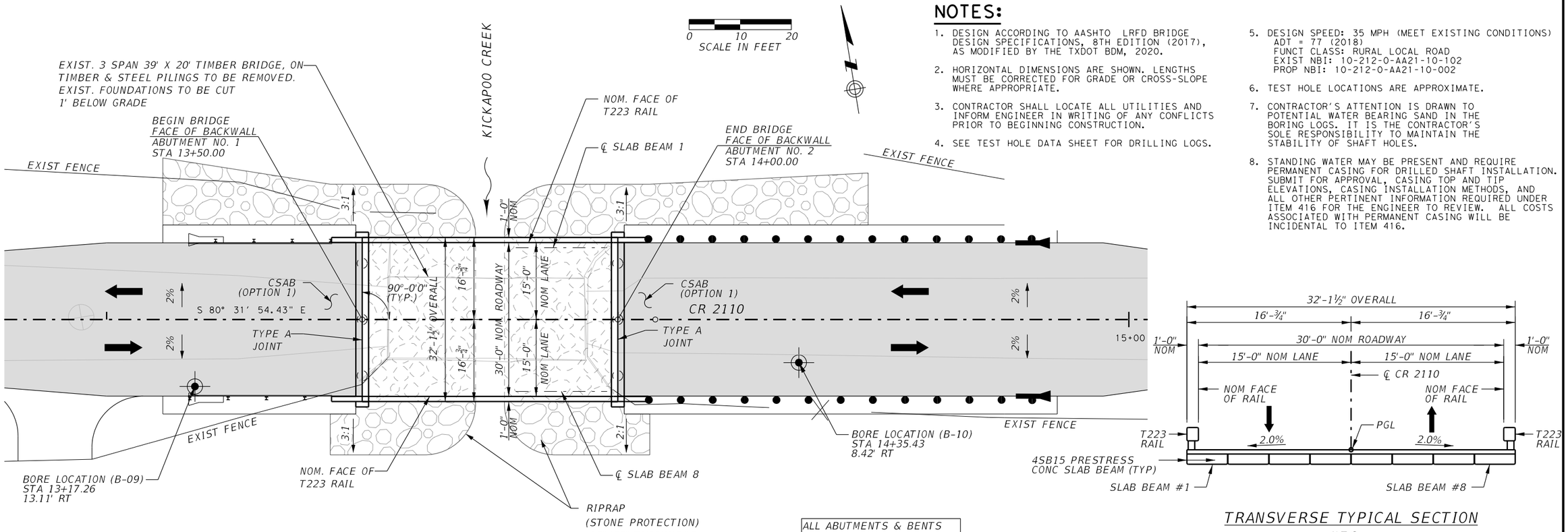
Texas Department of Transportation
Tyler District

SPECIAL WALL DETAILS

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	70

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: SPECIAL_WALL_DETAILS.dgn

100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:39:37 AM



PLAN

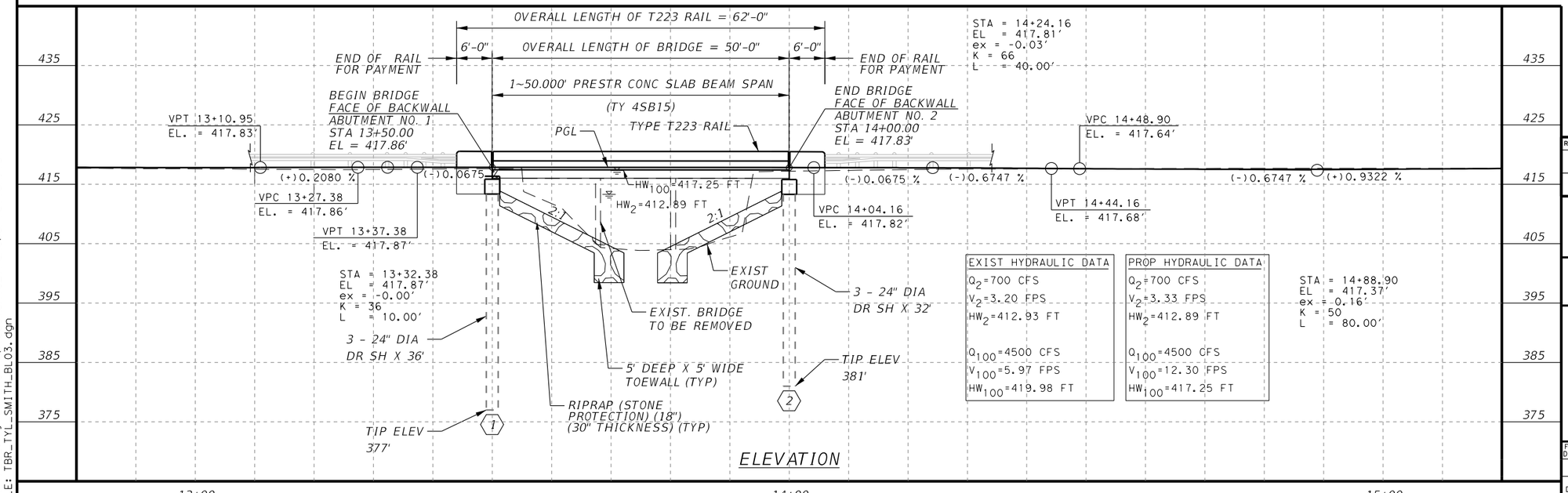
NOTES:

1. DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017), AS MODIFIED BY THE TXDOT BDM, 2020.
2. HORIZONTAL DIMENSIONS ARE SHOWN. LENGTHS MUST BE CORRECTED FOR GRADE OR CROSS-SLOPE WHERE APPROPRIATE.
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
4. SEE TEST HOLE DATA SHEET FOR DRILLING LOGS.
5. DESIGN SPEED: 35 MPH (MEET EXISTING CONDITIONS)
   ADT = 77 (2018)
   FUNCT CLASS: RURAL LOCAL ROAD
   EXIST NBI: 10-212-0-AA21-10-102
   PROP NBI: 10-212-0-AA21-10-002
6. TEST HOLE LOCATIONS ARE APPROXIMATE.
7. CONTRACTOR'S ATTENTION IS DRAWN TO POTENTIAL WATER BEARING SAND IN THE BORING LOGS. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO MAINTAIN THE STABILITY OF SHAFT HOLES.
8. STANDING WATER MAY BE PRESENT AND REQUIRE PERMANENT CASING FOR DRILLED SHAFT INSTALLATION. SUBMIT FOR APPROVAL, CASING TOP AND TIP ELEVATIONS, CASING INSTALLATION METHODS, AND ALL OTHER PERTINENT INFORMATION REQUIRED UNDER ITEM 416 FOR THE ENGINEER TO REVIEW. ALL COSTS ASSOCIATED WITH PERMANENT CASING WILL BE INCIDENTAL TO ITEM 416.

TRANSVERSE TYPICAL SECTION

N.T.S.

ALL ABUTMENTS & BENTS PERPENDICULAR TO ℄ CR 2110 & ON BEARING OF N9°28'05.57"E UNLESS NOTED OTHERWISE.



EXIST HYDRAULIC DATA	PROP HYDRAULIC DATA
Q_2=700 CFS	Q_2=700 CFS
V_2=3.20 FPS	V_2=3.33 FPS
HW_2=412.93 FT	HW_2=412.89 FT
Q_{100}=4500 CFS	Q_{100}=4500 CFS
V_{100}=5.97 FPS	V_{100}=12.30 FPS
HW_{100}=419.98 FT	HW_{100}=417.25 FT

STA = 14+88.90
EL = 417.37'
ex = -0.16'
K = 50
L = 80.00'

ELEVATION

HL93 LOADING

BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

BRIDGE LAYOUT
CR 2110 @ KICKAPOO CREEK

SCALE: 1"=20'H, 1"=20'V SHEET 1 OF 1

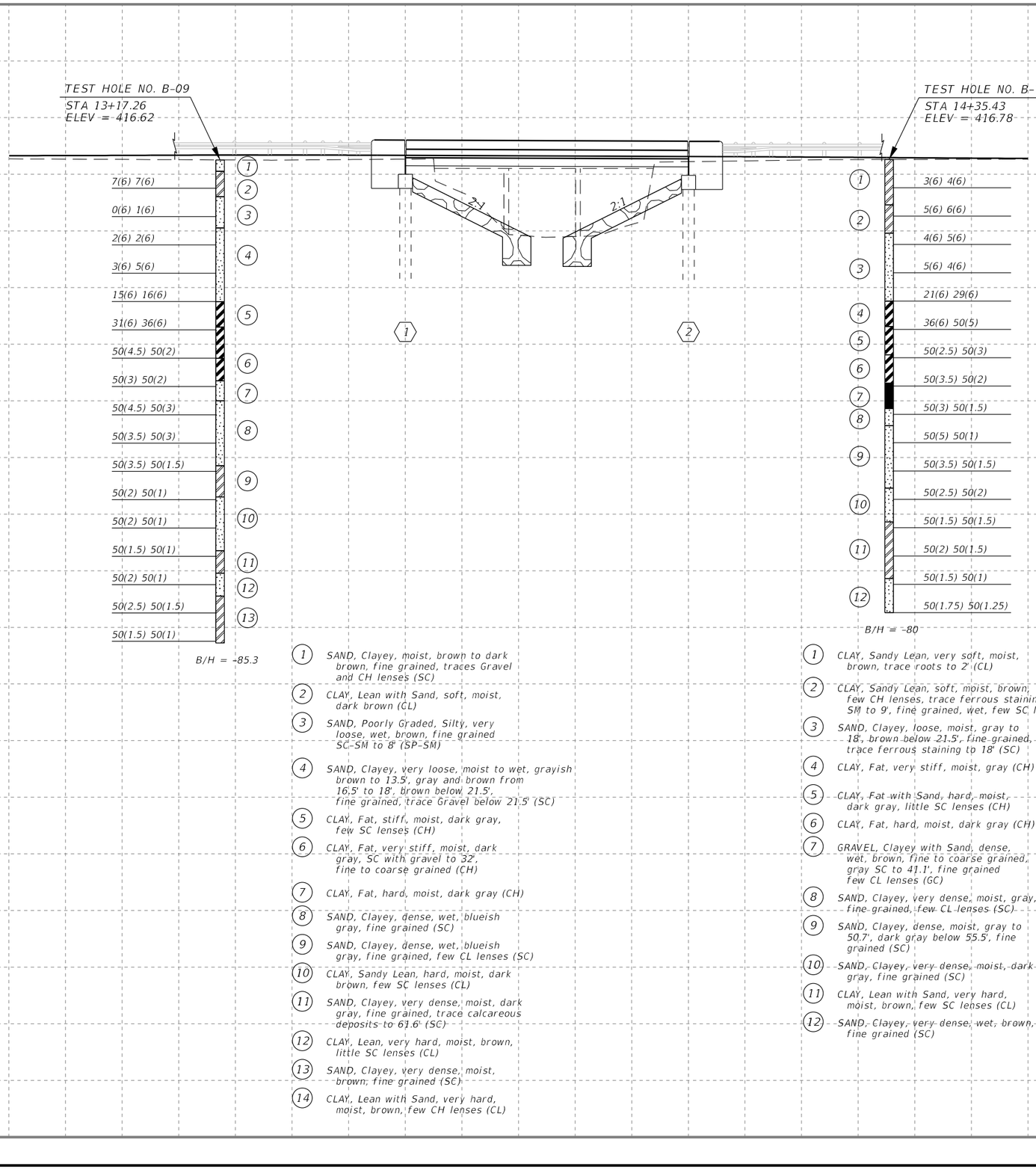
FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 2110
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	71

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_BL03.dgn

100% SUBMITTAL

DATE: 9/7/2021

TIME: 9:39:45 AM



1. SAND, Clayey, moist, brown to dark brown, fine grained, traces Gravel and CH lenses (SC)
2. CLAY, Lean with Sand, soft, moist, dark brown (CL)
3. SAND, Poorly Graded, Silty, very loose, wet, brown, fine grained SC-SM to 8' (SP-SM)
4. SAND, Clayey, very loose, moist to wet, grayish brown to 13.5', gray and brown from 16.5' to 18', brown below 21.5', fine grained, trace Gravel below 21.5' (SC)
5. CLAY, Fat, stiff, moist, dark gray, few SC lenses (CH)
6. CLAY, Fat, very stiff, moist, dark gray, SC with gravel to 32', fine to coarse grained (CH)
7. CLAY, Fat, hard, moist, dark gray (CH)
8. SAND, Clayey, dense, wet, blueish gray, fine grained (SC)
9. SAND, Clayey, dense, wet, blueish gray, fine grained, few CL lenses (SC)
10. CLAY, Sandy Lean, hard, moist, dark brown, few SC lenses (CL)
11. SAND, Clayey, very dense, moist, dark gray, fine grained, trace calcareous deposits to 61.6' (SC)
12. CLAY, Lean, very hard, moist, brown, little SC lenses (CL)
13. SAND, Clayey, very dense, moist, brown, fine grained (SC)
14. CLAY, Lean with Sand, very hard, moist, brown, few CH lenses (CL)

1. CLAY, Sandy Lean, very soft, moist, brown, trace roots to 2' (CL)
2. CLAY, Sandy Lean, soft, moist, brown, few CH lenses, trace ferrous staining, SM to 9', fine grained, wet, few SC lenses (CL)
3. SAND, Clayey, loose, moist, gray to 18', brown below 21.5', fine grained, trace ferrous staining to 18' (SC)
4. CLAY, Fat, very stiff, moist, gray (CH)
5. CLAY, Fat with Sand, hard, moist, dark gray, little SC lenses (CH)
6. CLAY, Fat, hard, moist, dark gray (CH)
7. GRAVEL, Clayey with Sand, dense, wet, brown, fine to coarse grained, gray SC to 41.1', fine grained few CL lenses (GC)
8. SAND, Clayey, very dense, moist, gray, fine grained, few CL lenses (SC)
9. SAND, Clayey, dense, moist, gray to 50.7', dark gray below 55.5', fine grained (SC)
10. SAND, Clayey, very dense, moist, dark gray, fine grained (SC)
11. CLAY, Lean with Sand, very hard, moist, brown, few SC lenses (CL)
12. SAND, Clayey, very dense, wet, brown, fine grained (SC)

DRILLING CONTRACTOR:
CORSAIR CONSULTING LLC.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

TEST HOLE DATA

CR 2110 @ KICKAPOO CREEK

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

SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 2110	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	72

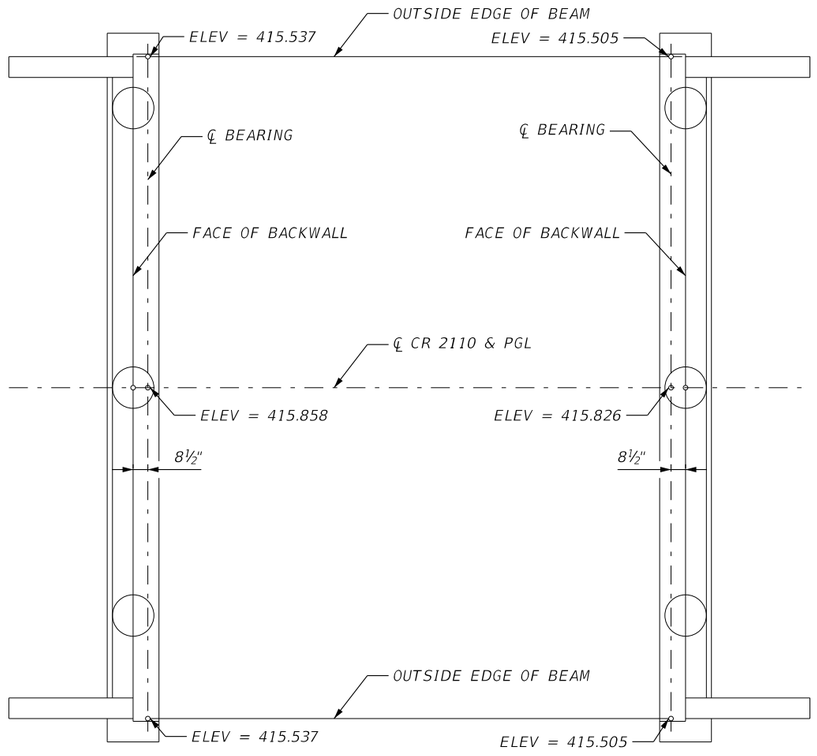
PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_TH03.dgn

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:39:51 AM

SUMMARY OF ESTIMATED QUANTITIES

BID ITEM	400	416	420	422	425	432	450	496
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB15)	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY 223)	REMOV STR (BRIDGE 0-99 FT LENGTH)
	CY	LF	CY	SF	LF	CY	LF	EA
2 - ABUTMENTS	33.4	204	24.0			390	24.0	
1 - 50' PRESTR CONC SLAB BEAM UNIT				1606	396.00		100.0	
TOTAL	33.4	204	24.0	1606	396.00	390	124.0	1



CAP ELEVATION

SEE APSB-30 STANDARD FOR CAP ELEVATION LOCATIONS AT OUTSIDE EDGE OF BEAM

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

ESTIMATED QUANTITIES AND CONTROL ELEVATIONS

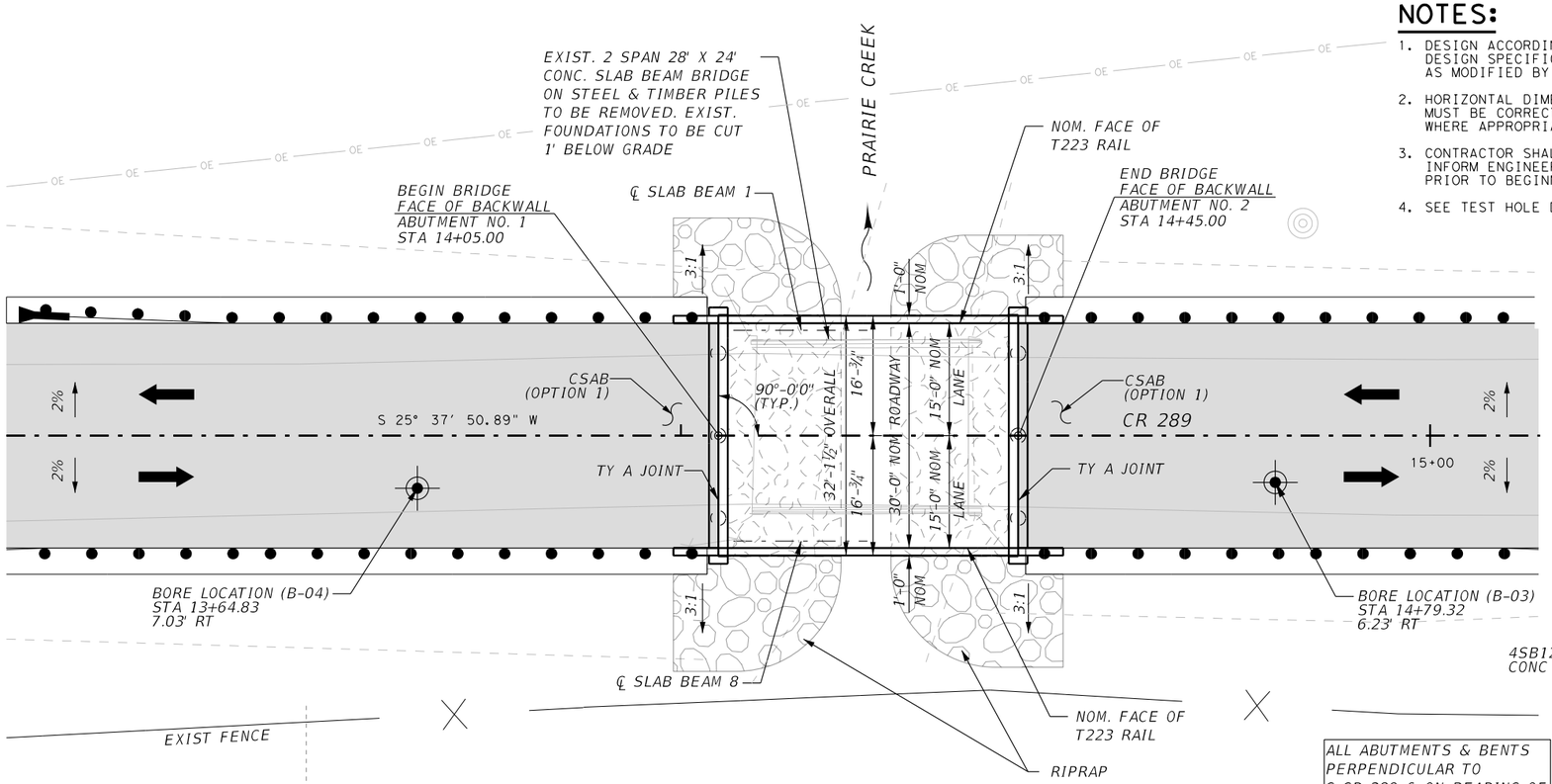
CR 2110
AT KICKAPOO CREEK

SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 2110	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	73

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_BDG_QTY03

100% SUBMITTAL
DATE: 9/7/2021
TIME: 9:39:58 AM



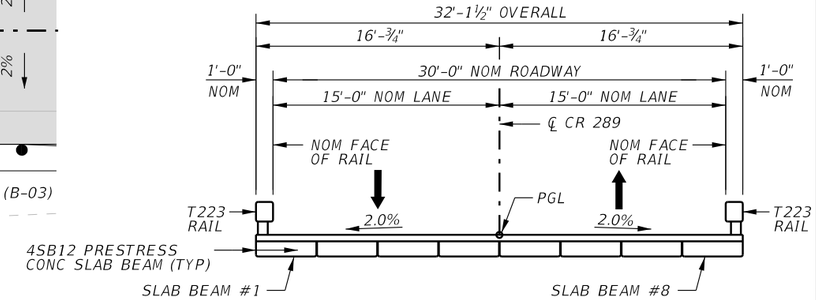
PLAN

ALL ABUTMENTS & BENTS PERPENDICULAR TO ℄ CR 289 & ON BEARING OF S64°22'09.11"E UNLESS NOTED OTHERWISE.

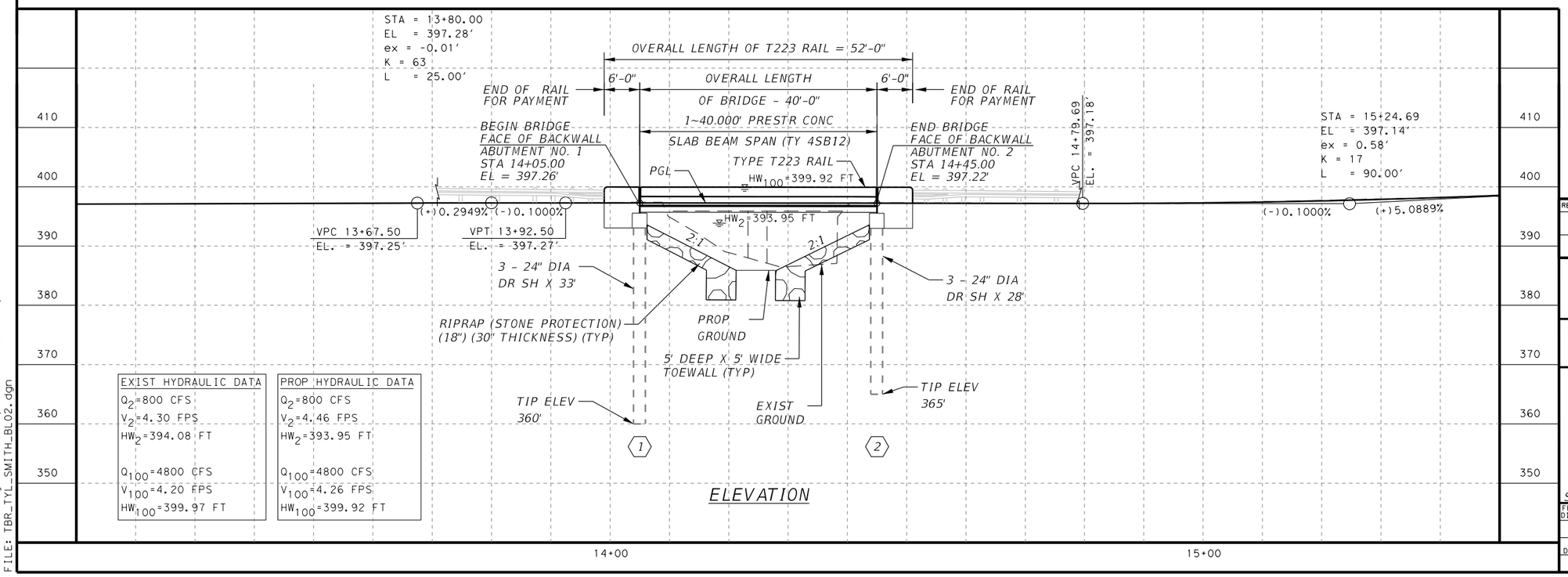
NOTES:

1. DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017), AS MODIFIED BY THE TXDOT BDM, 2020.
2. HORIZONTAL DIMENSIONS ARE SHOWN. LENGTHS MUST BE CORRECTED FOR GRADE OR CROSS-SLOPE WHERE APPROPRIATE.
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
4. SEE TEST HOLE DATA SHEET FOR DRILLING LOGS.
5. DESIGN SPEED: 20 MPH (MEET EXISTING CONDITIONS)
   ADT = 1643 (2018)
   FUNCT CLASS: RURAL LOCAL ROAD
   EXIST NBI: 10-212-0-AA02-89-101
   PROP NBI: 10-212-0-AA02-89-001
6. TEST HOLE LOCATIONS ARE APPROXIMATE.
7. CONTRACTOR'S ATTENTION IS DRAWN TO POTENTIAL WATER BEARING SAND IN THE BORING LOGS. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO MAINTAIN THE STABILITY OF SHAFT HOLES.
8. STANDING WATER MAY BE PRESENT AND REQUIRE PERMANENT CASING FOR DRILLED SHAFT INSTALLATION. SUBMIT FOR APPROVAL, CASING TOP AND TIP ELEVATIONS, CASING INSTALLATION METHODS, AND ALL OTHER PERTINENT INFORMATION REQUIRED UNDER ITEM 416 FOR THE ENGINEER TO REVIEW. ALL COSTS ASSOCIATED WITH PERMANENT CASING WILL BE INCIDENTAL TO ITEM 416.

0 10 20
SCALE IN FEET



TRANSVERSE TYPICAL SECTION
N.T.S.



