DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
GM	6	BR 2021(445) ETC			1
GRAPHICS	STATE	STATE DIST. NO.	COUNTY		
JM	TEXAS	FTW	PARKER		
CHECKED	CONT.	SECT.	JOB	HIGHWAY NO.	
GHA	0902	38	133, ETC	CS	
CHECKED					
GHA					

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL-AID PROJECT NO. BR 2021(445) ETC

(CS) CHERRY STREET & PINE STREET
PARKER COUNTY

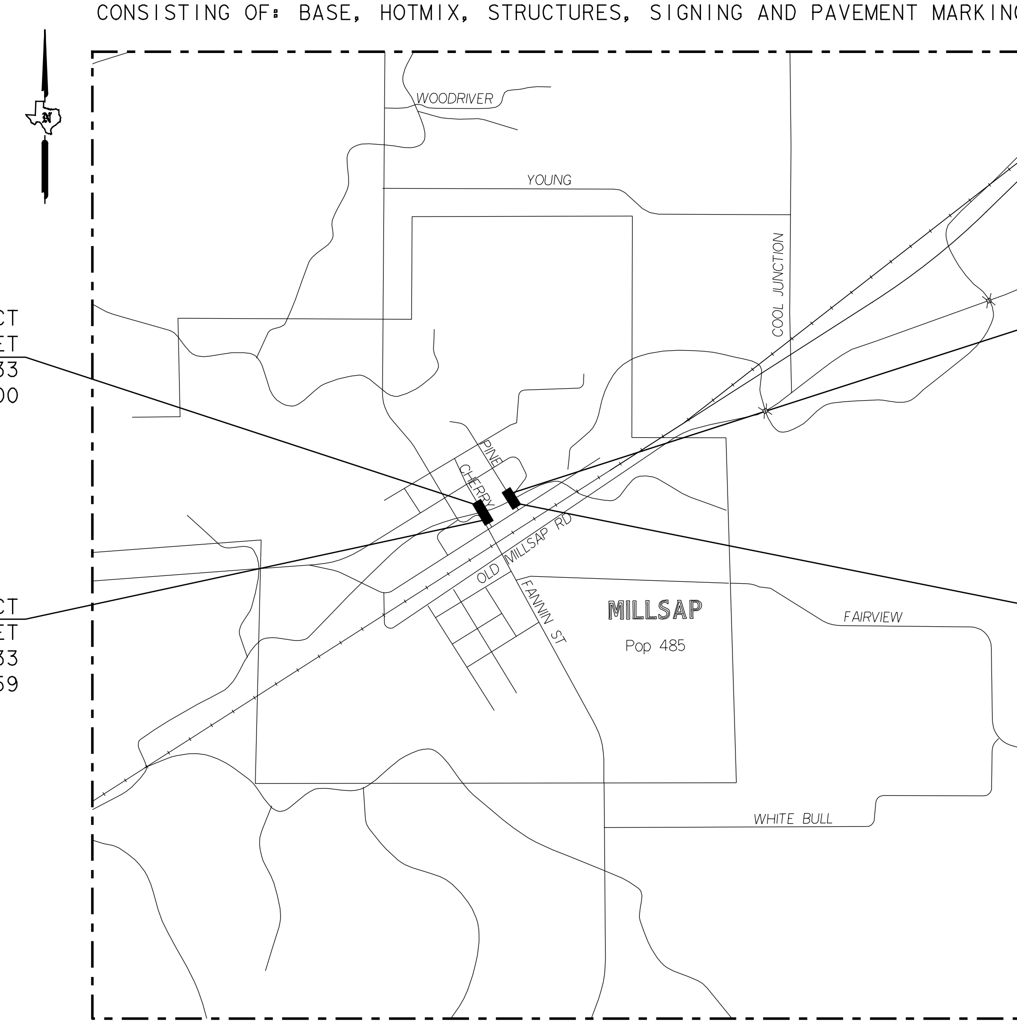
LIMITS: CHERRY STREET AT GRASSY BRANCH CSJ: 0902-38-133

LIMITS: PINE STREET AT GRASSY BRANCH CSJ: 0902-38-131

CHERRY STREET TOTAL LENGTH OF PROJECT =
ROADWAY = 373.41 FT = 0.071 MI.
BRIDGE = 50.00 FT = 0.009 MI.
TOTAL = 423.41 FT = 0.080 MI.

PINE STREET TOTAL LENGTH OF PROJECT =
ROADWAY = 245.74 FT = 0.046 MI.
BRIDGE = 40.00 FT = 0.008 MI.
TOTAL = 285.74 FT = 0.054 MI.

TYPE OF WORK: FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT
CONSISTING OF: BASE, HOTMIX, STRUCTURES, SIGNING AND PAVEMENT MARKINGS



END PROJECT
CHERRY STREET
CSJ: 0902-38-133
STA: 103+64.00

BEGIN PROJECT
CHERRY STREET
CSJ: 0902-38-133
STA: 99+40.59

END PROJECT
PINE STREET
CSJ: 0902-38-131
STA: 103+08.00

BEGIN PROJECT
PINE STREET
CSJ: 0902-38-131
STA: 100+22.26

EQUATIONS : NONE
RAILROAD : NONE
EXCEPTIONS : NONE

NOTES:
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, FEDERAL-AID CONSTRUCTION CONTRACTS
(FORM FHWA 1273, MAY 2012)

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COUNTY______ PROJ. NO.______
HWY. NO.______ LETTING DATE______
DATE ACCEPTED______

100% SUBMITTAL

PREPARED BY:
HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

HAYDEN CONSULTANTS, INC.
F-00640
STATE OF TEXAS
GEORGE H. AMEN
106875
PROFESSIONAL ENGINEER
3/1/2022

LETTING DATE: ______
CONTRACTOR: ______
______
WORK BEGAN: ______
WORK COMPLETED: ______
WORK ACCEPTED: ______
CHANGE ORDERS: ______

PINE STREET
FUNCTIONAL CLASSIFICATION = LOCAL RURAL TWO LANE
DESIGN SPEED = 30 MPH
ADT(2018) = 85
ADT(2038) = 128

CHERRY STREET
FUNCTIONAL CLASSIFICATION = LOCAL RURAL TWO LANE
DESIGN SPEED = 30 MPH
ADT(2018) = 85
ADT(2038) = 128

Texas Department of Transportation

SUBMITTED FOR LETTING: 3/4/2022 DATE
DocuSigned by:
086C6EB5217D412...
AREA ENGINEER

RECOMMENDED FOR LETTING: 3/9/2022 DATE
DocuSigned by:
7879B0B92E5D403...
DIRECTOR, TP&D

APPROVED FOR LETTING: 3/9/2022 DATE
DocuSigned by:
Carl L. Johnson, PE
2FE36139F0614C3...
DISTRICT ENGINEER

INDEX OF SHEETS

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

* THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY GEORGE H. AMEN JR. PE OR UNDER HIS RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

** THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY TXDOT'S RECOMMENDATION AS BEING APPLICABLE TO THIS PROJECT.

DocuSigned by:
Chad Dabbs , P.E. 3/4/2022
DF22E0295EB54E8...
Signature of Registrant Date

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET & PINE STREET

INDEX OF SHEETS

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	2
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

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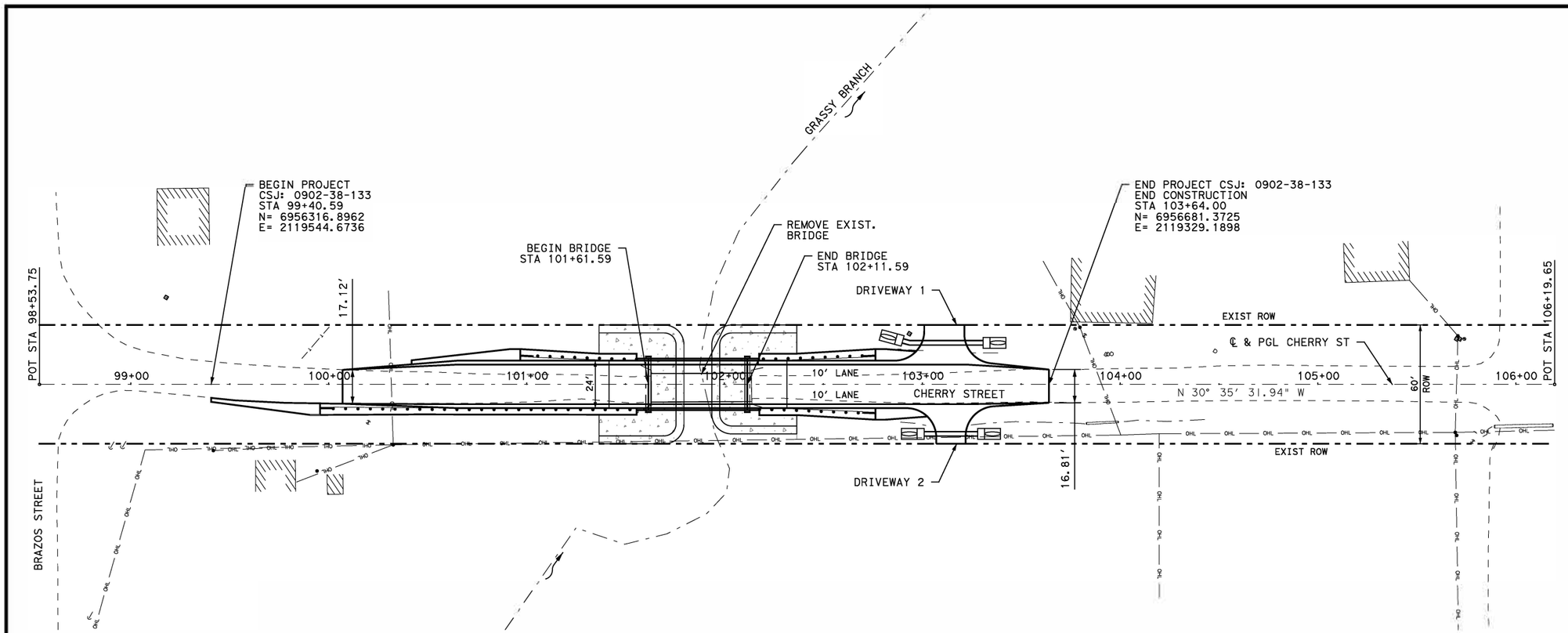

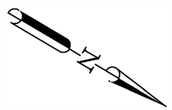

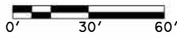

SCALE: 1"=60'

NOTES:

1. SEE BRIDGE LAYOUT FOR GRASSY BRANCH STRUCTURE INFORMATION.
2. SEE DRIVEWAY LAYOUTS FOR DRIVEWAY INFORMATION.

DESIGN SPEED = 30 MPH
FUNCTION CLASS = LOCAL RURAL TWO LANE
ADT (2018) = 85
ADT (2038) = 128

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER
3/3/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

PROJECT LAYOUT

SCALE: 1"=60' SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	3
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: jmurphy
DATE: 3/3/2022
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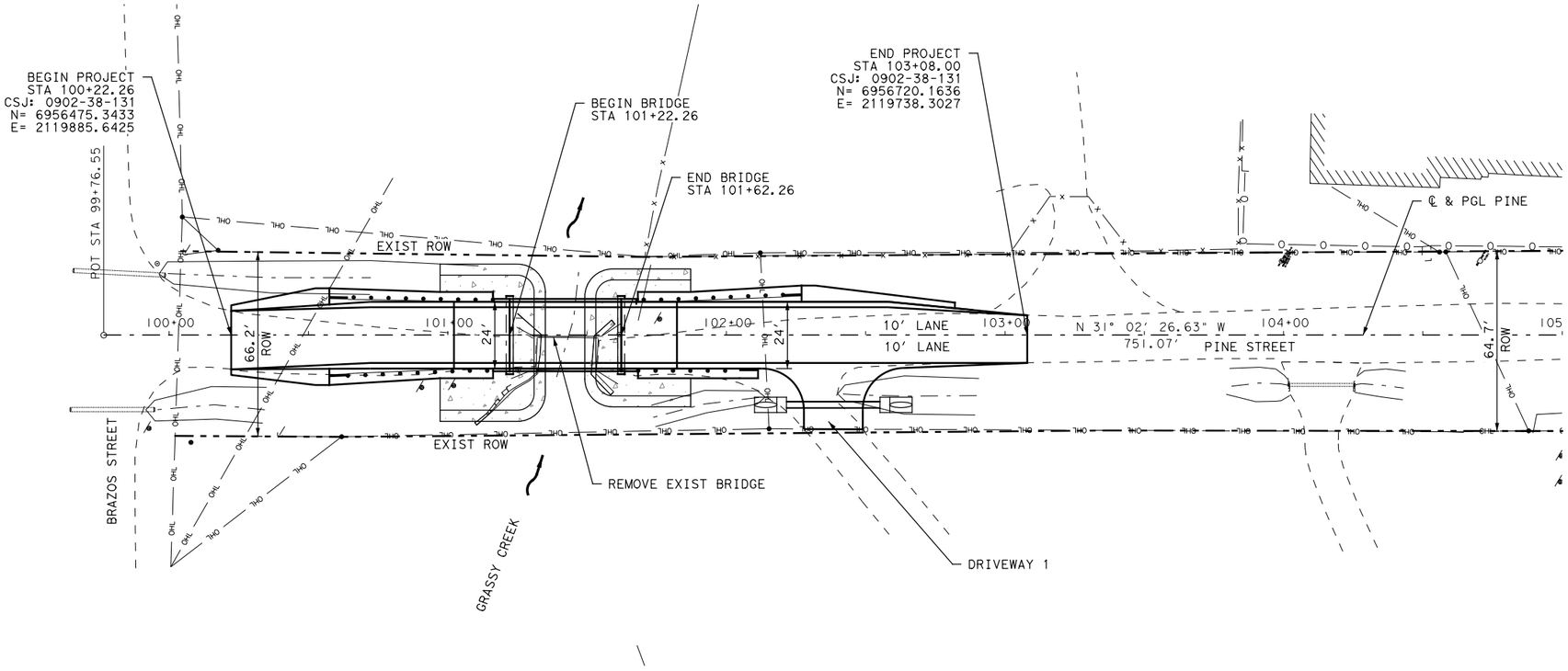

0′ 25′ 50′

SCALE: 1"=50′

NOTES:

1. SEE BRIDGE LAYOUT FOR GRASSY CREEK STRUCTURE INFORMATION.
2. SEE DRIVEWAY LAYOUTS FOR DRIVEWAY INFORMATION.

DESIGN SPEED = 30 MPH
FUNCTION CLASS = LOCAL RURAL TWO LANE
ADT (2018) = 85
ADT (2038) = 128

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106875
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET

PROJECT LAYOUT

SCALE: 1"=50′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	4
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

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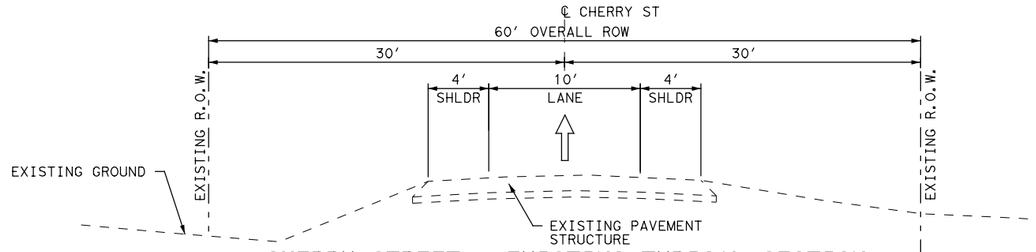
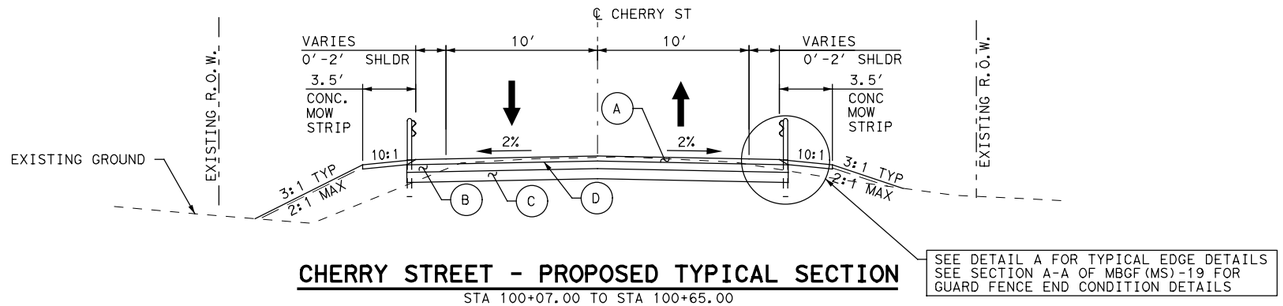


CHERRY STREET - EXISTING TYPICAL SECTION

STA 100+07.00 TO STA 103+64.00



CHERRY STREET - PROPOSED TYPICAL SECTION

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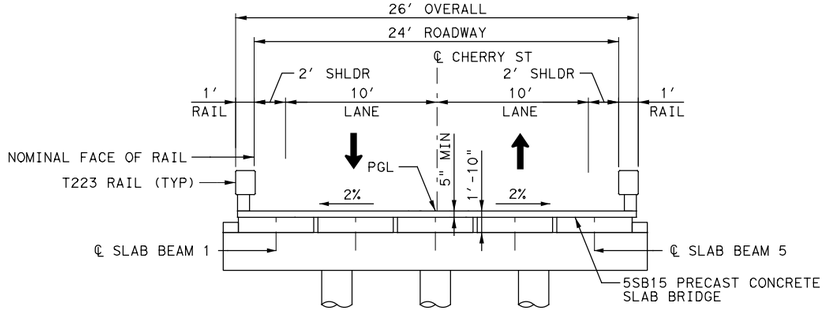

CHERRY STREET - PROPOSED TRANSVERSE BRIDGE SECTION

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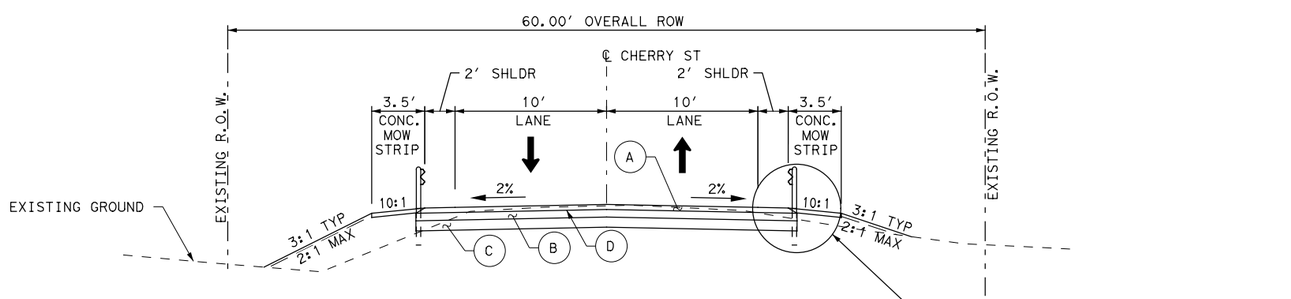
N.T.S.



CHERRY STREET - PROPOSED TYPICAL SECTION

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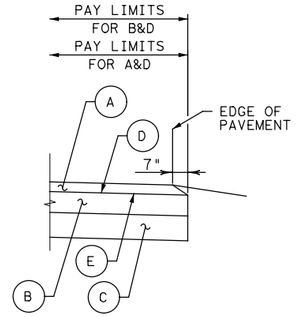
STA 102+11.59 TO STA 103+22.50
APPROACH SLAB: STA 101+41.59 TO STA 101+61.59
APPROACH SLAB: STA 102+11.59 TO STA 102+31.59

LEGEND

- (A) 3" SP MIXES (SP-C) (SAC-A) (PG70-28)(115LB/SY/IN)
- (B) 6" FLEXBASE (TY-A)(GR 1-2)
- (C) 8" LIME TREATED SUBGRADE (150LB/CY)
- (D) PRIME COAT (ITEM 310) MC-30, EC-30, OR CBSMS-1S (0.3GAL/SY)
- (E) TACK COAT (ITEM 3077) (0.2GAL/SY)



DETAIL A: TAPER EDGE DETAIL

TAPERED EDGE DETAIL FOR
NEW PAVEMENT SECTIONS
(ALL TYPES)

N.T.S.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

EXISTING & PROPOSED TYPICAL SECTIONS

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

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	5
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorshoi
DATE: 3/2/2022
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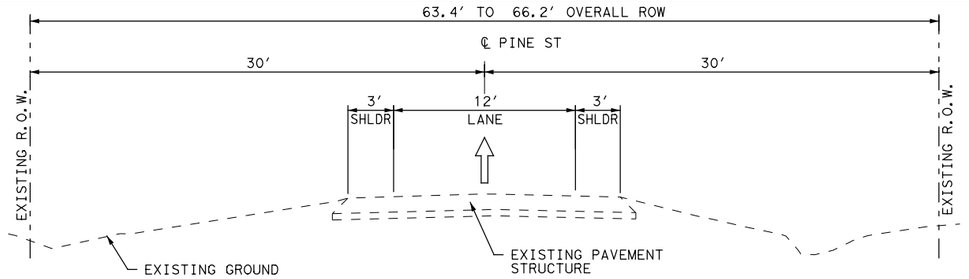

PINE STREET - EXISTING TYPICAL SECTION

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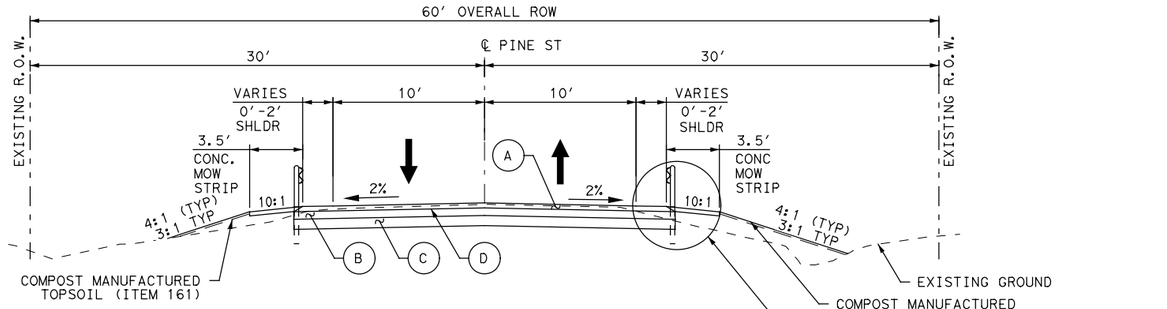
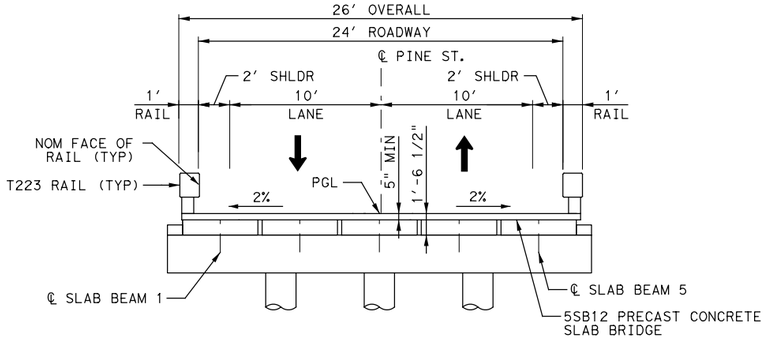


PINE STREET - PROPOSED TYPICAL SECTION

STA 100+43.00 TO STA 100+94.00
STA 102+57.83 TO STA 103+08.00



PINE STREET - PROPOSED TRANSVERSE BRIDGE SECTION

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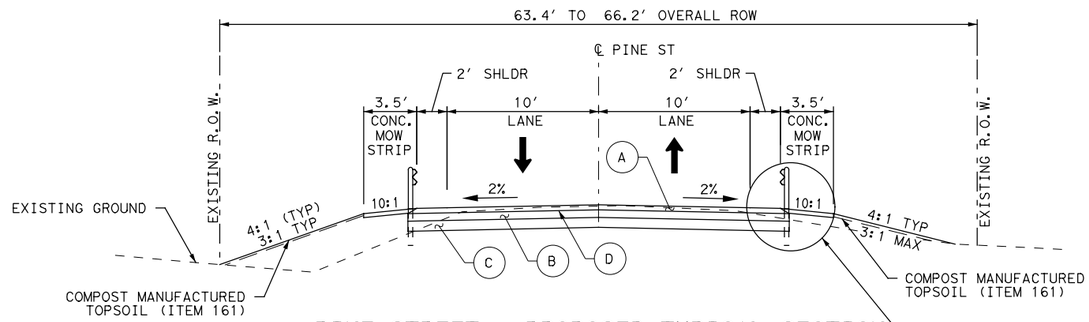
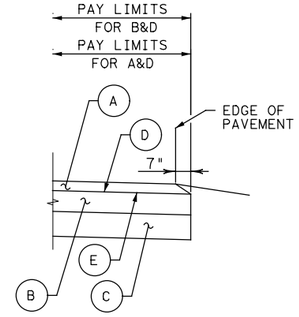


PINE STREET - PROPOSED TYPICAL SECTION

STA 100+94.00 TO STA 101+22.26
STA 101+62.26 TO STA 102+57.83
APPROACH SLAB: STA 101+02.26 TO STA 101+22.26
APPROACH SLAB: STA 101+62.26 TO STA 101+82.26

LEGEND

- (A) 3" SP MIXES (SP-C) (SAC-A) (PG70-28)(115LB/SY/IN)
- (B) 6" FLEXBASE (TY-A)(GR 1-2)
- (C) 8" LIME TREATED SUBGRADE (150LB/CY)
- (D) PRIME COAT (ITEM 310) MC-30, EC-30, OR CBSMS-1S (0.3GAL/SY)
- (E) TACK COAT (ITEM 3077)(0.2GAL/SY)



DETAIL A: TAPER EDGE DETAIL

TAPERED EDGE DETAIL FOR NEW PAVEMENT SECTIONS (ALL TYPES)

N.T.S.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100615
REGISTERED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET

EXISTING & PROPOSED TYPICAL SECTIONS

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

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	6
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

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Project Number: BR 2021(445), etc.

County: Parker **Control:** 0902-38-133 etc.

Highway: CS

Specification Data

Basis of Estimate

Item	Description	Rate	Unit
168	Vegetative Watering	169,400 gal./acre	1,000 gal.
260	Lime (Hydrated Lime) (Slurry)	150 lb./cu. yd.	ton
310	Asph Mat'l (MC-30, EC-30, or CBSMS-1S) (Flexbase)(Priming)	0.30 gal./sq. yd.*	gal.
3077	SP Mixes (SP-C) (SAC-A)	115 lb./sq. yd.-in.	ton
3077	Tack Coat - CSS-1P	0.20 gal./sq. yd.	gal.

* Based On 50% Asphalt Residue.

Compaction Requirements for Base Courses

Item	Material	Course	Min. Density
247	Flex Base	All	100 %

(Minimum Density is the percentage of density required based on results of Tex-113-E, Tex-114-E, Tex-120-E, and/or Tex-121-E)

Special Notes

Electronic files containing answered pre-letting questions and other project related design information will be placed in the following FTP site periodically.

Check this site for new information. Notices of new postings will not be sent out by the Engineer.

The data located in these files is for non-construction purposes only and can be found at

TxDOT's public FTP site at https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting Responses/.

Access is read-only.

All files in the FTP site are subject to the License Agreement shown on the FTP site.

Project Number: BR 2021(445), etc.

County: Parker **Control:** 0902-38-133 etc.

Highway: CS

To obtain a copy of the project plans free of charge, submit a request from the following site: http://www.txdot.gov/business/letting-bids/plans-online.html

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

Area Engineer's Email: Klinton.Kuntz@txdot.gov
Assistant Area Engineer's Email: Gary.Beck@txdot.gov
Design Manager's Email: Chadwick.Dabbs@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 Responses/

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.

Single lane closures, except as otherwise shown in the plans, will be restricted to off-peak hours as defined in the following table:

Peak Hours		Off-Peak Hours	
6 to 9 AM Monday through Friday	3 to 7 PM Monday through Friday	9 AM to 3 PM and 7 PM to 6 AM Monday through Friday	All day Saturday and Sunday

Work that requires closure of multiple travel lanes in the same direction, except as otherwise shown in the plans, are restricted to night hours between 9 PM and 6 AM.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work.

For dimensions of right-of-way not shown on the plans, see right-of-way map on file at the TxDOT District Office.

Modifications to Lane Closure / Work Restrictions:

Remove all existing fences within the right of way and remove and replace all existing fences within easements where such fences conflict with the work. Protect the remaining fence from

damage due to slacking. Erect temporary fencing in the easement areas as necessary to secure the property. Provide at least one week notice to the property owner prior to removing or relocating the fence. Restore permanent fencing to an equal or better condition.

Provide all-weather surface for temporary ingress and egress to adjacent property, as directed. Materials, labor, equipment and incidentals necessary to provide temporary ingress and egress will not be paid for directly, but will be subsidiary to the various bid items.

Remove any obstructions to existing drainage due to the contractor's operations, as required, at the Contractor's expense.

In those instances where necessary, the governing slopes indicated herein may be varied from the limits shown, to the extent approved.

Locations and lengths of all private entrances are approximate only. The actual locations, lengths, lines, and grades are to be established in the field.

Provide temporary drain openings at all low points or other drainage structures, as required, at the contractor's expense.

Remove any obstructions to existing drainage due to the contractor's operations, as required, at the Contractor's expense.

Item 4. Scope of Work

Reimbursement for project overhead will not be considered until project completion has extended beyond the original Contract Time.

Item 5. Control of the Work

When supplementary bridge plans, shop drawings, shop details, erection drawings, working drawings, forming plans, or other drawings are required, prepare and submit drawings on sheets 8-1/2 by 11 inches, 17 by 22 inches, or full size drawings reduced to half scale if completely legible. If, in the opinion of the Engineer, the drawings are not completely legible, prepare and submit on sheets 22 by 34 inches, with a 1-1/2 inch left margin, and 1/2 inch top, right, and bottom margins.

Submit all sheets with a title in the lower right hand corner. The title must include the sheet index data shown on the lower right corner of the project plans, name of the structure or element or stream, sheet numbering for the shop drawings, name of the fabricator and the name of the Contractor.

Project Number: BR 2021(445), etc.

County: Parker **Control:** 0902-38-133 etc.

Highway: CS

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

Standard Operating Procedure for Alternative 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 alternative is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternatives 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 (USACE) permit area that has not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to haul roads, equipment staging areas, borrow and disposal sites. "Associated" as 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 such work. The contractor will be responsible for all consultations with the USACE regarding activities, including project specific locations (PSLs) that have not been previously evaluated by the USACE. Provide the Department with a copy of all consultations or approvals from the USACE prior to initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The contractor is solely responsible for documenting any determinations that their activities do not affect a USACE permit area. Maintain copies of these determinations for review by the Department or any regulatory agency.

Document and coordinate with the USACE, if required, prior to any excavation hauled from or embankment hauled into a USACE permit area by either (1) or (2) below.

(1) **Restricted Use of Materials for Previously Evaluated Permit Areas.** Document both the project specific location (PSL) and its authorization. Maintain copies for review by the Department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
   a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in Item 110 is used for permanent or temporary fill (Item 132, Embankment) within a USACE permit area;

b. Suitable embankment (Item 132) from within the USACE permit area is used as fill within a USACE evaluated area; and,
c. Unsuitable excavation or excess excavation ["Waste"] (Item 110) that is disposed of at a location approved by the Engineer within a USACE evaluated area.

(2) Contractor Materials from Areas Other than Previously Evaluated Areas. Provide the Department with a copy of all USACE coordination or approvals prior to initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to haul roads, equipment staging areas, borrow and disposal sites:
a. Item 132, Embankment, used for temporary or permanent fill within a USACE permit area; and,
b. Unsuitable excavation or excess excavation ["Waste"] (Item 110, Excavation) that is disposed of outside a USACE evaluated area.

The total area disturbed for this project is 0.45 acres for Pine Street and 0.55 acres for Cherry Street. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), 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. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the right of way. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the right of way to the Engineer and to the local government that operates a separate storm sewer system.

When a bridge deck is milled, seal coated and overlaid, remove excess material. Do not just broom to the sides of the bridge, under guardrail, etc. Cover or protect all sealed expansion joints and rails on bridges and all railroad tracks encountered as approved. Clean and repair all of these features if they weren't properly protected at contractor's expense. This work is subsidiary work to applicable bid items.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, avoid nests containing migratory birds and perform no work in the nesting areas until the young birds have fledged.

Structures

Do not begin bridge and culvert construction operations until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting

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deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows. This work is subsidiary to the various bid items.

The following Holiday/Event lane closure restriction requirements apply to this project:
No work that restricts or interferes with traffic shall be allowed between 3 PM on the day preceding a Holiday or Event and 9 AM on the day after the Holiday or Event.

Holiday Lane Closure Restrictions	
New Year's Eve and New Year's Day (December 31 through January 1)	3 PM December 30 through 9 AM January 2
Easter Holiday Weekend (Friday through Sunday)	3PM Thursday through 9 AM Monday
Memorial Day Weekend (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
Independence Day (July 3 through July 5)	3 PM July 2 through 9 AM July 6
Labor Day Weekend (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
Thanksgiving Holiday (Wednesday through Sunday)	3 PM Tuesday through 9 AM Monday
Christmas Holiday (December 23 through December 26)	3 PM December 22 through 9 AM December 27

Plan work schedules around the appropriate dates above to ensure productive work is performed without lane closures.

No significant traffic generator events identified.

Item 8. Prosecution and Progress

Working days will be computed and charged in accordance with Section 8.3.1.1, 'Five-Day Workweek.'

Item 100. Preparing Right of Way

Measurement for this item will be along the centerline of the project with the limits of measurements as shown on the plans.

Removal of existing concrete pavement will be in accordance with Item 104, "Removing Concrete" except that this work will not be paid for directly, but will be subsidiary to Item 100, "Preparing Right of Way."

Item 105. Removing Treated and Untreated Base and Asphalt Pavement

Cement, lime, and/or lime fly-ash treated base material removed on this project will become the property of the Contractor.

Item 110. Excavation

Review proposed waste sites to determine if any site is located in a "Base Floodplain" or "Floodway" as defined by the Federal Emergency Management Agency (FEMA).

If waste material from this project is placed in a base floodplain as defined by FEMA, obtain a permit from the local community responsible for enforcing National Flood Insurance Program (NFIP) regulations. Ensure that the owner of the property receiving the waste has obtained the necessary permit.

Items 110, 112, and 132. Excavation, Subgrade Widening, and Embankment

Sulfate-laden subgrade material that is to be treated with either lime or cement, including material up to one foot outside the proposed treatment limits, is susceptible to sulfate heave. It has been determined that an excessive concentration of sulfate in the soils (>3,000 PPM by dry weight of the soil) exists for given areas of excavation and/or proposed treated subgrade within the project limits. The areas of moderate to high concentrations are as follows:

Areas of subgrade to be treated (3,001–7,000 PPM—moderate concentration)

Cherry - Station the 100+07.00 to Station 101+61.59 & 102+11.59 to Station 103+645.00
Pine – Station the 103+22.26 to Station 101+22.26 & 101+62.26 to 103+08.00

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Areas of excavation (>7,000 PPM—high concentration)

No areas identified

Moderate sulfate levels are those defined from 3,001 PPM to 7,000 PPM. Treat these soils with lime at the full 150 lb./cu. yd. rate or cement at the full 125 lb./cu. yd. rate. Do not split the rates to ensure complete reaction and mitigation of sulfate heaves. Allow the mixture to mellow for 7 days to provide for complete reaction.

High sulfate levels are not allowed within the treatment and surrounding areas as defined above.

Test soils for soluble sulfates in accordance with Test Method Tex-145 and Tex-146-E.

Treat moderate sulfate or excavate high sulfate areas identified above and other subgrade areas that may be identified during construction as having moderate to high sulfate concentrations to a depth of one foot below and laterally to one foot outside the proposed treatment limits. Treatment of the moderate level material will be paid for under Item 260, "Lime Treatment (Road Mixed)" or Item 275, "Cement Treatment (Road Mixed)." Removal of the high level material will be measured and paid for in accordance with Item 110, "Excavation" and replacement with suitable material will be measured and paid for in accordance with Item 132, "Embankment."

Any excavated sulfate-laden material will be acceptable for use in fill areas. Do not place within previously specified section boundaries of subgrade to be treated with either lime or cement.

Off-Site Borrow Sources. In addition to meeting pertinent specification requirements, test off-site borrow sources for sulfate content. Test soils for soluble sulfates in accordance with Test Method Tex-145 and Tex-146-E and provide documentation that supports compliance with previously stated requirements. The Engineer will perform additional testing for sulfates of this material upon delivery to the project. Only material that is placed within one foot vertically or laterally of subgrade treatment will require testing for sulfates. Remove and replace failing material (sulfate concentrations >7,000 PPM by dry weight).

Item 132. Embankment

Do not provide Type B embankment material with a Plasticity Index (PI) higher than 35.

Furnish test results per Test Procedures Tex-104, 105, and 106-E (PIs), Tex-113 or 114-E (M-D Curves), and Tex-145 and/or Tex-146-E (Sulfates) for each material sample provided by the Engineer. Perform field density tests (Tex-115-E, Part I) at a frequency for each worked section to produce passing results prior to testing by the Engineer per Tex-115-E, Part I.

When embankment is placed as a bridge header bank, test each lift for compliance with density requirements, near the center of each travel lane at the following locations:

1. At the "beginning of bridge" or "end of bridge" station (if abutment is on retaining wall, location may be adjusted by not more than 5 feet.)
2. At 25-foot intervals for a distance of 150 feet in advance of the "beginning of bridge" station.
3. At 25-foot intervals for a distance of 150 feet after the "end of bridge" station.

Density tests must be conducted by a department-certified independent testing laboratory. Results of tests will be furnished to TxDOT within 24 hours after testing; a final copy of all test reports must be signed and sealed by a Professional Engineer in the State of Texas and furnished within five (5) working days after testing. Areas which do not meet minimum density requirements will be removed, re-compacted, and re-tested for compliance at the contractor's entire expense. Testing and reporting of test results will not be paid for directly, but will be subsidiary to this item.

Construct embankments for bridge header banks to final subgrade elevation prior to excavation for abutment caps and placement of foundation course at approach slabs. Payment for structural excavation and/or excavation for placement of foundation course will not be paid for directly, but will be subsidiary to the pertinent bid items.

At all locations where guardrail is shown to flare, widen the embankment as necessary to accommodate the guardrail.

Item 161. Compost

Place approximately 4" of compost manufactured topsoil (CMT) on all cut and fill slopes (except drainage channels where flexible channel liners are indicated), at other locations shown on the plans, or as directed.

Where "blended on-site" CMT is specified, produce the compost manufactured topsoil by incorporating 1" of compost with 3" of furnished topsoil as shown on the plans.

Where "pre-blended" CMT is specified, amend suitable soil material, as directed, with 25% compost, by volume, to produce the compost manufactured topsoil. Place the compost manufactured topsoil in a loose layer approximately 4" thick, as shown on the plans.

Use the processed material from Item 100 as the wood chips to blend with the compost to produce the Erosion Control Compost required for this project. This is considered subsidiary to Item 161.

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Item 164. Seeding for Erosion Control

Apply seeding required between December 1 and January 31 using seed types and mixtures as shown in Item 164.2.1, Table 3. If, in the opinion of the Engineer, this does not provide an effective vegetative cover, apply "straw or hay mulch" as specified in Article 164.3.2, "Straw or Hay Mulch Seeding" as soon as possible. After February 1, apply warm season seeding in order to establish a permanent protective vegetative cover.

Item 168. Vegetative Watering

Furnish and install an approved rain gauge at the project site, as directed. Furnishing and installation of the rain gauge will not be paid for directly, but will be subsidiary to Item 168.

Apply vegetative watering for an establishment period of thirteen weeks following application of seed or installation of sod, at a rate of 1/2 inch of water depth per week (approximately 13,030 gallons per acre). During the first four weeks after seeding, apply water twice per week, on non-consecutive days, each at half the weekly application rate. For the remainder of the establishment period, apply vegetative watering once per week during the months of January through June or September through December, at the weekly application rate; apply watering twice per week, on non-consecutive days during the months of July and August, each at one-half the weekly application rate.

Average weekly rainfall rates for the District are:

January—0.39"	April—0.86"	July—0.48"	October—0.68"
February—0.46"	May—1.00"	August—0.47"	November—0.46"
March—0.48"	June—0.63"	September—0.74"	December—0.37"

Item 247. Flexible Base

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

Item 260. Lime Treatment (Road-Mixed)

Apply lime by the "slurry placement" method. Allow the mixture to mellow for a minimum of 4 days after initial mixing. If moderate sulfates are present, or for other extenuating circumstances as determined by the Engineer, allow the mixture to mellow for 7 days after initial mixing.

Except as noted below, treat the raw subgrade to a depth of 8".

Treat the raw subgrade with lime to a depth of 18" for:

- Fills equal to or greater than 18"—soil PI > 39

- Fills <18"—soil PI >29
- All cuts—soil PI > 29
- Any location directed by the Engineer

Item 301. Asphalt Antistripping Agent

Furnish a liquid antistripping agent unless otherwise directed.

Item 310. Prime Coat

Provide an MC-30, EC-30, or CBSMS-1S for this Item. MC-30 is restricted to usage from September 16 through April 15.

Item 400. Excavation and Backfill for Structures

Class B bedding will be permitted in lieu of Class C bedding.

Recycled flex base and RAP are allowed individually or combined for use as granular material and backfill in Class B and C bedding at the discretion of the Engineer. These materials must meet the requirements of Table 1. The Engineer may require the mixing of one or both of these materials with the local soil to provide a cohesive material for compaction and stability of the backfill around the pipe or box culvert.

Item 420. Concrete Structures

Provide weepholes at bridge ends in the wingwalls as directed.

Concrete for" Column" and "Bents" will be paid for as a plan quantity.

Item 421. Hydraulic Cement Concrete

For Class P (Item 360) and S (Item 421) Concrete Only: For concrete plants equipped with 2 aggregate bins or no calibrated metering system, blend manufactured and natural sand at the aggregate source only. For concrete plants equipped with a minimum of 3 bins and a calibrated metering system, blending of the separate sands on-site is permitted to meet gradation and AIR requirements.

Strength/cylinder testing equipment must be equipped with a printer for an electronic print out of all test results.

Air entrainment requirements are waived for all classes of concrete except all Class S and all Class P concrete.

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Concrete will not be rejected for low air content. Adjustment to the dosage of air entrainment will be as directed or allowed by the Engineer.

Include the approved mix design number on each delivery ticket.

Item 427. Surface Finish for Concrete

Unless otherwise noted, provide a surface area **(III)** with a slurry coat finish on the bridge(s).

Item 432. Riprap

The quantities for riprap at the location indicated may be varied to the extent necessary to ensure proper functioning for the purpose intended.

Item 440. Reinforcement for Concrete

Top and bottom layers of slab reinforcing steel shall be epoxy coated.

Item 454. Bridge Expansion Joints

For header-type expansion joints refer to the following TxDOT website for the approved systems:

http://www.txdot.gov/inside-txdot/division/bridge/approved-systems/expansion-joints.html

Item 464. Reinforced Concrete Pipe

All bends and connections in pipe must be prefabricated.

Item 466. Headwalls and Wingwalls

Do not use precast headwalls/wingwalls.

Item 496. Removing Structures

When required by the plans, partial or complete removal of a structure for staged construction shall be accomplished in a manner which does not cause damage to the remainder of the structure or its supporting members. The Contractor shall submit a demolition plan for all structures to be replaced and/or removed in accordance with Item 496. Submit the procedure for removal of superstructure or substructure in writing or plan drawing for approval prior to implementation.

Required on all projects removing or replace a bridge structure.

The structure(s) to be removed have surface coatings that contain hazardous materials as follows: Lead

Notify the Texas Department of State Health Services (DSHS) prior to demolition or renovation of bridges or other structures, using DSHS Form APB#5, "Demolition/Renovation Notification Form". The form and instructions may be found on the DSHS Asbestos Programs Branch web page at http://www.dshs.state.tx.us/asbestos/notification.shtm. The DSHS notification form must be hand-delivered or mailed to (received at) the DSHS Austin office at least ten working days (10) days prior to commencing demolition or renovation. Fax or e-mail notifications will not be accepted. For projects with multiple bridges, a single notification, with a listing of all bridges or structures to be demolished or renovated and the expected start dates of their demolition or renovation (the start date is defined as the first date of visible demolition activities). Notify the DSHS Regional or Local inspector of all start date changes. The expected project completion date may be used as the "end" date.

Removal of riprap as required, approach slabs and shoulder drains to be included in the unit price bid.

The structure(s) to be removed have surface coatings which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA standards and regulations.

To allow for disassembly, the Department will remove paint containing hazardous materials off the steel during the Contract in accordance with the following:

- For simple steel I-beam spans less than 80' in length, a four inch wide strip around the perimeter of the diaphragm member or members at each attachment location to the beams.
- For continuous I-beam units or simple spans more than 80' in length, a six inch wide strip around the perimeter of the beam cross-section for each beam at each cut location. A four inch wide strip around the perimeter of the diaphragm member or members at each attachment location to the beams.
- A four inch wide strip around bearing attachments and at the anchor bolts.
- As requested elsewhere and approved by the Engineer. Paint removal requested beyond that listed herein will be at the Contractor's expense.

Provide to the Engineer a detailed plan of the locations of paint removal at least 60 days prior to start of steel structure removal.

Do not cut simple I-beams less than 80' in length.

Cut continuous I-beams or simple I-beams more than 80' in length, into sections not less than 40' in length or more than 70' in length, as directed. Contact the District BRINSAP Coordinator, Mark Burwell, at 817-370-6882 for information on lengths needed.

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Item 502. Barricades, Signs, and Traffic Handling

The contractor force account 'safety contingency' that has been established for this project is intended to be utilized for work zone enhancements to improve the effectiveness of the traffic control plan that could typically not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's responsible person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Permanent signs may be installed when construction in an area is complete and they will not conflict with the traffic control plan for the remainder of the job.

Existing signs are to remain as long as they do not interfere with construction and they do not conflict with the traffic control plan.

Any sign not detailed in the plans but called for in the layout will be as shown in the current "Standard Highway Sign Designs for Texas".

When traffic is obstructed, arrange warning devices in accordance with the latest edition of the "Texas Manual on Uniform Traffic Control Devices".

Cover or remove any work zone signs when work or condition referenced is not occurring.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets. Provide access to all driveways during all phases of construction unless otherwise noted in the plans or as directed.

Item 504. Field Office and Laboratory

Furnish the following structures for this project:

Type	No.
Field Office and Lab (Ty. B)	1

Field office will require at least a 3' by 3' landing on the outside of each exit door and a concrete landing at the bottom of exit stairs. The concrete landing will be the width of the stairs and extend at least 4' in front of the bottom step.

Furnish the following for the Field Office structure:

Item	No.
Laptop Computer	1
Printer	1
Internet Service	1

Provide Laptop computers with an Intel i5 (2.8 GHz) processor, or greater.

Integrated printer/copier/scanner/fax units will be permitted.

Item 506. Temporary Erosion, Sedimentation, and Environmental Controls

Remove accumulated sediment or replace SW3P controls when the capacity has been reduced by 50% or when the depth of sediment at the control structure exceeds one foot.

Items 530 And 531. Intersections, Driveways and Turnouts, and Sidewalks

The furnishing and installation of the sand cushion in proposed sidewalks, sidewalk ramps, and driveways will not be paid for directly but will be subsidiary to this bid item.

Item 540. Metal Beam Guard Fence

The locations and lengths of guard fence shown on the plans are approximate. Actual lengths and locations are to be determined in the field.

The tops of timber posts will be domed. Beveled tops will not be permitted for timber or steel posts.

When holes for timber posts are drilled below bottom of proposed grade, backfill the excessive depth with an acceptable sand. The furnishing and installation of the sand backfill will not be paid for directly but will be subsidiary to this Item.

When guardrail posts are placed in a finished surface, backfill the top 4 inches with an asphaltic material, domed to carry water away from the posts or as shown on the plans. The furnishing and installation of the asphaltic material backfill will not be paid for directly but will be subsidiary to this Item.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding ½" from the edge of the hole.

Item 585. Ride Quality for Pavement Surfaces

Ride quality requirements are waived.

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Item 666. Reflectorized Pavement Markings with Retroreflective Requirements

Collection of retroreflectivity readings using a mobile retroreflectometer is the preferred method. If retroreflectivity readings are collected using a portable or handheld unit, then measurement is defined as a collective average of at least 20 readings taken along a 200-foot test section. A minimum of three measurements will be required per mile of roadway. Measurements collected on a centerline stripe will be averaged separately for stripe in each direction of travel. A TxDOT inspector must witness the calibration and collection of all retro-reflectivity data.

Item 3077. Superpave Mixtures

RAP aggregate must meet the requirements of Table 1.

Provide aggregate with a Surface Aggregate Classification (SAC) value of A for the travel lanes and shoulders.

No blending, of the material retained on the No. 4 sieve, to meet SAC A will be allowed for surface mixes.

Natural (field) sands are not allowed.

Provide a PG 70-28 asphalt for the surface course and levelup course, if applicable.

Furnish a CSS-1P with greater than 50% asphalt residue for the tack coat on this project. A trackless tack can be used in lieu of CSS-1P tack coat or as directed by the Engineer. The Engineer will set the rate at time of application.

Warm Mix Asphalt (WMA) is not permitted in any mix type on this project.

RAP and RAS are not permitted in any surface and levelup mixes on this project.

Grade substitution per Table 5 is not allowed.

Provide a mix design with the gradation curve below the restricted zone.

Use the Boil Test, Test Procedure Tex-530-C, and provide only mixes that produce zero percent (0%) stripping for design verification and during production.

Include the approved mix design number on each delivery ticket.

Use a Material Transfer Device (MTD) unless otherwise directed.

Stop production after Lot 1. Review all test data and confirm any changes with the Engineer. Do not start production and placement on subsequent Lots until approved by the Engineer.

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Shoulders, crossovers, and other areas listed on the Plan sheets or as directed are not subject to in-place air void determination for this project.

Temporary detours are subject to in-place air void determination for this project.

Ride quality is not required on this project.

Item 6001. Portable Changeable Message Signs

Provide all portable changeable message signs and arrow panels with a photoelectric device to allow for automatic dimming of operations to approximately 50% of their normal brightness when ambient light drops to approximately five footcandles, and then increase back again for daytime operations.

Four (4) electronic portable changeable message sign units will be required. Individual or collective use of signs will be required by the Engineer when deemed necessary to supplement the traffic control plan.

Each sign must have programmed in its permanent memory the following 15 messages:

1. Exit Closed Ahead
2. Use Other Routes
3. Right Lane
4. Left Lane
5. Closed Ahead
6. Two Lane
7. Detour Ahead
8. Thru Traffic
9. Prepare To Stop
10. Merging Traffic
11. Expect 15 Minute Delay
12. Max Speed ** MPH
13. Merge Right
14. Merge Left
15. No Exit Next ** Miles

Estimate & Quantity Sheet

Texas Department of Transportation

CONTROLLING PROJECT ID 0902-38-133 **DISTRICT** Fort Worth **COUNTY** Parker
HIGHWAY CS

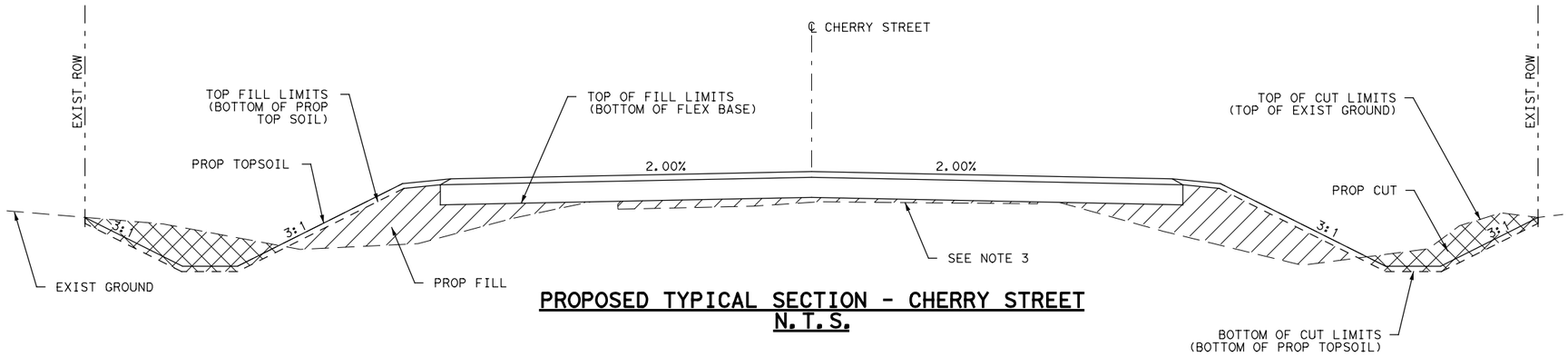
				CONTROL SECTION JOB	0902-38-131		0902-38-133		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00061160		A00061165			
				COUNTY	Parker		Parker			
				HIGHWAY	CS		CS			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA		2.900		4.300		7.200	
	105-6021	REMOVING STAB BASE AND ASPH PAV (0-4")	SY				104.000		104.000	
	105-6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY		557.000		489.000		1,046.000	
	110-6001	EXCAVATION (ROADWAY)	CY		334.000		403.000		737.000	
	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY		88.000		148.000		236.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY		804.000		911.000		1,715.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY		804.000		911.000		1,715.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY		402.000		455.500		857.500	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY		402.000		455.500		857.500	
	168-6001	VEGETATIVE WATERING	MG		28.100		31.900		60.000	
	247-6061	FL BS (CMP IN PLC)(TYA GR1-2) (6")	SY		541.000		695.000		1,236.000	
	260-6002	LIME (HYDRATED LIME (SLURRY))	TON		9.000		11.600		20.600	
	260-6073	LIME TRT (SUBGRADE)(8")	SY		541.000		695.000		1,236.000	
	310-6001	PRIME COAT (MULTI OPTION)	GAL		162.000		209.000		371.000	
	400-6005	CEM STABIL BKFL	CY		33.400		27.800		61.200	
	416-6002	DRILL SHAFT (24 IN)	LF		192.000		147.000		339.000	
	420-6014	CL C CONC (ABUT)(HPC)	CY		17.600		18.400		36.000	
	422-6002	REINF CONC SLAB (HPC)	SF		1,040.000		1,300.000		2,340.000	
	422-6016	APPROACH SLAB (HPC)	CY		38.500		38.500		77.000	
	425-6010	PRESTR CONC SLAB BEAM (SSB12)	LF		197.500				197.500	
	425-6012	PRESTR CONC SLAB BEAM (SSB15)	LF				247.500		247.500	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY		411.000		558.000		969.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY		18.000		25.000		43.000	
	450-6007	RAIL (TY T223)(HPC)	LF		104.000		124.000		228.000	
	454-6004	ARMOR JOINT (SEALED)	LF		52.000		52.000		104.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF		53.000		105.000		158.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA		2.000		4.000		6.000	
	496-6007	REMOV STR (PIPE)	LF		30.000		35.000		65.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA		1.000		1.000		2.000	
	500-6001	MOBILIZATION	LS		0.500		0.500		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO		3.000		3.000		6.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY		280.000		218.000		498.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY		280.000		218.000		498.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF		530.000		719.000		1,249.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF		530.000		719.000		1,249.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF		63.000		72.000		135.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF		63.000		72.000		135.000	

Estimate & Quantity Sheet

Texas Department of Transportation

CONTROLLING PROJECT ID 0902-38-133 **DISTRICT** Fort Worth **COUNTY** Parker
HIGHWAY CS

			CONTROL SECTION JOB		**0902-38-131**		**0902-38-133**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00061160**		**A00061165**			
			COUNTY		**Parker**		**Parker**			
			HIGHWAY		**CS**		**CS**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	530-6005	DRIVEWAYS (ACP)		SY	62.000		93.000		155.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)		LF	25.000		100.000		125.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)		EA	4.000		4.000		8.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)		EA	4.000		4.000		8.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)		EA	4.000		4.000		8.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)		EA	2.000		2.000		4.000	
	644-6076	REMOVE SM RD SN SUP&AM		EA	3.000		3.000		6.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)		EA	2.000		2.000		4.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)		EA	4.000		5.000		9.000	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)		LF	572.000		714.000		1,286.000	
	666-6205	REFL PAV MRK TY II (Y) 4" (BRK)		LF			90.000		90.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)		LF	572.000				572.000	
	672-6009	REFL PAV MRKR TY II-A-A		EA	4.000		5.000		9.000	
	678-6001	PAV SURF PREP FOR MRK (4")		LF	1,144.000		804.000		1,948.000	
	678-6033	PAV SURF PREP FOR MRK (RPM)		EA	4.000		5.000		9.000	
	3077-6027	SP MIXESSP-CSAC-A PG70-28		TON	94.000		120.000		214.000	
	3077-6075	TACK COAT		GAL	108.000		139.000		247.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN		EA	2.000		2.000		4.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS			1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS			1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)		LS			1.000		1.000	



PROPOSED TYPICAL SECTION - CHERRY STREET
N.T.S.

EARTHWORK SUMMARY
CHERRY STREET AT GRASSY CREEK

LIMITS STATION TO STATION	110-6001 EXCAVATION (ROADWAY) (CY)	132-6006 EMBANKMENT (FINAL) (DENS CONT) (TY C) (CY)	400-6005 CEM STAB BKFL (CY)
100+00	0.0	0.0	0.0
100+07	4.0	0.0	0.0
100+50	47.0	6.0	0.0
101+00	59.0	18.0	0.0
101+50	66.0	35.0	0.0
BEGIN BRIDGE 101+61.59	23.0	6.0	16.7
END BRIDGE 102+11.59	0.0	0.0	16.7
102+50	62.0	30.0	0.0
103+00	47.0	44.0	0.0
103+50	61.0	9.0	0.0
103+64.5	16.0	0.0	0.0
104+00	18.0	0.0	0.0
CSJ 0902-38-133	403	148	33.4

NOTES:
1. PLACE TY C1 EMBANKMENT AS FILL FOR TYPICAL ROADWAY SECTIONS.
2. PLACE TY C2 EMBANKMENT AS ABUTMENT BACKFILL AND UNDER APPROACH SLAB.
3. EXISTING PAVEMENT TO BE REMOVED AS PART OF REMOVAL ITEMS AND EXCLUDED FROM EARTHWORK CALCULATIONS.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

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PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

CHERRY STREET

EARTHWORK SUMMARY

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	9
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorshpoli
DATE: 3/2/2022
SCALE: 1:1
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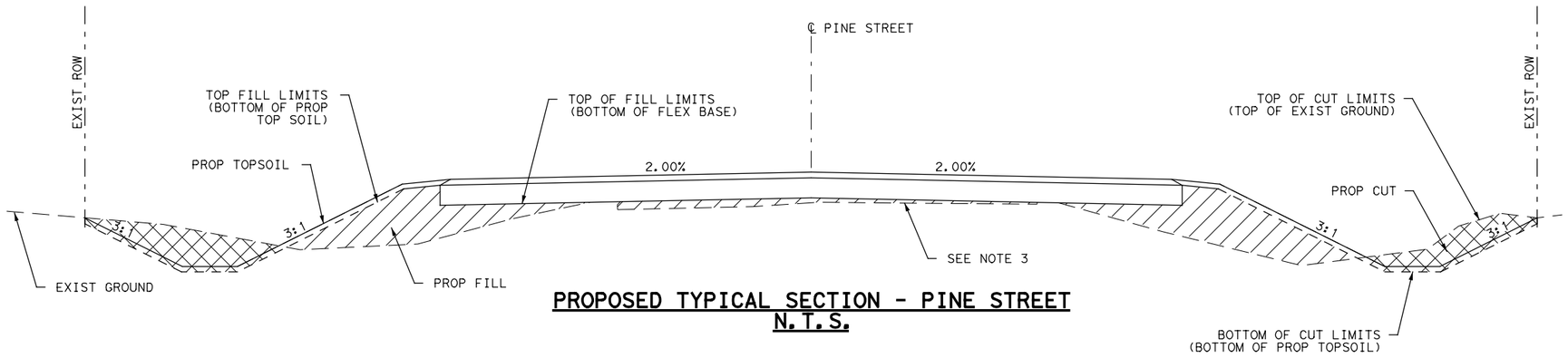

PROPOSED TYPICAL SECTION - PINE STREET
N.T.S.

EARTHWORK SUMMARY
PINE STREET AT GRASSY CREEK

LIMITS STATION TO STATION	110-6001 EXCAVATION (ROADWAY)	132-6006 EMBANKMENT (FINAL) (DENS CONT) (TY C)	400-6005 CEM STAB BKFL
	(CY)	(CY)	(CY)
100+00	0.0	0.0	0.0
100+22.26	14.0	0.0	0.0
100+50	36.0	5.0	0.0
101+00	62.0	25.0	0.0
BEGIN BRIDGE 101+22.26	34.0	18.0	13.9
END BRIDGE 101+68.26	0.0	0.0	13.9
102+00	35.0	17.0	0.0
102+50	59.0	13.0	0.0
103+00	65.0	10.0	0.0
103+08	8.0	0.0	0.0
103+50	21.0	0.0	0.0
CSJ 0902-38-131	334	88	27.8

NOTES:
1. PLACE TY C1 EMBANKMENT AS FILL FOR TYPICAL ROADWAY SECTIONS.
2. PLACE TY C2 EMBANKMENT AS ABUTMENT BACKFILL AND UNDER APPROACH SLAB.
3. EXISTING PAVEMENT TO BE REMOVED AS PART OF REMOVAL ITEMS AND EXCLUDED FROM EARTHWORK CALCULATIONS.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

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Texas Department of Transportation®

PINE STREET

EARTHWORK SUMMARY

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	10
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

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DATE: 3/2/2022
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SUMMARY OF WORK ZONE QUANTITIES

LOCATION	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING	6001 6002 PORTABLE CHANGEABLE MESSAGE SIGN
	MO	EA
CSJ: 0902-38-133	3	2
CSJ: 0902-38-131	3	2
PROJECT TOTALS	6	4

SUMMARY OF REMOVAL ITEMS

LOCATION	105 6021 REMOVING STAB BASE AND ASPH PAV (0-4")	105 6046 REMOVING STAB BASE AND ASPH PAV (0-10")	496 6007 REMOV STR (PIPE)	496 6009 REMOV STR (BRIDGE 0 - 99 FT LENGTH)	644 6076 REMOVE SM RD SN SUP&AM
	SY	SY	LF	EA	EA
CSJ: 0902-38-133	104	489	35	1	3
CSJ: 0902-38-131	-	557	30	1	3
PROJECT TOTALS	104	1046	65	2	6

SUMMARY OF DRAINAGE ITEMS

LOCATION	464 6005 RC PIPE (CL III) (24 IN)	467 6395 SET (TY II) (24 IN)(RCP) (6:1)(P)
	LF	EA
CSJ: 0902-38-133	105	4
CSJ: 0902-38-131	53	2
PROJECT TOTALS	158	6

SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002 PREPARING ROW	110 6001 EXCAVATION (ROADWAY)	132 6006 EMBANKMENT (FINAL) (DENS CONT) (TY C)	247 6061 FL BS (CMP IN PLC) (TYA GR1-2) (6")	260 6002 LIME (HYDRATED LIME (SLURRY))	260 6073 LIME TRT (SUBGRADE) (8")	310 6001 PRIME COAT (MULTI OPTION)	432 6045 RIPRAP (MOW STRIP) (4 IN)	530 6005 DRIVEWAYS (ACP)	540 6001 MTL W-BEAM GD FEN (TIM POST)	540 6007 MTL BEAM GD FEN TRANS (TL2)	544 6001 GUARDRAIL END TREATMENT (INSTALL)	3077 6027 SP MIXES (SP-C) (SAC-A) (PG70-28)	3077 6075 TACK COAT
	STA	CY	CY	SY	TON	SY	GAL	CY	SY	LF	EA	EA	TON	GAL
CSJ: 0902-38-133	4.3	403	148	695	11.6	695	209	25.0	93	100	4	4	120	139
CSJ: 0902-38-131	2.9	334	88	541	9.0	541	162	18.0	62	25	4	4	94	108
PROJECT TOTALS	7.2	737	236	1236	20.6	1236	371	43.0	155	125	8	8	214	247

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001 IN SM RD SN SUP&AM TY10BWG(1)SA(P)	644 6007 IN SM RD SN SUP&AM TY10BWG(1)SA(U)	658 6014 INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	658 6062 INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI)
	EA	EA	EA	EA
CSJ: 0902-38-133	4	2	2	5
CSJ: 0902-38-131	4	2	2	4
PROJECT TOTALS	8	4	4	9

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6170 REFL PAV MRK TY II (W) 4" (SLD)	666 6205 REFL PAV MRK TY II (Y) 4" (BRK)	666 6207 REFL PAV MRK TY II (Y) 4" (SLD)	672 6009 REFL PAV MRKR TY II-A-A	678 6001 PAV SURF PREP FOR MRK (4")	678 6033 PAV SURF PREP FOR MRK (RPM)
	LF	LF	LF	EA	LF	EA
CSJ: 0902-38-133	714	90	0	5	804	5
CSJ: 0902-38-131	572	0	572	4	1144	4
PROJECT TOTALS	1286	90	572	9	1948	9

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	161 6017 COMPOST MANUF TOPSOIL (4")	164 6003 BROADCAST SEED (PERM) (RURAL) (CLAY)	164 6009 BROADCAST SEED (TEMP) (WARM)	164 6011 BROADCAST SEED (TEMP) (COOL)	168 6001 VEGETATIVE WATERING	506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	506 6024 CONSTRUCTION EXITS (REMOVE)	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	506 6040 BIODEG EROSN CONT LOGS (INSTL) (8")	506 6043 BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	SY	MG	SY	SY	LF	LF	LF	LF
CSJ: 0902-38-133	911	911	455.5	455.5	31.9	218	218	719	719	72	72
CSJ: 0902-38-131	804	804	402.0	402.0	28.1	280	280	530	530	63	63
PROJECT TOTALS	1715	1715	857.5	857.5	60.0	498	498	1249	1249	135	135

REV	DATE	BY	DESCRIPTION

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Texas Department of Transportation®

CHERRY STREET & PINE STREET

SUMMARY OF QUANTITIES

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	11
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorgroll
DATE: 3/2/2022
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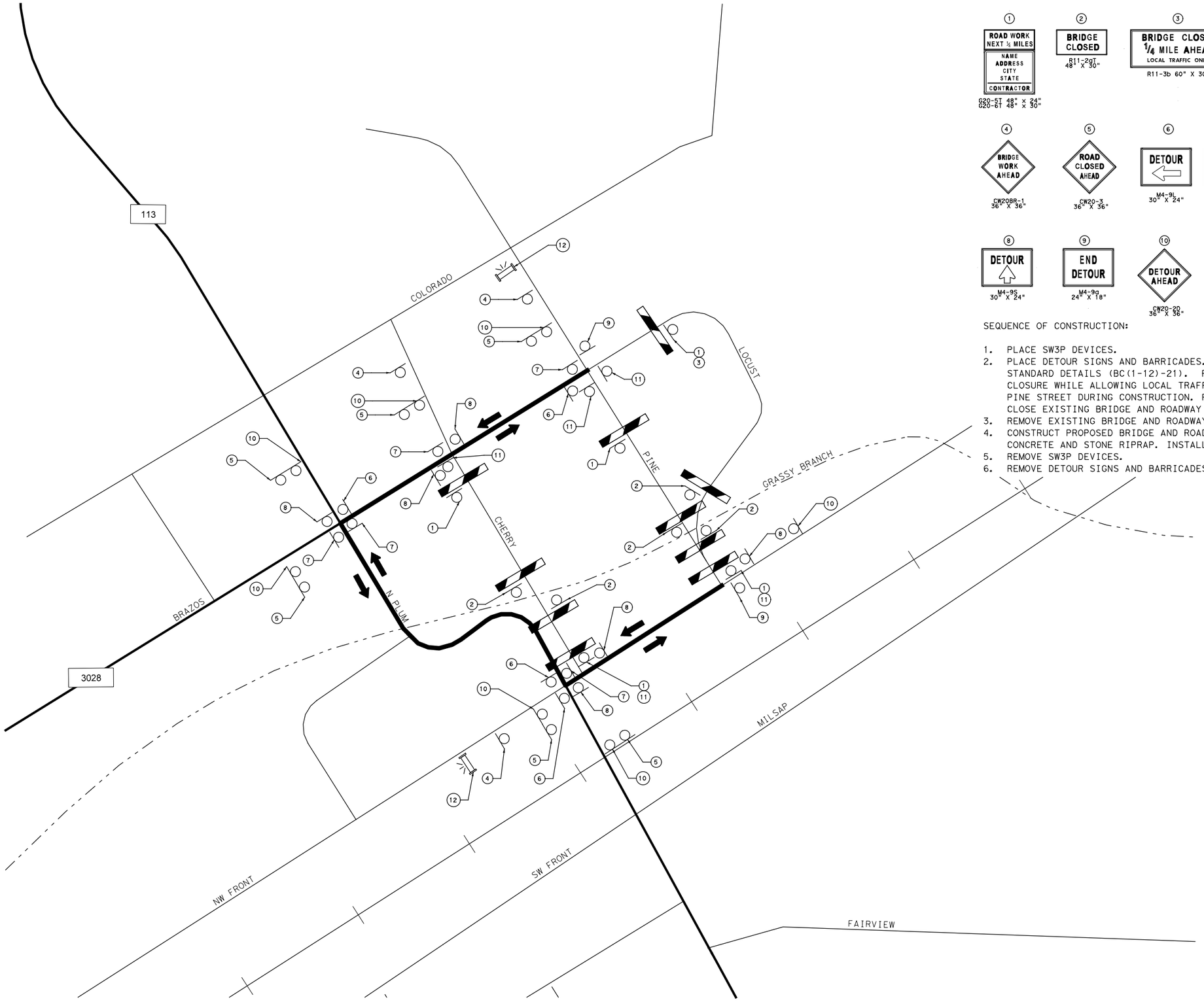

① ROAD WORK NEXT ½ MILES / NAME ADDRESS CITY STATE CONTRACTOR — G20-5T 48" x 24" / G20-6T 48" x 30"

② BRIDGE CLOSED — R11-2gT 48" X 30"

③ BRIDGE CLOSED ¼ MILE AHEAD LOCAL TRAFFIC ONLY — R11-3b 60" X 30"

④ BRIDGE WORK AHEAD — CW20BR-1 36" X 36"

⑤ ROAD CLOSED AHEAD — CW20-3 36" X 36"

⑥ DETOUR — M4-9l 30" X 24"

⑦ DETOUR — M4-9R 30" X 24"

⑧ DETOUR — M4-9S 30" X 24"

⑨ END DETOUR — M4-9a 24" X 18"

⑩ DETOUR AHEAD — CW20-2D 36" X 36"

⑪ ROAD CLOSED TO THRU TRAFFIC — R11-4 60" X 30"

⑫ PROTABLE MESSAGE BOARD

N

0′ 250′ 500′

SCALE: 1"=500′

SEQUENCE OF CONSTRUCTION:

1. PLACE SW3P DEVICES.
2. PLACE DETOUR SIGNS AND BARRICADES. REFER TO BARRICADE AND CONSTRUCTION STANDARD DETAILS (BC(1-12)-21). PLACE TYPE III BARRICADES IN ADVANCE OF ROADWAY CLOSURE WHILE ALLOWING LOCAL TRAFFIC TO MAINTAIN ACCESS ALONG CHERRY STREET AND PINE STREET DURING CONSTRUCTION. REFER TO WORK ZONE ROAD CLOSURE STANDARD DETAILS. CLOSE EXISTING BRIDGE AND ROADWAY APPROACHES.
3. REMOVE EXISTING BRIDGE AND ROADWAY APPROACHES.
4. CONSTRUCT PROPOSED BRIDGE AND ROADWAY APPROACHES. GRADE ROADSIDE DITCHES. INSTALL CONCRETE AND STONE RIPRAP. INSTALL PERMANENT PAVEMENT MARKINGS.
5. REMOVE SW3P DEVICES.
6. REMOVE DETOUR SIGNS AND BARRICADES. OPEN PROPSED BRIDGE AND ROADWAY APPROACHES.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100655
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

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Texas Department of Transportation®

CHERRY STREET & PINE STREET

TRAFFIC CONTROL DETOUR PLAN

SCALE: 1"=500′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	12
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorford1
DATE: 3/2/2022
SCALE: 1:500
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

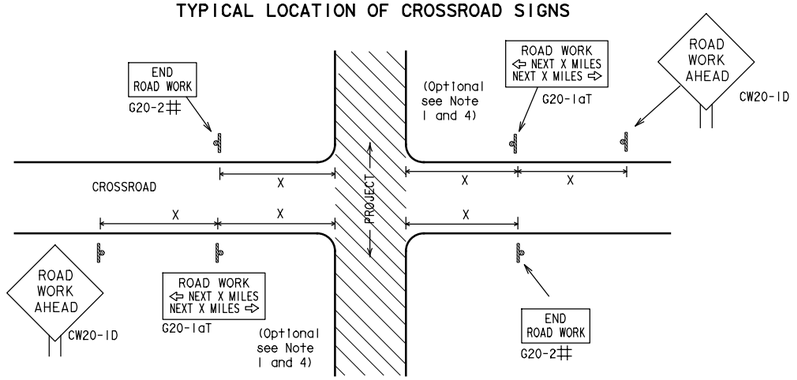
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		13

DATE: 3/2/2022 8:49:52 AM
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6\DP5400\1195.04\DGN\STANDARDS\bc-21_sheet1-12.dgn

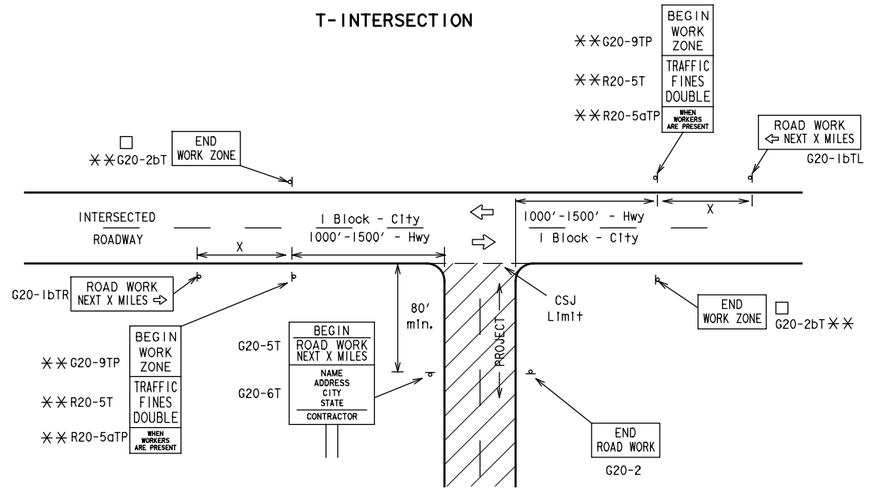
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

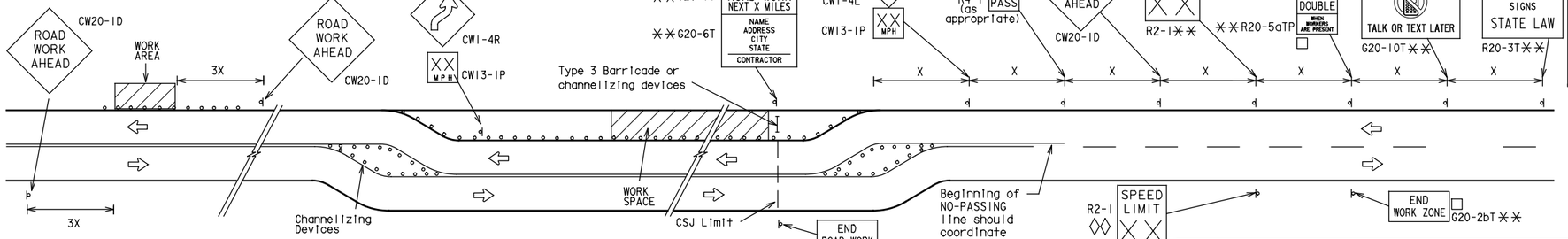
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

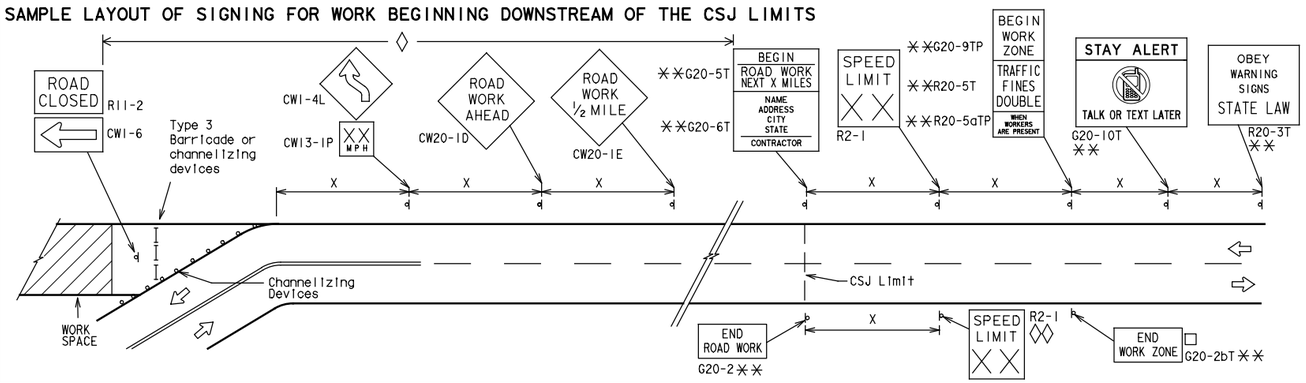
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

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	0902	38	133,ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PARKER		14

DATE: 3/2/2022 8:49:53 AM
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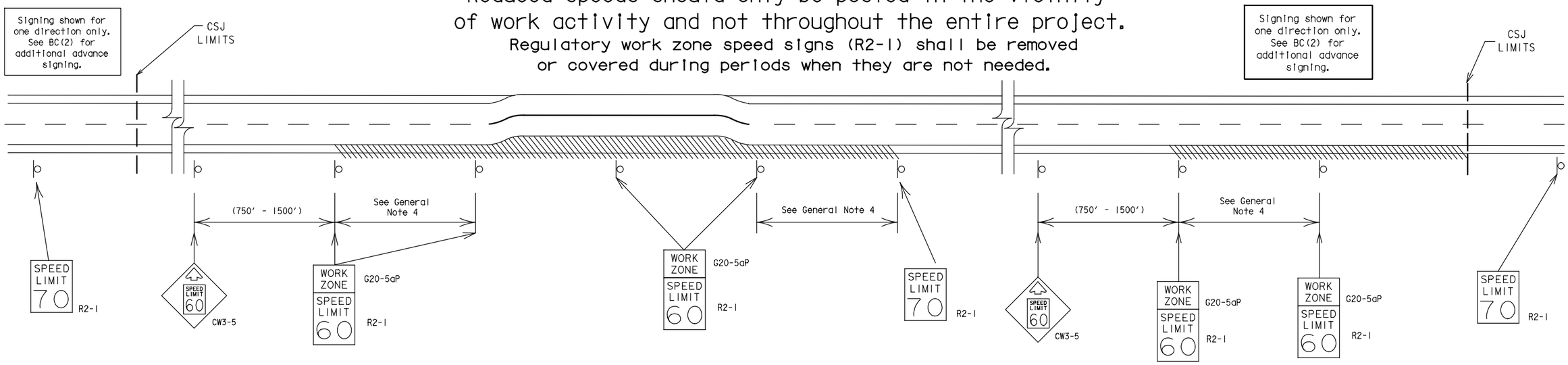
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		15

DATE: 3/2/2022 8:49:54 AM
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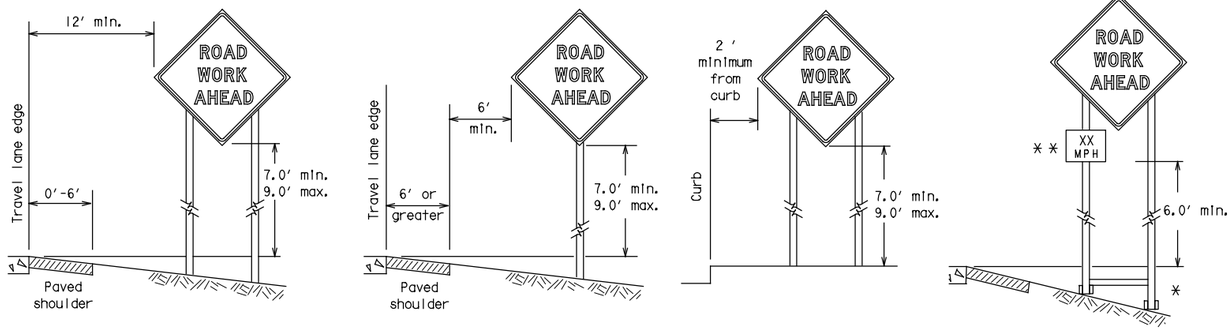
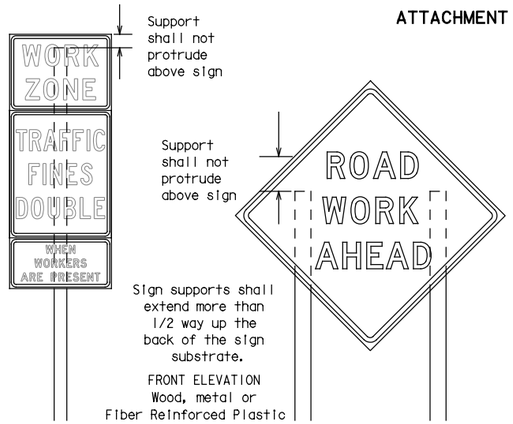
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

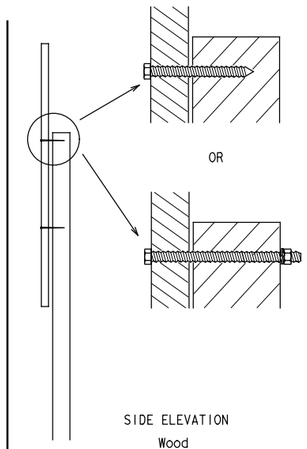


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





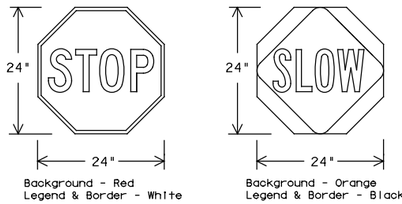
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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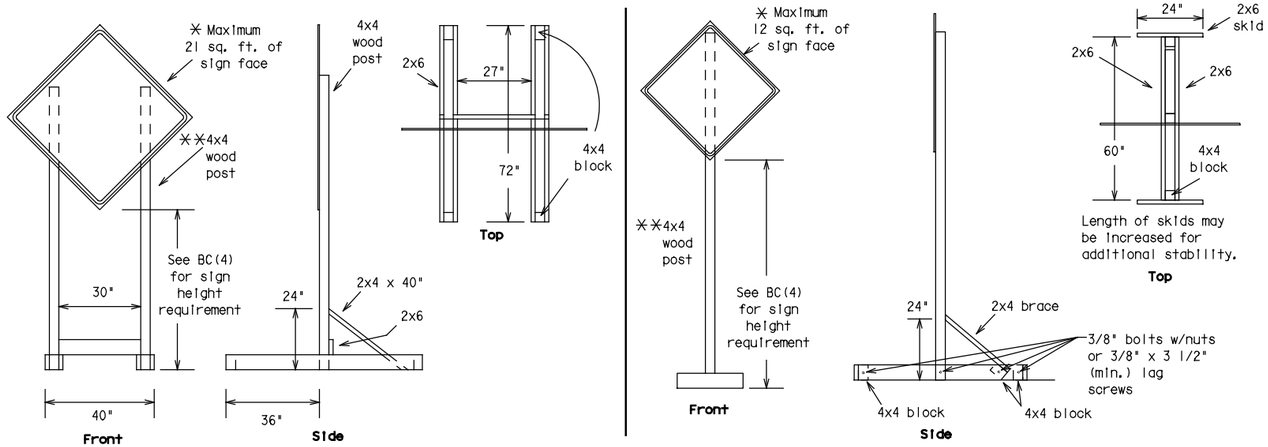
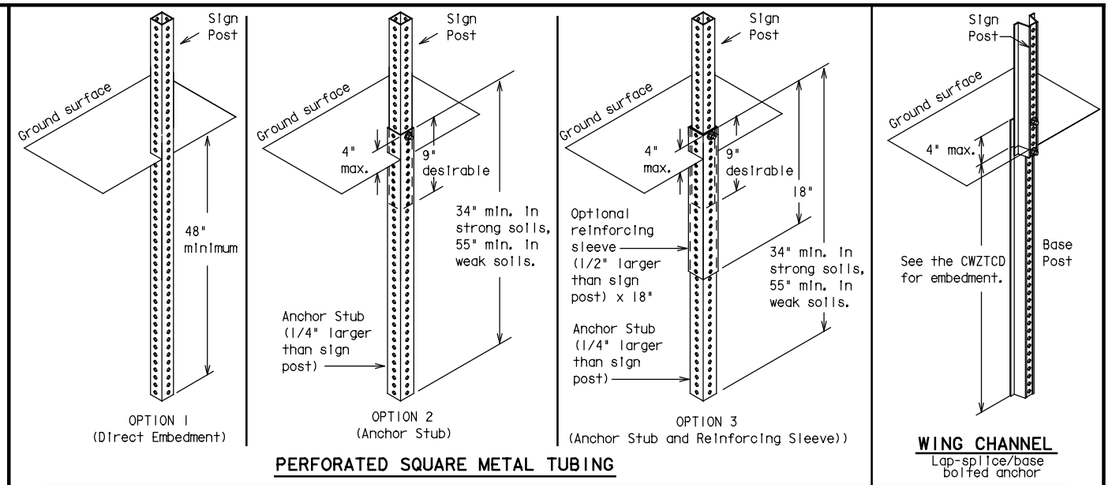


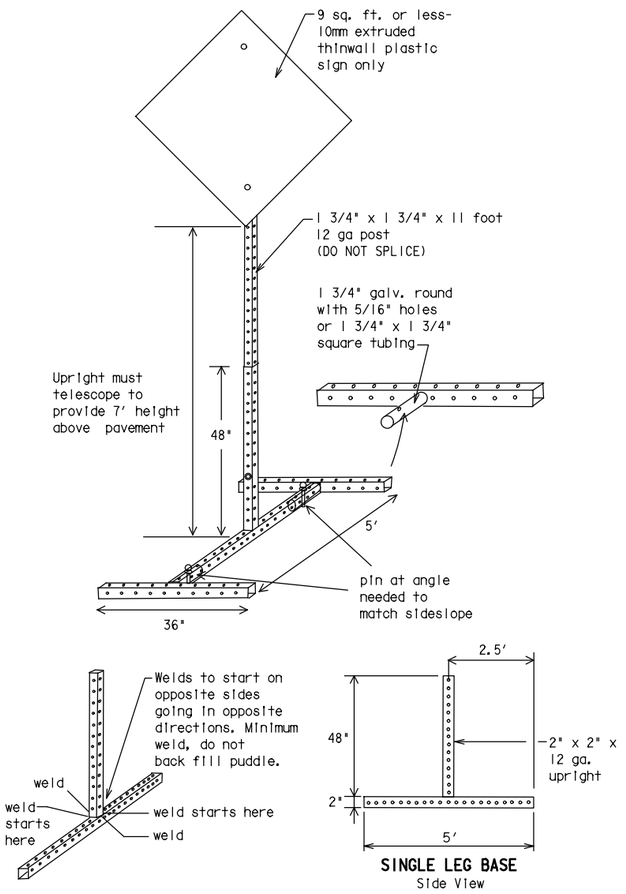
SKID MOUNTED WOOD SIGN SUPPORTS

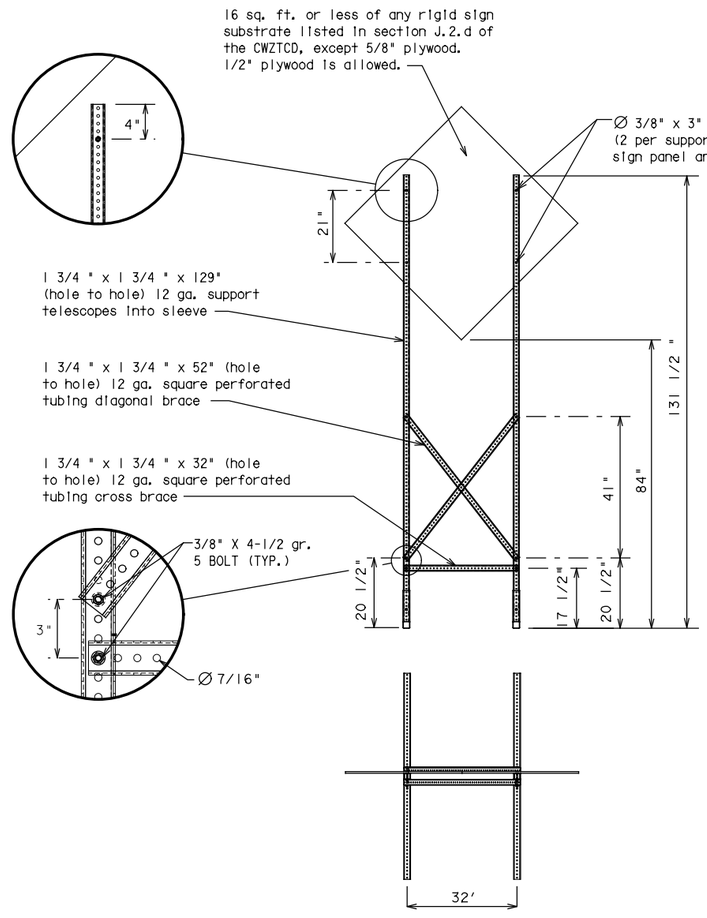
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

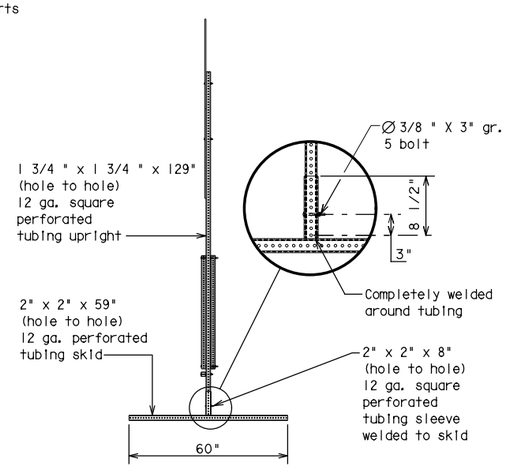


GROUND MOUNTED SIGN SUPPORTS

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







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	0902	38	133, ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PARKER		17

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0900	22	133,ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PARKER		18

100

DATE: 3/2/2022 8:49:56 AM
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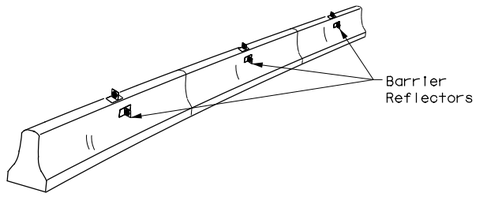
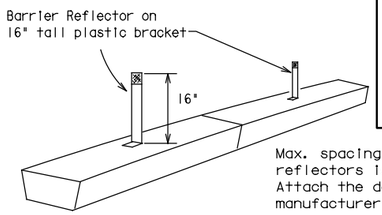
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

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

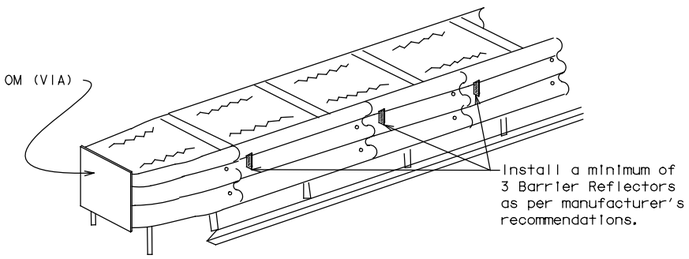


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) 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.

LOW PROFILE CONCRETE BARRIER (LPCB)

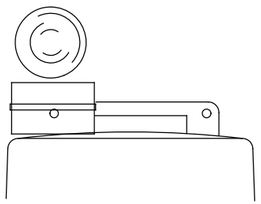


DELINEATION OF END TREATMENTS

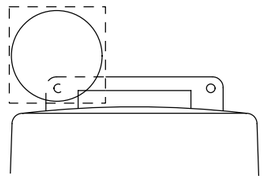
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the appproprlate 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

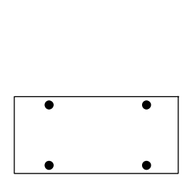
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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.

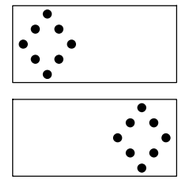
Arrow Boards may be located behind channellzing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channellzing devices placed perpendicular to traffic on the upstream side of traffic.

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:

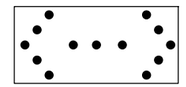


4 CORNER CAUTION

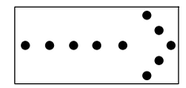
OR



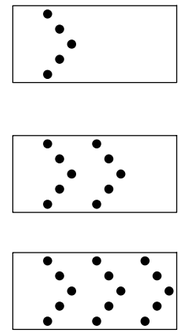
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PARKER		19

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

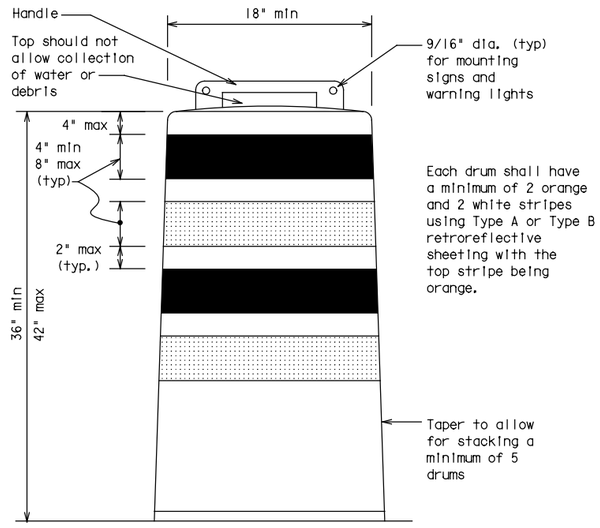
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

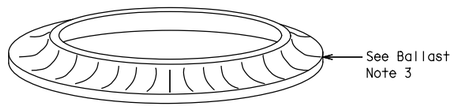
RETROREFLECTIVE SHEETING

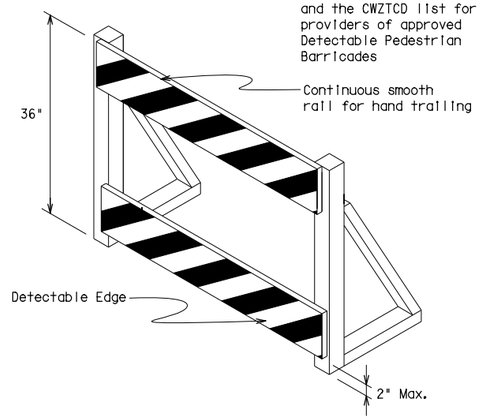
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

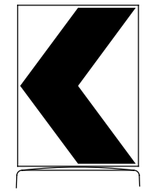




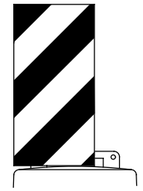


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0902	38	133,ETC	CS
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9-07 5-21	FTW	PARKER		20
7-13				

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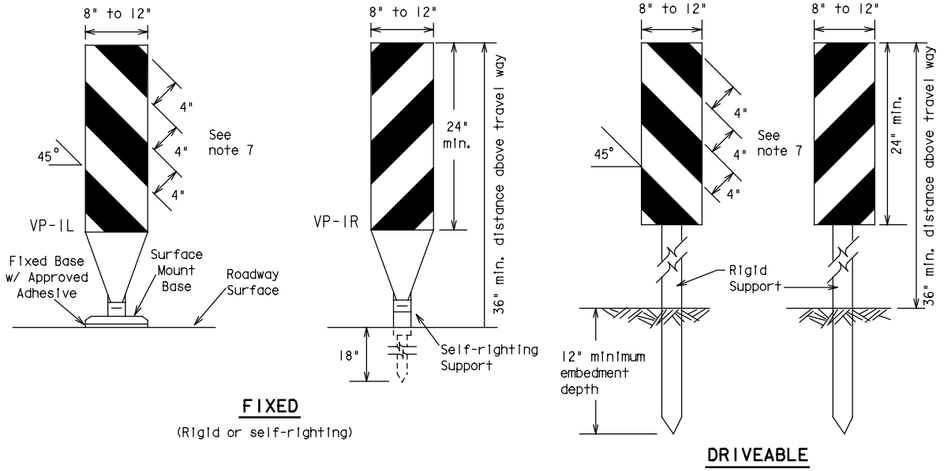
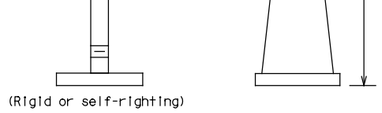


FIXED
(Rigid or self-righting)

DRIVEABLE

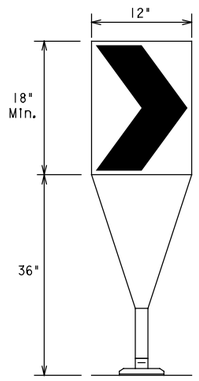


(Rigid or self-righting)

PORTABLE

VERTICAL PANELS (VPs)

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.



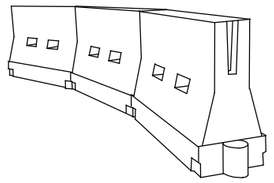
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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)

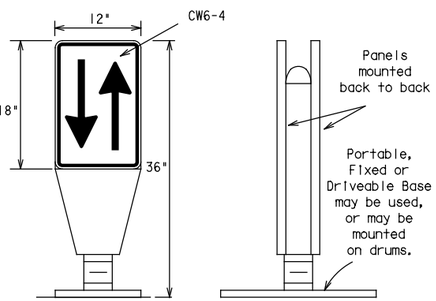
1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application 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



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)

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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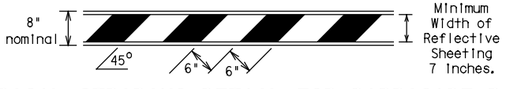
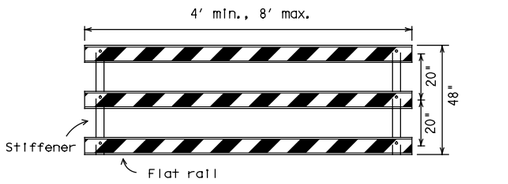
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



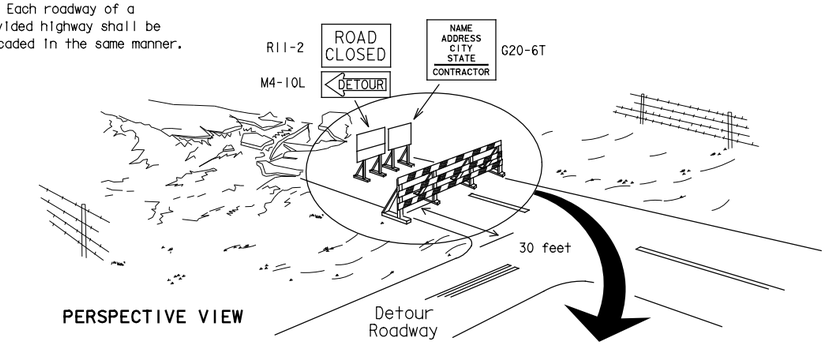
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

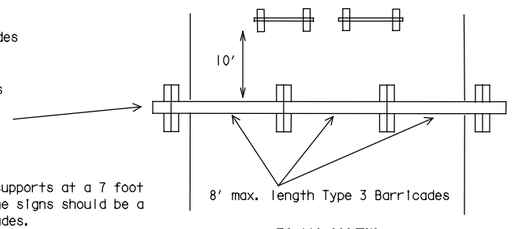
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

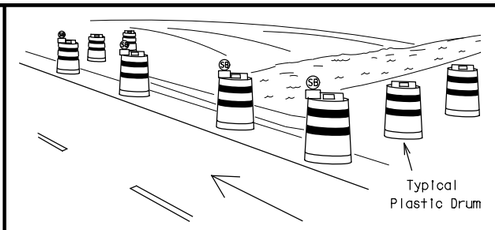
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

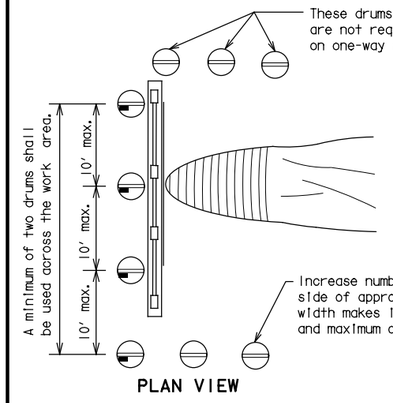
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

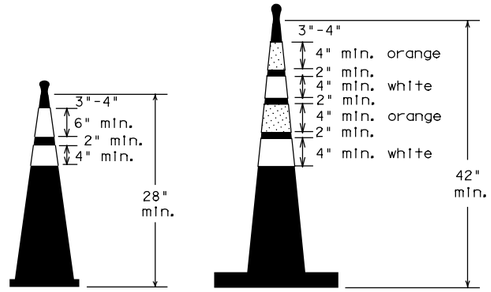
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

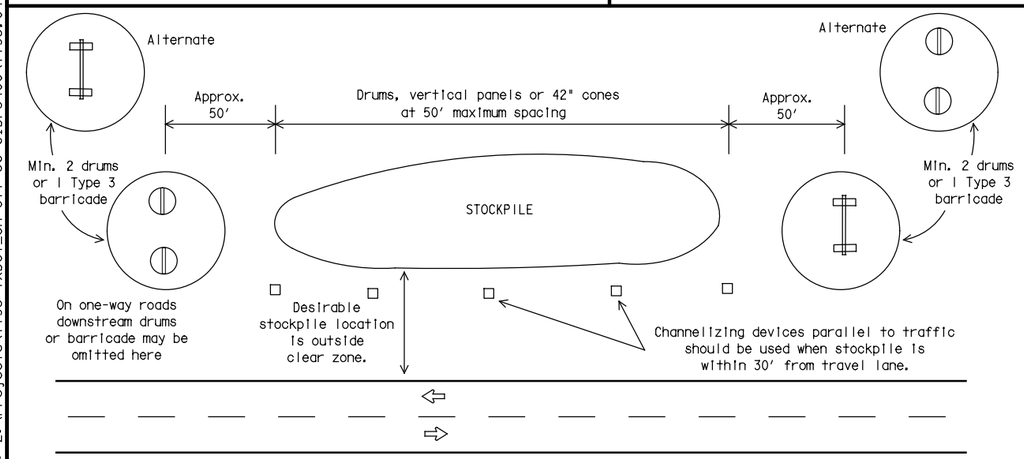
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PARKER		22

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

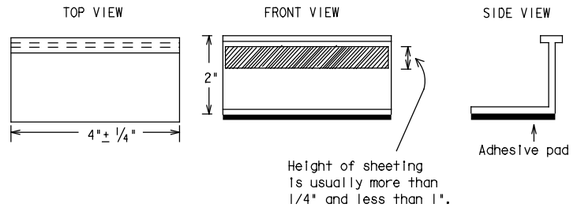
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

DATE: 3/2/2022 8:50:01 AM
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\STANDARDS\bc-21-(sheet-sl-12).dgn

SHEET 11 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

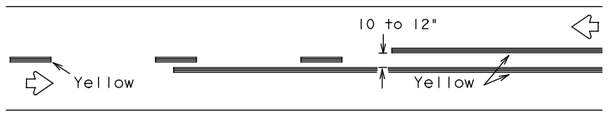
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

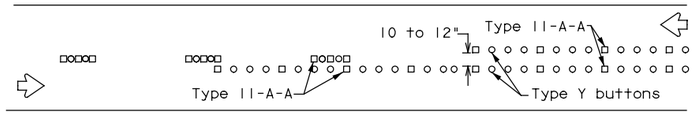
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	FTW	PARKER		23
11-02 8-14				

105

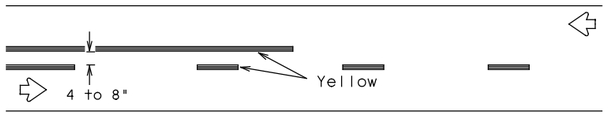
PAVEMENT MARKING PATTERNS



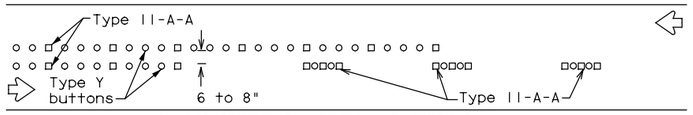
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



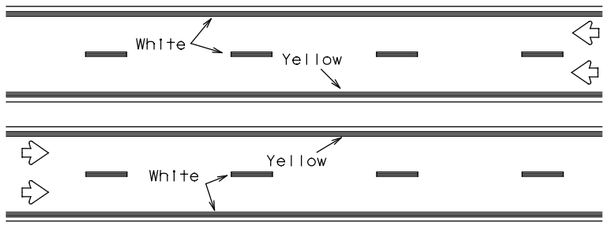
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



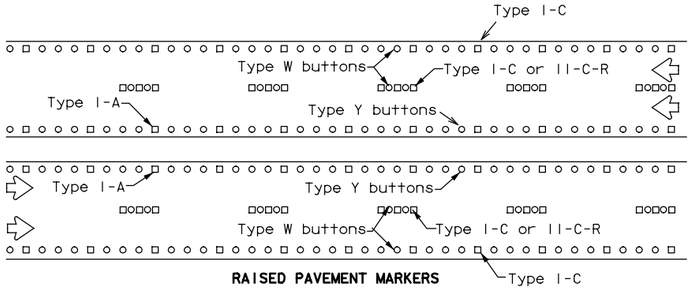
RAISED PAVEMENT MARKERS - PATTERN B

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



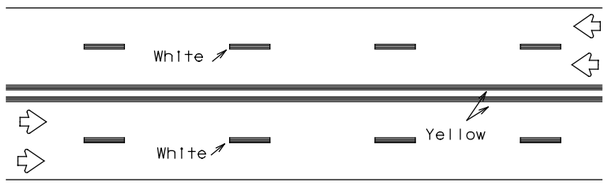
REFLECTORIZED PAVEMENT MARKINGS



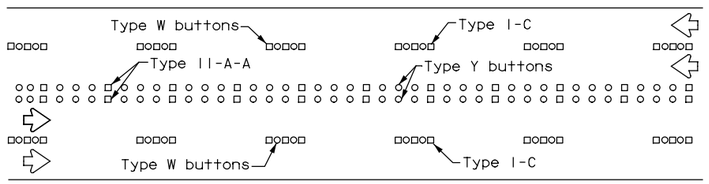
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



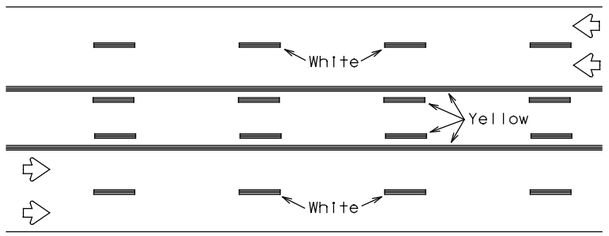
REFLECTORIZED PAVEMENT MARKINGS



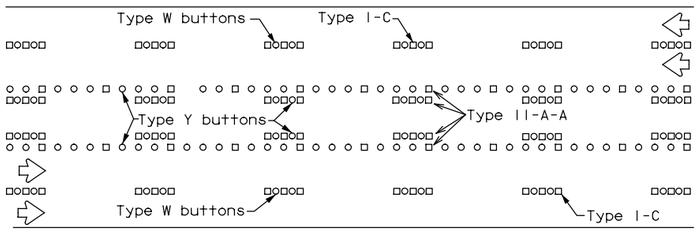
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

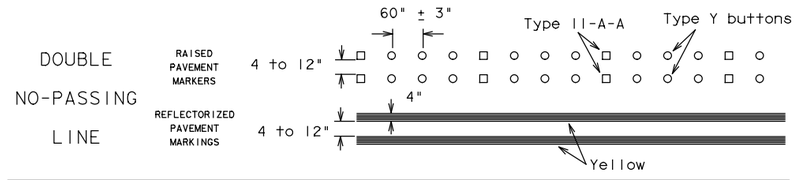
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

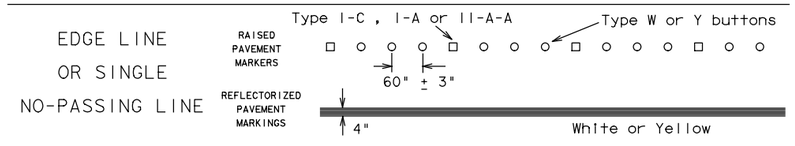
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

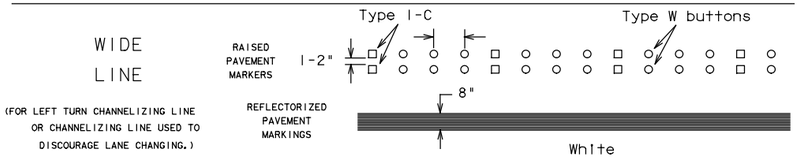


EDGE LINE OR SINGLE NO-PASSING LINE



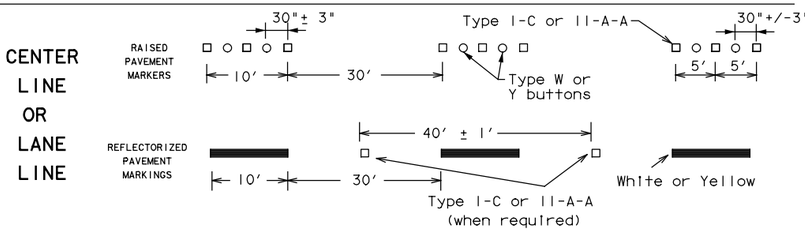
WIDE LINE

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

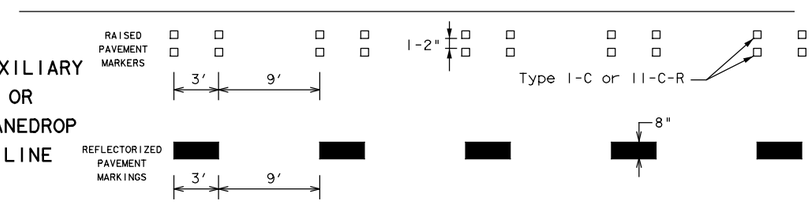


BROKEN LINES

CENTER LINE OR LANE LINE

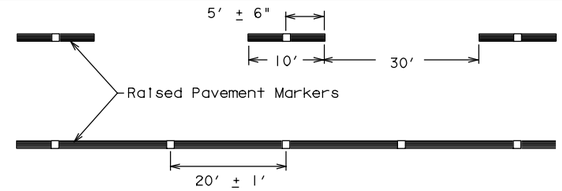


AUXILIARY OR LANEDROP LINE



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."

SHEET 12 OF 12

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	0902	38	133,ETC	CS
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	FTW	PARKER		24

106

DATE: 3/2/2022 8:50:01 AM
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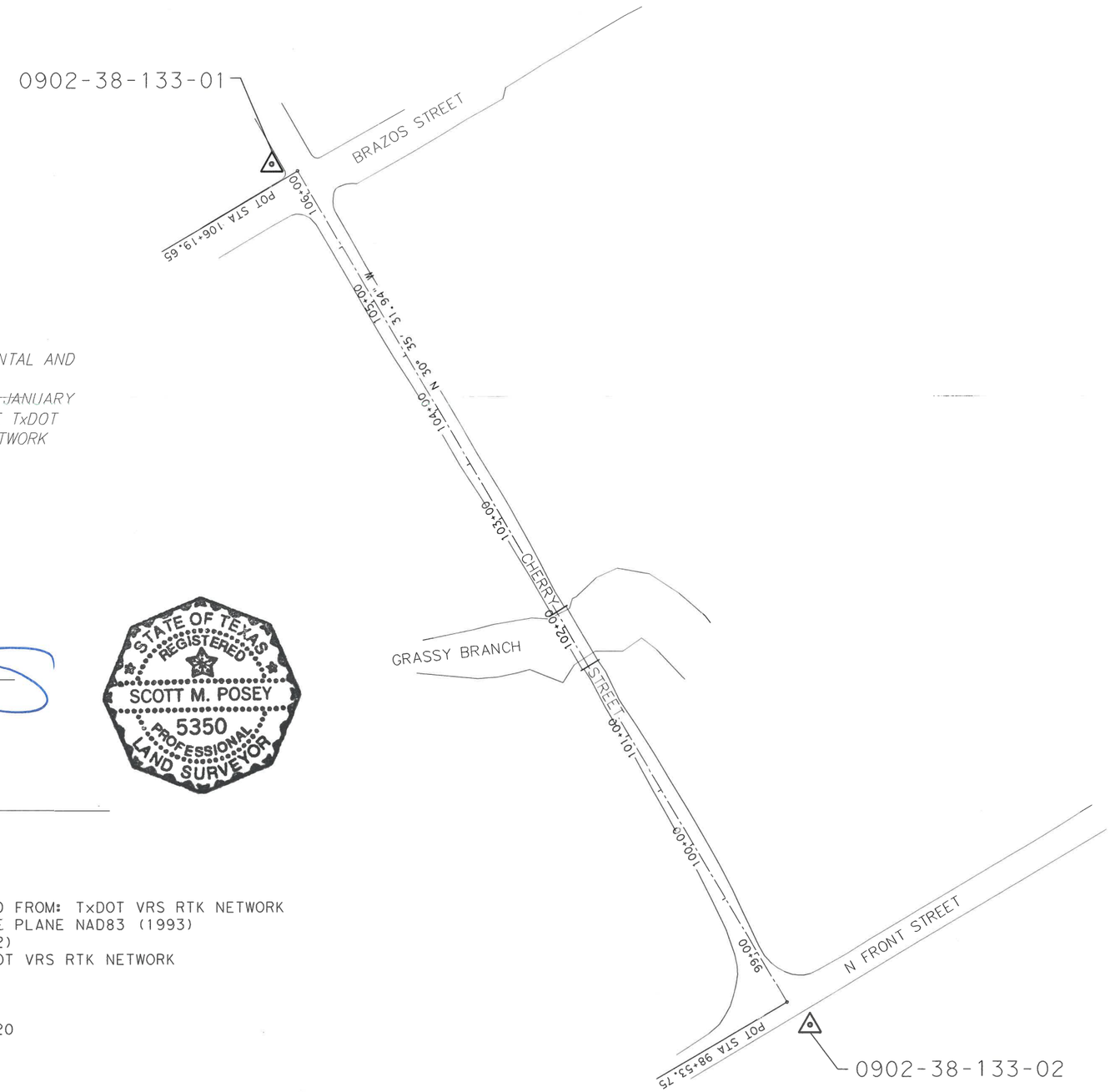
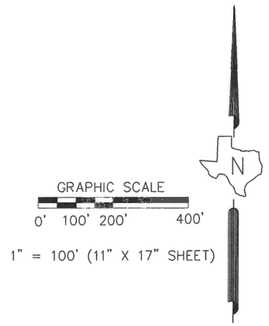
PRIMARY CONTROL POINTS (SURFACE)					
CP	NORTHING	EASTING	ELEVATION	STATION	OFFSET
0902-38-133-01	6,956,907.032	2,119,178.729	819.63'	106+34.82	14.67' L
0902-38-133-02	6,956,224.614	2,119,607.203	819.99'	98+29.33	6.86' R





I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 23RD AND 24TH, 2020 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

SCOTT M. POSEY
Registered Professional Land Surveyor
Texas No. 5350

TBPLS # 10048300

3/9/2022
DATE

STATE OF TEXAS REGISTERED SCOTT M. POSEY 5350 PROFESSIONAL LAND SURVEYOR

NOTE:
HORIZONTAL COORDINATES DERIVED FROM: TxDOT VRS RTK NETWORK
COORDINATE SYSTEM: TEXAS STATE PLANE NAD83 (1993)
ZONE: NORTH CENTRAL ZONE (4202)
ELEVATIONS ARE BASED UPON TxDOT VRS RTK NETWORK
VERTICAL DATUM: NAVD88
UNITS: U.S. SURVEY FEET

COMBINED SCALE FACTOR: 1.000120

CONTROL POINT LEGEND

△ DENOTES PRIMARY CONTROL POINT (5/8" IRON ROD SET IN CONCRETE WITH A 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL POINT"), UNLESS OTHERWISE NOTED

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TX 75093
P 214-440-3600
F 214-440-3601
TBPLS # 10048300

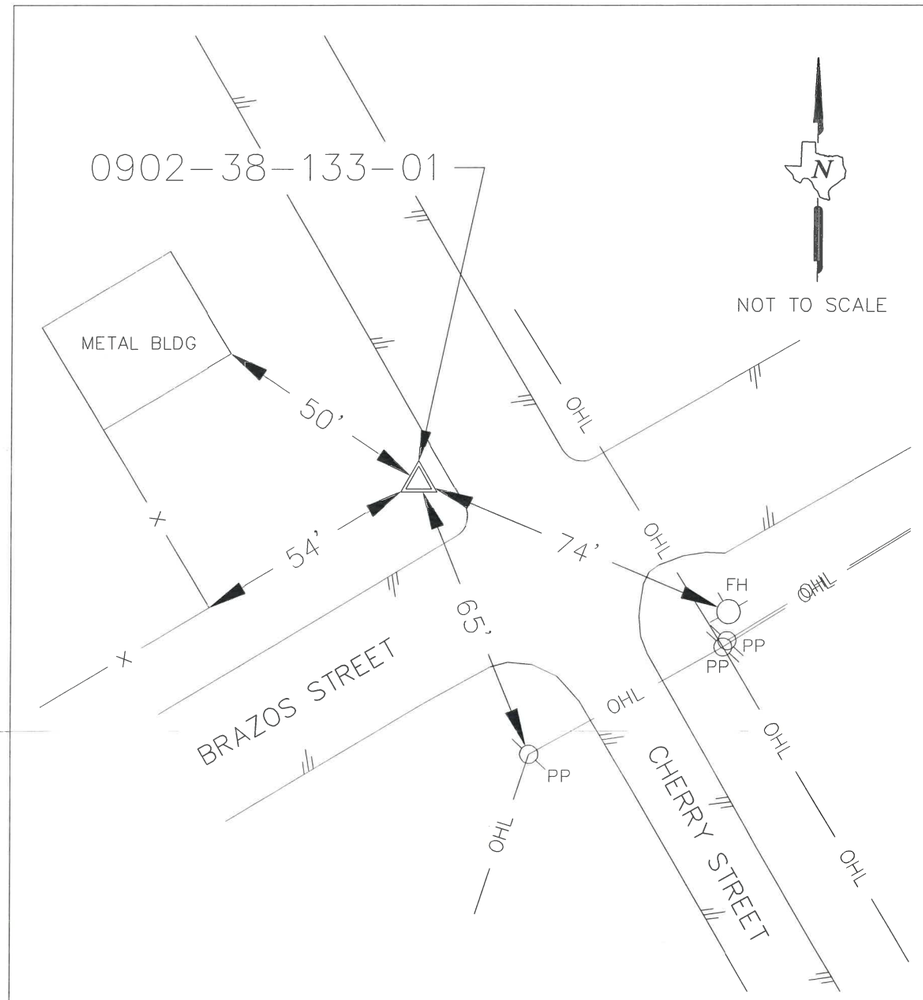
Texas Department of Transportation

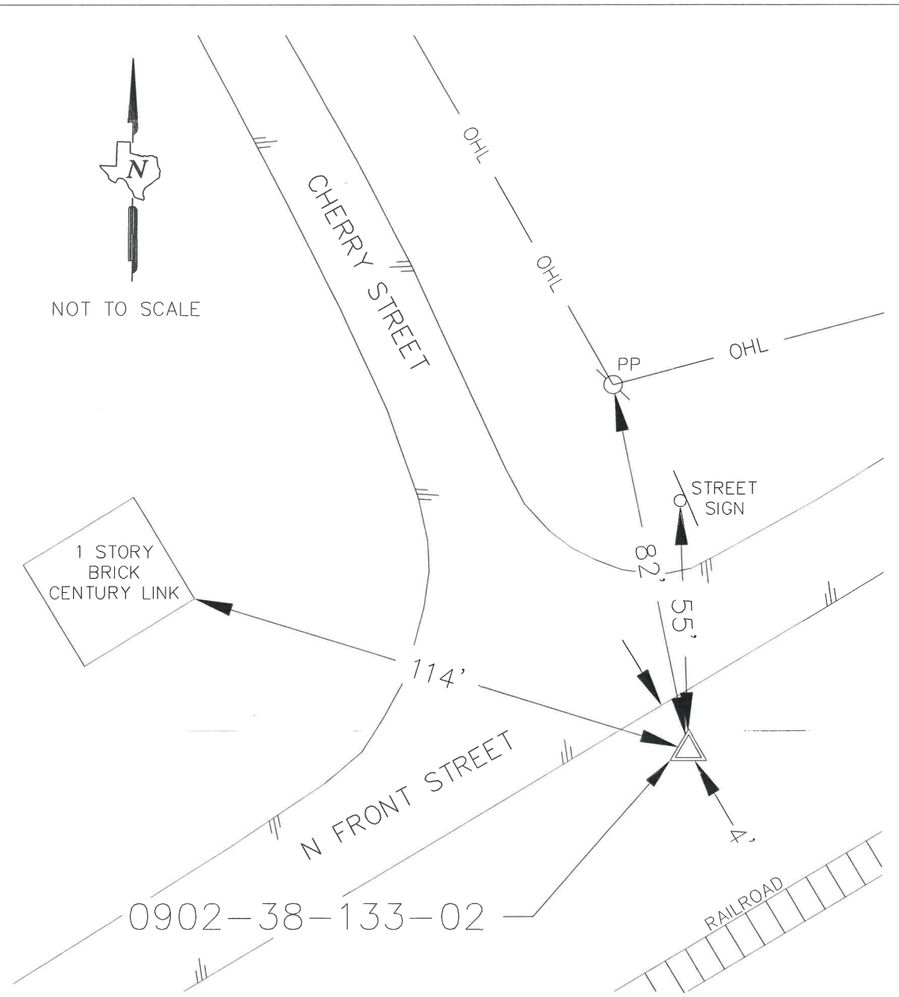
CHERRY STREET @ GRASSY BRANCH

PRIMARY HORIZONTAL AND VERTICAL CONTROL

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		25
STATE	DIST.	COUNTY	
TEXAS	FTW	PARKER	
CONT.	SECT.	JOB	HIGHWAY NO.
0902	38	133	CHERRY STREET





I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 23RD AND 24TH, 2020 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS REGISTERED SCOTT M. POSEY 5350 PROFESSIONAL LAND SURVEYOR

3/9/22

SCOTT M. POSEY
Registered Professional Land Surveyor
Texas No. 5350

TBPLS # 10048300

APPROXIMATE LOCATION 0902-38-133-01:

5/8" IRON ROD SET IN CONCRETE WITH A 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL POINT", ±74' NORTHWEST OF A FIRE HYDRANT, ±65' NORTHWEST OF A POWER POLE, ±54' NORTHEAST OF A WIRE FENCE CORNER AND ±50' SOUTHEAST OF THE SOUTHEAST CORNER OF A METAL BUILDING.

US SURVEY FEET
NAVD 88 ELEVATION= 819.63'
DATE SET: SEPTEMBER 23, 2020
MONUMENT: 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL MARK"
PARKER COUNTY SCALE FACTOR: 1.000120
SURFACE ENGLISH COORDINATES
NORTHING: 6,956,907.032
EASTING: 2,119,178.729
STATE PLANE ENGLISH COORDINATES
NORTHING: 6,956,072.303
EASTING: 2,118,924.458
ELEVATIONS ARE NAVD 88 BASED UPON TxDOT VRS RTK NETWORK

APPROXIMATE LOCATION 0902-38-133-02:

5/8" IRON ROD SET IN CONCRETE WITH A 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL POINT", ±4' SOUTHEAST OF THE SOUTHEAST EDGE OF PAVEMENT, ±114' SOUTHEAST OF THE SOUTHEAST CORNER OF A 1 STORY BRICK BUILDING "CENTURY LINK, ±82' SOUTHWEST OF A POWER POLE AND ±55' SOUTHWEST OF A STREET SIGN.

US SURVEY FEET
NAVD 88 ELEVATION= 819.99'
DATE SET: SEPTEMBER 23, 2020
MONUMENT: 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL MARK"
PARKER COUNTY SCALE FACTOR: 1.000120
SURFACE ENGLISH COORDINATES
NORTHING: 6,956,224.614
EASTING: 2,119,607.203
STATE PLANE ENGLISH COORDINATES
NORTHING: 6,955,389.967
EASTING: 2,119,352.880
ELEVATIONS ARE NAVD 88 BASED UPON TxDOT VRS RTK NETWORK

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5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TX 75093
P 214-440-3600
F 214-440-3601
TBPLS # 10048300

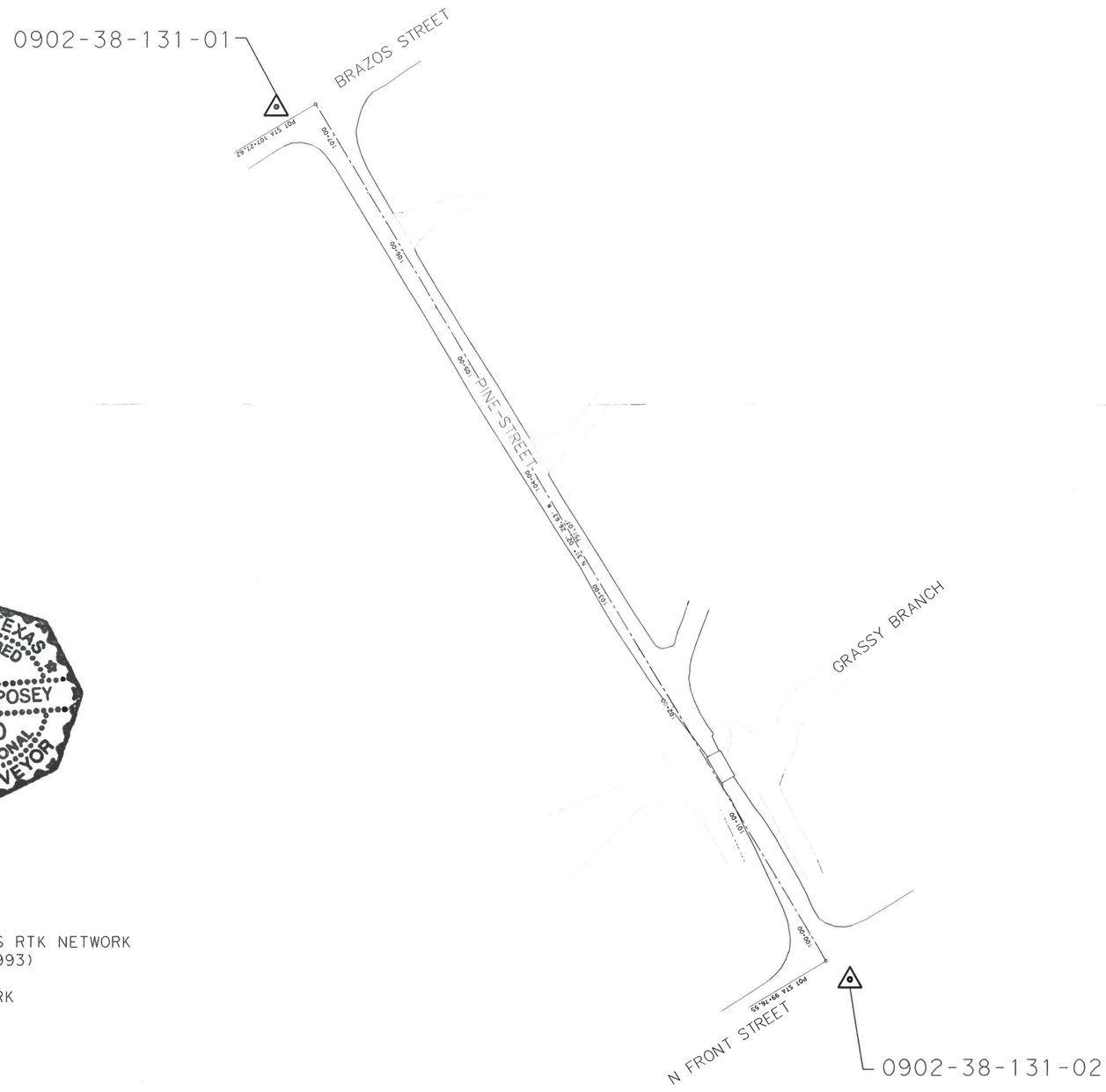
Texas Department of Transportation

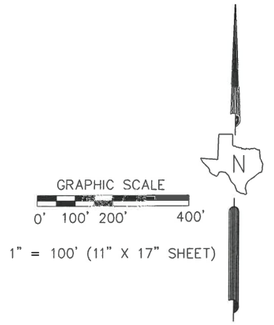
CHERRY STREET @ GRASSY BRANCH

PRIMARY HORIZONTAL AND VERTICAL CONTROL

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		26
STATE	DIST.	COUNTY	
TEXAS	FTW	PARKER	
CONT.	SECT.	JOB	HIGHWAY NO.
0902	38	133	CHERRY STREET

PRIMARY CONTROL POINTS (SURFACE)					
CP	NORTHING	EASTING	ELEVATION	STATION	OFFSET
0902-38-131-01	6,957,077.216	2,119,492.583	824.61'	107+40.63	26.42' L
0902-38-131-02	6,956,422.298	2,119,927.138	817.98'	99+55.38	8.24' R





I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 23RD AND 24TH, 2020 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS REGISTERED SCOTT M. POSEY 5350 PROFESSIONAL LAND SURVEYOR

SCOTT M. POSEY
Registered Professional Land Surveyor
Texas No. 5350

TBPLS # 10048300

3/9/2022
DATE

NOTE:
HORIZONTAL COORDINATES DERIVED FROM: TxDOT VRS RTK NETWORK
COORDINATE SYSTEM: TEXAS STATE PLANE NAD83 (1993)
ZONE: NORTH CENTRAL ZONE (4202)
ELEVATIONS ARE BASED UPON TxDOT VRS RTK NETWORK
VERTICAL DATUM: NAVD88
UNITS: U.S. SURVEY FEET

COMBINED SCALE FACTOR: 1.000120

CONTROL POINT LEGEND

△ DENOTES PRIMARY CONTROL POINT (5/8" IRON ROD SET IN CONCRETE WITH A 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL POINT"), UNLESS OTHERWISE NOTED

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TX 75093
P 214-440-3600
F 214-440-3601
TBPLS # 10048300

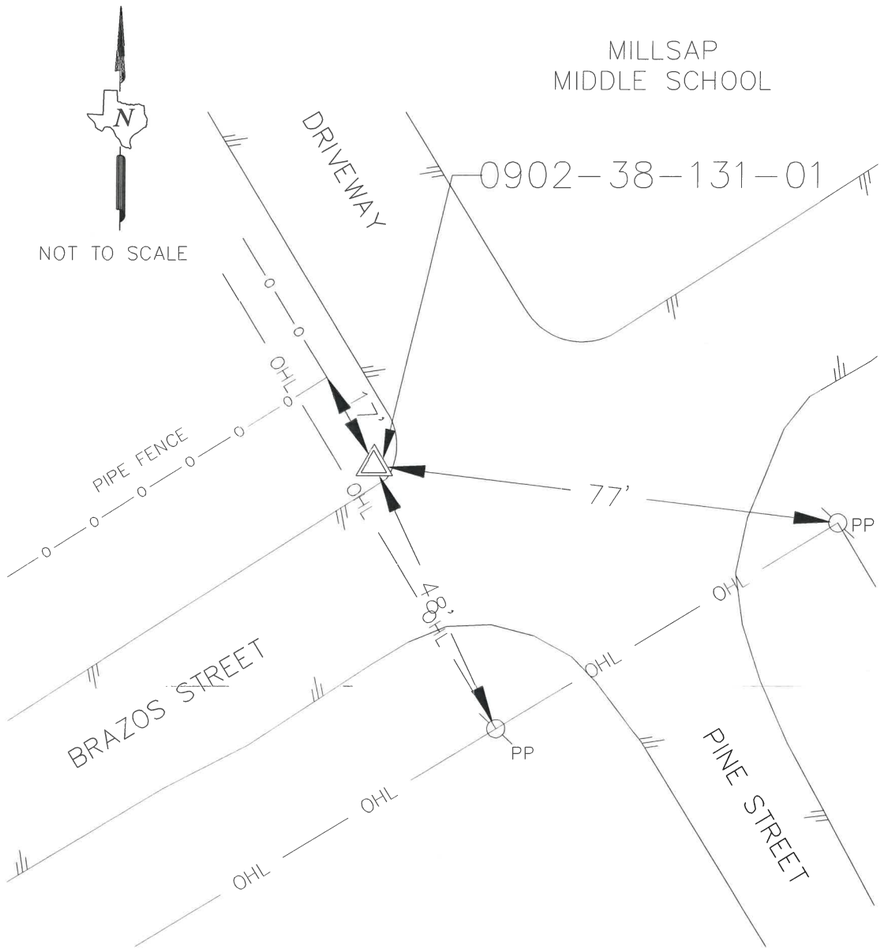
Texas Department of Transportation

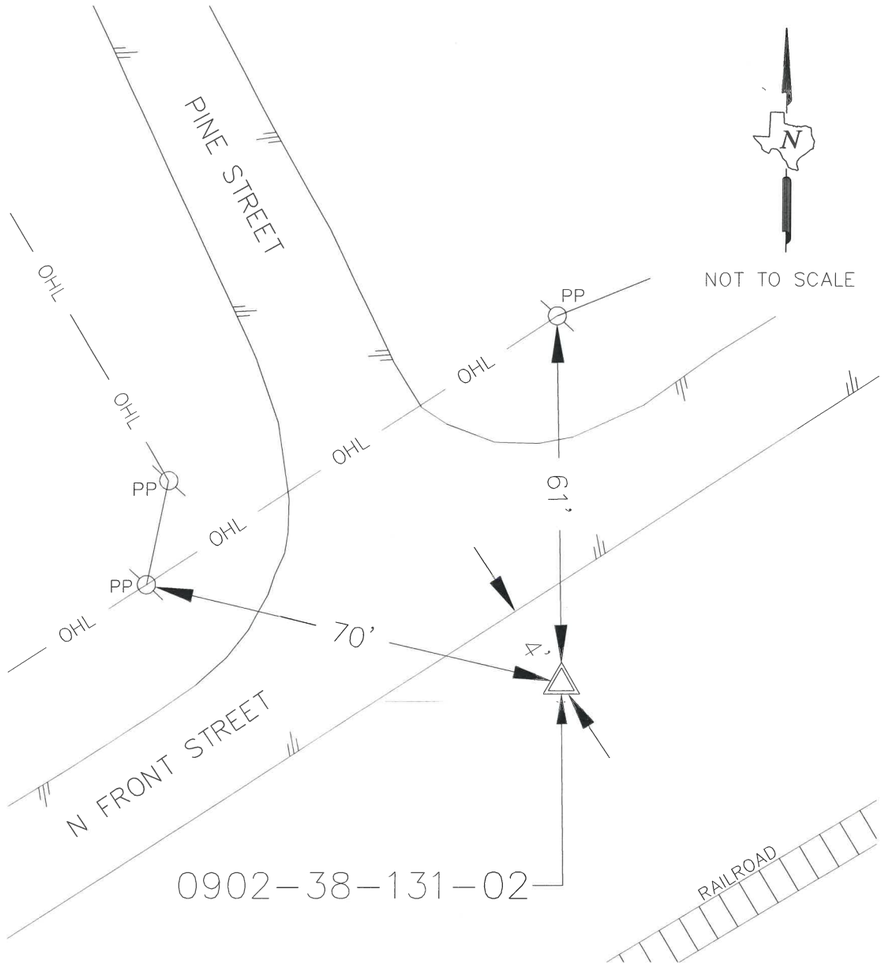
PINE STREET @ GRASSY BRANCH

PRIMARY HORIZONTAL AND VERTICAL CONTROL

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		27
STATE	DIST.	COUNTY	
TEXAS	FTW	PARKER	
CONT.	SECT.	JOB	HIGHWAY NO.
0902	38	131	PINE STREET





I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY 23RD AND 24TH, 2020 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
SCOTT M. POSEY
5350
PROFESSIONAL
LAND SURVEYOR

3/9/22

SCOTT M. POSEY
Registered Professional Land Surveyor
Texas No. 5350

TBPLS # 10048300

APPROXIMATE LOCATION 0902-38-131-01:

5/8" IRON ROD SET IN CONCRETE WITH A 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL POINT", ±17' SOUTHEAST OF A PIPE FENCE CORNER, ±48' NORTHWEST OF A POWER POLE AT THE SOUTHWEST CORNER OF PINE STREET AND BRAZOS STREET AND ±77' NORTHWEST OF A POWER POLE AT THE SOUTHEAST CORNER OF PINE STREET AND BRAZOS STREET.

US SURVEY FEET
NAVD 88 ELEVATION= 824.61'
DATE SET: SEPTEMBER 23, 2020
MONUMENT: 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL MARK"
PARKER COUNTY SCALE FACTOR: 1.000120
SURFACE ENGLISH COORDINATES
NORTHING: 6,957,077.216
EASTING: 2,11,949.583
STATE PLANE ENGLISH COORDINATES
NORTHING: 6,956,242.467
EASTING: 2,119,238.275
ELEVATIONS ARE NAVD 88 BASED UPON
TxDOT VRS RTK NETWORK

APPROXIMATE LOCATION 0902-38-131-02:

5/8" IRON ROD SET IN CONCRETE WITH A 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL POINT", ±4' SOUTHEAST OF THE SOUTH EDGE OF PAVEMENT, ±70' SOUTHEAST OF A POWER POLE AT THE NORTHWEST CORNER OF N. FRONT STREET AND ±61' SOUTHEAST OF A POWER POLE AT THE NORTHEAST CORNER OF N FRONT STREET AND PINE STREET.

US SURVEY FEET
NAVD 88 ELEVATION= 817.98'
DATE SET: SEPTEMBER 23, 2020
MONUMENT: 3 1/2" ALUMINUM CAP STAMPED "TEXAS DEPT. OF TRANSPORTATION CONTROL MARK"
PARKER COUNTY SCALE FACTOR: 1.000120
SURFACE ENGLISH COORDINATES
NORTHING: 6,956,422.298
EASTING: 2,119,927.138
STATE PLANE ENGLISH COORDINATES
NORTHING: 6,955,587.628
EASTING: 2,119,672.777
ELEVATIONS ARE NAVD 88 BASED UPON
TxDOT VRS RTK NETWORK

LAMB-STAR ENGINEERING, L.P.
5700 W. PLANO PARKWAY, SUITE 1000
PLANO, TX 75093
P 214-440-3600
F 214-440-3601
TBPLS # 10048300

Texas Department of Transportation

PINE STREET @ GRASSY BRANCH

PRIMARY HORIZONTAL AND VERTICAL CONTROL

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		28
STATE	DIST.	COUNTY	
TEXAS	FTW	PARKER	
CONT.	SECT.	JOB	HIGHWAY NO.
0902	38	131	PINE STREET

PROPOSED CHERRY STREET ALIGNMENT

HORIZONTAL CHAIN: CHERRY

Beginning chain CHERRY description

Point C005	N 6,956,242.14	E 2,119,588.87	Sta 98+53.75
Course from C005 to C03		N 30° 35′31.94" W	Dist 765.90
Point C03	N 6,956,901.44	E 2,119,199.08	Sta 106+19.65

Ending chain CHERRY description

VERTICAL CHAIN: CHERRY

Beginning profile PRCHERRY3 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	99+76.25	818.09				
VPI	2	100+07.00	817.88	-0.69			
VPC		100+40.07	817.71	-0.49	K = 37.0		
Low Point		100+58.04	817.67				
VPI	3	100+86.80	817.49		93.46	46.73	46.73
VPT		101+33.53	818.44	2.04			
VPC		101+44.68	818.67	2.04	K = 19.0	SSD = 280.5	
High Point		101+83.44	819.06				
VPI	4	101+87.88	819.55		86.41	43.20	43.20
VPT		102+31.08	818.47	-2.51			
VPI	5	102+31.14	818.47	-2.51			
VPC		102+34.01	818.38	-2.95	K = 37.0		
VPI	6	102+91.69	816.68		115.37	57.68	57.68
Low Point		103+43.33	816.77				
VPT		103+49.37	816.77	0.16			
VPI	7	103+64.00	816.79	0.16			
VPI	8	103+91.25	816.85	0.20			

Ending profile PRCHERRY3 description

PROPOSED PINE STREET ALIGNMENT

HORIZONTAL CHAIN: PINE

Beginning chain PINE description

Point PINE005	N 6,956,436.18	E 2,119,909.21	Sta 99+76.55
Course from PINE005 to PINE03		N 31°02′26.63" W	Dist 751.07
Point PINE03	N 6,957,079.70	E 2,119,521.93	Sta 107+27.62

Ending chain PINE description

VERTICAL CHAIN: PRPINE2

Beginning profile PRPINE2 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L
VPI	1	100+25.00	818.83				
VPI	2	100+40.00	818.86	0.21			
VPC		100+50.88	818.89	0.29	K = 69.5		
VPI	3	100+73.88	818.96		46.00	23.00	23.00
VPT		100+96.88	819.18	0.95			
VPC		100+97.18	819.18	0.95	K = 78.4	SSD = 984.9	
VPI	4	101+42.18	819.61		90.00	45.00	45.00
High Point		101+71.79	819.54				
VPT		101+87.18	819.52	-0.20			
VPC		102+36.50	819.42	-0.20	K = 69.3		
Low Point		102+50.10	819.41				
VPI	5	102+69.00	819.36		65.00	32.50	32.50
VPT		103+01.50	819.60	0.74			
VPI	6	103+03.00	819.61	0.74			

Ending profile PRPINE2 description

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET & PINE STREET

HORIZONTAL & VERTICAL ALIGNMENT DATA

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	29
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorshoi
DATE: 3/2/2022
SCALE: 1:1
FILE: I:\Projects\1195 TxDOT_On-Off 46 6IDP&OS\1195_04\CON\SHT\131-PINE\131PCHALPL01.dgn
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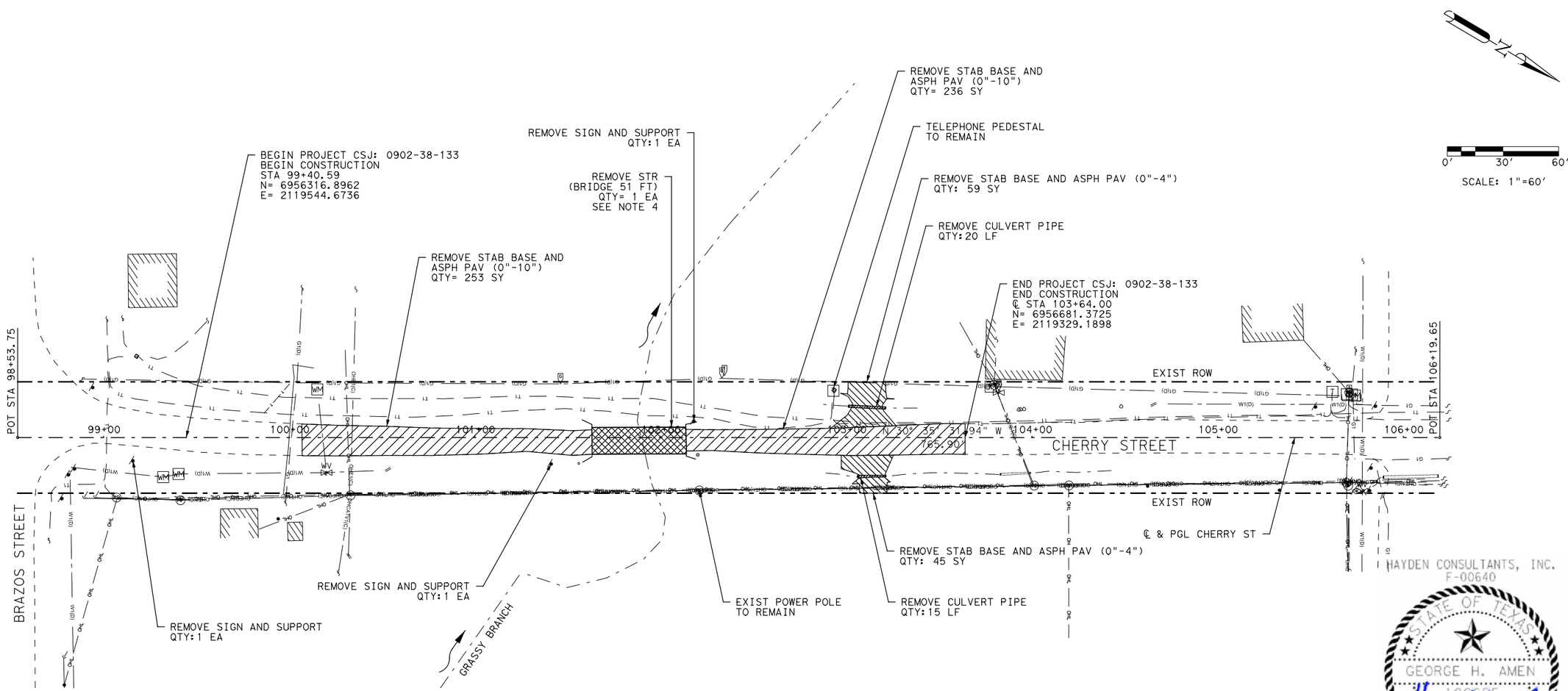
PLOT DRIVER: TXDOT_PDF_BW.pltcfg

133CRMVPL01.dgn



0′ 30′ 60′

SCALE: 1"=60′

REMOVAL LEGEND

- REMOVE STAB BASE AND ASPH PAV (0"-10")
- REMOVE BRIDGE
- REMOVE STAB BASE AND ASPH PAV (0"-4")
- REMOVE STR (PIPE)

NOTES:

1. REMOVAL SHALL BE DONE ACCORDING TO TCP PLANS. FOR DETAILS SEE TCP PLANS AND NARRATIVE.
2. REMOVAL OF DELINEATORS, OBJECT MARKERS, FENCE AND MAILBOXES ARE SUBSIDIARY TO ITEM 100.
3. SAWCUT, PROVIDE A NEAT SMOOTH JOINT. MATCH EXISTING GRADE AT APPROACHES.
4. REMOVE BRIDGE SUPER STRUCTURE AND SUBSTRUCTURE.
5. EXISTING UTILITIES ARE BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR TO FIELD VERIFY UTILITY LOCATIONS PRIOR TO BEGINNING CONSTRUCTION.

* FOR CONTRACTOR'S INFORMATION ONLY

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100665
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

REMOVAL PLAN

SCALE: 1"=60′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	30
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorshol
DATE: 3/2/2022
SCALE: 1:60
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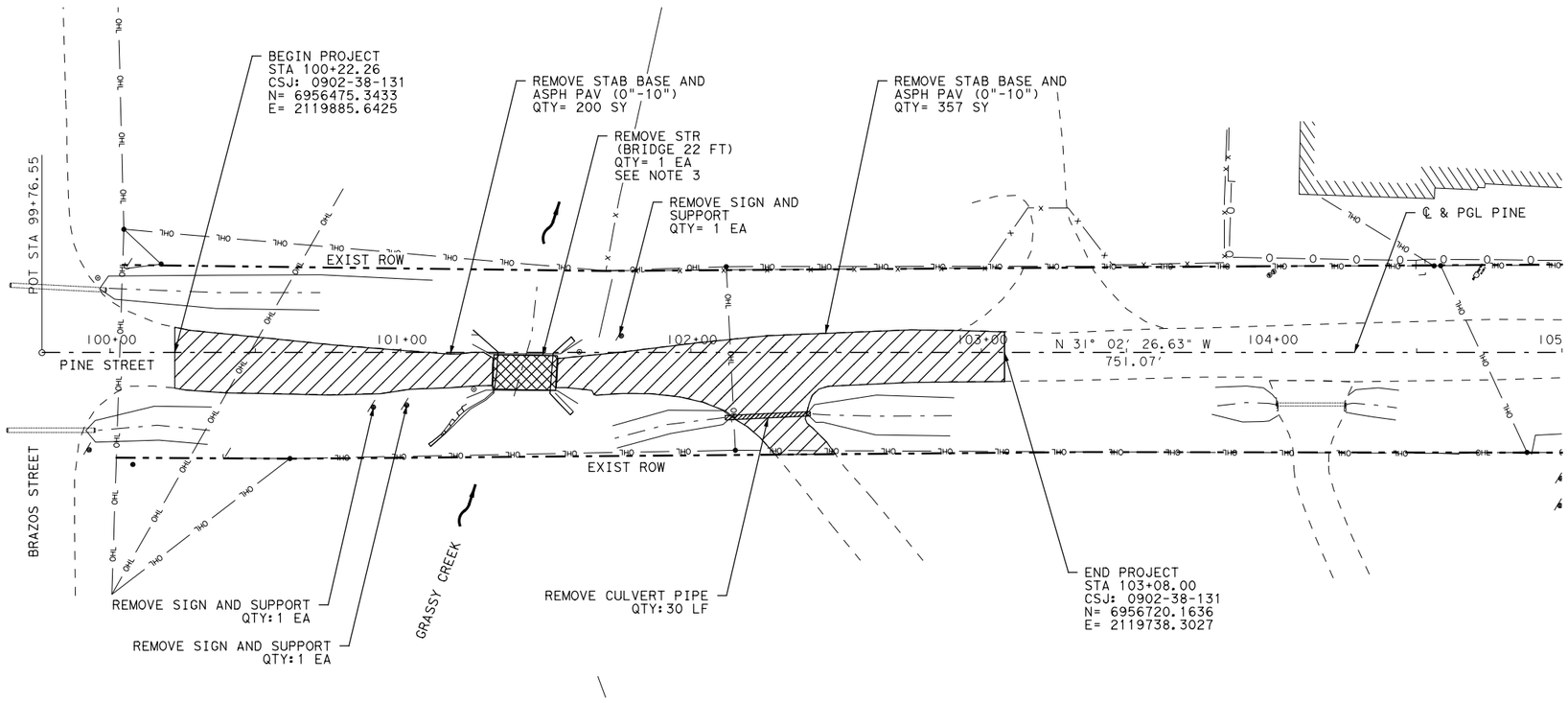

0′ 25′ 50′

SCALE: 1"=50′

REMOVAL LEGEND:

- REMOVE STAB BASE AND ASPH PAV (0"-10")
- REMOVE BRIDGE
- REMOVE STR (PIPE)

NOTES:

1. REMOVAL OF DELINEATORS, OBJECT MARKERS, FENCE AND MAILBOXES ARE SUBSIDIARY TO ITEM 100.
2. SAWCUT, PROVIDE A NEAT SMOOTH JOINT. MATCH EXISTING GRADE AT APPROACHES.
3. REMOVE BRIDGE SUPER STRUCTURE AND SUBSTRUCTURE.
4. EXISTING UTILITIES ARE BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR TO FIELD VERIFY UTILITY LOCATIONS PRIOR TO BEGINNING CONSTRUCTION.