EXIST HYDRAULIC DATA	PROP HYDRAULIC DATA
Q_2=800 CFS	Q_2=800 CFS
V_2=4.30 FPS	V_2=4.46 FPS
HW_2=394.08 FT	HW_2=393.95 FT
Q_{100}=4800 CFS	Q_{100}=4800 CFS
V_{100}=4.20 FPS	V_{100}=4.26 FPS
HW_{100}=399.97 FT	HW_{100}=399.92 FT

ELEVATION

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

BRIDGE LAYOUT
CR 289 @ PRAIRIE CREEK

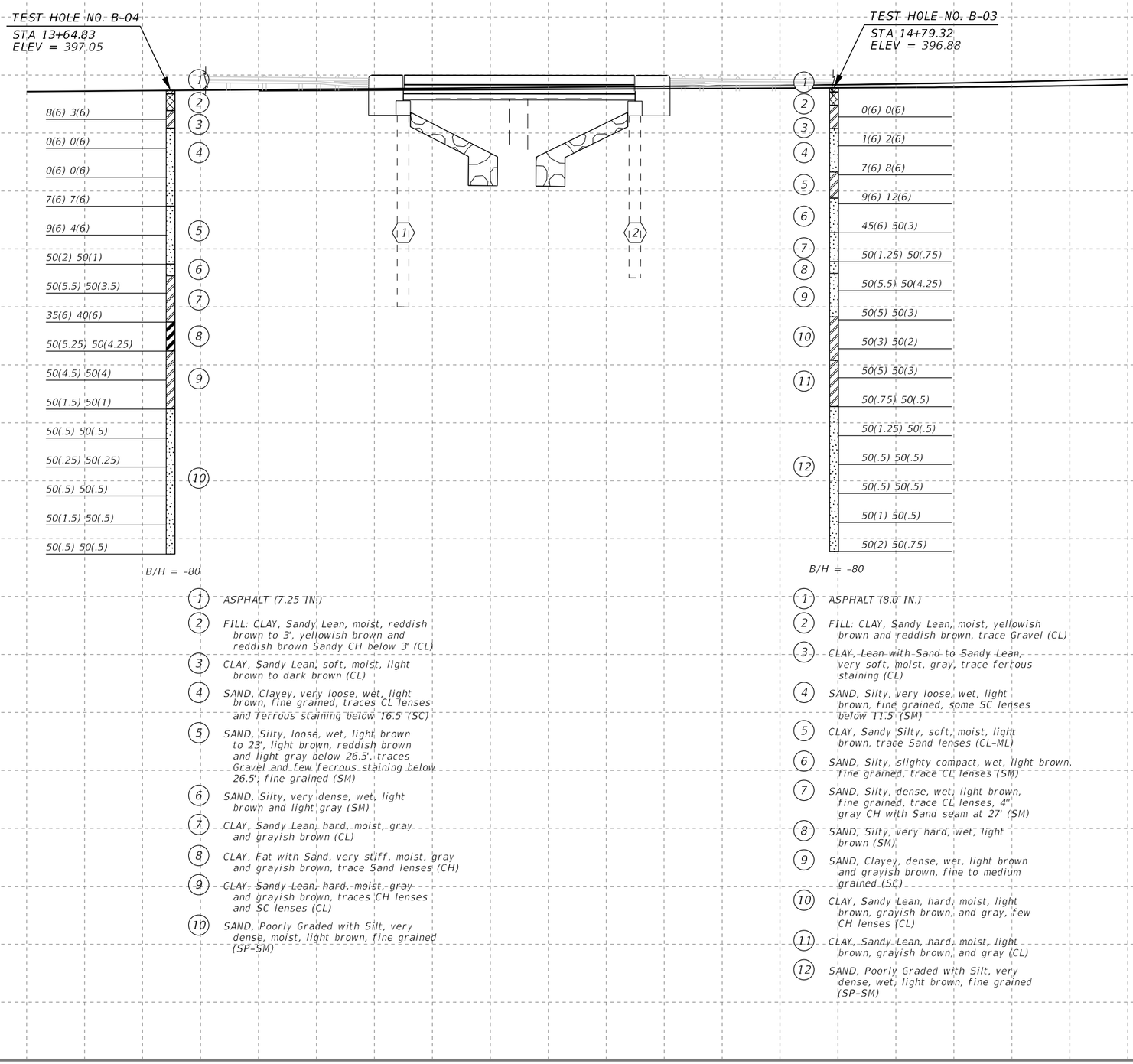
SCALE: 1"=20'H, 1"=20'V
SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.
6	TEXAS	SEE TITLE SHEET		CR 289
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	74

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_BL02.dgn

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:40:07 AM



DRILLING CONTRACTOR:
CORSAIR CONSULTING LLC.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

TEST HOLE DATA

CR 289 @ PRAIRIE CREEK

SCALE: 1"=20'H, 1"=20'V SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 289
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	75

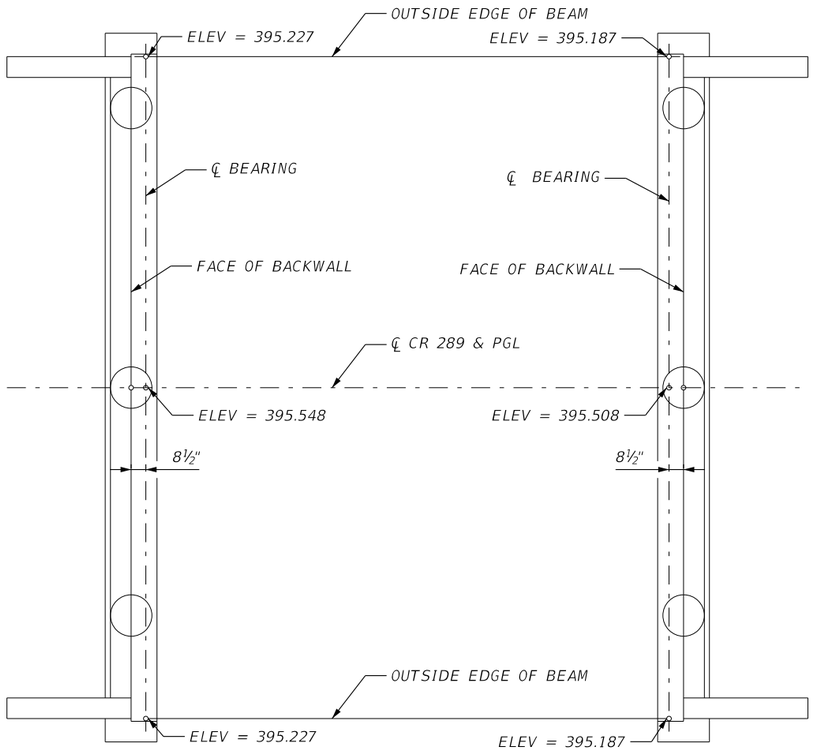
PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_TH02.dgn

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:40:13 AM

SUMMARY OF ESTIMATED QUANTITIES

BID ITEM / BID ITEM DESCRIPTION / BRIDGE ELEMENT	400 CEM STABIL BKFL	416 DRILL SHAFT (24 IN)	420 CL C CONC (ABUT)	422 REINF CONC SLAB (SLAB BEAM)	425 PRESTR CONC SLAB BEAM (4SB12)	432 RIPRAP (STONE PROTECTION) (18 IN)	450 RAIL (TY 223)	496 REMOV STR (BRIDGE 0-99 FT LENGTH)
	CY	LF	CY	SF	LF	CY	LF	EA
2 - ABUTMENTS	30.3	183	23.2			254	24.0	
1 - 40' PRESTR CONC SLAB BEAM UNIT				1285	316.00		80.0	
TOTAL	30.3	183	23.2	1285	316.00	254	104.0	1



CAP ELEVATION

SEE APSB-30 STANDARD FOR CAP ELEVATION LOCATIONS AT OUTSIDE EDGE OF BEAM

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED
PROFESSIONAL ENGINEER
9/7/2021

HL93 LOADING

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

ESTIMATED QUANTITIES AND CONTROL ELEVATIONS

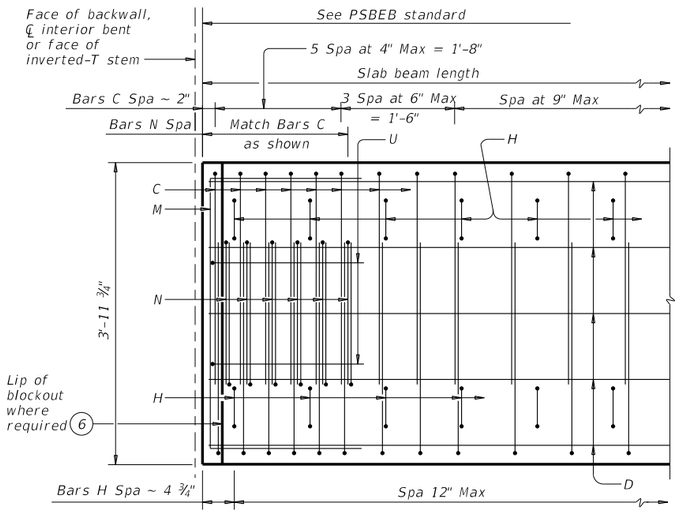
CR 289
AT PRAIRIE CREEK

SHEET 1 OF 1

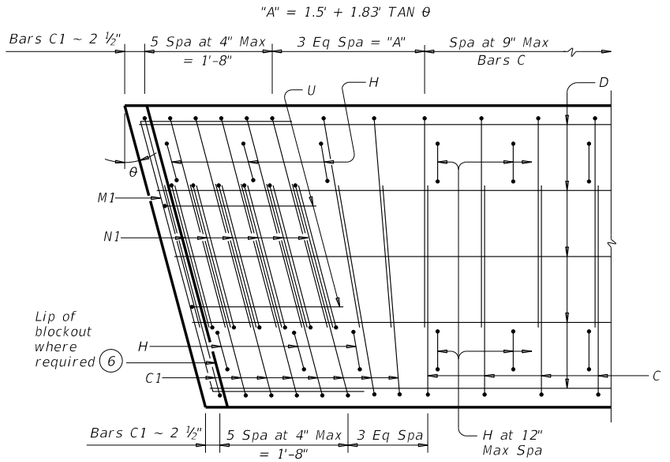
FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 289	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	76

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_BDG_QTY02

DATE: 5/20/2021 8:56:11 AM
FILE: ...\SMITH STD BDG\psbsts01-17.dgn

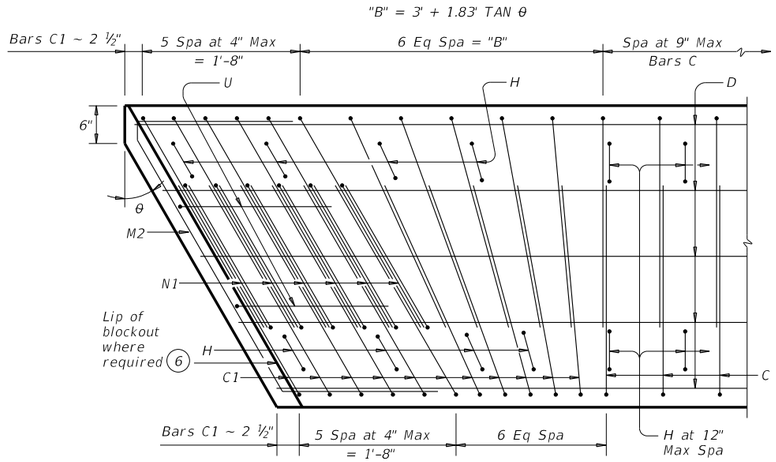


PART PLAN



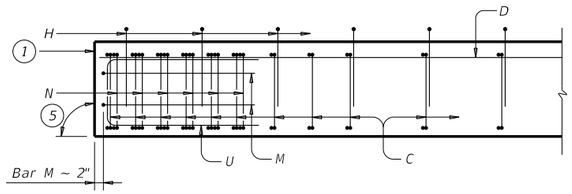
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

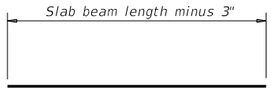


PART SKEW PLAN

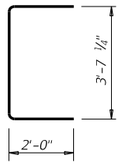
(Showing θ over 15° to 30° Skew)



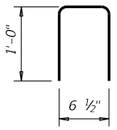
ELEVATION



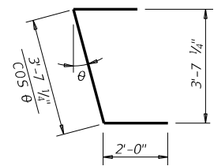
BARS D(#6)



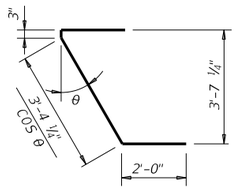
BARS M(#4)



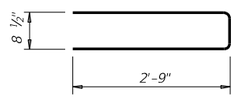
BARS H(#4)



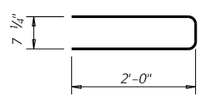
BARS M1(#4)



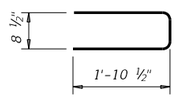
BARS M2(#4)



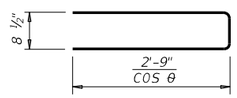
BARS C(#4)



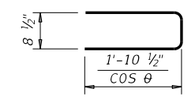
BARS U(#5)



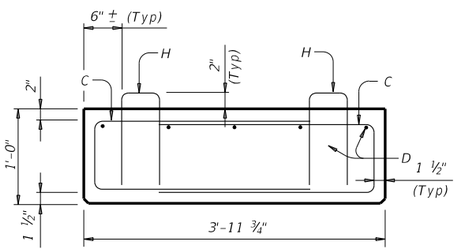
BARS N(#4)



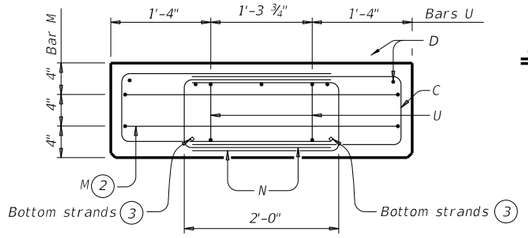
BARS C1(#4)



BARS N1(#4)

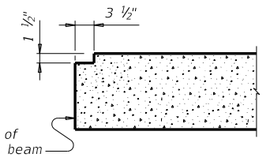


SECTION



END MAT REINFORCING

Bars H not shown for clarity.



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	573.0
Y top	in	6.00
Y bott	in	6.00
I	in^4	6,876
Weight (4)	lb/ft	597

(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 3/4" or round to a 3/4" 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

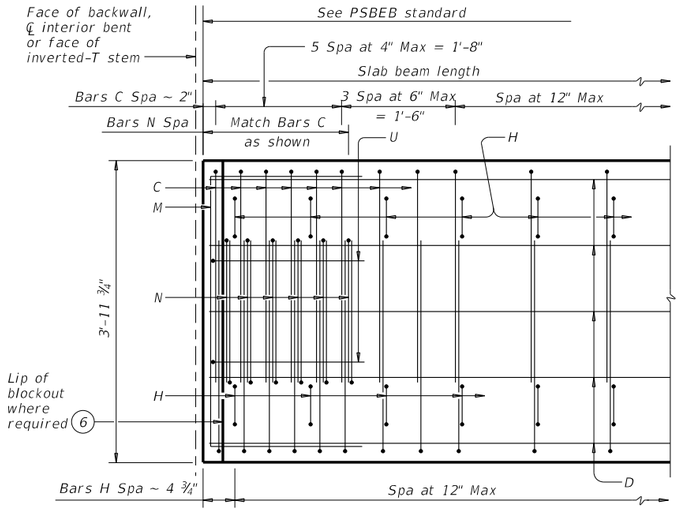
PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 4SB12)

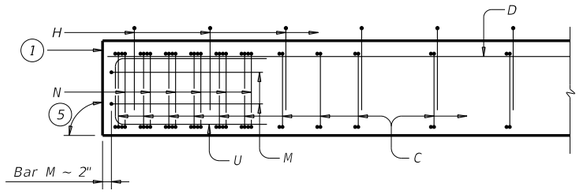
PSB-4SB12

FILE: psbsts01-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		77

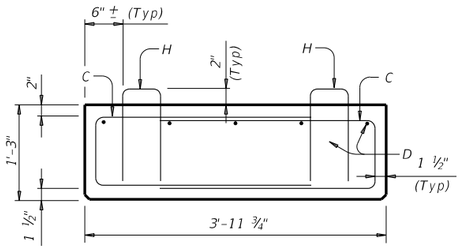
DATE: 5/20/2021 8:56:20 AM
FILE: ...\SMITH STD BDG\psbsts02-17.dgn



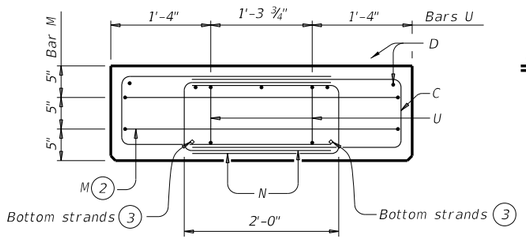
PART PLAN



ELEVATION

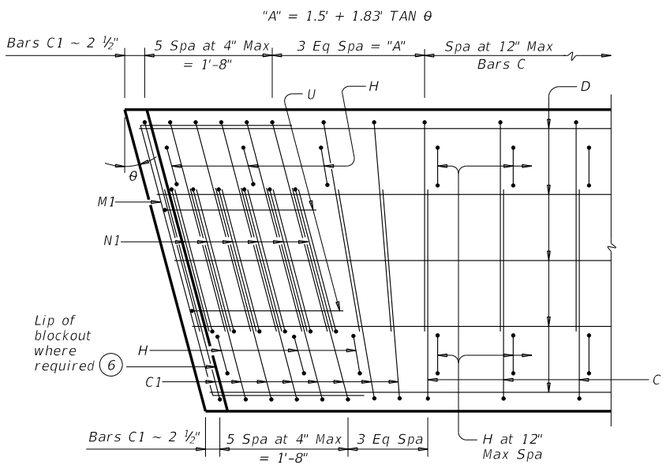


SECTION



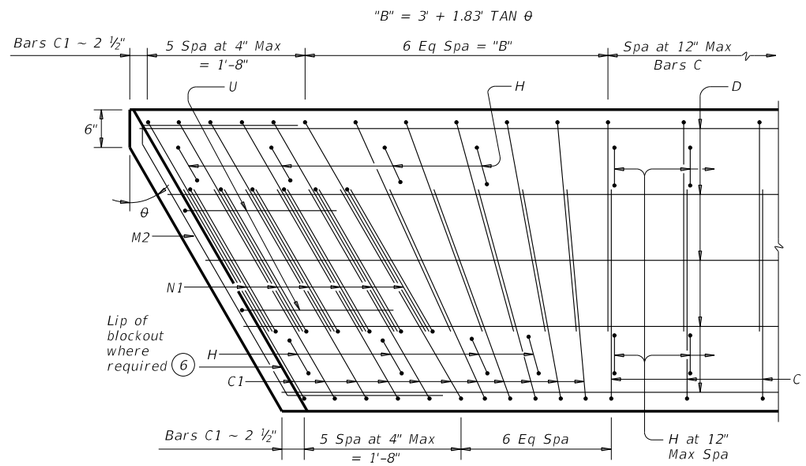
END MAT REINFORCING

Bars H not shown for clarity.



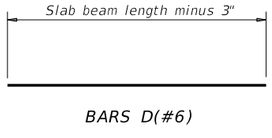
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

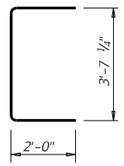


PART SKEW PLAN

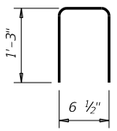
(Showing θ over 15° to 30° Skew)



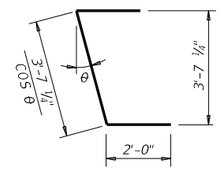
BARS D(#6)



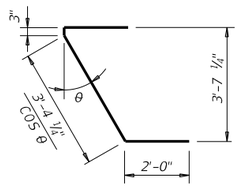
BARS M(#4)



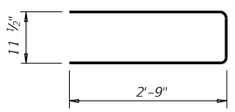
BARS H(#4)



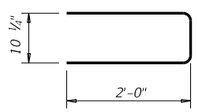
BARS M1(#4)



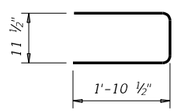
BARS M2(#4)



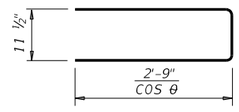
BARS C(#4)



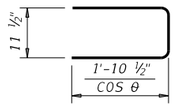
BARS U(#5)



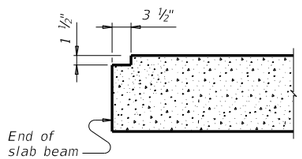
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	716.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	13,429
Weight (4)	lb/ft	746

(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

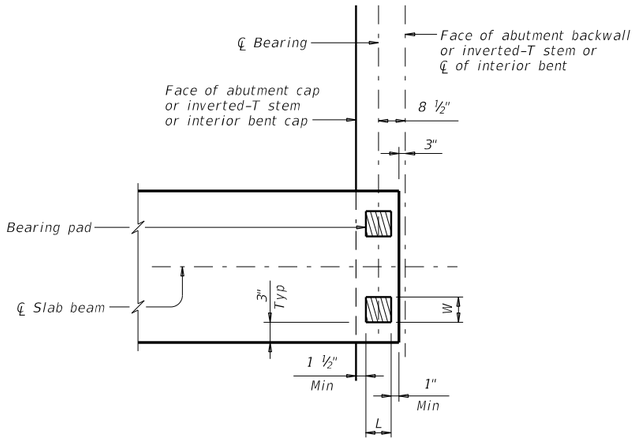
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

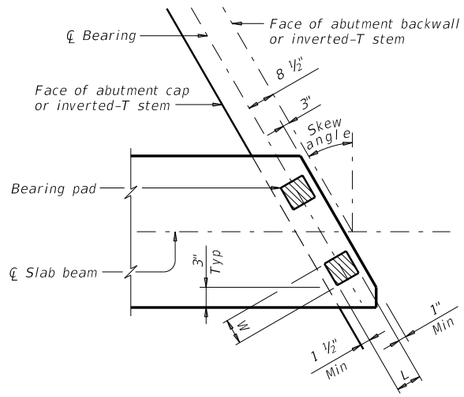
(TYPE 4SB15)

PSB-4SB15

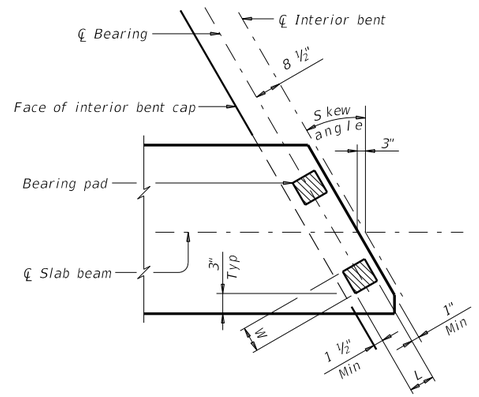
FILE: psbsts02-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		78



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)



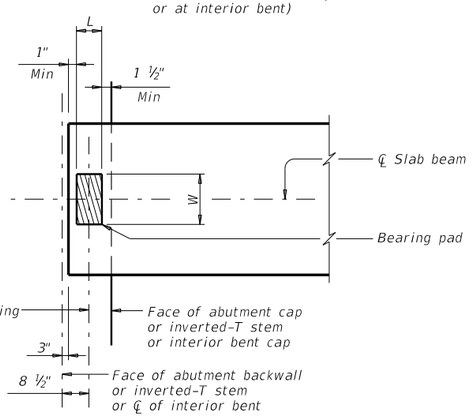
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

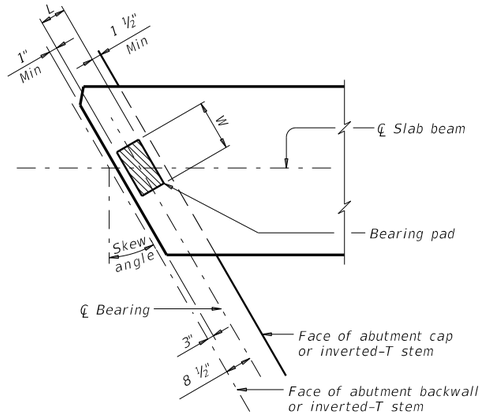
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

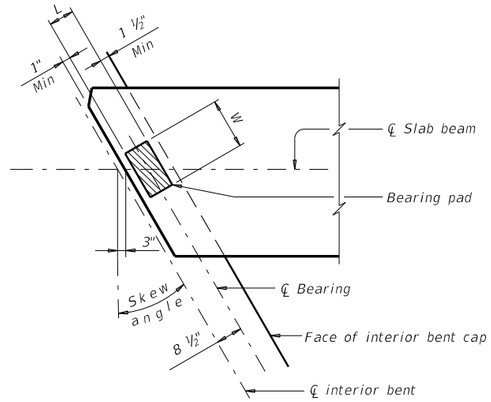
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



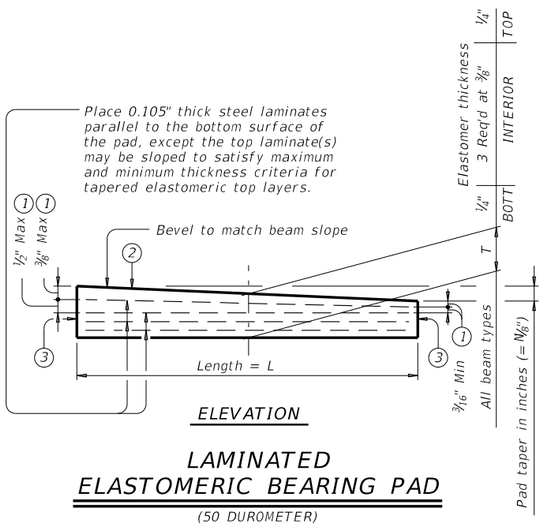
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



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

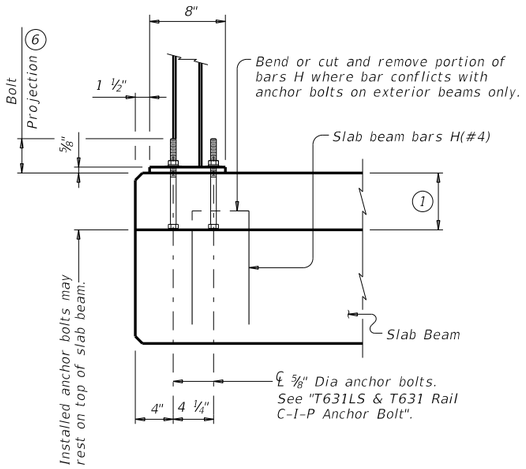
ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

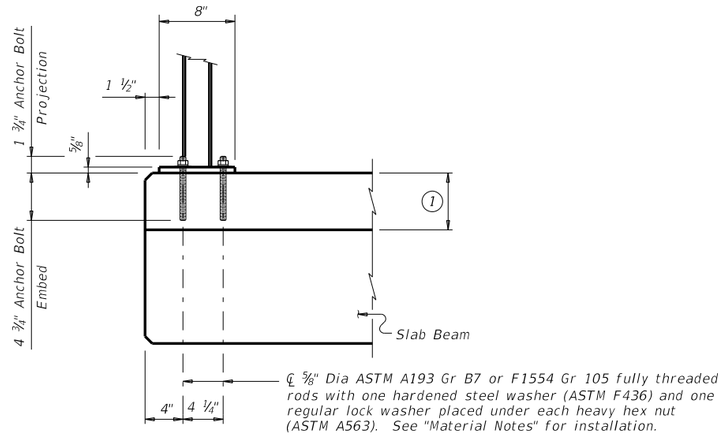
PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		79

DATE: 5/20/2021 8:56:28 AM
FILE: ...\SMITH STD BDG\psbste06-17.dgn



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 bitumuminous 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	16	147,ETC	WHITTLE ST,ETC
03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		80

DESIGNED BEAMS (STRAIGHT STRANDS)

STRUCTURE	SPAN LENGTH (ft)	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB	DEBONDED STRANDS PER ROW: DIST FROM BOTTOM (in)	NO. OF STRANDS: TOTAL	DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end): 3	6	9	12	15	CONCRETE: RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)
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
	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
	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
	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
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
	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
	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
	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
	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
	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
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
	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
	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
	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
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
	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
	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
	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
	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
	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
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
	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
	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
	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
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
	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
	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
	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
	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
	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

OPTIONAL DESIGN

STRUCTURE	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) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2): Moment	Shear
24' ROADWAY SB12 BEAM	0.914	-1.217	448	0.450	0.450
	1.292	-1.685	530	0.450	0.450
	1.730	-2.219	675	0.450	0.450
	2.218	-2.796	820	0.440	0.440
24' ROADWAY SB15 BEAM	0.725	-0.897	551	0.450	0.450
	1.020	-1.244	574	0.450	0.450
	1.361	-1.640	708	0.450	0.450
	1.739	-2.068	864	0.440	0.440
	2.179	-2.574	1054	0.440	0.440
	2.680	-3.153	1276	0.440	0.440
28' ROADWAY SB12 BEAM	0.903	-1.184	444	0.430	0.430
	1.276	-1.639	508	0.430	0.430
	1.708	-2.159	647	0.430	0.430
	2.200	-2.744	799	0.430	0.430
28' ROADWAY SB15 BEAM	0.716	-0.874	529	0.430	0.430
	1.007	-1.212	570	0.430	0.430
	1.343	-1.598	680	0.430	0.430
	1.725	-2.032	842	0.430	0.430
	2.149	-2.508	1013	0.420	0.420
	2.643	-3.073	1227	0.420	0.420
30' ROADWAY SB12 BEAM	0.904	-1.187	341	0.340	0.340
	1.277	-1.646	407	0.340	0.340
	1.711	-2.169	518	0.340	0.340
	2.205	-2.758	640	0.340	0.340
30' ROADWAY SB15 BEAM	0.723	-0.888	431	0.350	0.350
	1.017	-1.231	438	0.350	0.350
	1.346	-1.605	545	0.340	0.340
	1.729	-2.043	675	0.340	0.340
	2.166	-2.542	823	0.340	0.340
	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.

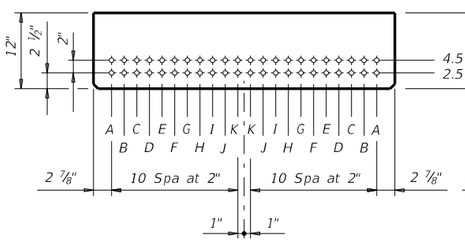
(2) Portion of full HL93.

DESIGN NOTES:

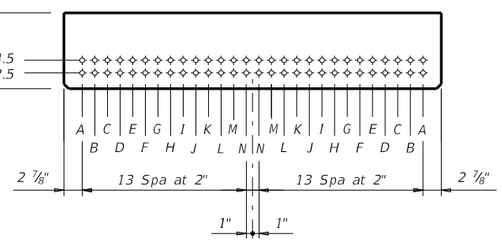
Designed according to AASHTO LRFD Bridge Design Specifications.
Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

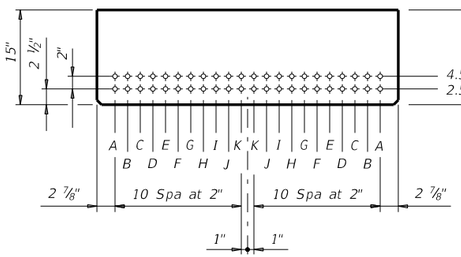
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
Full-length debonded strands are not permitted in positions "A" and "B".
Strand debonding must comply with Item 424.4.2.2.2.4.
When shown on this sheet, the Fabricator has 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.



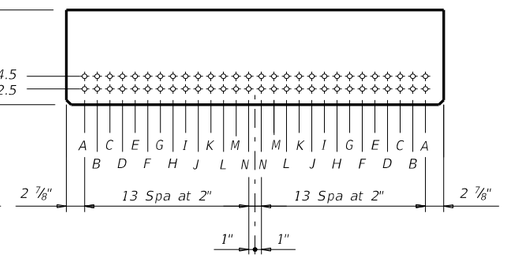
TxDOT 4SB12 SLAB BEAM



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)

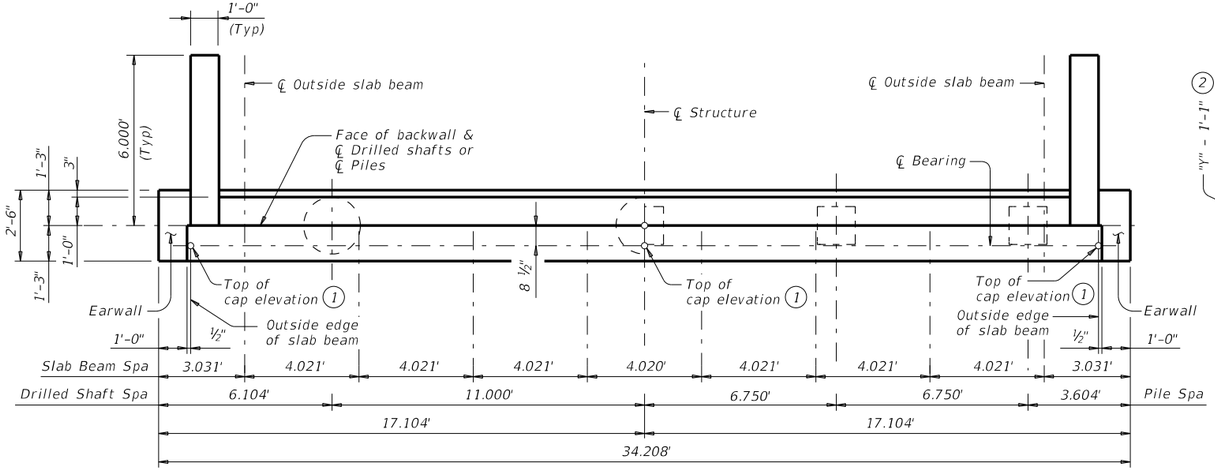
24', 28' & 30' ROADWAY

PSBSD

FILE: psbsts08-17.dgn	DN: SRW	CK: BMP	DW: SFS	CK: SDB
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		81

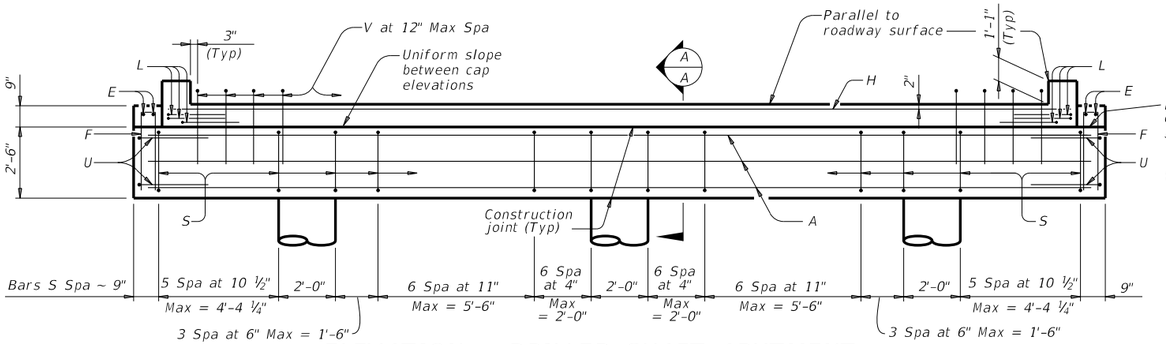
DATE: 5/20/2021 8:56:45 AM
FILE: ...\SMITH STD BDG\psbst\s08-17.dgn

DATE: 5/20/2021 8:56:53 AM
FILE: ...\SMITH STD BDG\psbste17-17.dgn

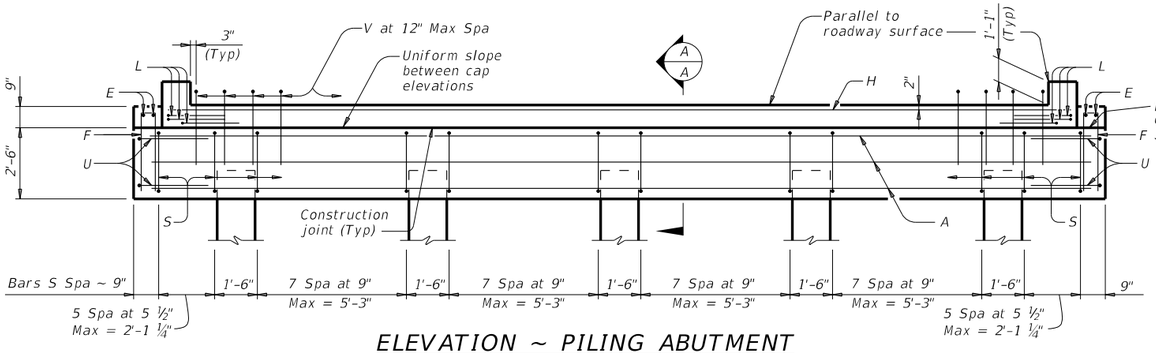


SHOWING DRILLED SHAFTS SHOWING PILES

PLAN

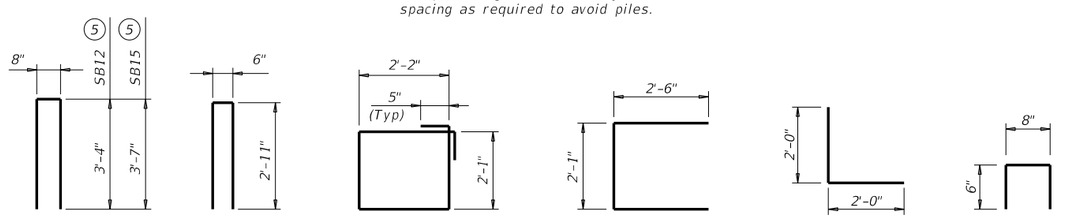


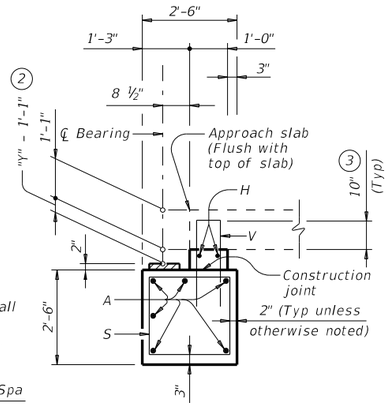
ELEVATION ~ DRILLED SHAFT ABUTMENT



ELEVATION ~ PILING ABUTMENT

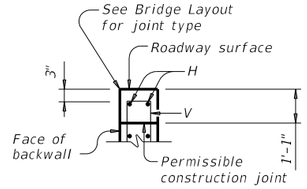
Note: For piles larger than 16", adjust Bars S spacing as required to avoid piles.





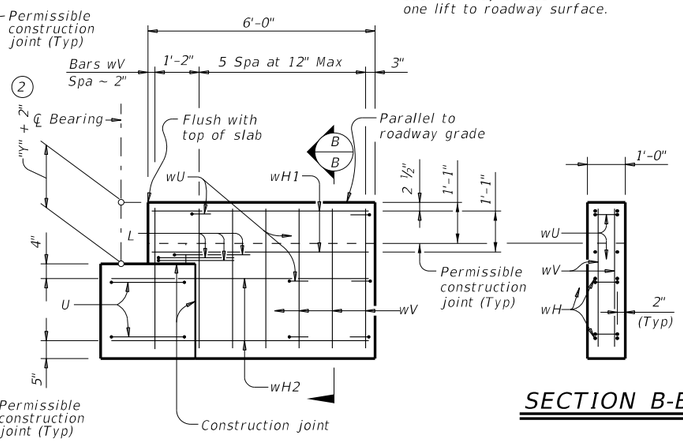
SECTION A-A (4)

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



BACKWALL DETAIL (4)

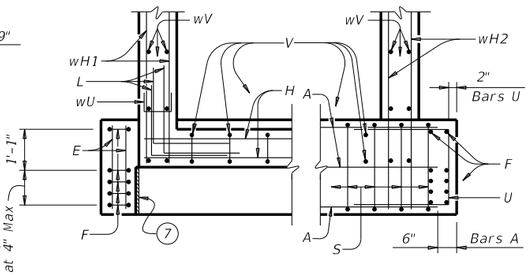
(Without Approach Slab)
Note: At Contractor's option, backwall may be cast in one lift to roadway surface.



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	
	4SB12	4SB15	4SB12	4SB15
25	43	46	26	28
30	48	51	29	31
35	53	57	32	34
40	57	62	34	37
45		67		40
50		71		43

TABLE OF ESTIMATED QUANTITIES (6)

Bar	No.	Size	Length (5)		Weight (5)	
			4SB12	4SB15	4SB12	4SB15
A	6	#11	33'-3"	33'-3"	1,060	1,060
E	4	#4	2'-2"	2'-2"	6	6
F	10	#4	6'-4"	6'-4"	43	43
H	2	#5	31'-10"	31'-10"	66	66
L	6	#6	4'-0"	4'-0"	36	36
S	44	#4	9'-4"	9'-4"	275	275
U	4	#6	7'-1"	7'-1"	43	43
V	31	#5	7'-4"	7'-10"	237	253
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	2,043	2,066
Cl "C" Conc (Abut)				CY	10.4	10.8

(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 1.2 CY Class "C" concrete and 66 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-30 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

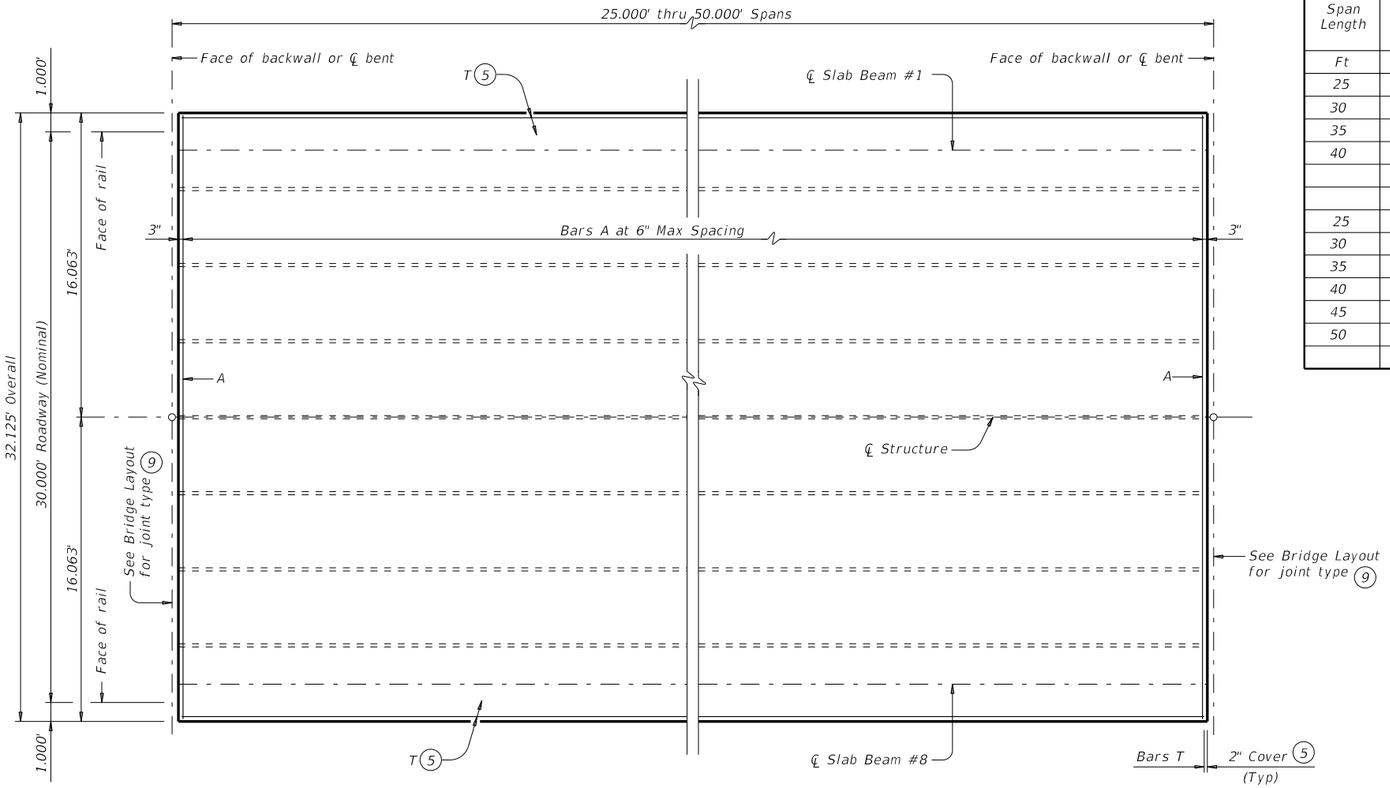
PRESTR CONCRETE SLAB BEAM

30' ROADWAY

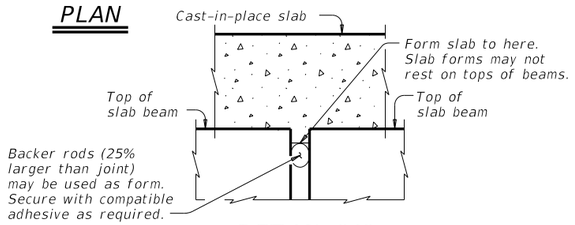
APSB-30

FILE: psbste17-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		82

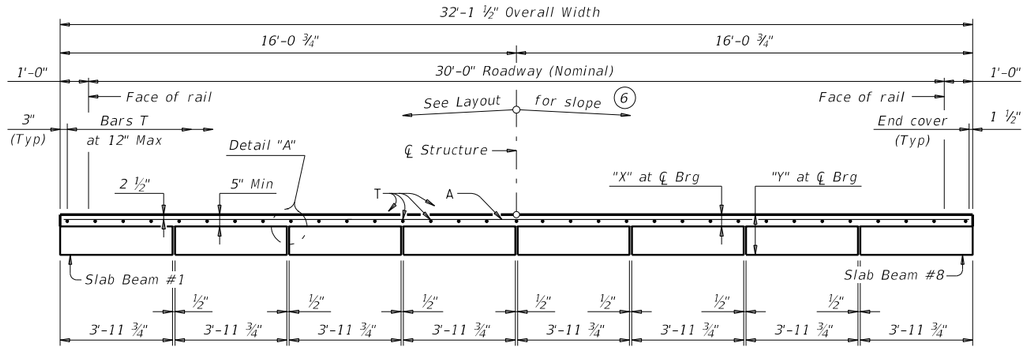
DATE: 5/20/2021 8:57:03 AM
FILE: ...\SMITH STD BDG\psbste36-17.dgn



PLAN



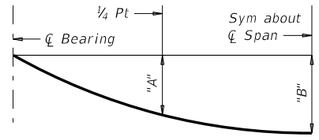
DETAIL "A"



TYPICAL TRANSVERSE SECTION

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	4SB12	0.003	0.005	5 ¼"	1'-5 ¼"
30	4SB12	0.007	0.010	5 ½"	1'-5 ½"
35	4SB12	0.014	0.020	6"	1'-6"
40	4SB12	0.025	0.035	6 ½"	1'-6 ½"
25	4SB15	0.002	0.003	5 ¼"	1'-8 ¼"
30	4SB15	0.004	0.005	5 ½"	1'-8 ½"
35	4SB15	0.007	0.010	5 ½"	1'-8 ½"
40	4SB15	0.013	0.018	5 ¾"	1'-8 ¾"
45	4SB15	0.021	0.029	6 ½"	1'-9 ½"
50	4SB15	0.032	0.045	7"	1'-10"

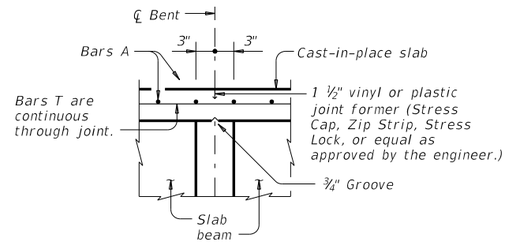


DEAD LOAD DEFLECTION DIAGRAM

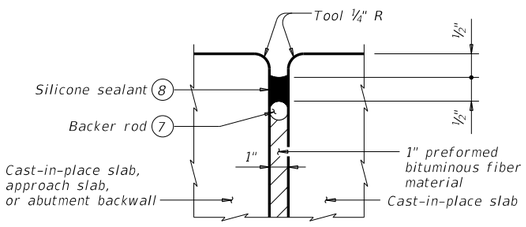
NOTE: Deflections shown are due to concrete slab only (E_C = 5,000 ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

BAR TABLE

BAR	SIZE
A	#5
T	#4



CONTINUOUS SLAB DETAIL



TYPE A JOINT DETAIL (9)

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (4SB12 OR 4SB15) (1)			TOTAL (2) REINF STEEL
		ABUT TO INT BT	INT BT TO INT BT	ABUT TO ABUT	
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	803	196.00	196.00	196.00	2,250
30	964	236.00	236.00	236.00	2,700
35	1,124	276.00	276.00	276.00	3,150
40	1,285	316.00	316.00	316.00	3,600
45	1,446	356.00	356.00	356.00	4,050
50	1,606	396.00	396.00	396.00	4,500

(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".

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

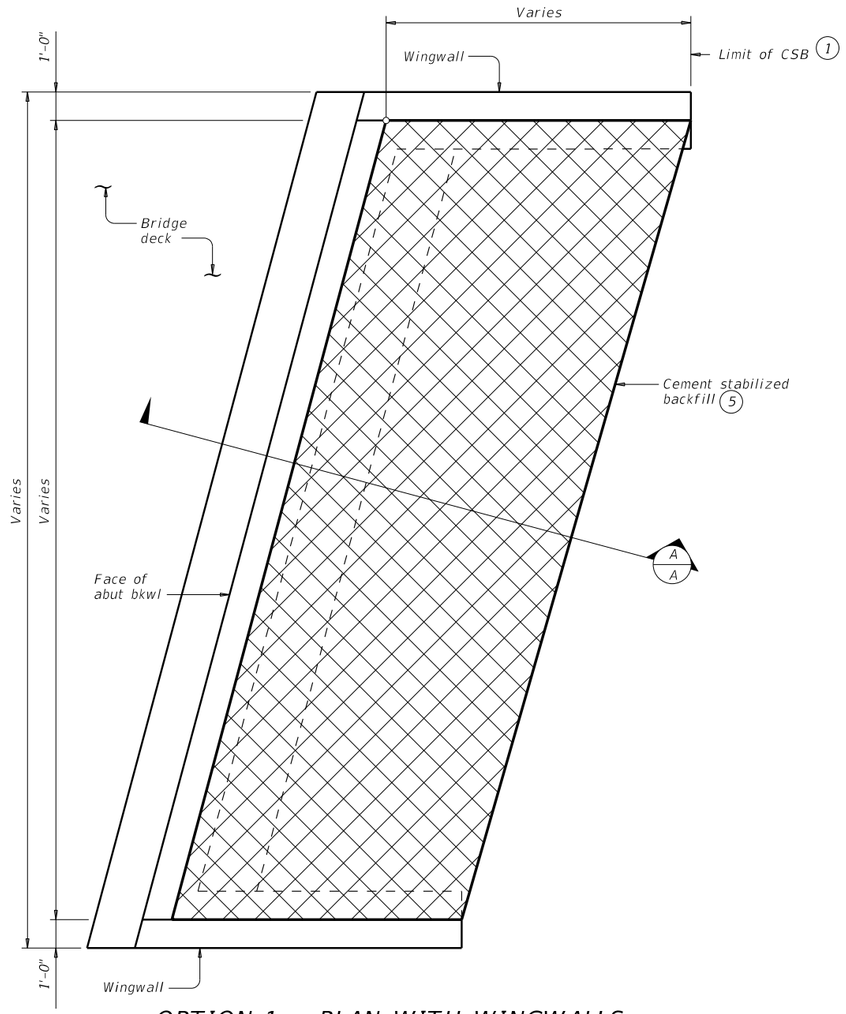
PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

30' ROADWAY

SPSB-30

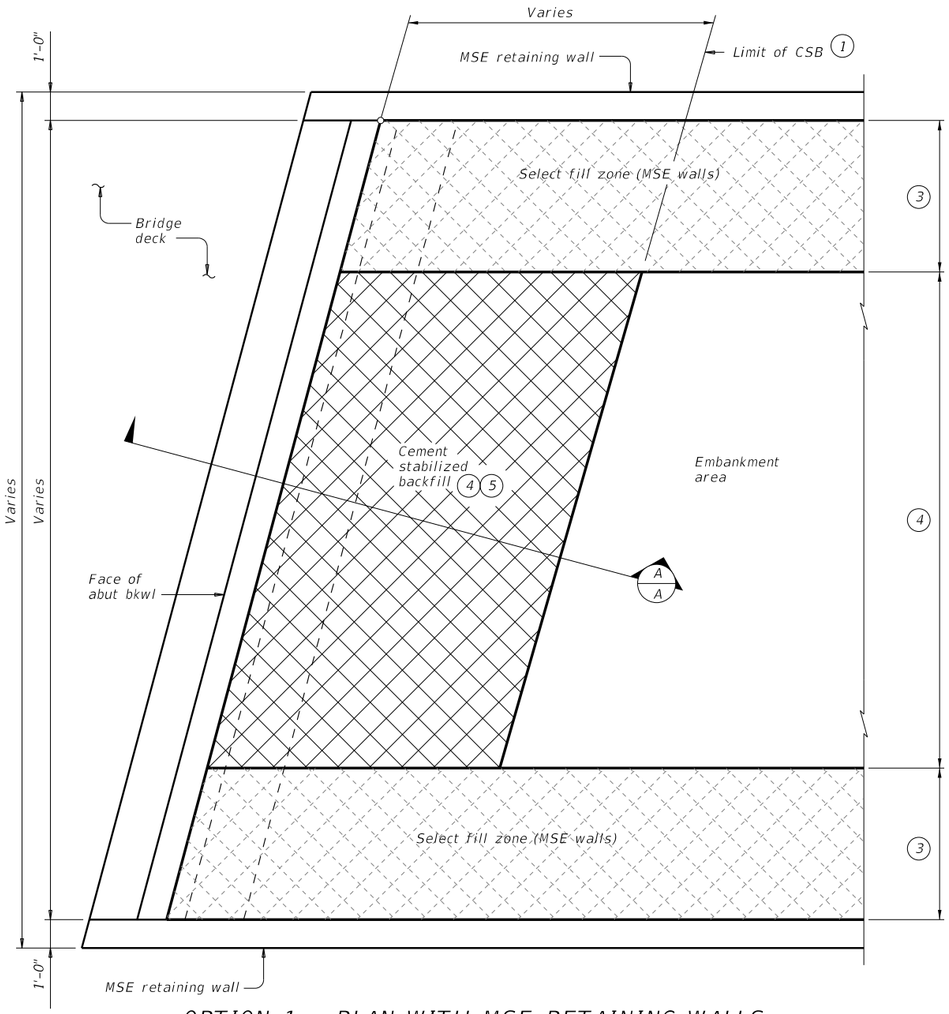
FILE: psbste36-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		83

DATE: 5/20/2021 8:57:11 AM
FILE: ...\SMITH STD BDG\csabste1-20.dgn

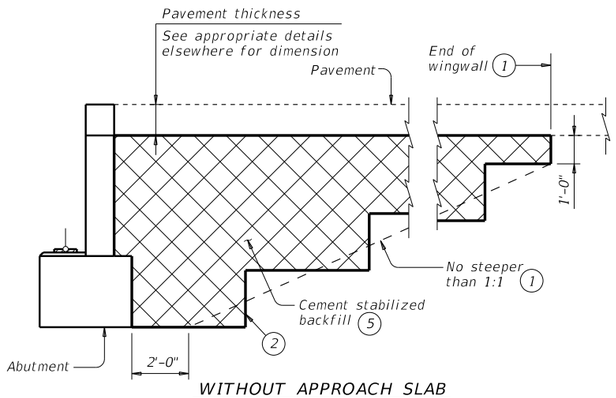


OPTION 1 ~ PLAN WITH WINGWALLS

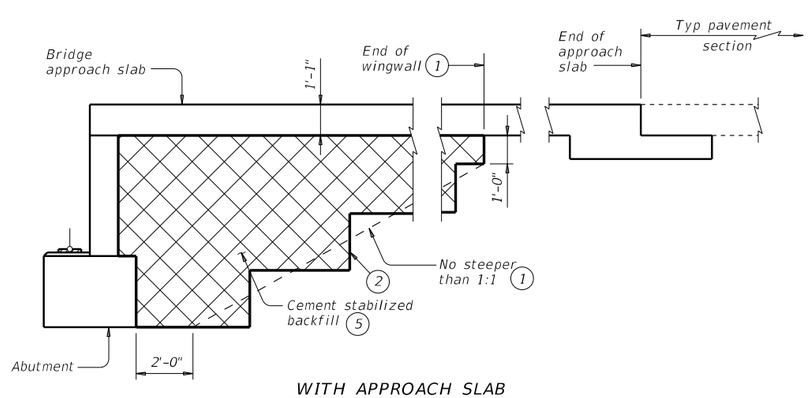
Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION A-A

(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).