✳ FOR CONTRACTOR'S INFORMATION ONLY

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106875
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET

REMOVAL PLAN

SCALE: 1"=50′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	31
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorshoi
DATE: 3/2/2022
SCALE: 1:50
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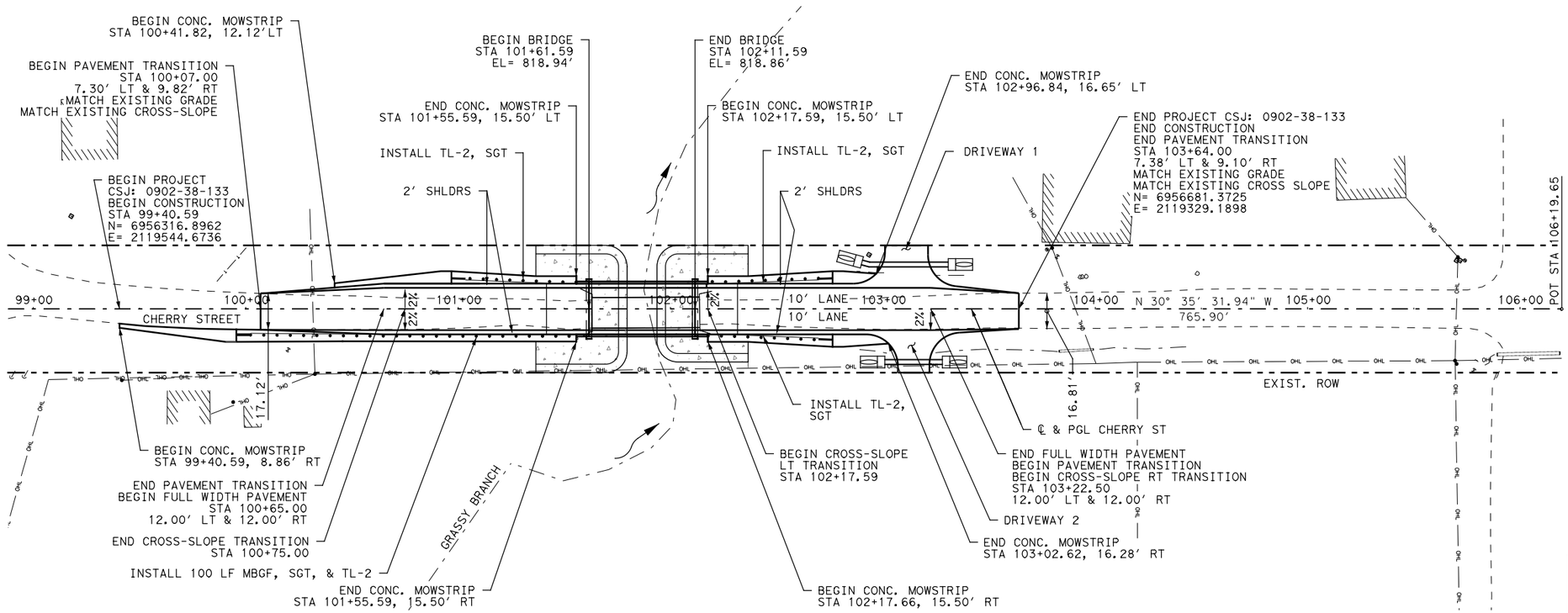
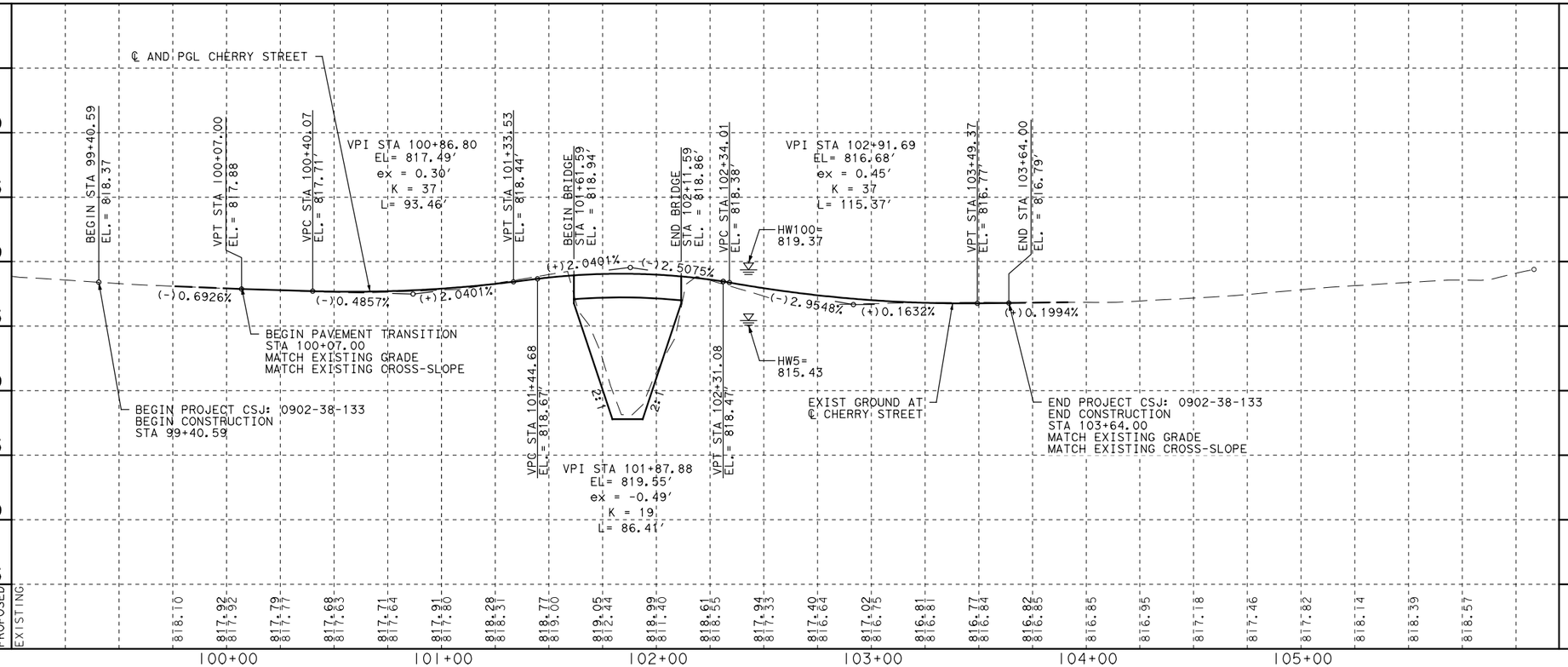
PLOT DRIVER: TXDOT_PDF_BW.pltcfg



NOTES:

1. SEE BRIDGE LAYOUTS FOR GRASSY BRANCH STRUCTURE INFORMATION.
2. SEE TYPICAL SECTION SHEET FOR EXISTING AND PROPOSED PAVEMENT DEPTHS.
3. SEE DRIVEWAY DETAILS FOR DRIVEWAY INFORMATION.
4. SEE RIPRAP DETAILS FOR RIPRAP INFORMATION.

DESIGN SPEED= 30 MPH
FUNCTIONAL CLASSIFICATION= LOCAL RURAL TWO-LANE
ADT=(85)(2018YR)
ADT=(128)(2038YR)



HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

CHERRY STREET
PAVING
PLAN & PROFILE

SCALE: 1"=60'H 1"=5'V SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	32
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorrell
DATE: 3/2/2022
SCALE: 1:60
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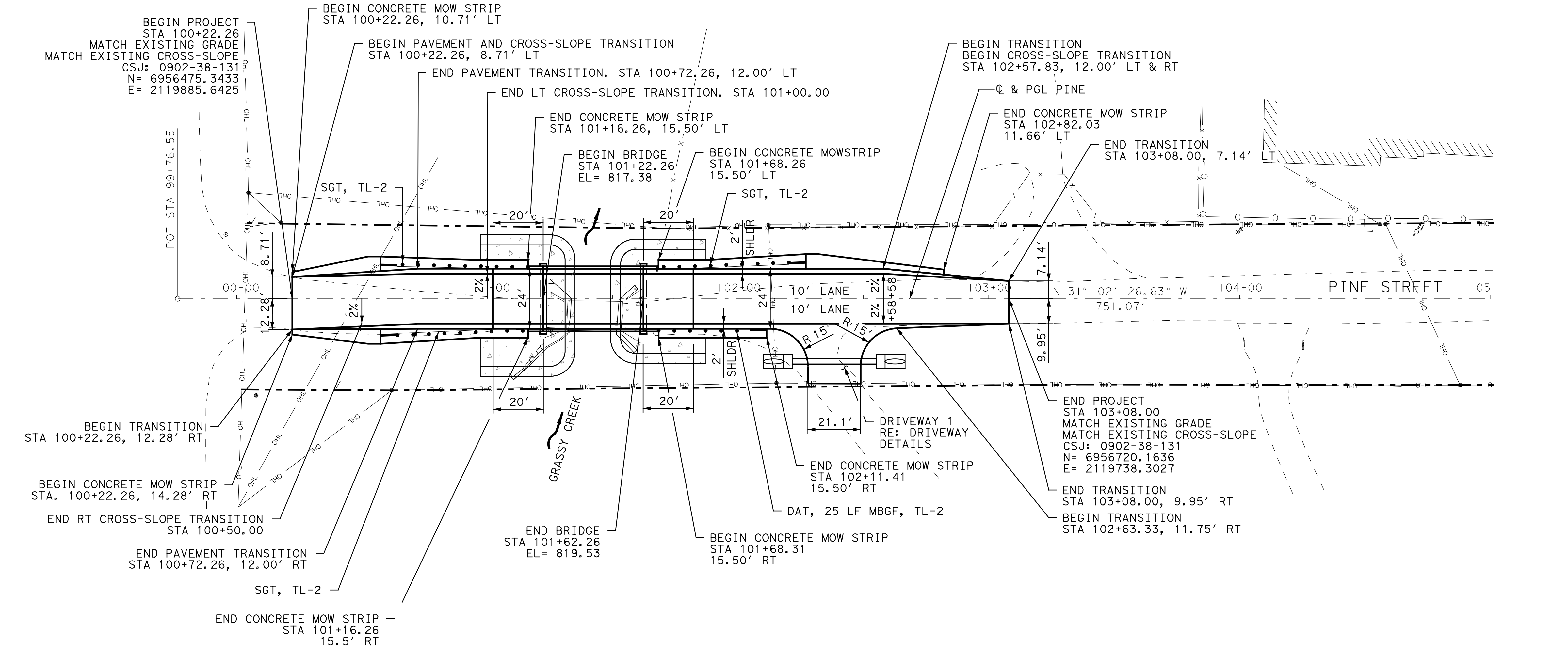
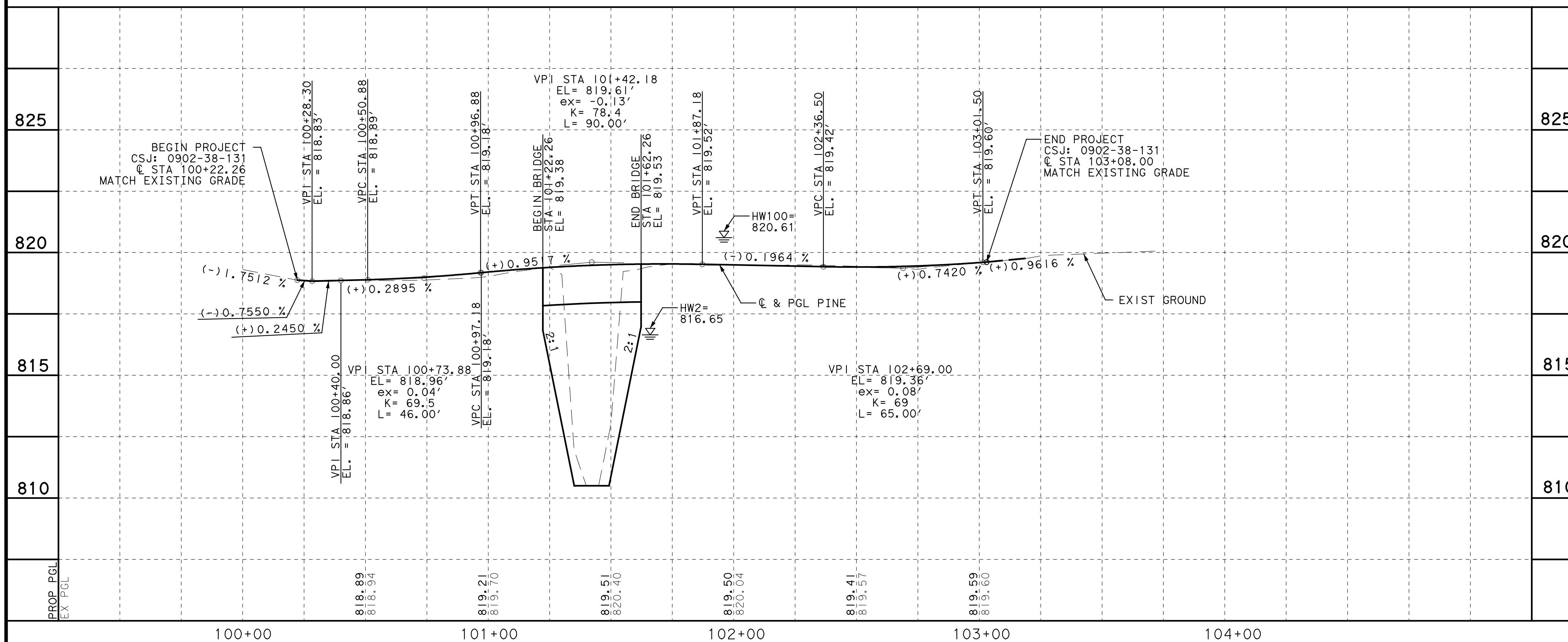


NOTES:

1. SEE BRIDGE LAYOUTS FOR GRASSY BRANCH STRUCTURE INFORMATION.
2. SEE TYPICAL SECTION SHEETS FOR EXISTING & PROPOSED PAVEMENT DEPTHS.
3. SEE DRIVEWAY DETAILS FOR DRIVEWAY INFORMATION.
4. SEE RIPRAP DETAILS FOR RIPRAP INFORMATION.

DESIGN SPEED= 30 MPH
FUNCTIONAL CLASSIFICATION= LOCAL RURAL TWO-LANE
ADT=(85)(2018YR)
ADT=(128)(2038YR)



HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET
PAVING PLAN & PROFILE

SCALE: 1"=50'H 1"=5'V SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6	BR 2021(445) ETC		CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	33
CHECKED GHA	CONTROL	SECTION	JOB	
APPROVED GHA	0902	38	133, ETC	

USER: gmarshall
DATE: 3/2/2022
SCALE: 1:50
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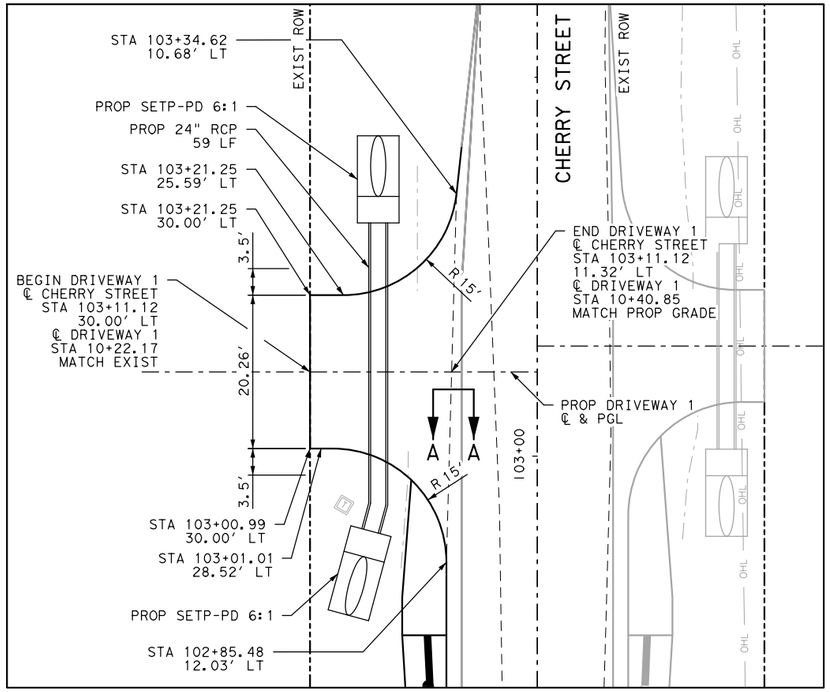
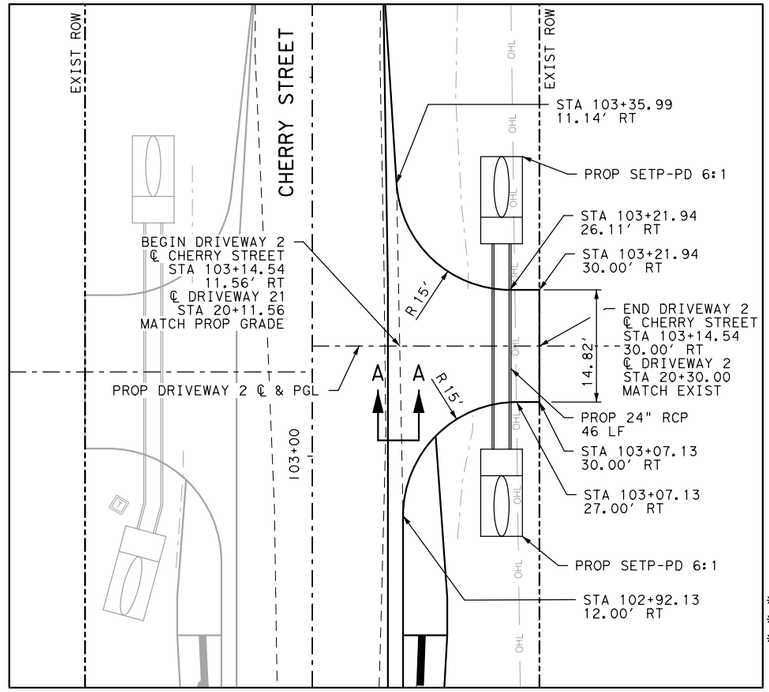


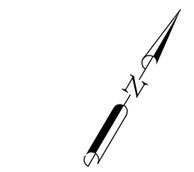
DRIVEWAY 1



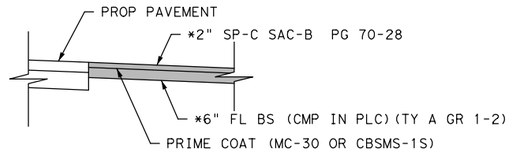
DRIVEWAY 2

NOTE:

1. WORK PERFORMED AND MATERIALS FURNISHED FOR DRIVEWAYS ARE SUBSIDIARY TO ITEM 530.
2. GRADE PIPE TO DRAIN.



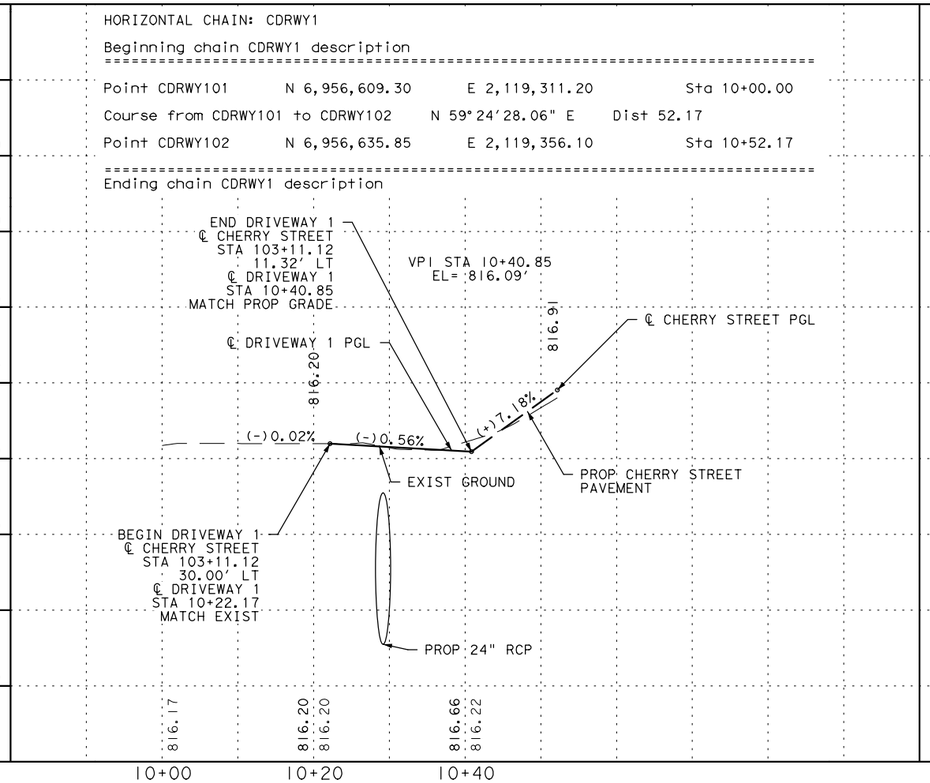
HORIZONTAL
0' 10' 20'
VERTICAL
0' 10' 20'
SCALE: 1"= 20'H 1"=20'V

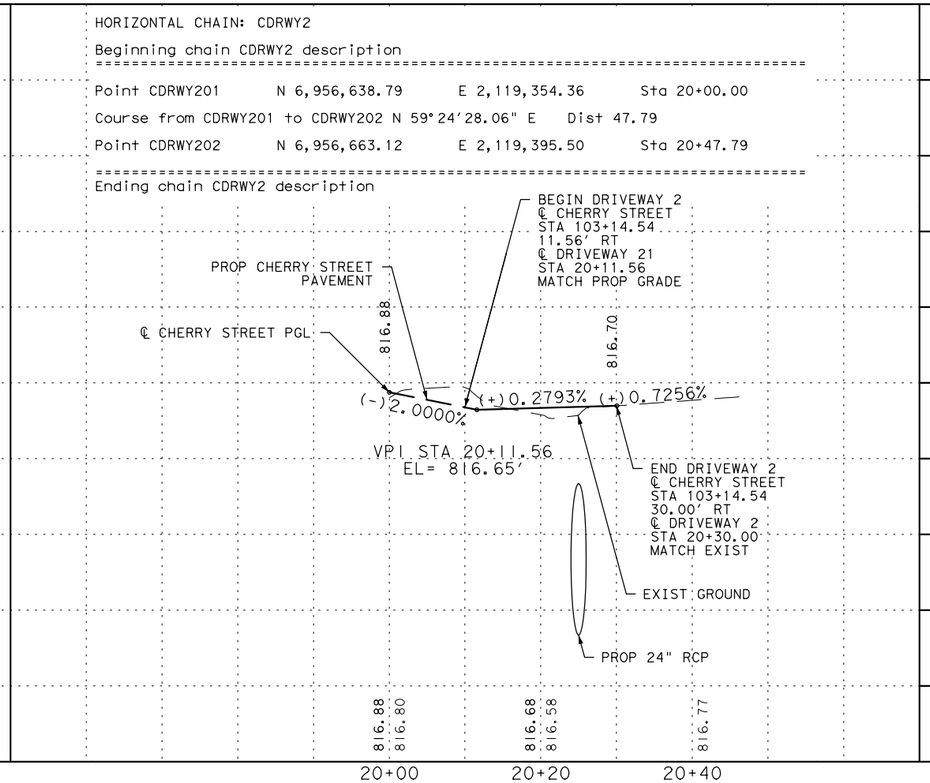


SECTION A-A

ESTIMATED QUANTITIES THIS SHEET				
		QTY		
ITEM	DESCRIPTION	DRWY1	DRWY2	UNIT
* 247-6061	FL BS (CMP IN PLC)(TY A)(GR 1-2)(6")	52	41	SY
* 310-6001	PRIME COAT (MULTI OPTION)	10.4	8.2	GAL
* 3077-6028	2" SP-C SAC-B PG70-28	6.0	4.7	TON
530-6005	DRIVEWAY (ACP)	52	41	SY

(*) FOR CONTRACTOR'S INFORMATION ONLY. SEE NOTE 1.





HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100875
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

DRIVEWAY DETAILS

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

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	34
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorstoll
DATE: 3/2/2022
SCALE: 1:20
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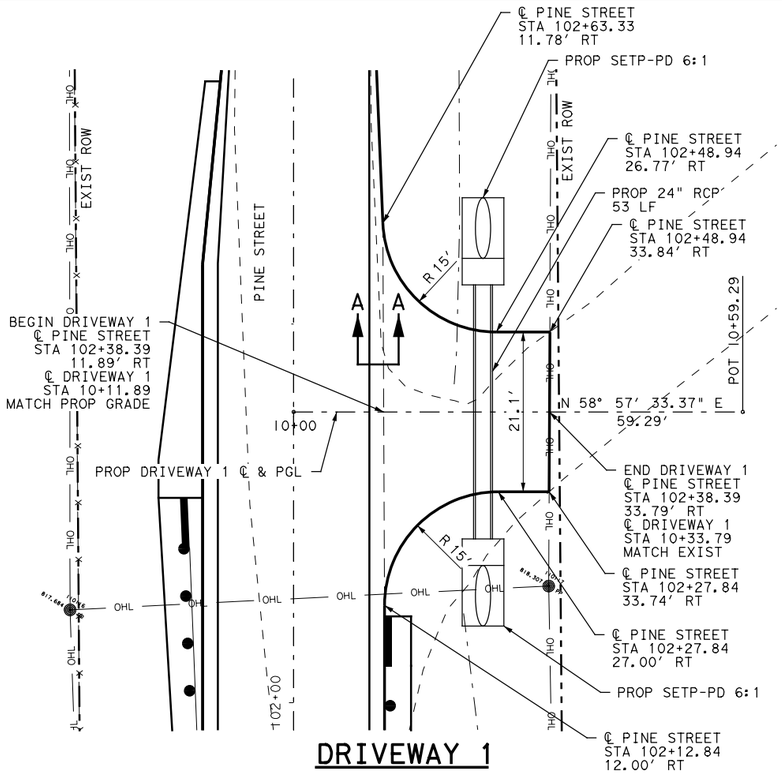
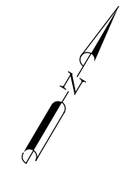


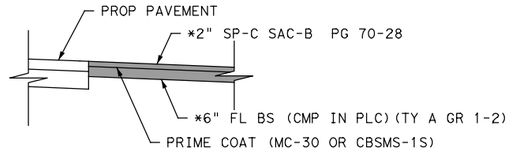
DRIVEWAY 1

NOTE:

1. WORK PERFORMED AND MATERIALS FURNISHED FOR DRIVEWAYS ARE SUBSIDIARY TO ITEM 530.
2. GRADE PIPE TO DRAIN.



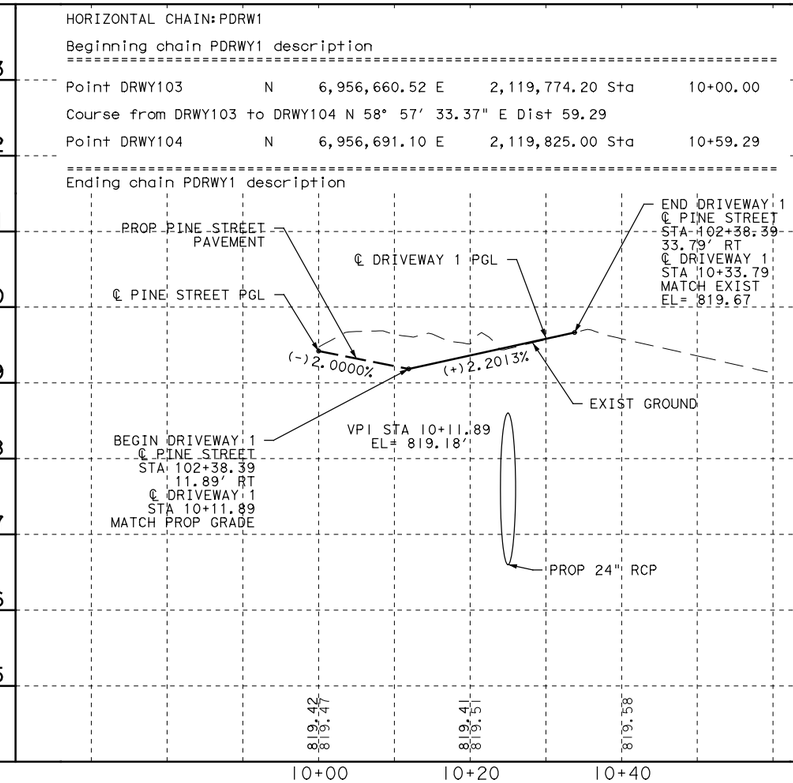
HORIZONTAL
0' 10' 20'
VERTICAL
0' 10' 20'
SCALE: 1"= 20'H 1"=20'V



SECTION A-A

ESTIMATED QUANTITIES THIS SHEET			
ITEM	DESCRIPTION	QTY	UNIT
* 247-6061	FL BS (CMP IN PLC)(TY A)(GR 1-2)(6")	62	SY
* 310-6001	PRIME COAT (MULTI OPTION)	12.4	GAL
* 3077-6028	2" SP-C SAC-B PG70-28	7.1	TON
530-6005	DRIVEWAY (ACP)	62	SY

(*) FOR CONTRACTOR'S INFORMATION ONLY. SEE NOTE 1.



HAYDEN CONSULTANTS, INC.
F-00640
STATE OF TEXAS
GEORGE H. AMEN
109675
LICENSED PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET

DRIVEWAY DETAILS

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

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	35
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED			
GHA			

USER: gmorgstoll
DATE: 3/2/2022
SCALE: 1:20
FILE: Z:\Projects\195 TxDOT\30-61DFS\001\195_04\DGN\SHT\131-PINEY\131PDRVPP01.dgn
PLOT DRIVER: TXDOT_PDF_BW.pltcfg
TIME: 8:51:09 AM
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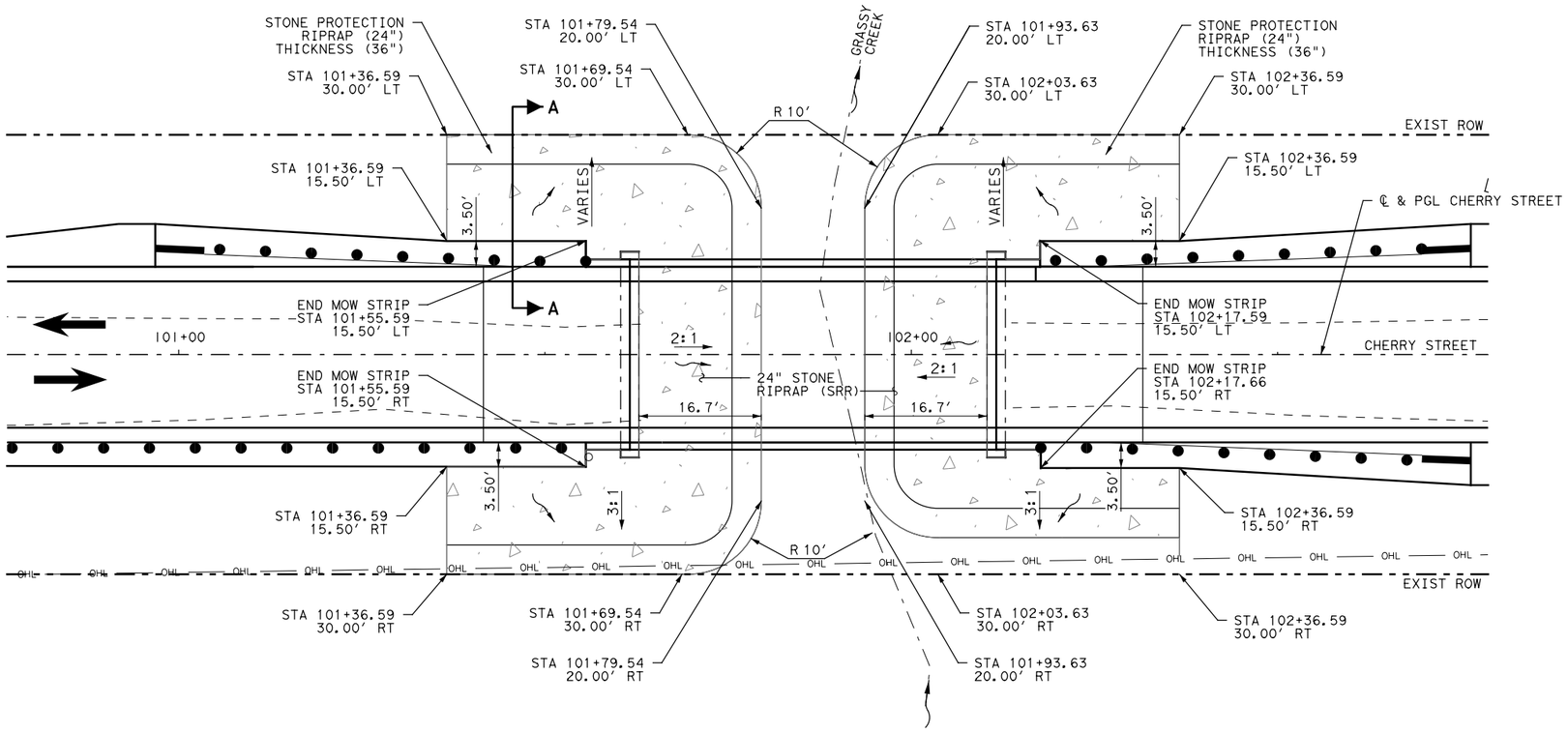
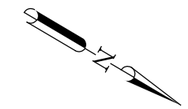


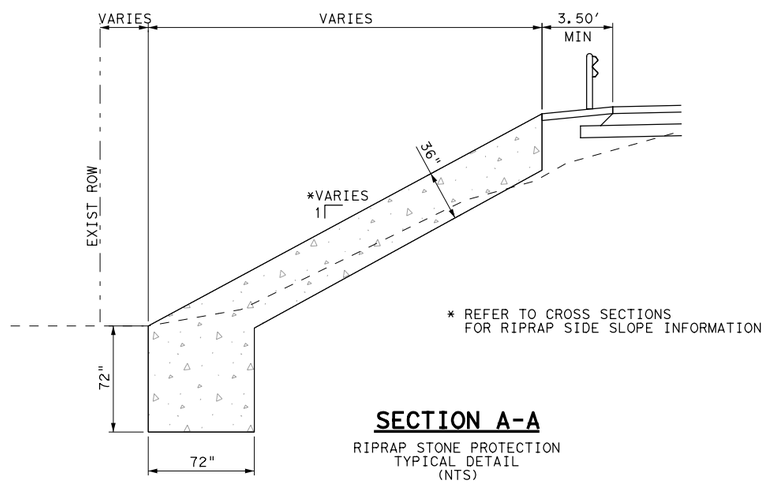


0' 10' 20'

SCALE: 1"=20'

NOTES:

1. SEE ITEM 432 FOR CONSTRUCTION OF STONE RIPRAP.
2. PROVIDE TYPE 2 FILTER FABRIC IN ACCORDANCE WITH DMS-6200.



* REFER TO CROSS SECTIONS FOR RIPRAP SIDE SLOPE INFORMATION

SECTION A-A

RIPRAP STONE PROTECTION TYPICAL DETAIL (NTS)

ESTIMATED QUANTITIES THIS SHEET				
LOCATION	ITEM	DESCRIPTION	QTY	UNIT
SOUTH APPROACH	432-6035	RIPRAP STONE PROTECTION (24")	279	CY
NORTH APPROACH	432-6035	RIPRAP STONE PROTECTION (24")	279	CY

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

RIPRAP DETAILS

SCALE: 1"=20' SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	36
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorshoi
DATE: 3/2/2022
SCALE: 1:20
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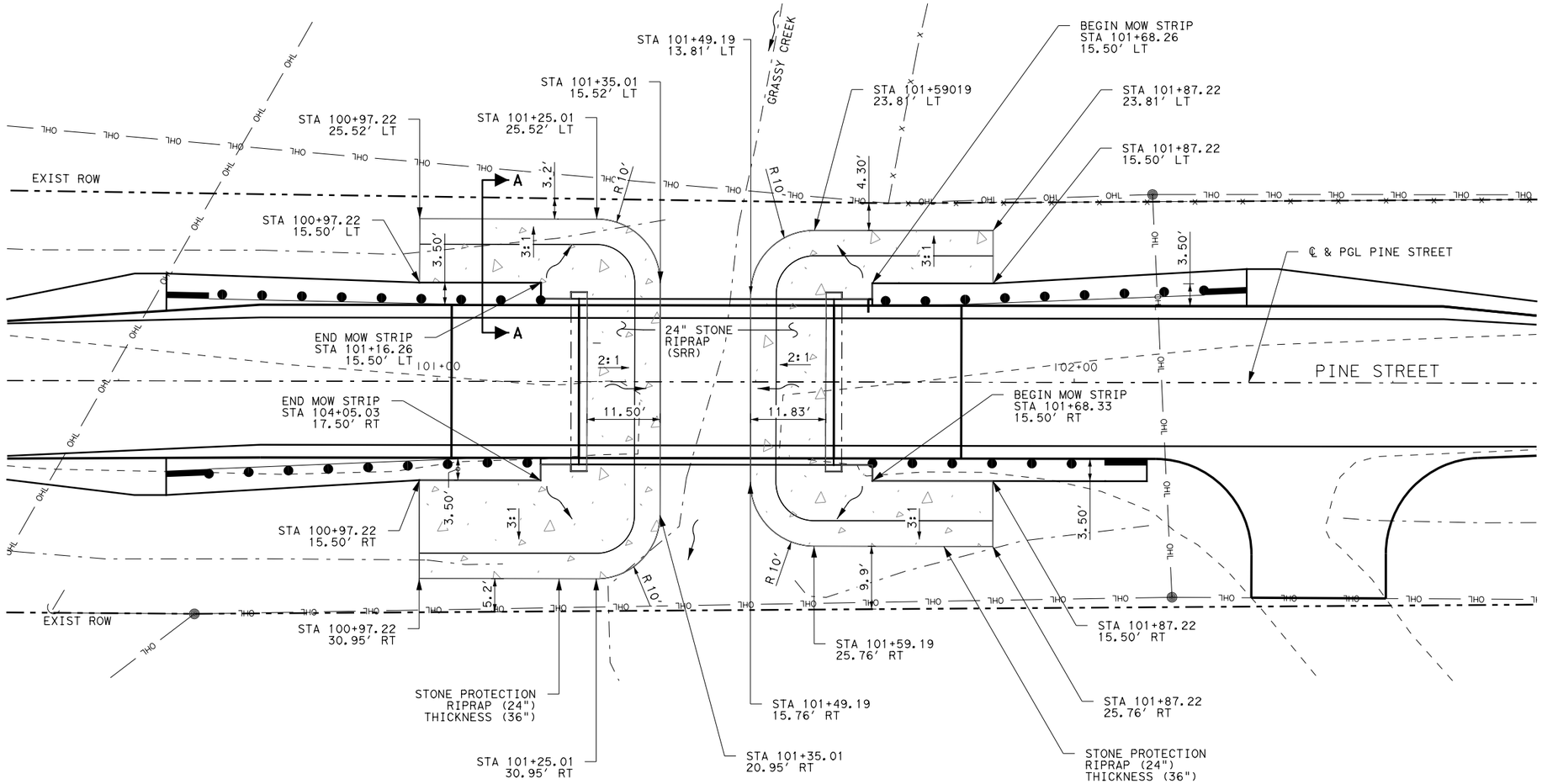
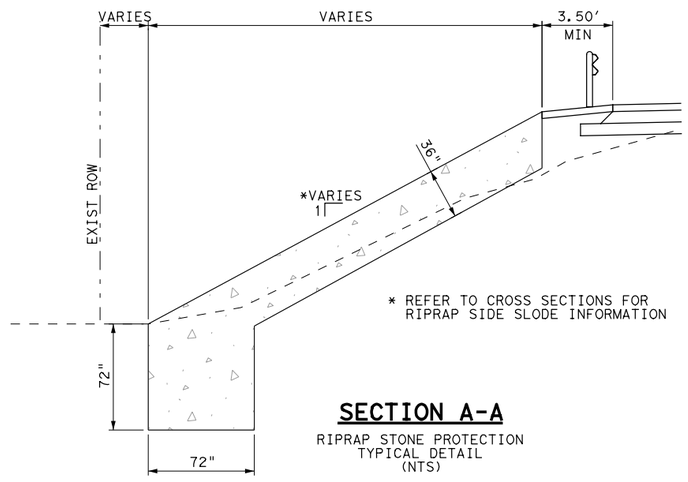


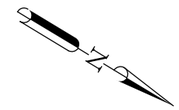


* REFER TO CROSS SECTIONS FOR RIPRAP SIDE SLODE INFORMATION

SECTION A-A

RIPRAP STONE PROTECTION
TYPICAL DETAIL
(NTS)

ESTIMATED QUANTITIES THIS SHEET				
LOCATION	ITEM	DESCRIPTION	QTY	UNIT
SOUTH APPROACH	432-6035	RIPRAP STONE PROTECTION (24")	221	CY
NORTH APPROACH	432-6035	RIPRAP STONE PROTECTION (24")	190	CY



0' 10' 20'

SCALE: 1"=20'

NOTES:

1. SEE ITEM 432 FOR CONSTRUCTION OF STONE RIPRAP.
2. PROVIDE TYPE 2 FILTER FABRIC IN ACCORDANCE WITH DMS-6200.

HAYDEN CONSULTANTS, INC.
F-00640

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET

RIPRAP DETAILS

SCALE: 1"=20' SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN JM	STATE / DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX / FT WORTH	PARKER	37
APPROVED GHA	CONTROL / SECTION	JOB	
	0902 / 38	133, ETC	

USER: gmorrell
DATE: 3/2/2022
SCALE: 1:20
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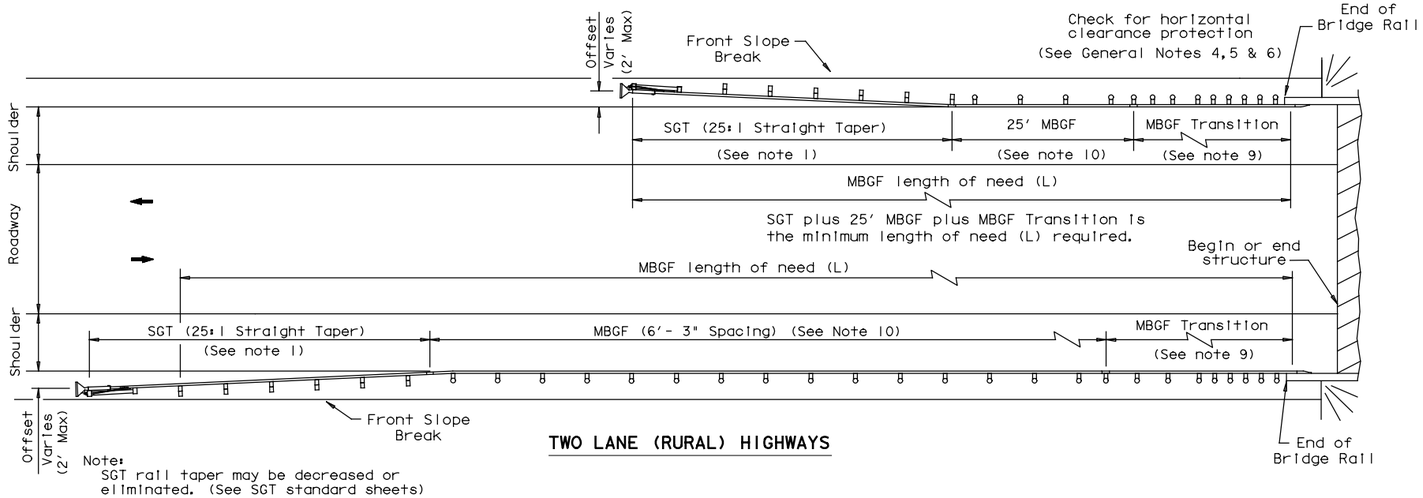
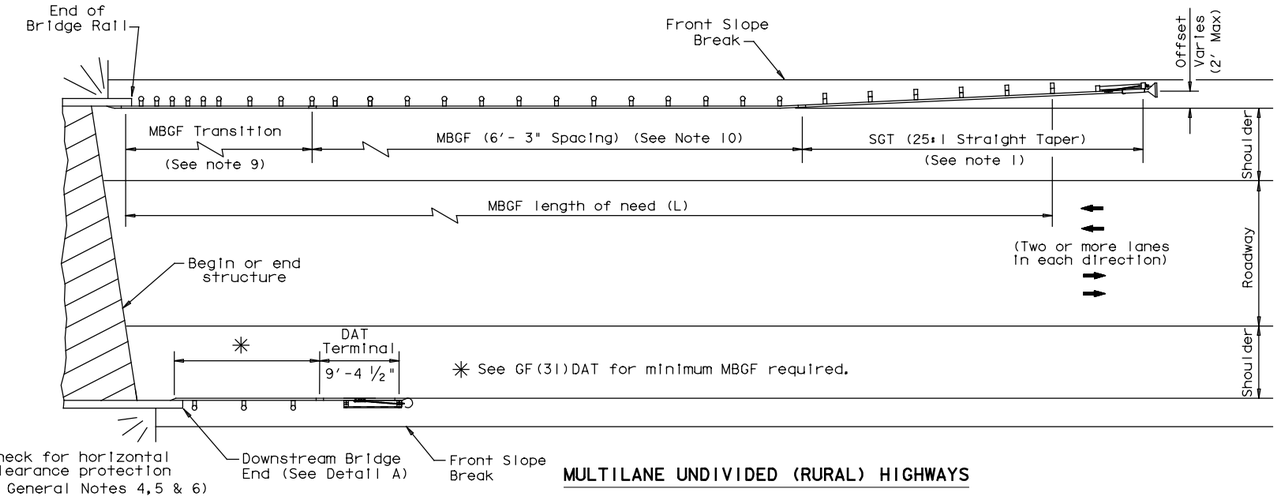
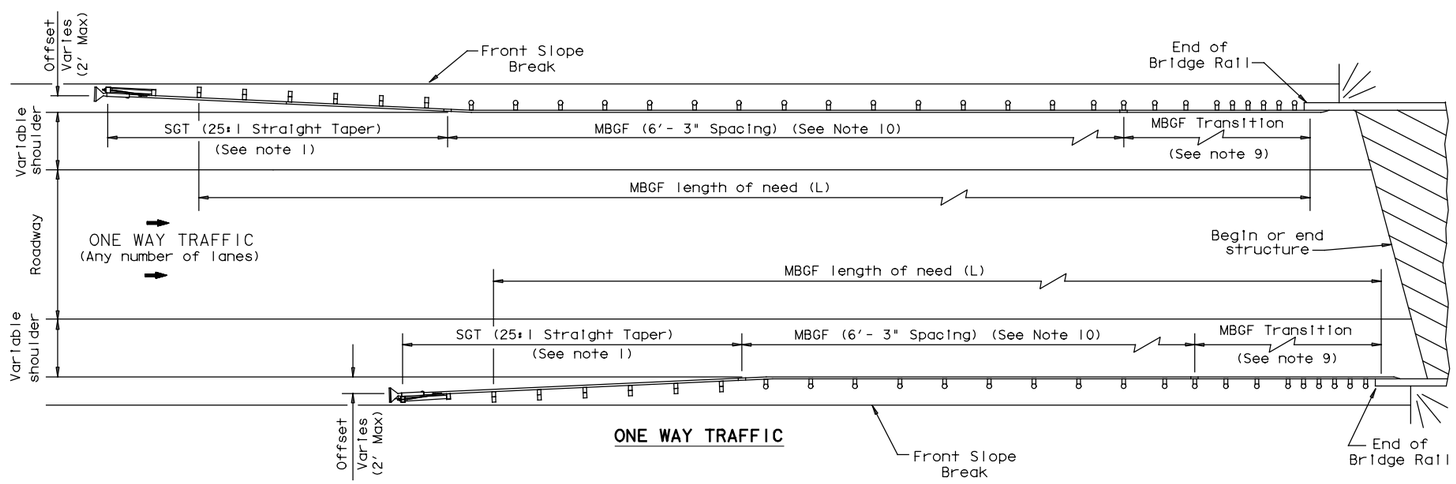


TWO LANE (RURAL) HIGHWAYS

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



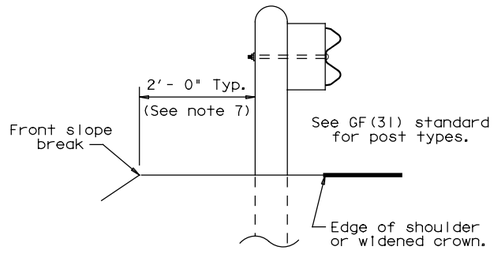
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



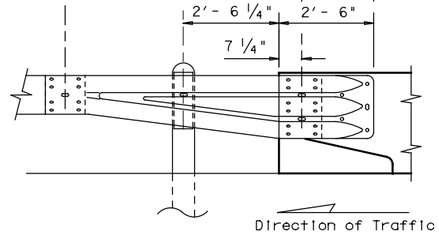
ONE WAY TRAFFIC

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

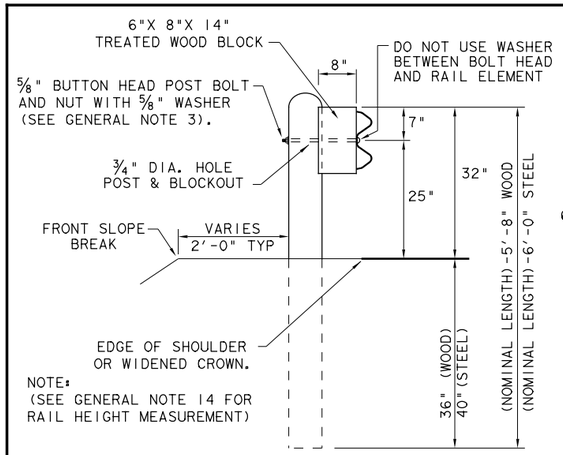
BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

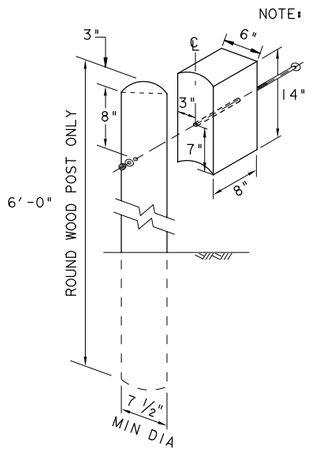
BED-14

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)	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		38

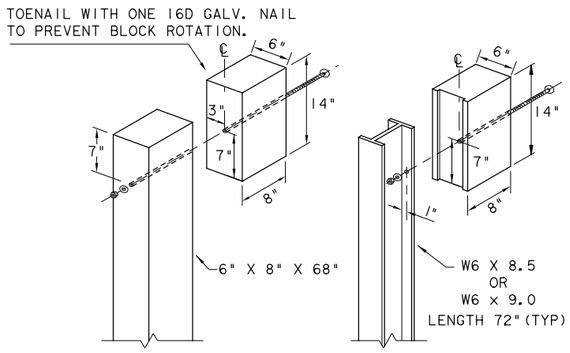
DATE: 3/2/2022
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6IDP540\1195_04\DGN\STANDARDS\gf3119.dgn



TYPICAL POST PLACEMENT



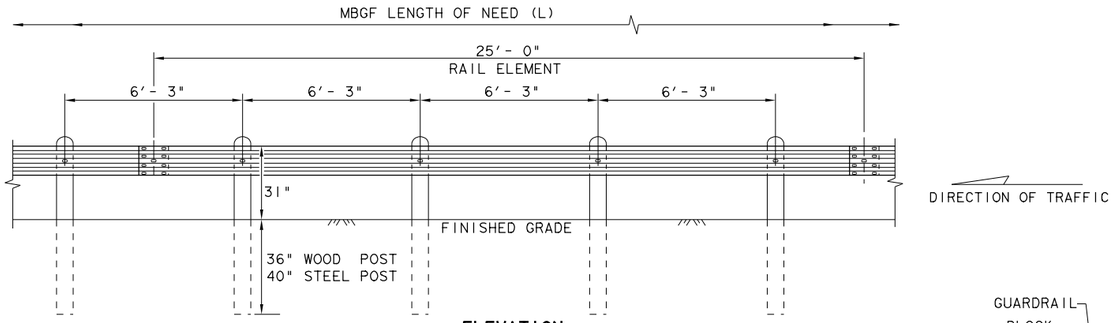
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

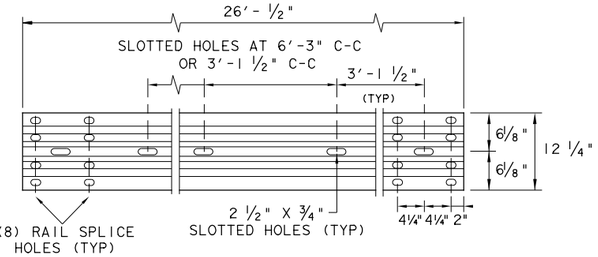
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



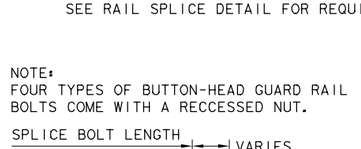
ELEVATION MID-SPAN RAIL SPLICE

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



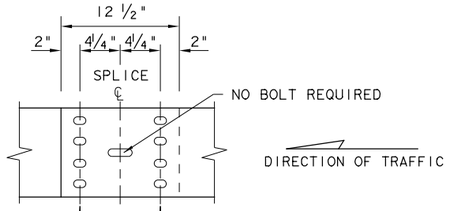
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



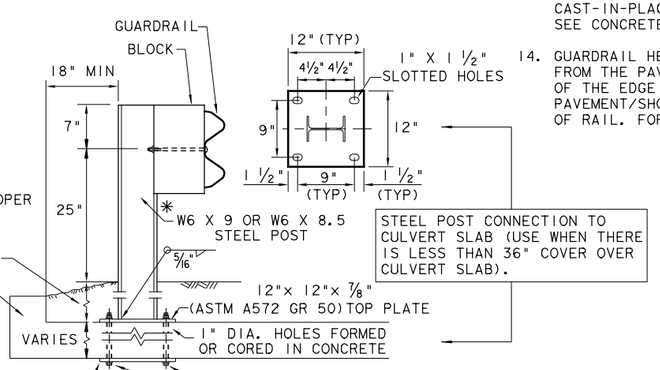
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

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

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

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
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	DIST	COUNTY		SHEET NO.
	FTW	PARKER		39

DATE: 3/2/2022
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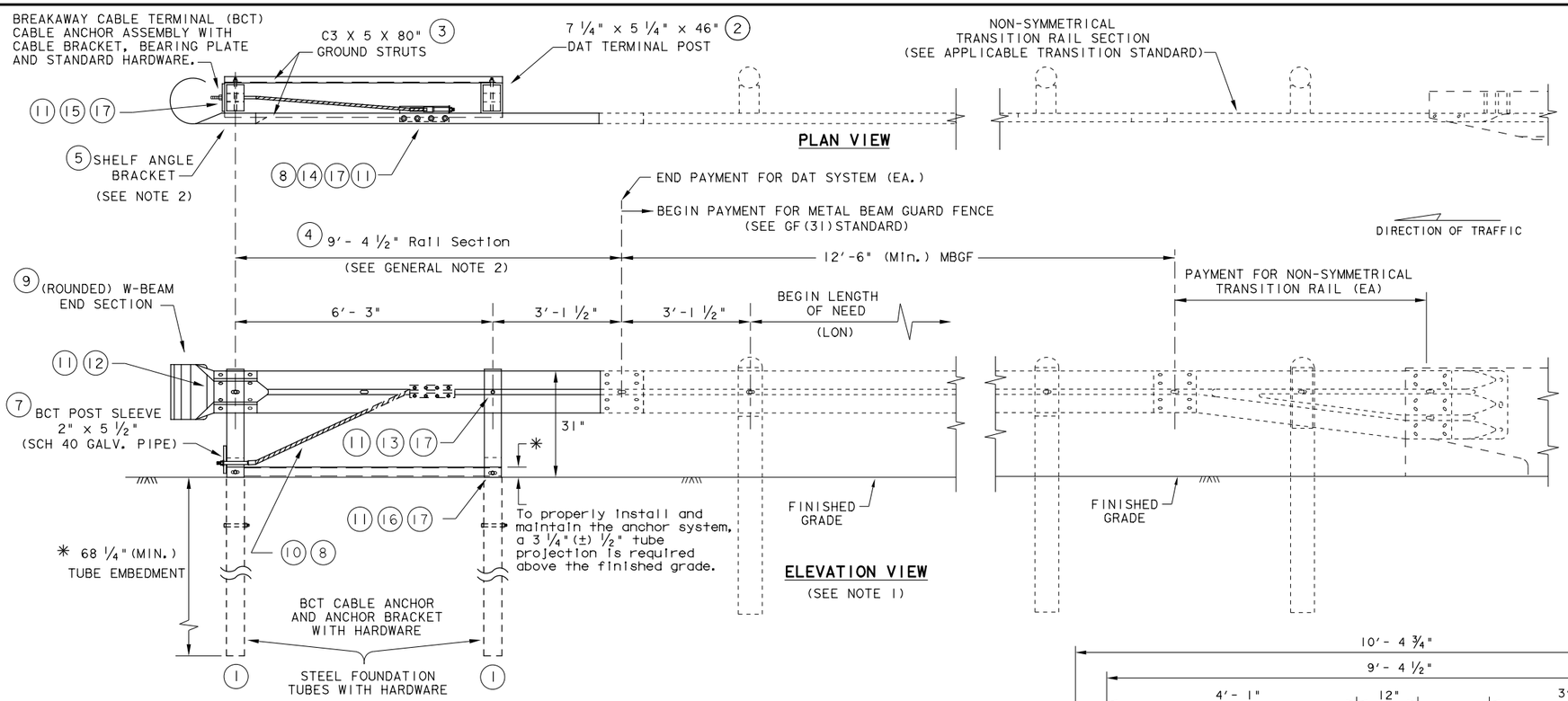


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

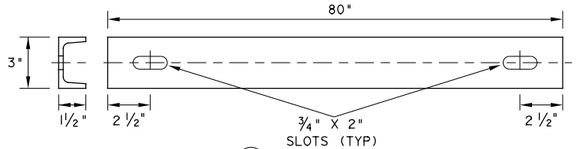
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

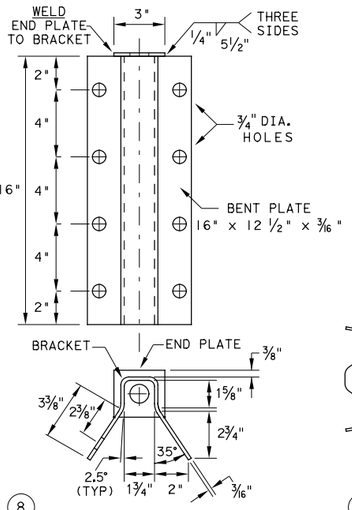
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

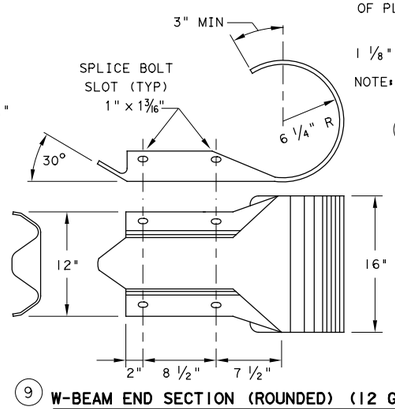
(4) TERMINAL RAIL ELEMENT FOR DAT



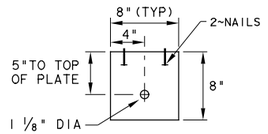
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

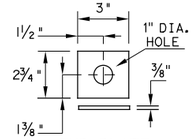


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

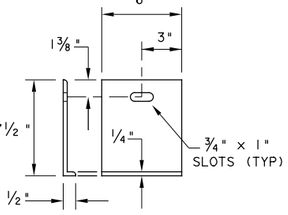


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

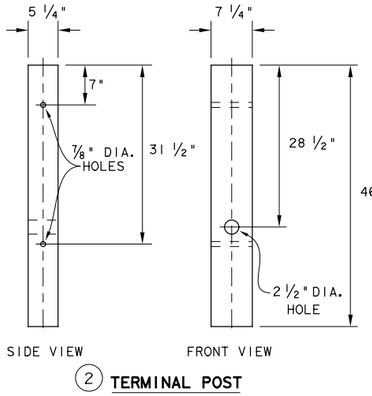
(6) BEARING PLATE
8"x 8"x 5/8" PL



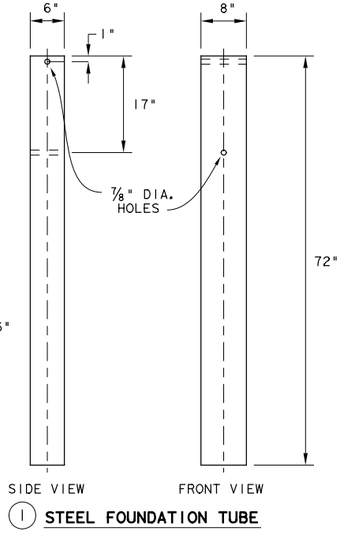
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE (DOWNSTREAM ANCHOR TERMINAL) TL-3 MASH COMPLIANT

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		40

DATE: 3/2/2022
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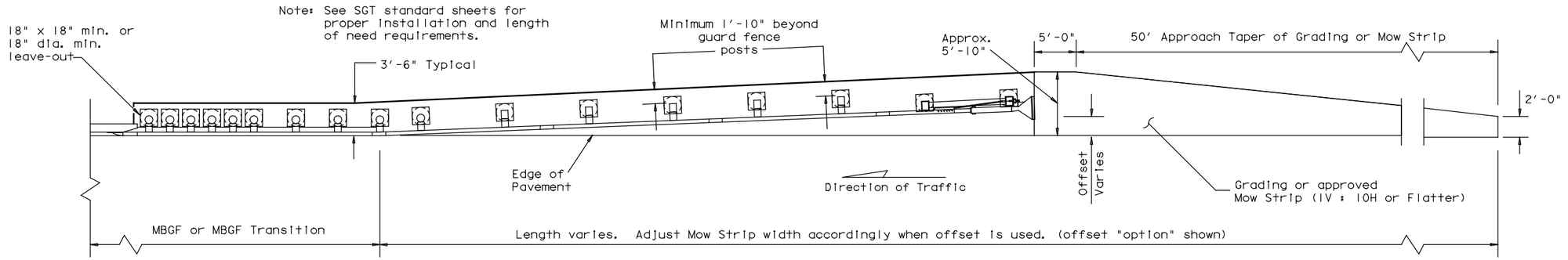
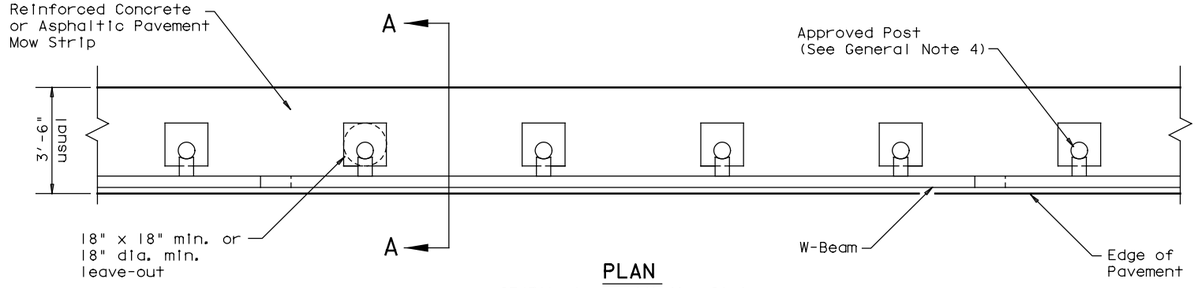
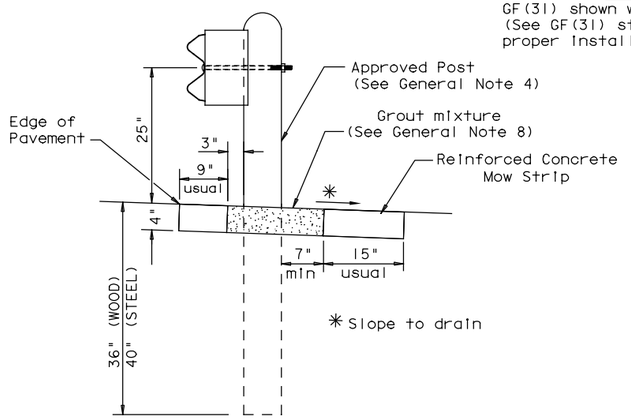


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



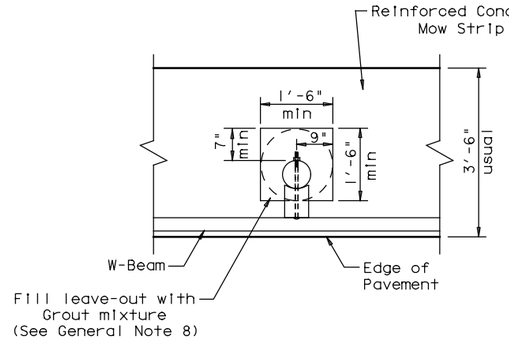
PLAN

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



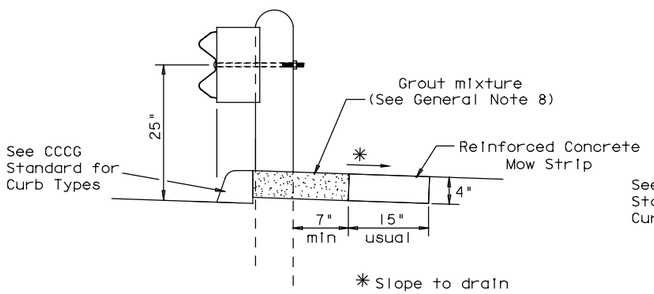
SECTION A-A

Typical



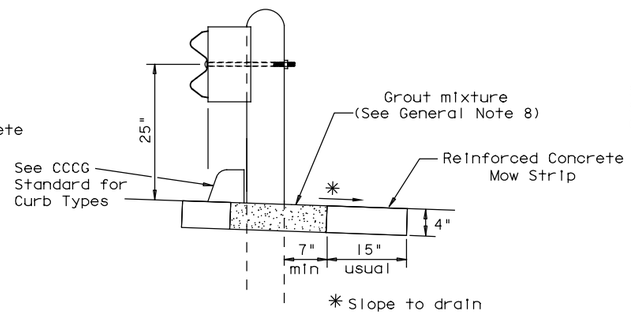
MOW STRIP DETAIL

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



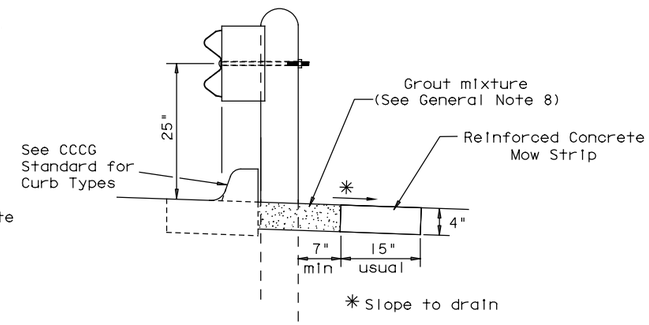
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		41

DATE: 3/2/2022 8:51:33 AM
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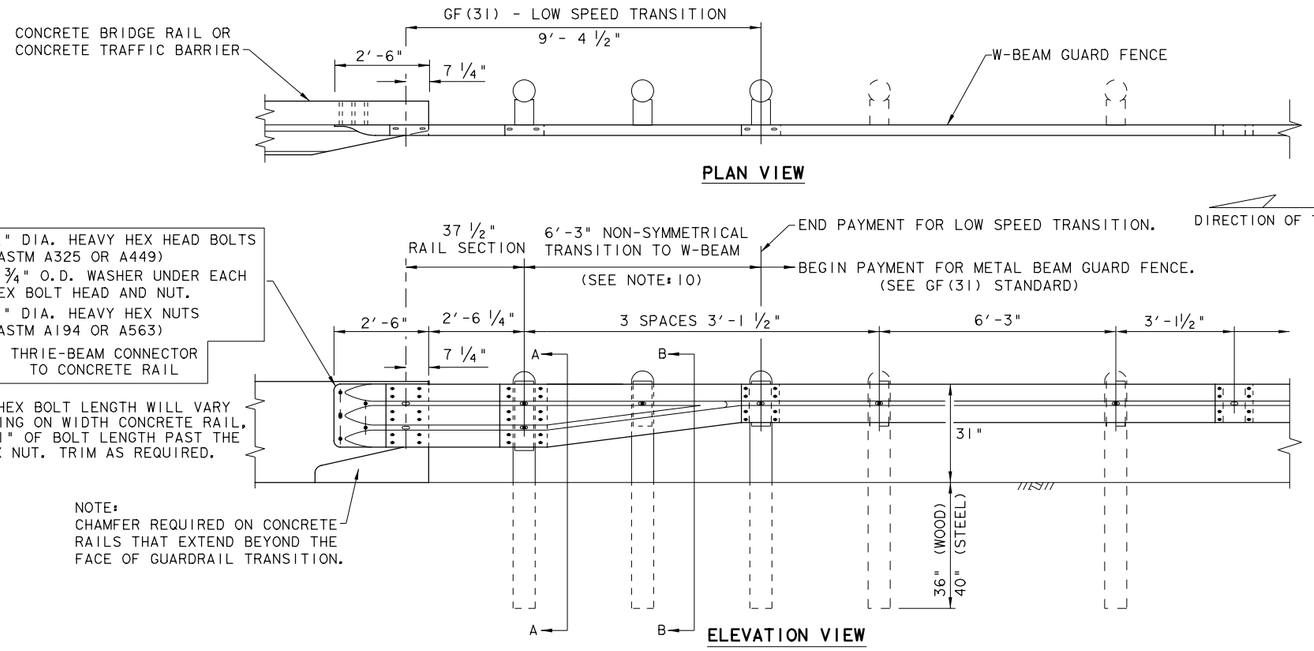
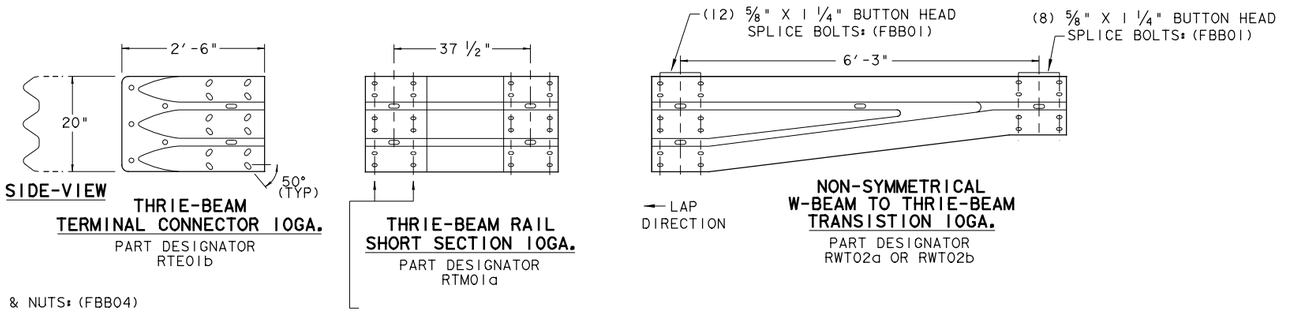


GENERAL NOTES

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.