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

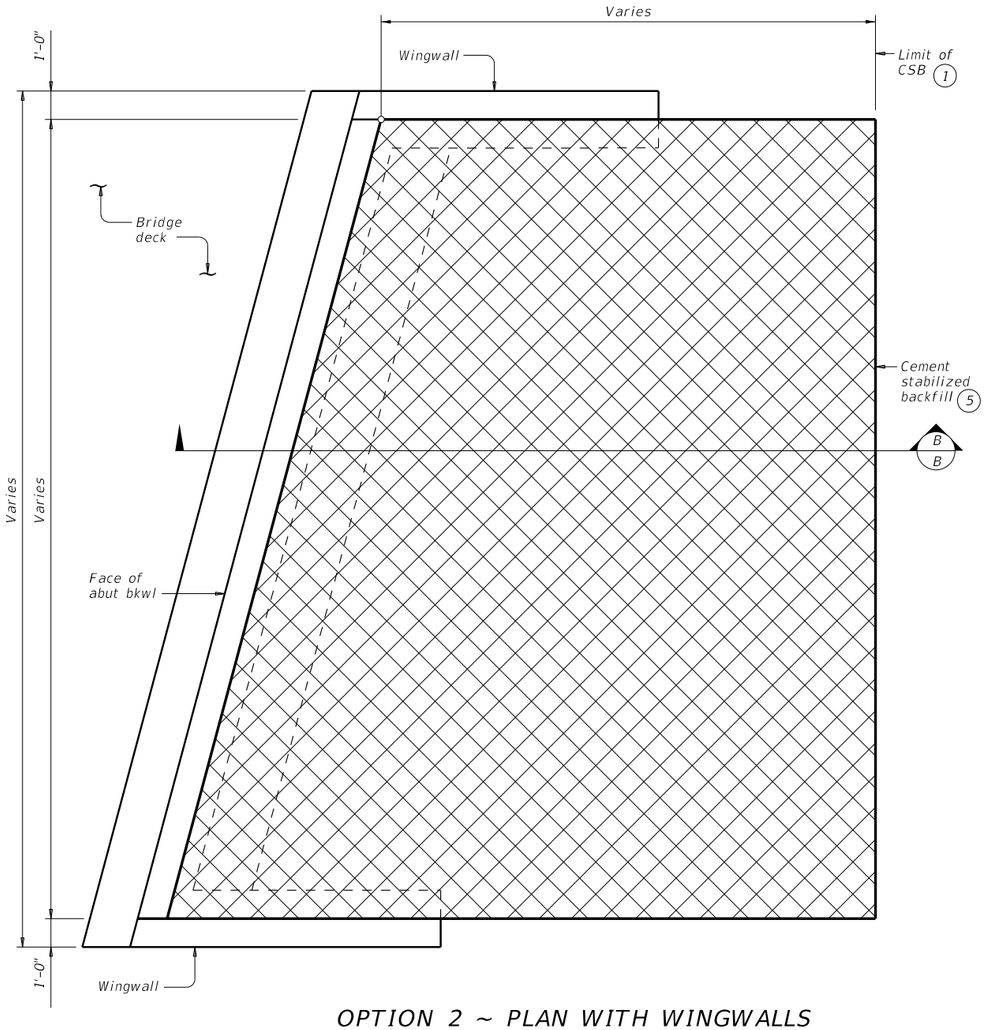
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

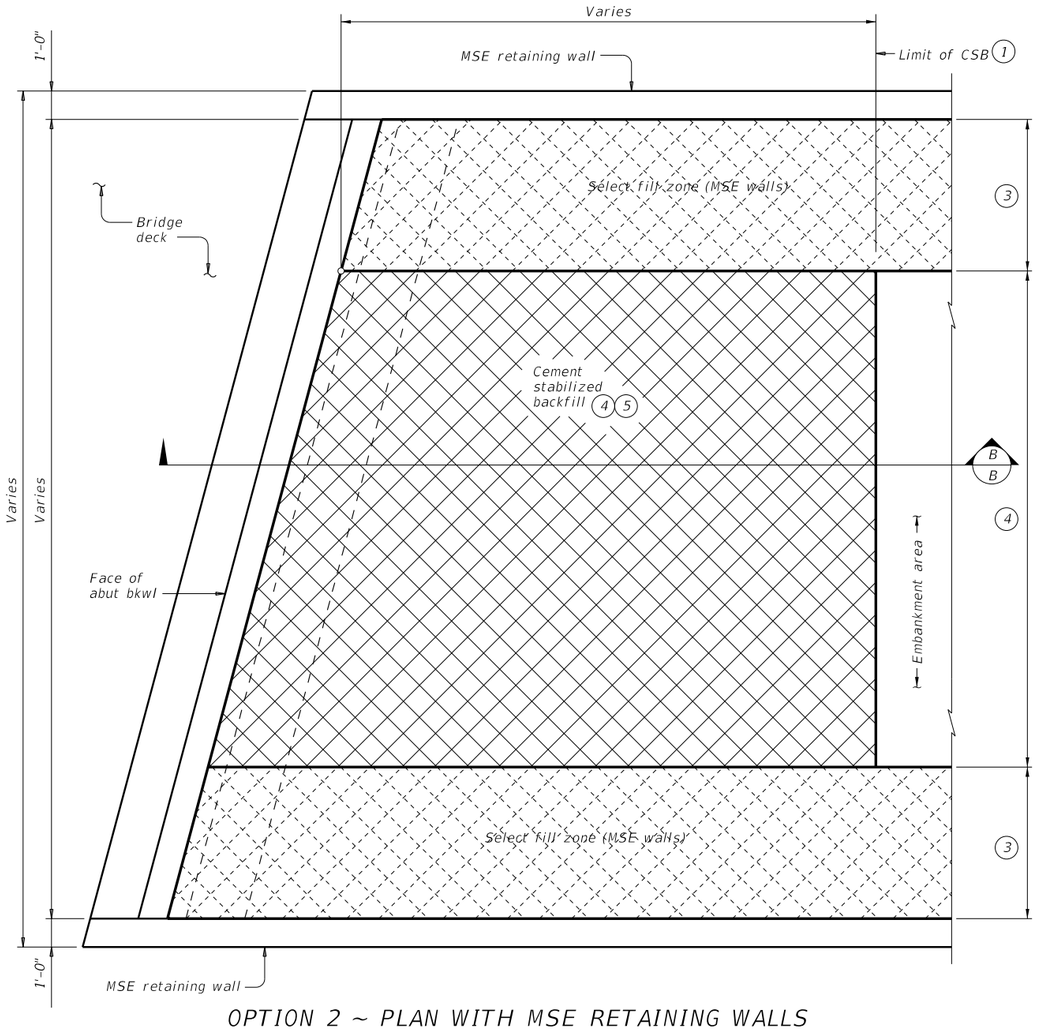
FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		84

DATE: 5/20/2021 8:57:11 AM
FILE: ...\SMITH STD BDG\csabste1-20.dgn



OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

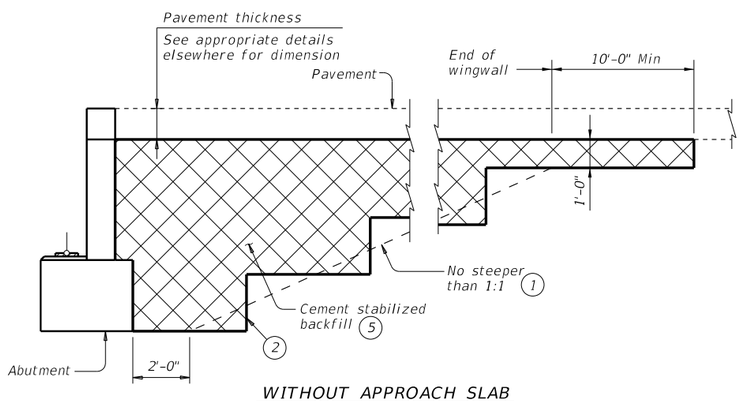
(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

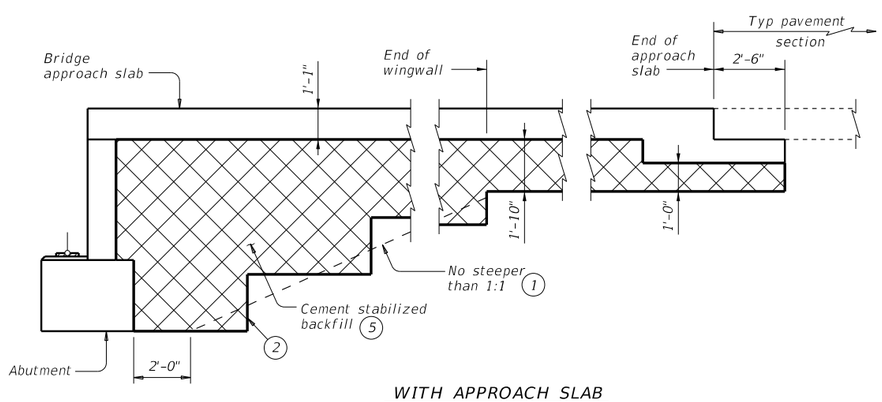
(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(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

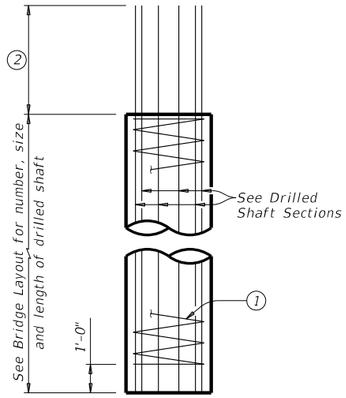
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

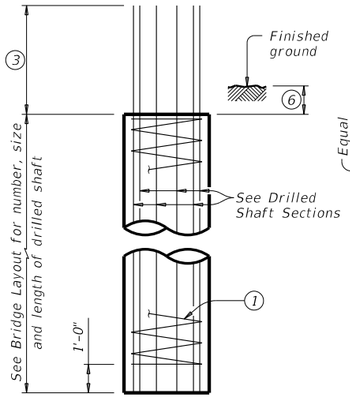
CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		85

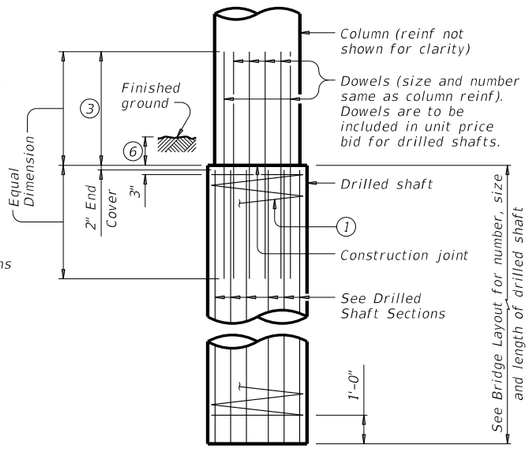
DATE: 5/20/2021 8:57:17 AM
FILE: ...\SMITH STD BDG\fdstde01-20.dgn



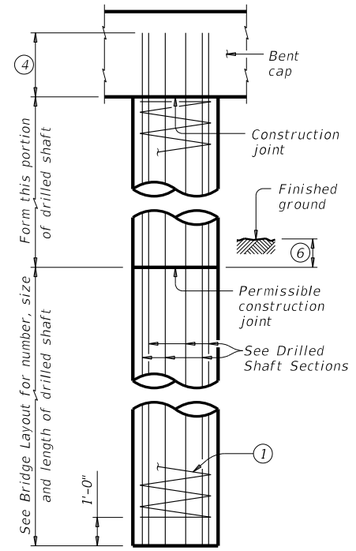
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



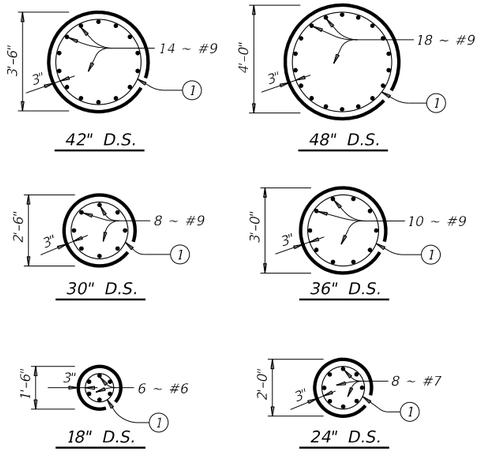
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

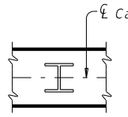


DRILLED SHAFT SECTIONS

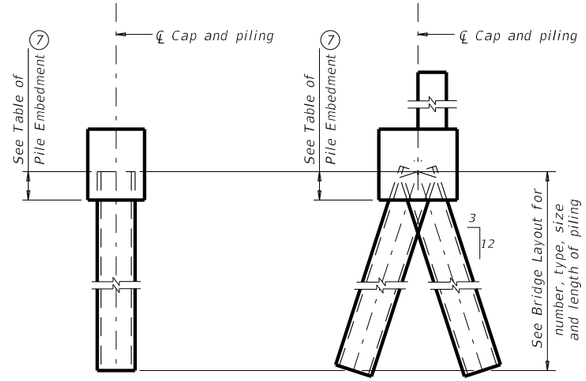
DRILLED SHAFT DETAILS

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"

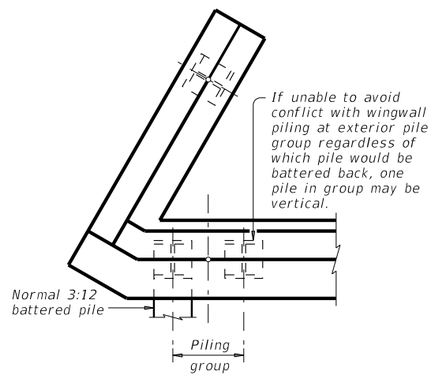
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



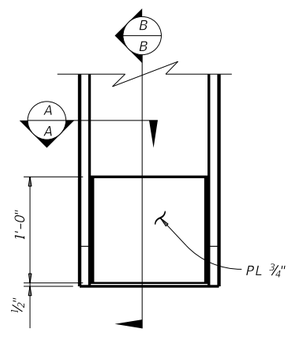
ORIENTATION OF STEEL H-PILING



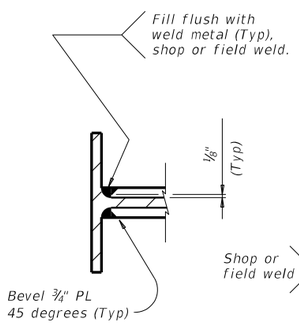
PILING DETAILS
(Concrete or steel H)



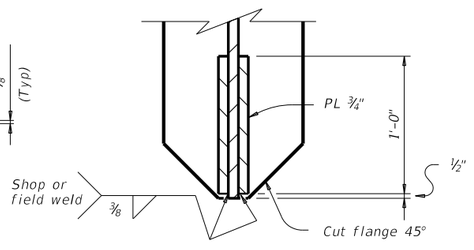
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION



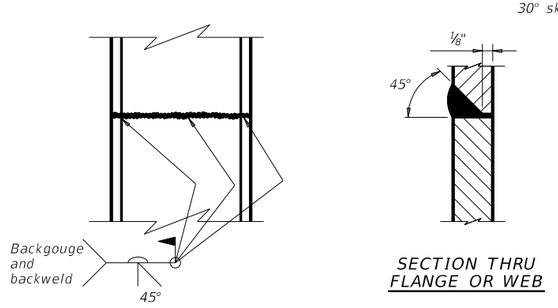
SECTION A-A



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.

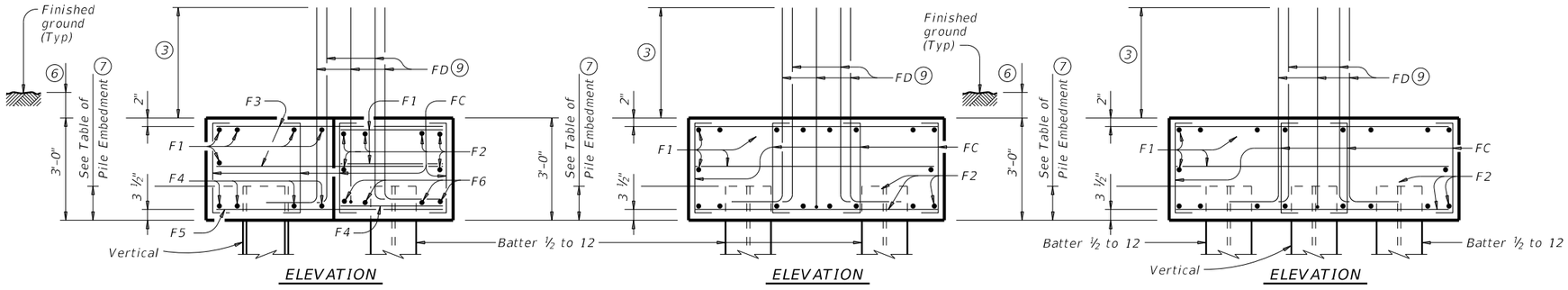
Texas Department of Transportation

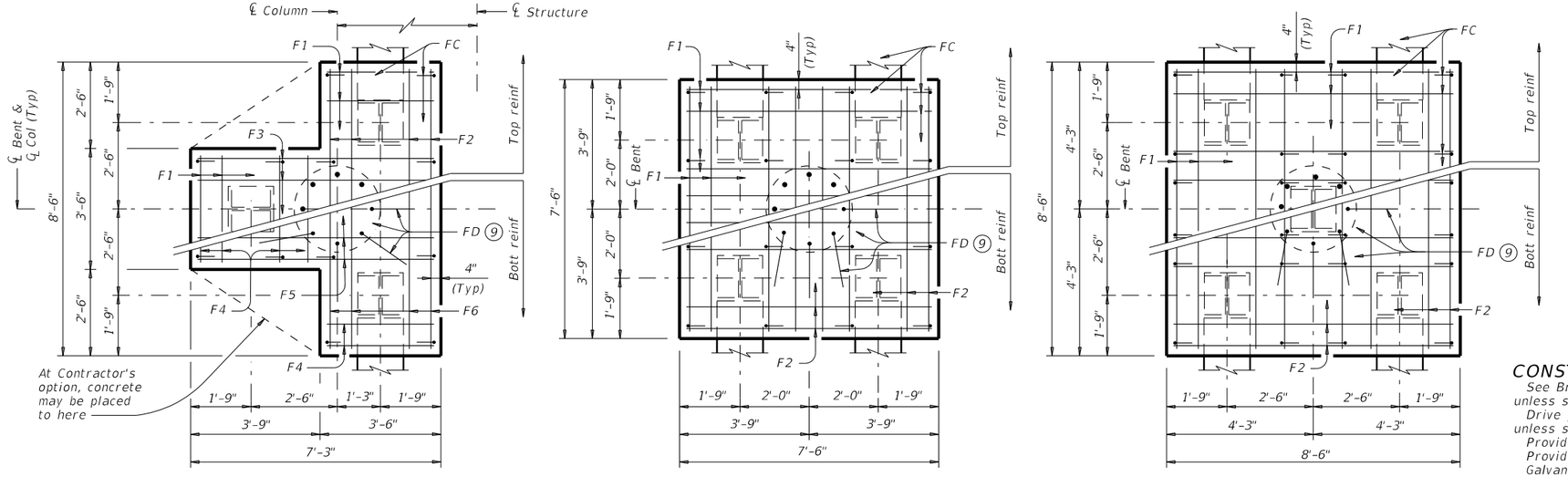
Bridge Division Standard

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	16	147,ETC	WHITTLE ST,ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		86





THREE PILE FOOTING (8)

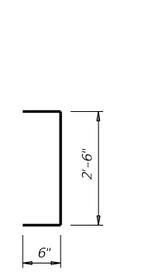
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

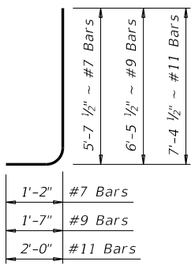
For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



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.

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

Texas Department of Transportation

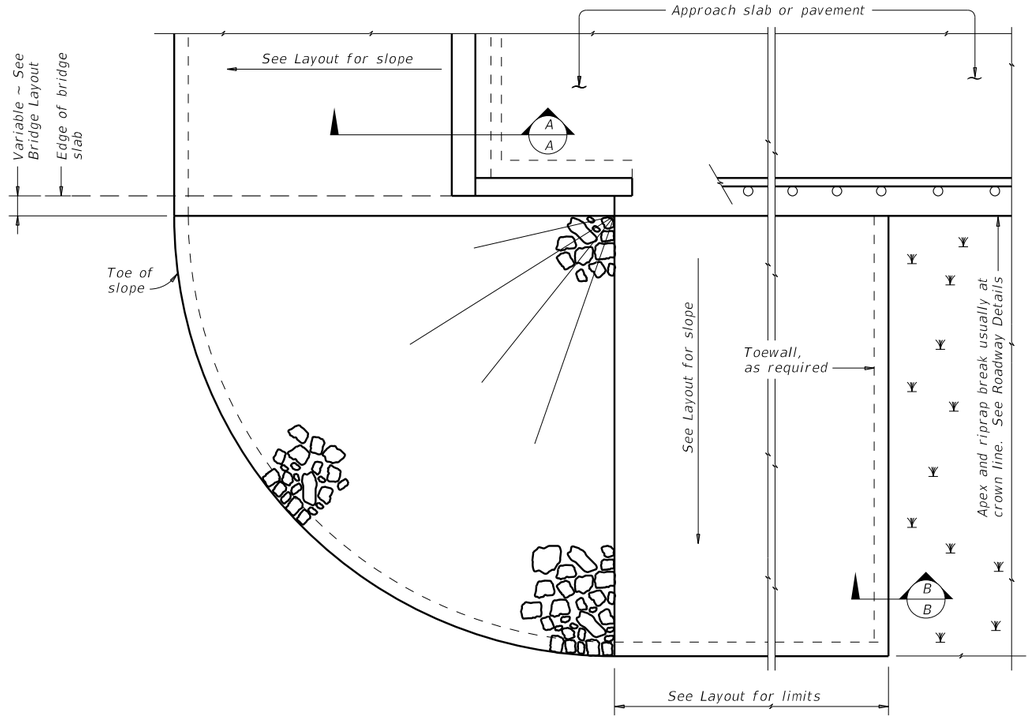
Bridge Division Standard

COMMON FOUNDATION DETAILS

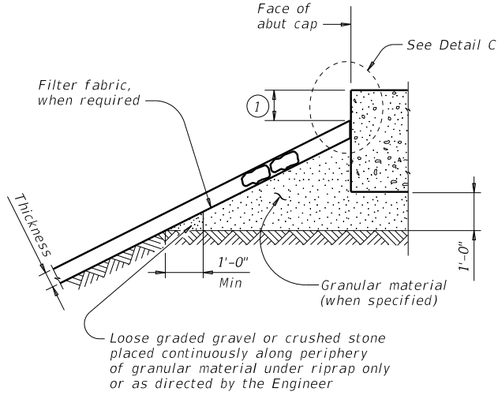
FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	TYL	SMITH		87

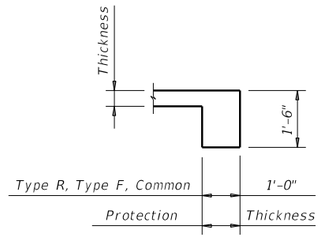
DATE: 5/20/2021 8:57:18 AM
FILE: ...\SMITH STD BDG\fdstde01-20.dgn



PLAN

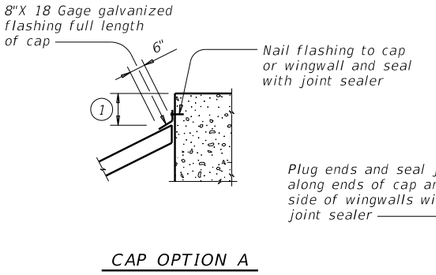


SECTION A-A AT CAP

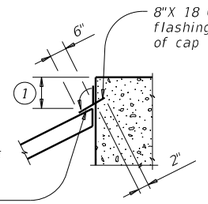


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

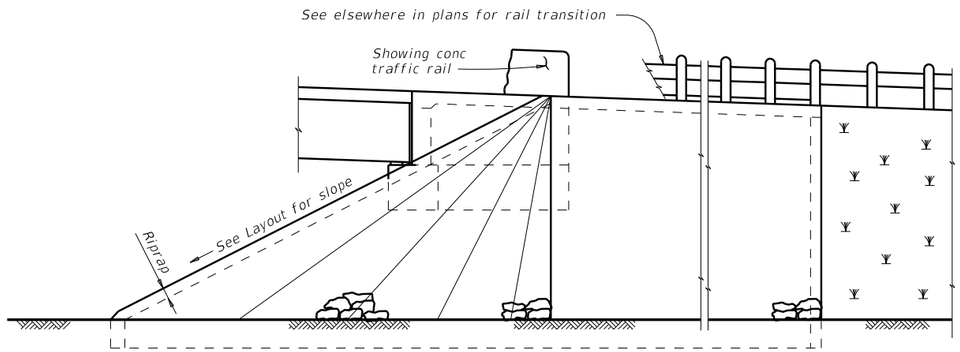


CAP OPTION A



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	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		88

DATE: 5/20/2021 8:57:24 AM
FILE: ...\SMITH STD BDG\srrstde1-19.dgn

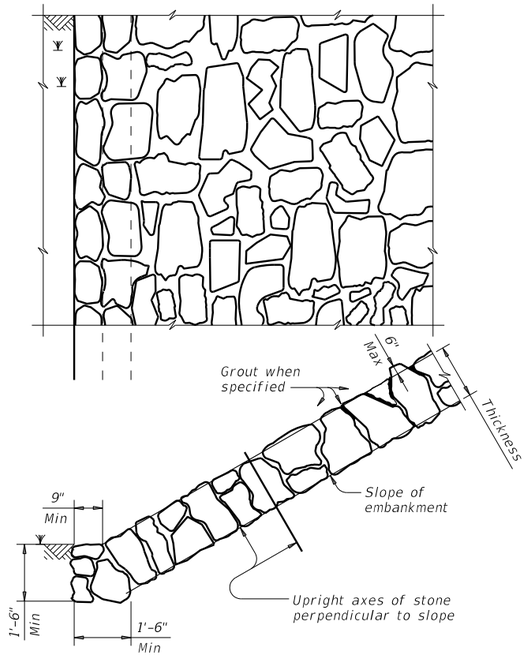


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

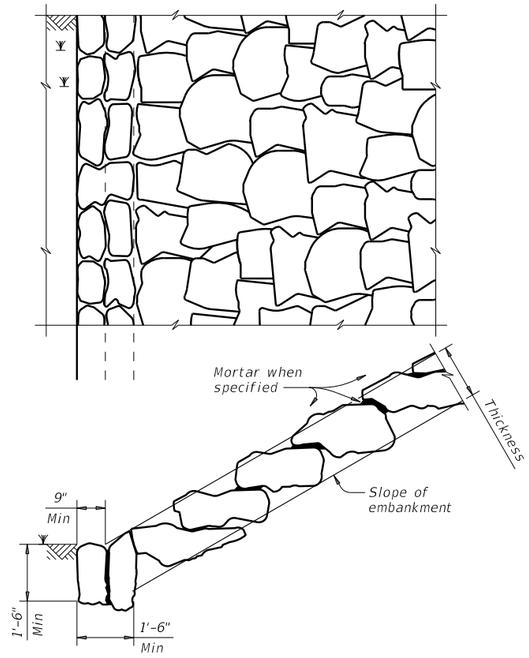


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

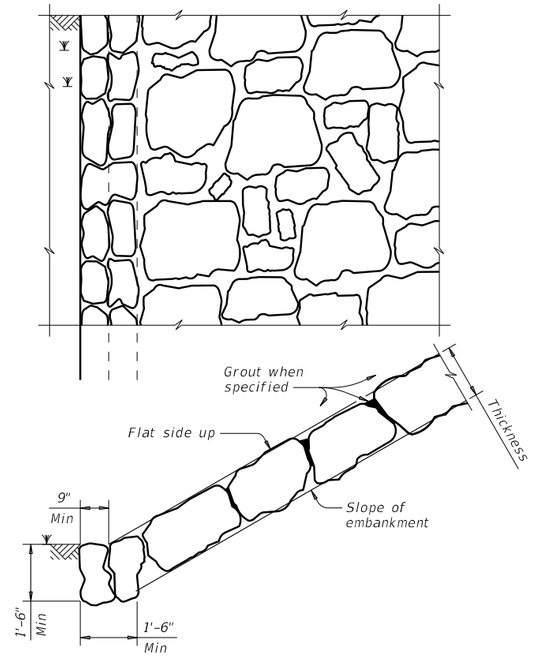
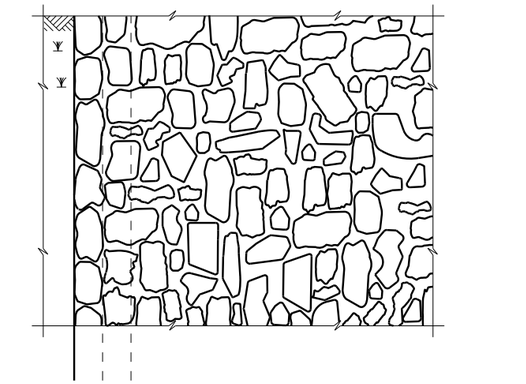


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted



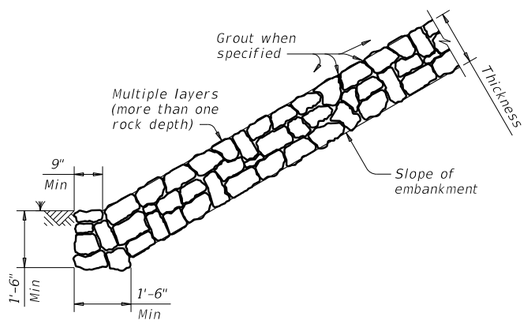
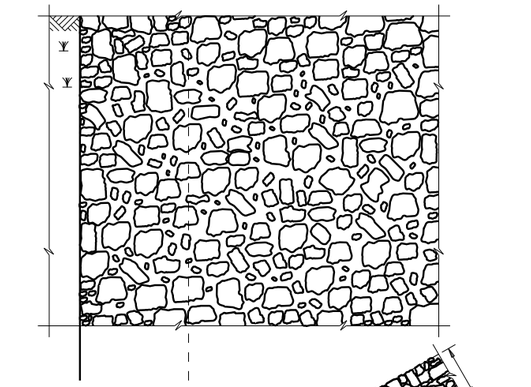


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted



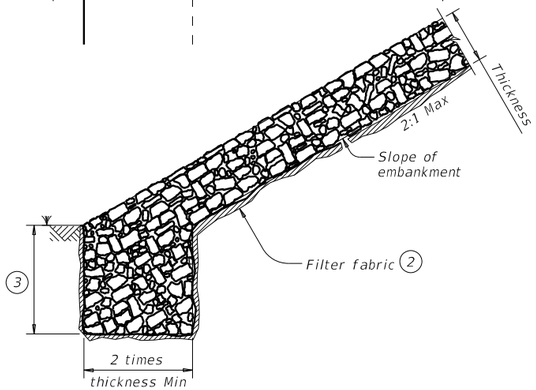


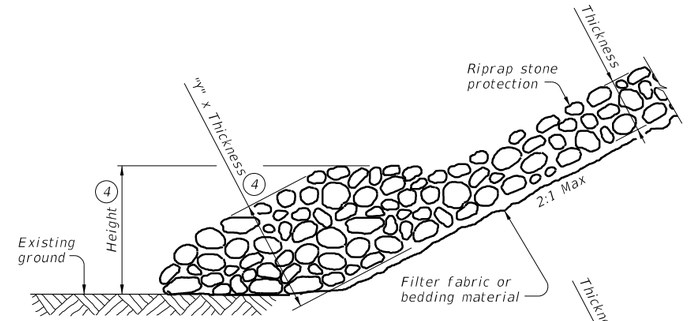
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

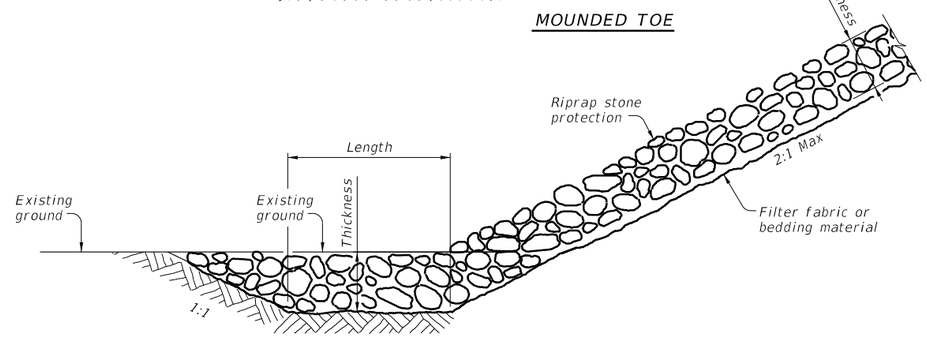
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

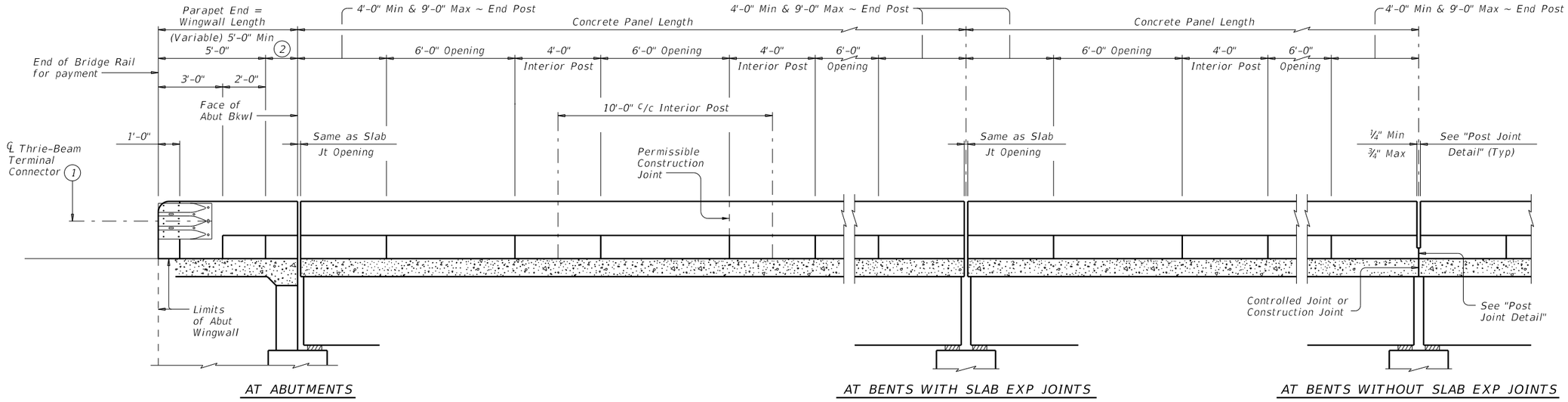
Bridge Division Standard

STONE RIPRAP

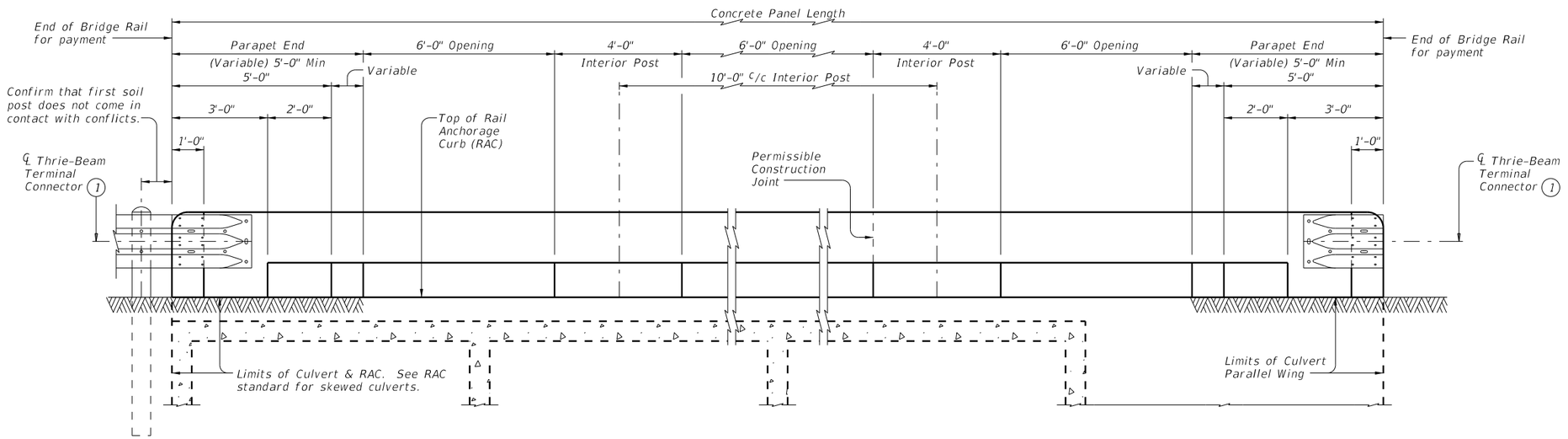
SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147, ETC	WHITTLE ST, ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		89

DATE: 5/20/2021 8:57:25 AM
FILE: ...\SMITH STD BDG\srrstde1-19.dgn



ROADWAY ELEVATION OF RAIL ON BRIDGE



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

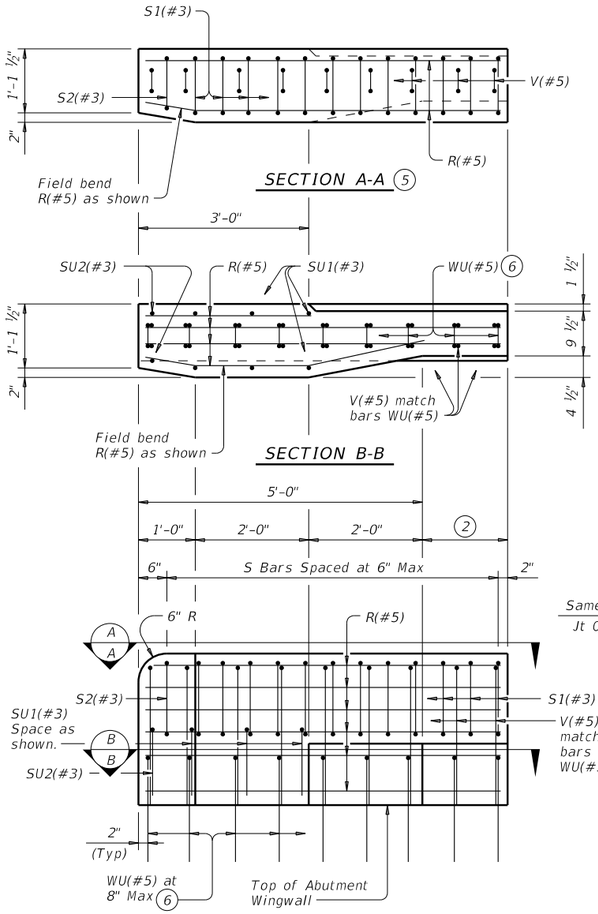
Bridge Division Standard

TRAFFIC RAIL

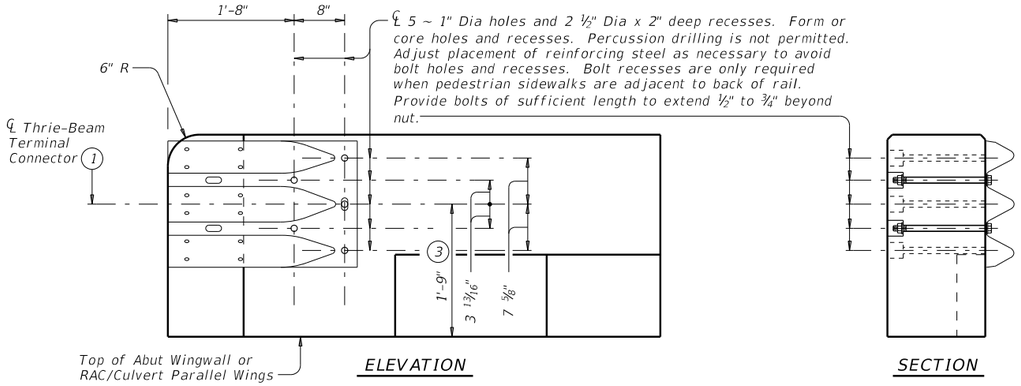
TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		90

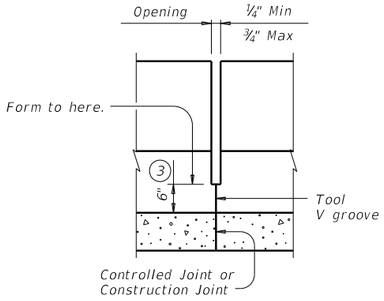
DATE: 5/20/2021 8:57:30 AM
FILE: ...\SMITH STD BDG\rlstd005-19.dgn



PARAPET END AT ABUT WINGWALL (6)

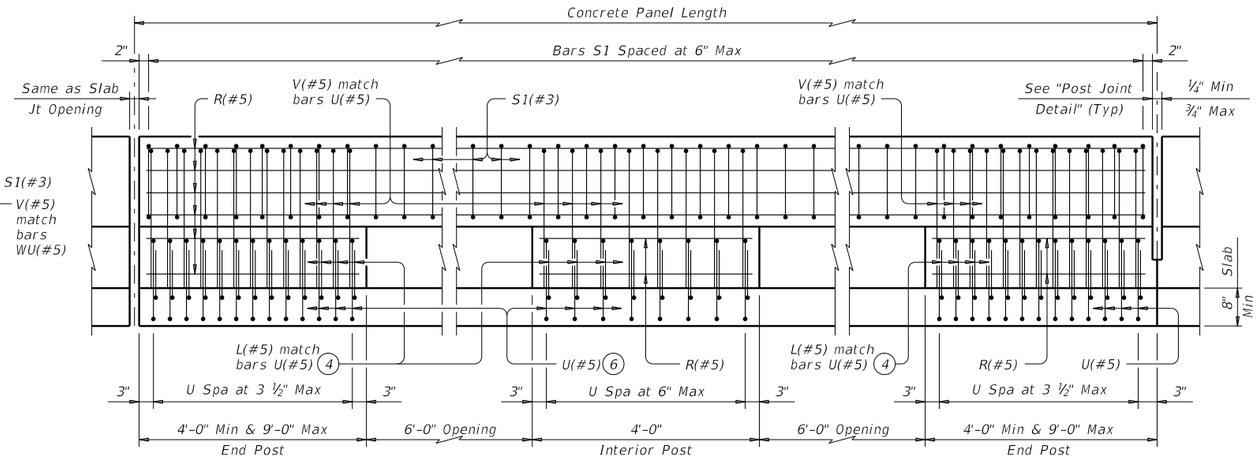


TERMINAL CONNECTION DETAILS



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

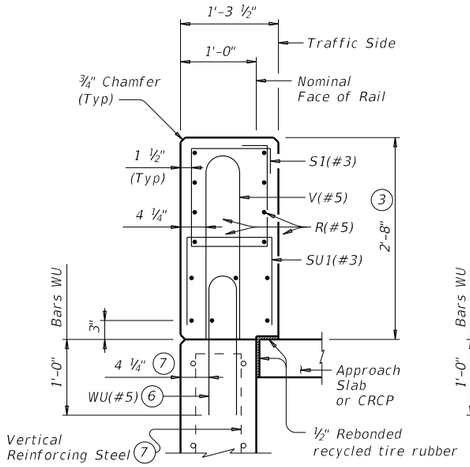
Bridge Division Standard

TRAFFIC RAIL

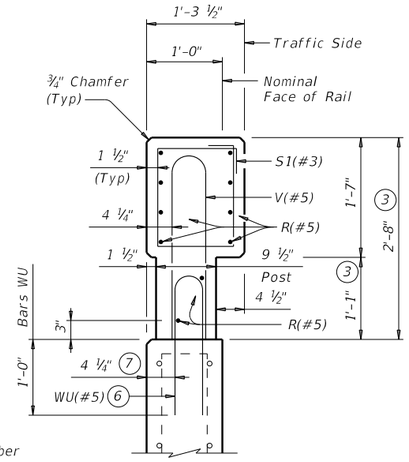
TYPE T223

FILE:	rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0910	16	147,ETC	WHITTLE ST,ETC
		DIST	COUNTY		SHEET NO.
		TYL	SMITH		91

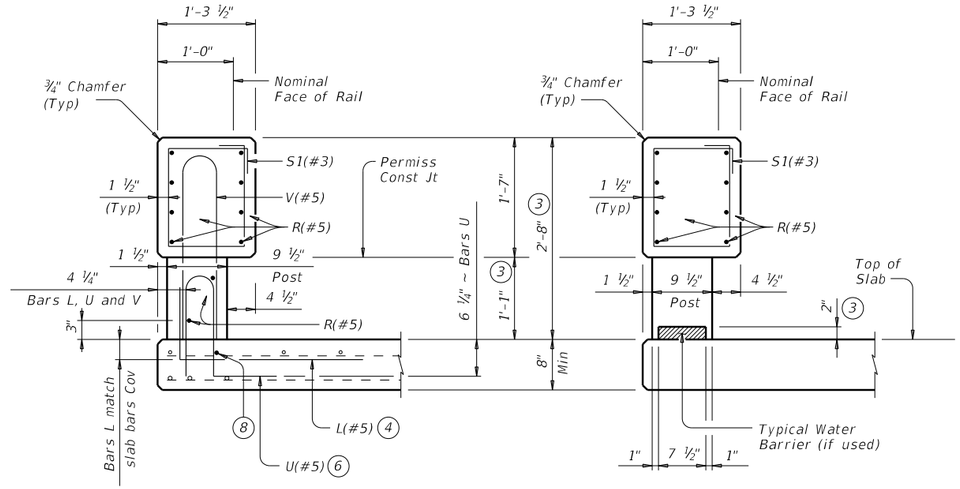
DATE: 5/20/2021 8:57:31 AM
FILE: ...\SMITH STD BDG\rlstd005-19.dgn



SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

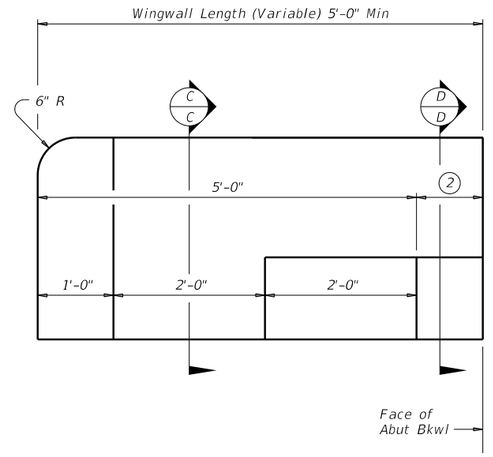


AT POST
ON BRIDGE SLAB

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.

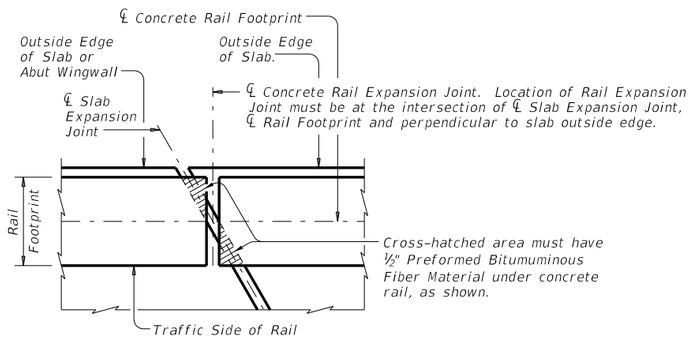
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(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.

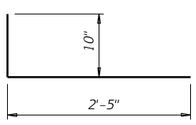
Do not use this railing on bridges with expansion joints providing more than 5" movement.

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

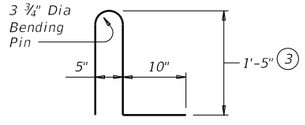
Shop drawings are not required for this rail.

Average weight of railing with no overlay is 358 plf.