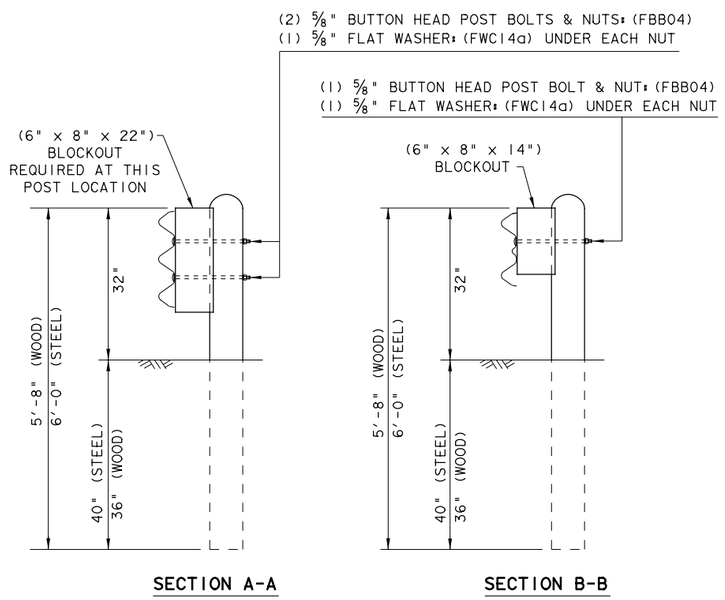
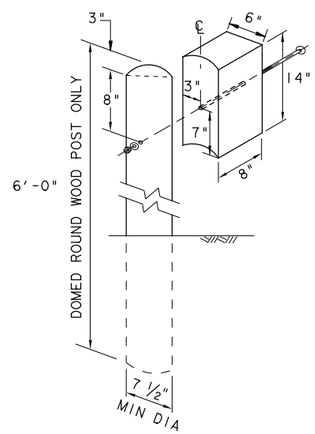
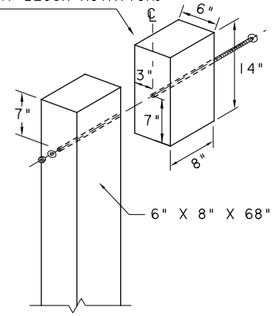


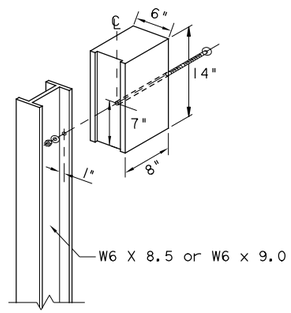
PLATE WASHER INSTRUCTIONS

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





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: gf31trtl219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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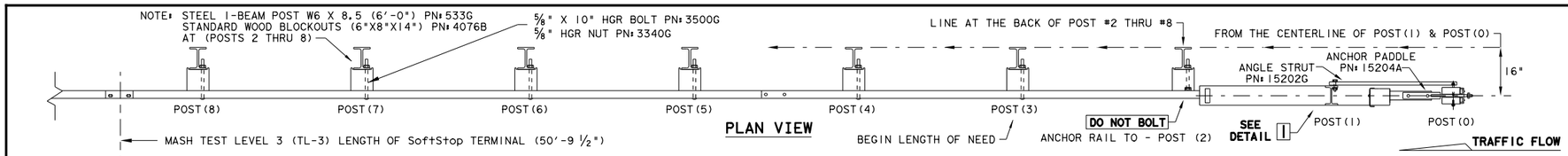
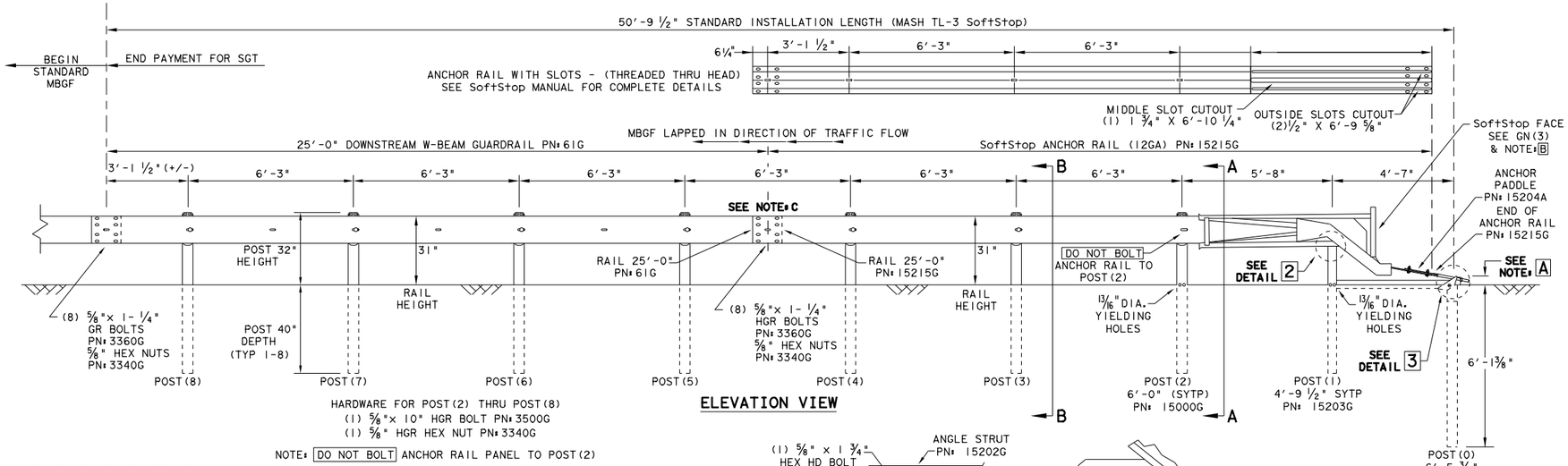
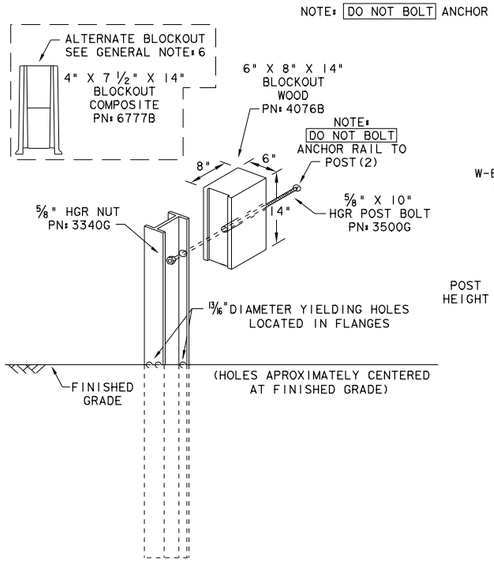


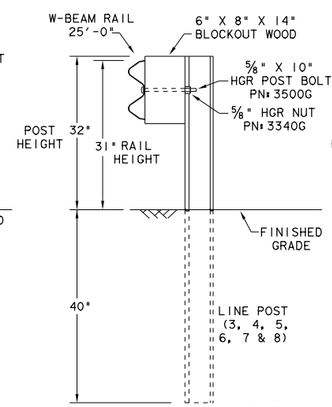




ISOMETRIC VIEW POST(1 & 2)

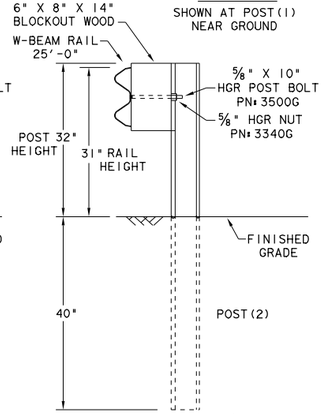
W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)



SECTION VIEW B-B

6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G



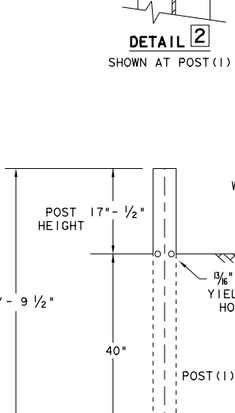
SECTION VIEW A-A

6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

DETAIL 1

SHOWN AT POST(1) NEAR GROUND



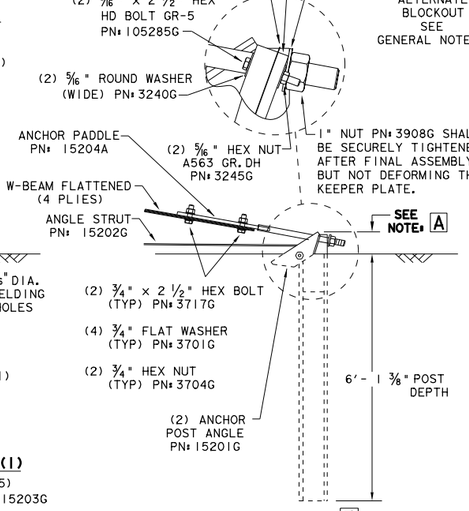
DETAIL 2

SHOWN AT POST(1)

FRONT VIEW POST(1)

4'-9 1/2" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

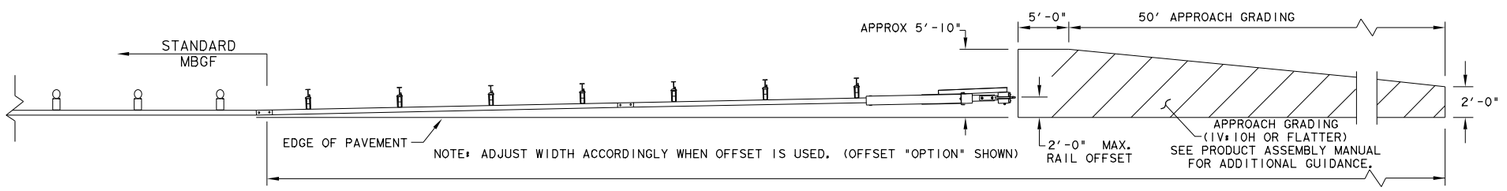
NOTE: NO BLOCKOUT INSTALLED AT POST(1)



DETAIL 3 AT POST(0)

6'-5 3/8" (W6 X 15)
I-BEAM POST PN: 15205A

TRAFFIC FLOW



APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY SOFTSTOP END TERMINAL MASH - TL-3

SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
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REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		43

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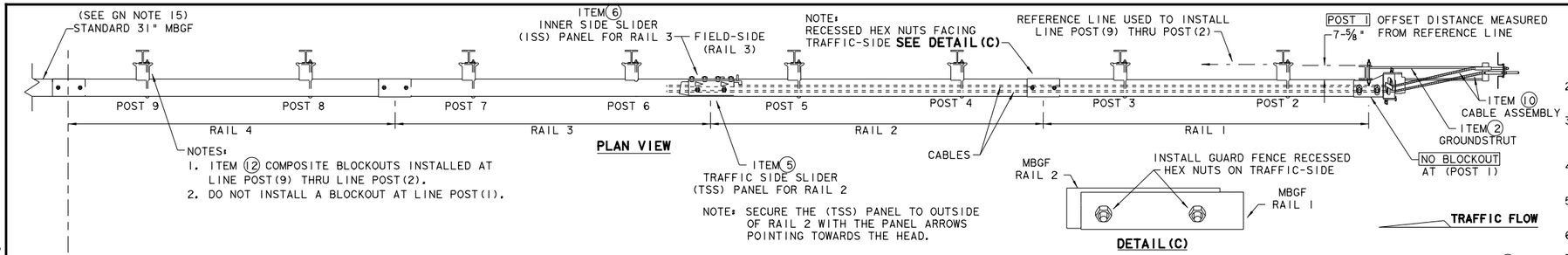
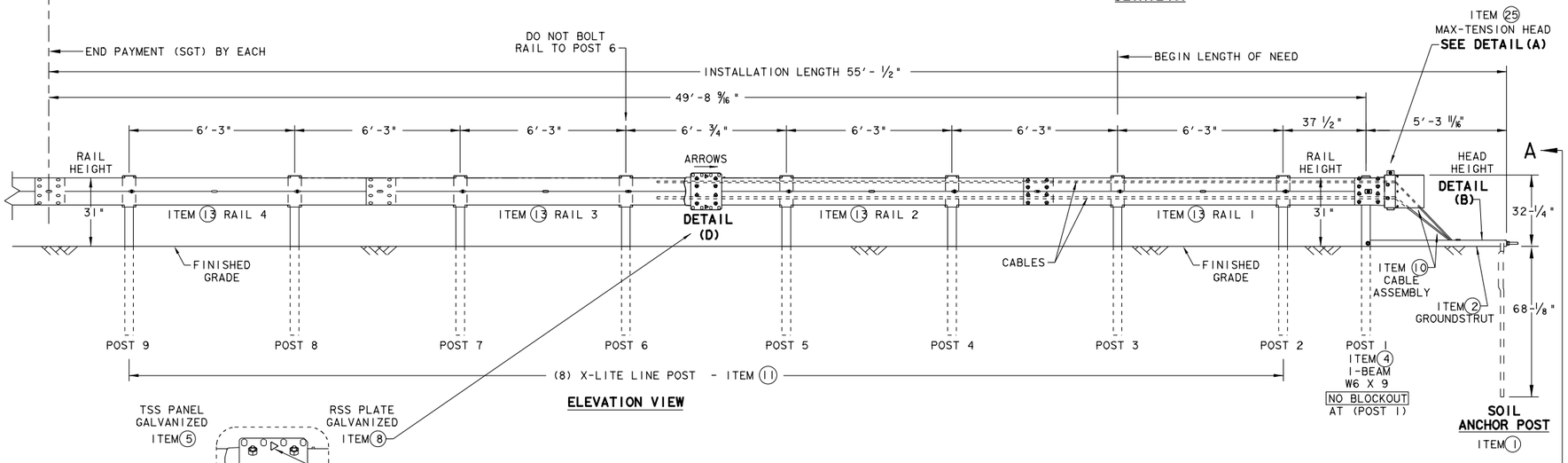
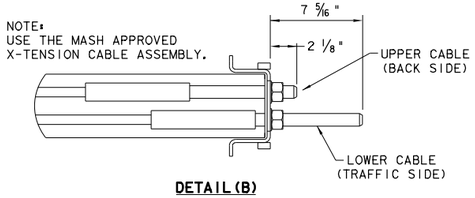
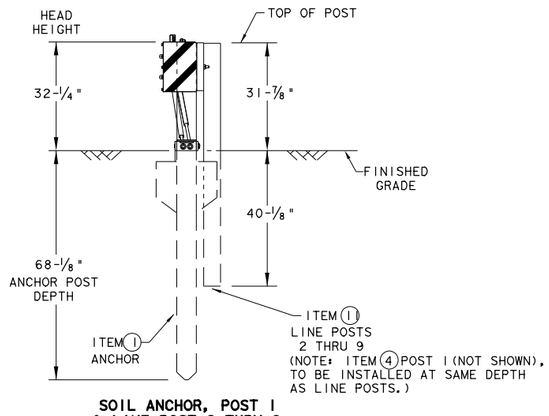
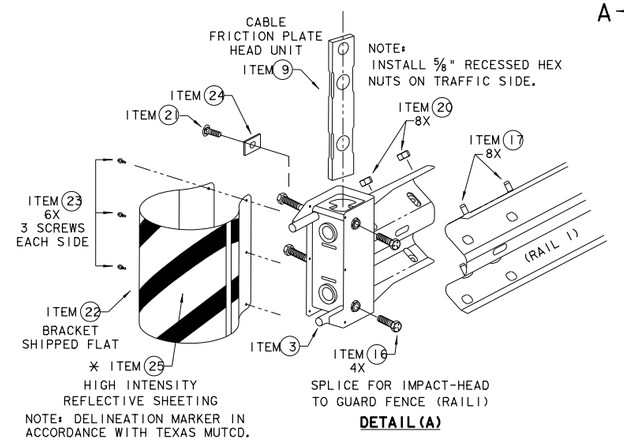










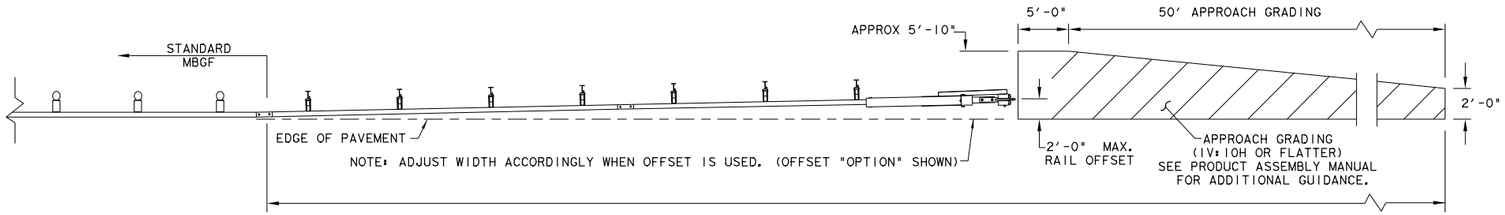
GENERAL NOTES

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

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

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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



TRAFFIC FLOW

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		44

DATE: 3/2/2022
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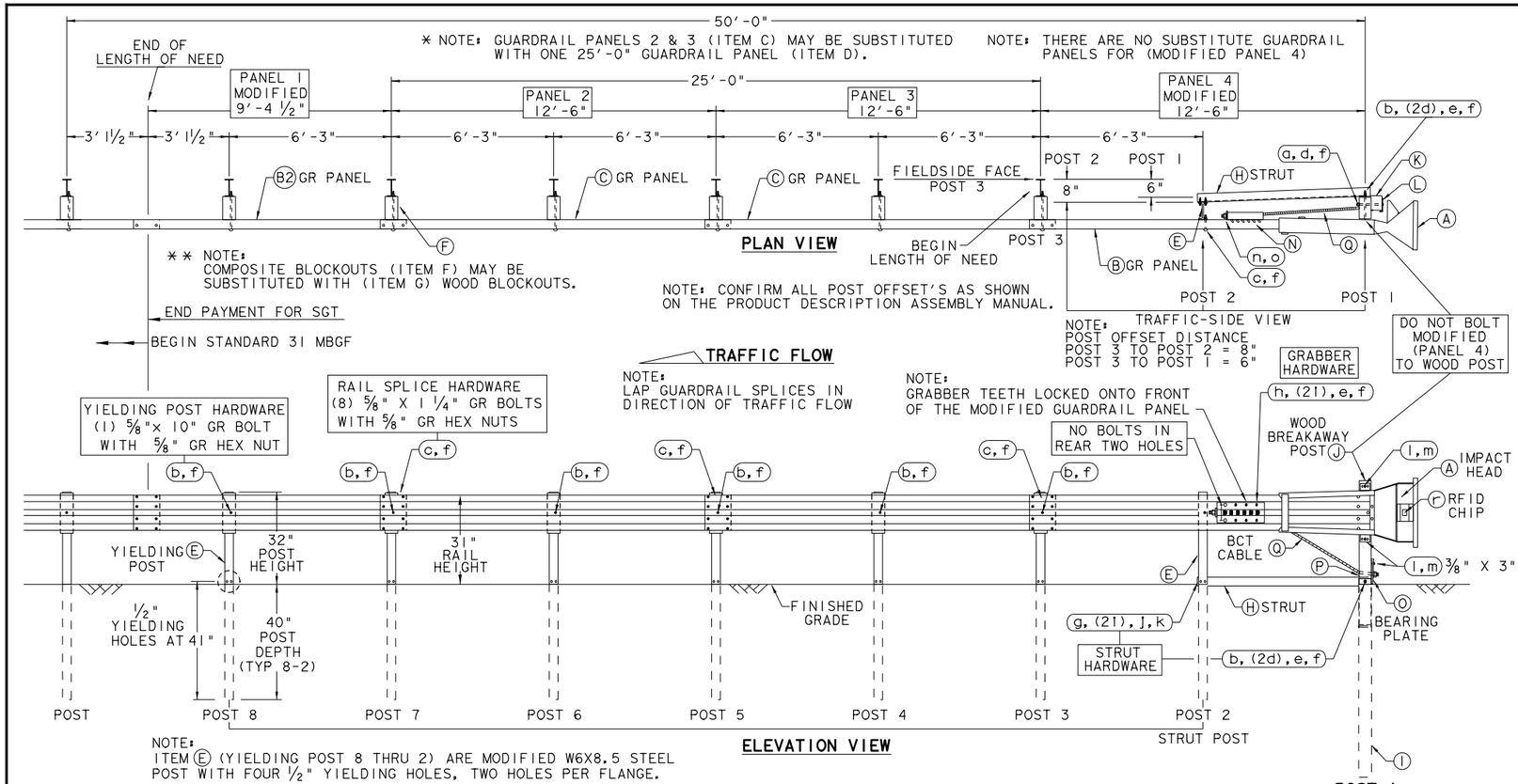
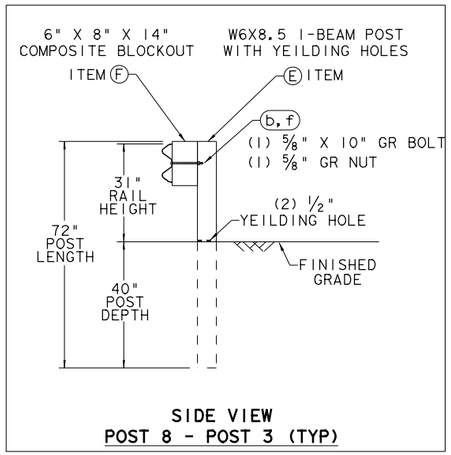


GENERAL NOTES

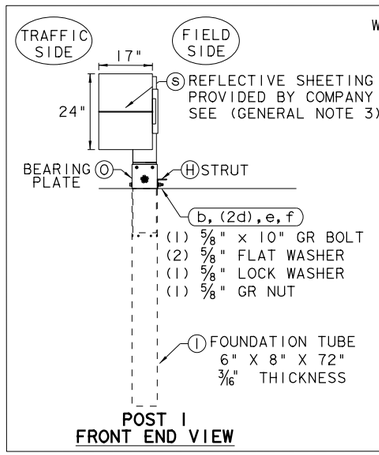
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

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

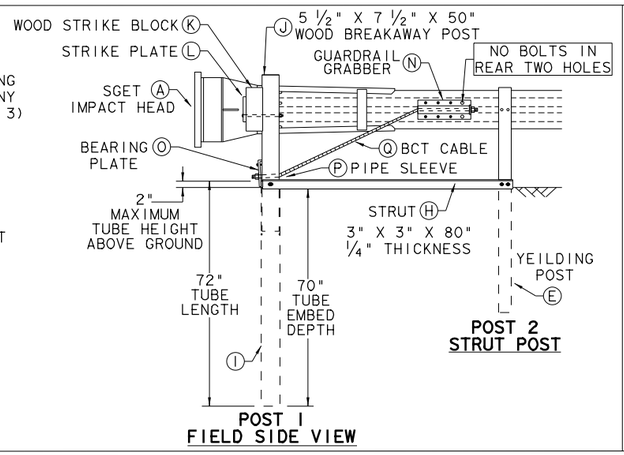
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW
* —
** —



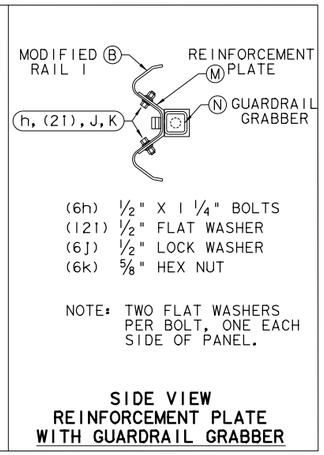
SIDE VIEW
POST 8 - POST 3 (TYP)



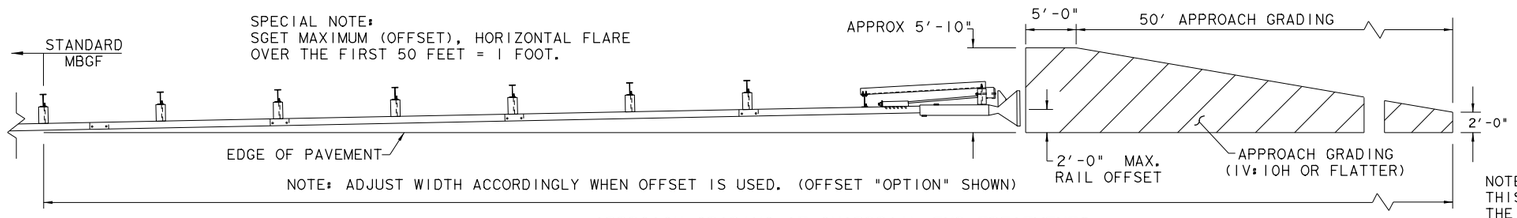
POST 1
FRONT END VIEW



POST 2
STRUT POST
FIELD SIDE VIEW



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation
Design Division Standard

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

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP		
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0902	38	133, ETC	CS		
	DIST	COUNTY		SHEET NO.		
	FTW	PARKER		45		

DATE: 3/2/2022
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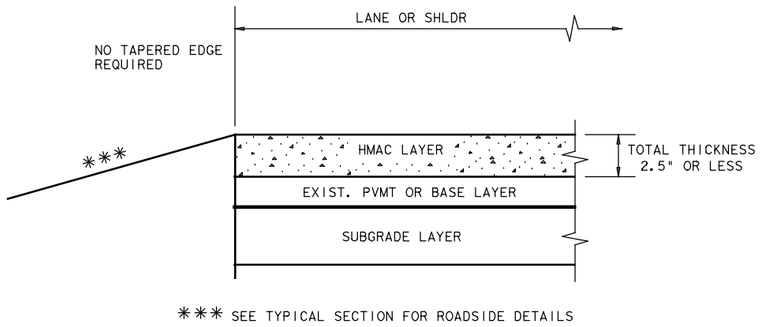
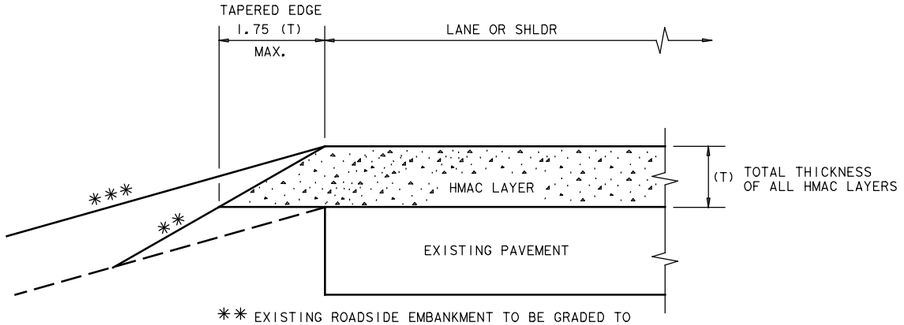


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

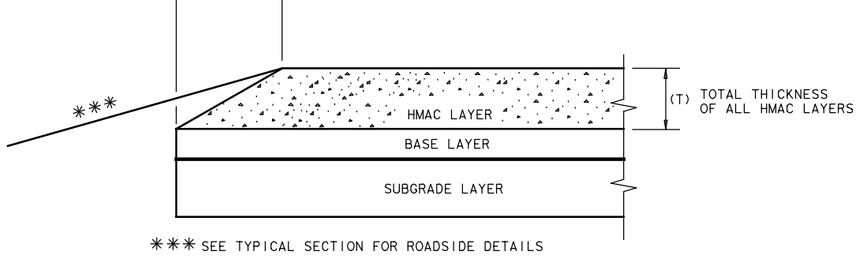
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



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

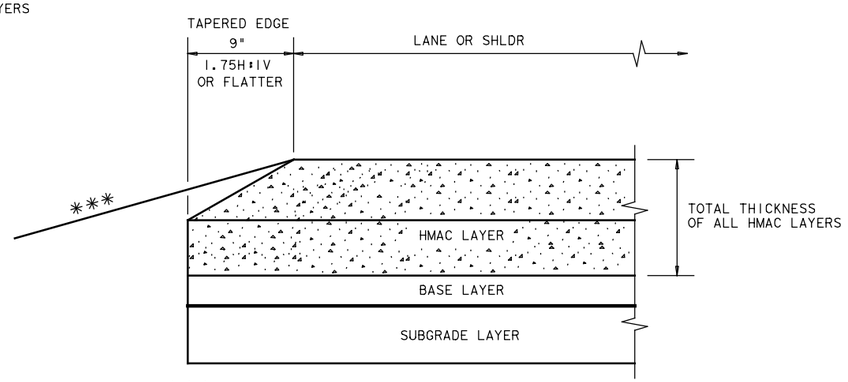
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

(NOT TO SCALE)

GENERAL NOTES

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

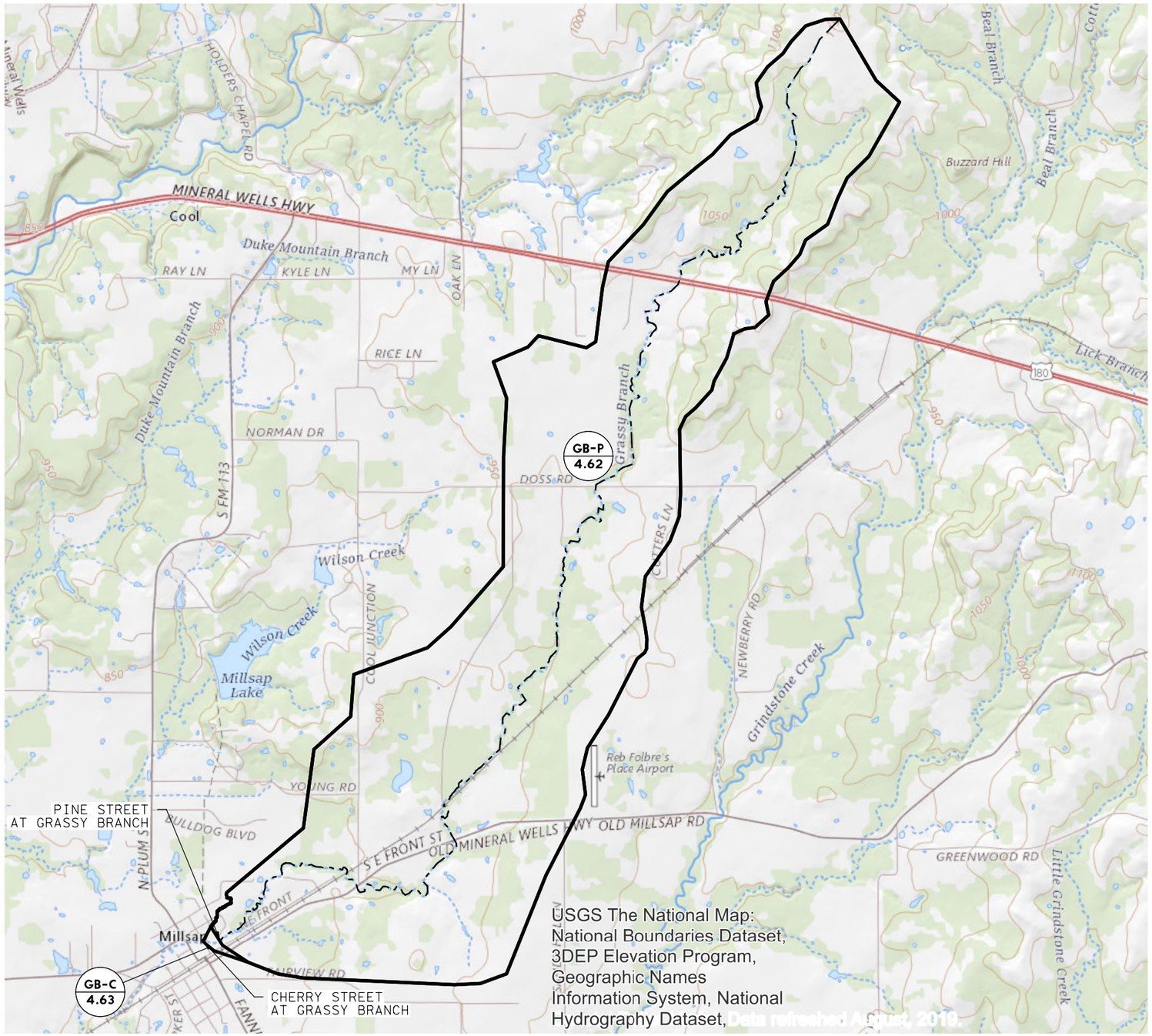
Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT		CK: RL	DW: KB		CK:	
©TxDOT January 2011	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0902	38	133,ETC		CS		
	DIST	COUNTY				SHEET NO.	
	FTW	PARKER				46	



N

0′ 1000′ 3000′

SCALE: 1"=3000′

LEGEND

- X / XX.X — Sub-DRAINAGE AREA NO. / AREA IN SQUARE MILES
- FLOW PATH/CREEK CHANNEL
- FLOW DIRECTION
- EXT. DRAINAGE DIVIDE

NOTES:

1. OMEGA EM REGRESSION FLOWS WERE USED TO MODEL GRASSY BRANCH DRAINAGE AREA.
2. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3. NOAA ATLAS 14 PRECIPITAION DATA WAS USED FOR THE 24 HR RAINFALL DEPTH.
4. THE DESIGN ANNUAL RECURRENCE INTERVAL OF 2-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR PINE ST AND THE DESIGN RECURRENCE INTERVAL OF 10-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR CHERRY ST WAS USED FOR ANALYSIS.
5. BASIN DELINEATION IS BASED ON PARKER COUNTY LIDAR 11-1M.
6. FEMA ZONE A MAP # 48367C0350F REVISED DATE APRIL 5, 2018, IN WHICH BASE FLOOD ELEVATIONS HAVE NOT BEEN DETERMINED.

BASIN ID	CROSSING NAME	METHOD USED	DRAINAGE AREA		WEIGHTED	LAG	FLOWS (CFS)						
			ACRES	SQ. MI.	CN	MIN	Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}	Q_{500}
GB-P	Grassy Branch at Pine St	SCS	2956.77	4.62	78	265	469	826	1111	1779	1897	2285	3201
		Omega EM Regression			-	-	489	1000	1386	2002	2536	3178	5024
GB-C	Grassy Branch at Cherry St	SCS	2962.43	4.63	78	219	576	958	1288	1779	2192	2635	3674
		Omega EM Regression			-	-	489	1002	1388	2005	2540	3183	5033

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET & PINE STREET

DRAINAGE AREA MAP

SCALE: 1"=3000′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	47
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmarshall
DATE: 3/2/2022
SCALE: 1:3000
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TIME: 8:51:53 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl

DA Name	GIS AREA	Soil Group	Land Use	CN	C	Area acre	A*CN	A*C
Grassy Branch at Cherry St	2.52	A	Pasture (Fair Condition; ground cover 50 - 75%)	49	0.45	2.518	123.38	1.13
Grassy Branch at Cherry St	15.86	B	Pasture (Fair Condition; ground cover 50 - 75%)	69	0.45	15.858	1094.22	7.14
Grassy Branch at Cherry St	19.81	C	Pasture (Fair Condition; ground cover 50 - 75%)	79	0.45	19.813	1565.20	8.92
Grassy Branch at Cherry St	17.39	D	Pasture (Fair Condition; ground cover 50 - 75%)	84	0.45	17.388	1460.63	7.82
Grassy Branch at Cherry St	4.04	A	Commercial & Business	89	0.7	4.041	359.64	2.83
Grassy Branch at Cherry St	13.58	B	Commercial & Business	92	0.7	13.576	1249.04	9.50
Grassy Branch at Cherry St	19.36	C	Commercial & Business	94	0.7	19.361	1819.91	13.55
Grassy Branch at Cherry St	5.56	D	Commercial & Business	95	0.7	5.559	528.12	3.89
Grassy Branch at Cherry St	0.06	A	Pasture (Fair Condition; ground cover 50 - 75%)	49	0.45	0.056	2.74	0.03
Grassy Branch at Cherry St	20.39	C	Pasture (Fair Condition; ground cover 50 - 75%)	79	0.45	20.390	1610.78	9.18
Grassy Branch at Cherry St	1.39	D	Pasture (Fair Condition; ground cover 50 - 75%)	84	0.45	1.386	116.45	0.62
Grassy Branch at Cherry St	4.73	C	Commercial & Business	94	0.7	4.729	444.56	3.31
Grassy Branch at Cherry St	10.60	D	Commercial & Business	95	0.7	10.605	1007.46	7.42
Grassy Branch at Cherry St	9.66	A	Residential 1/8 acre	77	0.65	9.664	744.12	6.28
Grassy Branch at Cherry St	2.71	B	Residential 1/8 acre	85	0.65	2.712	230.56	1.76
Grassy Branch at Cherry St	92.07	C	Residential 1/8 acre	90	0.65	92.068	8286.14	59.84
Grassy Branch at Cherry St	7.97	D	Residential 1/8 acre	92	0.65	7.971	733.37	5.18
Grassy Branch at Cherry St	108.60	A	Pasture (Fair Condition; ground cover 50 - 75%)	49	0.45	108.603	5321.55	48.87
Grassy Branch at Cherry St	212.29	B	Pasture (Fair Condition; ground cover 50 - 75%)	69	0.45	212.293	14648.22	95.53
Grassy Branch at Cherry St	323.05	C	Pasture (Fair Condition; ground cover 50 - 75%)	79	0.45	323.046	25520.63	145.37
Grassy Branch at Cherry St	80.54	D	Pasture (Fair Condition; ground cover 50 - 75%)	84	0.45	80.541	6765.42	36.24
Grassy Branch at Cherry St	86.10	A	Residential 1/4 acre	61	0.6	86.100	5252.12	51.66
Grassy Branch at Cherry St	101.15	B	Residential 1/4 acre	75	0.6	101.154	7586.55	60.69
Grassy Branch at Cherry St	435.68	C	Residential 1/4 acre	83	0.6	435.678	36161.27	261.41
Grassy Branch at Cherry St	83.50	D	Residential 1/4 acre	87	0.6	83.498	7264.37	50.10
Grassy Branch at Cherry St	14.54	B	Residential 1/4 acre	75	0.6	14.540	1090.49	8.72
Grassy Branch at Cherry St	28.99	C	Residential 1/4 acre	83	0.6	28.987	2405.95	17.39
Grassy Branch at Cherry St	25.96	D	Residential 1/4 acre	87	0.6	25.956	2258.21	15.57
Grassy Branch at Cherry St	4.61	B	Streets & Roads (dirt, including ROW)	82	0.7	4.610	378.01	3.23
Grassy Branch at Cherry St	1.99	C	Streets & Roads (dirt, including ROW)	87	0.7	1.992	173.34	1.39
Grassy Branch at Cherry St	6.74	D	Streets & Roads (dirt, including ROW)	89	0.7	6.738	599.70	4.72
Grassy Branch at Cherry St	8.02	A	Woods (Fair Condition; ground cover 50 - 75%)	36	0.3	8.024	288.87	2.41
Grassy Branch at Cherry St	3.85	B	Woods (Fair Condition; ground cover 50 - 75%)	60	0.3	3.850	230.98	1.15
Grassy Branch at Cherry St	63.41	C	Woods (Fair Condition; ground cover 50 - 75%)	73	0.3	63.406	4628.62	19.02
Grassy Branch at Cherry St	19.25	D	Woods (Fair Condition; ground cover 50 - 75%)	79	0.3	19.253	1521.00	5.78
Grassy Branch at Cherry St	149.62	A	Residential 1/4 acre	61	0.6	149.624	9127.06	89.77
Grassy Branch at Cherry St	270.54	B	Residential 1/4 acre	75	0.6	270.541	20290.57	162.32
Grassy Branch at Cherry St	413.59	C	Residential 1/4 acre	83	0.6	413.592	34328.14	248.16
Grassy Branch at Cherry St	272.71	D	Residential 1/4 acre	87	0.6	272.708	23725.60	163.62
	2962.43		WEIGHTED	77.96	0.55	2962.432	230942.98	1641.56

Sheet flow			
	Segment ID	AB	
1. Surface description (table 3-1)		GRASS	
2. Roughness coefficient, n (table 3-1)		0.240	
3. Flow length, L (total L * 100 ft	ft	100	
4. Two-year 24-hour rainfall, P_2	in	3.3	
5. Land slope, s		0.98%	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5}\ s^{0.4})$	hr	0.31	0.31 hr

Shallow concentrated flow			
	Segment ID	BC	
7. Surface description (paved or unpaved)		Unpaved	
8. Flow length, L	ft	639	
9. Watercourse slope, s		3.49%	
10. Average velocity, V (figure 3-1)	ft/s	3.0	
11. $T_t = L / (3600\ V)$	hr	0.06	0.06 hr

Channel flow			
	Segment ID	CD	
12. Cross sectional flow area, a	sf	186.20	
13. Wetted perimeter, p_w	ft	488.90	
14. Hydraulic radius, $r = a / p_w$	ft	0.381	
15. Channel slope, s		0.78%	
16. Manning's roughness coefficient, n		0.035	
17. $V = 1.49\ r^{2/3}\ s^{1/2} / n$	ft/s	1.98	
18. Flow length, L	ft	40688	
19. $T_t = L / (3600\ V)$	hr	5.71	5.71 hr
20. Watershed or subarea T_c or T_t			6.08 hr
			364.92 min

NOTES:
1. OMEGA EM REGRESSION FLOWS WERE USED TO MODEL GRASSY BRANCH DRAINAGE AREA.
2. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3. NOAA ATLAS 14 PRECIPITATION DATA WAS USED FOR THE 24-HR RAINFALL DEPTH.
4. THE DESIGN ANNUAL RECURRENCE INTERVAL OF 2-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR PINE STREET AND THE DESIGN RECURRENCE INTERVAL OF 5-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR CHERRY STREET WAS USED FOR ANALYSIS.
5. BASIN DELINEATION IS BASED ON PARKER COUNTY LIDAR 11-1M.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

Soil Groups	CN VALUES A	B	C	D	RATIONAL C VALUE
Brush (Fair Condition; ground cover 50 - 75%)	35	56	70	77	0.35
Commercial & Business	89	92	94	95	0.70
Developing Urban Area (newly graded, no veg)	77	86	91	94	0.65
Industrial	81	88	91	93	0.80
Meadow	30	58	71	78	0.30
Open Space (Fair Condition; grass cover 50 to 75%)	49	69	79	84	0.35
Open Space (Good Condition; grass cover >75%)	39	61	74	80	0.30
Open Space (Poor Condition; grass cover <50%)	68	79	86	89	0.45
Pasture (Fair Condition; ground cover 50 - 75%)	49	69	79	84	0.45
Residential 1 acre	51	68	79	84	0.45
Residential 1/2 acre	54	70	80	85	0.50
Residential 1/3 acre	57	72	81	86	0.55
Residential 1/4 acre	61	75	83	87	0.60
Residential 1/8 acre	77	85	90	92	0.65
Residential 2 acre	46	65	77	82	0.40
Row Crops (Straight row, good)	67	78	85	89	0.60
Streets & Roads (dirt, including ROW)	72	82	87	89	0.70
Streets & Roads (excluding ROW)	98	98	98	98	0.90
Streets & Roads (gravel, including ROW)	76	85	89	91	0.80
Streets & Roads (paved, including ROW)	83	89	92	93	0.80
Woods (Fair Condition; ground cover 50 - 75%)	36	60	73	79	0.30
Water	98	98	98	98	0.90

Regression Equations in Texas Using an L-moment-Based, PRESS-Minimized, Residual-Approach

Q_T = peak streamflow for T-year recurrence interval in cubic feet per second
P= mean annual precipitation in inches
S= dimensionless main-channel slope
Ω= OmegaEM parameter in figures 2 - 4
A= drainage area in square miles

Regression equation	RSE	Adj. R-squared	AIC statistic	PRESS statistic	Percent change
$Q_2 = P^{1.398} S^{0.270} x\ 10^{[0.776\Omega + 50.98 - 50.30A^{-0.0058}]}$	0.29	0.84	273	64.6	-16.5
$Q_5 = P^{1.308} S^{0.372} x\ 10^{[0.885\Omega + 16.62 - 15.32A^{-0.0215}]}$	0.26	0.88	122	49.1	-24.7
$Q_{10} = P^{1.203} S^{0.403} x\ 10^{[0.918\Omega + 13.62 - 11.97A^{-0.0289}]}$	0.25	0.89	86.5	46.6	-26.8
$Q_{25} = P^{1.140} S^{0.446} x\ 10^{[0.945\Omega + 11.79 - 9.819A^{-0.0374}]}$	0.26	0.89	140	49.5	-26.2
$Q_{50} = P^{1.105} S^{0.476} x\ 10^{[0.961\Omega + 11.17 - 8.997A^{-0.0424}]}$	0.28	0.87	220	55.6	-24.4
$Q_{100} = P^{1.071} S^{0.507} x\ 10^{[0.969\Omega + 10.82 - 8.448A^{-0.0467}]}$	0.30	0.86	320	64.8	-21.7
$Q_{200} = P^{1.034} S^{0.531} x\ 10^{[0.975\Omega + 10.61 - 8.058A^{-0.0504}]}$	0.33	0.84	436	77.2	-19.0
$Q_{250} = P^{1.021} S^{0.541} x\ 10^{[0.977\Omega + 10.56 - 7.943A^{-0.0516}]}$	0.34	0.83	474	81.9	-18.1
$Q_{500} = P^{0.988} S^{0.569} x\ 10^{[0.976\Omega + 10.40 - 7.605A^{-0.0554}]}$	0.37	0.81	591	98.7	-15.6

P=	36	inches
S=	0.008	ft/ft
Ω=	-0.058	
A=	4.629	Sq. Miles

Peak Streamflow (Q) - cubic feet per second

2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	200-Yr	250-Yr	500-Yr
489	**1,002**	**1,388**	**2,005**	**2,540**	**3,183**	**3,891**	**4,157**	**5,033**

Drainage Area ID:	County Name:	Stream Name:
Grassy Brach at Cherry St	Parker	Grassy Branch

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
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PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

CHERRY STREET

HYDROLOGIC DATA

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6	BR 2021(445) ETC		CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	48
APPROVED GHA	CONTROL 0902	SECTION 38	JOB 133, ETC	

131PHYDROTB01.dgn

DA Name	GIS AREA	Soil Group	Land_Use	CN	C	Area acre	A*CN	A*C
Grassy Branch at Pine St	2.52	A	Pasture (Fair Condition; ground cover 50 - 75%)	49	0.45	2.518	123.38	1.13
Grassy Branch at Pine St	15.86	B	Pasture (Fair Condition; ground cover 50 - 75%)	69	0.45	15.858	1094.22	7.14
Grassy Branch at Pine St	18.97	C	Pasture (Fair Condition; ground cover 50 - 75%)	79	0.45	18.965	1498.27	8.53
Grassy Branch at Pine St	16.47	D	Pasture (Fair Condition; ground cover 50 - 75%)	84	0.45	16.473	1383.77	7.41
Grassy Branch at Pine St	4.04	A	Commercial & Business	89	0.7	4.041	359.64	2.83
Grassy Branch at Pine St	13.58	B	Commercial & Business	92	0.7	13.576	1249.04	9.50
Grassy Branch at Pine St	19.36	C	Commercial & Business	94	0.7	19.361	1819.91	13.55
Grassy Branch at Pine St	5.56	D	Commercial & Business	95	0.7	5.559	528.12	3.89
Grassy Branch at Pine St	0.06	A	Pasture (Fair Condition; ground cover 50 - 75%)	49	0.45	0.056	2.74	0.03
Grassy Branch at Pine St	20.39	C	Pasture (Fair Condition; ground cover 50 - 75%)	79	0.45	20.390	1610.78	9.18
Grassy Branch at Pine St	1.39	D	Pasture (Fair Condition; ground cover 50 - 75%)	84	0.45	1.386	116.45	0.62
Grassy Branch at Pine St	4.73	C	Commercial & Business	94	0.7	4.729	444.56	3.31
Grassy Branch at Pine St	10.60	D	Commercial & Business	95	0.7	10.605	1007.46	7.42
Grassy Branch at Pine St	9.66	A	Residential 1/8 acre	77	0.65	9.664	744.12	6.28
Grassy Branch at Pine St	2.71	B	Residential 1/8 acre	85	0.65	2.712	230.56	1.76
Grassy Branch at Pine St	92.07	C	Residential 1/8 acre	90	0.65	92.068	8286.14	59.84
Grassy Branch at Pine St	7.56	D	Residential 1/8 acre	92	0.65	7.560	695.51	4.91
Grassy Branch at Pine St	108.60	A	Pasture (Fair Condition; ground cover 50 - 75%)	49	0.45	108.603	5321.55	48.87
Grassy Branch at Pine St	212.29	B	Pasture (Fair Condition; ground cover 50 - 75%)	69	0.45	212.293	14648.22	95.53
Grassy Branch at Pine St	323.05	C	Pasture (Fair Condition; ground cover 50 - 75%)	79	0.45	323.046	25520.63	145.37
Grassy Branch at Pine St	80.54	D	Pasture (Fair Condition; ground cover 50 - 75%)	84	0.45	80.541	6765.42	36.24
Grassy Branch at Pine St	86.10	A	Residential 1/4 acre	61	0.6	86.100	5252.12	51.66
Grassy Branch at Pine St	101.15	B	Residential 1/4 acre	75	0.6	101.154	7586.55	60.69
Grassy Branch at Pine St	435.68	C	Residential 1/4 acre	83	0.6	435.678	36161.27	261.41
Grassy Branch at Pine St	83.50	D	Residential 1/4 acre	87	0.6	83.498	7264.37	50.10
Grassy Branch at Pine St	14.54	B	Residential 1/4 acre	75	0.6	14.540	1090.49	8.72
Grassy Branch at Pine St	28.35	C	Residential 1/4 acre	83	0.6	28.346	2352.72	17.01
Grassy Branch at Pine St	24.74	D	Residential 1/4 acre	87	0.6	24.745	2152.80	14.85
Grassy Branch at Pine St	4.61	B	Streets & Roads (dirt, including ROW)	82	0.7	4.610	378.01	3.23
Grassy Branch at Pine St	1.99	C	Streets & Roads (dirt, including ROW)	87	0.7	1.992	173.34	1.39
Grassy Branch at Pine St	6.74	D	Streets & Roads (dirt, including ROW)	89	0.7	6.738	599.70	4.72
Grassy Branch at Pine St	8.02	A	Woods (Fair Condition; ground cover 50 - 75%)	36	0.3	8.024	288.87	2.41
Grassy Branch at Pine St	3.85	B	Woods (Fair Condition; ground cover 50 - 75%)	60	0.3	3.850	230.98	1.15
Grassy Branch at Pine St	62.44	C	Woods (Fair Condition; ground cover 50 - 75%)	73	0.3	62.444	4558.40	18.73
Grassy Branch at Pine St	19.13	D	Woods (Fair Condition; ground cover 50 - 75%)	79	0.3	19.127	1511.03	5.74
Grassy Branch at Pine St	149.62	A	Residential 1/4 acre	61	0.6	149.624	9127.06	89.77
Grassy Branch at Pine St	270.54	B	Residential 1/4 acre	75	0.6	270.541	20290.57	162.32
Grassy Branch at Pine St	413.05	C	Residential 1/4 acre	83	0.6	413.047	34282.90	247.83
Grassy Branch at Pine St	272.71	D	Residential 1/4 acre	87	0.6	272.708	23725.60	163.62
	2956.77		WEIGHTED	77.95	0.55	2956.772	230477.26	1638.73

Sheet flow			
	Segment ID	AB	
1. Surface description (table 3-1)		GRASS	
2. Roughness coefficient, n (table 3-1)		0.240	
3. Flow length, L (total L * 100 ft	ft	100	
4. Two-year 24-hour rainfall, P_2	in	3.3	
5. Land slope, s		0.98%	
6. $T_t = 0.007 (nL)^{0.8} / (P_2)^{0.5} s^{0.4}$	hr	0.31	0.31 hr
Shallow concentrated flow			
	Segment ID	BC	
7. Surface description (paved or unpaved)		Unpaved	
8. Flow length, L	ft	639	
9. Watercourse slope, s		3.49%	
10. Average velocity, V (figure 3-1)	ft/s	3.0	
11. $T_t = L / (3600\ V)$	hr	0.06	0.06 hr
Channel flow			
	Segment ID	CD	
12. Cross sectional flow area, a	sf	195.90	
13. Wetted perimeter, p_w	ft	702.30	
14. Hydraulic radius, $r = a / p_w$	ft	0.279	
15. Channel slope, s		0.77%	
16. Manning's roughness coefficient, n		0.035	
17. $V = 1.49\ r^{2/3}\ s^{1/2} / n$	ft/s	1.60	
18. Flow length, L	ft	40230	
19. $T_t = L / (3600\ V)$	hr	6.99	6.99 hr
20. Watershed or subarea T_c or T_t			7.35 hr
			441.24 min

NOTES:

1. OMEGA EM REGRESSION FLOWS WERE USED TO MODEL GRASSY BRANCH DRAINAGE AREA.
2. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3. NOAA ATLAS 14 PRECIPITATION DATA WAS USED FOR THE 24-HR RAINFALL DEPTH.
4. THE DESIGN ANNUAL RECURRENCE INTERVAL OF 2-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR PINE STREET AND THE DESIGN RECURRENCE INTERVAL OF 5-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR CHERRY STREET WAS USED FOR ANALYSIS.
5. BASIN DELINEATION IS BASED ON PARKER COUNTY LIDAR 11-1M.

HAYDEN CONSULTANTS, INC.
F-00640

Soil Groups	CN VALUES				RATIONAL C VALUE
	A	B	C	D	
Brush (Fair Condition; ground cover 50 - 75%)	35	56	70	77	0.35
Commercial & Business	89	92	94	95	0.70
Developing Urban Area (newly graded, no veg)	77	86	91	94	0.65
Industrial	81	88	91	93	0.80
Meadow	30	58	71	78	0.30
Open Space (Fair Condition; grass cover 50 to 75%)	49	69	79	84	0.35
Open Space (Good Condition; grass cover >75%)	39	61	74	80	0.30
Open Space (Poor Condition; grass cover <50%)	68	79	86	89	0.45
Pasture (Fair Condition; ground cover 50 - 75%)	49	69	79	84	0.45
Residential 1 acre	51	68	79	84	0.45
Residential 1/2 acre	54	70	80	85	0.50
Residential 1/3 acre	57	72	81	86	0.55
Residential 1/4 acre	61	75	83	87	0.60
Residential 1/8 acre	77	85	90	92	0.65
Residential 2 acre	46	65	77	82	0.40
Row Crops (Straight row, good)	67	78	85	89	0.60
Streets & Roads (dirt, including ROW)	72	82	87	89	0.70
Streets & Roads (excluding ROW)	98	98	98	98	0.90
Streets & Roads (gravel, including ROW)	76	85	89	91	0.80
Streets & Roads (paved, including ROW)	83	89	92	93	0.80
Woods (Fair Condition; ground cover 50 - 75%)	36	60	73	79	0.30
Water	98	98	98	98	0.90

Regression Equations in Texas Using an L-moment-Based, PRESS-Minimized, Residual-Approach

Q_T = peak streamflow for T-year recurrence interval in cubic feet per second
P = mean annual precipitation in inches
S = dimensionless main-channel slope
Ω = OmegaEM parameter in figures 2 - 4
A = drainage area in square miles

Regression equation	RSE	Adj. R-squared	AIC statistic	PRESS statistic	Percent change
$Q_2 = P^{1.398} S^{0.270} x 10^{[0.776\Omega+50.98-50.30A^{-0.0058}]}$	0.29	0.84	273	64.6	-16.5
$Q_5 = P^{1.308} S^{0.372} x 10^{[0.885\Omega+16.62-15.32A^{-0.0215}]}$	0.26	0.88	122	49.1	-24.7
$Q_{10} = P^{1.203} S^{0.403} x 10^{[0.918\Omega+13.62-11.97A^{-0.0289}]}$	0.25	0.89	86.5	46.6	-26.8
$Q_{25} = P^{1.140} S^{0.446} x 10^{[0.945\Omega+11.79-9.819A^{-0.0374}]}$	0.26	0.89	140	49.5	-26.2
$Q_{50} = P^{1.105} S^{0.476} x 10^{[0.961\Omega+11.17-8.997A^{-0.0424}]}$	0.28	0.87	220	55.6	-24.4
$Q_{100} = P^{1.071} S^{0.507} x 10^{[0.969\Omega+10.82-8.448A^{-0.0467}]}$	0.30	0.86	320	64.8	-21.7
$Q_{200} = P^{1.034} S^{0.531} x 10^{[0.975\Omega+10.61-8.058A^{-0.0504}]}$	0.33	0.84	436	77.2	-19.0
$Q_{250} = P^{1.021} S^{0.541} x 10^{[0.977\Omega+10.56-7.943A^{-0.0516}]}$	0.34	0.83	474	81.9	-18.1
$Q_{500} = P^{0.988} S^{0.569} x 10^{[0.976\Omega+10.40-7.605A^{-0.0554}]}$	0.37	0.81	591	98.7	-15.6

P=	36	inches
S=	0.008	ft/ft
Ω=	-0.058	
A=	4.62	Sq. Miles

Peak Streamflow (Q) - cubic feet per second

2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	200-Yr	250-Yr	500-Yr
489	**1,000**	**1,386**	**2,002**	**2,536**	**3,178**	**3,885**	**4,150**	**5,024**

Drainage Area ID:	County Name:	Stream Name:
Grassy Branch at Pine St	Parker	Grassy Branch

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
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FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

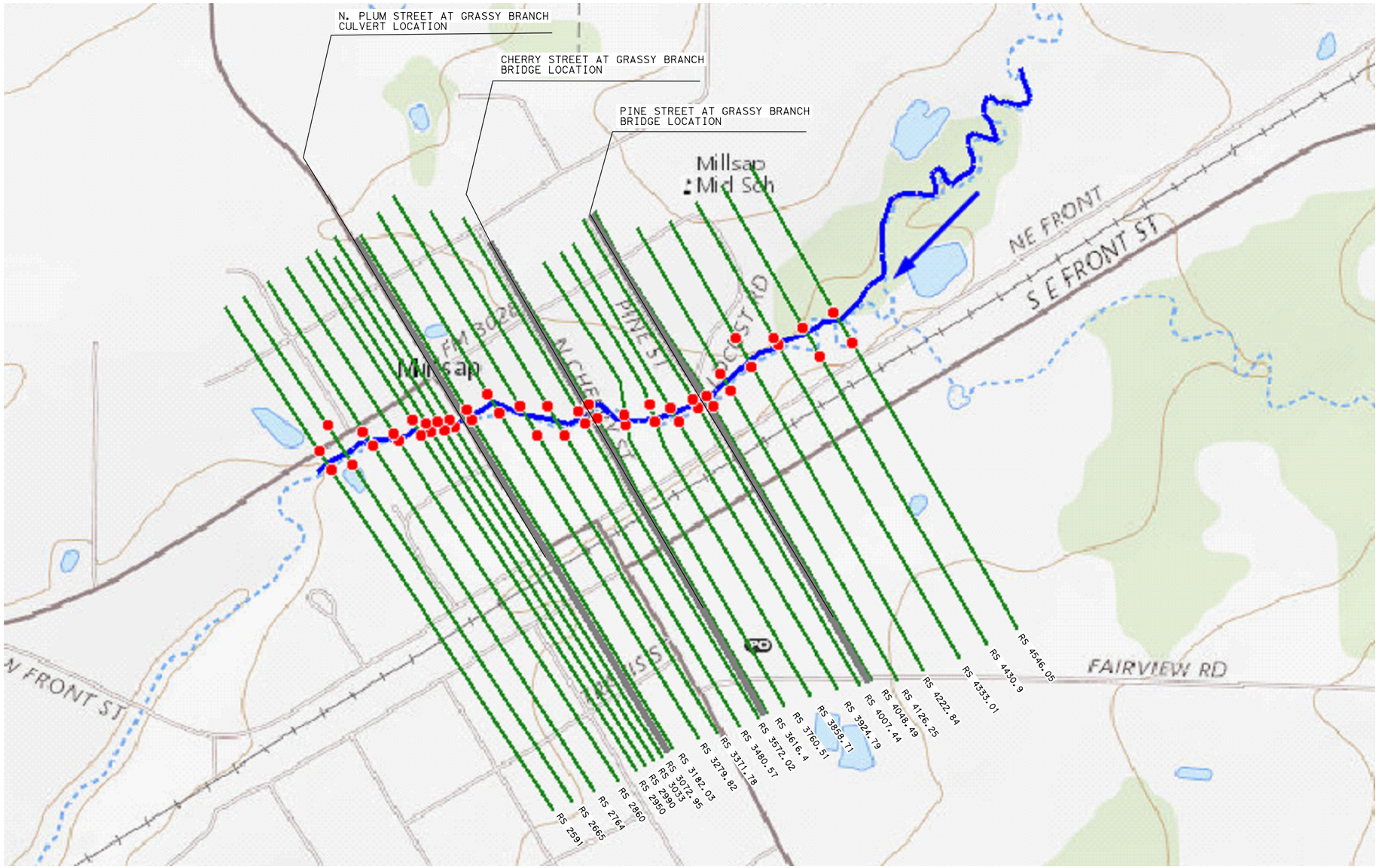
PINE STREET

HYDROLOGIC DATA

SHEET 1 OF 1

DESIGNED GM	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
DRAWN JM	6		BR 2021(445) ETC	CS
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	49
	CONTROL	SECTION	JOB	
APPROVED GHA	0902	38	133, ETC	

USER: gmarshall
DATE: 3/2/2022
SCALE: 1:1
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\SHT\131-PINE\131PHYDROTB01.dgn
TIME: 8:57:45 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl
PLOT DRIVER: TXDOT_PDF_BW.pltcfg



HEC-RAS GEOMETRY CROSS-SECTION LAYOUT

HYDRAULICS NOTES:

1. HEC-RAS VERSION 5.0.7 USED FOR THE ANALYSIS.
2. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3. A COPY OF THIS REPORT AND THE HYDAULIC MODELS WILL BE PROVIDED TO THE LOCAL FLOODLAIN ADMINISTRATION AT THE END OF THE PROJECT, THE LOCAL FPA WAS CONTACTED ON APRIL 9, 2020.
4. THE STARTING WATER SURFACE ELEVATION WAS BASED ON NORMAL DEPTH AND STEADY FLOW WITH A BED SLOPE OF 0.006 FT/FT.
5. NOAA ATLAS 14 PRECIPITAION DATA WAS USED FOR THE 24 HR RAINFALL DEPTH.
6. THE DESIGN ANNUAL RECURRENCE INTERVAL OF 2-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR PINE ST, AND THE DESIGN RECURRENCE INTERVAL OF 10-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR CHERRY ST WAS USED FOR ANALYSIS.
7. FEMA ZONE A MAP # 48367C0350F REVISED DATE APRIL 5, 2018, IN WHICH BASE FLOOD ELEVATIONS HAVE NOT BEEN DETERMINED.

HYDRAULIC DATA:

GRASSY BRANCH AT PINE ST:
Q2= 489 CFS V2= 2.95 FPS HW2= 816.54 FT
Q100= 3178 CFS V100= 6.45 FPS HW100= 820.61 FT

GRASSY BRANCH AT CHERRY ST:
Q10= 1388 CFS V10= 3.94 FPS HW10= 817.27 FT
Q100= 3183 CFS V100= 7.06 FPS HW100= 818.97 FT

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

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FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET & PINE STREET

HYDRAULIC DATA SHEET

SHEET 1 OF 4

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	50
APPROVED GHA	CONTROL	SECTION	JOB	
	0902	38	133, ETC	

USER: gmorgroll
DATE: 3/2/2022
SCALE: 1:1
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TIME: 8:57:49 AM
PENTABLE: CHERRY-PINE_PENTABLE.tbl
PLOT DRIVER: TXDOT_PDF_BW.pltcfg

Hydraulic Analysis												
River Sta	Existing Model						Proposed Model					
	2 YR Design			100 YR Check			2 YR Design			100 YR Check		
	Q Total	Vel Chnl	W.S. Elev	Q Total	Vel Chnl	W.S. Elev	Q Total	Vel Chnl	W.S. Elev	Q Total	Vel Chnl	W.S. Elev
	(cfs)	(ft/s)	(ft)	(cfs)	(ft/s)	(ft)	(cfs)	(ft/s)	(ft)	(cfs)	(ft/s)	(ft)
4546.05	489.00	3.03	819.62	3178.00	3.31	823.31	489.00	3.03	819.62	3178.00	3.42	823.21
4430.9	489.00	2.82	819.30	3178.00	3.47	823.10	489.00	2.82	819.29	3178.00	3.47	823.10
4333.01	489.00	8.78	817.66	3178.00	9.68	822.16	489.00	8.73	817.67	3178.00	9.53	822.19
4222.84	489.00	4.09	817.46	3178.00	4.54	821.76	489.00	4.40	817.31	3178.00	4.55	821.75
4126.25	489.00	5.46	816.78	3178.00	9.04	820.55	489.00	6.62	816.29	3178.00	8.89	820.59
4048.49	489.00	3.05	816.84	3178.00	5.12	820.64	489.00	2.70	816.54	3178.00	5.04	820.61
4025.39	Pine Street Bridge											
4007.44	489.00	3.86	816.47	3178.00	6.85	820.07	489.00	2.95	816.48	3178.00	6.45	820.05
	10 YR Design			100 YR Check			10 YR Design			100 YR Check		
3924.79	1388.00	4.50	818.61	3183.00	7.62	819.46	1388.00	4.82	818.54	3183.00	7.91	819.35
3858.71	1388.00	6.99	817.94	3183.00	7.69	819.23	1388.00	6.92	817.96	3183.00	8.56	819.01
3760.51	1388.00	5.43	817.39	3183.00	5.53	819.18	1388.00	6.25	817.11	3183.00	6.03	818.96
3616.4	1388.00	2.43	817.48	3183.00	3.30	819.18	1388.00	2.59	817.27	3183.00	3.51	818.97
3590.27	Cherry Street Bridge											
3572.02	1388.00	3.94	817.04	3183.00	7.06	817.65	1388.00	3.94	817.04	3183.00	7.06	817.65
3480.57	1388.00	1.90	817.06	3183.00	3.57	817.71	1388.00	1.90	817.06	3183.00	3.57	817.71
3371.78	1388.00	0.87	817.08	3183.00	1.76	817.77	1388.00	0.87	817.08	3183.00	1.76	817.77
3279.82	1388.00	0.92	817.08	3183.00	1.86	817.76	1388.00	0.92	817.08	3183.00	1.86	817.76
3182.03	1388.00	1.11	817.08	3183.00	2.18	817.75	1388.00	1.11	817.08	3183.00	2.18	817.75

Existing Bridge Output

Reach	Bridge	River Sta	Profile	Min El Prs	BR Open Area	Prs O WS	Q Total	Min El Weir Flow	Q Weir	Delta EG	BR Sluice Coef
				(ft)	(sq ft)	(ft)	(cfs)	(ft)	(cfs)	(ft)	
Cherry_Pine	Pine St Bridge	4025.39	2 YR	818.41	132.22		489.00	818.54		0.28	
Cherry_Pine		4025.39	100 YR	818.41	132.22		3178.00	818.54	2421.04	0.39	
Cherry_Pine	Cherry St Bridge	3590.27	10 YR	817.90	299.26		1388.00	816.83		0.32	
Cherry_Pine		3590.27	100 YR	817.90	299.26		3183.00	816.83		1.10	

Proposed Bridge Output

Reach	Bridge	River Sta	Profile	Min El Prs	BR Open Area	Prs O WS	Q Total	Min El Weir Flow	Q Weir	Delta EG	BR Sluice Coef
				(ft)	(sq ft)	(ft)	(cfs)	(ft)	(cfs)	(ft)	
Cherry_Pine	Pine St Bridge	4025.39	2 YR	817.91	214.17		1386.00	818.84	121.83	0.39	
Cherry_Pine		4025.39	100 YR	817.91	214.17		3178.00	818.84	1949.57	0.40	
Cherry_Pine	Cherry St Bridge	3590.27	10 YR	817.23	331.10		1388.00	816.78		0.12	
Cherry_Pine		3590.27	100 YR	817.23	331.10		3183.00	816.78		0.91	

Bridge X-ing	RI	Proposed Free board (ft)
4025.39	2-yr	1.37
	100-yr	-2.70
3590.27	10-yr	-0.45
	100-yr	-2.15

HYDRAULICS NOTES:

1. HEC-RAS VERSION 5.0.7 USED FOR THE ANALYSIS.
2. ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3. A COPY OF THIS REPORT AND THE HYDAULIC MODELS WILL BE PROVIDED TO THE LOCAL FLOODLAIN ADMINISTRATION AT THE END OF THE PROJECT, THE LOCAL FPA WAS CONTACTED ON APRIL 9, 2020.
4. THE STARTING WATER SURFACE ELEVATION WAS BASED ON NORMAL DEPTH AND STEADY FLOW WITH A BED SLOPE OF 0.006 FT/FT.
5. NOAA ATLAS 14 PRECIPITAION DATA WAS USED FOR THE 24 HR RAINFALL DEPTH.
6. THE DESIGN ANNUAL RECURRENCE INTERVAL OF 2-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR PINE ST, AND THE DESIGN RECURRENCE INTERVAL OF 10-YR EVENT WITH A CHECK FLOOD OF 100-YR FOR CHERRY ST WAS USED FOR ANALYSIS.
7. FEMA ZONE A MAP # 48367C0350F REVISED DATE APRIL 5, 2018, IN WHICH BASE FLOOD ELEVATIONS HAVE NOT BEEN DETERMINED.