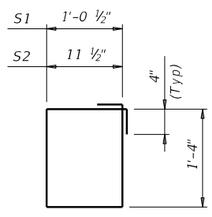
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



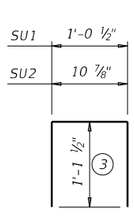
BARS L (#5)



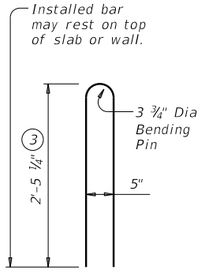
BARS U (#5) (9)



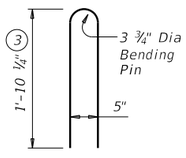
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

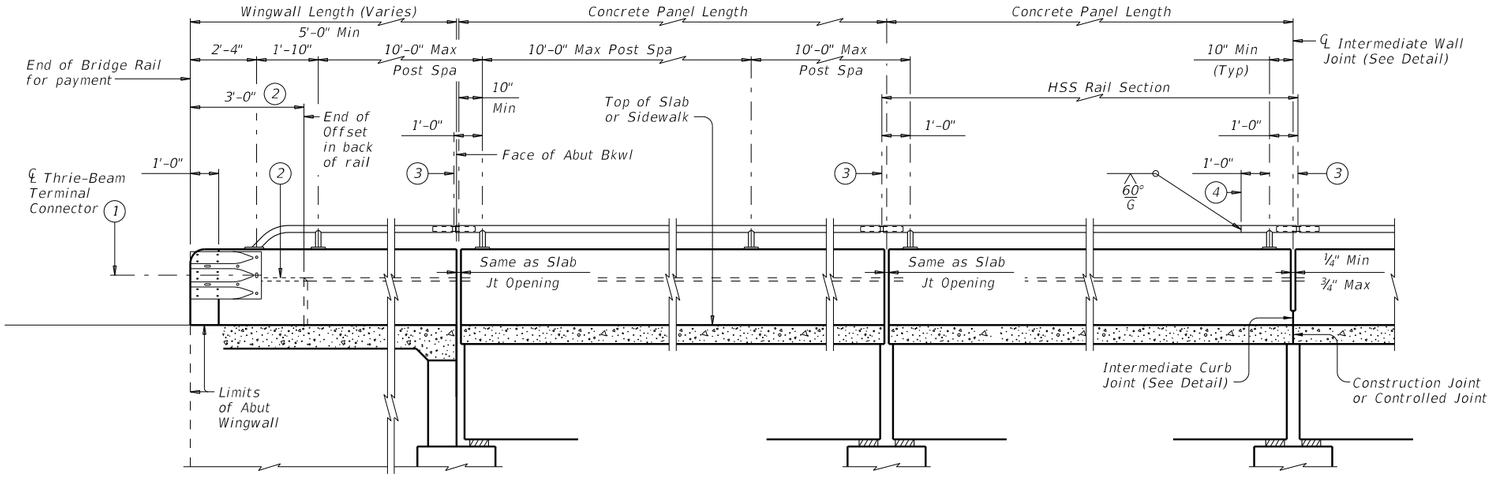
TRAFFIC RAIL

TYPE T223

FILE:	ristd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0910	16	147,ETC	WHITTLE ST,ETC
		DIST	COUNTY		SHEET NO.
		TYL	SMITH		92

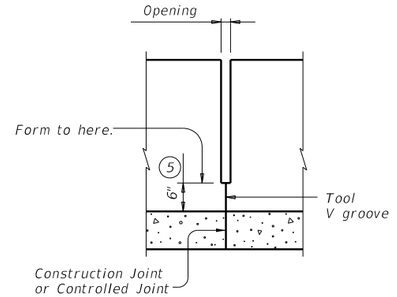
DATE: 5/20/2021 8:57:31 AM
FILE: ...\SMITH STD BDG\ristd005-19.dgn

DATE: 5/20/2021 8:57:37 AM
FILE: ...\SMITH STD BDG\rlstd018-19.dgn



AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

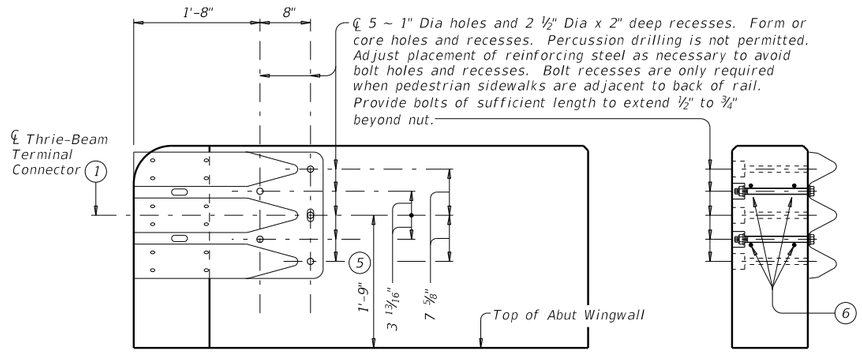
ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

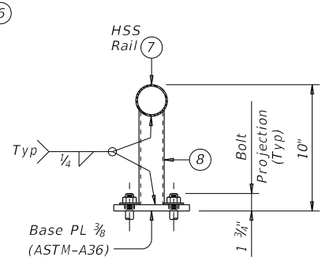
Provide at all interior bents without slab expansion joints.

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. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
3. ℄ Exp Joint or Splice Joint as required.
4. One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.
5. Increase 2" for structures with overlay.
6. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
7. HSS 2.875 x 0.203
8. HSS 2.375 x 0.154
9. ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

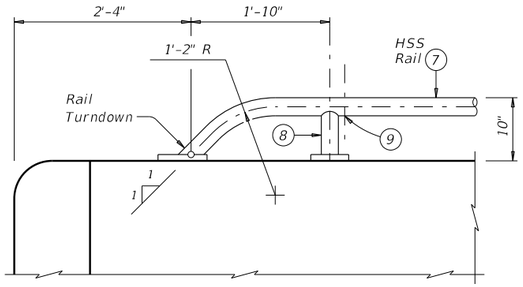


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS

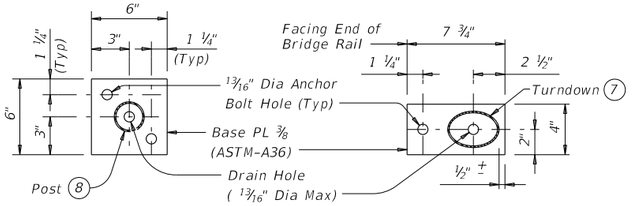


TRANSVERSE SECTION



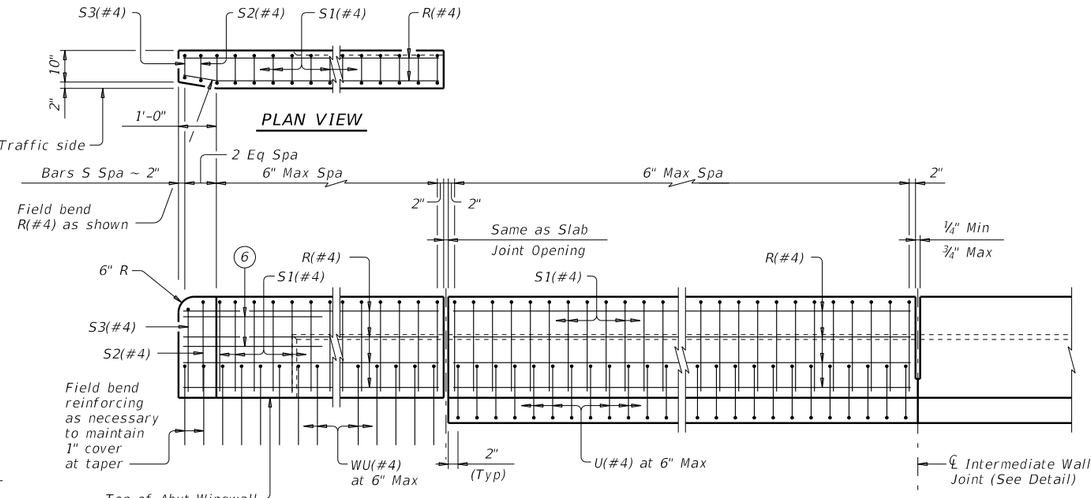
Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

HSS RAIL TERMINAL DETAIL



POST BASE PLATE PLAN | RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



AT ABUT WINGWALL | AT BENTS WITH SLAB EXP JOINTS | AT SLAB | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

SHEET 1 OF 3

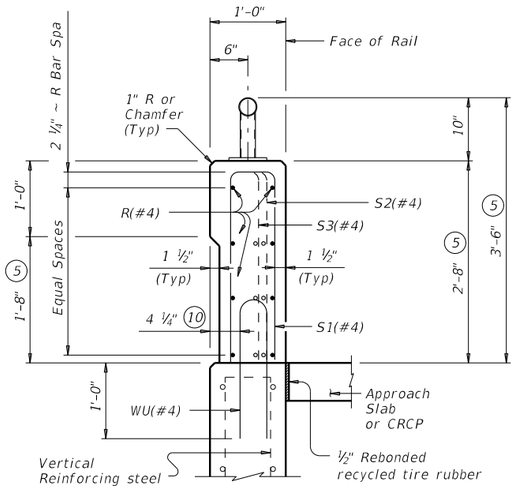
Texas Department of Transportation

Bridge Division Standard

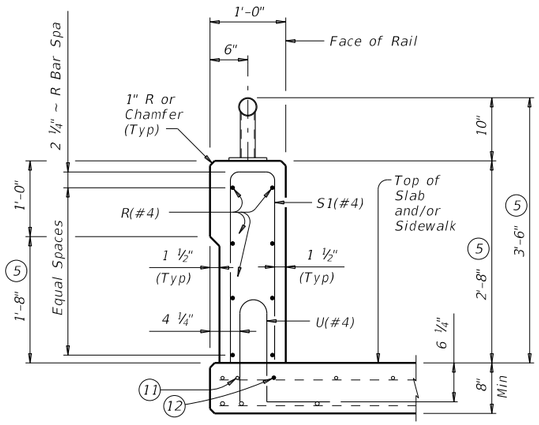
COMBINATION RAIL

TYPE C221

FILE: rlstd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		93

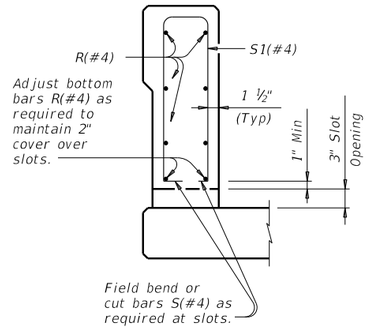


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

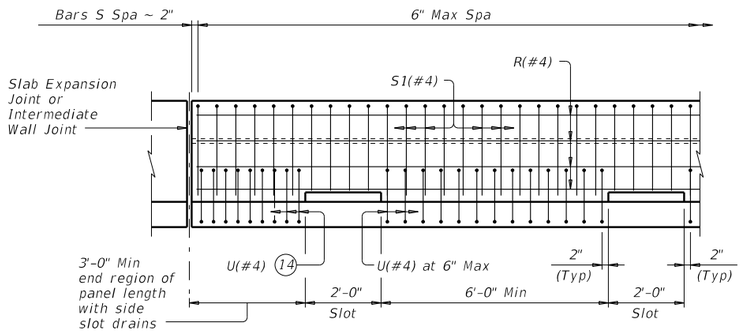


ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

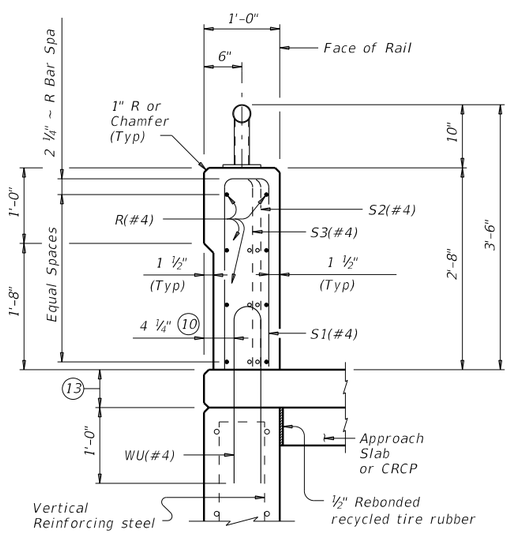


SECTION THRU OPTIONAL SIDE SLOT DRAIN

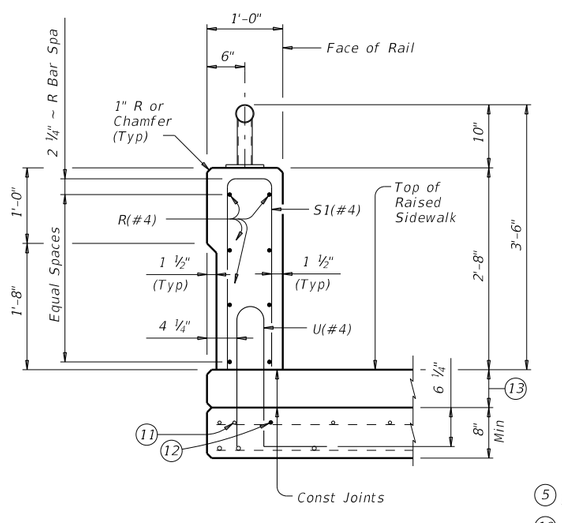


OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK

(5) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractors expense.

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

(13) Raised Sidewalk

(14) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

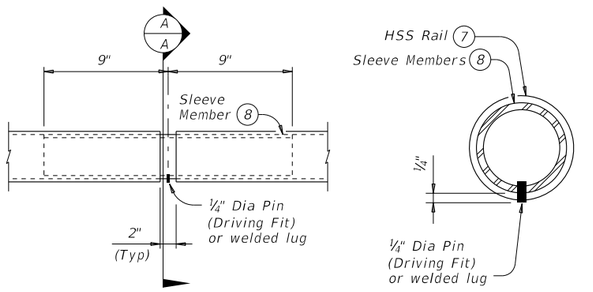
TYPE C221

FILE:	ristd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0910	16	147,ETC	WHITTLE ST,ETC
		DIST	COUNTY		SHEET NO.
		TYL	SMITH		94

DATE: 5/20/2021 8:57:38 AM
FILE: ...\SMITH STD BDGVr1\std018-19.dgn

RAIL DATA FOR HORIZONTAL CURVES

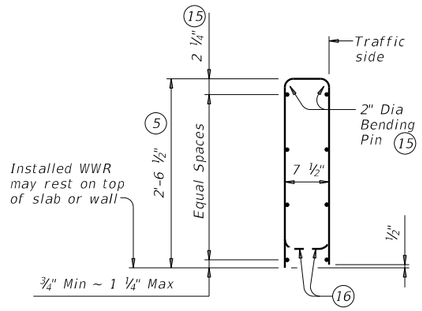
	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail panels
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius



AT SPLICE OR EXP JTS

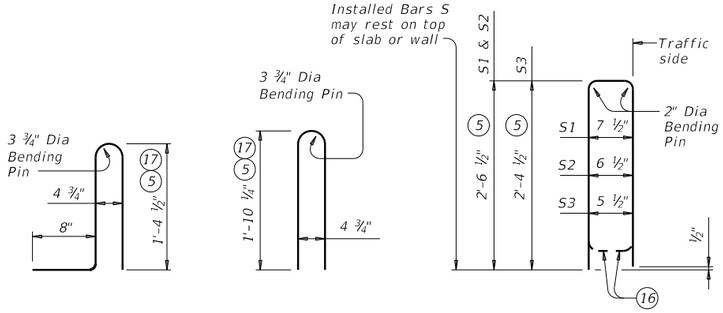
SECTION A-A

PIPE SPLICE DETAILS

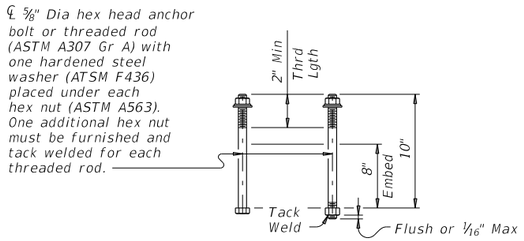


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

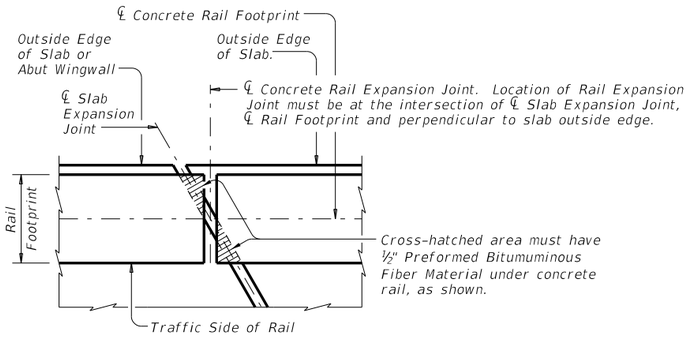
DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



BARS U (#4) BARS WU (#4) BARS S (#4)



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.

(7) HSS 2.875 x 0.203

(8) HSS 2.375 x 0.154

(15) No longitudinal wires may be in top center of cage.

(16) Bend or cut as required to clear drain slots.

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

(18) See "Material Notes" for anchor bolt information.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer and when adhesive anchor bolts are used. Slipforming parapet is not allowed if anchor bolts are cast with parapet wall. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

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.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Face of rail, parapet must be plumb unless otherwise approved by the Engineer. HSS rail posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Round or chamfer exposed edges of HSS rail and HSS rail posts to approximately 1/16" by grinding.

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Povide 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.

Provide ASTM A1085 or A500 Gr B or A53 Gr B for all HSS.

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

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 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".

Optional cast-in-place anchor bolts must be ⅝" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested 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.

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

Average weight of railing with no overlay: 380 plf (total)
370 plf (Conc)
10 plf (Steel)

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

Texas Department of Transportation

Bridge Division Standard

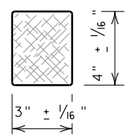
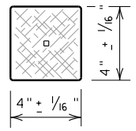
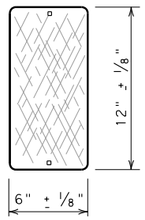
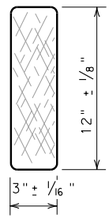
COMBINATION RAIL

TYPE C221

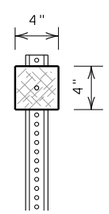
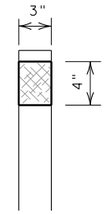
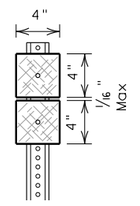
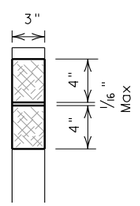
FILE:	ristd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0910	16	147,ETC	WHITTLE ST,ETC
		DIST	COUNTY		SHEET NO.
		TYL	SMITH		95

DATE: 5/20/2021 8:57:39 AM
FILE: ...\SMITH STD BDGV I\std018-19.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

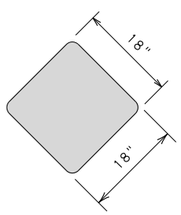
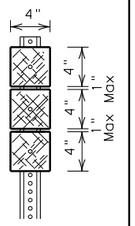
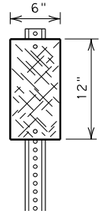
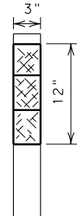
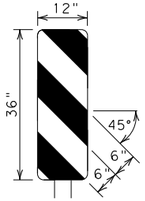
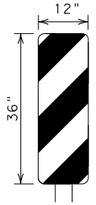
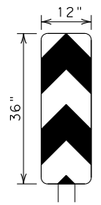
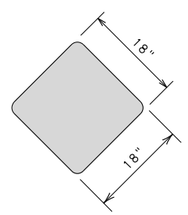
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

DIRECTION
If Required
BI = Bi-Directional

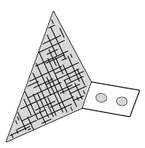
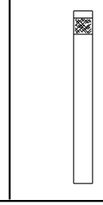
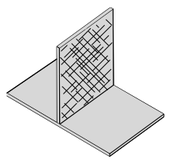
OBJECT MARKERS

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

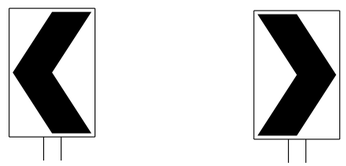
DEPARTMENTAL MATERIAL SPECIFICATIONS

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

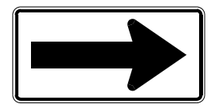
BARRIER REFLECTORS (BRF)

	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	16	147,ETC	WHITTLE ST,ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	SMITH		96

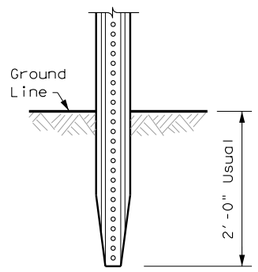
20A

DATE: 5/20/2021 8:57:45 AM
FILE: ...\SMITH STD S&PM\dom1-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

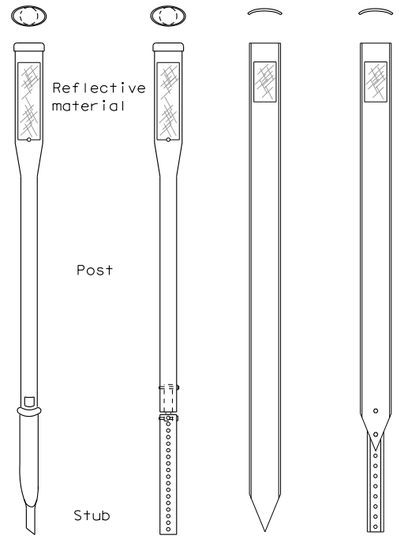


NOTES

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

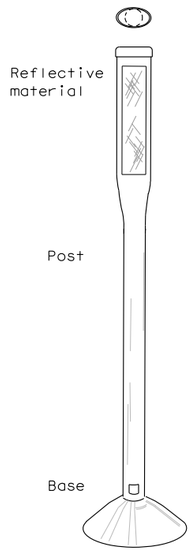
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



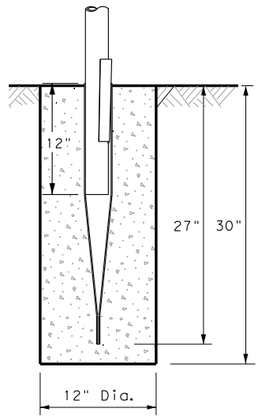
SURFACE MOUNT

NOTES

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

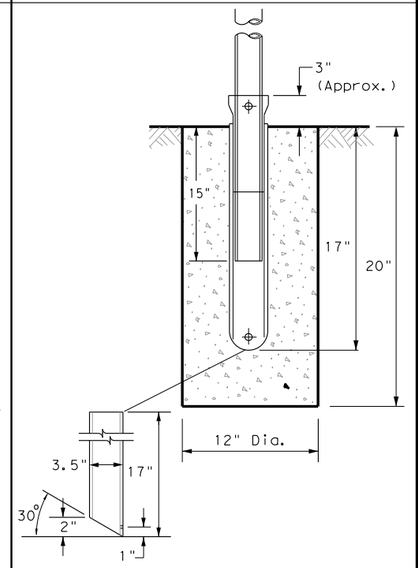
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

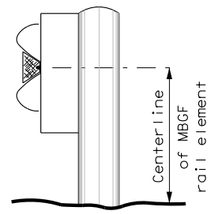
NOTE

1. Install per manufacturer's recommendations.

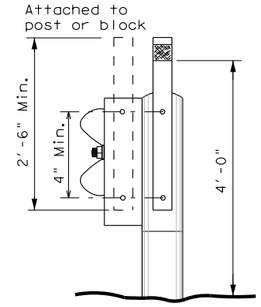
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

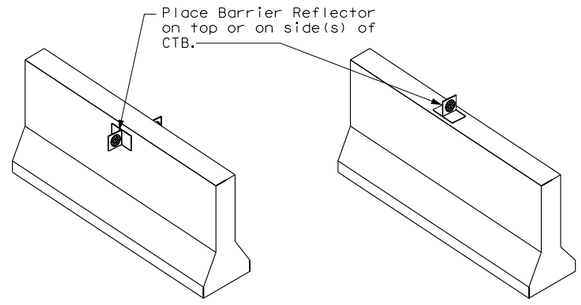
GF1



GF2



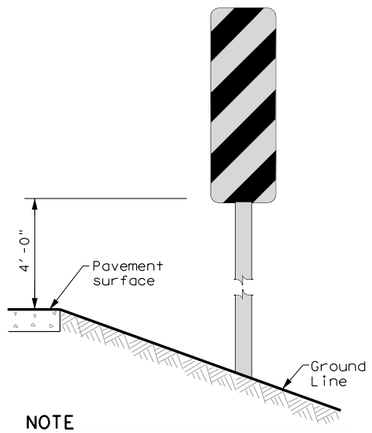
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

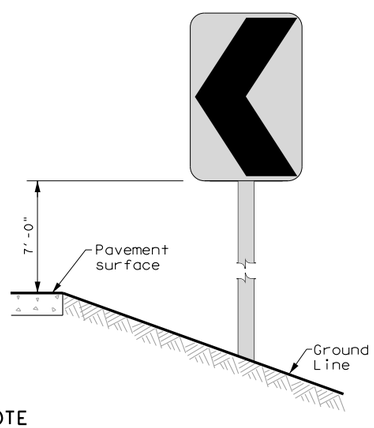
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

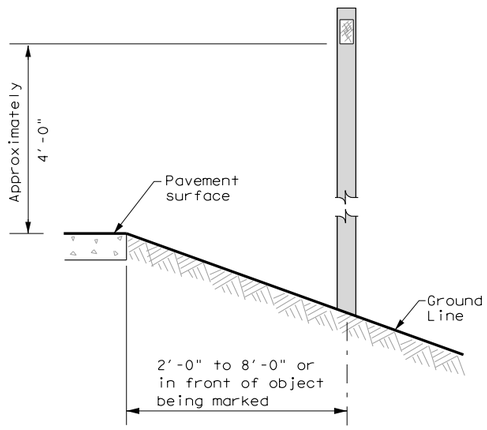
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	TYL	SMITH		97

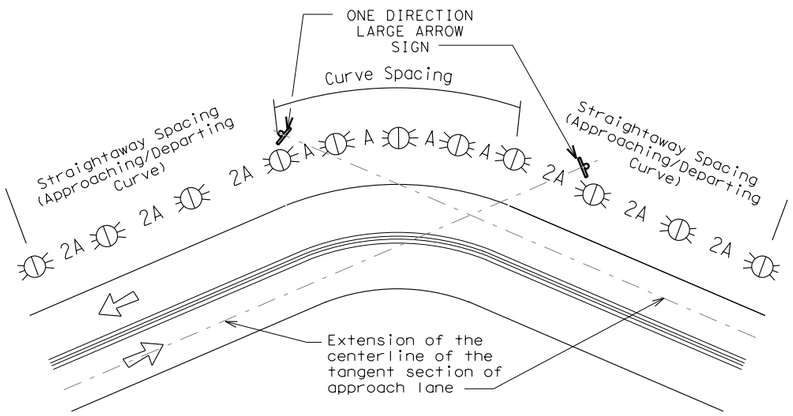
20B

DATE: 5/20/2021 8:57:51 AM
FILE: ...\SMITH STD S&PM\dom2-20.dgn

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

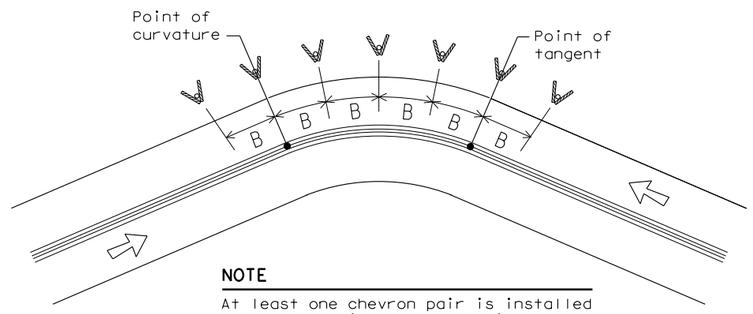
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

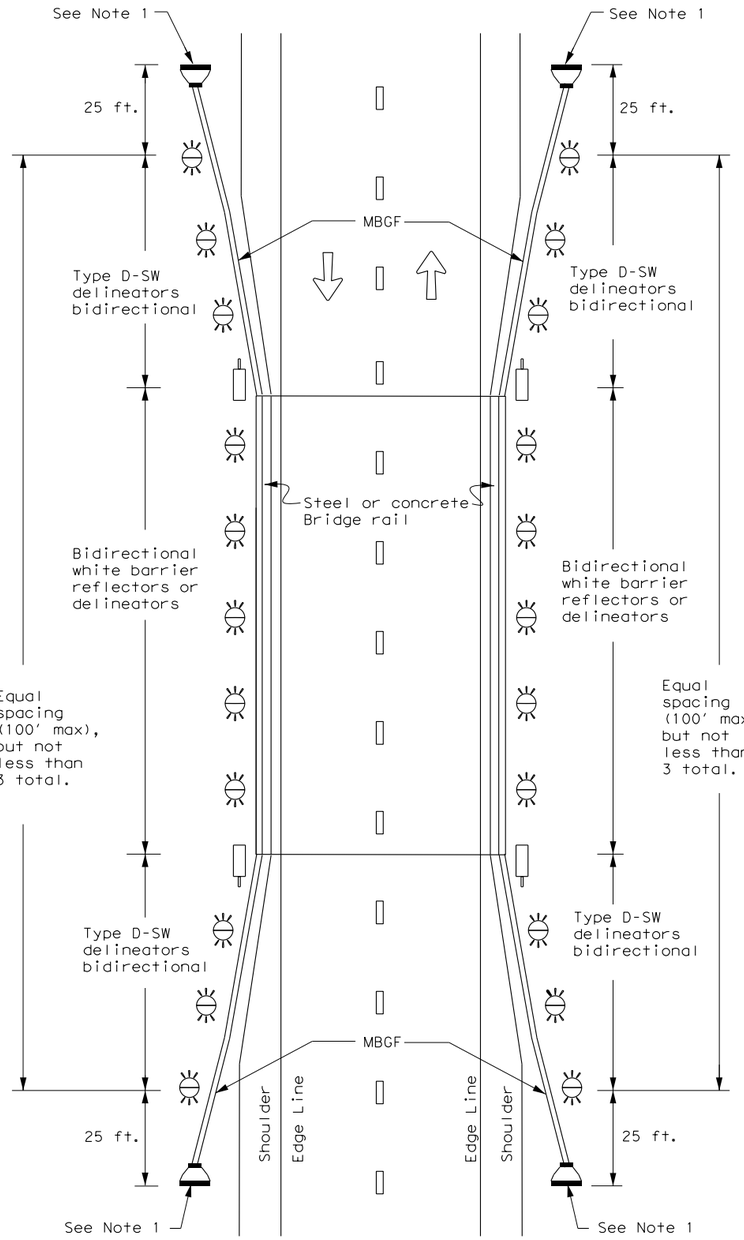
FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	TYL	SMITH		98

20C

DATE: 5/20/2021 8:58:14 AM
FILE: ...\SMITH STD S&PM\dom3-20.dgn

DATE: 5/20/2021 8:58:19 AM
FILE: ...\SMITH STD S&PM\dom5-20.dgn

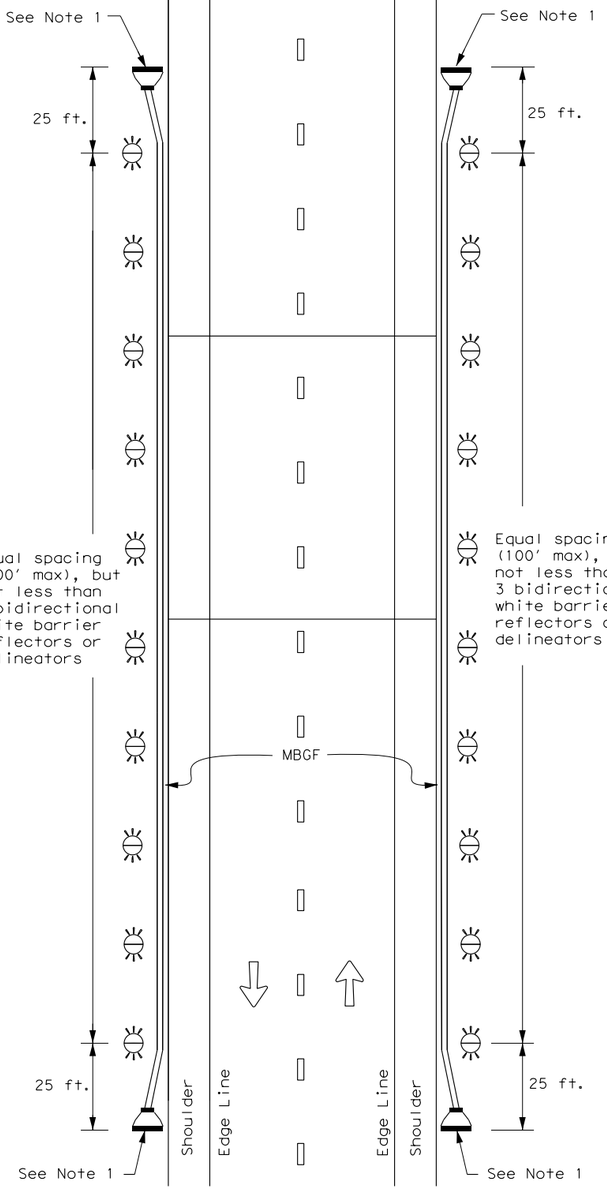
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

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

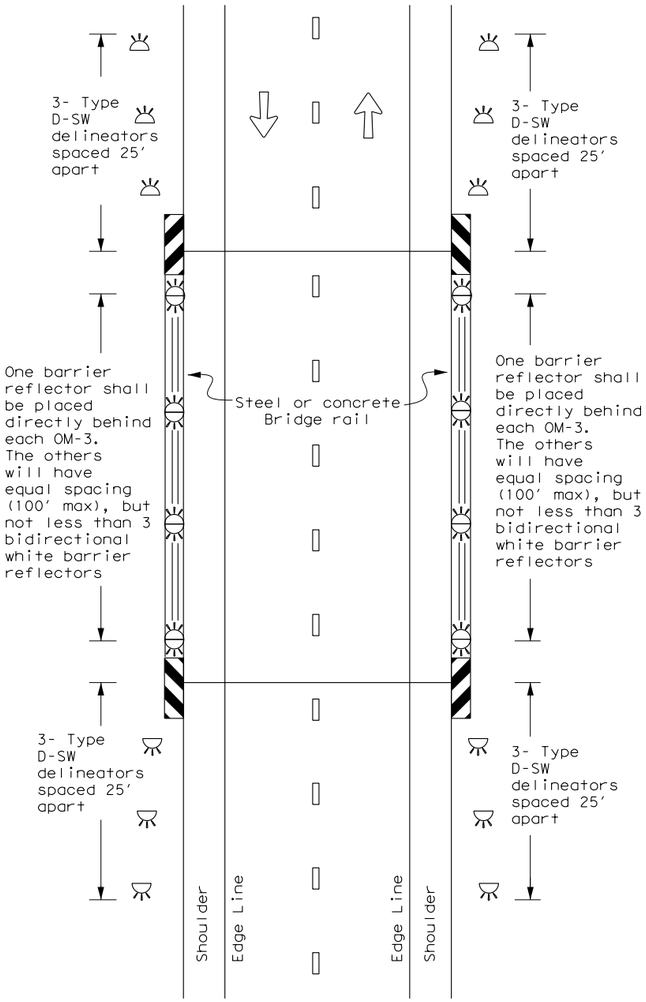
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

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

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



LEGEND

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

Texas Department of Transportation

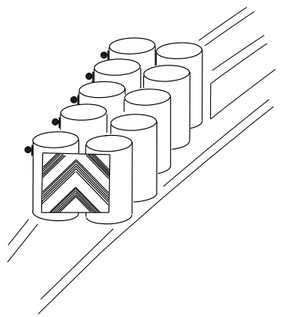
Traffic Safety Division Standard

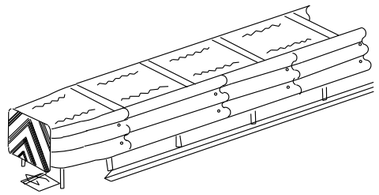
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

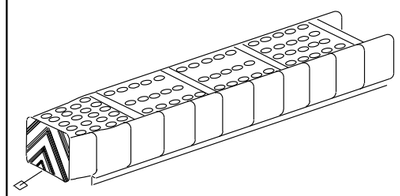
D & OM(5)-20

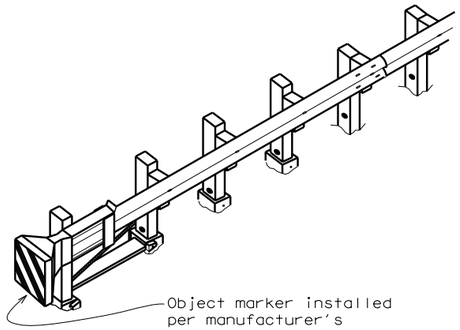
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147, ETC	WHITTLE ST, ETC
7-20	DIST	COUNTY		SHEET NO.
	TYL	SMITH		99

20E

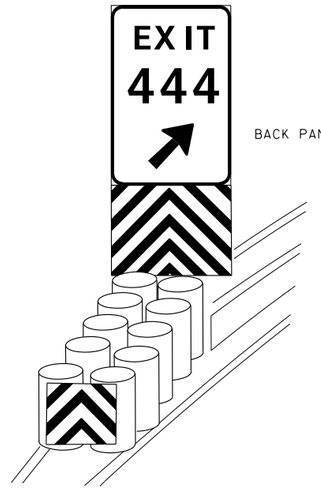




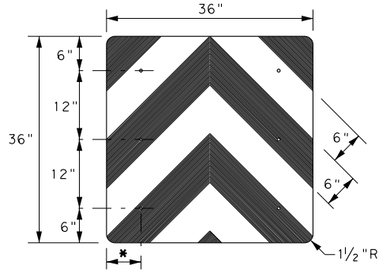


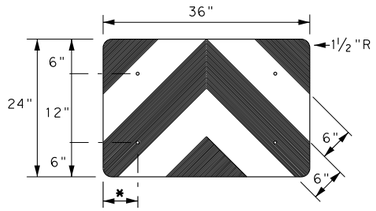


Object marker installed per manufacturer's recommendations.

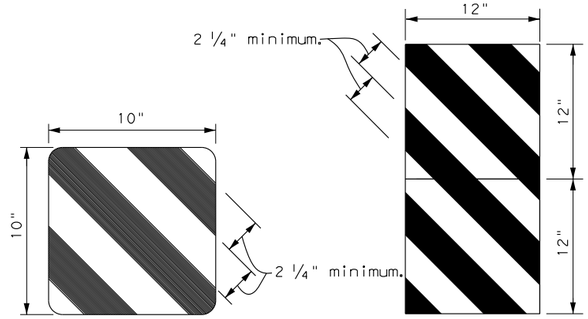


BACK PANEL (OPTIONAL)

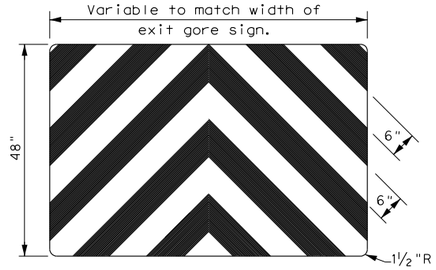


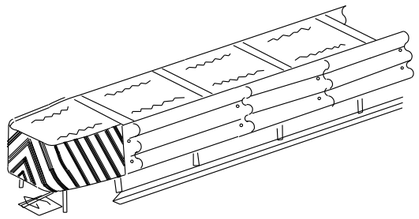


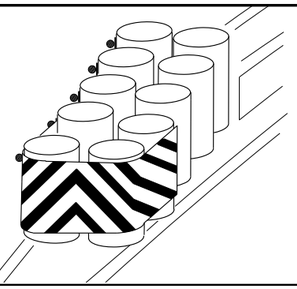
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

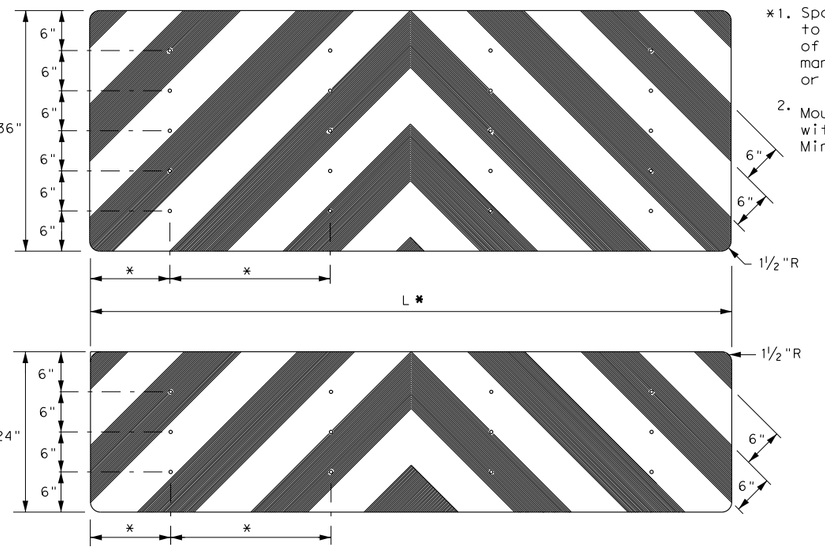


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

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

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

NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147,ETC	WHITTLE ST,ETC
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	TYL	SMITH		100
4-98 7-20				

20G

DATE: 5/20/2021 8:58:25 AM
FILE: ...\SMITH STD S&PM\domvia-20.dgn

100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:40:21 AM

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☐ No Permit Required
☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

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. Areas within the existing ROW, but outside the limits of construction, would not be disturbed. Every effort would be made to preserve trees where they would neither compromise safety nor substantially interfere with the proposed project.
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. In accordance with Migratory Birds Treaty Act (MBTA), TxDOT would take any reasonable and practical measures to avoid impacts to migratory birds, ground nesting birds, their nests or their young.
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.

2.

3.

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC
WHITTLE STREET @ WEST MUD CREEK TRIBUTARY

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	101

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_WHITTLE_EPIC

FILE: ...\TBR*TYL*SMITH*WHITTLE*SWP3.dgn
DATE: 5/20/2021 8:58:36 AM

A. GENERAL SITE DATA

1. PROJECT LIMITS: **THIS PROJECT IS IN THE CITY OF TYLER ON WHITTLE STREET AT WEST MUD CREEK PROJECT LENGTH = 60 FT. = 0.011 MILES**

PROJECT COORDINATES:
BEG LATITUDE: +32.315486 BEG LONGITUDE: -95.306075
END LATITUDE: +32.315486 END LONGITUDE: -95.305878

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: **TITLE SHEET**
* DRAINAGE PATTERNS: **DRAINAGE AREA MAP**
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: **EXISTING AND PROPOSED TYPICAL SECTIONS**
* LOCATION OF EROSION AND SEDIMENT CONTROLS: **SW3P LAYOUTS**
* SURFACE WATERS AND DISCHARGE LOCATIONS: **BRIDGE 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:
FOR THE CONSTRUCTION OF THE REPLACEMENT OF EXISTING BRIDGE FACILITY CONSISTING OF REPLACING BRIDGE AND APPROACHES, GRADING, ACP BASE & SURFACE, AND CURB & GUTTER.

4. MAJOR SOIL DISTURBING ACTIVITIES:
TOPSOIL REMOVAL, STRUCTURE WORK, AND TOPSOIL WORK FOR SEEDING.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
THE EXISTING SOILS ARE SILTY LOOSE SAND AND ARE COVERED 80 TO 85 PERCENT WITH VARIOUS GRASSES AND TREES.

6. TOTAL PROJECT AREA: **0.023 ACRES**

7. TOTAL AREA TO BE DISTURBED: **0.015 ACRES (63%)**

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: **0.70**
AFTER CONSTRUCTION: **0.71**

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
WEST MUD CREEK, SEGMENT 0611D, WHICH FLOWS INTO THE ANGELINA RIVER, SEGMENT 0611

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:

___ 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
___ 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
_X_ CURBS AND GUTTERS
___ STORM SEWERS
___ VELOCITY CONTROL DEVICES

OTHER:

3. STORM WATER MANAGEMENT:

STORM WATER DRAINAGE WILL BE PROVIDED BY **DITCHES AND CURB & GUTTER**

THIS SYSTEM WILL CARRY THE DRAINAGE WITHIN THE RIGHT-OF-WAY TO **LOWS WITHIN THE ROADWAY AND PROJECT SITE WHICH DRAINS TO NATURAL FACILITIES.**

4. STORM WATER MANAGEMENT ACTIVITIES: (SEQUENCE OF CONSTRUCTION)

1. **INSTALL SW3P DEVICES AS SHOWN ON SW3P LAYOUT SHEETS.**
2. **PERFORM ALL EXCAVATION, EMBANKMENT, BASE, AND STRUCTURE REPLACEMENT.**
3. **PLACE HMA OVERLAY.**
4. **WHEN ALL CONSTRUCTION ACTIVITIES ARE COMPLETE AND THE SITE IS STABILIZED AND APPROVED BY THE ENGINEER, REMOVE ALL TEMPORARY SEDIMENT CONTROLS AND RE-SOD ANY DISTURBED AREAS.**

5. NON-STORM WATER DISCHARGES:
FILTER NON-STORM WATER DISCHARGES, OR HOLD RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION AND/OR FOOTING DRAIN WATER; AND WATER USED FOR DUST CONTROL, PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

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 AND DISPOSED OF IN A LIDDED DUMPSTER 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:

_X_ HAUL ROADS DAMPENED FOR DUST CONTROL
_X_ LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
_X_ EXCESS DIRT ON ROAD REMOVED DAILY
_X_ 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.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
5/20/2021

Bradley M. Tiemann, P.E.

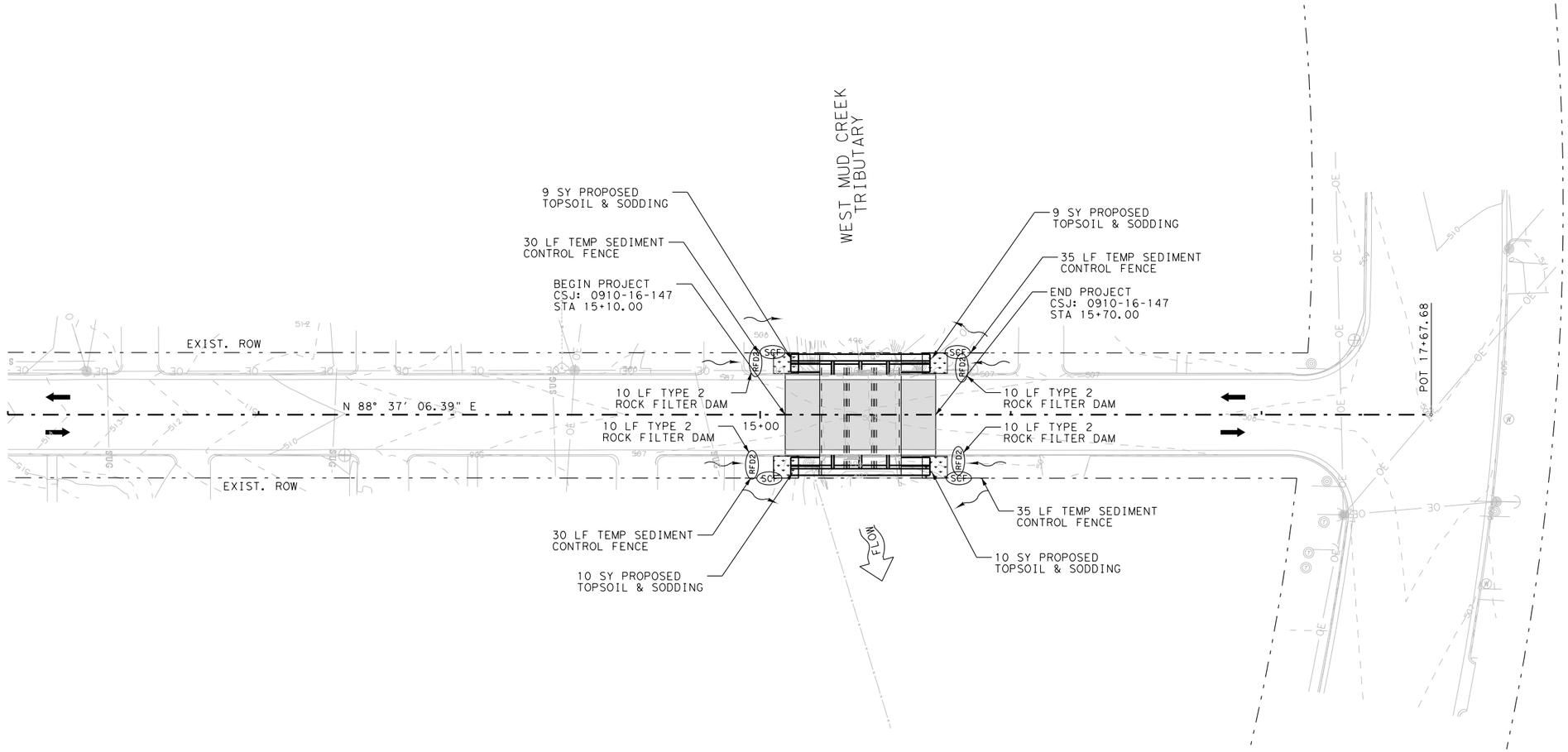
WHITTLE ST STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0910	16	147,ETC	WHITTLE ST
DIST	COUNTY		SHEET NO.
TYL	SMITH		102

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:40:30 AM



0 25 50

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- SEEDING OR SODDING AREA
- PROPOSED PAVEMENT
- PROPOSED TRAFFIC
- DRAINAGE FLOW ARROWS

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District
©2021 by TxDOT

SW3P LAYOUT
WHITTLE ST BRIDGE @ WEST MUD CREEK TRIBUTARY

SCALE: 1"=50'H SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	103

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_SW3P01.dgn

100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:40:37 AM

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☐ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

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. Areas within the existing ROW, but outside the limits of construction, would not be disturbed. Every effort would be made to preserve trees where they would neither compromise safety nor substantially interfere with the proposed project.
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. In accordance with Migratory Birds Treaty Act (MBTA), TxDOT would take any reasonable and practical measures to avoid impacts to migratory birds, ground nesting birds, their nests or their young.
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
CGP: Construction General Permit
DSHS: Texas Department of State Health Services
FHWA: Federal Highway Administration
MOA: Memorandum of Agreement
MOU: Memorandum of Understanding
MS4: Municipal Separate Stormwater Sewer System
MBTA: Migratory Bird Treaty Act
NOT: Notice of Termination
NWP: Nationwide Permit
NOI: Notice of Intent
SPCC: Spill Prevention Control and Countermeasure
SW3P: Storm Water Pollution Prevention Plan
PCN: Pre-Construction Notification
PSL: Project Specific Location
TCEQ: Texas Commission on Environmental Quality
TPDES: Texas Pollutant Discharge Elimination System
TPWD: Texas Parks and Wildlife Department
TxDOT: Texas Department of Transportation
T&E: Threatened and Endangered Species
USACE: U.S. Army Corps of Engineers
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.

2.

3.

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC
CR 2110 @
KICKAPOO CREEK

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 2110	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	104

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR2110_EPIC

FILE: ...\TBR*TYL*SMITH*CR2110*SWP3.dgn
DATE: 5/20/2021 8:58:54 AM

A. GENERAL SITE DATA

1. PROJECT LIMITS: **THIS PROJECT IS IN SOUTH EAST SMITH COUNTY ON CR 2110 AT KICKAPOO CREEK**
PROJECT LENGTH = 310 FT. = 0.059 MILES

PROJECT COORDINATES:
BEG LATITUDE: +32.205397 BEG LONGITUDE: -95.060122
END LATITUDE: +32.205225 END LONGITUDE: -95.059111

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: **TITLE SHEET**
* DRAINAGE PATTERNS: **DRAINAGE AREA MAP**
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: **EXISTING AND PROPOSED TYPICAL SECTIONS**
* LOCATION OF EROSION AND SEDIMENT CONTROLS: **SW3P LAYOUTS**
* SURFACE WATERS AND DISCHARGE LOCATIONS: **BRIDGE 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:
FOR THE CONSTRUCTION OF THE REPLACEMENT OF EXISTING BRIDGE FACILITY CONSISTING OF REPLACING BRIDGE AND APPROACHES, GRADING, ACP BASE & SURFACE, AND MBGF.

4. MAJOR SOIL DISTURBING ACTIVITIES:
TOPSOIL REMOVAL, STRUCTURE WORK, AND TOPSOIL WORK FOR SEEDING.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
THE EXISTING SOILS ARE SANDY LEAN CLAY AND ARE COVERED 80 TO 85 PERCENT WITH VARIOUS GRASSES AND TREES.

6. TOTAL PROJECT AREA: **0.25 ACRES**

7. TOTAL AREA TO BE DISTURBED: **0.19 ACRES (77%)**

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: **0.34**
AFTER CONSTRUCTION: **0.36**

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
KICKAPOO CREEK IN SMITH COUNTY, SEGMENT 0611S THEN INTO MUD CREEK, SEGMENT 0611C, WHICH FLOWS INTO THE ANGELINA RIVER, SEGMENT 0611

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:

3. STORM WATER MANAGEMENT:

STORM WATER DRAINAGE WILL BE PROVIDED BY **DITCHES**

THIS SYSTEM WILL CARRY THE DRAINAGE WITHIN THE RIGHT-OF-WAY TO **LOWS WITHIN THE ROADWAY AND PROJECT SITE WHICH DRAINS TO NATURAL FACILITIES.**

4. STORM WATER MANAGEMENT ACTIVITIES: (SEQUENCE OF CONSTRUCTION)

1. **INSTALL SW3P DEVICES AS SHOWN ON SW3P LAYOUT SHEETS.**
2. **PERFORM ALL EXCAVATION, EMBANKMENT, BASE, AND STRUCTURE REPLACEMENT.**
3. **PLACE HMA SURFACE.**
4. **WHEN ALL CONSTRUCTION ACTIVITIES ARE COMPLETE AND THE SITE IS STABILIZED AND APPROVED BY THE ENGINEER, REMOVE ALL TEMPORARY SEDIMENT CONTROLS AND RESEED ANY DISTURBED AREAS.**

5. NON-STORM WATER DISCHARGES:
FILTER NON-STORM WATER DISCHARGES, OR HOLD RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION AND/OR FOOTING DRAIN WATER; AND WATER USED FOR DUST CONTROL, PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

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 AND DISPOSED OF IN A LIDDED DUMPSTER 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:

- [X] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [X] 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.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
5/20/2021

Bradley M. Tiemann, P.E.