HYDRAULIC DATA:

GRASSY BRANCH AT PINE ST:

Q2= 489 CFS	V2= 2.95 FPS	HW2= 816.54 FT
Q100= 3178 CFS	V100= 6.45 FPS	HW100= 820.61 FT

GRASSY BRANCH AT CHERRY ST:

Q10= 1388 CFS	V10= 3.94 FPS	HW10= 817.27 FT
Q100= 3183 CFS	V100= 7.06 FPS	HW100= 818.97 FT

HAYDEN CONSULTANTS, INC.
F-00640

REV	DATE	BY	DESCRIPTION

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FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

CHERRY STREET & PINE STREET

HYDRAULIC DATA SHEET

SHEET 2 OF 4

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN JM	STATE / DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX / FT WORTH	PARKER	51
APPROVED GHA	CONTROL / SECTION: 0902 / 38	JOB: 133, ETC	

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SCALE: 1:1
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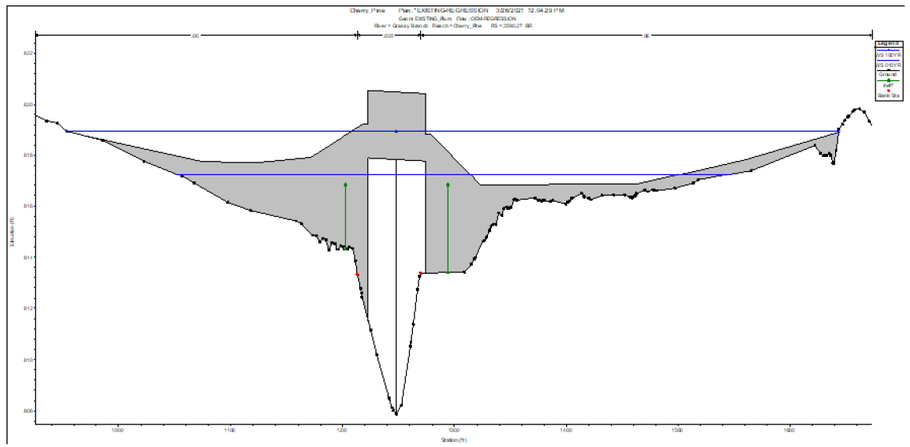
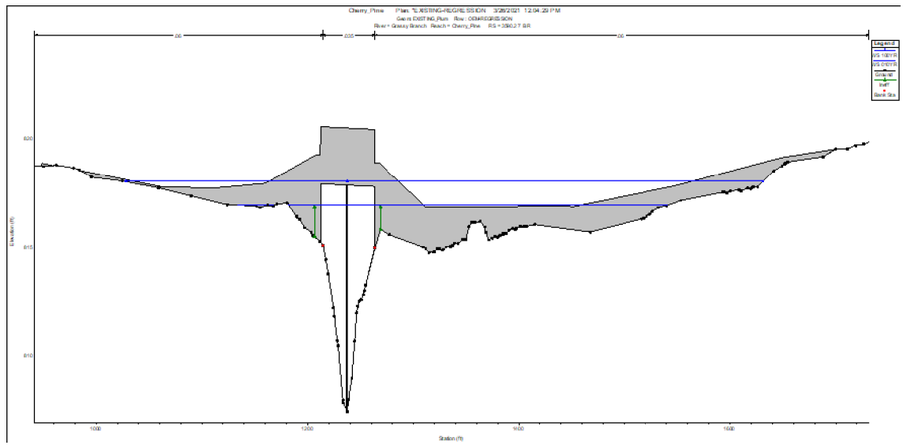
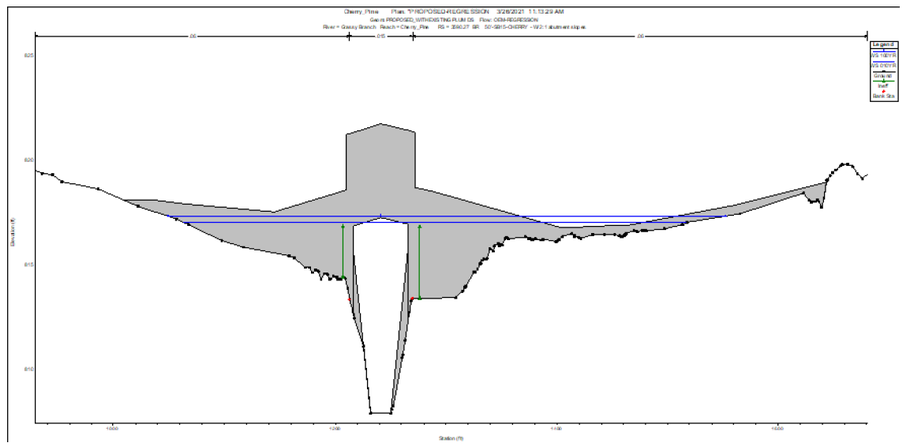


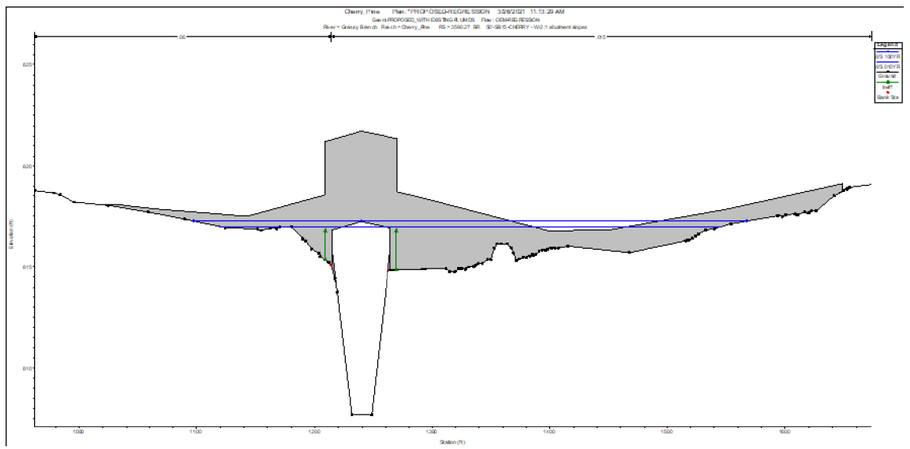
EXISTING BRIDGE - UPSTREAM



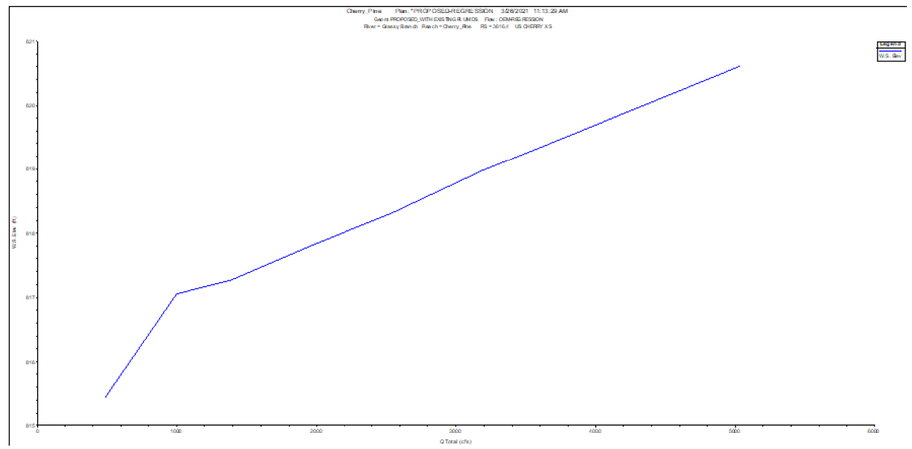
EXISTING BRIDGE - DOWNSTREAM



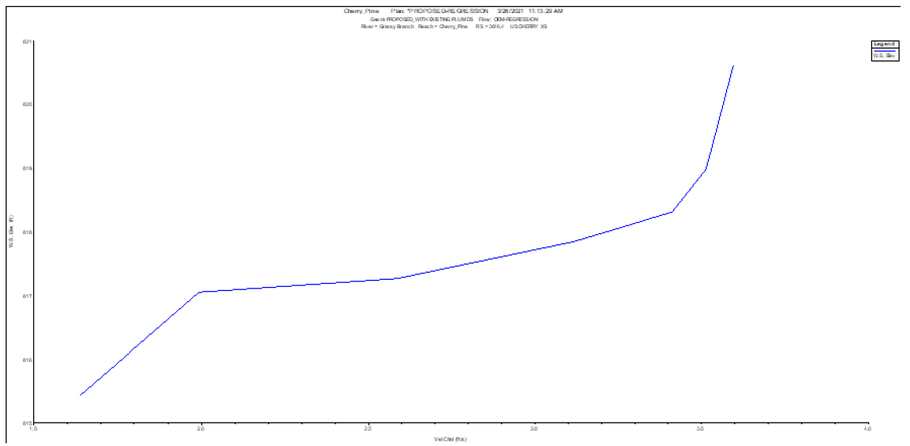
PROPOSED BRIDGE - UPSTREAM



PROPOSED BRIDGE - DOWNSTREAM



PROPOSED BRIDGE - CONVEYANCE CURVE



PROPOSED BRIDGE - VELOCITY CURVE

HYDRAULICS NOTES:

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HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

CHERRY STREET

HYDRAULIC DATA SHEET

SHEET 3 OF 4

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	52
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorgroll
DATE: 3/2/2022
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PENTABLE: CHERRY-PINE_PENTABLE.tbl
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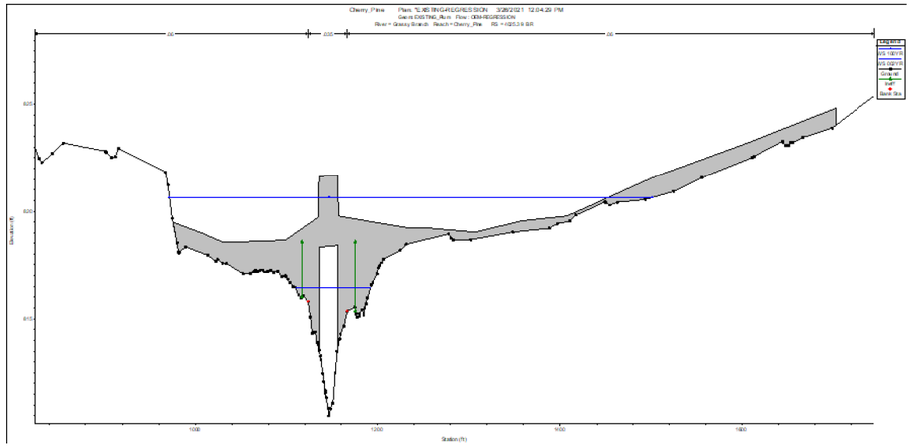

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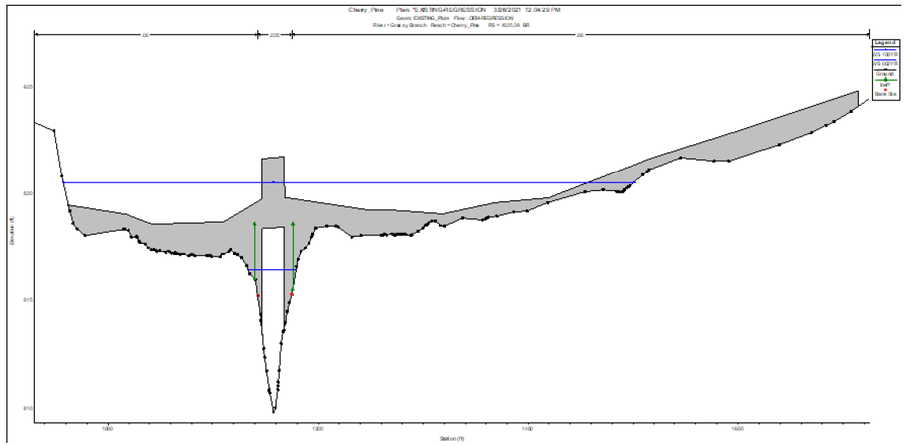

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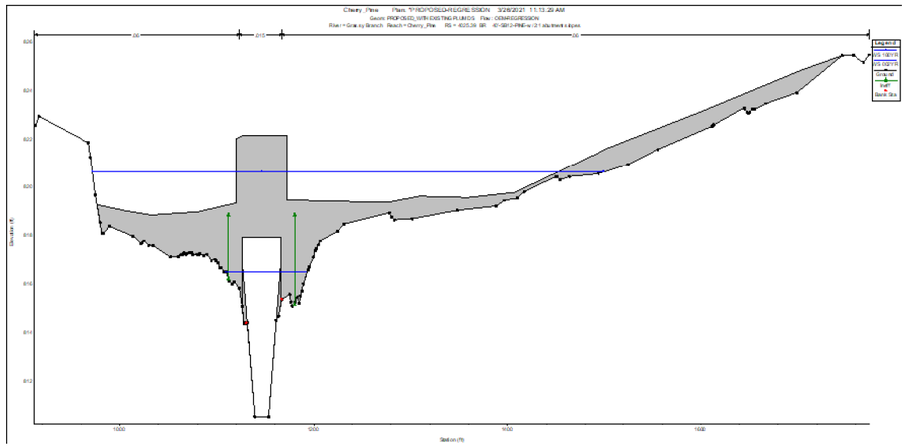
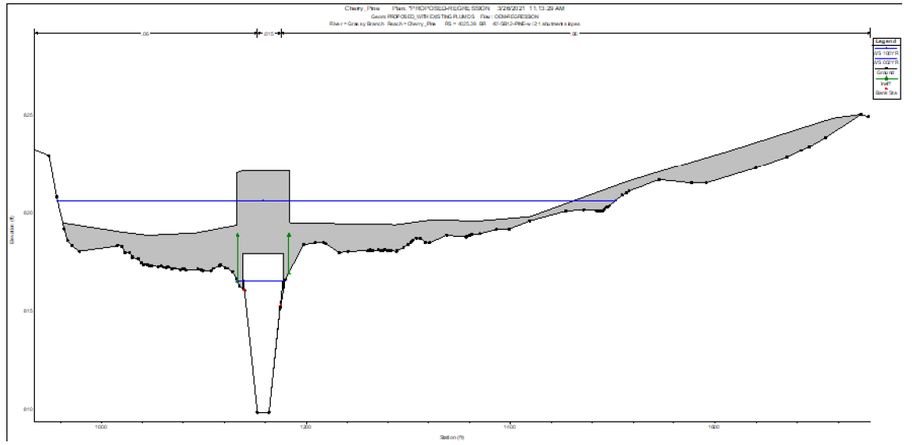


PROPOSED BRIDGE - UPSTREAM



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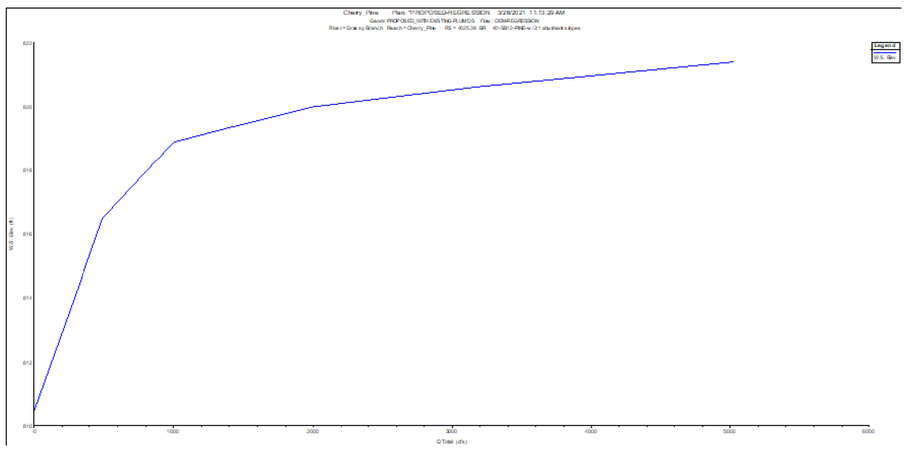
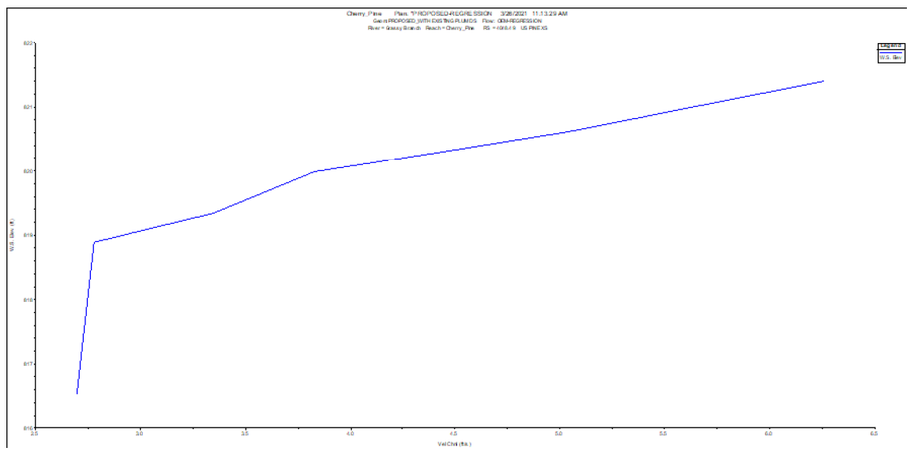


PROPOSED BRIDGE - CONVEYANCE CURVE



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Q100= 3183 CFS V100= 7.06 FPS HW100= 818.97 FT

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3/1/2022

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Texas Department of Transportation®

PINE STREET

HYDRAULIC DATA SHEET

SHEET 4 OF 4

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	53
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

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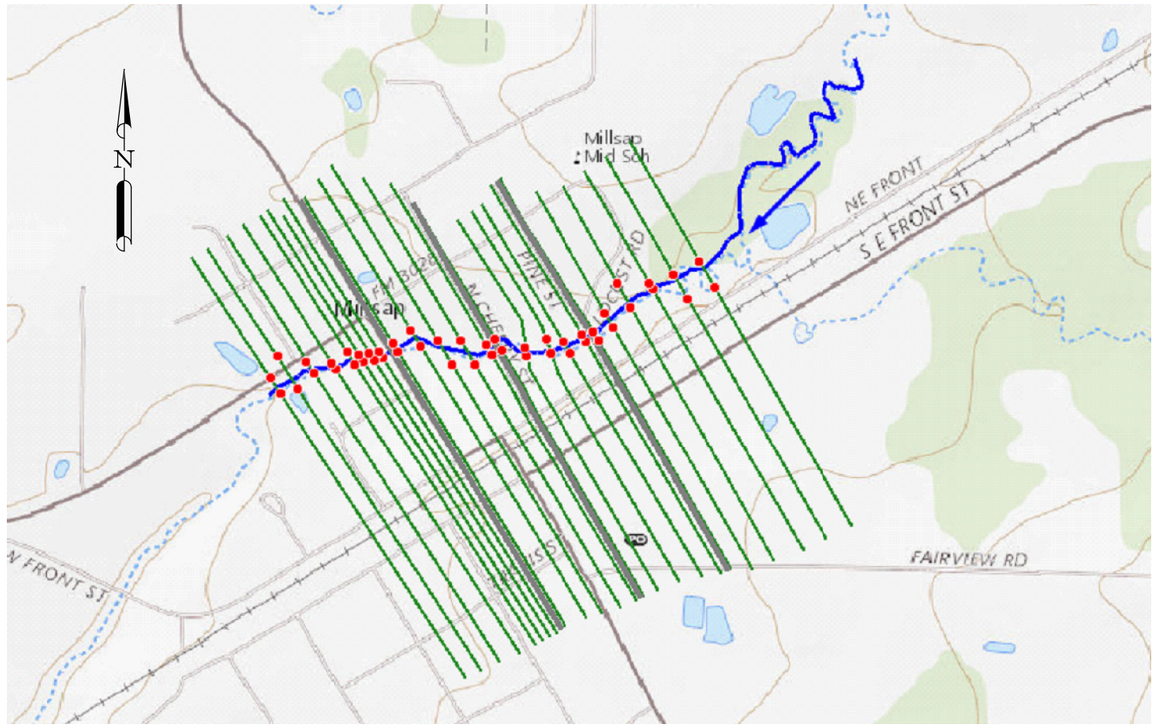
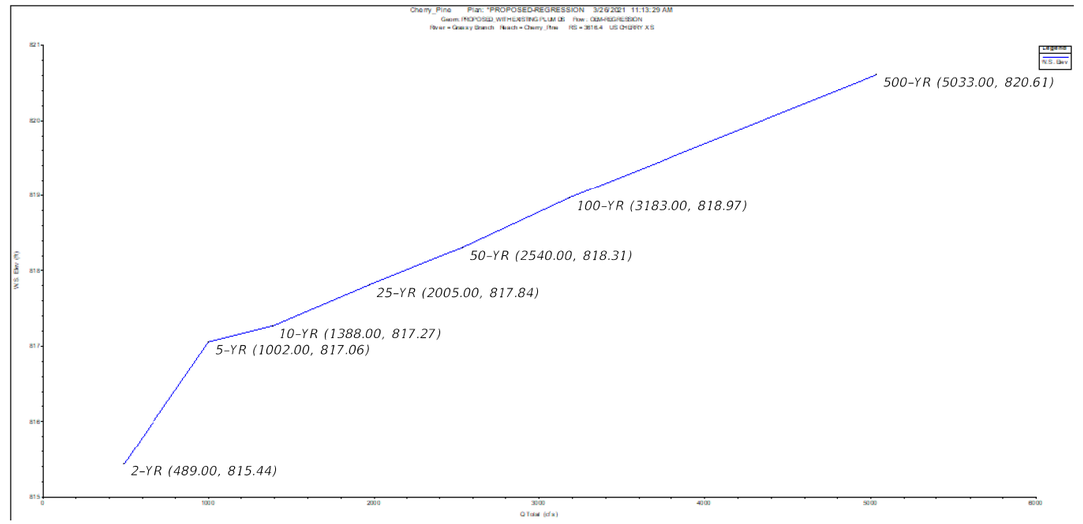




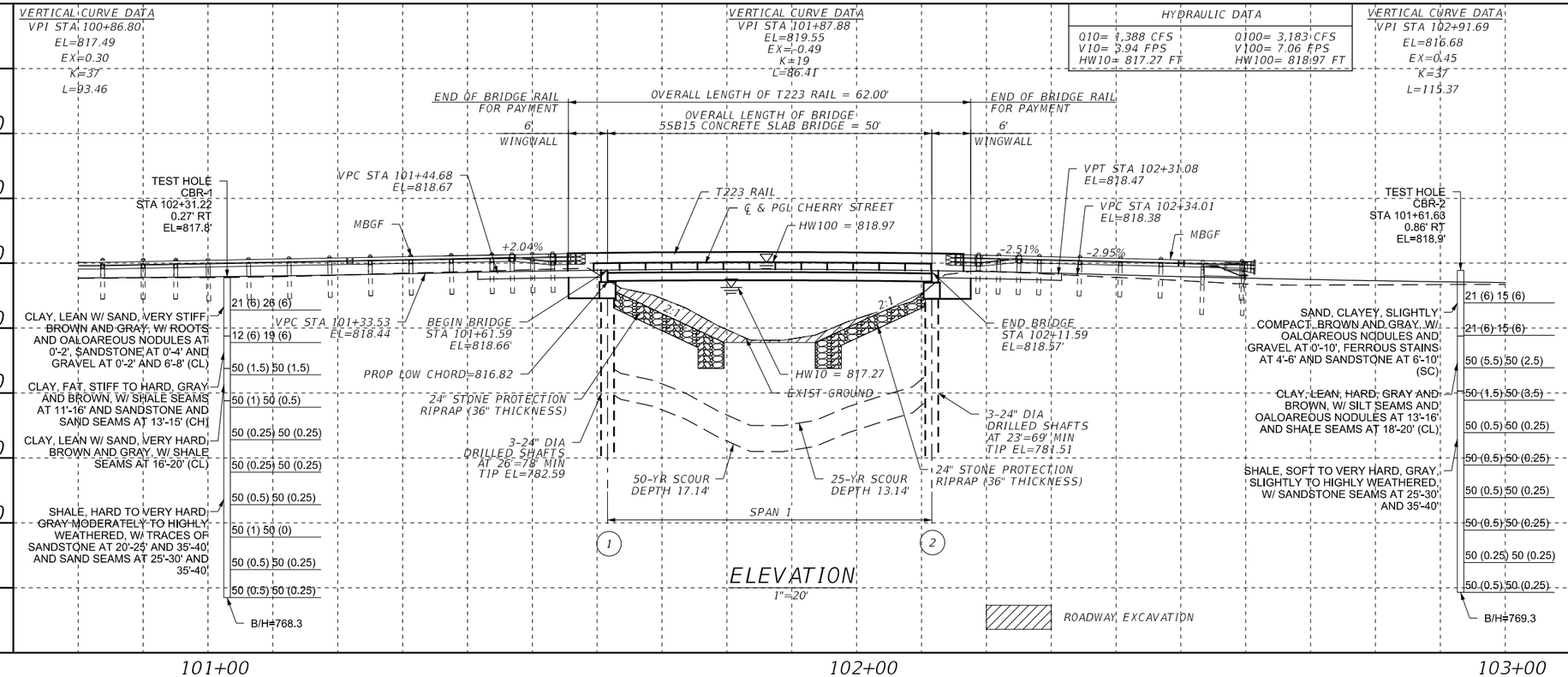
25-YR CONTRACTION SCOUR DEPTH:	12.07'
25-YR PRESSURE SCOUR DEPTH:	1.07'
25-YR TOTAL SCOUR DEPTH:	13.14'

50-YR CONTRACTION SCOUR DEPTH:	15.99'
50-YR PRESSURE SCOUR DEPTH:	1.15'
50-YR TOTAL SCOUR DEPTH:	17.14'

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

GENERAL NOTES:

1. EXIST NBI NO.: 02-184-0-Y000-70-001
PROP NBI NO.:



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DATE: 3/22/2022
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CHERRY STREET AT GRASSY BRANCH CREEK SCOUR LAYOUT

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

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	54
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED			
GHA			

	SCOUR DESIGN FLOOD					
	Upstream Approach River Station 3760.51			Contracted Section at Bridge River Station 3616.4		
	Left Overbank	Main Channel	Right Overbank	Left Overbank	Main Channel	Right
A (sq. ft.)	140.91	189.38	304.37	366.85	428.21	572.90
WP (ft.)	126.52	43.85	227.25	194.31	57.83	323.69
n (-)	0.06	0.04	0.06	0.06	0.04	0.06
Q (cfs)	219.61	1248.94	535.45	268.10	1334.16	402.73
V (ft./sec.)	1.56	6.60	1.76	0.47	3.12	0.70
y (ft.)	1.11	4.53	1.34	1.89	7.57	1.77
W (ft.)	126.50	41.80	227.22	194.07	56.60	323.46
WSEL (ft.)	817.74			817.84		
V_{avg} (ft./sec.)	3.16			1.47		

SUMMARY OF RETURN PERIODS	
HYDRAULIC DESIGN FLOOD	10-YR
SCOUR DESIGN FLOOD	25-YR
SCOUR DESIGN CHECK FLOOD	50-YR

SCOUR ANALYSIS METHOD:

BRIDGE SCOUR ANALYSIS WAS PERFORMED IN ACCORDANCE WITH THE METHOLOGIES AND PROCEDURES OUTLINED IN THE TXDOT HYDRAULIC MANUAL, TXDOT GEOTECHNICAL MANUAL, AND FHWA HEC-18.

HYDRAULIC DATA OBTAINED USING HEC-RAD (V.5.0.7)

PER THE TXDOT GEOTECHNICAL MANUAL, ABUTMENT SCOUR WAS NOT CALCUALTED.

PER THE TXDOT GEOTECHNICAL MANUAL, CHANNELS IN COHESIVE MATERIALS (SUCH AS CLAY) WILL HAVE THE D50 VALUE LIMITED TO 0.2 MM (0.0007 FT). A 0.5 REDUCTION FACTOR WAS APPLIED TO THE COMPUTED PIER SCOUR DUE TO THE PRESENCE OF 11% OR MORE CLAY IN THE SOIL.

	SCOUR DESIGN CHECK FLOOD					
	Upstream Approach River Station 3760.51			Contracted Section at Bridge River Station 3616.4		
	Left Overbank	Main Channel	Right Overbank	Left Overbank	Main Channel	Right Overbank
A (sq. ft.)	213.53	210.95	432.61	462.11	454.59	733.82
WP (ft.)	155.06	43.85	267.08	214.95	57.83	366.21
n (-)	0.06	0.04	0.06	0.06	0.04	0.06
Q (cfs)	354.91	1383.90	801.19	387.57	1151.17	601.27
V (ft./sec.)	1.66	6.56	1.85	0.84	3.41	0.82
y (ft.)	1.38	5.05	1.62	2.15	8.03	2.01
W (ft.)	155.04	41.80	267.04	214.70	56.60	365.89
WSEL (ft.)	818.25			818.31		
V_{avg} (ft./sec.)	2.96			1.54		

	SUMMARY OF CALCULATED SCOUR DEPTHS (ft.)							
	SCOUR DESIGN FLOOD				SCOUR DESIGN CHECK FLOOD			
	Contraction Scour	Pressure Scour	Pier Scour	Total Scour	Contraction Scour	Pressure Scour	Pier Scour	Total Scour
LOB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Channel	12.07	1.07	0.00	13.14	15.99	1.15	0.00	17.14
ROB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOIL DATA SUMMARY TABLE	
CHANNEL BED MATERIAL DESCRIPTION	CL, LEAN CLAY
D50 VALUE*	0.002 MM
BASIS OF CHANNEL BED MATERIAL DESCRIPTION	OBTAINED VIA LABORATORY TESTS
PRESENCE OF NON-ERODIBLE STRATA	NONE

*A MINIMUM D50 OF 0.2 MM WAS USED FOR ANALYSIS.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET AT GRASSY BRANCH CREEK BRIDGE SCOUR DATA

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	55
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorstoll
DATE: 3/2/2022
SCALE: 1:20
FILE: Z:\Projects\1195 TxDOT-Dir Of 36-61DFS-ODN\1195-ODN\SHT\133-CHERRY\133CSCRTB01.dgn
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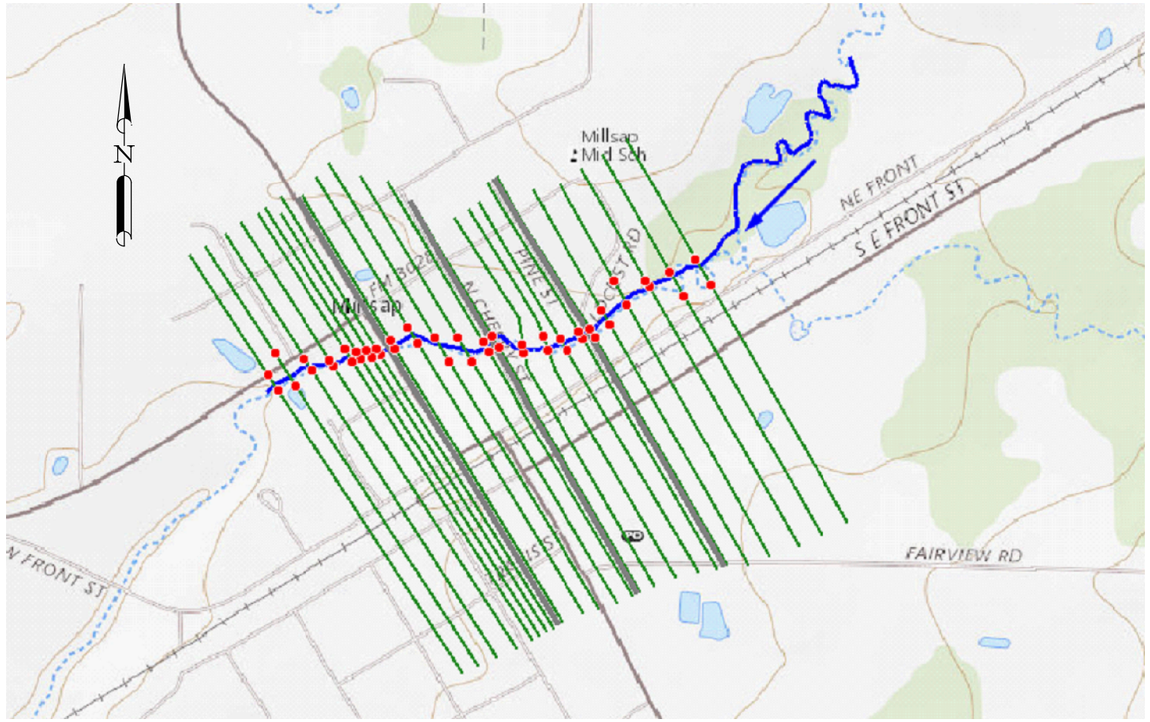
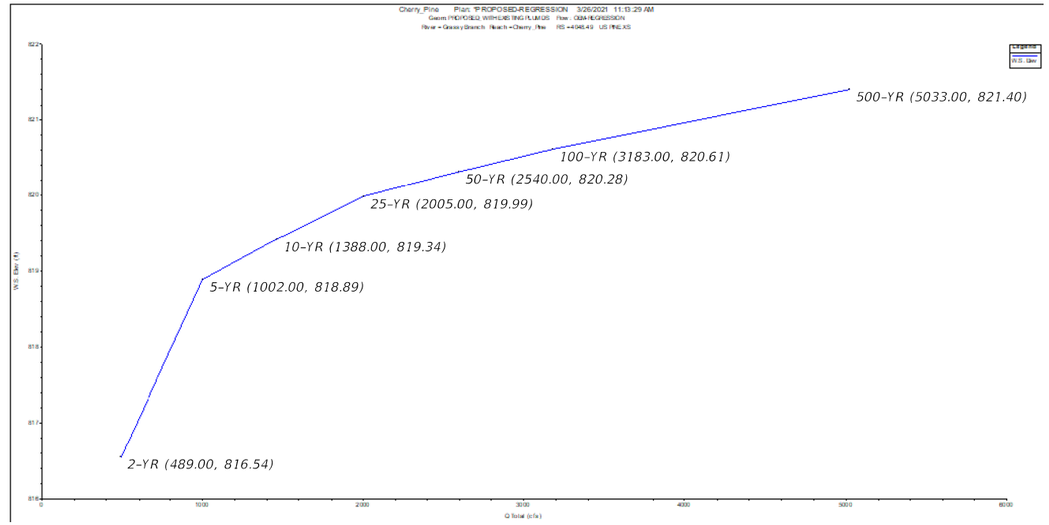
PENTABLE: CHERRY-PINE-PENTABLE.tbl
PLOT DRIVER: TXDOT_PDF_BW.pltcfg

131PSCRPL01.dgn



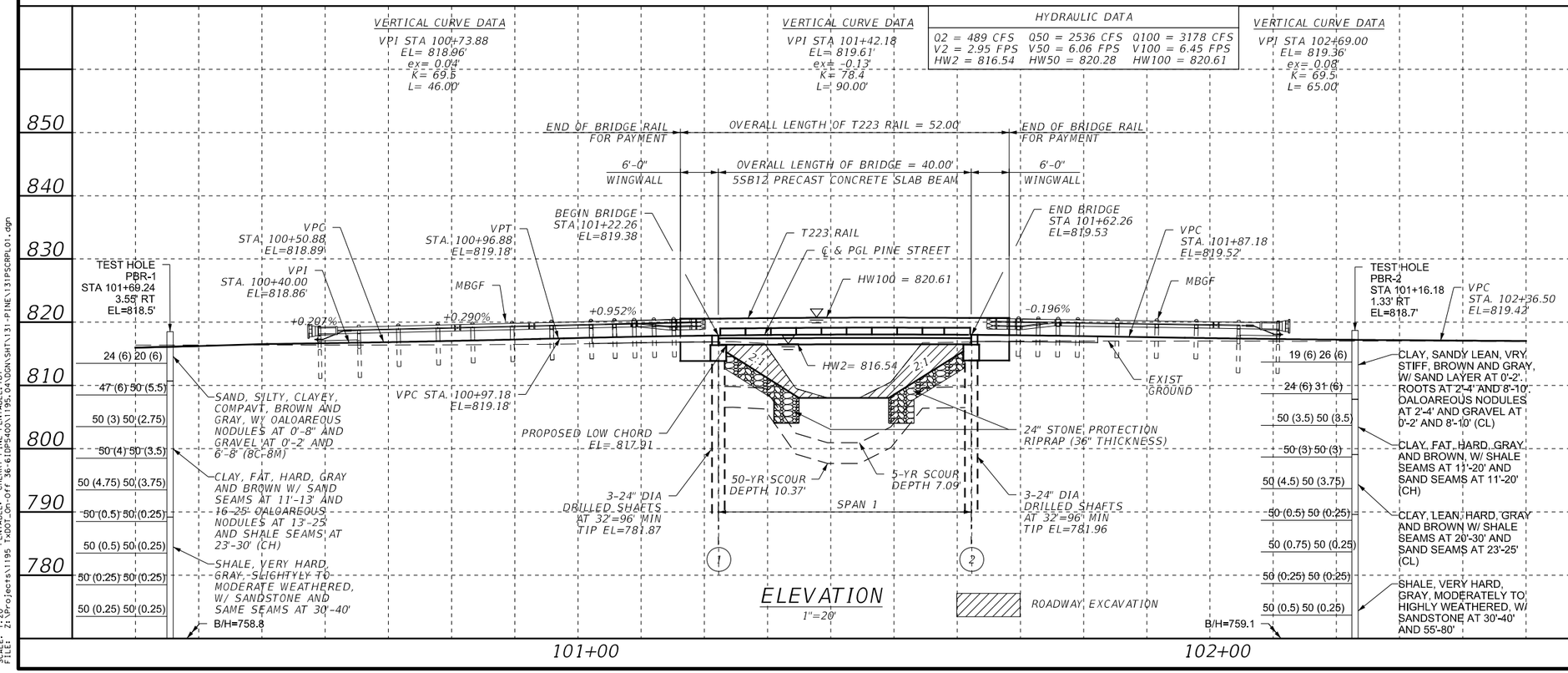


5-YR CONTRACTION SCOUR DEPTH:	7.16'
5-YR PRESSURE SCOUR DEPTH:	0.74'
5-YR TOTAL SCOUR DEPTH:	7.09'
50-YR CONTRACTION SCOUR DEPTH:	9.02'
50-YR PRESSURE SCOUR DEPTH:	1.35'
50-YR TOTAL SCOUR DEPTH:	10.37'

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

GENERAL NOTES:

1. EXIST NBI NO.: 02-184-0-Y003-50-001
PROP NBI NO.:



ELEVATION
1"=20'

HAYDEN CONSULTANTS, INC.
F-00640
STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET AT GRASSY BRANCH SCOUR LAYOUT

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

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	56
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED			
GHA			

USER: gmorstoll
DATE: 3/2/2022
SCALE: 1:20
FILE: Z:\Projects\195 TxDOT-Ofc 36-61DPS-DOT\195.04\DGN\SHT\131-PINEY\13PSCRPL01.dgn
PLOT DRIVER: TXDOT_PDF_BW.pltcfg
TIME: 8:58:29 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl

	SCOUR DESIGN FLOOD					
	Upstream Approach River Station 4126.25			Contracted Section at Bridge River Station 4048.49		
	Left Overbank	Main Channel	Right Overbank	Left Overbank	Main Channel	Right
A (sq. ft.)	-	173.17	-	220.38	278.46	149.86
WP (ft.)	-	60.56	-	145.15	45.77	159.52
n (-)	-	0.04	-	0.06	0.04	0.06
Q (cfs)	-	1000.00	-	141.68	774.20	84.12
V (ft./sec.)	-	2.77	-	0.64	2.78	0.56
y (ft.)	-	2.98	-	1.52	6.37	0.94
W (ft.)	-	58.05	-	144.96	43.70	159.21
WSEL (ft.)	818.67			818.89		
V_{avg} (ft./sec.)	5.77			1.54		

	SUMMARY OF CALCULATED SCOUR DEPTHS (ft.)							
	SCOUR DESIGN FLOOD				SCOUR DESIGN CHECK FLOOD			
	Contraction Scour	Pressure Scour	Pier Scour	Total Scour	Contraction Scour	Pressure Scour	Pier Scour	Total Scour
LOB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Channel	7.16	0.74	0.00	7.90	9.02	1.35	0.00	10.37
ROB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOIL DATA SUMMARY TABLE	
CHANNEL BED MATERIAL DESCRIPTION	CH, FAT CLAY
D50 VALUE*	0.0026 MM
BASIS OF CHANNEL BED MATERIAL DESCRIPTION	OBTAINED VIA LABORATORY TESTS
PRESENCE OF NON-ERODIBLE STRATA	NONE

*A MINIMUM D50 OF 0.2 MM WAS USED FOR ANALYSIS.

SUMMARY OF RETURN PERIODS	
HYDRAULIC DESIGN FLOOD	2-YR
SCOUR DESIGN FLOOD	5-YR
SCOUR DESIGN CHECK FLOOD	50-YR

SCOUR ANALYSIS METHOD:

BRIDGE SCOUR ANALYSIS WAS PERFORMED IN ACCORDANCE WITH THE METHOLOGIES AND PROCEDURES OUTLINED IN THE TXDOT HYDRAULIC MANUAL, TXDOT GEOTECHNICAL MANUAL, AND FHWA HEC-18.

HYDRAULIC DATA OBTAINED USING HEC-RAD (V.5.0.7)

PER THE TXDOT GEOTECHNICAL MANUAL, ABUTMENT SCOUR WAS NOT CALCUALTED.

PER THE TXDOT GEOTECHNICAL MANUAL, CHANNELS IN COHESIVE MATERIALS (SUCH AS CLAY) WILL HAVE THE D50 VALUE LIMITED TO 0.2 MM (0.0007 FT). A 0.5 REDUCTION FACTOR WAS APPLIED TO THE COMPUTED PIER SCOUR DUE TO THE PRESENCE OF 11% OR MORE CLAY IN THE SOIL.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

PINE STREET AT GRASSY BRANCH BRIDGE SCOUR DATA

SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	57
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorshoi
DATE: 3/2/2022
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3/2/2022 8:58:36 AM
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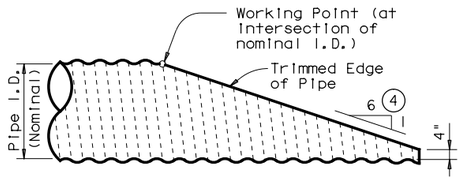
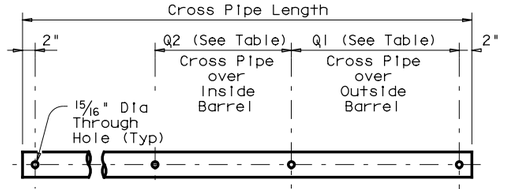


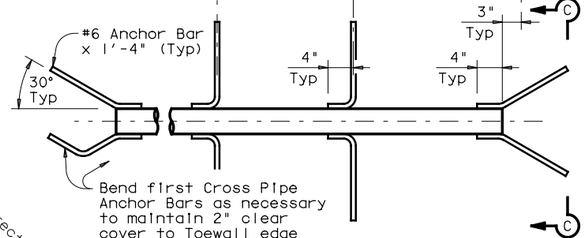
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

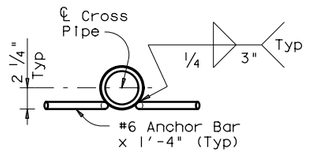
(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)



PIPE W/ BOLTED ANCHOR

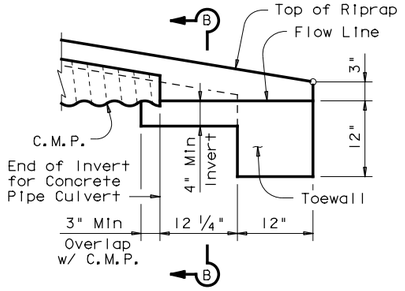


PIPE W/ ANCHOR BARS



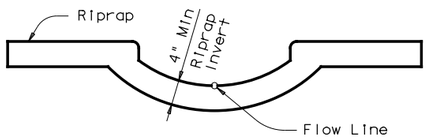
SECTION C-C

CROSS PIPE DETAILS



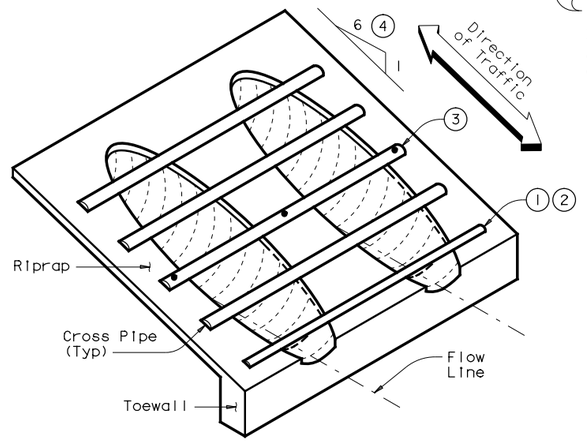
DETAIL "A"

(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)



SECTION B-B

(Cross Pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES (2)							
Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'- 1"	1'- 9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'- 5"	2'- 2"		
18"	0.8	1'- 2"	N/A	2'-10"	2'- 8"		
21"	0.9	1'- 4"	N/A	3'- 2"	3'- 1"		
24"	0.9	1'- 7"	N/A	3'- 6"	3'- 7"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'- 2"	4'- 5"	4'- 8"	All Pipe Culverts	
36"	1.3	2'- 1"	4'- 5"	4'- 9"	5'- 1"	All Pipe Culverts	4" Std (4.500" O.D.)
42"	1.5	2'- 4"	4'-11"	5'- 5"	5'-10"		
48"	1.7	2'- 7"	5'- 5"	6'- 0"	6'- 7"	All Pipe Culverts	5" Std (5.563" O.D.)
54"	2.0	3'- 0"	5'-11"	6'- 9"	7'- 6"		
60"	2.2	3'- 3"	6'- 5"	7'- 4"	8'- 3"		
66"	2.4	3'- 3"	6'-11"	7'-10"	8'- 9"		
72"	2.7	3'- 4"	7'- 5"	8'- 5"	9'- 4"		

(1) The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.

(2) Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).

(3) The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.

(4) Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

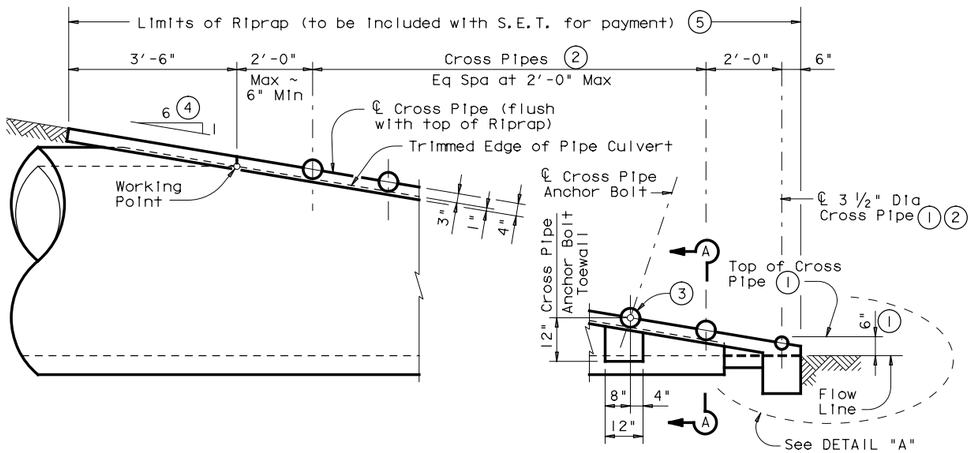
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

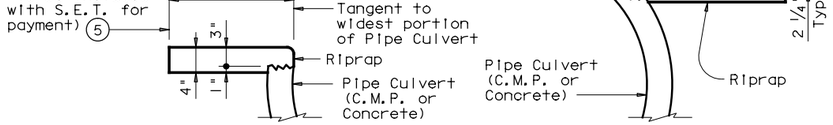
Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



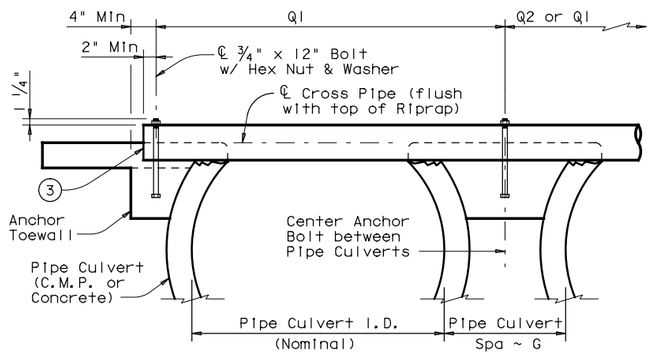
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



SHOWING TYPICAL PIPE CULVERT & RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
	FTW	PARKER		58

SUMMARY OF BRIDGES

New PSN	Layout Sheet No	Description	Station		Length	0400-6005	0416-6002	0420-6014	0422-6002	0422-6016	0425-6010	0425-6012	0432-6035	0450-6007	0454-6004	0496-6009
						Cem Stabil Bkfl	Drill Shaft (24 In)	CL "C" Conc (Abut) (HPC)	Reinf Conc Slab (HPC)	Approach Slab (HPC)	Prestr Conc Slab Beam (5SB12)	Prestr Conc Slab Beam (5SB15)	Riprap (Stone Protection) (24 In)	Rail (Ty T223) (HPC)	Armor Joint (Sealed)	Remov Str (Bridge 0-99 Ft Length)
			Begin	End	LF	CY	LF	CY	SF	CY	LF	LF	CY	LF	LF	EA
002		Cherry Street @ Grassy Branch Creek	101+61.59	102+11.59	50.00	27.8	147	18.4	1300	38.5	~	247.5	558	124.0	52	1
002		Pine Street @ Grassy Branch Creek	101+22.26	101+62.26	40.00	33.4	192	17.6	1040	38.5	197.5	~	411	104.0	52	1
TOTALS						61.2	339	36.0	2340	77.0	197.5	247.5	969	228.0	104	2

DESCRIPTIONS:

AJ (Armor Joint with Seal)
BAS-A (Bridge Approach Slab)(ACP)
CSAB (FTW)(Cement Stabilized Abutment Backfill)
FD (Common Foundation Details)
PBSBRA (Rail Anchorage Details Prestr Slab Beam)
PSB-5SB15 (PrestrConc Slab Beam Details) (Type 5SB15)
PSBEB (Elastomeric Bearing & Beam End Details) (Prestr Conc Slab Beam)
PSBSD (Prest Conc Beam Designs) (Ty 5B12 or 5B15)
SRR (Stone Riprap)
T223 (Traffic Rail)

HL93 LOADING

SHEET 1 OF 1

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs

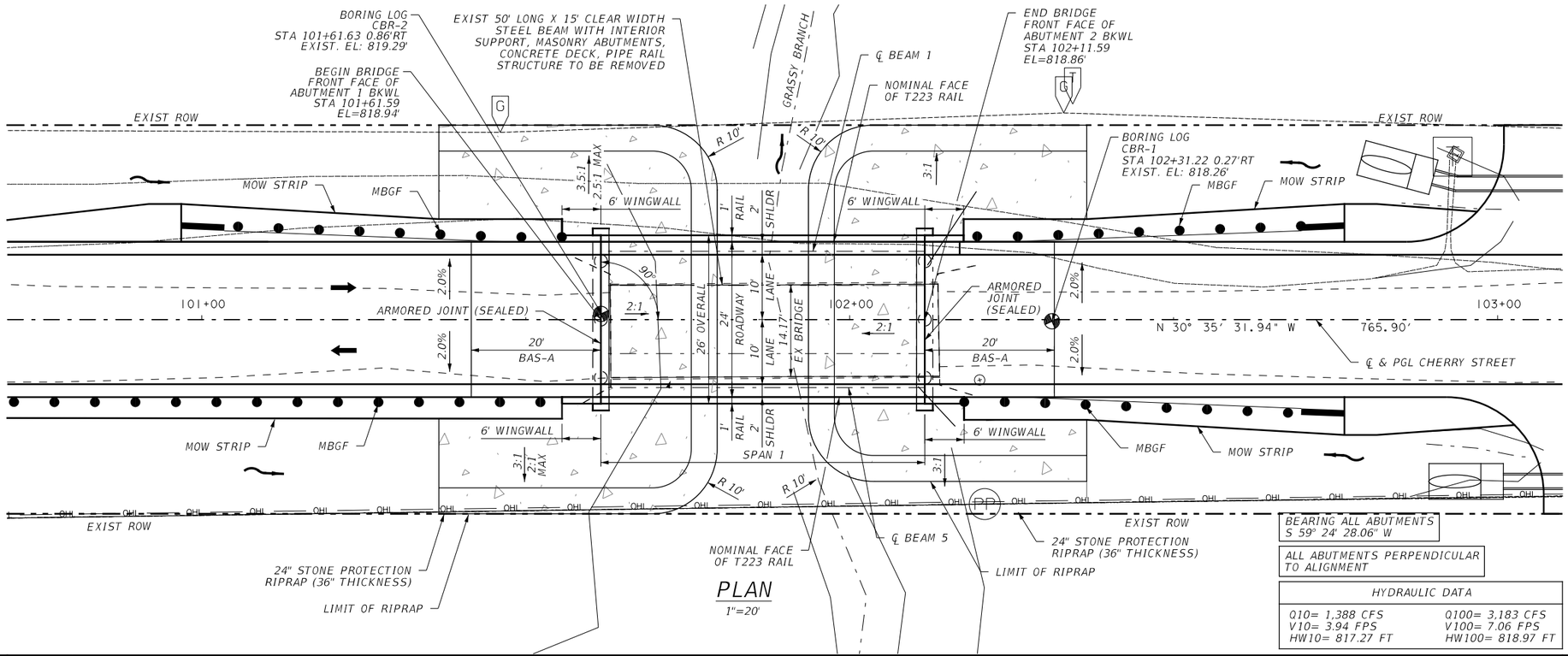
Texas Department of Transportation

Fort Worth Bridge Design

SUMMARY OF BRIDGES

DN: CHD	CK: AV	DW: GC/CHD	CK: AV/CHD		
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0902	38	133, ETC	CS	
	DIST	COUNTY		SHEET NO.	
	02	PARKER		59	

133CBRGPP01.dgn



PLAN
1"=20'

BEARING ALL ABUTMENTS
S 59° 24' 28.06" W

ALL ABUTMENTS PERPENDICULAR TO ALIGNMENT

HYDRAULIC DATA	
Q10= 1,388 CFS	Q100= 3,183 CFS
V10= 3.94 FPS	V100= 7.06 FPS
HW10= 817.27 FT	HW100= 818.97 FT

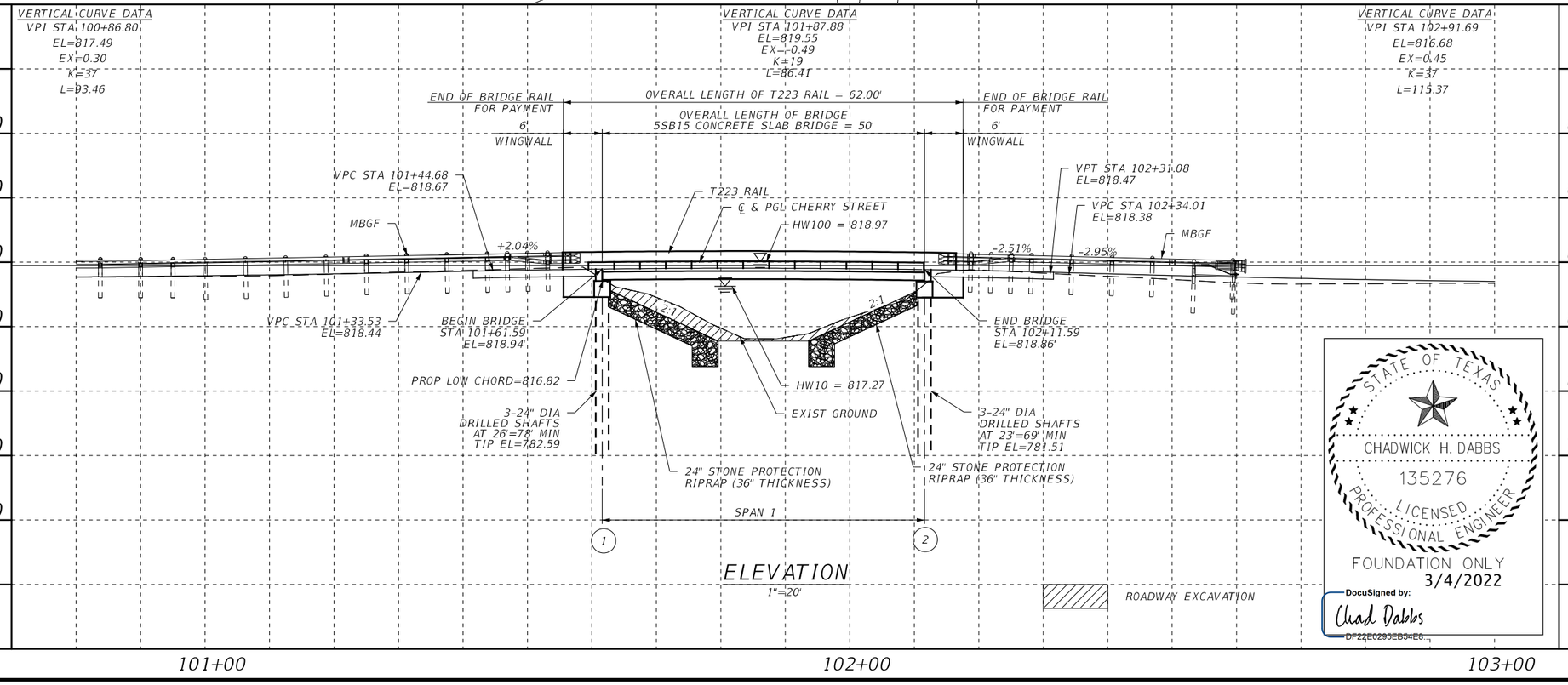
DESIGN SPEED = 30 MPH
FUNCTION CLASS = LOCAL RURAL TWO LANE
ADT (2018) = 85
ADT (2038) = 125

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

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LFRD SPECIFICATIONS AND INTERIM REVISIONS THERETO FOR HL93 LOADING, 8TH EDITION (2017).
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL STRUCTURES AND UTILITIES PRIOR TO ORDERING MATERIALS AND NOTIFY ENGINEERS IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
3. SEE BRIDGE TYPICAL SECTION SHEET FOR ADDITIONAL INFORMATION.
4. SAWCUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.
5. RIPRAP SLOPES SHOWN ARE A MAXIMUM. CONTRACTOR SHALL FIELD VERIFY.
6. SEE CSAB (FTW) STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
7. SEE SPSB STANDARD FOR TYPE A JOINT DETAILS.

EXIST NBI NO.: 02-184-0-Y000-70-001
PROP NBI NO.: 02-184-0-Y000-70-002



ELEVATION
1"=20'

ROADWAY EXCAVATION

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED PROFESSIONAL ENGINEER
3/3/2022

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED PROFESSIONAL ENGINEER
FOUNDATION ONLY
3/4/2022
DocuSigned by:
Chad Dabbs
DF22E0295EB54E8...

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET AT GRASSY BRANCH CREEK BRIDGE LAYOUT

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

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	60
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: jmurphy
DATE: 3/3/2022
SCALE: 1:20
FILE: Z:\Projects\195 TxDOT\30-61DPS-DOL\195.04\DGN\SHT\133-CHERRY\133CBRGPP01.dgn
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DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	CBR-1	District	Fort Worth
Highway	Cherry Street	Structure	Bridge	Date	7/14/20
CSJ	0902-38-133	Station	102+31.22	Grnd. Elev.	818.26 ft
		Offset	0.27' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
817.8			PAVEMENT, 5in. Asphalt							
			CLAY, Lean w/ Sand, very stiff, brown and gray, w/ roots and calcareous nodules at 0'-2', sandstones at 0'-4' and gravel at 0'-2' and 6'-8' (CL)			5				
						8	32	15		% Passing #200 Sieve: 70.8
5		21 (6) 26 (6)								
						8				
808.8										
10		16 (6) 19 (6)	CLAY, Fat, stiff to hard, gray and brown, w/ shale seams at 11'-15' and sandstone and sand seams at 13'-15' (CH)							
				0	79.9	14	61	34	142	% Passing #200 Sieve: 92.6
803.8										
15		50 (1.5) 50 (1.5)	CLAY, Lean w/ Sand, very hard, brown and gray, w/ shale seams at 16'-20' (CL)							
						9				
						6	31	15		% Passing #200 Sieve: 74.6
798.8										
20		50 (1) 50 (0.5)	SHALE, hard to very hard, gray, moderately to highly weathered, w/ traces of sandstone at 20'-25' and 35'-40' and sand seams at 25'-30' and 35'-40'							
										RUN=60in., REC=86%, RQD=56%
25		50 (0.25) 50 (0.25)								

Remarks: Rock coring was initiated at 20'; still dry at 20'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger: George** **Organization: HVJ Associates, Inc.**

C:\Users\jhohman\Desktop\Wincore Cherry Street.clg

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	CBR-1	District	Fort Worth
Highway	Cherry Street	Structure	Bridge	Date	7/14/20
CSJ	0902-38-133	Station	102+31.22	Grnd. Elev.	818.26 ft
		Offset	0.27' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
			SHALE, hard to very hard, gray, moderately to highly weathered, w/ traces of sandstone at 20'-25' and 35'-40' and sand seams at 25'-30' and 35'-40'			5				
										RUN=60in., REC=95%, RQD=49%
30		50 (0.25) 50 (0.25)								
										RUN=60in., REC=95%, RQD=30%
35		50 (0.5) 50 (0.25)								
						6				RUN=60in., REC=94%, RQD=70%
40		50 (1) 50 (0)								
										RUN=60in., REC=95%, RQD=77%
45		50 (0.5) 50 (0.25)								
				0	863.2	6			156	RUN=60in., REC=89%, RQD=30%
768.3		50 (0.5) 50 (0.25)								

Remarks: Rock coring was initiated at 20'; still dry at 20'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger: George** **Organization: HVJ Associates, Inc.**

C:\Users\jhohman\Desktop\Wincore Cherry Street.clg

HAYDEN CONSULTANTS, INC.
F-00640
STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
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PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

BORING LOG CBR-1
CHERRY STREET
GRASSY CREEK

SHEET 1 OF 2

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	61
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorphol
DATE: 3/2/2022
SCALE: 1:20
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DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	CBR-2	District	Fort Worth
Highway	Cherry Street	Structure	Bridge	Date	7/14/20
CSJ	0902-38-133	Station	101+61.63	Grnd. Elev.	819.29 ft
		Offset	0.86' RT	GW Elev.	N/A

Elev. (ft)	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
818.9		PAVEMENT, 5in. Asphalt							
		SAND, Clayey, slightly compact, brown and gray, w/ calcareous nodules and gravel at 0'-10', ferrous stains at 4'-5' and sandstone at 6'-10' (SC)			6				
5	21 (6) 15 (6)				46	32	40		% Passing #200 Sieve: 45.1
			0	45.1	18			129	
10	21 (6) 15 (6)								
808.8		CLAY, Lean, hard, gray and brown, w/ silt seams and calcareous nodules at 13'-15' and shale seams at 18'-20' (CL)							
					17	30	16		% Passing #200 Sieve: 91.9
15	50 (5.5) 50 (2.5)								
800.3		SHALE, soft to very hard, gray, slightly to highly weathered, w/ sandstone seams at 25'-30' and 35'-40'							
20	50 (1.5) 50 (3.5)								
					5				RUN=60in., REC=75%, RQD=23%
25	50 (0.5) 50 (0.25)								

Remarks: Rock coring was initiated at 20'; still dry at 20'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon Logger: George Organization: HVJ Associates, Inc.

C:\Users\jhohman\Desktop\Wincore Cherry Street.clg

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	CBR-2	District	Fort Worth
Highway	Cherry Street	Structure	Bridge	Date	7/14/20
CSJ	0902-38-133	Station	101+61.63	Grnd. Elev.	819.29 ft
		Offset	0.86' RT	GW Elev.	N/A

Elev. (ft)	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
		SHALE, soft to very hard, gray, slightly to highly weathered, w/ sandstone seams at 25'-30' and 35'-40'							
					5				RUN=60in., REC=90%, RQD=71%
30	50 (0.5) 50 (0.25)								
			0	2371.5	7			148	RUN=60in., REC=95%, RQD=85%
35	50 (0.5) 50 (0.25)								
									RUN=60in., REC=91%, RQD=74%
40	50 (0.5) 50 (0.25)								
			0	1158.4	6			150	RUN=60in., REC=97%, RQD=48%
45	50 (0.25) 50 (0.25)								
									RUN=60in., REC=93%, RQD=29%
769.3 50	50 (0.5) 50 (0.25)								

Remarks: Rock coring was initiated at 20'; still dry at 20'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon Logger: George Organization: HVJ Associates, Inc.

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HAYDEN CONSULTANTS, INC.
F-00640

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
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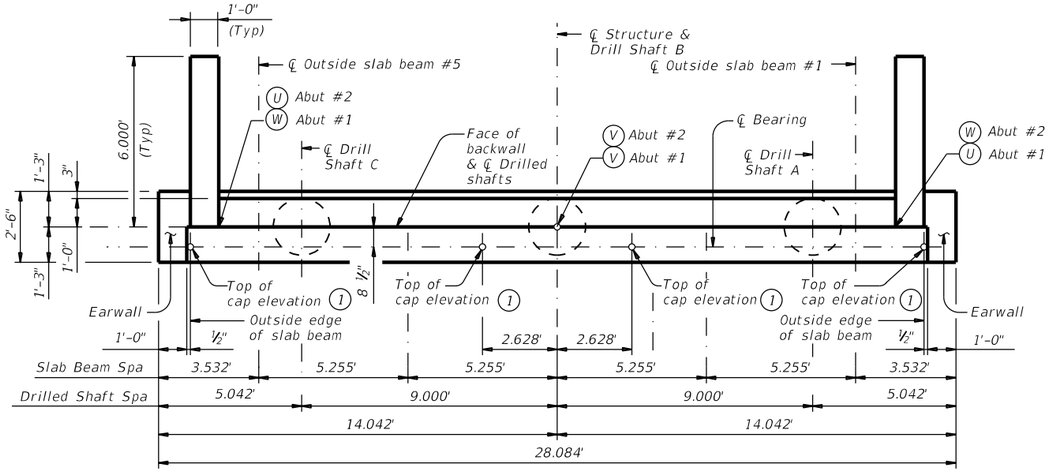
Texas Department of Transportation®

BORING LOG CBR-2
CHERRY STREET
GRASSY CREEK

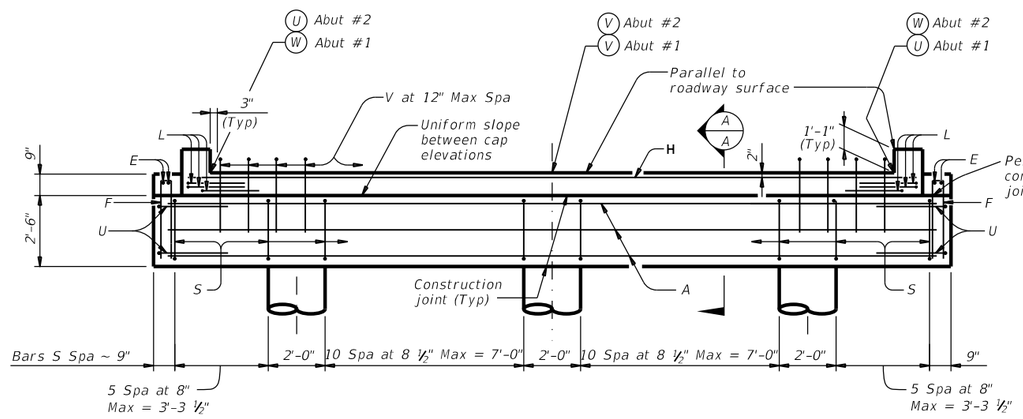
SHEET 2 OF 2

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6	BR 2021(445) ETC		CS
DRAWN JM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX	FT WORTH	PARKER	62
APPROVED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	



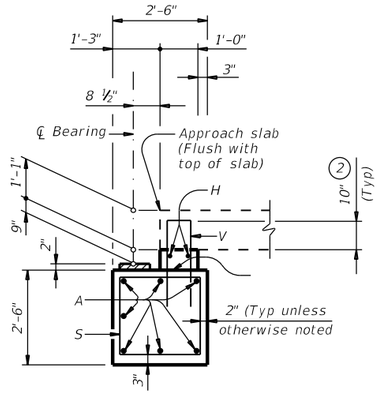
PLAN

(Showing Abutment #1; Abutment #2 symmetrical by opposite hand.)



ELEVATION ~ DRILLED SHAFT ABUTMENT

(Showing Abutment #1; Abutment #2 symmetrical by opposite hand.)



SECTION A-A (3)

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

TABLE OF ESTIMATED QUANTITIES (4)

Bar	No.	Size	Length 5SB15	Weight 5SB15
A	7	#11	27'-1"	1006
E	4	#4	2'-2"	6
F	10	#4	6'-4"	43
H	2	#5	25'-8"	54
L	6	#6	4'-0"	36
S	34	#5	9'-4"	331
U	4	#6	7'-1"	43
V	25	#5	7'-10"	204
wH1	8	#6	5'-8"	68
wH2	8	#6	6'-11"	83
wU	12	#4	1'-8"	14
wV	28	#5	4'-1"	119
Reinforcing Steel			Lb	2,007
Cl "C" Conc (Abut)			CY	9.2

TABLE OF ELEVATIONS

	TOP OF DS		
	A	B	C
Abut #1	814.259	814.439	814.259
Abut #2	814.178	814.358	814.178
	BOTTOM OF DS (AS BUILT)		
	A	B	C
Abut #1			
Abut #2			
	TOP OF BACKWALL		
	U	V	W
Abut #1	817.616	817.856	817.616
Abut #2	817.535	817.775	817.535

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

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

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

(4) Quantities shown are for one abutment only (with approach slab).

(5) 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.

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 Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.

See applicable rail details for rail anchorage in wingwalls.

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

SHEET 1 OF 2

STATE OF TEXAS
CHADWICK H. DABBS
135276
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PROFESSIONAL ENGINEER

3/8/2022

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Chad Dabbs
BF22E0293EB04E8...

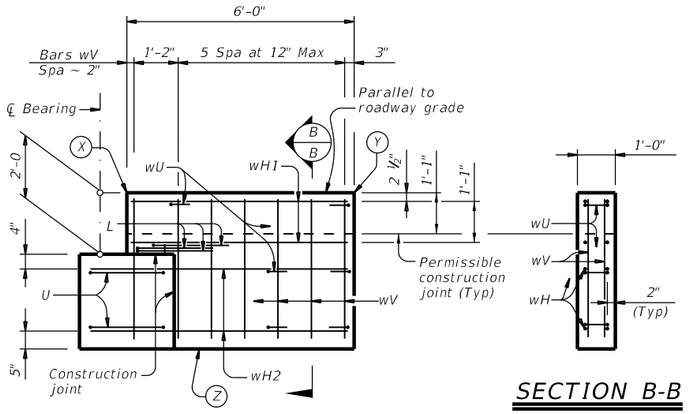
Texas Department of Transportation

Fort Worth Bridge Design

ABUTMENTS #1 & #2
PRESTR CONCRETE SLAB BEAM

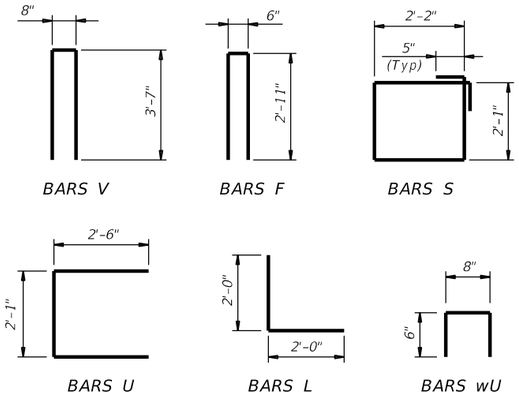
CHERRY STREET AT GRASSY BRANCH CREEK

	DN: JV	CK: AV	DW: KM/AV	CK: AV/JV
©TxDOT 03-07-22 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		63

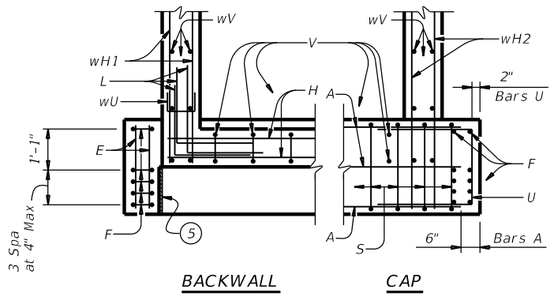


WINGWALL ELEVATION

SECTION B-B



WINGWALL ELEVATIONS				
	ABUTMENT #1		ABUTMENT #2	
POINT	LEFT WING	RIGHT WING	LEFT WING	RIGHT WING
X	818.699	818.699	818.618	818.618
Y	818.621	818.621	818.520	818.520
Z	814.199	814.199	814.118	814.118



BACKWALL CAP

CORNER DETAILS

(5) 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)

For Abutments 1 & 2:
Maximum Calculated Footing Load = 87.0 Tons/Shaft
Point Bearing based on Penetration test of 1½"/100 blows
Point Bearing @ 31.0 Tons/SF = 97.0 Tons/Shaft
No skin friction needed
Total Load Resistance = 97.0 Tons/Shaft

HL93 LOADING

STATE OF TEXAS
CHADWICK H. DABBS
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Texas Department of Transportation

Fort Worth Bridge Design

ABUTMENTS #1 & #2

PRESTR CONCRETE SLAB BEAM

CHERRY STREET AT GRASSY BRANCH CREEK

	DN: JV	CK: AV	DW: KM/JV	CK: AV/JV
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		64

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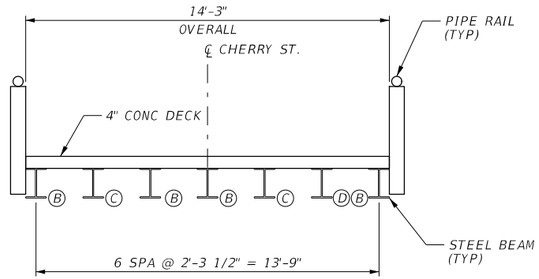
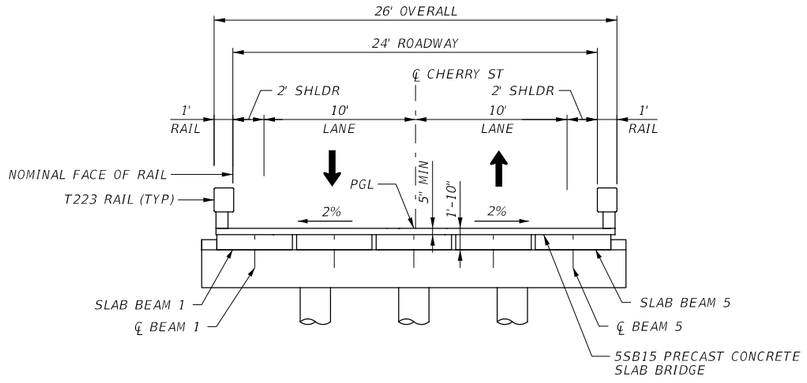


TYPICAL SECTION LOOKING NORTH

CHERRY STREET - EXISTING TRAVERSE BRIDGE SECTION

N.T.S.



CHERRY STREET - PROPOSED TRANSVERSE BRIDGE SECTION

STA 101+61.59 TO STA 102+11.59
N.T.S.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
REGISTERED
PROFESSIONAL ENGINEER

3/1/2022

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CHERRY STREET

TRANSVERSE BRIDGE SECTION

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

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	65
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmarshall
DATE: 3/2/2022
SCALE: 1:10
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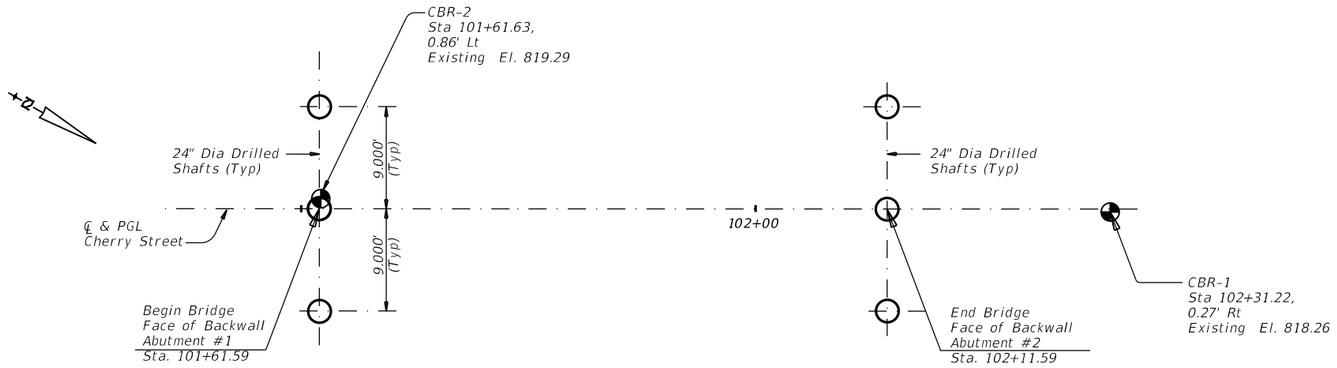
ESTIMATED QUANTITIES

DESCRIPTIONS	0400-6005 Cem Stabil Bkfl	0416-6002 Drill Shaft (24 In)	0420-6014 CL "C" Conc (Abut) (HPC)	0422-6002 Reinf Conc Slab (HPC)	0422-6016 Approach Slab (HPC)	0425-6012 Prestr Conc Slab Beam (5SB15)	0432-6035 Riprap (Stone Protection) (24 In)	0450-6007 Rail (Ty T223) (HPC)	0454-6004 Armor Joint (Sealed)	0496-6009 Remov Str (Bridge 0-99 Ft Length
	CY	LF	CY	SF	CY	LF	CY	LF	LF	EA
2 ~ Abutments	27.8	147.0	18.4	1300	~	~	~	24.0	~	~
1 ~ 50.00' Prestr Concrete Slab Beam Span	~	~	~		38.5	247.5	~	100.0	52.0	1
TOTALS		147.0	18.4	1300	38.5	247.5	558	124.0	52.0	1



FOUNDATION LAYOUT

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 8th Edition (2017).

See Common Foundation Details (FD) standard sheet for all foundation details and notes not shown.

See Abutment Details for top of Drilled Shaft Elevations. Top of shafts shown are to be used as basis of measurement. Lengths shown on layout are minimum lengths.

Drilled shafts are designed for point bearing into shale a minimum of 6.0' and shall be founded at the elevations shown or deeper.

MATERIAL NOTES:

Provide Class "C" Concrete (f'c = 3600 psi).
Provide Grade 60 reinforcing steel.

HL93 LOADING

SHEET 1 OF 1

STATE OF TEXAS
CHADWICK H. DABBS
135276
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PROFESSIONAL ENGINEER

3/8/2022

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Chad Dabbs
DF22E0295EB54E8...

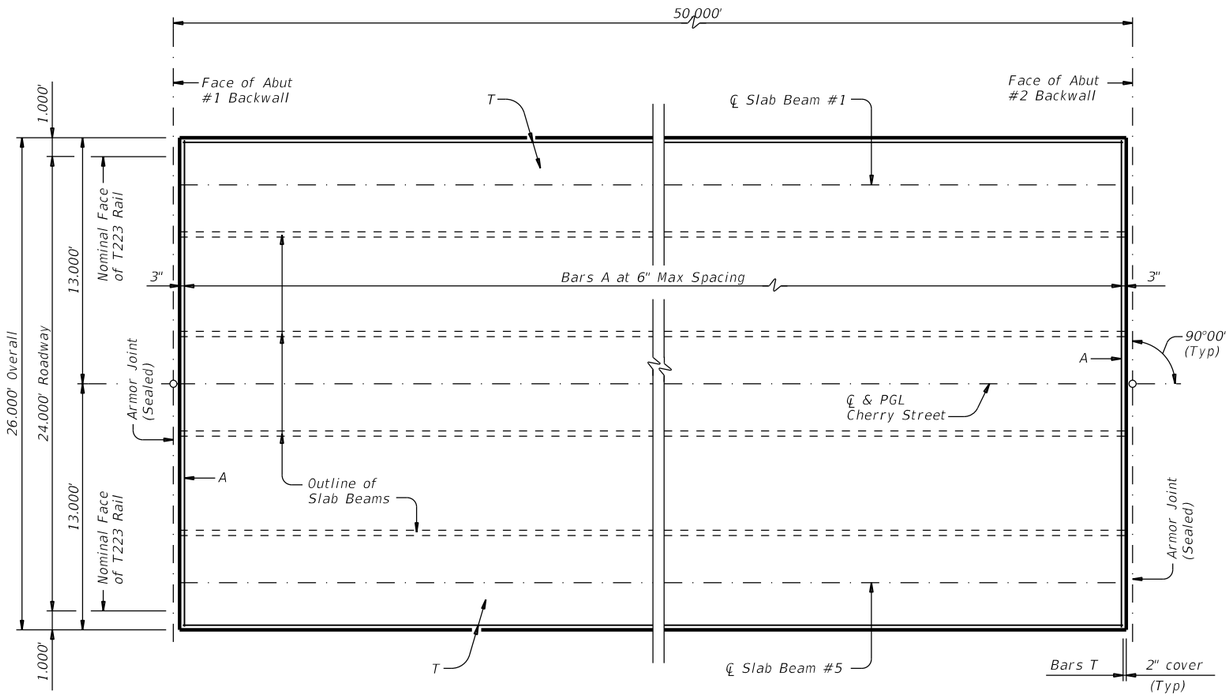
Texas Department of Transportation

Fort Worth Bridge Design

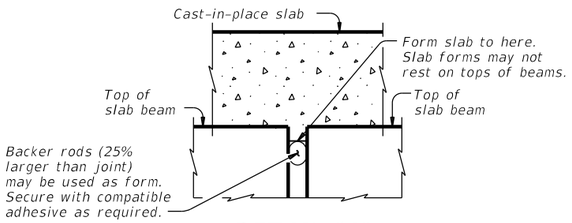
EST. QUANTITIES AND FOUNDATION LAYOUT

CHERRY STREET AT GRASSY BRANCH CREEK

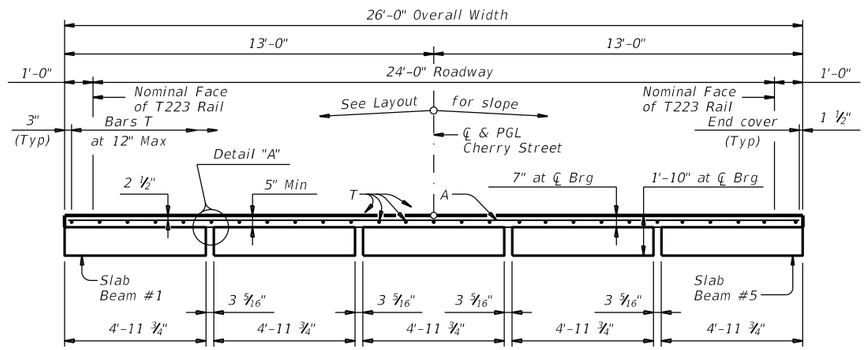
DN: JV	CK: AV	DW: KM/JV	CK: AV/JV
©TxDOT 03-07-22 REVISIONS	CONT 0902	SECT 38	JOB 133, ETC	HIGHWAY CS
	DIST 02	COUNTY PARKER		SHEET NO. 66



PLAN



DETAIL "A"



TYPICAL TRANSVERSE SECTION

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection		Section (2) Depths	
		"A"	"B"	"X"	"Y"
Ft		Ft	Ft	In	Ft/In
50	5SB15	0.029	0.041	7"	1'-10"

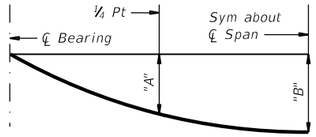
TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (5SB15) ABUT TO ABUT	TOTAL (1) REINF STEEL
Ft	SF	LF (3)	Lb
50	1,300	247.50	3,640

(1) Reinforcing steel weight is calculated using an approximate factor of 2.8 Lbs/SF.