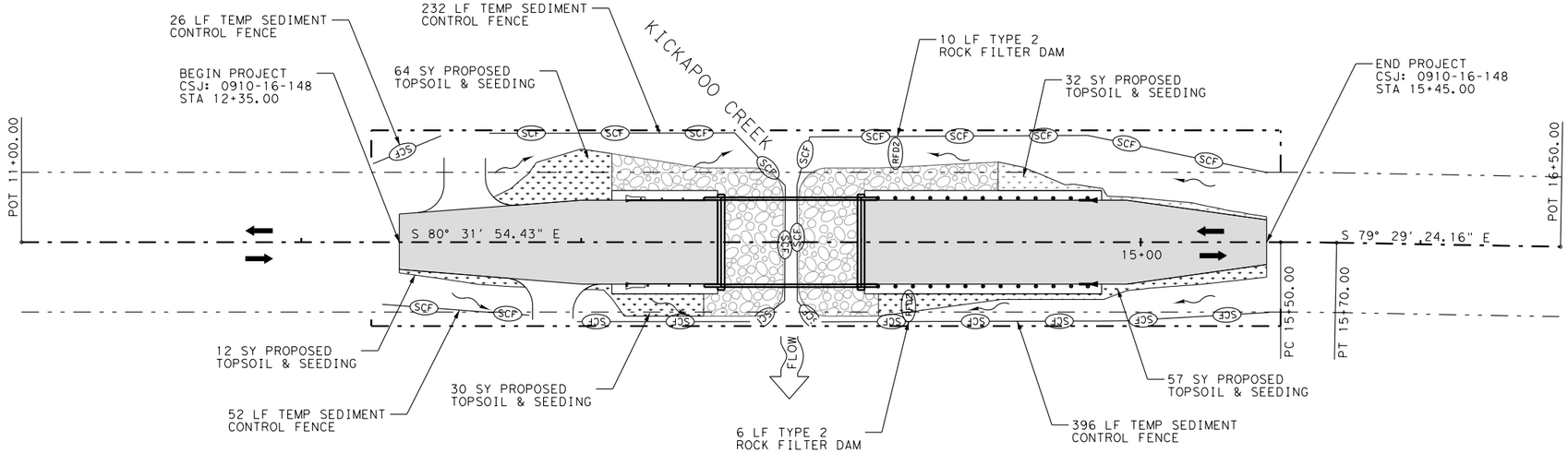
CR 2110
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0910	16	147,ETC	CR 2110
DIST	COUNTY		SHEET NO.
TYL	SMITH		105

100% SUBMITTAL
DATE: 9/7/2021
TIME: 9:40:45 AM



0 25 50

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- SEEDING AREA
- PROPOSED PAVEMENT
- PROPOSED TRAFFIC
- DRAINAGE FLOW ARROWS

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

SW3P LAYOUT
CR 2110 BRIDGE @ KICKAPOO CREEK

SCALE: 1"=50'H
SHEET 1 OF 1

FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 2110	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	106

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_SW3P02.dgn

100% SUBMITTAL
DATE: 9/7/2021 TIME: 9:40:54 AM

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☐ No Permit Required
☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

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. Areas within the existing ROW, but outside the limits of construction, would not be disturbed. Every effort would be made to preserve trees where they would neither compromise safety nor substantially interfere with the proposed project.
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. In accordance with Migratory Birds Treaty Act (MBTA), TxDOT would take any reasonable and practical measures to avoid impacts to migratory birds, ground nesting birds, their nests or their young.
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. CR 289 at Prairie Creek (lead-based paint on metal columns).
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC
CR 289 BRIDGE @ PRAIRIE CREEK

FED. RD DIV. No.	STATE	PROJECT No.			HIGHWAY No.
6	TEXAS	SEE TITLE SHEET			CR 289
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	107

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CR289_EPIC

FILE: ...\TBR*TYL*SMITH*CR289*SWP3.dgn
DATE: 5/20/2021 8:59:12 AM

A. GENERAL SITE DATA

1. PROJECT LIMITS: **THIS PROJECT IS IN CENTRAL SOUTH EAST SMITH COUNTY ON CR 289 AT PRAIRIE CREEK**
PROJECT LENGTH = 380 FT. = 0.072 MILES

PROJECT COORDINATES:
BEG LATITUDE: +32.293114 BEG LONGITUDE: -95.177267
END LATITUDE: +32.292156 END LONGITUDE: -95.177861

2. PROJECT SITE MAPS:
* PROJECT LOCATION MAP: **TITLE SHEET**
* DRAINAGE PATTERNS: **DRAINAGE AREA MAP**
* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: **EXISTING AND PROPOSED TYPICAL SECTIONS**
* LOCATION OF EROSION AND SEDIMENT CONTROLS: **SW3P LAYOUTS**
* SURFACE WATERS AND DISCHARGE LOCATIONS: **BRIDGE 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:
FOR THE CONSTRUCTION OF THE REPLACEMENT OF EXISTING BRIDGE FACILITY CONSISTING OF REPLACING BRIDGE AND APPROACHES, GRADING, ACP BASE & SURFACE, AND MBGF.

4. MAJOR SOIL DISTURBING ACTIVITIES:
TOPSOIL REMOVAL, STRUCTURE WORK, AND TOPSOIL WORK FOR SEEDING.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
THE EXISTING SOILS ARE SANDY LEAN TO FAT CLAY AND ARE COVERED 80 TO 85 PERCENT WITH VARIOUS GRASSES AND TREES.

6. TOTAL PROJECT AREA: **0.43 ACRES**

7. TOTAL AREA TO BE DISTURBED: **0.24 ACRES (55%)**

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: **0.34**
AFTER CONSTRUCTION: **0.36**

9. NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)
PRAIRIE CREEK, TO LAKE TYLER, THEN INTO MUD CREEK, SEGMENT 0611C WHICH FLOWS INTO THE ANGELINA RIVER, SEGMENT 0611

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:

3. STORM WATER MANAGEMENT:

STORM WATER DRAINAGE WILL BE PROVIDED BY **DITCHES**

THIS SYSTEM WILL CARRY THE DRAINAGE WITHIN THE RIGHT-OF-WAY TO **LOWS WITHIN THE ROADWAY AND PROJECT SITE WHICH DRAINS TO NATURAL FACILITIES.**

4. STORM WATER MANAGEMENT ACTIVITIES: (SEQUENCE OF CONSTRUCTION)

1. **INSTALL SW3P DEVICES AS SHOWN ON SW3P LAYOUT SHEETS.**
2. **PERFORM ALL EXCAVATION, EMBANKMENT, BASE, AND STRUCTURE REPLACEMENT.**
3. **PLACE HMA SURFACE.**
4. **WHEN ALL CONSTRUCTION ACTIVITIES ARE COMPLETE AND THE SITE IS STABILIZED AND APPROVED BY THE ENGINEER, REMOVE ALL TEMPORARY SEDIMENT CONTROLS AND RESEED ANY DISTURBED AREAS.**

5. NON-STORM WATER DISCHARGES:
FILTER NON-STORM WATER DISCHARGES, OR HOLD RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION AND/OR FOOTING DRAIN WATER; AND WATER USED FOR DUST CONTROL, PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

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 AND DISPOSED OF IN A LIDDED DUMPSTER 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:

- [X] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [X] 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.

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER
5/20/2021

Bradley M. Tiemann, P.E.

CR 289
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

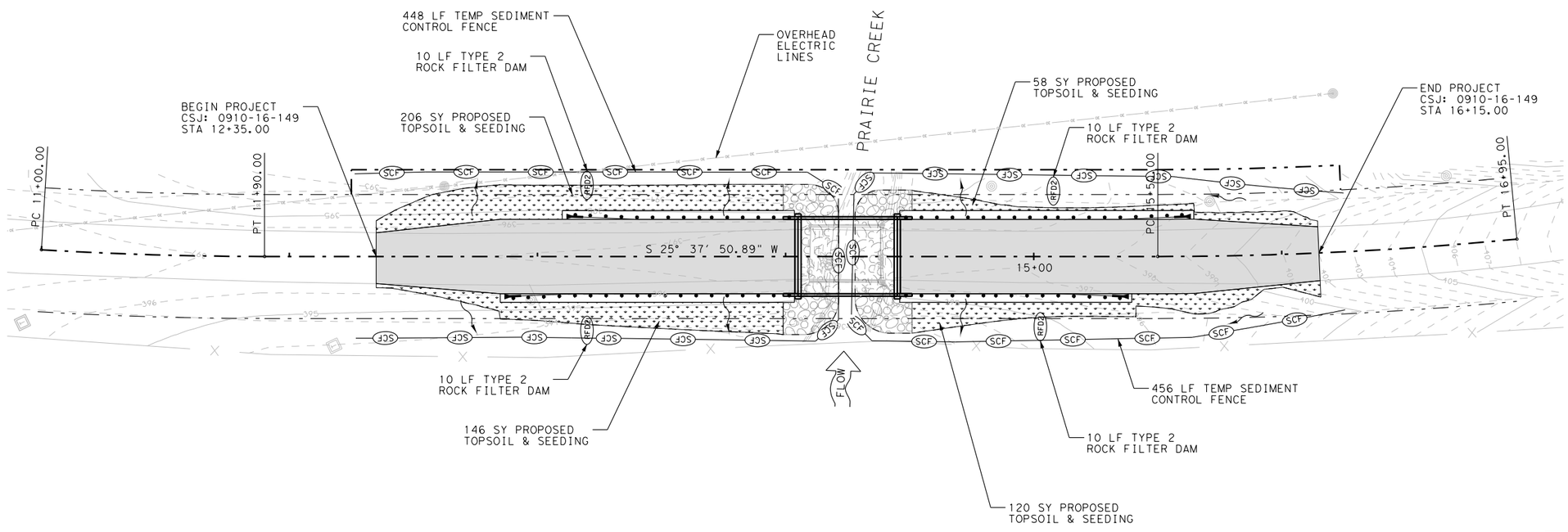
Texas Department of Transportation

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0910	16	147,ETC	CR 289
DIST	COUNTY		SHEET NO.
TYL	SMITH		108

100% SUBMITTAL

DATE: 9/7/2021 TIME: 9:41:01 AM



0 25 50

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- SEEDING AREA
- PROPOSED PAVEMENT
- PROPOSED TRAFFIC
- DRAINAGE FLOW ARROWS

STATE OF TEXAS
BRADLEY M. TIEMANN
88660
LICENSED PROFESSIONAL ENGINEER

9/7/2021

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

Texas Department of Transportation
Tyler District

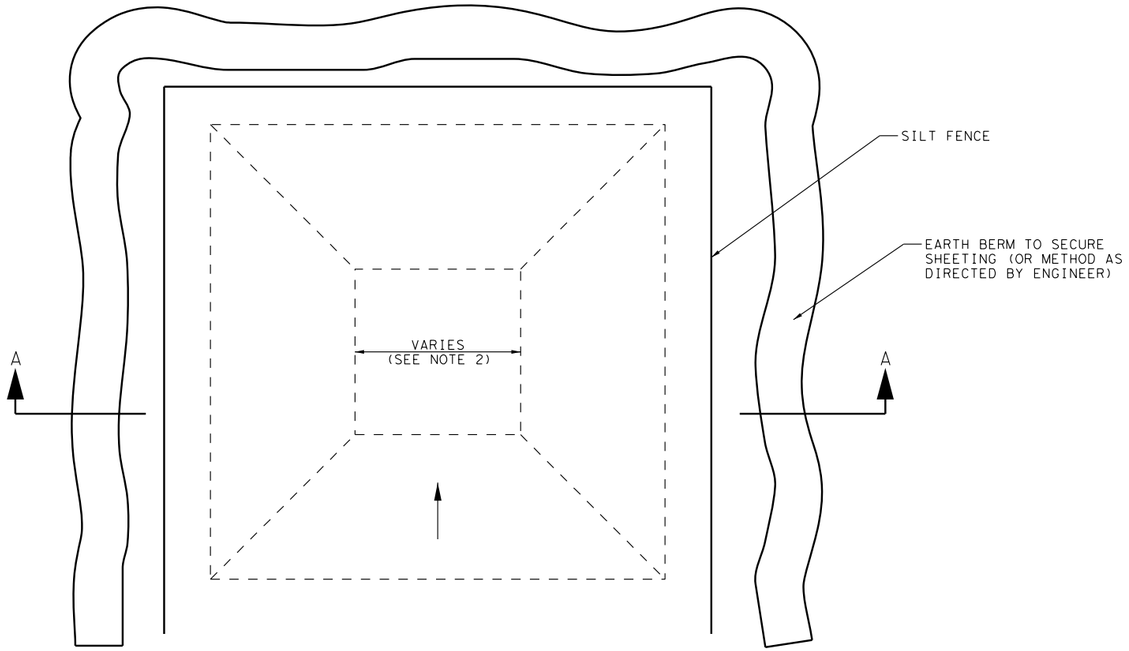
SW3P LAYOUT
CR 289 BRIDGE @ PRAIRIE CREEK

SCALE: 1"=50'H SHEET 1 OF 1

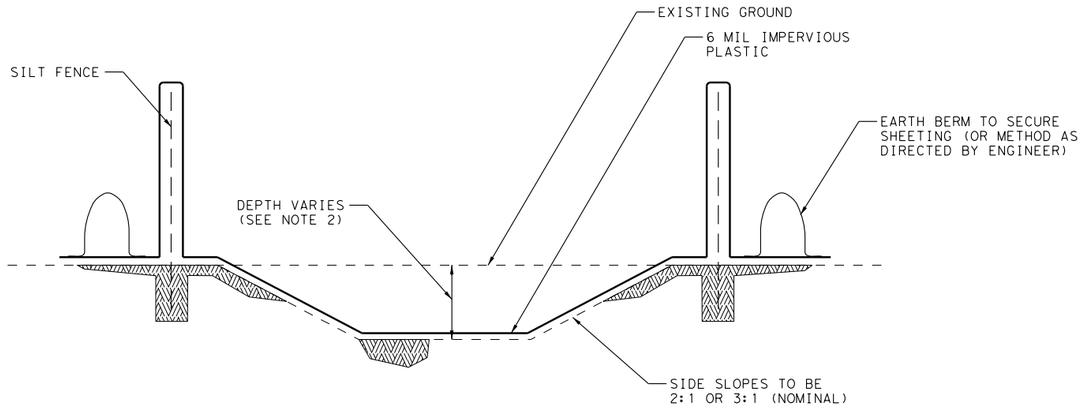
FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		CR 289	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147,ETC	109

PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_SW3P03.dgn

100% SUBMITTAL
DATE: 5/20/2021 TIME: 8:59:23 AM



PLAN VIEW



SECTION A-A

CONCRETE WASHOUT DETAIL

(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 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 FLOOD PLAIN.

   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, THEREFORE 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 WASHOUT AREA(S) 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 WASHOUT 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.

5/20/2021

Bradley M. Tiemann, P.E.

REV. No.	DATE	REVISION	BY

ATKINS
TBPE REG. # F-474

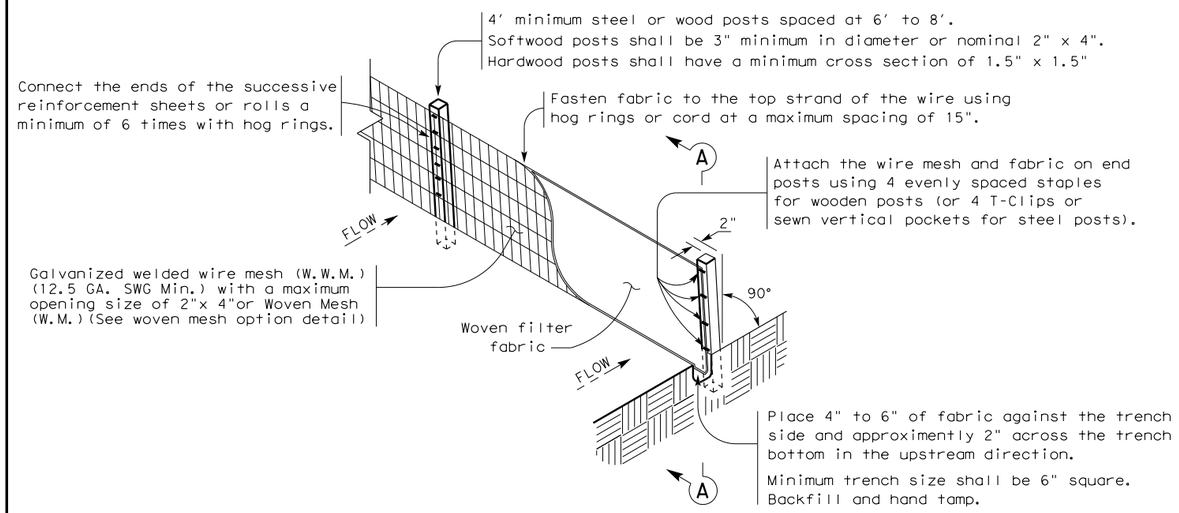
Texas Department of Transportation
Tyler District

CONCRETE WASHOUT DETAILS

NOT TO SCALE

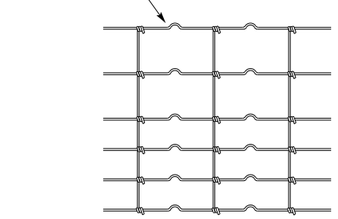
FED. RD DIV. No.	STATE	PROJECT No.		HIGHWAY No.	
6	TEXAS	SEE TITLE SHEET		WHITTLE ST, ETC	
STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
TYL	SMITH	0910	16	147, ETC	110

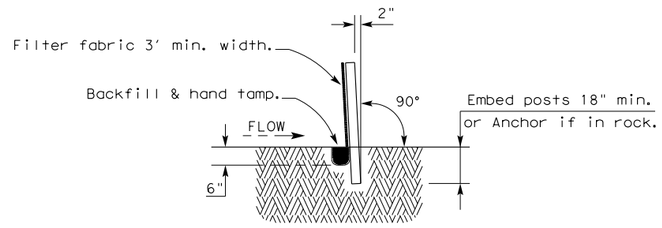
PLOT DRIVER: RD_11x17_PDF.plt
PEN TABLE: Tyler BRG Replacements_transportation.tbl
FILE: TBR_TYL_SMITH_CONC_WASHOUT_DETAIL.dgn



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.

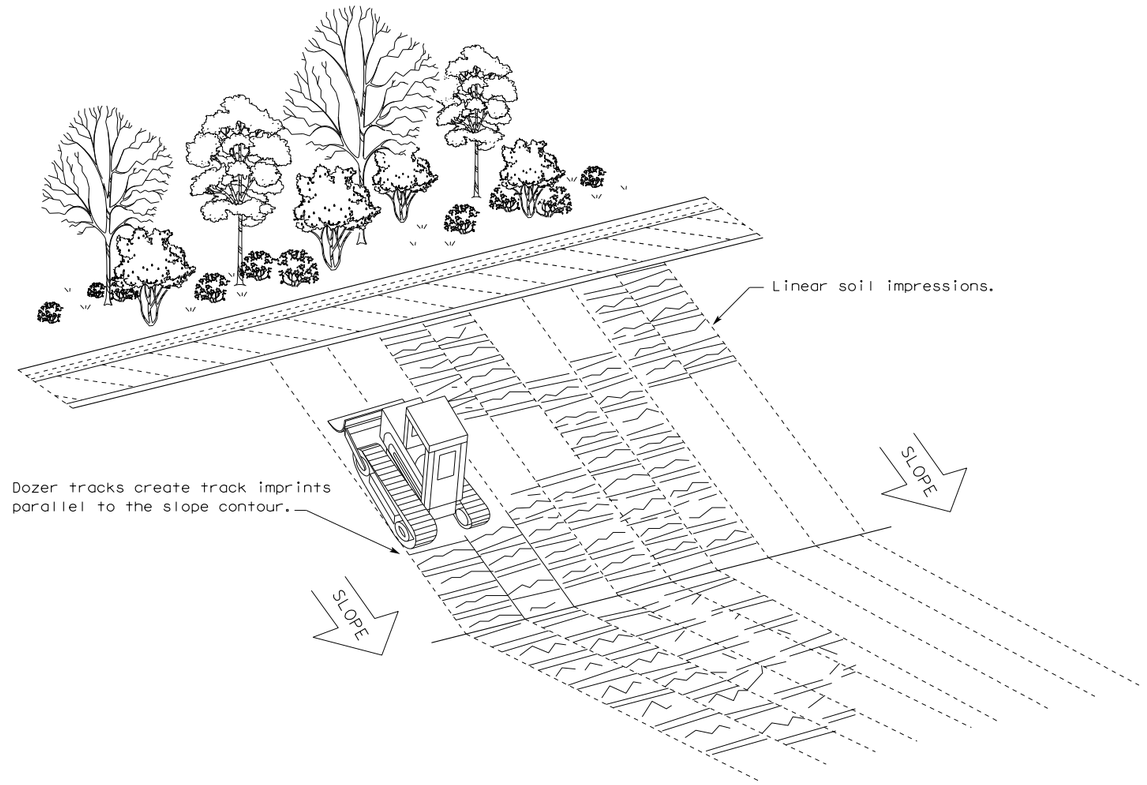
LEGEND

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

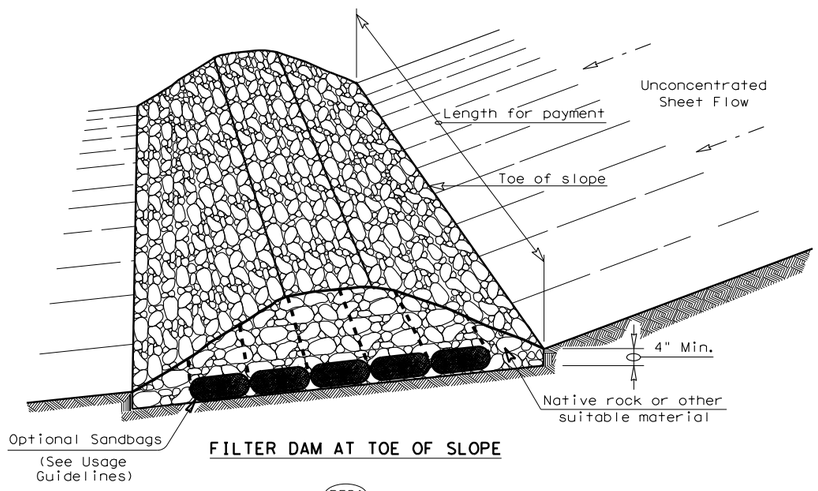
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

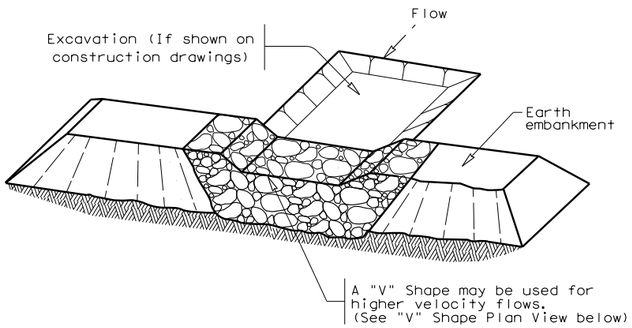
FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0910	16	147,ETC		WHITTLE ST,ETC	
	DIST	COUNTY			SHEET NO.	
	TYL	SMITH			111	

DATE: 5/20/2021
FILE: ...\CADD\SW3P\STD SW3P\ec116.dgn



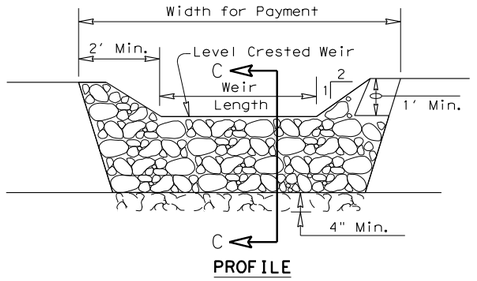
FILTER DAM AT TOE OF SLOPE

RFD1

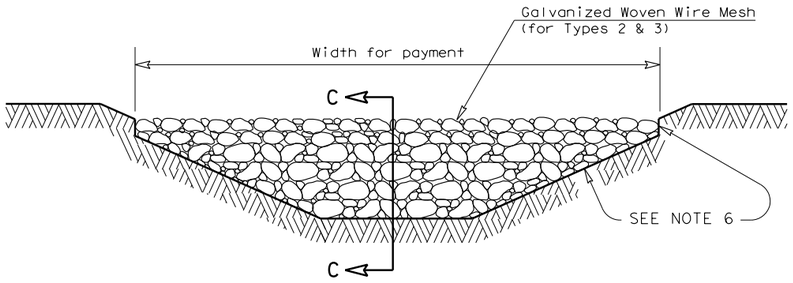


FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2

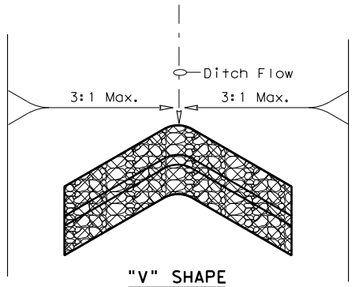


PROFILE

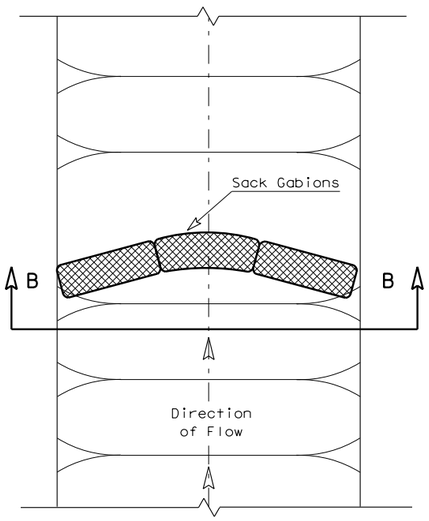


FILTER DAM AT CHANNEL SECTIONS

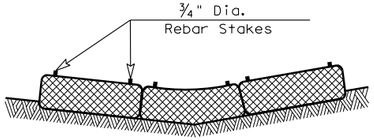
RFD1 — OR — RFD2 — OR — RFD3



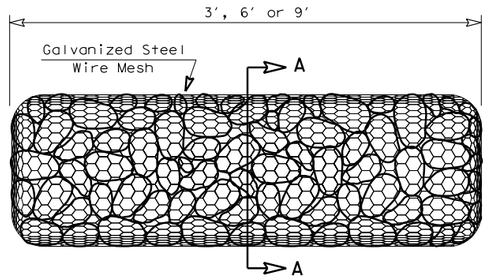
"V" SHAPE
PLAN VIEW



PLAN VIEW

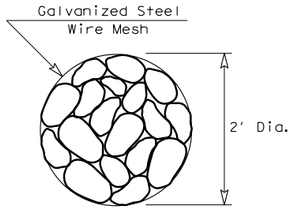


SECTION B-B

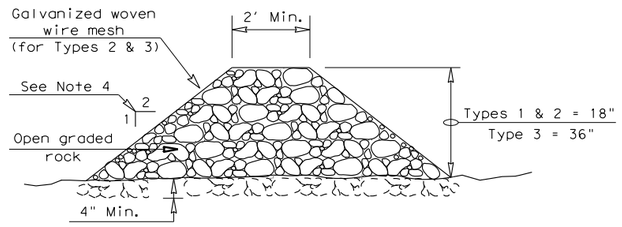


TYPE 4 (SACK GABIONS)

RFD4



SECTION A-A



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0910	16	147, ETC	WHITTLE ST, ETC
	DIST	COUNTY		SHEET NO.
	TYL	SMITH		112

DATE: 5/20/2021
FILE: ...\CADD\SW3P\STD SW3P\ec216.dgn