(2) Based on theoretical beam camber, dead load deflections of 6" cast-in-place concrete slab and a constant grade. The Contractor will adjust these values for any vertical curve.

(3) Fabricator will adjust beam lengths for beam slopes as required.

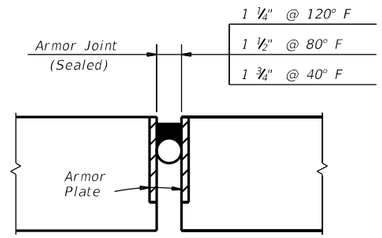


DEAD LOAD DEFLECTION DIAGRAM

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



JOINT OPENING DETAIL

(For Additional Information and Details, See Related Standard Sheet "AJ".)

ARMOR JOINT DETAILS

TABLE OF ARMOR JOINT ESTIMATED QUANTITIES

ABUTMENT	LF
1	26.0
2	26.0
TOTAL	52.0

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
See applicable rail details for rail anchorage in slab.

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:

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

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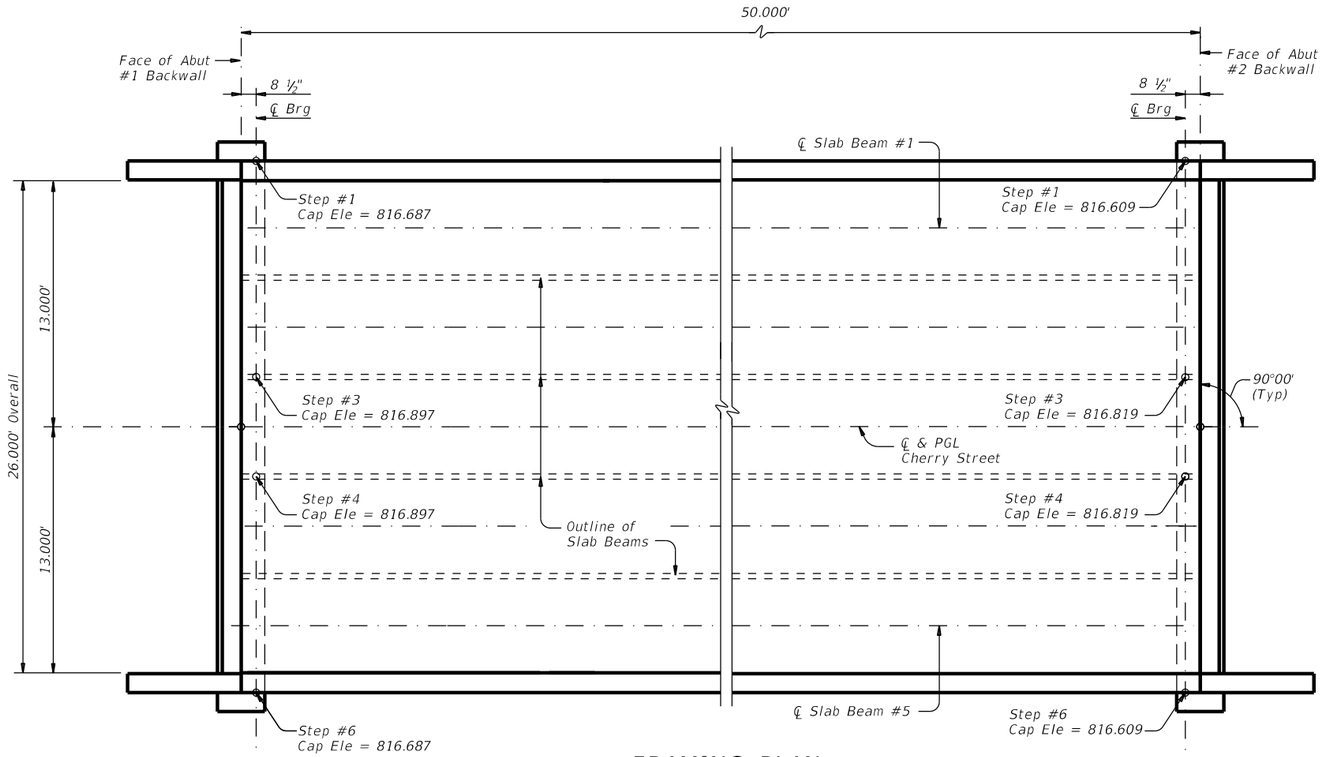
Texas Department of Transportation
Fort Worth Bridge Design

50.00' PRESTR CONCRETE SLAB BEAM SPAN (PSB 5SB15)

CHERRY STREET AT GRASSY BRANCH CREEK

©TxDOT 03-07-22 REVISIONS	DN: JV	CK: AV	DW: KM/JV	CK: AV/JV
	CONT	SECT	JOB	HIGHWAY
	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		67



FRAMING PLAN

BENT REPORT

BENT NO. 1 (N 59 24 27.57 E)
DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 13.0000 L

	STEP SPAC.	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	90 0 0.00
BOX 1	5.2550	90 0 0.00
STEP 3	5.2550	90 0 0.00
STEP 4	5.2550	90 0 0.00
BOX 4	5.2550	90 0 0.00
STEP 6	4.9800	90 0 0.00
TOTAL	26.0001	

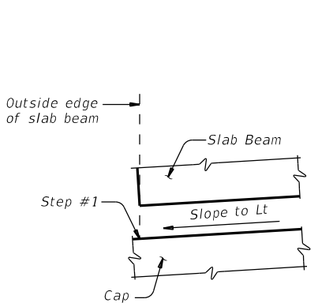
BENT NO. 2 (N 59 24 27.57 E)
DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 13.0000 L

	STEP SPAC.	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	90 0 0.00
BOX 1	5.2550	90 0 0.00
STEP 3	5.2550	90 0 0.00
STEP 4	5.2550	90 0 0.00
BOX 4	5.2550	90 0 0.00
STEP 6	4.9800	90 0 0.00
TOTAL	26.0001	

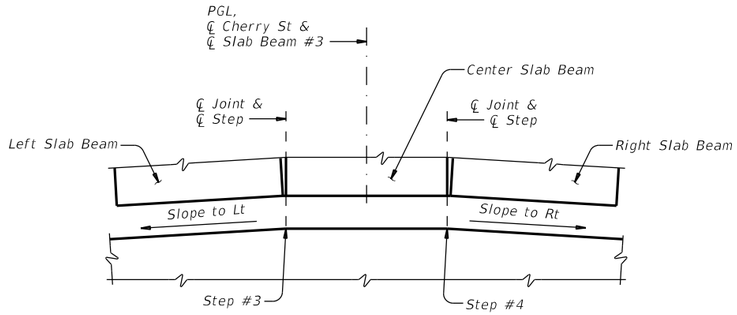
BEAM REPORT

BEAM REPORT, SPAN 1

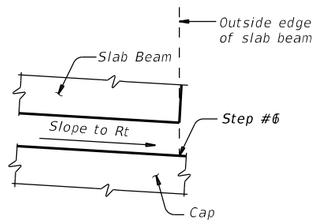
	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	BEAM SLOPE
BOX 1	50.0000	48.5833	49.5001	-0.00162
BOX 2	50.0000	48.5833	49.5001	-0.00162
BOX 3	50.0000	48.5833	49.5001	-0.00162
BOX 4	50.0000	48.5833	49.5001	-0.00162
BOX 5	50.0000	48.5833	49.5001	-0.00162



STEP #1



STEP #3 & STEP #4



STEP #6

HL93 LOADING

SHEET 2 OF 2

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs
3F22E0208ED54E8...

Texas Department of Transportation

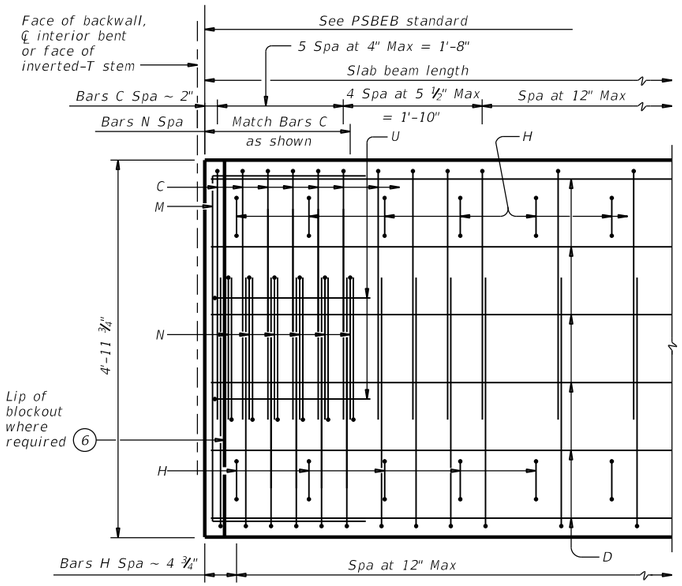
Fort Worth Bridge Design

50.00' PRESTR CONCRETE SLAB BEAM SPAN (PSB SB15)

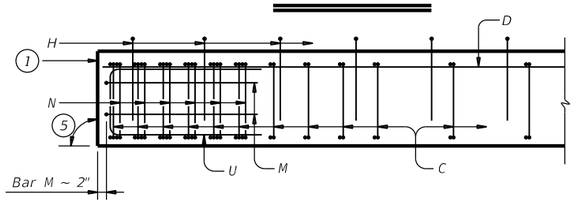
CHERRY STREET AT GRASSY BRANCH CREEK

		DN: JV	CK: AV	DW: KM/JV	CK: AV/JV	
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0902	38	133, ETC	CS		
	DIST	COUNTY		SHEET NO.		
	02	PARKER		68		

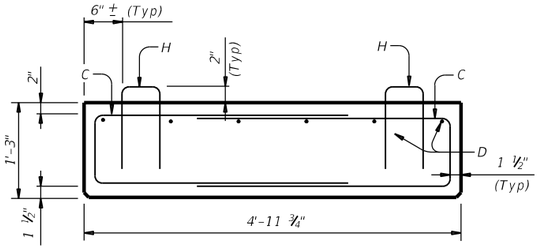
DATE: 3/8/2022 9:24:08 AM



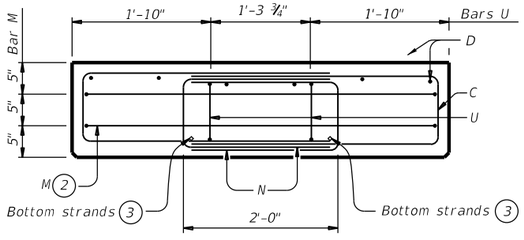
PART PLAN



ELEVATION

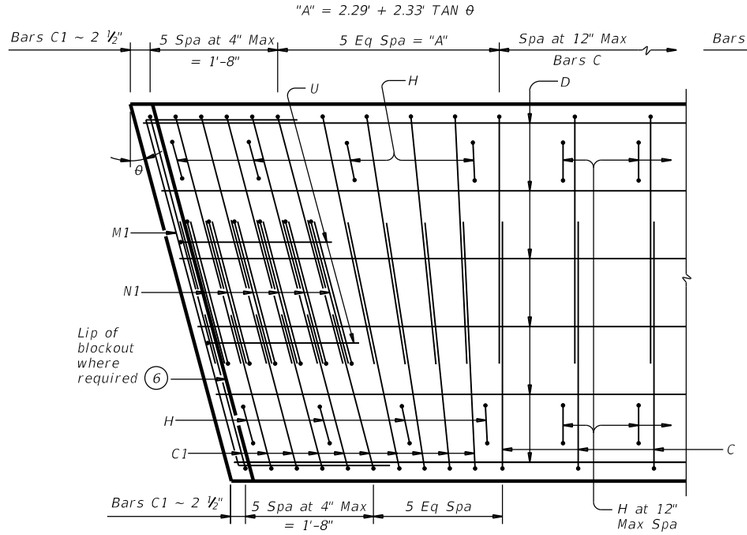


SECTION



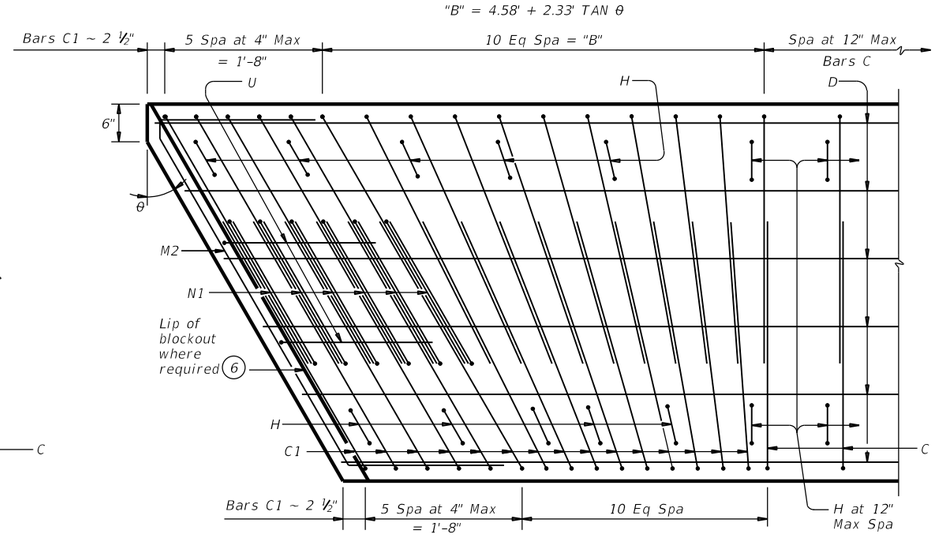
END MAT REINFORCING

Bars H not shown for clarity.



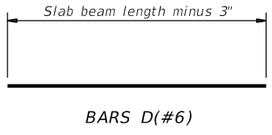
PART SKEW PLAN

(Showing θ over 0° to 15° skew)

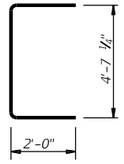


PART SKEW PLAN

(Showing θ over 15° to 30° skew)



BARS D(#6)



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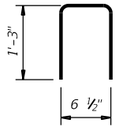

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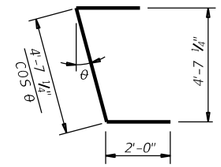

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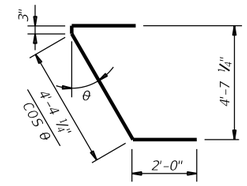

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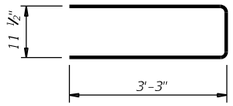

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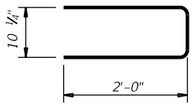
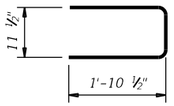


BARS U(#5)



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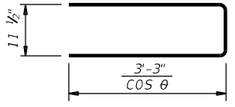

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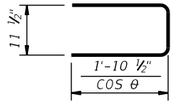
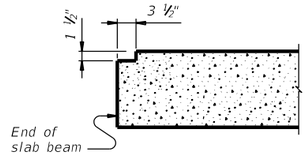


BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	896.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	16,805
Weight (4)	lb/ft	934

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.

(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.

HL93 LOADING

Texas Department of Transportation

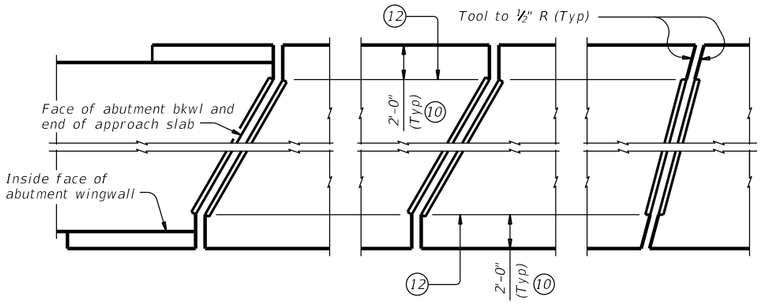
Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB15)

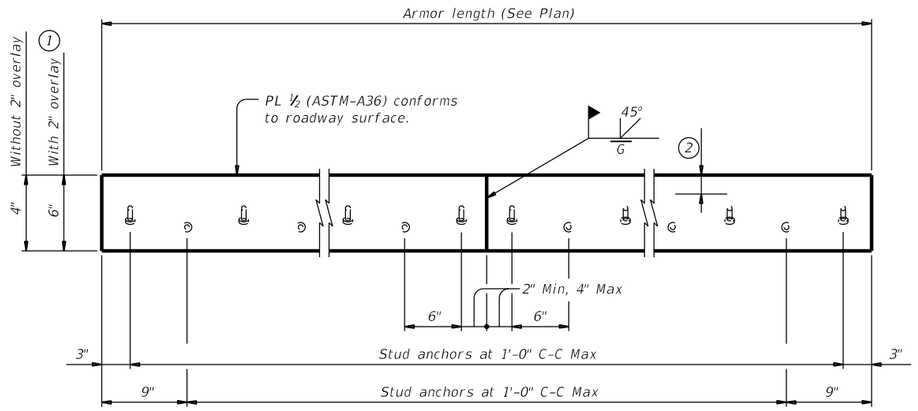
PSB-5SB15

FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		69



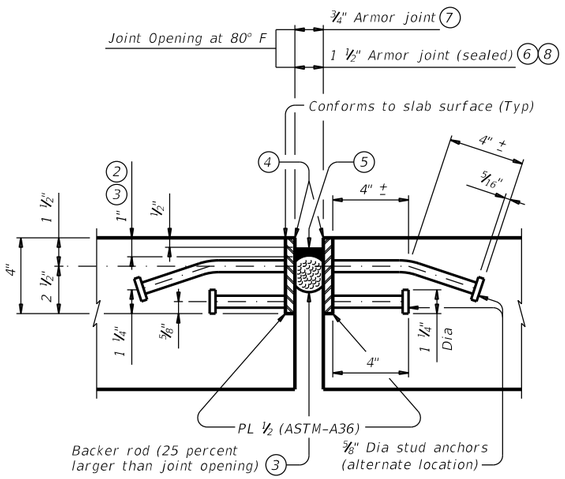
JOINTS AT ABUTMENTS | SKEWS OVER 15° | SKEWS THRU 15°

PLANS OF ARMOR PLATES

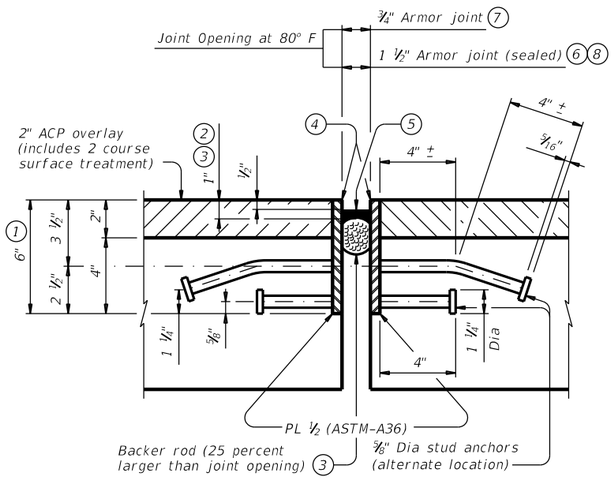


ELEVATION OF BASIC ARMOR PLATE

1. Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each ½" variation in thickness.
2. Do not paint top 1 ½" of plate if using sealed armor joint.
3. Set top of backer rod 1" below top of armor plate. 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.
4. Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
5. Use Class 7 joint sealant that conforms to DMS-6310.
6. Place sealant while ambient temperature is between 55°F and 80°F and is rising.
7. Armor joint does not include joint sealant or backer rod.
8. Armor joint (sealed) includes Class 7 joint sealant and backer rod.
9. Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
10. Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
11. See "Plans of Armor Plates".
12. At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
13. Align shipping angle perpendicular to joint.



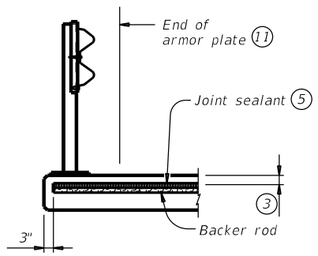
SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION



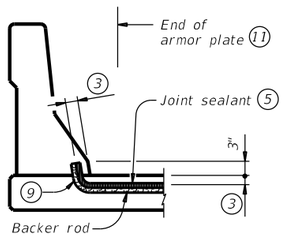
SHOWN WITH 2" OVERLAY AT JOINT LOCATION 1

ARMOR JOINT SECTIONS

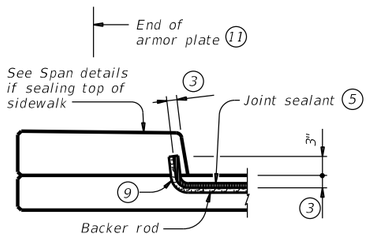
Showing Armor Joint (Sealed)



AT STEEL POST BRIDGE RAIL



AT CONCRETE BRIDGE RAIL



AT SIDEWALK

JOINT SEALANT TERMINATION DETAILS

Armor joint (sealed) only. Armor plate is not shown for clarity.

FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts.

Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

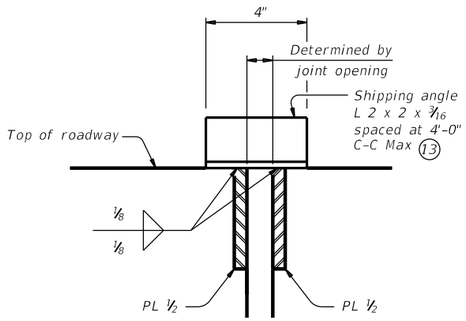
Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans. These joint details accommodate a joint movement range of 1 ⅜" (¾" opening movement and ⅜" closure movement).

Payment for armor joint, with or without seal, is based on length of armor plate.



SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION

With overlay similar

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY 1	22.90 plf

Texas Department of Transportation

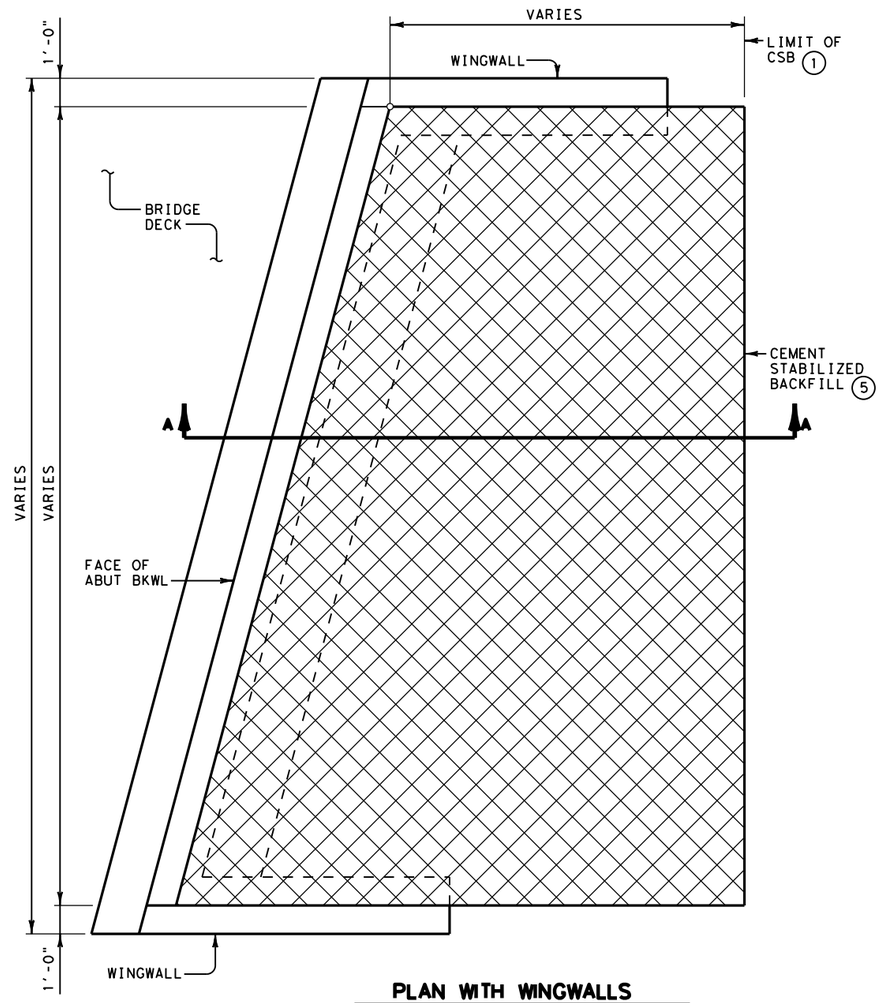
Bridge Division Standard

ARMOR JOINT DETAILS

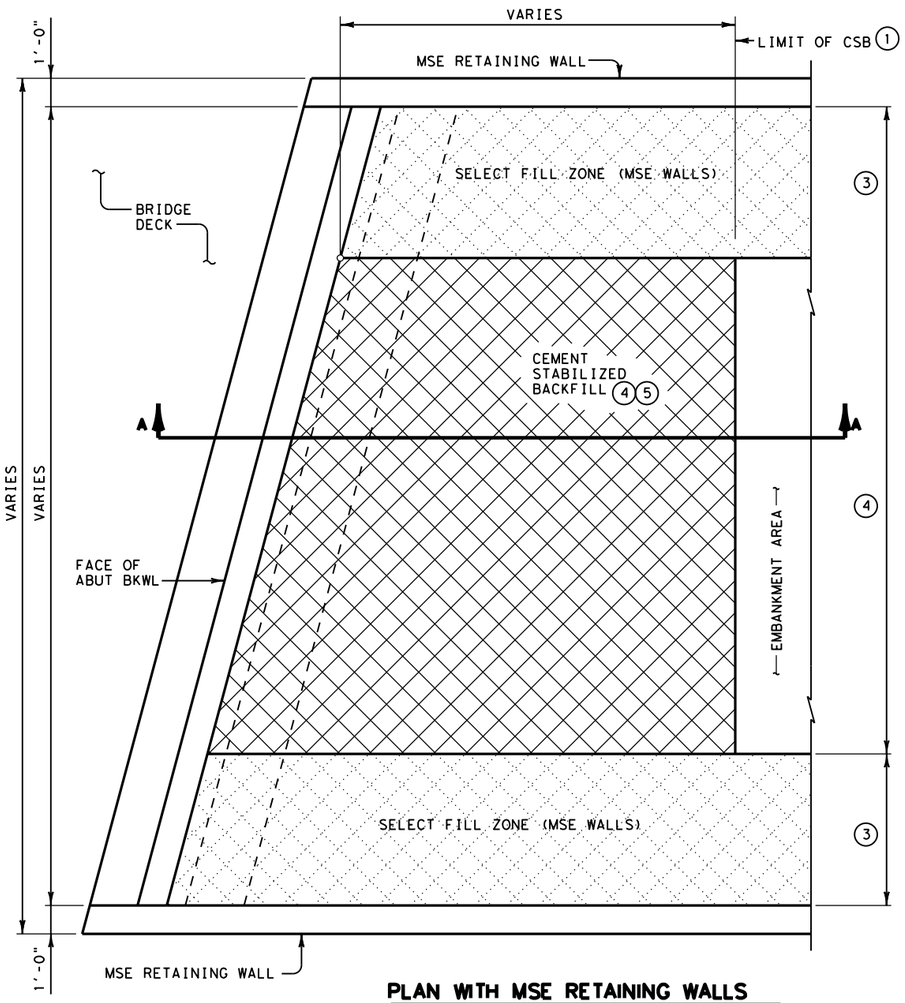
AJ

FILE: ajstde01-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		70

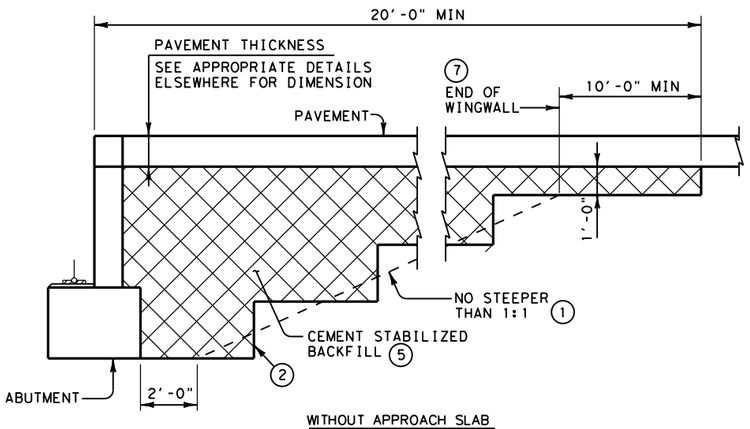
DATE: 3/8/2022 9:22:48 AM



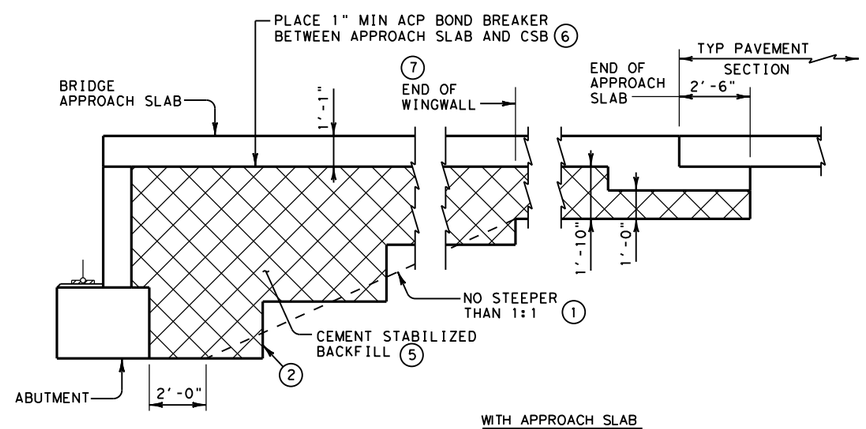
PLAN WITH WINGWALLS
CAST-IN-PLACE RETAINING WALLS SIMILAR



PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(SHOWING BAS-C, BAS-A SIMILAR)

SECTION A-A

GENERAL NOTES

1. PROVIDE CEMENT STABILIZED BACKFILL (CSB) MEETING THE REQUIREMENTS OF ITEM 400, "EXCAVATION AND BACKFILL FOR STRUCTURES", TO THE LIMITS SHOWN AT BRIDGE ABUTMENTS. PLACE CSB IN ACCORDANCE WITH ITEM 400.
2. DETAILS ARE DRAWN SHOWING LEFT FORWARD SKEW. SEE BRIDGE LAYOUT FOR ACTUAL SKEW.
3. THESE DETAILS DO NOT APPLY WHEN CONCRETE BLOCK RETAINING WALLS ARE USED IN LIEU OF WINGWALLS. CONTACT THE BRIDGE DIVISION FOR MORE INFORMATION.

(1) USUAL LIMIT OF CEMENT STABILIZED BACKFILL IS AT 20' FROM BACK OF ABUTMENT BACKWALL, IF NO APPROACH SLAB, OR AT END OF SUPPORT SLAB IF APPROACH SLAB IS USED.

(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 APPORVAL FROM THE ENGINEER.

(5) IF APPROVED BY THE ENGINEER, "NON-EXCAVATABLE" FLOWABLE BACKFILL, AS DEFINED BY ITEM 401, TABLE 2, MAY BE USED AS A SUBSTITUTE FOR CEMENT STABILIZED BACKFILL, WITH THE FOLLOWING CONSTRAINTS:
   a. IF FLOWABLE BACKFILL IS TO BE PLACED OVER MSE BACKFILL, PLACE A FILTER FABRIC OVER THE MSE BACKFILL; AND
   b. PLACE FLOWABLE FILL IN LIFTS NOT EXCEEDING 2 FEET IN DEPTH; PLACE EACH SUCCESSIVE LIFT WHEN THE PREVIOUS LIFT HAS STIFFENED/HARDENED (HAS LOST ITS FLOWABILITY).
   c. NO ADJUSTMENT IN PAYMENT WILL BE MADE FOR SUBSTITUTION OF FLOWABLE FILL IN LIEU OF CEMENT STABILIZED BACKFILL.

(6) OTHER MATERIALS MAY BE USED AS A BOND BREAKER IF PERMITTED BY THE ENGINEER. 2 LAYERS OF 30 LB ROOFING FELT OR 2 LAYERS OF HEAVY MIL POLYETHYLENE SHEETING ARE EXAMPLES. BOND BREAKER WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

(7) 10'-0" FROM BACK OF ABUTMENT BACKWALL, IF NO WINGWALLS.

Texas Department of Transportation

Fort Worth District Standard

CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT

CSAB (FTW)

ORIGINAL DRAWING: 05/2019	csab-ftw.dgn	PROJECT NO.			SHEET NO.
DATE	REVISIONS	SEE SHEET 1			71
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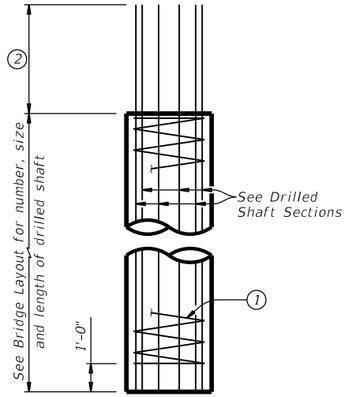
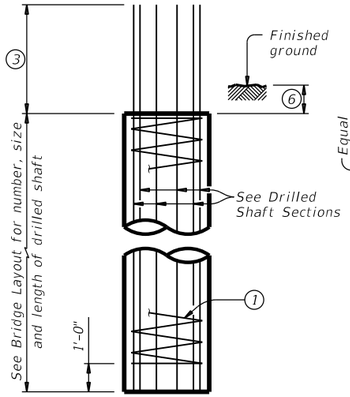
		CONT.	SECT.	JOB	HIGHWAY NO.
		0902	38	133,ETC	CS

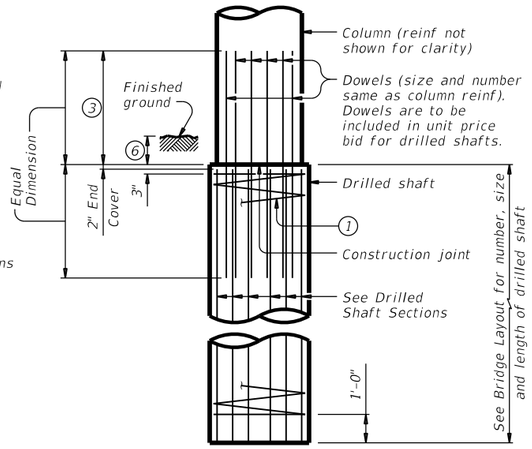
DATE: 3/8/2022 9:15:37 AM



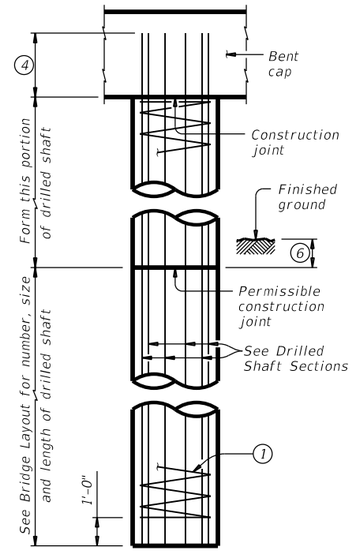
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



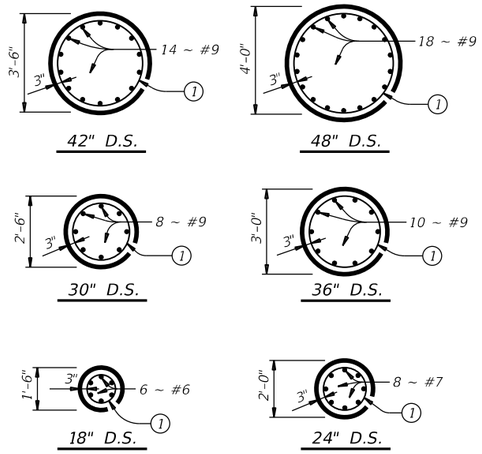
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

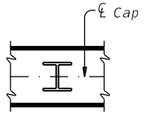


DRILLED SHAFT SECTIONS

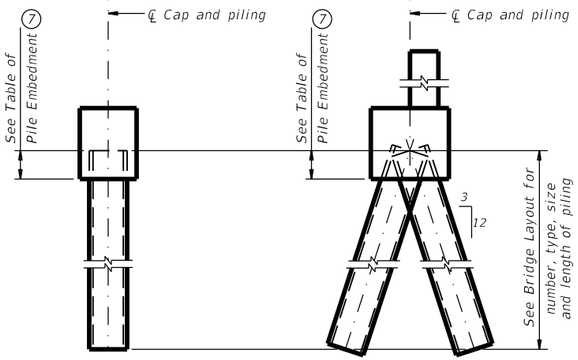
DRILLED SHAFT DETAILS

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.



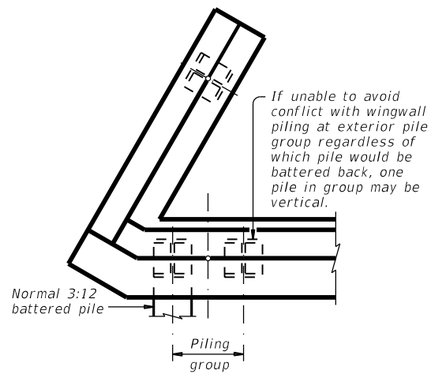
ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

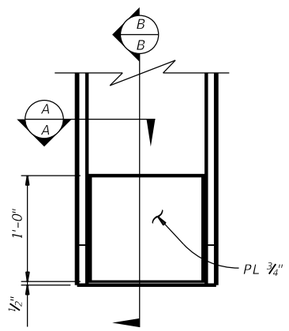
PILING DETAILS

(Concrete or steel H)

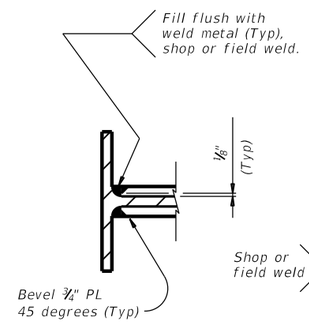


DETAIL "A"

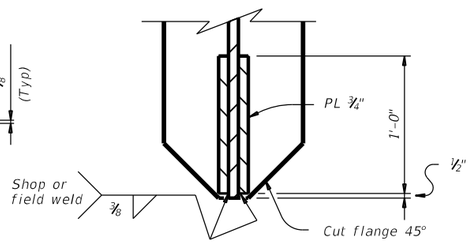
(Showing plan view of a 30° skewed abutment)



ELEVATION



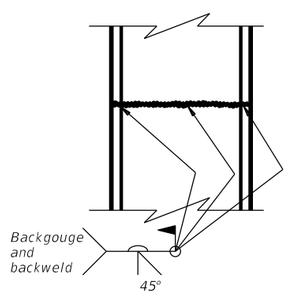
SECTION A-A

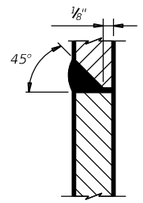


SECTION B-B

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.

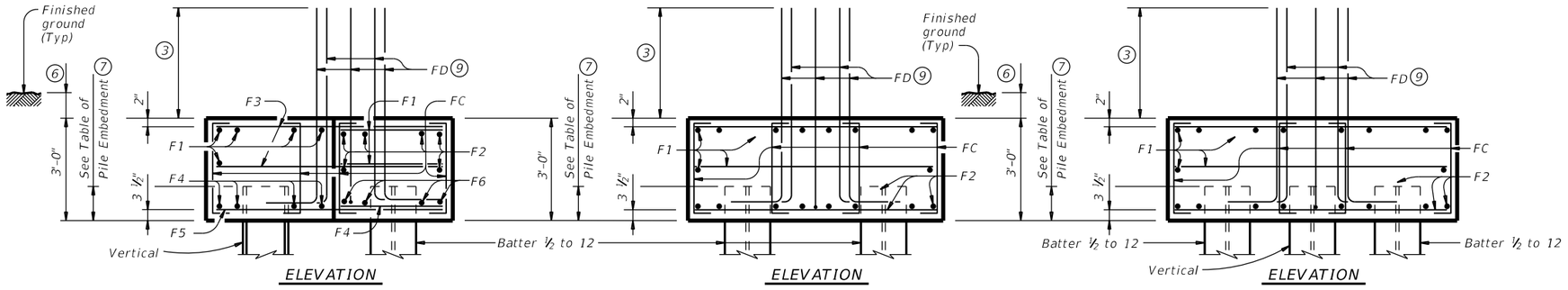
Texas Department of Transportation

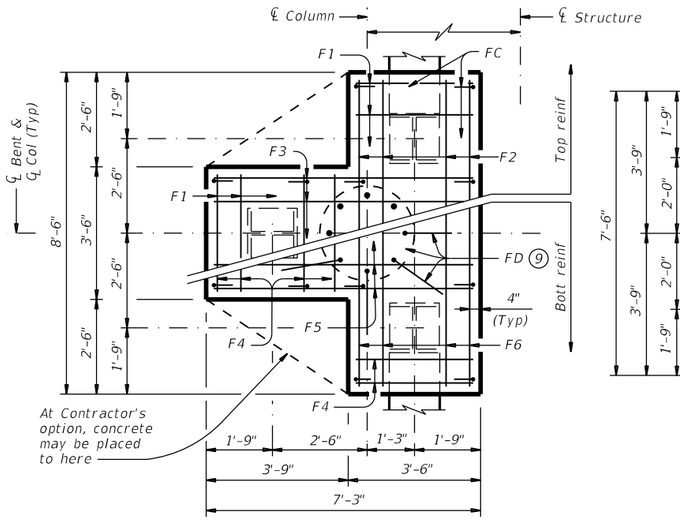
Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

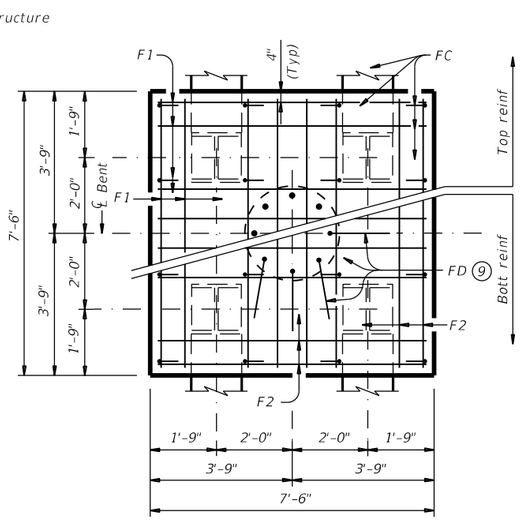
FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	02	PARKER		72





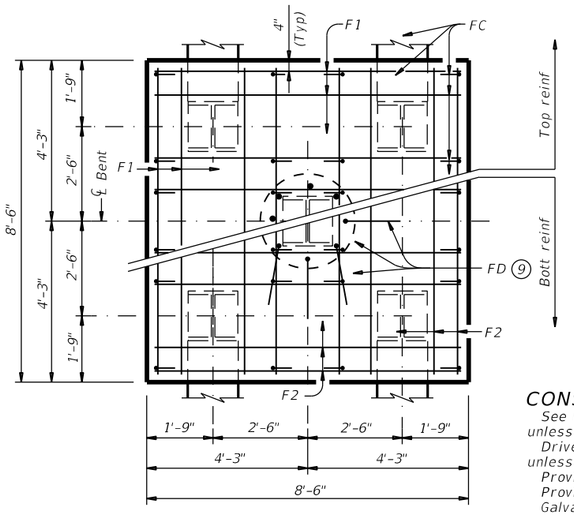
THREE PILE FOOTING (8)

For 36" Dia and smaller columns.



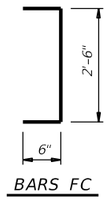
FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

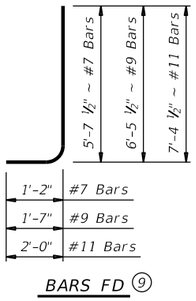


FIVE PILE FOOTING (8)

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

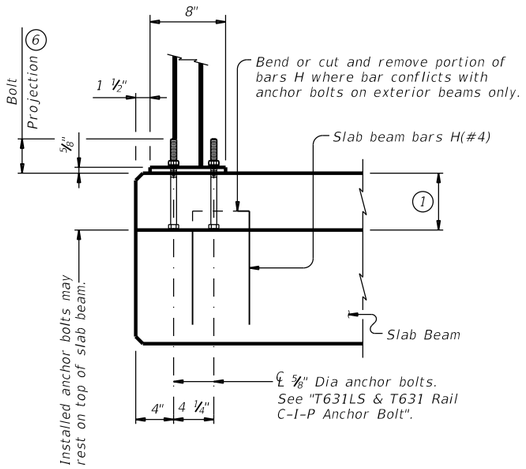
COMMON FOUNDATION DETAILS

FD

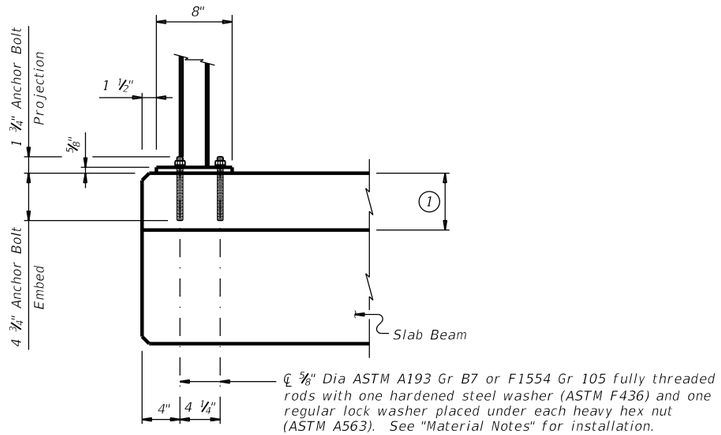
FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	02	PARKER		73

DATE: 3/8/2022 9:15:54 AM

DATE: 3/8/2022 9:46:22 AM



CAST-IN-PLACE ANCHORAGE OPTION



ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT 2 7

PART SPAN ELEVATION

SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

T631LS & T631 RAIL C-I-P ANCHOR BOLT

PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

1. Cast-in-place slab thickness varies due to beam camber (5" minimum).
2. Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
3. Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.
4. See rail standard for projection from finished grade or top of sidewalk.
5. Place additional (#5) longitudinal bar.
6. Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
7. Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
   30° Skew: 1'-3" (acute corner only)
8. Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.
9. Cross-hatched area must have ½" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

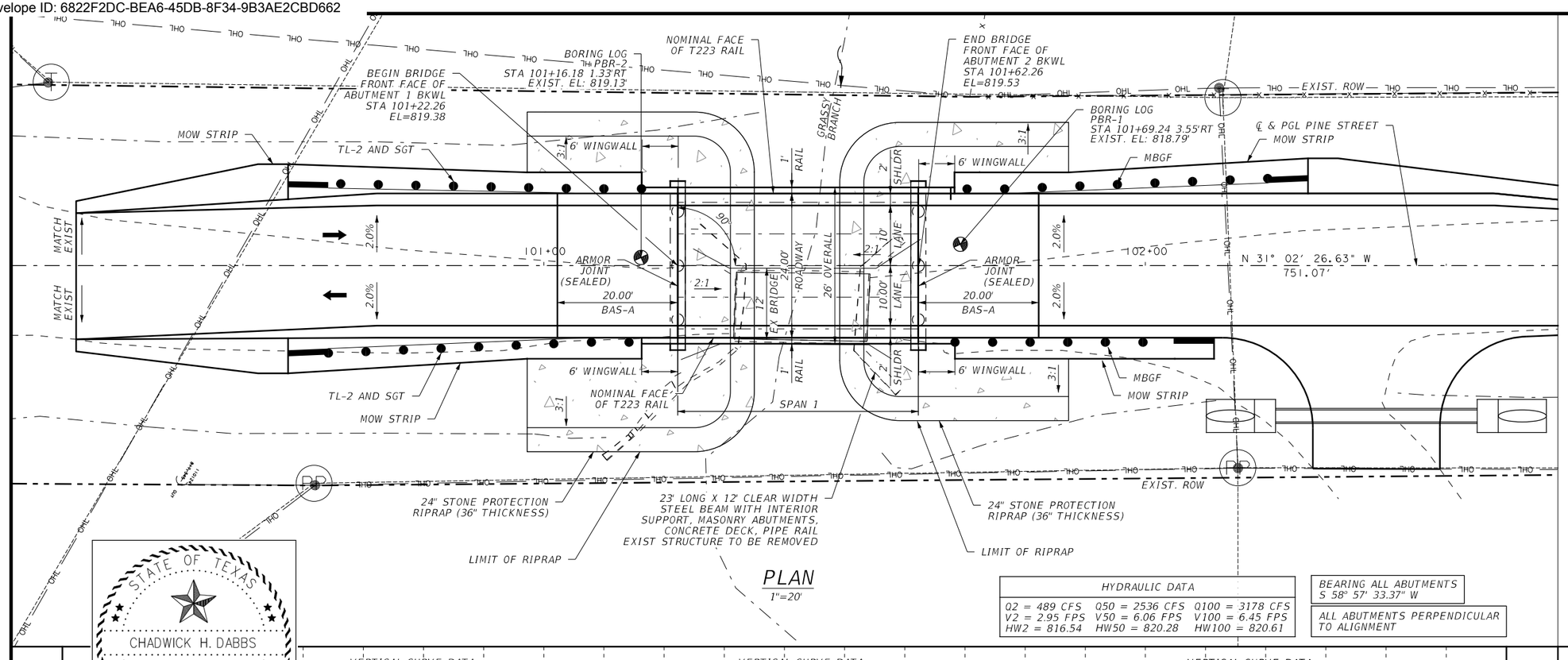
RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	02	PARKER		74

131PBRGPP01.dgn



DESIGN SPEED = 30 MPH
FUNCTION CLASS = LOCAL RURAL TWO LANE
ADT (2018) = 85
ADT (2038) = 128

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

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LFRD SPECIFICATIONS AND INTERIM REVISIONS THERETO FOR HL93 LOADING, 8TH EDITION (2017).
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL STRUCTURES AND UTILITIES PRIOR TO ORDERING MATERIALS AND NOTIFY ENGINEERS IN WRITING OF ANY CONFLICTS OR DISCREPANCIES.
3. SEE BRIDGE TYPICAL SECTION SHEET FOR ADDITIONAL INFORMATION.
4. SAWCUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS REQUIRED.
5. RIPRAP SLOPES SHOWN ARE A MAXIMUM. CONTRACTOR SHALL FIELD VERIFY.
6. SEE CSAB (FTW) STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
7. SEE SPSB STANDARD FOR TYPE A JOINT DETAILS.

EXIST NBI NO.: 02-184-0-Y003-50-001
PROP NBI NO.: 02-184-0-Y330-50-002

HYDRAULIC DATA		
Q2 = 489 CFS	Q50 = 2536 CFS	Q100 = 3178 CFS
V2 = 2.95 FPS	V50 = 6.06 FPS	V100 = 6.45 FPS
HW2 = 816.54	HW50 = 820.28	HW100 = 820.61

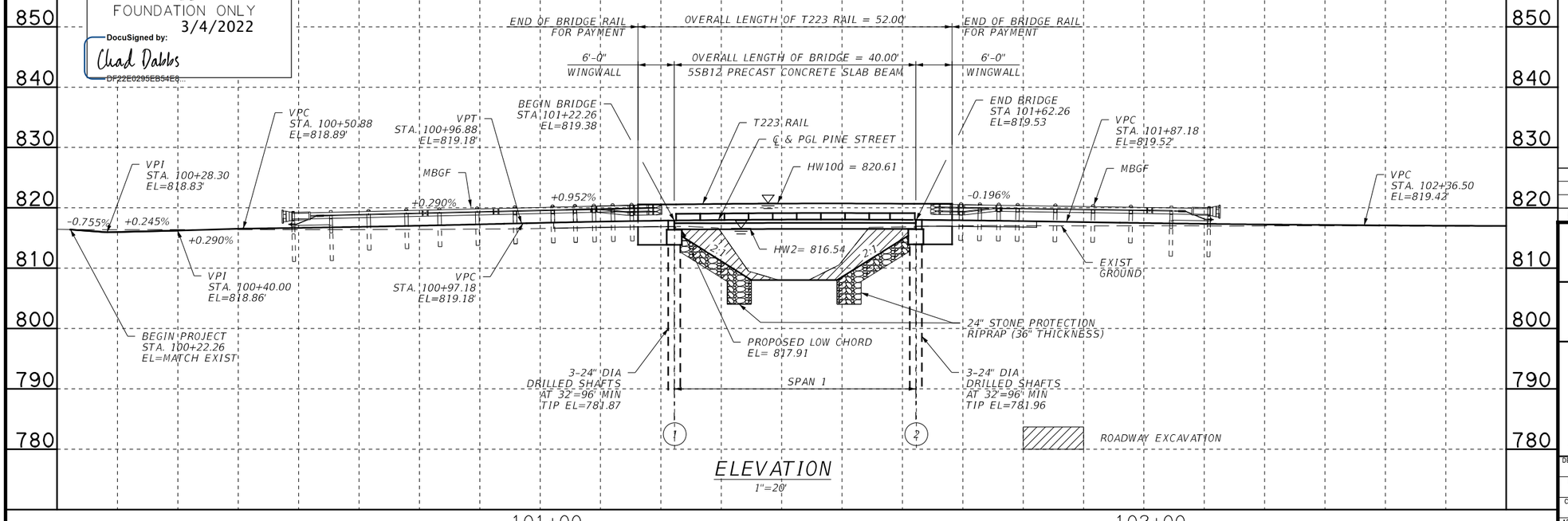
BEARING ALL ABUTMENTS
S 58° 57' 33.37" W

ALL ABUTMENTS PERPENDICULAR TO ALIGNMENT

VERTICAL CURVE DATA
VPI STA 100+73.88
EL= 818.96'
ex= 0.04'
K= 69.5
L= 46.00'

VERTICAL CURVE DATA
VPI STA 101+42.18
EL= 819.61'
ex= -0.13'
K= 78.4
L= 90.00'

VERTICAL CURVE DATA
VPI STA 102+69.00
EL= 819.36'
ex= 0.08'
K= 69.5
L= 65.00'



ELEVATION
1"=20'

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED PROFESSIONAL ENGINEER
FOUNDATION ONLY
3/4/2022
DocuSigned by:
Chad Dabbs
DF22E0295EB54E8...

HAYDEN CONSULTANTS, INC.
F-00640
STATE OF TEXAS
GEORGE H. AMEN
100655
LICENSED PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET AT GRASSY BRANCH BRIDGE LAYOUT

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

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	75
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmoreno1
DATE: 3/2/2022
SCALE: 1:20
FILE: Z:\Projects\1195 TxDOT\Off-Sys 6(DPS-SOU)\195-04-DON\SHT\31-PINE\131PBRGPP01.dgn
PLOT DRIVER: TXDOT_PDF_BW.pltcfg
PENTABLE: CHERRY-PINE-PENTABLE.tbl
TIME: 8:59:33 AM

131PBORETB01.dgn

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	PBR-1	District	Fort Worth
Highway	Pine Street	Structure	Bridge	Date	7/16/20
CSJ	0902-38-131	Station	101+69.24	Grnd. Elev.	818.79 ft
		Offset	3.55' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
818.5			PAVEMENT, 4in. Asphalt							
			SAND, Silty Clayey, compact, brown and gray, w/ calcareous nodules at 0'-8' and gravel at 0'-2' and 6'-8' (SC-SM)			10				
						8	19	6		% Passing #200 Sieve: 40.8
5		24 (6) 20 (6)								
						4				
810.8			CLAY, Fat, hard, gray and brown, w/ sand seams at 11'-13' and 16'-25', calcareous nodules at 13'-25' and shale seams at 23'-30' (CH)							
						15				
10		47 (6) 50 (5.5)								
						12	54	26		% Passing #200 Sieve: 94.6
15		50 (3) 50 (2.75)								
						14	55	25		% Passing #200 Sieve: 98.5
20		50 (4) 50 (3.5)								

Remarks: Rock coring was initiated at 30'; still dry at 30'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger: George** **Organization: HVJ Associates, Inc.**

C:\Users\jhohman\Desktop\Wincore Pine Street.clg

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	PBR-1	District	Fort Worth
Highway	Pine Street	Structure	Bridge	Date	7/16/20
CSJ	0902-38-131	Station	101+69.24	Grnd. Elev.	818.79 ft
		Offset	3.55' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Fat, hard, gray and brown, w/ sand seams at 11'-13' and 16'-25', calcareous nodules at 13'-25' and shale seams at 23'-30' (CH)							
25		50 (4.75) 50 (3.75)								
789.3										
30		50 (0.5) 50 (0.25)	SHALE, very hard, gray, slightly to moderately weathered, w/ sandstone and sand seams at 30'-40'							RUN=60in., REC=75%, RQD=54%
35		50 (0.5) 50 (0.25)				0	2003.2	30	155	RUN=60in., REC=95%, RQD=80%
40		50 (0.25) 50 (0.25)								

Remarks: Rock coring was initiated at 30'; still dry at 30'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger: George** **Organization: HVJ Associates, Inc.**

C:\Users\jhohman\Desktop\Wincore Pine Street.clg

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

BORING LOG PBR-1
PINE STREET
GRASSY CREEK

SHEET 1 OF 2

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	76
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorrell
DATE: 3/2/2022
SCALE: 1:20
FILE: Z:\Projects\1195 TxDOT_On-Off SB-6(DP540)\195-04\DGN\SHT\131-PINE\131PBORETB01.dgn

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
TIME: 8:59:38 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	PBR-1	District	Fort Worth
Highway	Pine Street	Structure	Bridge	Date	7/16/20
CSJ	0902-38-131	Station	101+69.24	Grnd. Elev.	818.79 ft
		Offset	3.55' RT	GW Elev.	N/A

Elev. (ft)	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	Properties: LL	Properties: PI	Properties: Wet Den. (pcf)	Additional Remarks
		SHALE, very hard, gray, slightly to moderately weathered, w/ sandstone and sand seams at 30'-40'							
									RUN=60in., REC=95%, RQD=80%
45	50 (0.25) 50 (0.25)								
					6				RUN=60in., REC=95%, RQD=82%
50	50 (0.5) 50 (0.25)								
									RUN=60in., REC=96%, RQD=73%
55	50 (0.5) 50 (0.5)								
			0	1144	6			151	RUN=60in., REC=98%, RQD=75%
758.8 60	50 (0.5) 50 (0.25)								

Remarks: Rock coring was initiated at 30'; still dry at 30'.

The ground water elevation was not determined during the course of this boring.

Driler: Rubicon — Logger: George — Organization: HVJ Associates, Inc.

C:\Users\jhohman\Desktop\Wincore Pine Street.clg

USER: gmorshali DATE: 3/2/2022 SCALE: 1:20 FILE: Z:\Projects\1195 TxDOT_On-Off 36-61DP5400\1195.04\DGN\SHT\131-PINE\131PBORETB01-1.dgn
TIME: 8:59:48 AM PENTABLE: CHERRY-PINE-PENTABLE.tbl
PLOT DRIVER: TXDOT_PDF_BW.pltcfg

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

BORING LOG PBR-1
PINE STREET
GRASSY CREEK

SHEET 2 OF 2

DESIGNED GM	FED. RD. DIV. NO. 6		FEDERAL AID PROJECT NO. BR 2021(445) ETC	HIGHWAY NO. CS
DRAWN JM	STATE TX	DISTRICT FT WORTH	COUNTY PARKER	SHEET NO. 77
CHECKED GHA	CONTROL 0902	SECTION 38	JOB 133, ETC	
APPROVED GHA				

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	PBR-2	District	Fort Worth
Highway	Pine Street	Structure	Bridge	Date	7/15/20
CSJ	0902-38-131	Station	101+16.18	Grnd. Elev.	819.13 ft
		Offset	1.33' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
818.7			PAVEMENT, 5in. Asphalt							
			CLAY, Sandy Lean, very stiff, brown and gray, w/ sand layer at 0'-2', roots at 2'-4' and 8'-10', calcareous nodules at 2'-4' and gravel at 0'-2' and 8'-10' (CL)			4				% Passing #200 Sieve: 24.6
5		19 (6) 26 (6)				9	41	22		% Passing #200 Sieve: 64.4
						9				
10		24 (6) 31 (6)								
807.6			CLAY, Fat, hard, gray and brown, w/ shale seams at 11'-20' and sand seams at 11'-20' (CH)			13				
15		50 (3.5) 50 (3.5)								
						12	56	28		% Passing #200 Sieve: 98.7
20		50 (3) 50 (3)								

Remarks: Rock coring was initiated at 30'; still dry at 30'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger:** George **Organization:** HVJ Associates, Inc.

C:\Users\jhohman\Desktop\Wincore Pine Street.clg

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	PBR-2	District	Fort Worth
Highway	Pine Street	Structure	Bridge	Date	7/15/20
CSJ	0902-38-131	Station	101+16.18	Grnd. Elev.	819.13 ft
		Offset	1.33' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Lean, hard, gray and brown, w/ shale seams at 20'-30' and sand seams at 23'-25' (CL)							
						13				
25		50 (4.5) 50 (3.75)								
						7	35	14		% Passing #200 Sieve: 88.4
789.6										
30		50 (0.5) 50 (0.25)	SHALE, very hard, gray, moderately to highly weathered, w/ sandstone at 30'-40' and 55'-60'							
										RUN=60in., REC=86%, RQD=65%
35		50 (0.75) 50 (0.25)								
						0	401.6	6	156	RUN=60in., REC=91%, RQD=70%
40		50 (0.25) 50 (0.25)								

Remarks: Rock coring was initiated at 30'; still dry at 30'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger:** George **Organization:** HVJ Associates, Inc.

C:\Users\jhohman\Desktop\Wincore Pine Street.clg

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

BORING LOG PBR-2
PINE STREET
GRASSY CREEK

SHEET 1 OF 2

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN JM	STATE / DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX / FT WORTH	PARKER	78
APPROVED GHA	CONTROL / SECTION	JOB	
	0902 / 38	133, ETC	

USER: gmorshoi
DATE: 3/2/2022
SCALE: 1:20
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TIME: 8:59:53 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl
PLOT DRIVER: TXDOT_PDF_BW.pltcfg

DRILLING LOG

WinCore Version 3.3

County	Parker	Hole	PBR-2	District	Fort Worth
Highway	Pine Street	Structure	Bridge	Date	7/15/20
CSJ	0902-38-131	Station	101+16.18	Grnd. Elev.	819.13 ft
		Offset	1.33' RT	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SHALE, very hard, gray, moderately to highly weathered, w/ sandstone at 30'-40' and 55'-60'							
						5				RUN=60in., REC=91%, RQD=68%
45		50 (0.5) 50 (0.25)								
										RUN=60in., REC=93%, RQD=18%
50		50 (0.5) 50 (0.25)								
										RUN=60in., REC=91%, RQD=51%
55		50 (0.5) 50 (0.25)								
						8				RUN=60in., REC=95%, RQD=53%
759.1	60	50 (0.25) 50 (0.25)								

Remarks: Rock coring was initiated at 30'; still dry at 30'.

The ground water elevation was not determined during the course of this boring.

Driller: Rubicon **Logger: George** **Organization: HVJ Associates, Inc.**

C:\Users\jhohman\Desktop\Wincore Pine Street.clg

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
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FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

BORING LOG PBR-2
PINE STREET
GRASSY CREEK

SHEET 2 OF 2

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	79
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorspoll
DATE: 3/2/2022
SCALE: 1:20
FILE: Z:\Projects\1195 TxDOT-Dff SG-6(DPS-DAL)DAL\SHT\131-PINE\131PBORETB02-1.dgn
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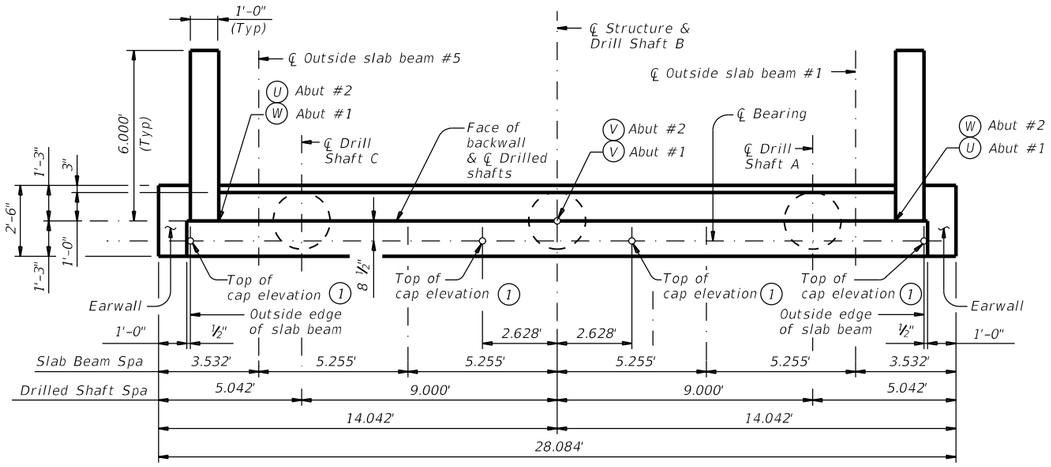
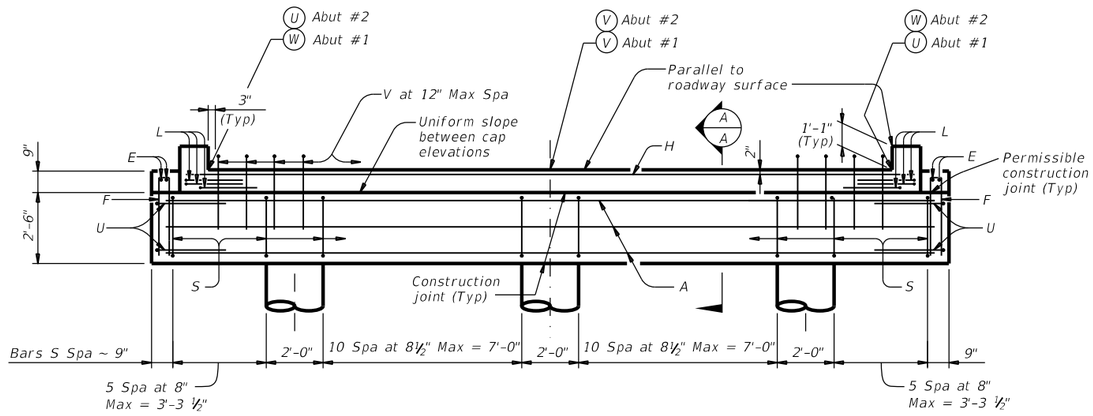


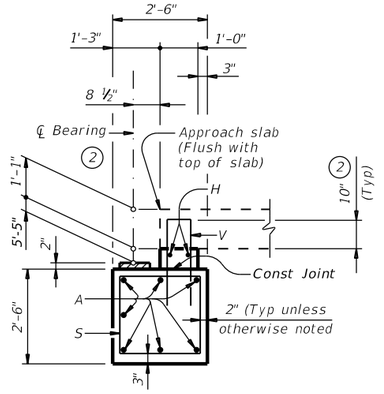
PLAN

(Showing Abutment #1; Abutment #2 symmetrical by opposite hand.)



ELEVATION ~ DRILLED SHAFT ABUTMENT

(Showing Abutment #1; Abutment #2 symmetrical by opposite hand.)



SECTION A-A (3)

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

TABLE OF ESTIMATED QUANTITIES (4)

Bar	No.	Size	Length 5SB12	Weight 5SB12
A	7	#11	27'-1"	1006
E	4	#4	2'-2"	6
F	10	#4	6'-4"	43
H	2	#5	25'-8"	54
L	6	#6	4'-0"	36
S	35	#5	9'-4"	340
U	4	#6	7'-1"	43
V	26	#5	7'-4"	198
wH1	8	#6	5'-8"	68
wH2	8	#6	6'-11"	83
wU	12	#4	1'-8"	14
wV	28	#5	3'-10"	112
Reinforcing Steel			Lb	2,007
Cl "C" Conc (Abut)			CY	8.8

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

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

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

(4) Quantities shown are for one abutment only (with approach slab).

(5) 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)

TABLE OF ELEVATIONS

	TOP OF DS		
	A	B	C
Abut #1	814.990	815.170	814.990
Abut #2	815.141	815.321	815.141
	BOTTOM OF DS (AS BUILT)		
	A	B	C
Abut #1			
Abut #2			
	U	V	W
Abut #1	818.057	818.297	818.057
Abut #2	818.207	818.447	818.207

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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 Stone Riprap (SRR) standard sheet for riprap attachment details, if applicable.

See applicable rail details for rail anchorage in wingwalls.

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

SHEET 1 OF 2

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs
3F08E0005ED64E8...

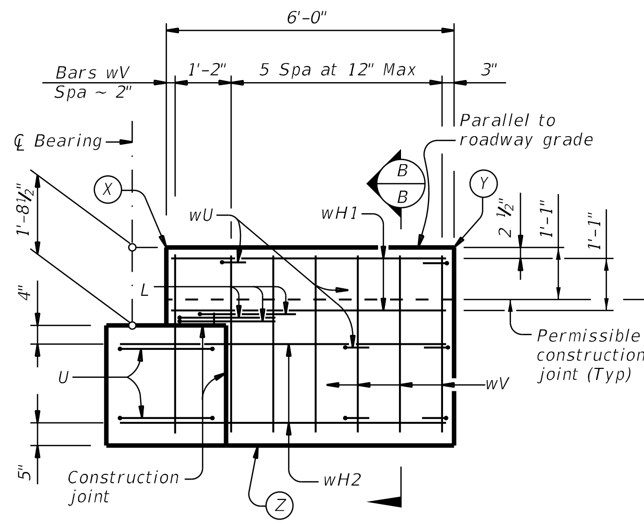
Texas Department of Transportation

Fort Worth Bridge Design

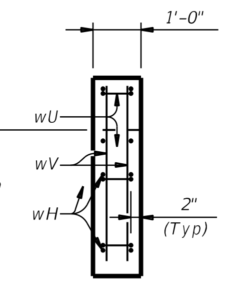
ABUTMENTS #1 & #2
PRESTR CONCRETE SLAB BEAM

PINE STREET AT GRASSY BRANCH CREEK

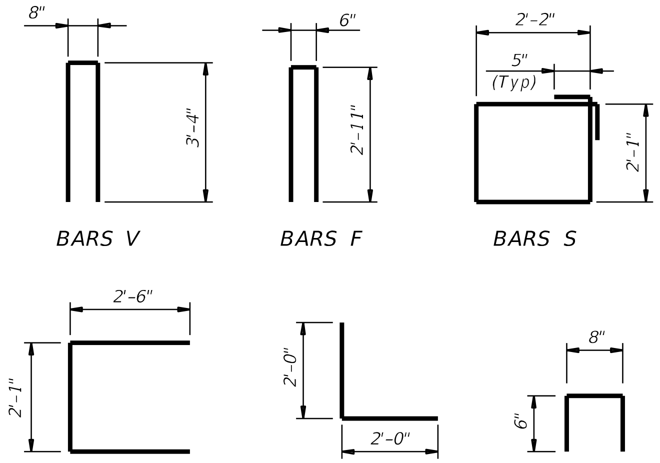
	DN: CHD	CK: AV	DW: KM/CHD	CK: AV/CHD
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		80



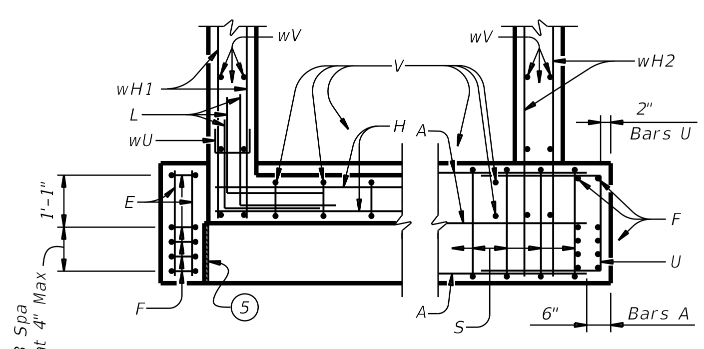
WINGWALL ELEVATION



SECTION B-B



WINGWALL ELEVATIONS				
	ABUTMENT #1		ABUTMENT #2	
POINT	LEFT WING	RIGHT WING	LEFT WING	RIGHT WING
X	819.140	819.140	819.291	819.291
Y	819.100	819.100	819.296	819.296
Z	814.930	814.930	815.081	815.081



CORNER DETAILS

(5) 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)

Maximum Calculated Footing Load = 77.0 Tons/Shaft
Point Bearing based on Penetration test of ¾"/100 blows
Point Bearing @ 31.0 Tons/SF = 97.0 Tons/Shaft
No skin friction needed
Total Load Resistance = 97.0 Tons/Shaft

HL93 LOADING

SHEET 2 OF 2

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs

Texas Department of Transportation

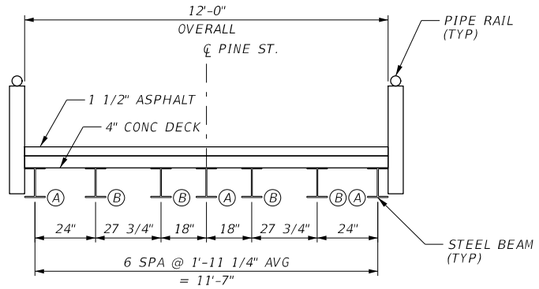
Fort Worth Bridge Design

ABUTMENTS #1 & #2

PRESTR CONCRETE SLAB BEAM

PINE STREET AT GRASSY BRANCH CREEK

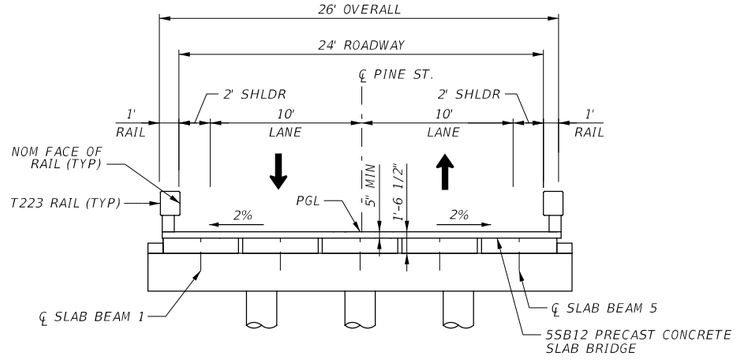
DN: CHD		CK: AV		DW: KM/CHD		CK: AV/CHD	
©TxDOT	03-07-22	CONT	SECT	JOB		HIGHWAY	
		0902	38	133, ETC		CS	
REVISIONS		DIST		COUNTY		SHEET NO.	
		02		PARKER		81	



TYPICAL SECTION LOOKING SOUTH

PINE STREET - EXISTING TRAVERSE BRIDGE SECTION

STA 100+31.69 TO STA 100+53.98
N.T.S.



PINE STREET - PROPOSED TRANSVERSE BRIDGE SECTION

STA 101+22.26 TO STA 101+62.26
N.T.S.
*SEE PSBRA STANDARD FOR RAIL ANCHORAGE ON SLAB BEAM

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
REGISTERED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

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PINE STREET

TRANSVERSE
BRIDGE SECTION

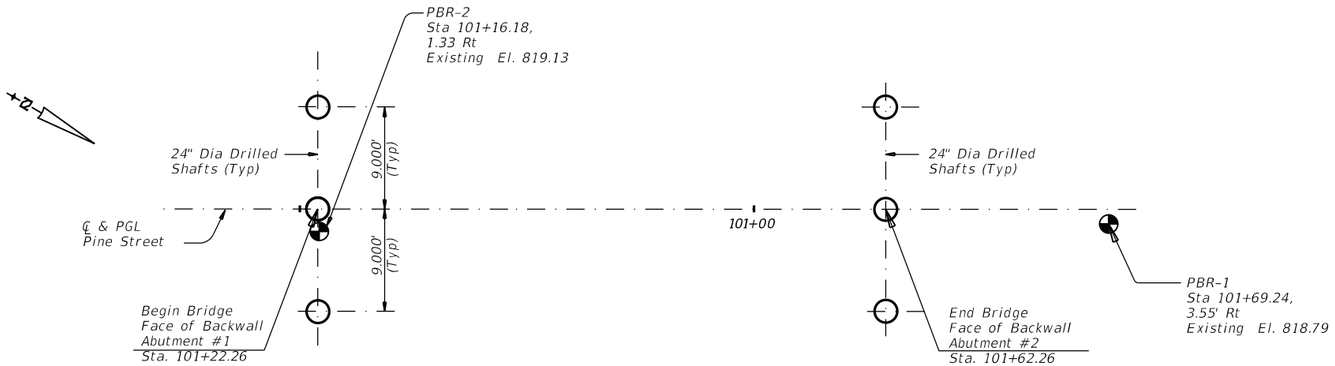
SCALE: N.T.S. SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	82
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorspoll
DATE: 3/2/2022
SCALE: 1:10
FILE: Z:\Projects\1195 TxDOT SG 6(DPS-DOT)195-04-DGN\SHT\131-PINE\131PBRGTYP01.dgn
PLOT DRIVER: TXDOT_PDF_BW.pltcfg
TIME: 9:00:10 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl
TxDOT.Orf 56 6(DPS-DOT)195-04-DGN

ESTIMATED QUANTITIES

DESCRIPTIONS	0400-6005 Cem Stabil Bkfl	0416-6002 Drill Shaft (24 In)	0420-6014 CL "C" Conc (Abut) (HPC)	0422-6002 Reinf Conc Slab (HPC)	0422-6016 Approach Slab (HPC)	0425-6010 Prestr Conc Slab Beam (5SB12)	0432-6035 Riprap (Stone Protect) (24 In)	0450-6007 Rail (Ty T223) (HPC)	0454-6004 Armor Joint (Sealed)	0496-6009 Remov Str (Bridge 0-99 Ft Length
	CY	LF	CY	SF	CY	LF	CY	LF	LF	EA
2 ~ Abutments	33.4	192.0	17.6	~	38.5	~	411	24.0	~	~
1 ~ 40.00' Prestr Concrete Slab Beam Span	~	~	~	1040.0	~	197.5	~	80.0	52.0	1
TOTALS	33.4	192.0	17.6	1040.0	38.5	197.5	411	104.0	52.0	1



FOUNDATION LAYOUT

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 8th Edition (2017).

See Common Foundation Details (FD) standard sheet for all foundation details and notes not shown.

See Abutment Details for top of Drilled Shaft Elevations. Top of shafts shown are to be used as basis of measurement. Lengths shown on layout are minimum lengths.

Drilled shafts are designed for point bearing a minimum of 6.0' into shale and shall be founded at the elevations shown or deeper.

MATERIAL NOTES:

Provide Class "C" Concrete (f'c = 3600 psi).
Provide Grade 60 reinforcing steel.

HL93 LOADING

SHEET 1 OF 1

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs
BF22E0203EB34E8...

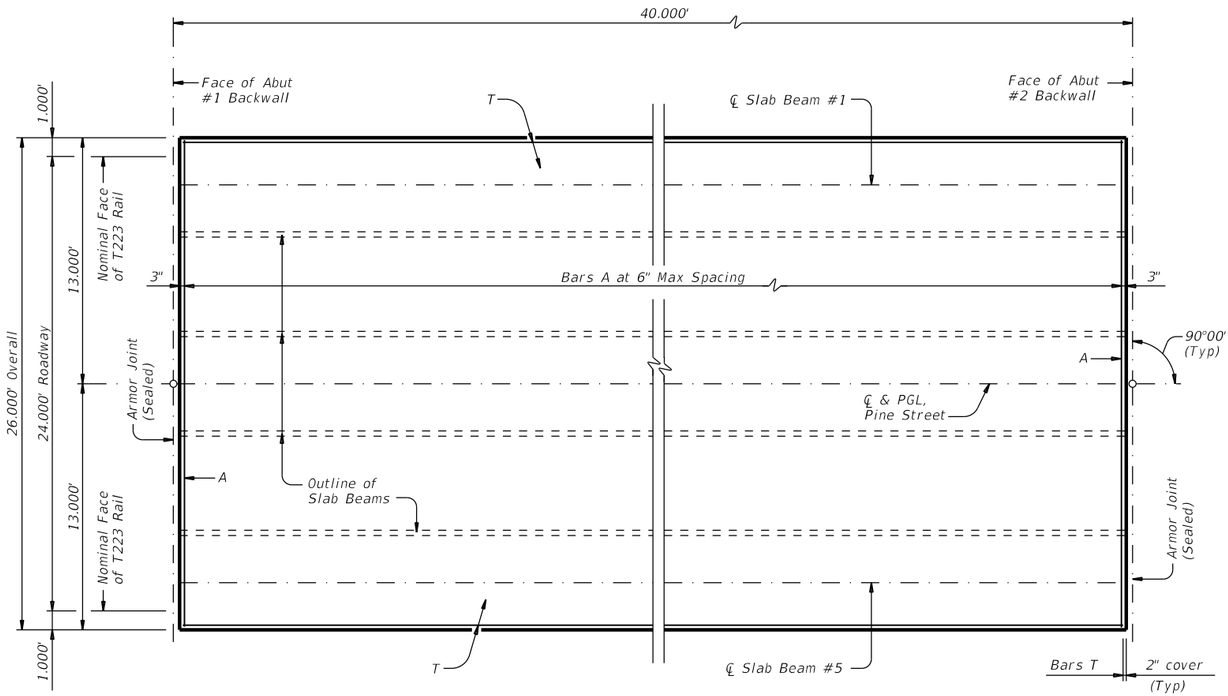
Texas Department of Transportation

Fort Worth Bridge Design

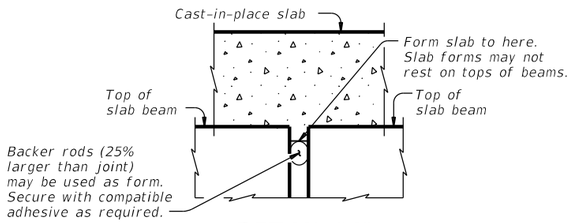
EST. QUANTITIES AND FOUNDATION LAYOUT

PINE STREET AT GRASSY BRANCH CREEK

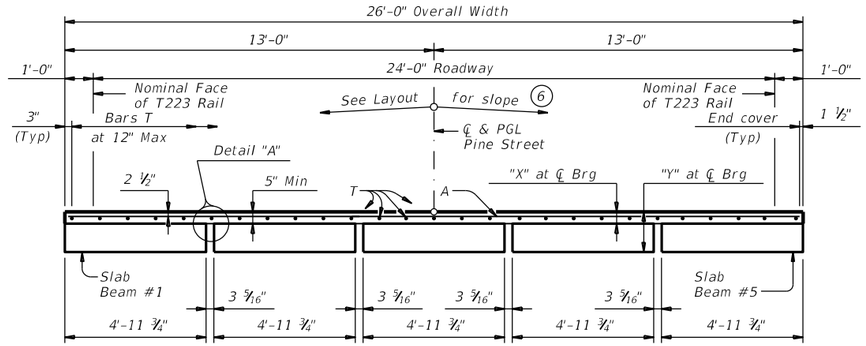
	DN: CHD	CK: AV	DW: KM/CHD	CK: AV/CHD
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		83



PLAN



DETAIL "A"



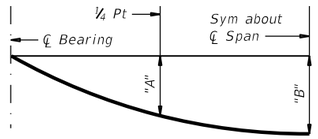
TYPICAL TRANSVERSE SECTION

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection		Section Depths (2)	
		"A"	"B"	"X"	"Y"
Ft		Ft	Ft	In	Ft/In
40	5SB12	0.023	0.032	6.50	1'-6 ½"

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (5SB12) ABUT TO ABUT	TOTAL REINF STEEL (1)
Ft	SF	LF (3)	Lb
40	1,040	197.50	2,910



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.

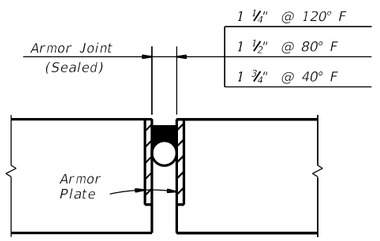
(1) Reinforcing steel weight is calculated using an approximate factor of 2.8 Lbs/SF.

(2) Based on theoretical beam camber, dead load deflections of 6" cast-in-place concrete slab and a constant grade. The Contractor will adjust these values for any vertical curve.

(3) Fabricator will adjust beam lengths for beam slopes as required.

BAR TABLE

BAR	SIZE
A	#5
T	#4



JOINT OPENING DETAIL

(For Additional Information and Details, See Related Standard Sheet "AJ".)

ARMOR JOINT DETAILS

TABLE OF ARMOR JOINT ESTIMATED QUANTITIES

ABUTMENT	LF
1	26.0
2	26.0
TOTAL	52.0

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
See applicable rail details for rail anchorage in slab.

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:
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

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs
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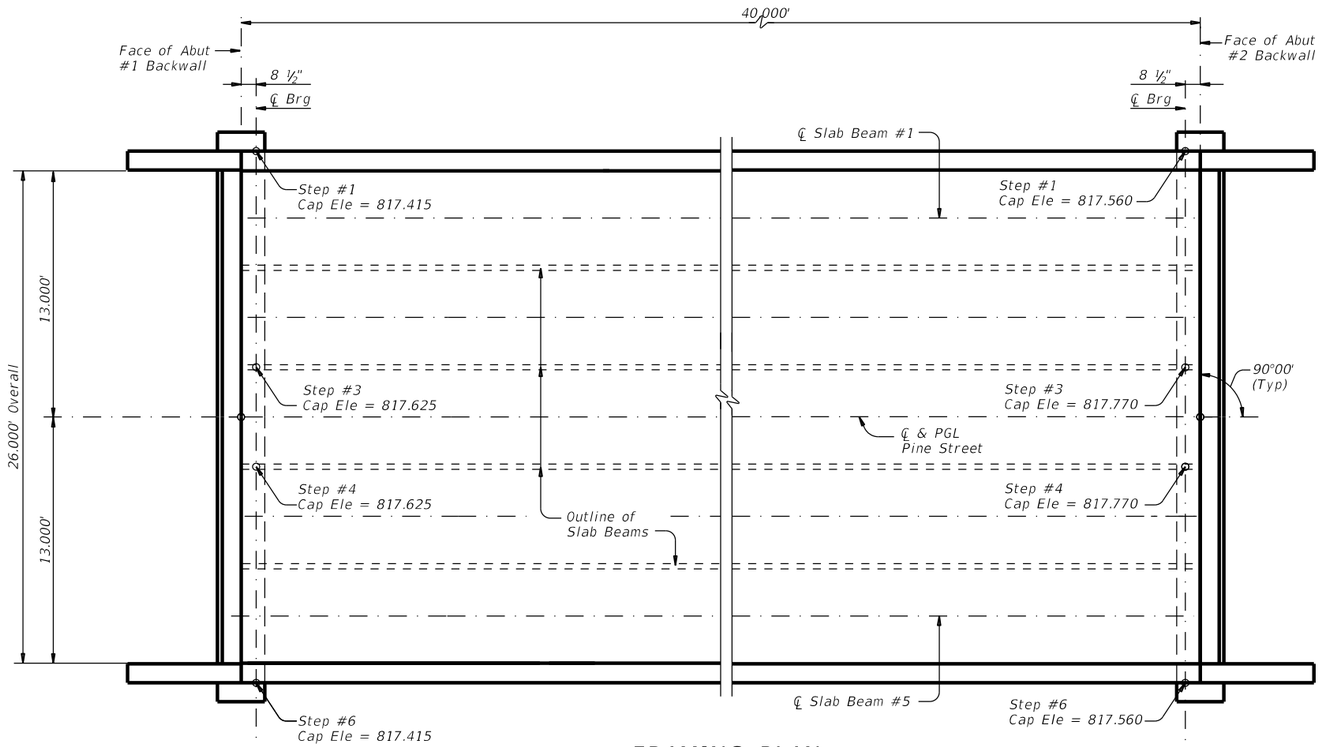
Texas Department of Transportation

Fort Worth Bridge Design

40.00' PRESTR CONCRETE SLAB BEAM SPAN (PSB 5SB12)

PINE STREET AT GRASSY BRANCH CREEK

DN: CHD	CK: AV	DW: KM/CHD	CK: AV/CHD
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		84



FRAMING PLAN

BENT REPORT

BENT NO. 1 (S 58 57 35.42 W)
DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 13.0000 L

	STEP SPAC.	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	90 0 0.00
BOX 1	5.2550	90 0 0.00
STEP 3	5.2550	90 0 0.00
STEP 4	5.2550	90 0 0.00
BOX 4	5.2550	90 0 0.00
STEP 6	4.9800	90 0 0.00
TOTAL	26.0001	

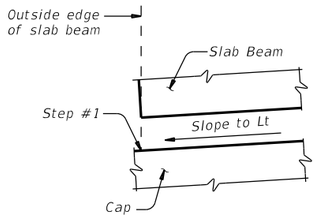
BENT NO. 2 (S 58 57 35.42 W)
DISTANCE BETWEEN STATION LINE AND STEP LINE 1, 13.0000 L

	STEP SPAC.	BEAM ANGLE D M S
SPAN 1		
STEP 1	0.0000	90 0 0.00
BOX 1	5.2550	90 0 0.00
STEP 3	5.2550	90 0 0.00
STEP 4	5.2550	90 0 0.00
BOX 4	5.2550	90 0 0.00
STEP 6	4.9800	90 0 0.00
TOTAL	26.0001	

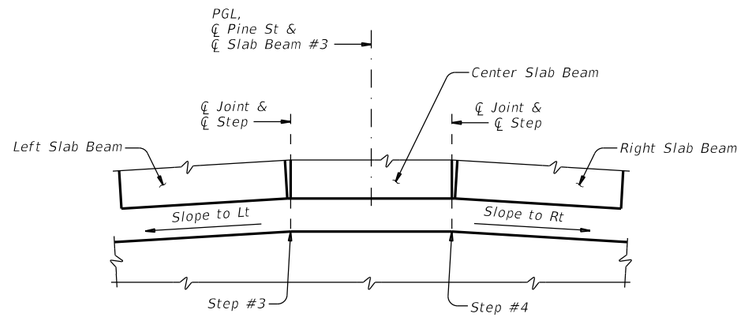
BEAM REPORT

BEAM REPORT, SPAN 1

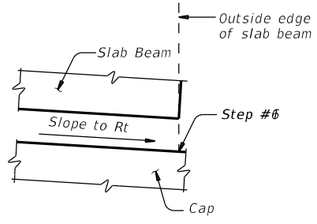
	HORIZONTAL C-C BENT	DISTANCE C-C BRG.	TRUE DISTANCE BOT. BM. FLG.	BEAM SLOPE
BEAM 1	40.0000	38.5833	39.5003	0.00375
BEAM 2	40.0000	38.5833	39.5003	0.00375
BEAM 3	40.0000	385833	39.5003	0.00375
BEAM 4	40.0000	38.5833	39.5003	0.00375
BEAM 5	40.0000	38.5833	39.5003	0.00375



STEP #1



STEP #3 & STEP #4



STEP #6

HL93 LOADING

SHEET 2 OF 2

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs
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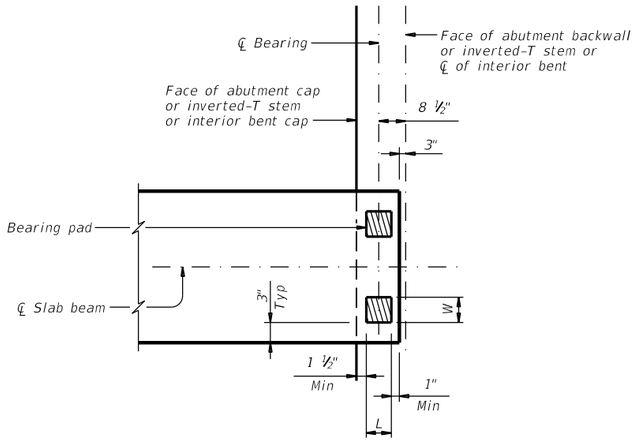
Texas Department of Transportation

Fort Worth Bridge Design

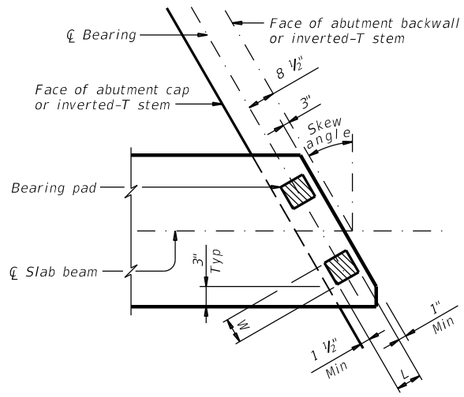
40.00' PRESTR CONCRETE SLAB BEAM SPAN (PSB 5SB12)

PINE STREET AT GRASSY BRANCH CREEK

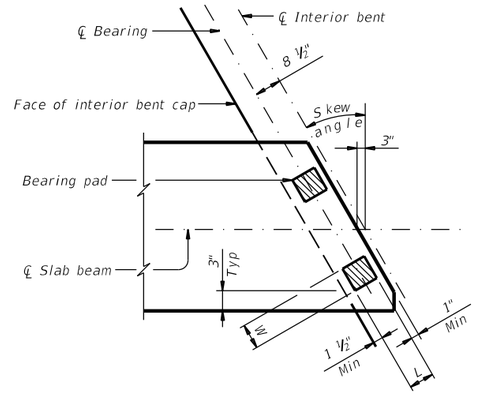
	DN: CHD	CK: AV	DW: KM/CHD	CK: AV/CHD
©TxDOT 03-07-22	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		85



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)



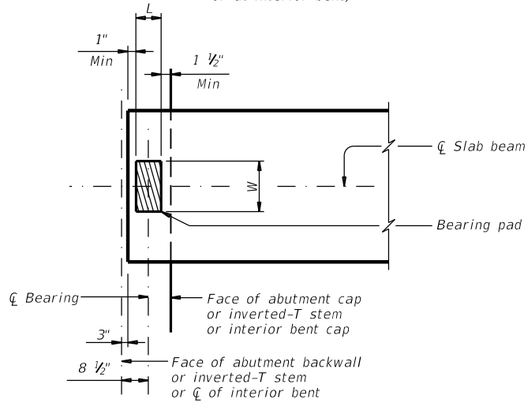
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

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

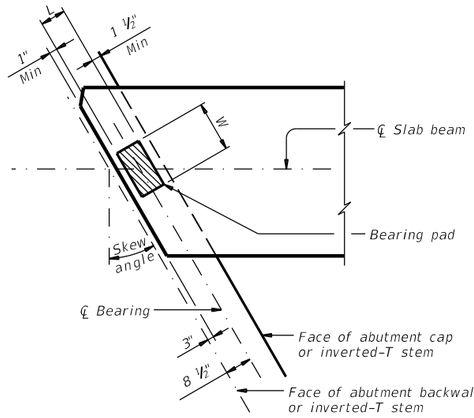
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

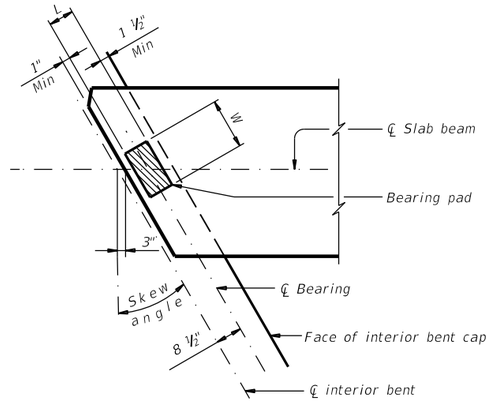
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



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



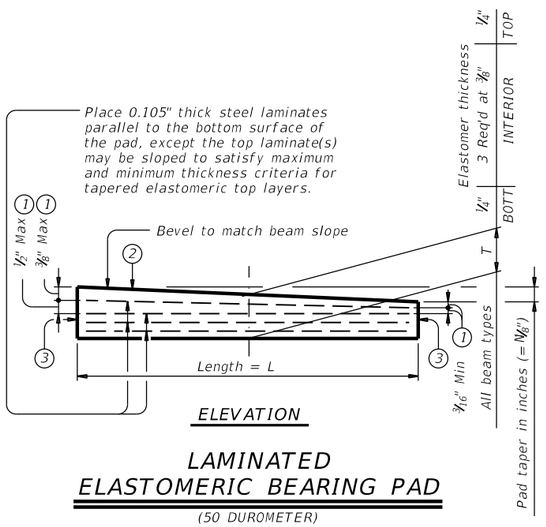
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



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

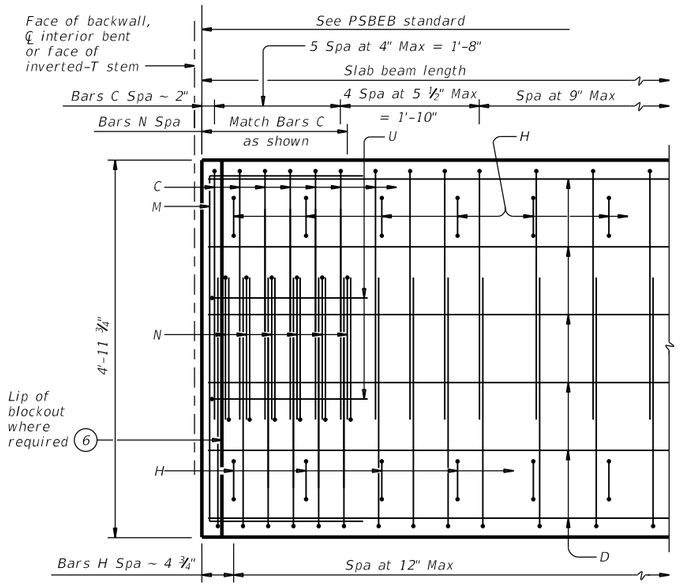
ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

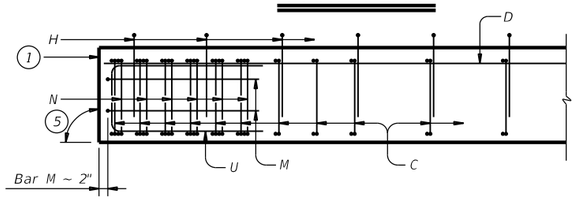
PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		86

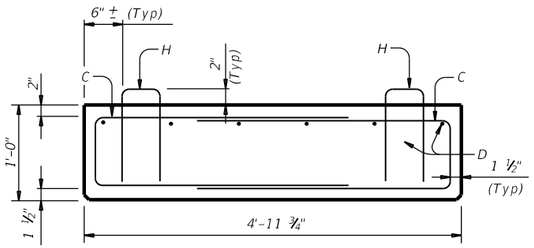
DATE: 3/8/2022 9:26:35 AM



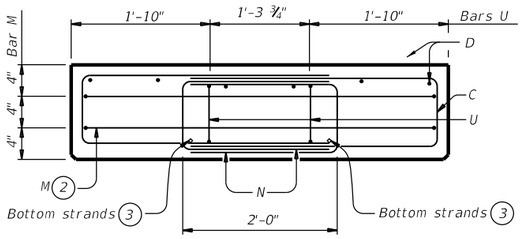
PART PLAN



ELEVATION

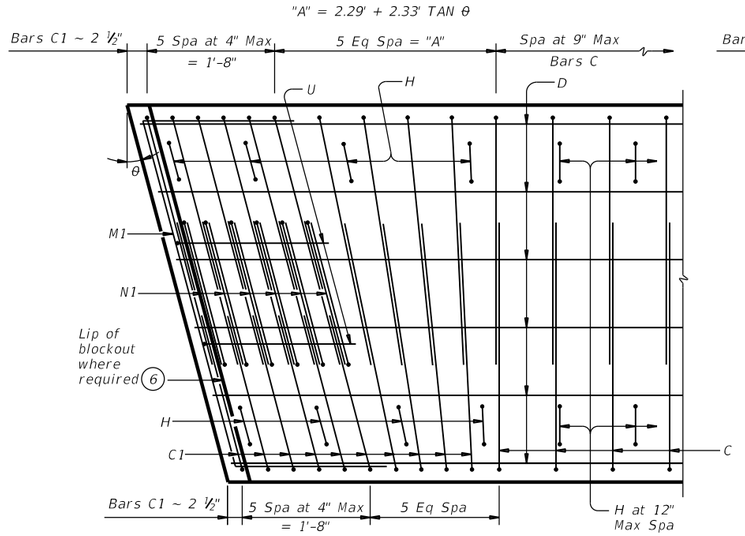


SECTION



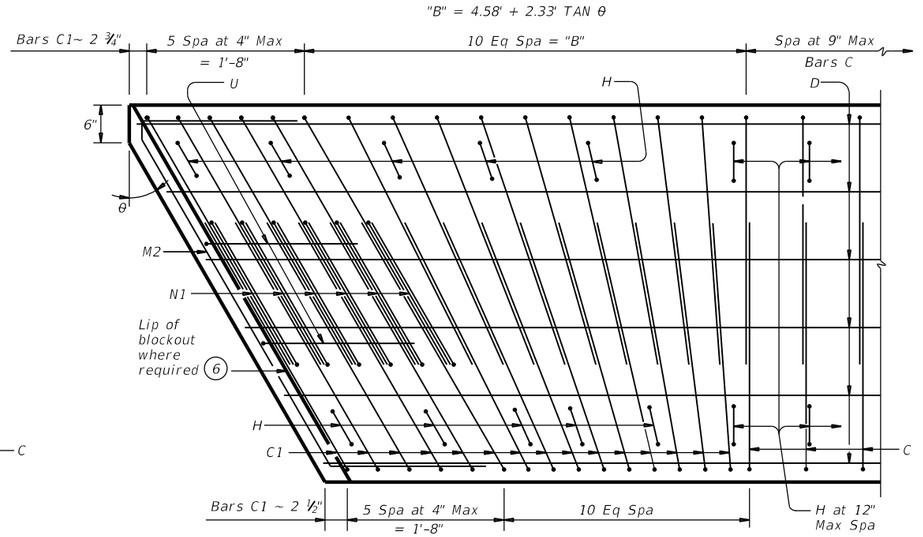
END MAT REINFORCING

Bars H not shown for clarity.



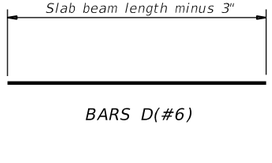
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

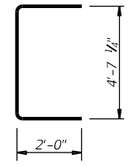


PART SKEW PLAN

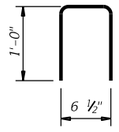
(Showing θ over 15° to 30° Skew)



BARS D(#6)



BARS M(#4)



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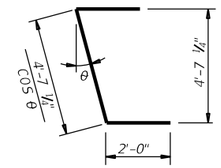

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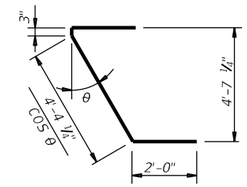

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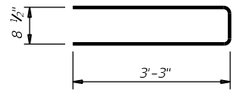

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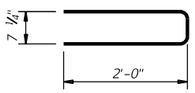

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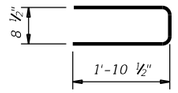

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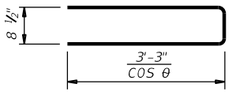

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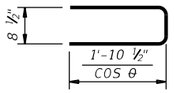

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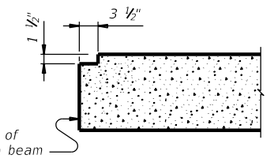


ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	717.0
Y top	in	6.00
Y bott	in	6.00
I	in^4	8,604
Weight (4)	lb/ft	747

(1) See End Mat Reinforcing detail.

(2) Adjust bars M vertically to avoid strands.

(3) See sheet PSBND or PSBSD for strand locations.

(4) Assumes 150 pcf weight density of concrete.

(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.

(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.

These details can be used for any skew angle up to a maximum of 30 degrees.

Chamfer all exposed corners ¾" or round to a ¾" radius.

Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.

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

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB12)

PSB-5SB12

FILE: psbsts03-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		87

DATE: 3/8/2022 9:24:46 AM

DESIGNED BEAMS (STRAIGHT STRANDS)

STRUCTURE	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS						DEBONDED STRANDS PER ROW							CONCRETE	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	TOT NO. DEB	DIST FROM BOTTOM (in)	NO. OF STRANDS TOTAL	NO. OF STRANDS DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end) 3	6	9	12	15	RELEASE STRGTH ① f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)
Cherry Street at Grassy Branch Creek	1	ALL	5SB15		26	0.6	270	5.00	5.00	8	2.50	26	8	2	4	2	0	0	4.000	5.000
Pine Street at Grassy Branch Creek	1	ALL	5SB12		22	0.6	270	3.50	3.50	4	2.50	22	4	4	0	0	0	0	4.400	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
Cherry Street at Grassy Branch Creek	2.934	-3.468	1381	0.440	0.440
Pine Street at Grassy Branch Creek	2.582	-3.226	909	0.443	0.443

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

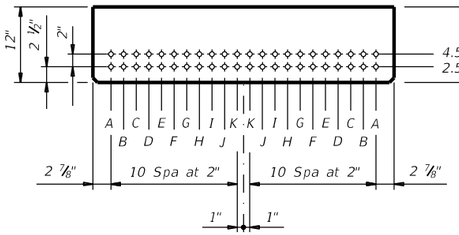
② Portion of full HL93.

DESIGN NOTES:

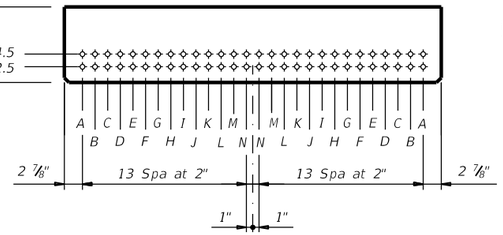
Designed according to AASHTO LRFD Bridge Design Specifications.
Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

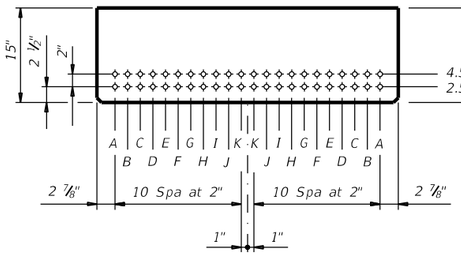
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
Full-length debonded strands are not permitted in positions "A" and "B".
Strand debonding must comply with Item 424.4.2.2.2.4.
When shown on this sheet, the Fabricator has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



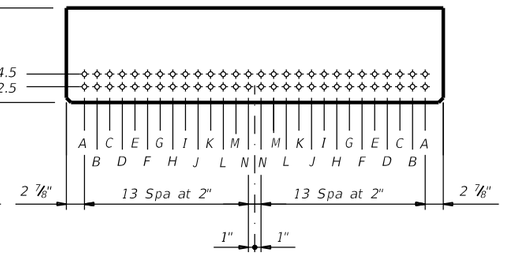
TxDOT 4SB12 SLAB BEAM



TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

STATE OF TEXAS
CHADWICK H. DABBS
135276
LICENSED
PROFESSIONAL ENGINEER

3/8/2022

DocuSigned by:
Chad Dabbs
DF22E0295EB54E8...

HL93 LOADING

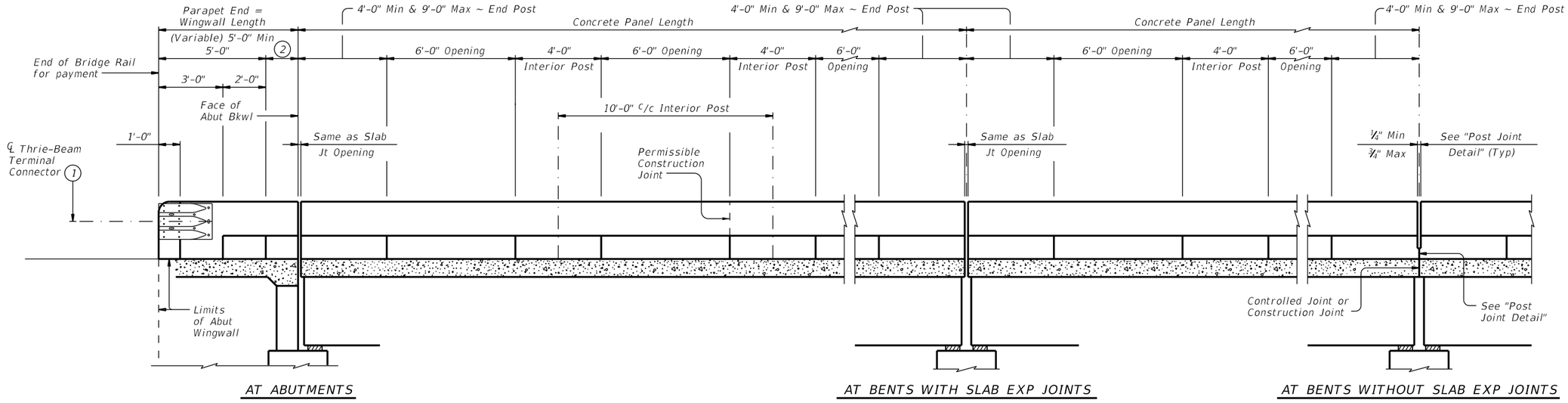
Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAMS (NON-STANDARD SPANS)

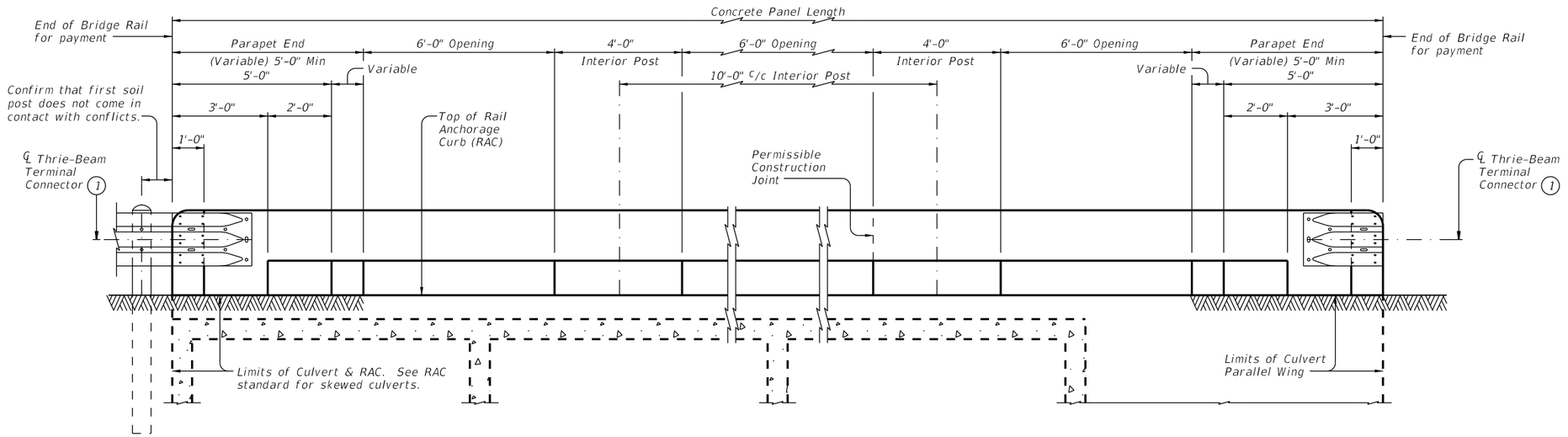
PSBND

FILE: psbsts05-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		88



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

ROADWAY ELEVATION OF RAIL ON BRIDGE



AT STRAIGHT OR FLARED WINGS | AT PARALLEL WINGS

ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown.
Vertical joints in concrete rail are not required, unless shown elsewhere.

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

(2) Wingwall Length minus 5'-0" (Varies)

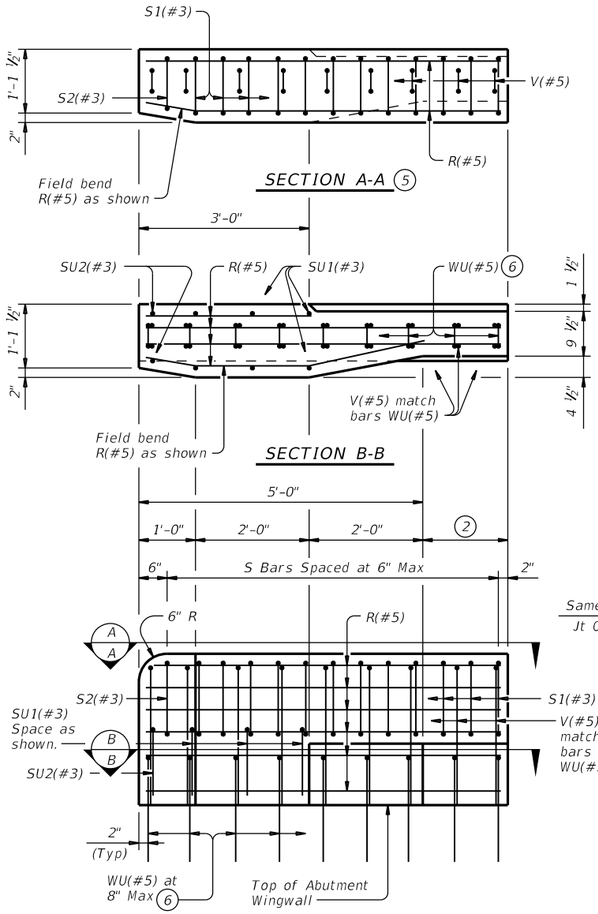
Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL

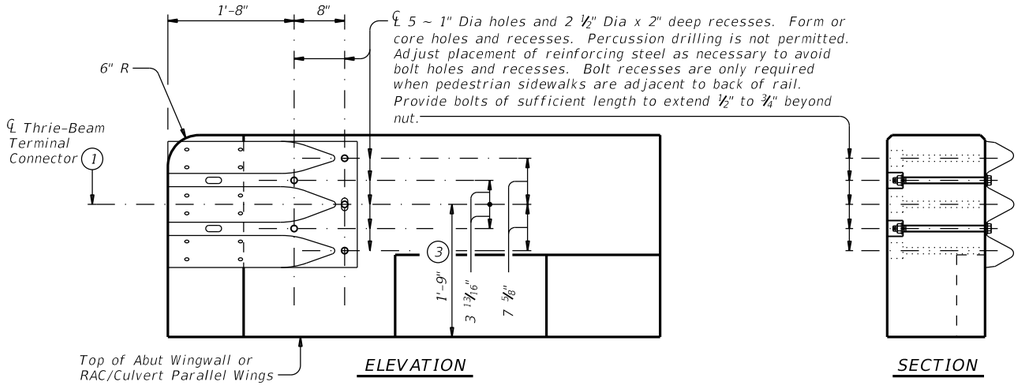
TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		89

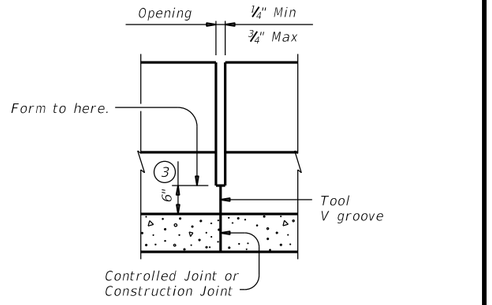
DATE: 3/8/2022 9:25:28 AM



PARAPET END AT ABUT WINGWALL (6)

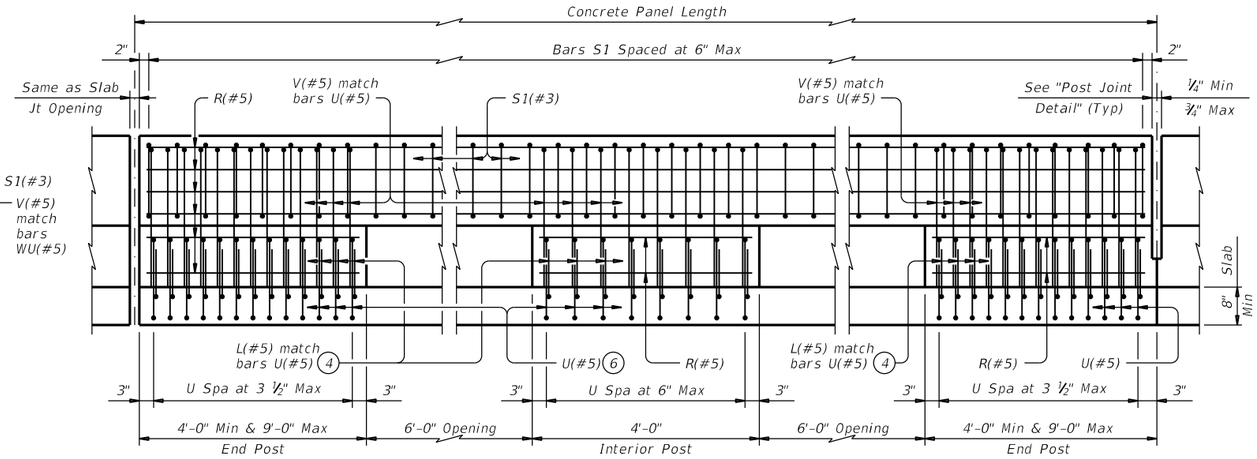


TERMINAL CONNECTION DETAILS



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

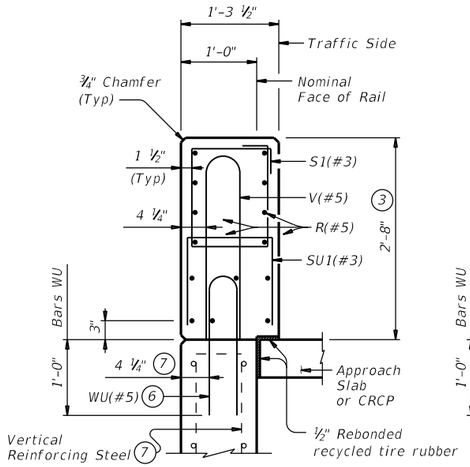
TRAFFIC RAIL

TYPE T223

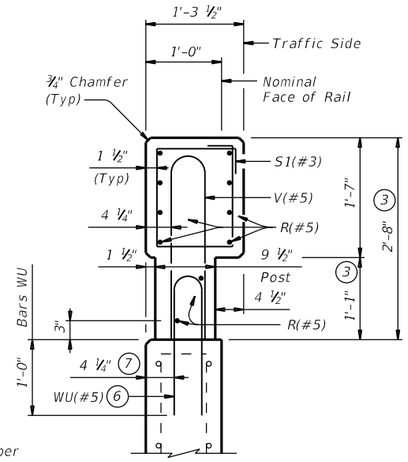
FILE:	r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0902	38	133, ETC	CS
		DIST	COUNTY		SHEET NO.
		02	PARKER		90

DATE: 3/8/2022 9:25:50 AM

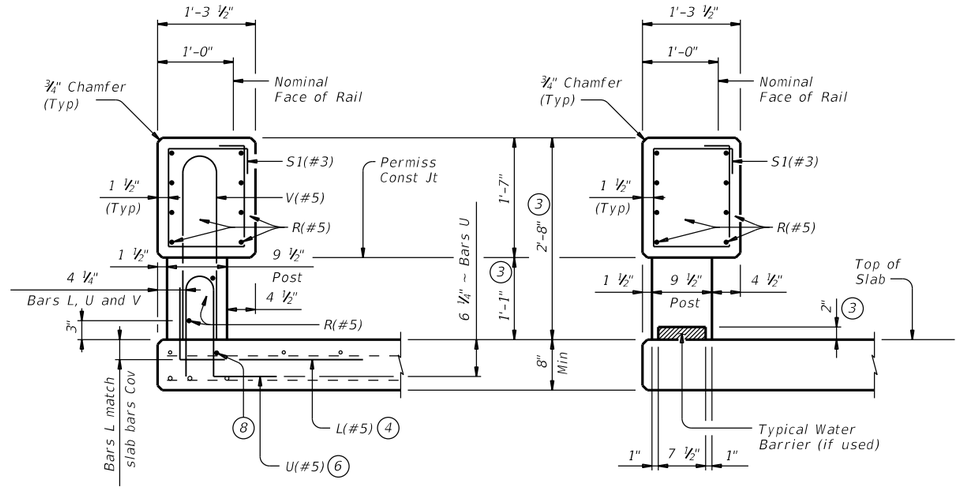
DATE: 3/8/2022 9:26:05 AM



SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

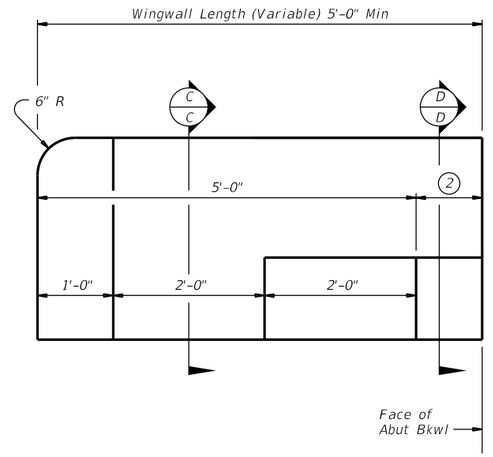


AT POST
ON BRIDGE SLAB

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.

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.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

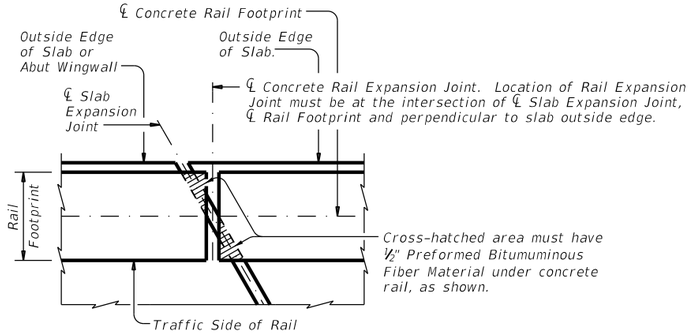
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(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.

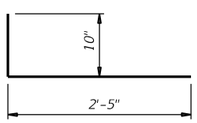
(8) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(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.

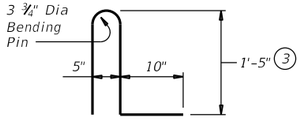


PLAN OF RAIL AT EXPANSION JOINTS

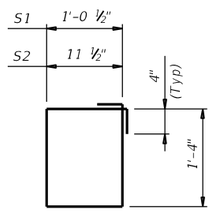
Example showing Slab Expansion Joints without breakbacks.



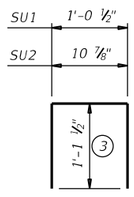
BARS L (#5)



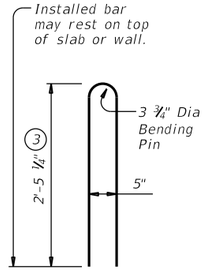
BARS U (#5) (9)



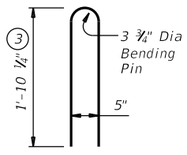
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

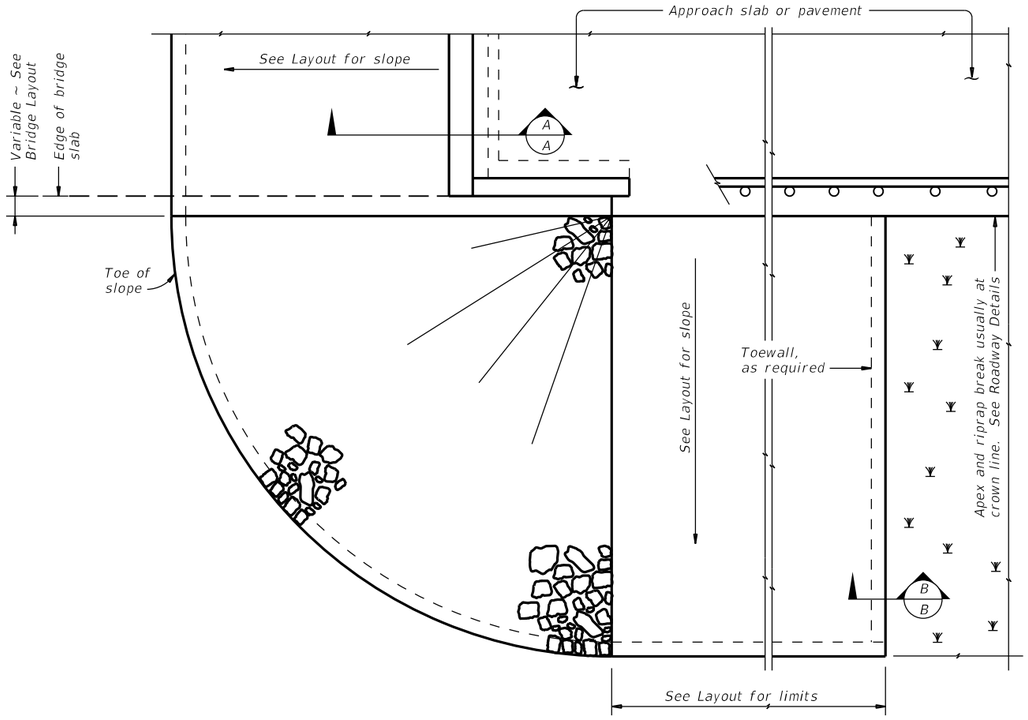
Texas Department of Transportation

Bridge Division Standard

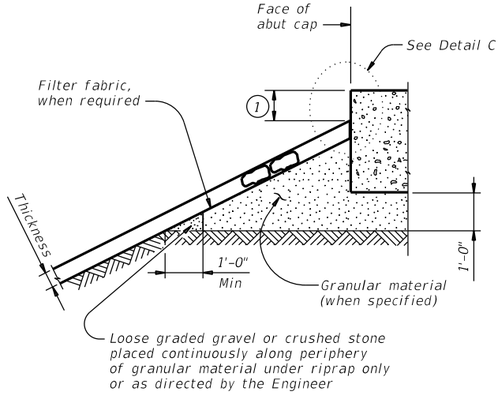
TRAFFIC RAIL

TYPE T223

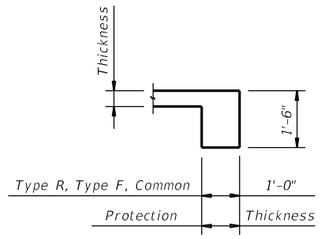
FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		91



PLAN

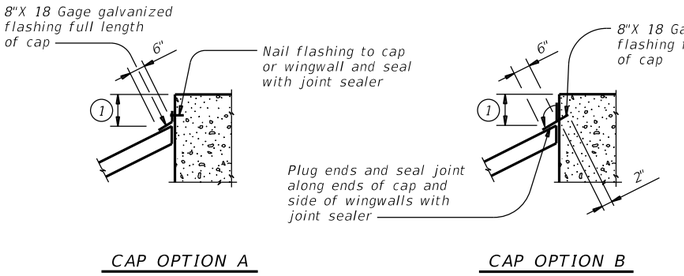


SECTION A-A AT CAP



SECTION B-B

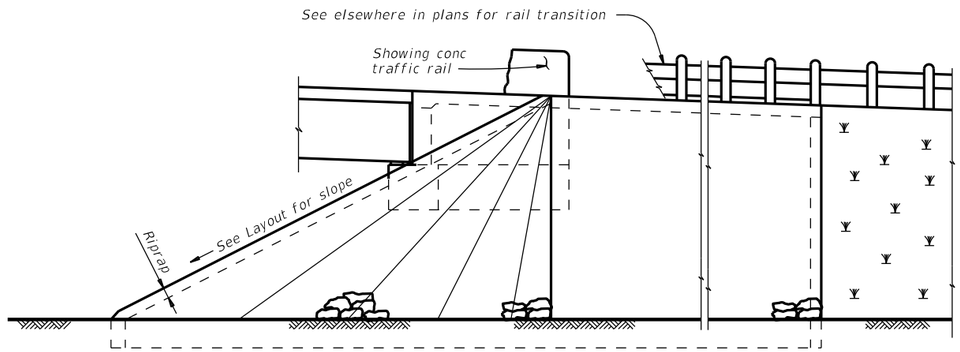
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



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.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES			
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0902	38	133, ETC	CS			
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	02	PARKER		92			

DATE: 3/8/2022 9:23:20 AM

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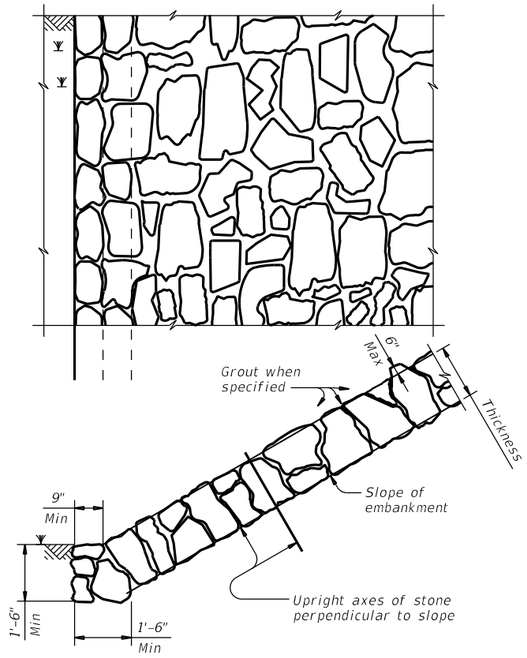


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

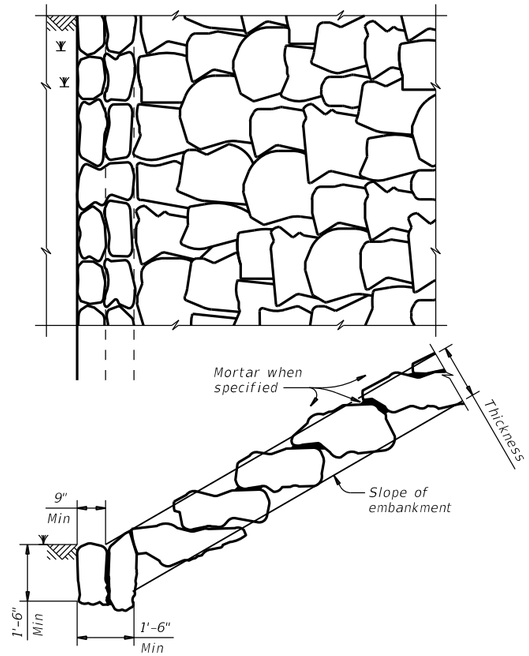


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

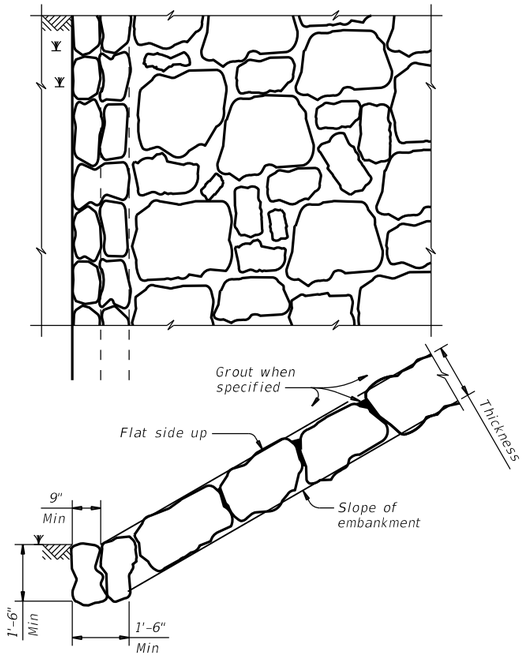


FIGURE 3 ~ TYPE F STONE RIPRAP

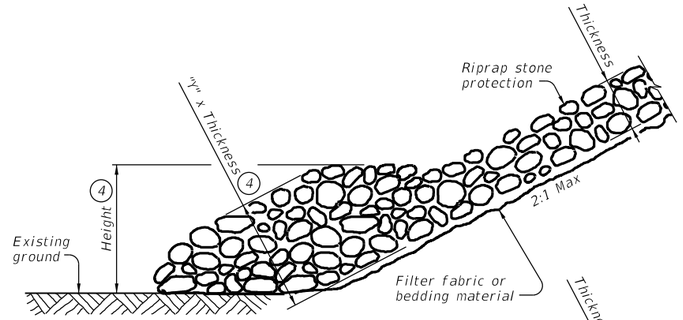
grouted

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

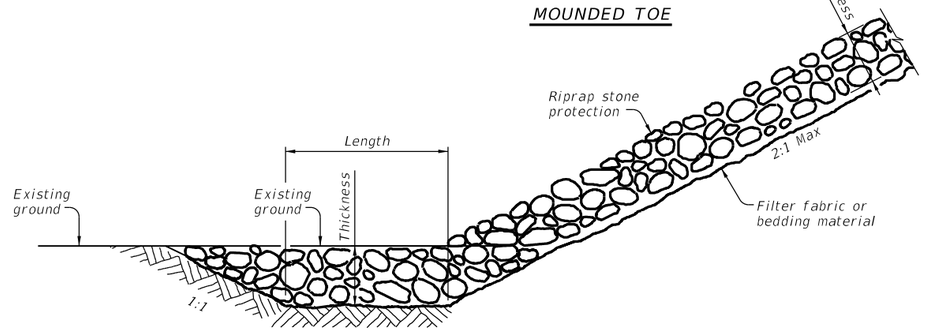
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

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

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



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

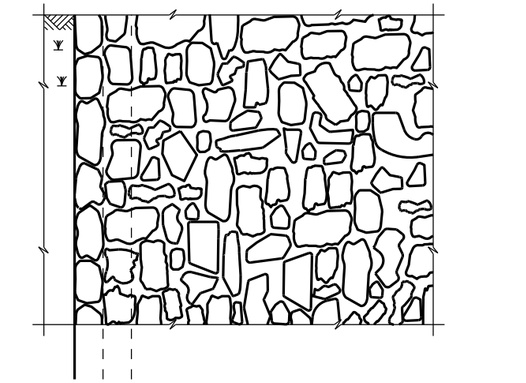


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

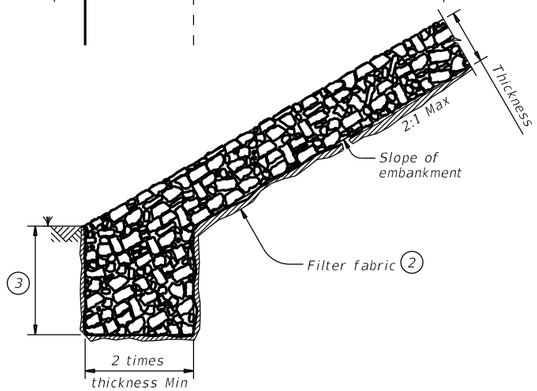


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

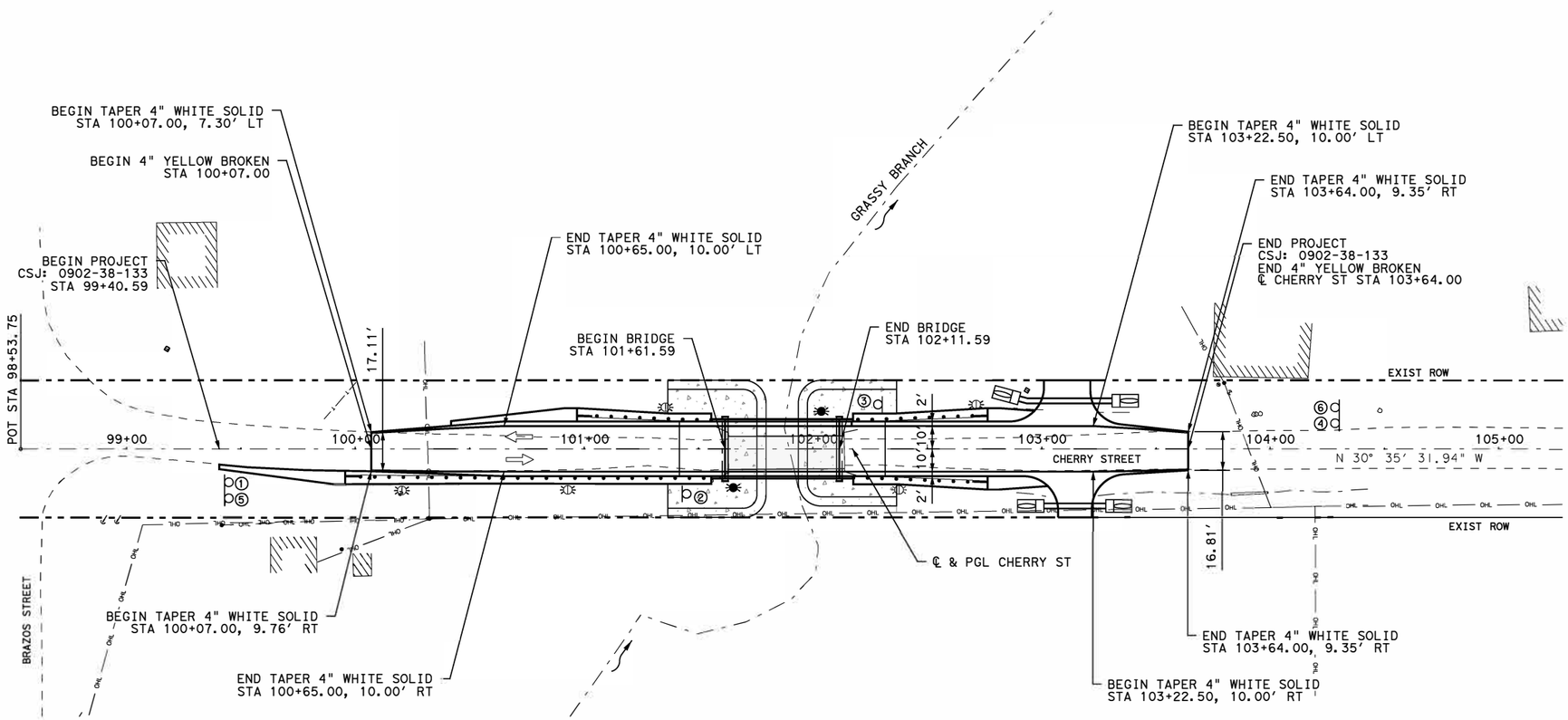
Texas Department of Transportation

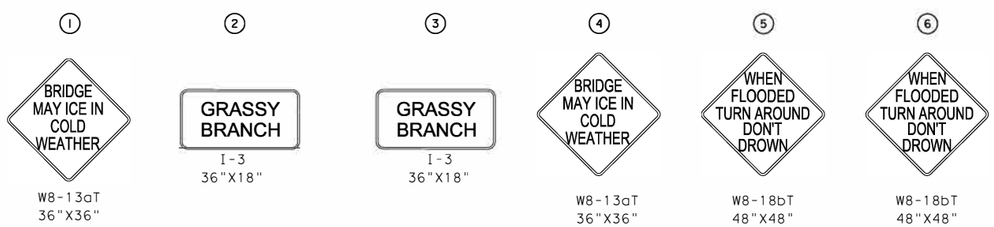
Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	02	PARKER		93





SCALE: 1"=60'

LEGEND

- INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BI)
- INSTL DEL ASSM (D-SW) SZ (BRF) GF2 (BI)
- d SMALL SIGN
- (X) SMALL SIGN NUMBERS

NOTE

1. ALL SIGNS AND PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE TEXAS MUTCD.
2. PLACE TY II PAVEMENT MARKINGS IN THE LIMITS OF THE BRIDGE.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

SIGNING & PAVEMENT MARKINGS

SCALE: 1"=60' SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	94
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorshoi
DATE: 3/2/2022
SCALE: 1:60
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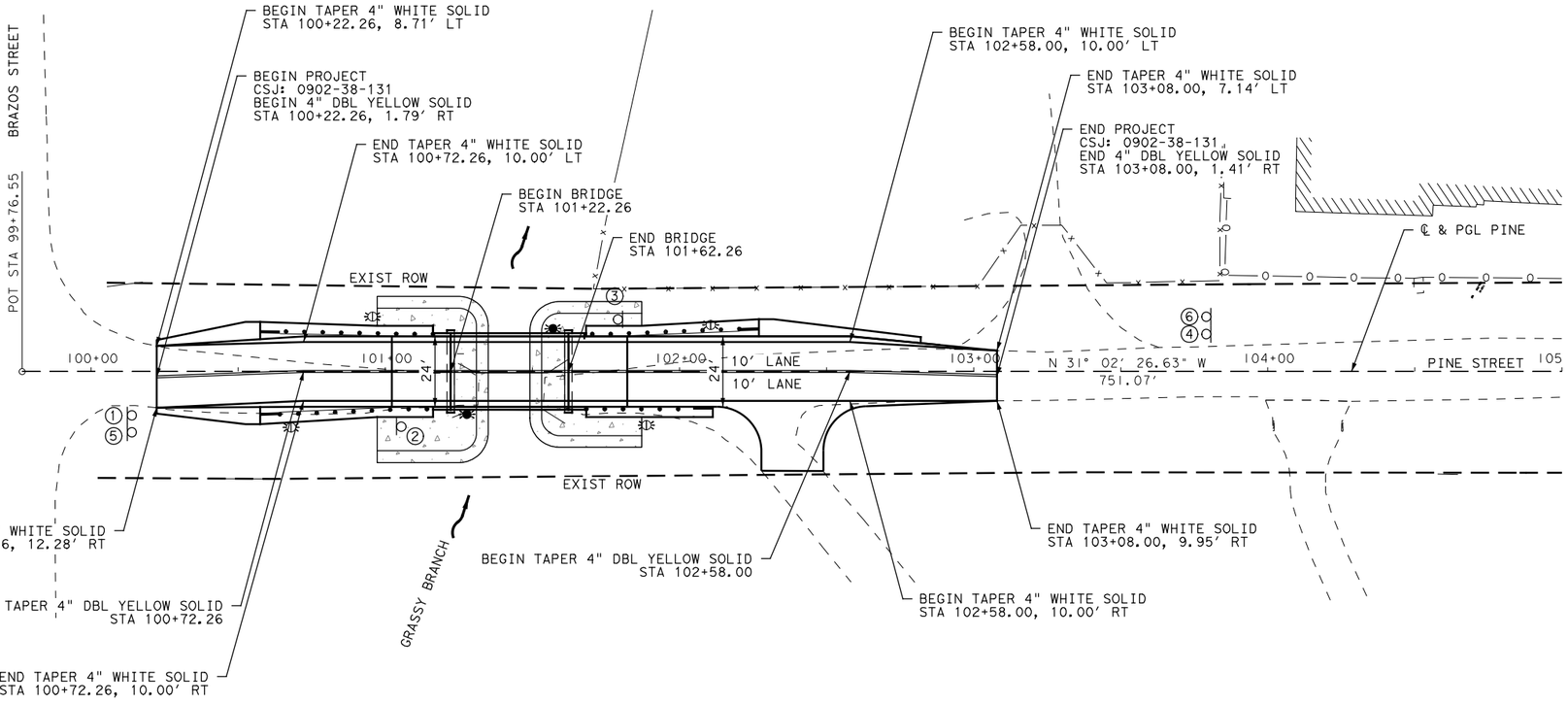

0' 25' 50'

SCALE: 1"=50'

LEGEND

- INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BI)
- INSTL DEL ASSM (D-SW) SZ (BRF) GF2 (BI)
- SMALL SIGN
- (X) SMALL SIGN NUMBERS

NOTE

1. ALL SIGNS AND PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE TEXAS MUTCD.
2. PLACE TY II PAVEMENT MARKINGS IN THE LIMITS OF THE BRIDGE.

① BRIDGE MAY ICE IN COLD WEATHER
W8-13aT
36"X36"

② GRASSY BRANCH
I-3
36"X18"

③ GRASSY BRANCH
I-3
36"X18"

④ BRIDGE MAY ICE IN COLD WEATHER
W8-13aT
36"X36"

⑤ WHEN FLOODED TURN AROUND DON'T DROWN
W8-18bT
48"X48"

⑥ WHEN FLOODED TURN AROUND DON'T DROWN
W8-18bT
48"X48"

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER

3/3/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

PINE STREET

SIGNING & PAVEMENT MARKINGS

SCALE: 1"=50' SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	95
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: jmurphy
DATE: 3/3/2022
SCALE: 1:50
FILE: z:\Projects\1195 TxDOT_On-Off 56 6195-00\1195.04\DGN\SHT\131-PINE\131PMRKPL01.dgn
PLOT DRIVER: TXDOT_PDF_BW.plt<fg
TIME: 2:19:24 PM
PENTABLE: CHERRY-PINE-PENTABLE.TBL

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
94	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36			10BWG	1	SA	P		
94	2	I-3	GRASSY BRANCH	36X18			10BWG	1	SA	U		
94	3	I-3	GRASSY BRANCH	36X18			10BWG	1	SA	U		
94	4	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36			10BWG	1	SA	P		
94	5	W8-18bT	WHEN FLOODED TURN AROUND DONT DROWN	48X48			10BWG	1	SA	P		
94	6	W8-18bT	WHEN FLOODED TURN AROUND DONT DROWN	48X48			10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

CHERRY STREET

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
4-16 8-16	DIST	COUNTY		SHEET NO.
	FTW	PARKER		96

18

DATE: 3/3/2022 2:19:30 PM
FILE: Z:\Projects\1195 TxDOT_On-Off 36-61DP5400\1195.04\DGN\STANDARDS\sums16-CHERRY.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
95	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36			10BWG	1	SA	P		
95	2	I-3	GRASSY BRANCH	36X18			10BWG	1	SA	U		
95	3	I-3	GRASSY BRANCH	36X18			10BWG	1	SA	U		
95	4	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36X36			10BWG	1	SA	P		
95	5	W8-18bT	WHEN FLOODED TURN AROUND DONT DROWN	48X48			10BWG	1	SA	P		
95	6	W8-18bT	WHEN FLOODED TURN AROUND DONT DROWN	48X48			10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

PINE STREET

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
4-16 8-16	DIST	COUNTY		SHEET NO.
	FTW	PARKER		97

18

DATE: 3/3/2022 2:19:32 PM
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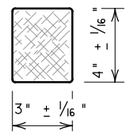
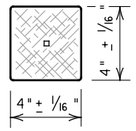
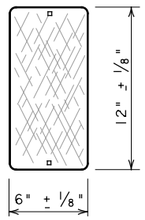
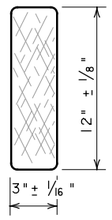
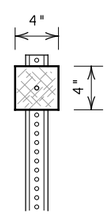
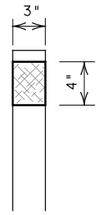
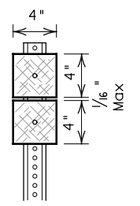
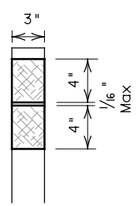
DATE: DATE/TIME 9:00:35 AM
FILE: DOCUMENT NAME I95 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\STANDARDS\dom1-20.dgn

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

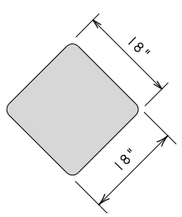
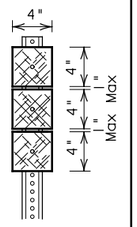
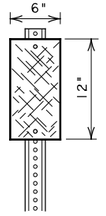
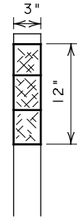
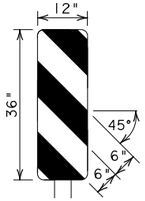
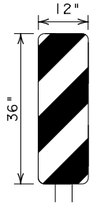
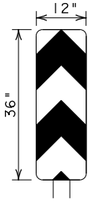
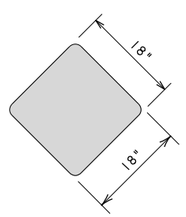
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

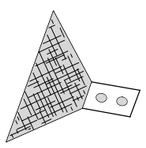
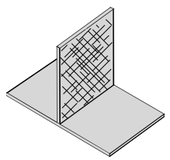
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = BI-Directional

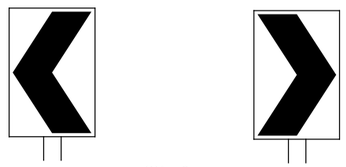
OBJECT MARKERS

	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

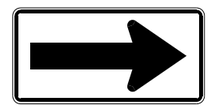
BARRIER REFLECTORS (BRF)

	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	 WI-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 (WI-8) signs and ONE DIRECTION LARGE ARROW (WI-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 (WI-9T) may be used instead of the ONE DIRECTION LARGE ARROW (WI-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 WI-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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

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	0902	38	133,ETC	CS
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	FTW	PARKER		98

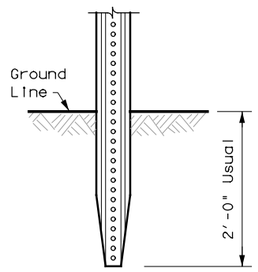
20A

DATE: DATE/TIME: 9:00:36 AM
FILE: DOCUMENT NAME: I195 TxDOT_On-Off 36-61DP5400\1195.04\DGN\STANDARDS\dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

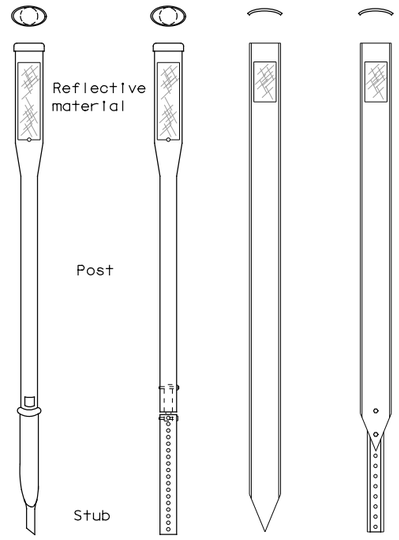


NOTES

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.

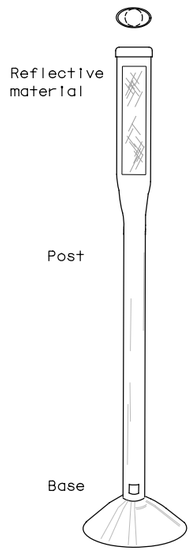
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



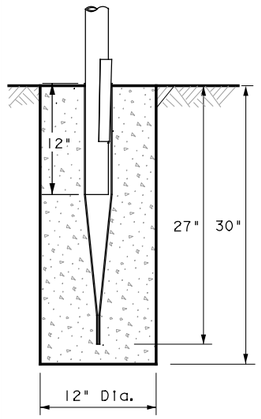
SURFACE MOUNT

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.

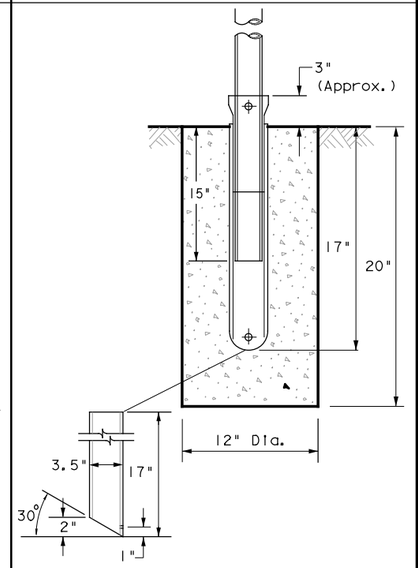
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

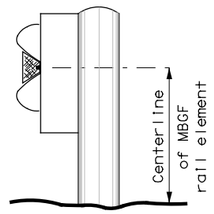
NOTE

1. Install per manufacturer's recommendations.

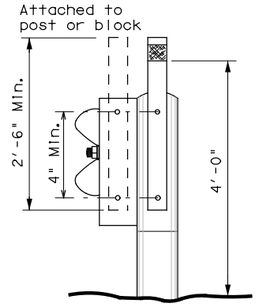
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

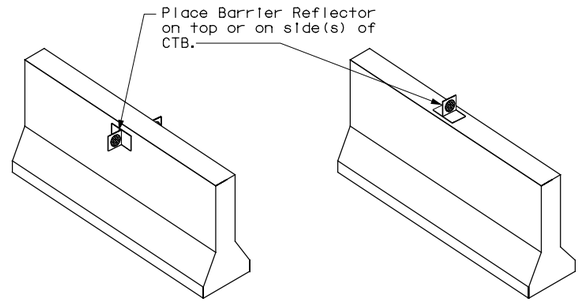
GF1



GF2



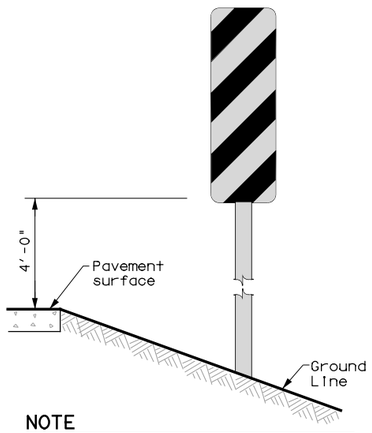
CONCRETE TRAFFIC BARRIER (CTB)



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.

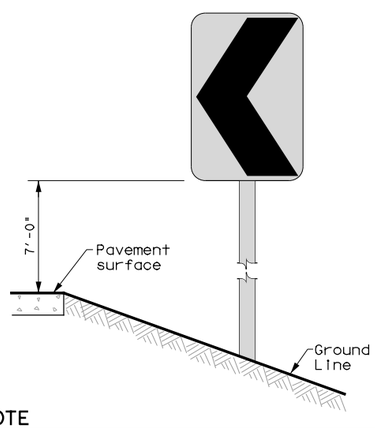
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

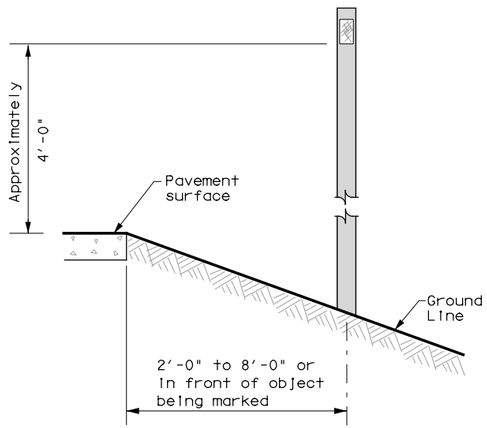
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	0902	38	133, ETC	CS
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	FTW	PARKER		99

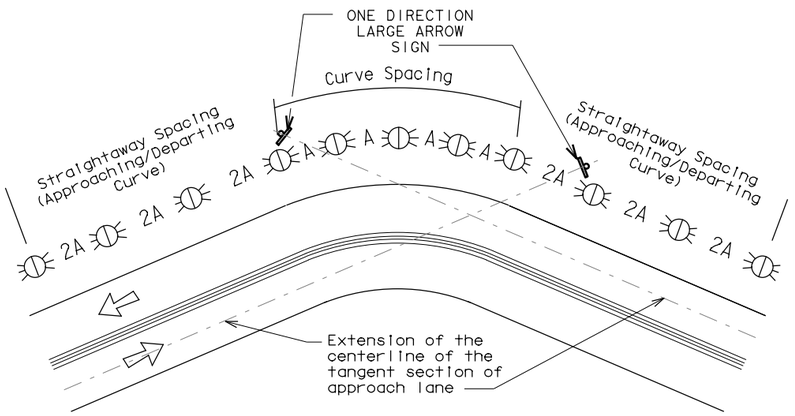
20B

DATE: DATE/TIME 9:00:38 AM
FILE: DOCUMENT NAME dom3-20.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

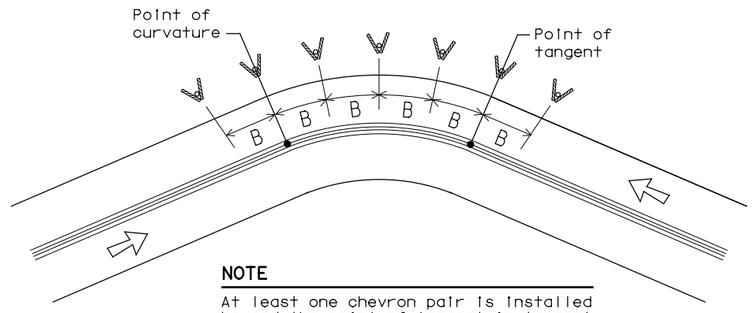
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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
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3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	FTW	PARKER		100

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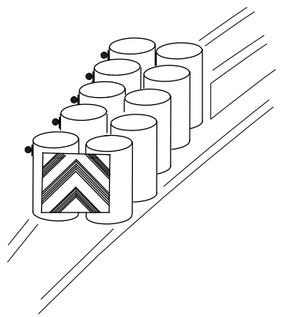
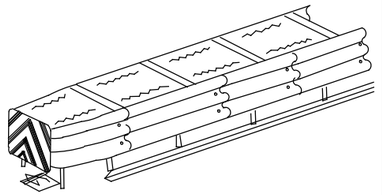
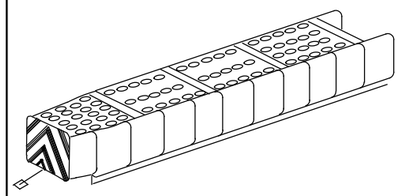
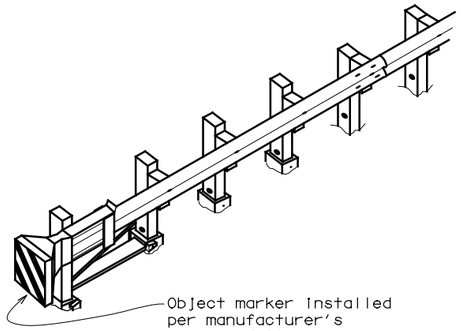
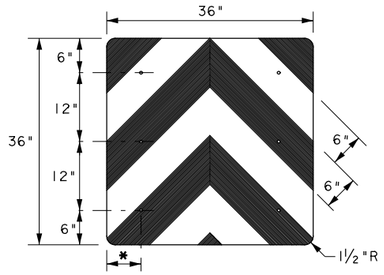
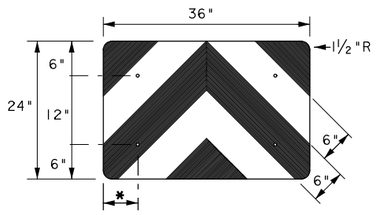




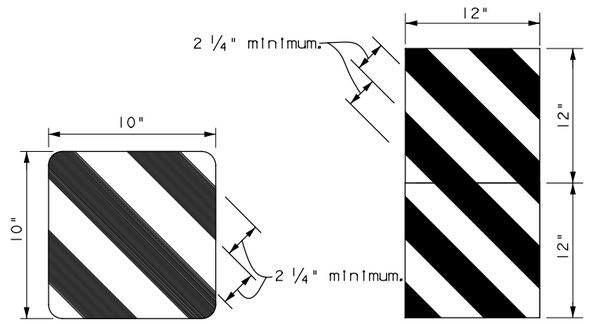




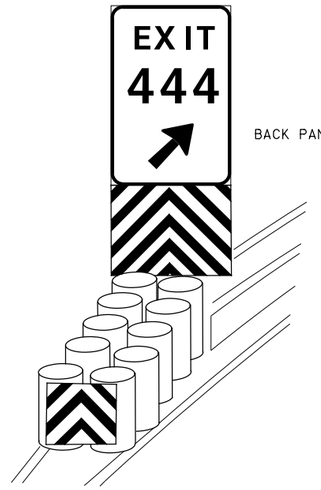




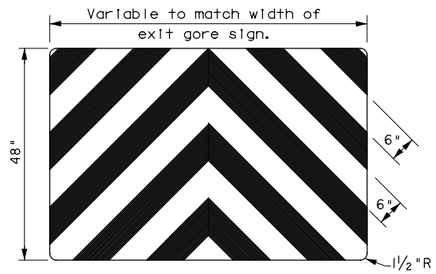
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

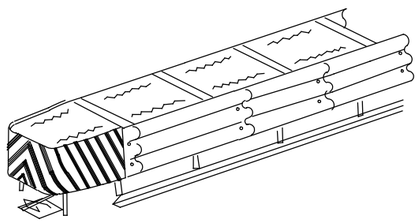


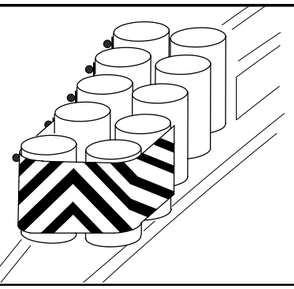
OBJECT MARKERS SMALLER THAN 3 FT^2

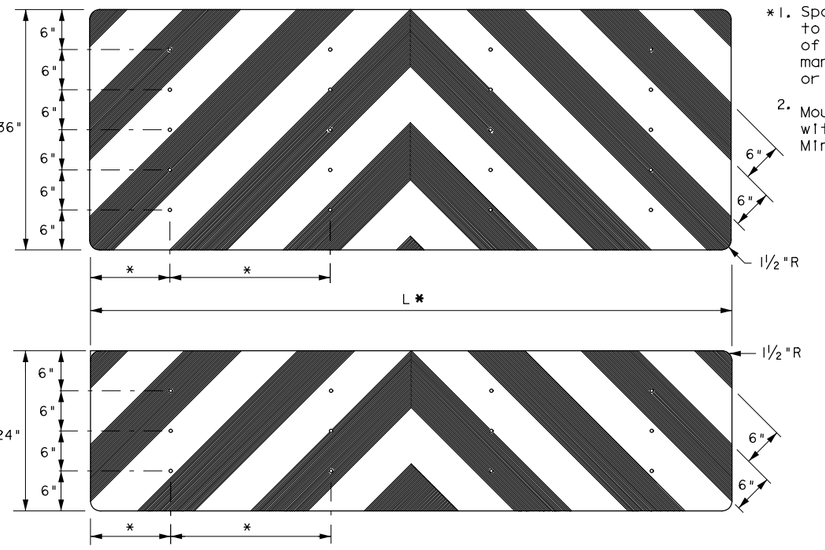


BACK PANEL (OPTIONAL)









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

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©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
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4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	FTW	PARKER		101
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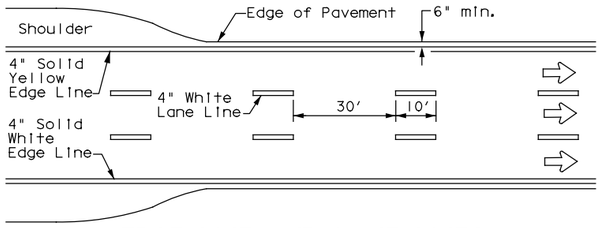
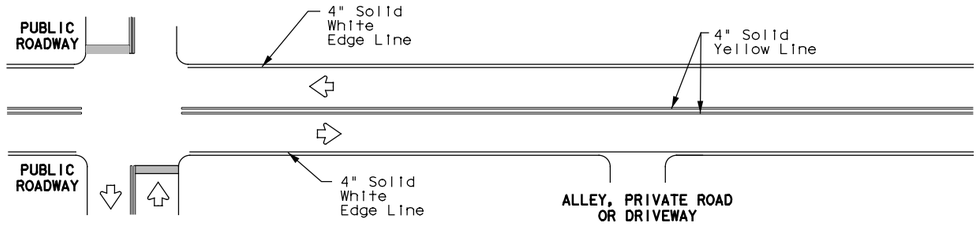
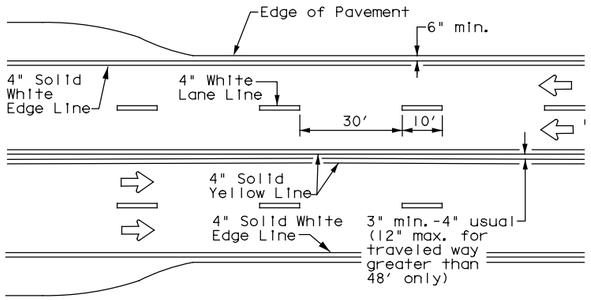


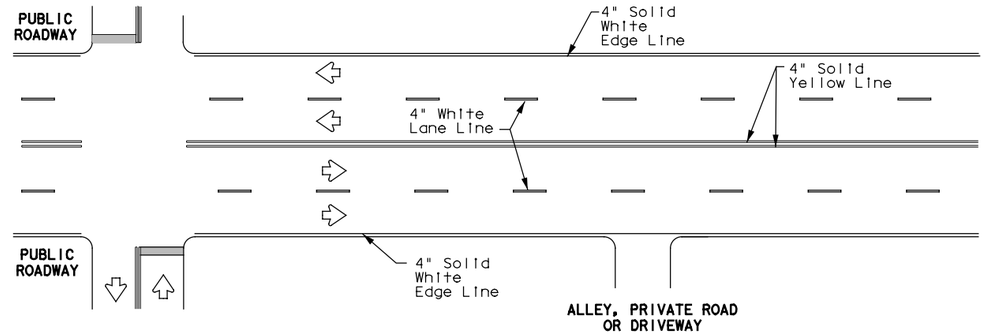
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



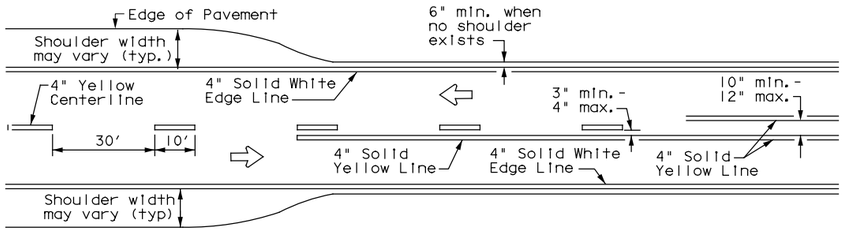
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



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

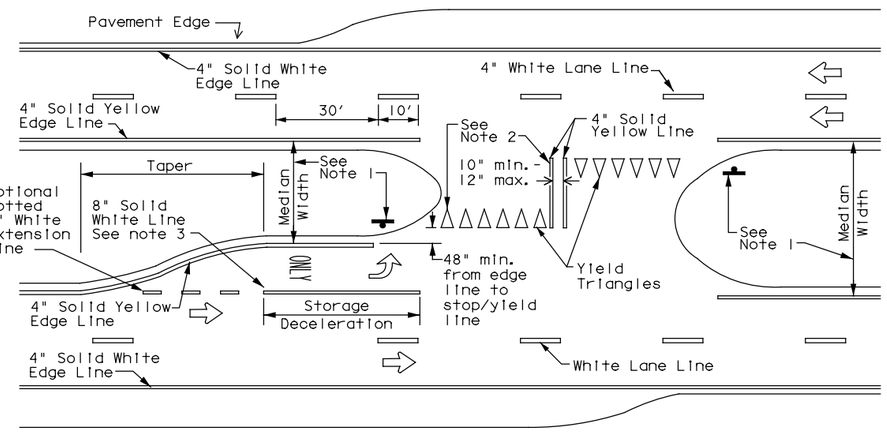


TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

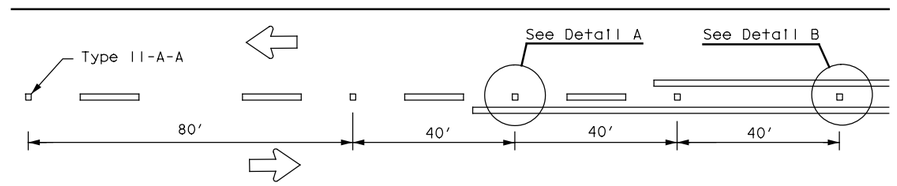
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

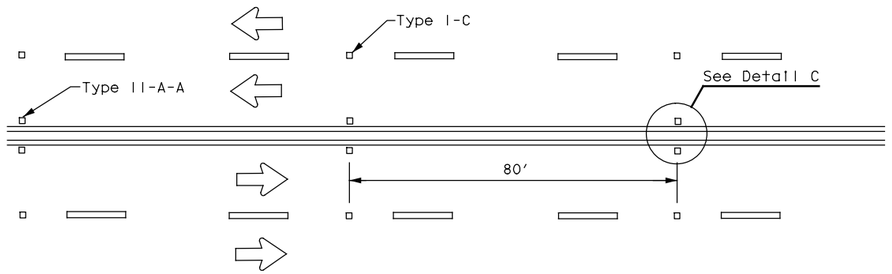
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0902	38	133,ETC	CS
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	FTW	PARKER		102

22A

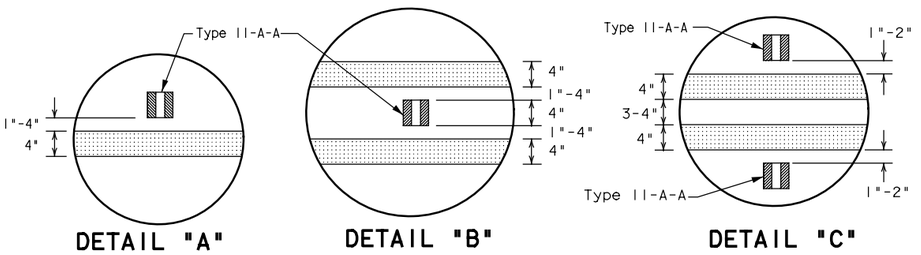
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

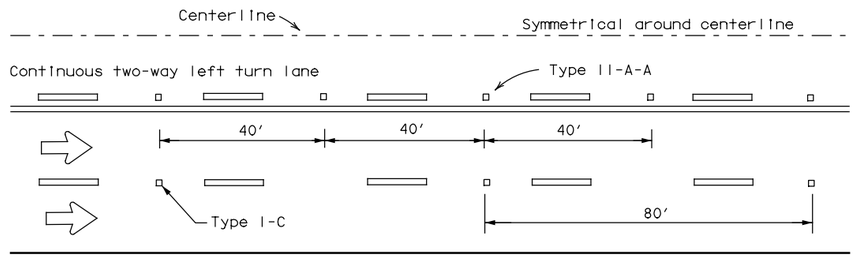


CENTERLINE FOR ALL TWO LANE ROADWAYS

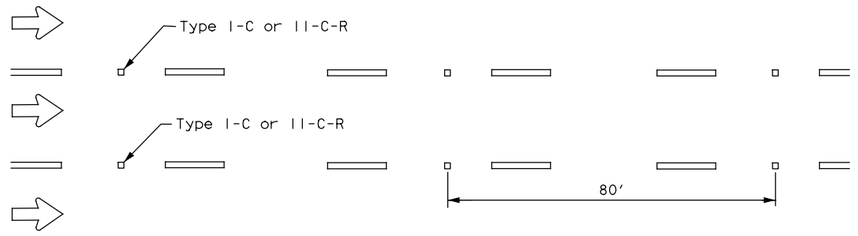


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



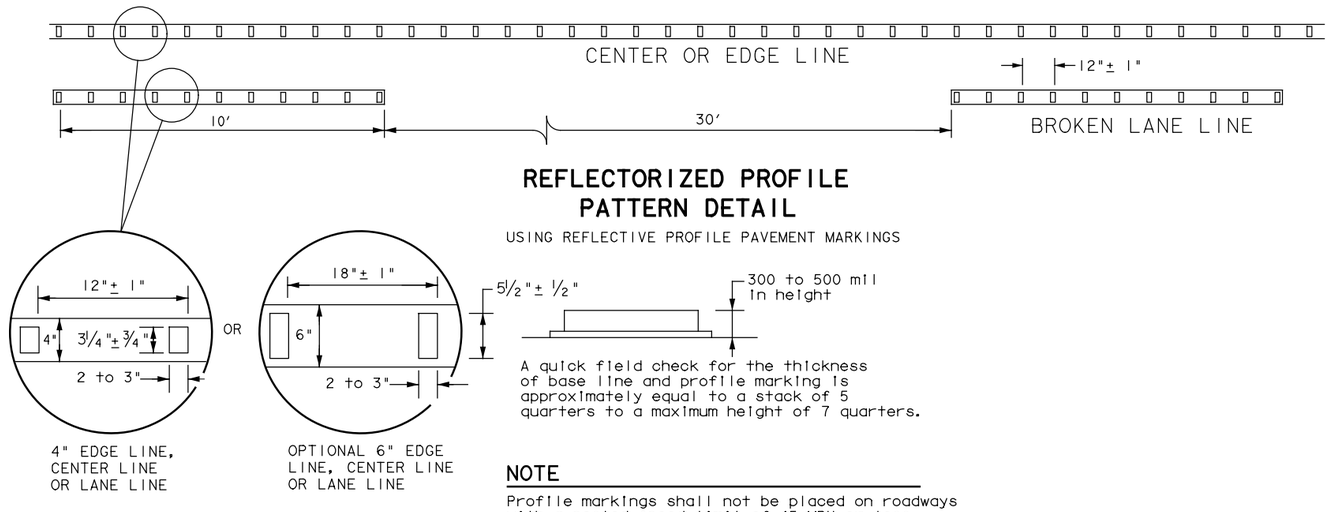


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTE

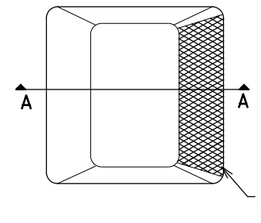
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

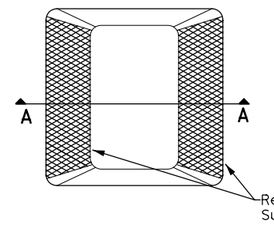
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

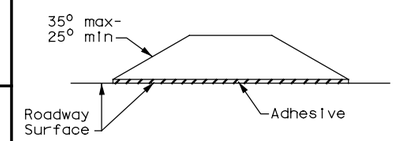
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		103

22B

DATE: DATE/TIME 9:00:44 AM
FILE: DOCUMENT NAME 195 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\STANDARDS\pm2-20.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

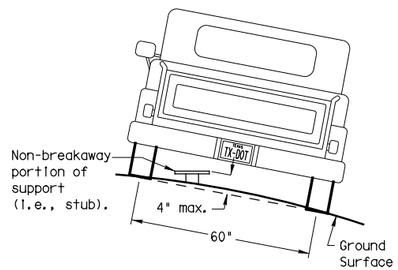
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

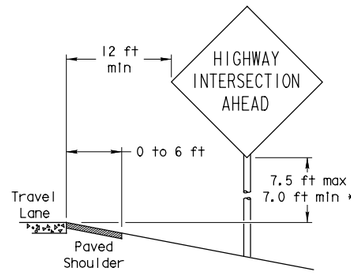
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

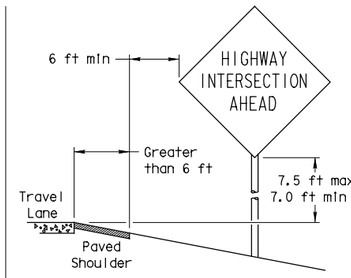
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

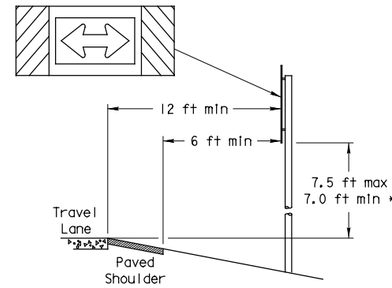
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



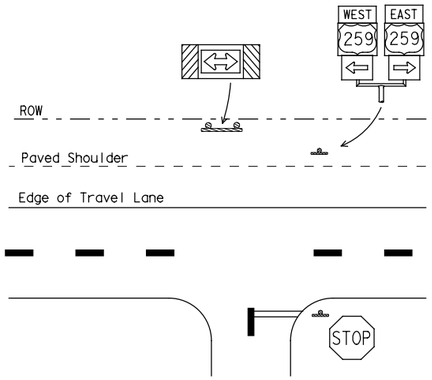
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

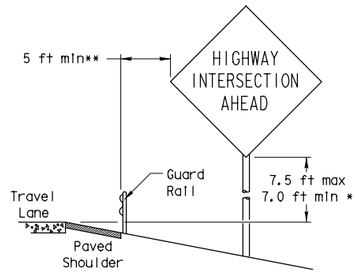
T-INTERSECTION



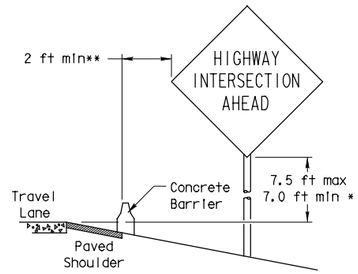
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



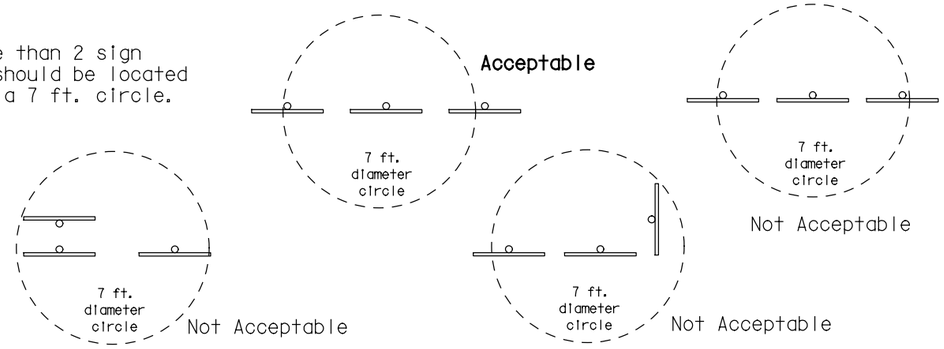
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

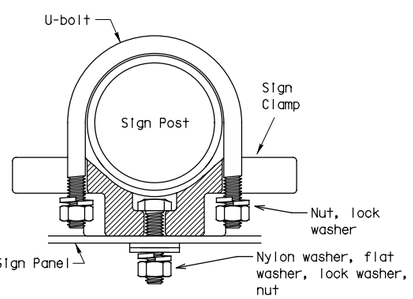
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

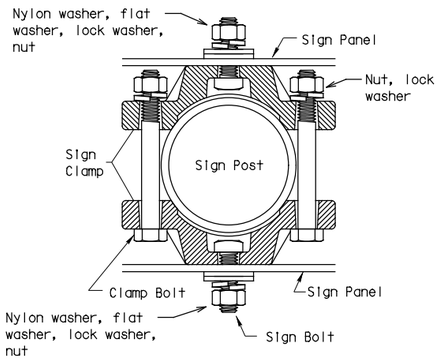


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

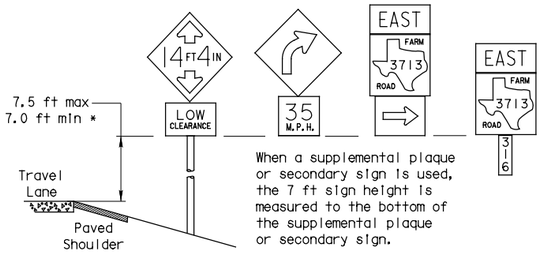
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



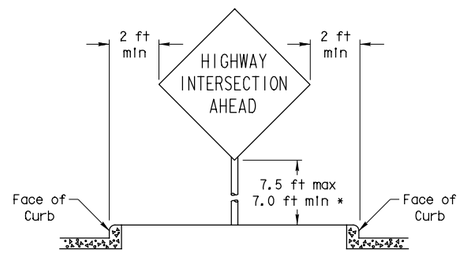
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



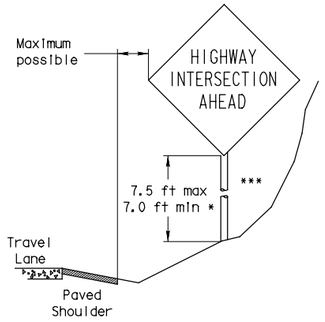
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

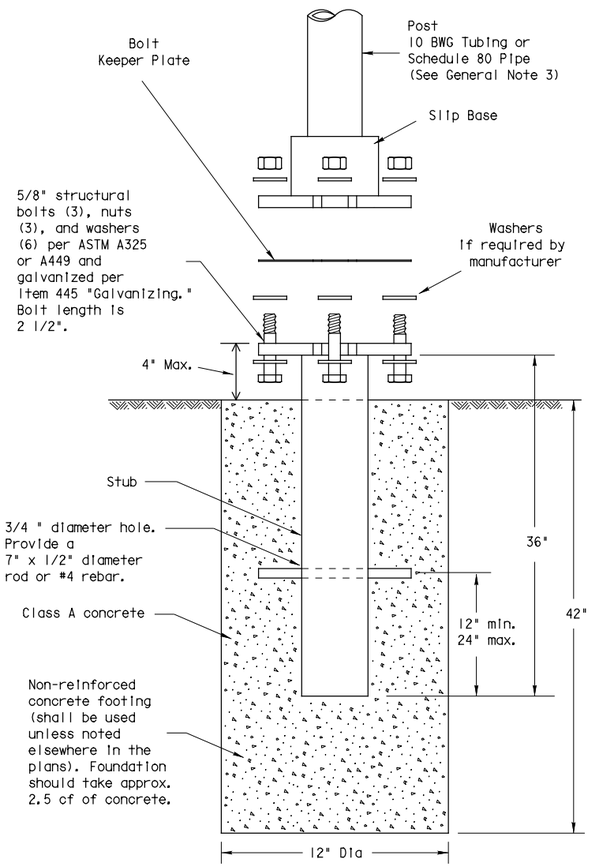
SMD(GEN)-08

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

9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		104

DATE: 3/2/2022 9:00:46 AM
FILE: Z:\Projects\1195 TxDOT*On-Off 36-6\DP5400V\1195.04\DGN\STANDARDS\smdgen.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

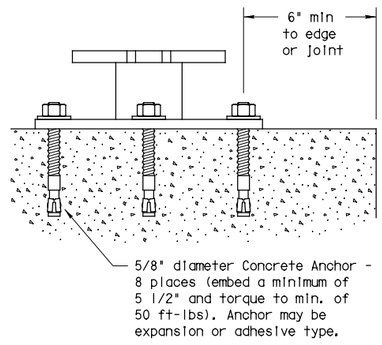
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		105

DATE: 3/2/2022 9:00:47 AM
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DATE: 3/2/2022 9:00:49 AM
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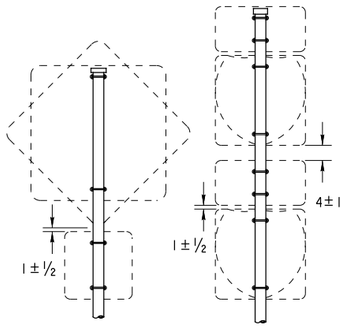
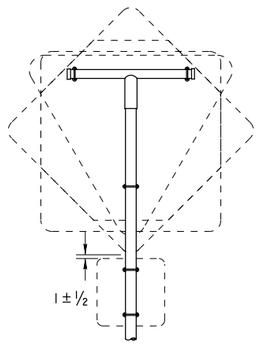
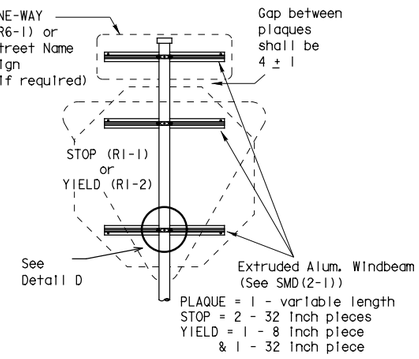


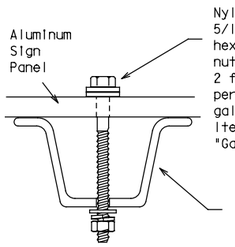
SM RD SGN ASSM TY XXXXX(1)XX(P)



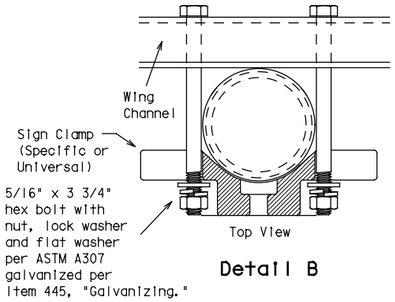
SM RD SGN ASSM TY XXXXX(1)XX(T)



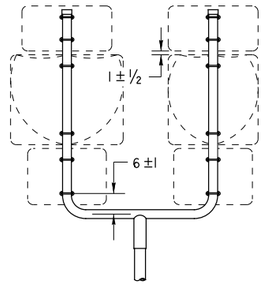
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



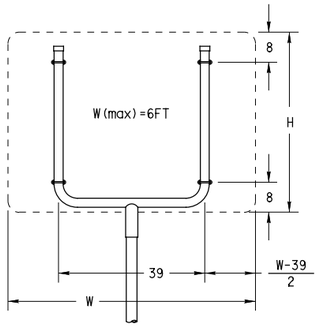
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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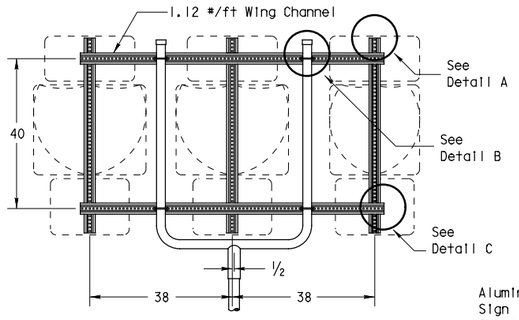
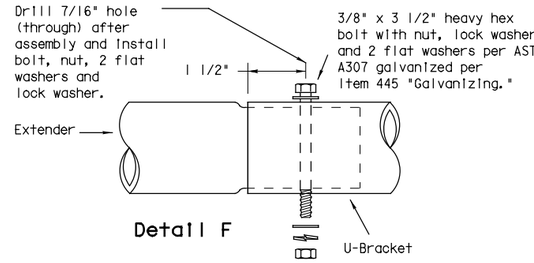
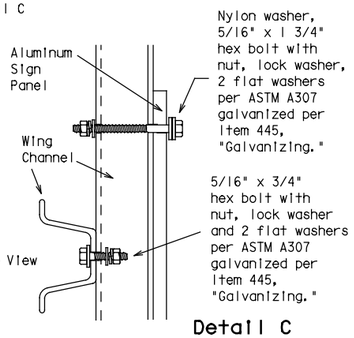


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

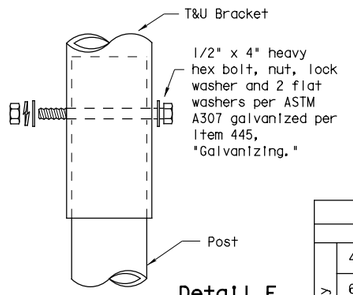


Detail F

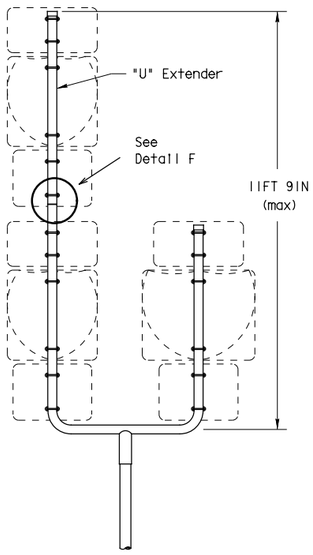
Splices shall only be allowed behind the sign substrate.



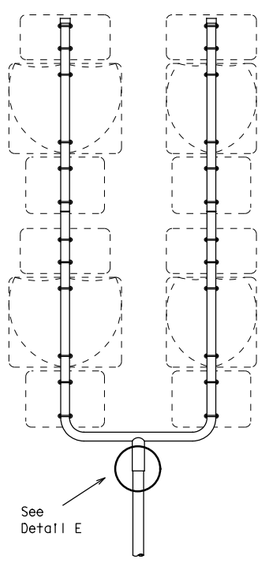
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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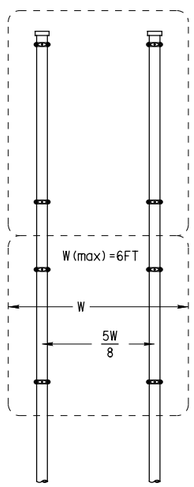
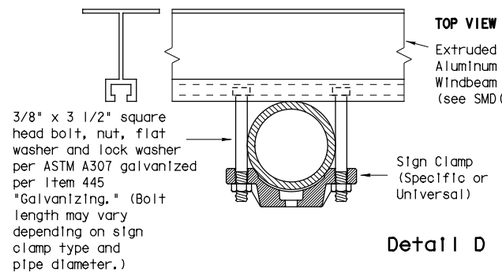
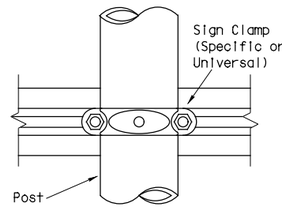


SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D



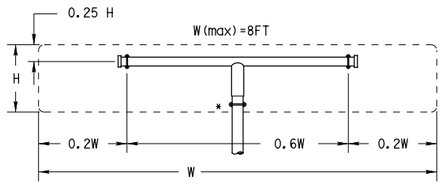
GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

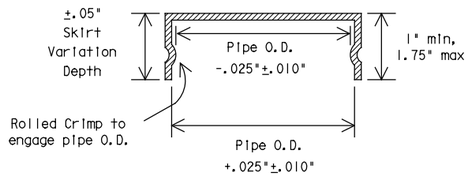
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-Inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-Inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-Inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-Inch signs	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
Warning	48x48-Inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
	48-Inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-Inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth to be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

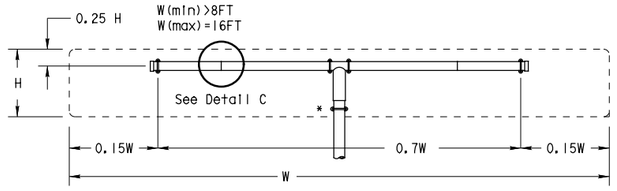
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

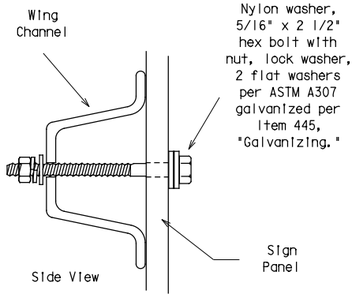
SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		106

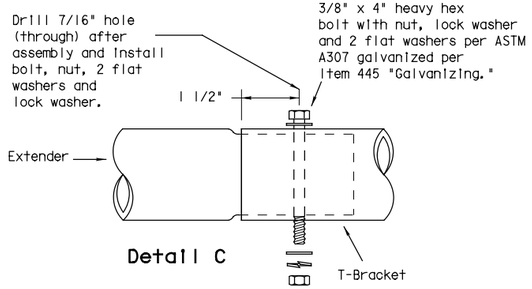
DATE: 3/2/2022 9:00:50 AM
FILE: Z:\Projects\1195 TxDOT*On-Off 36-61DP5400\1195.04\DGN\STANDARDS\smds3.dgn



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



Detail C

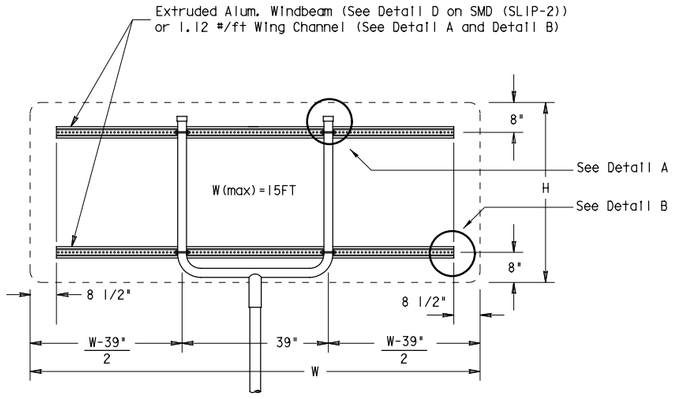
Splices shall only be allowed behind the sign substrate.

GENERAL NOTES:

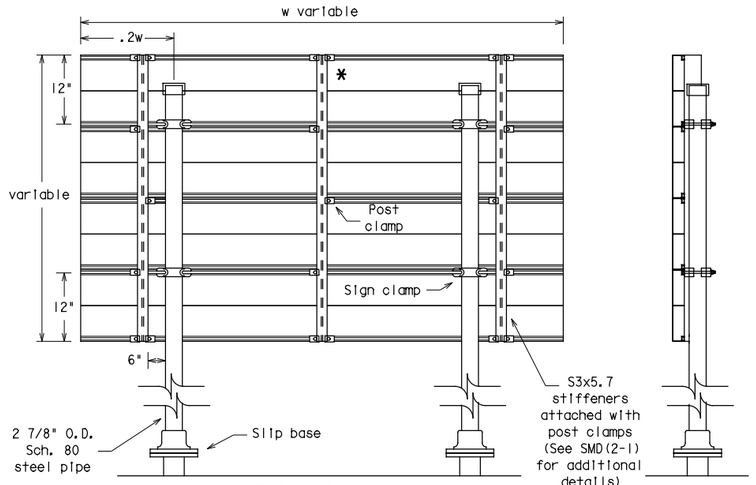
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

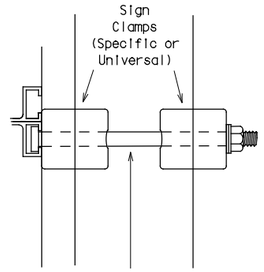


Typical Sign Mount

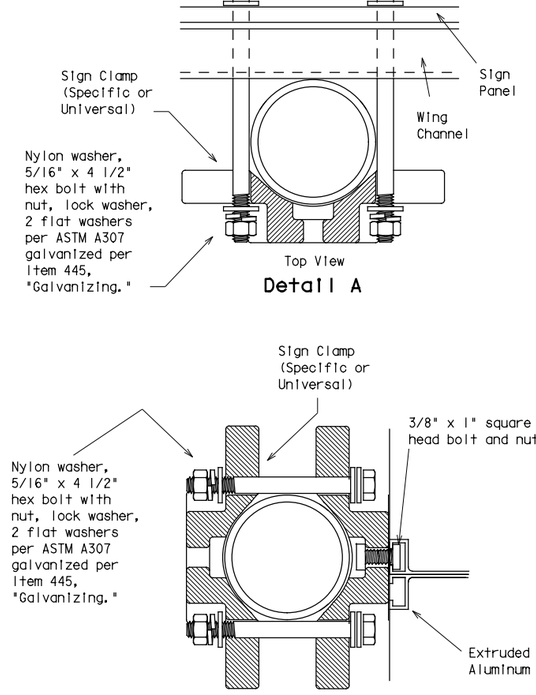
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

See Detail E
for clamp Installation

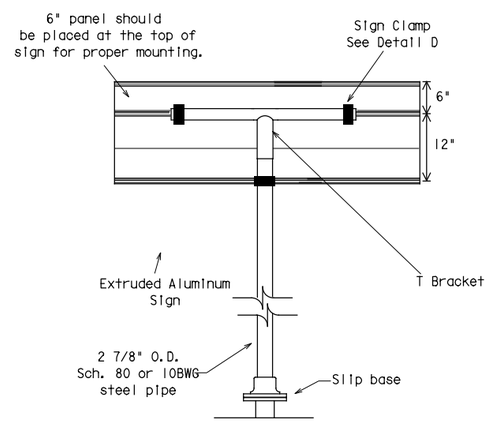


Detail E

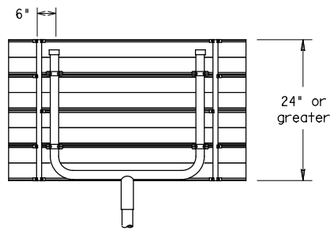


Detail A

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp Installation

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-Inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-Inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-Inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-Inch signs	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
Warning	48x48-Inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-Inch signs	TY S80(1)XX(T)
	48-Inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-Inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

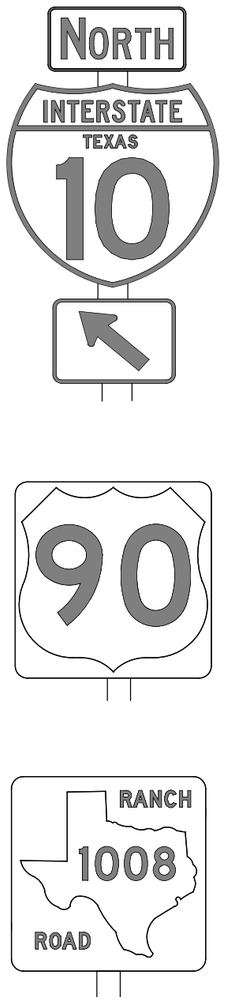
SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		107

DATE: 3/2/2022 9:00:53 AM
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\STANDARDS\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

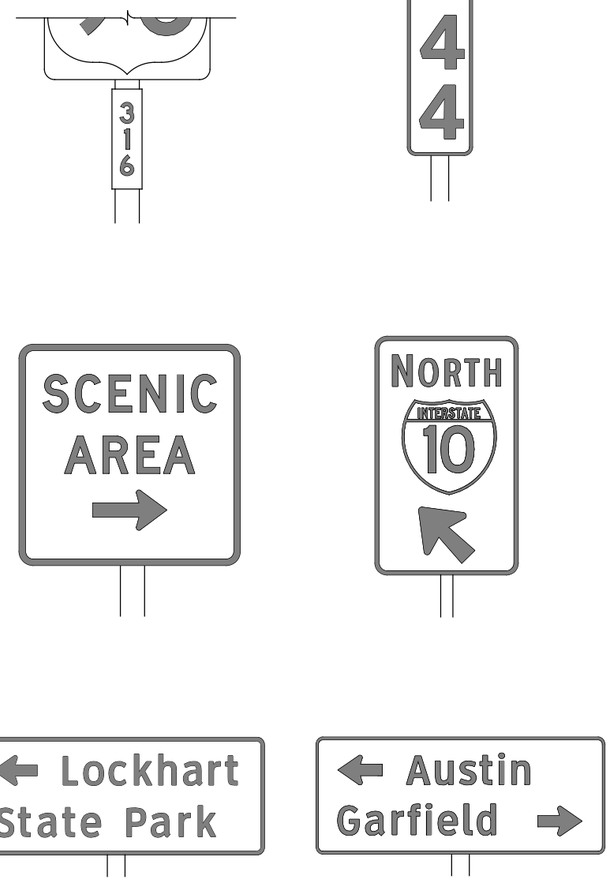
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

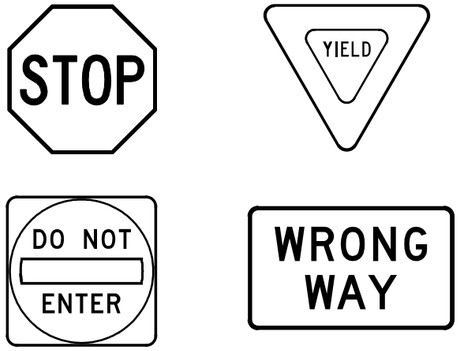
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	FTW	PARKER		108

DATE: 3/2/2022 9:00:54 AM
FILE: Z:\Projects\1195 TxDOT_On-Off 36-61DP5400\1195.04\DGN\STANDARDS\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

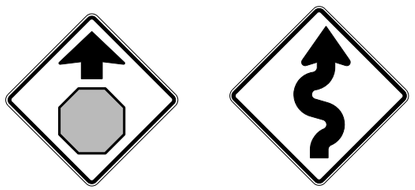
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	FTW	PARKER		109

4

DATE: 3/2/2022
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\STANDARDS\CHERRY-epic.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

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.

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. The following species may be present in the project area: Brazos heelsplitter, Brazos watersnake, Strecker's chorus frog, Woodhouse's toad, slender glass lizard, Texas garter snake, and timber (canebrake) rattlesnake.

Proposed Mussel BMPs:
2. In addition to Water Quality and Stream Crossing BMP, follow the most recent, 7/32 TPWDTxDOT Annual Work Plan for Pre-Construction Surveys, Aquatic Resources Relocations, and Other Best Management Practices to Avoid, Minimize, and Mitigate Impacts to Freshwater Resources, 9/32 which, in part, requires a mussel survey and potential relocation prior to start of construction.

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.

CHERRY STREET

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0902	38	133	CS
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	FTW	PARKER		110

DATE: 9/12/2017 5:48:18 PM
FILE: I:\Environmental\COUNTIES\TARRANT\0008-13-124 (Sawey)\d-List CE Documents\epic.dgn

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

Water Quality BMPs include:
3. Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges.

4. Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.

Stream Crossing BMPs include:
5. Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, rip rap may be buried, back-filled with topsoil and planted with native vegetation.

6. Incorporate bat-friendly design into bridges and culverts.

7. Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.

8. A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.

9. Riparian buffer zones should remain undisturbed.

Insect Pollinator BMPs:
10. Where available and economical, native plants and seed should be procured from local eco-type providers. Seed mixes should be diverse and include as many ecoregion natives as possible ensuring full season floral resources. Species by Texas ecoregion can be found in the Texas Management Recommendations for Native Insect Pollinators in Texas document: https://tpwd.texas.gov/publications/pwdpubs/media/pwd bk w7000 1813.pdf.

11. Planting at least three different native flowering plants within each of three blooming periods are recommended (spring, summer, early fall) in high rainfall regions of Texas. In drier regions of the state, a target of three native flowering plants within each of two blooming periods can be used.

Proposed Bat BMPs:
12. For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.

13. Prior to start of construction, the contractor will ensure a bat survey has been conducted of the project area according the TPWD 2021 MOU Bat BMPs.

Proposed Aquatic Amphibian and Reptile BMPs:
14. For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

15. Minimize impacts to wetlands, temporary and permanent open water features, including depressions, and riverine habitats.

16. Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features.

17. Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.

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19. Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.

20. When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs).

21. If gutters and curbs are part of the roadway design, install gutters that do not include the side box inlet and include sloped (i.e., mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

Proposed Terrestrial Amphibian and Reptile BMPs:
22. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.

23. Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.

24. Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge.

25. Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season. Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged.

26. When designing roads with curbs, consider using Type I or Type III curbs to provide a gentle slope to enable turtles and small animals to get out of roadways.

27. If Texas tortoises (Gopherus berlandieri) or box turtles (Terrepene spp.) are present in a project area, they should be removed from the area and relocated between 100 and 200 meters from the project area. After removal of the individuals, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude reentry by turtles, tortoises, and other reptiles. The exclusion fence should be constructed and maintained as follows:

a) The exclusion fence should be constructed with metal flashing or drift fence material.
b) Rolled erosion control mesh material should not be used.
c) The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
d) The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

28. After project is complete, revegetate disturbed areas with an appropriate locally sourced native seed mix. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

Proposed Vegetation BMPs:
29. Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. Impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation.

30. To minimize adverse effects, activities should be planned to preserve mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation have high value to wildlife as food and cover.

31. It is strongly recommended that trees greater than 12 inches in diameter at breast height (DBH) that are removed be replaced. TPWD5#32s experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to either on-site or off-site. Trees less than 12 inches DBH should be replaced at a 1:1 ratio.

32. Replacement trees should be of equal or better wildlife quality than those removed and be regionally adapted native species.

33. When trees are planted, a maintenance plan that ensures at least an 85 percent survival rate after three years should be developed for the replacement trees.

34. The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.

35. The use of seed mix that contains seeds from only regional ecotype native species is recommended.

CHERRY STREET

Texas Department of Transportation | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC

SHEET 2 of 2 SHEETS

FILE: epic.dgn	DN: TxDOT		CK: RG		DW: VP		CK: AR
	CONT	SECT	JOB		HIGHWAY		
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	DIST	COUNTY			SHEET NO.		
	FTW	PARKER					

DATE: 3/2/2022
FILE: Z:\Projects\1195 TxDOT_On-Off 36-6IDP5400\1195.04\DGN\STANDARDS\PINE-epic.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

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☐ 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.

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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.

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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.

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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. The following species may be present in the project area: Brazos heelsplitter, Brazos watersnake, Strecker's chorus frog, Woodhouse's toad, slender glass lizard, Texas garter snake, and timber (canebrake) rattlesnake.

Proposed Mussel BMPs:
2. In addition to Water Quality and Stream Crossing BMP, follow the most recent, 7/32 TPWDTxDOT Annual Work Plan for Pre-Construction Surveys, Aquatic Resources Relocations, and Other Best Management Practices to Avoid, Minimize, and Mitigate Impacts to Freshwater Resources, 9/32 which, in part, requires a mussel survey and potential relocation prior to start of construction.

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

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PINE STREET

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

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PINE STREET

Texas Department of Transportation | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC

SHEET 2 of 2 SHEETS

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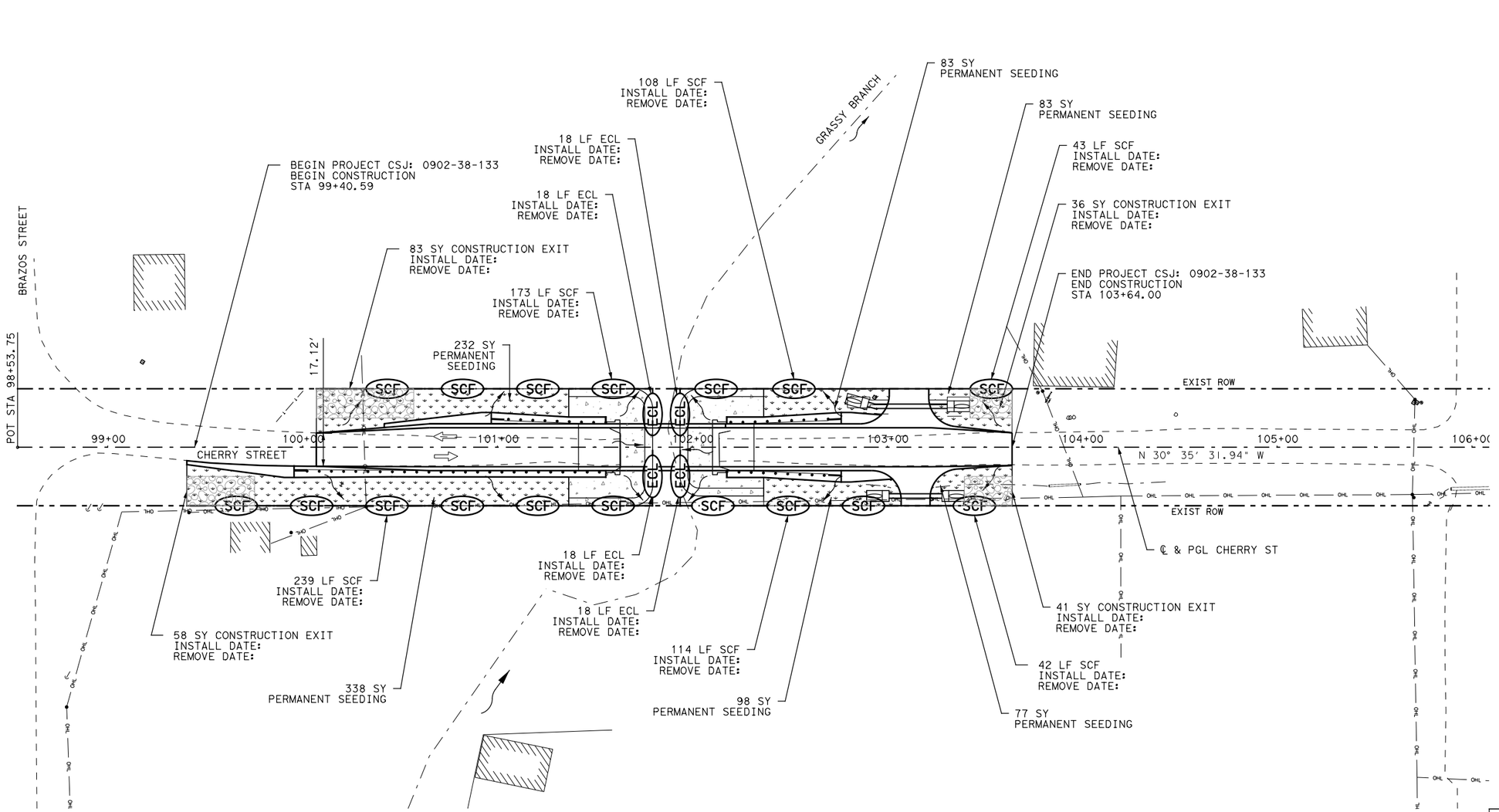

0′ 30′ 60′

SCALE: 1"=60′

LEGEND

- SEEDING (PERMANENT)
- CONSTRUCTION EXIT TYPE 1
- SCF — SEDIMENT CONTROL FENCE
- ECL — EROSION CONTROL LOG
- DRAINAGE FLOW

NOTE

1. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
2. SEE EC(1)-16 STANDARD DETAIL FOR VERTICAL TRACKING.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
REGISTERED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation®

CHERRY STREET

SW3P LAYOUT

SCALE: 1"=60′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6	BR 2021(445) ETC	CS
DRAWN JM	STATE / DISTRICT	COUNTY	SHEET NO.
CHECKED GHA	TX / FT WORTH	PARKER	114
APPROVED GHA	CONTROL / SECTION	JOB	
	0902 / 38	13:133:TC	

USER: gmorshoi
DATE: 3/2/2022
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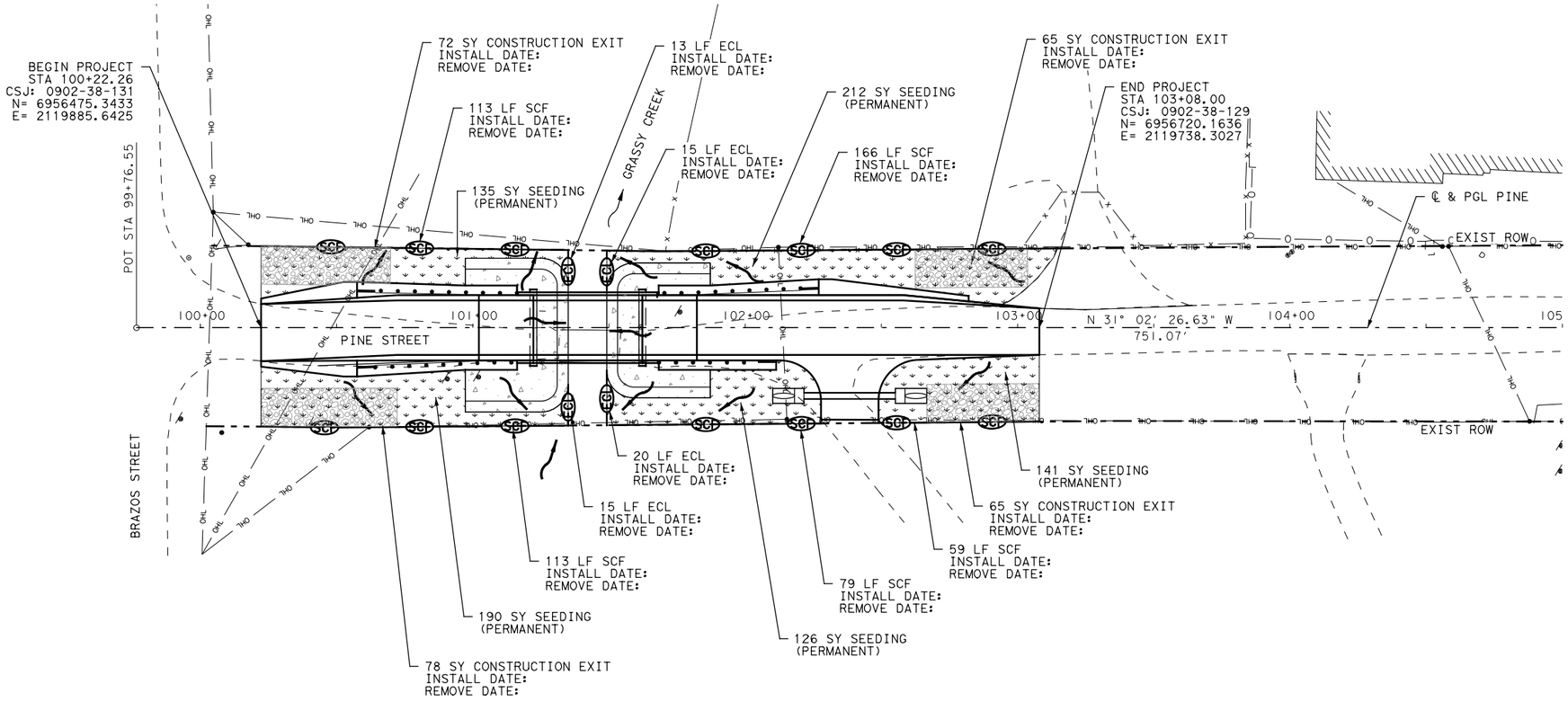
PLOT DRIVER: TXDOT_PDF_BW.pltcfg



0′ 25′ 50′

SCALE: 1"=50′

LEGEND

- SEEDING (PERMANENT)
- CONSTRUCTION EXIT TYPE 1
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NOTE

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HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

REV	DATE	BY	DESCRIPTION

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
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Texas Department of Transportation®

PINE STREET
SW3P LAYOUT

SCALE: 1"=50′ SHEET 1 OF 1

DESIGNED	FED. RD. DIV. NO.		FEDERAL AID PROJECT NO.	HIGHWAY NO.
GM	6		BR 2021(445) ETC	CS
DRAWN	STATE	DISTRICT	COUNTY	SHEET NO.
JM	TX	FT WORTH	PARKER	115
CHECKED	CONTROL	SECTION	JOB	
GHA	0902	38	133, ETC	
APPROVED				
GHA				

USER: gmorshoi
DATE: 3/2/2022
SCALE: 1"=50'
FILE: z:\Projects\1195 TxDOT_On-Off 56 6195-00\1195_04\DGN\SHT\131-PINE\131PSW3PPL01.dgn

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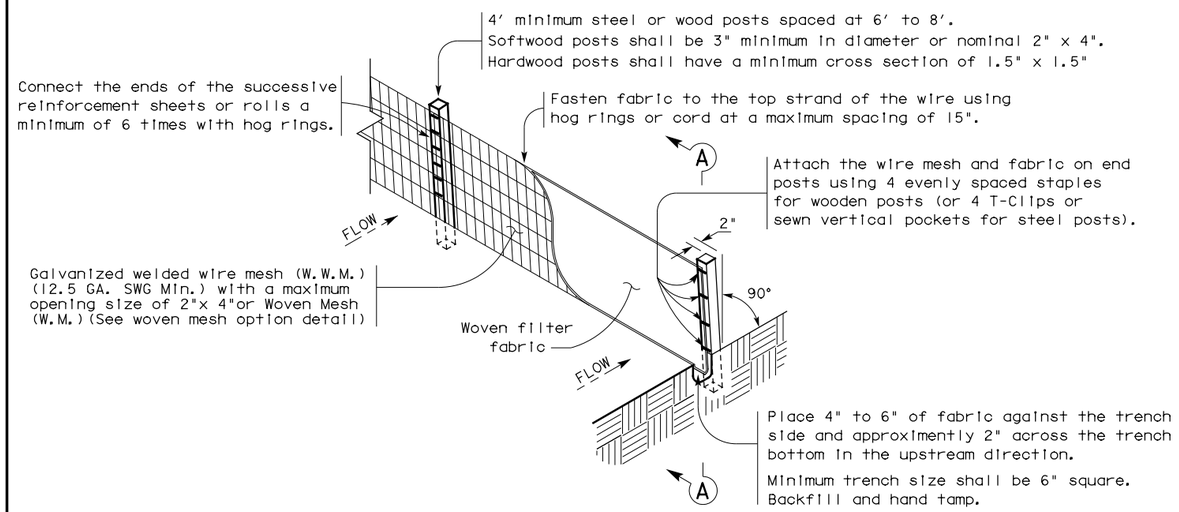
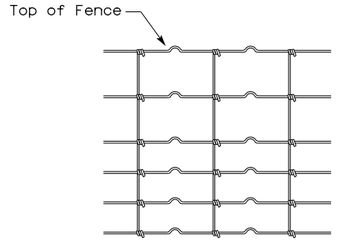
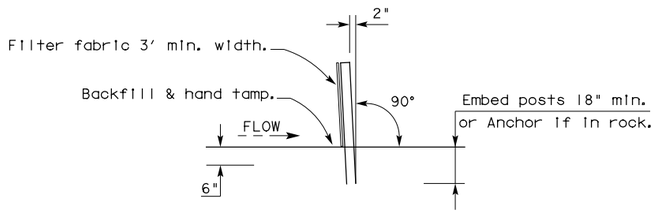
TIME: 9:01:18 AM
PENTABLE: CHERRY-PINE-PENTABLE.tbl



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.

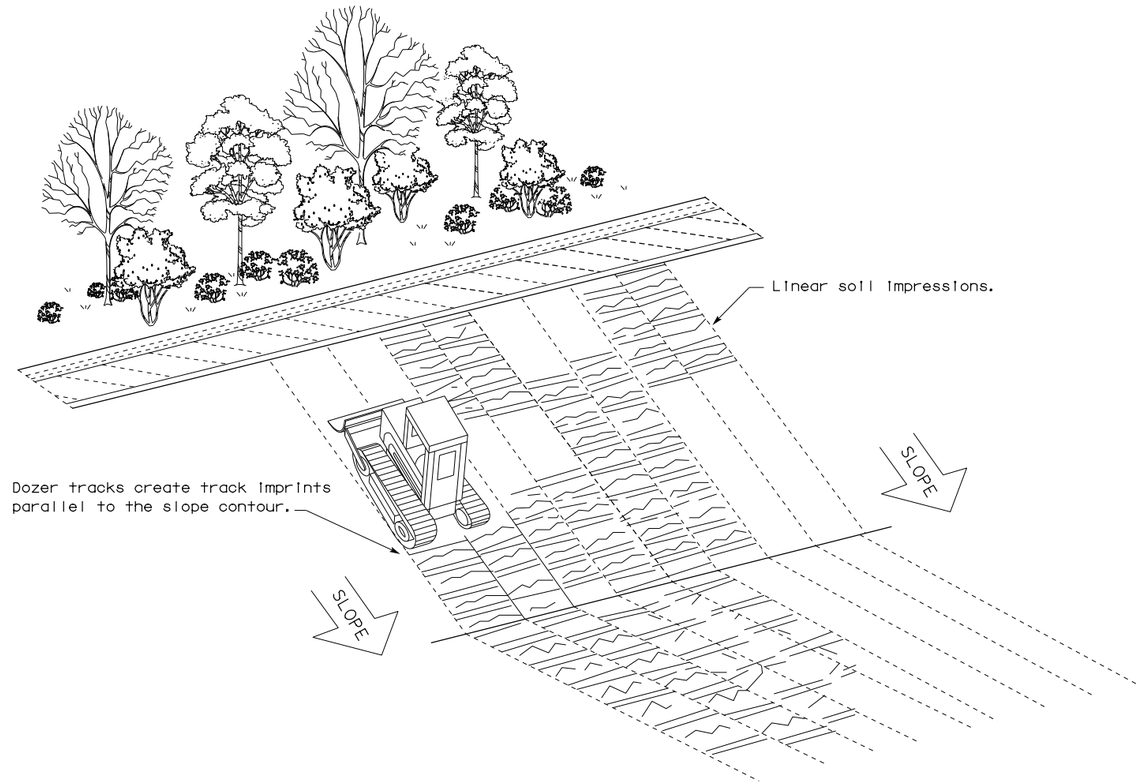
LEGEND

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	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		116

3/8/2022
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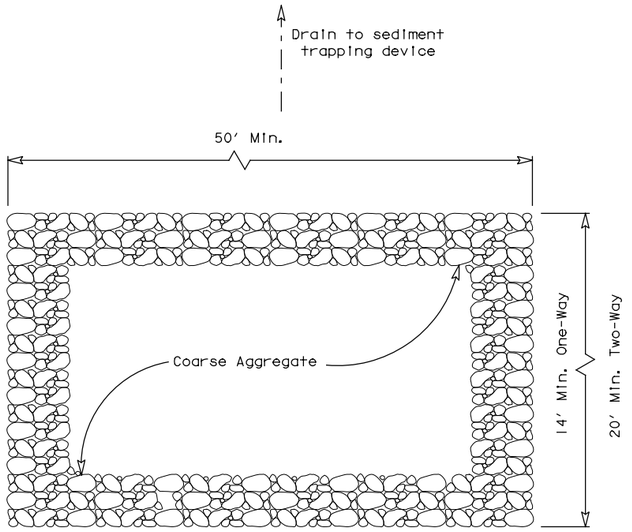
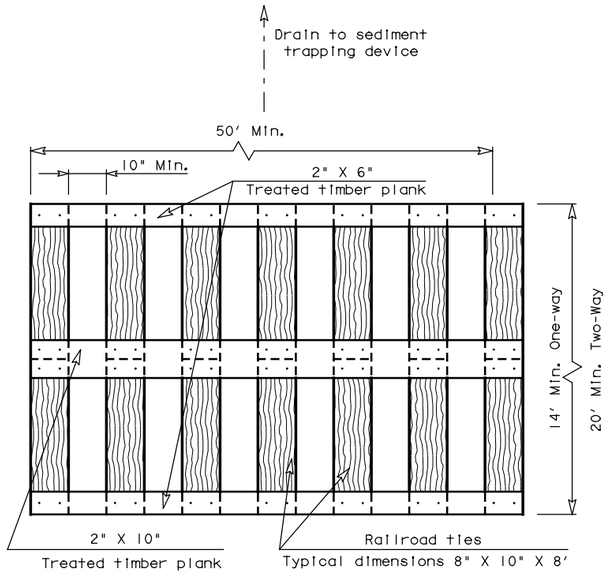
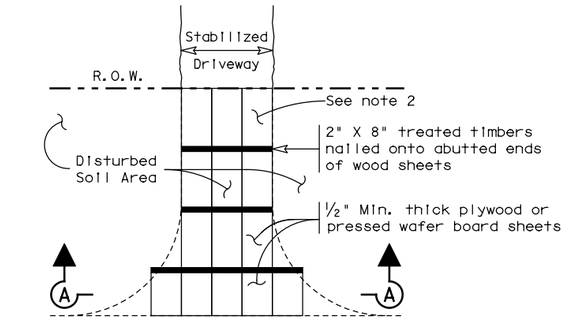


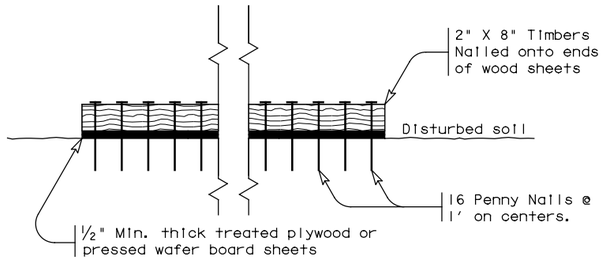
PLAN VIEW



PLAN VIEW



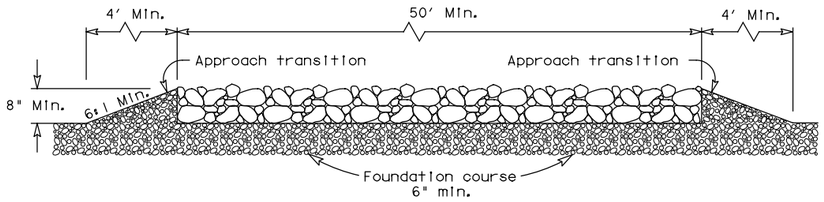
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

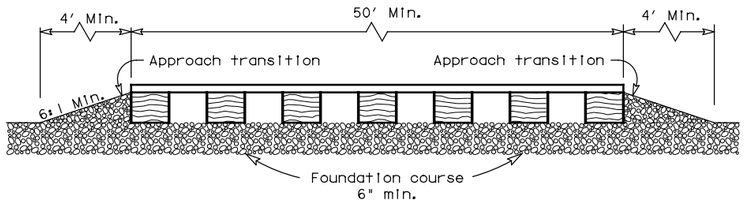
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		117

DATE: 3/2/2022
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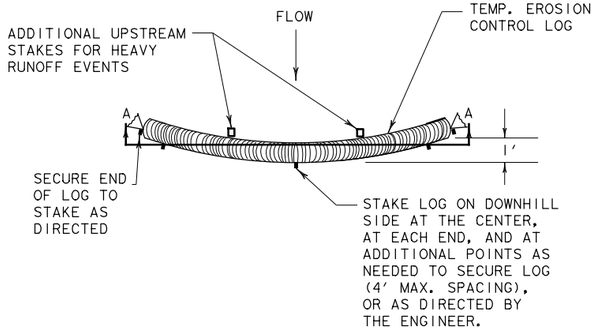
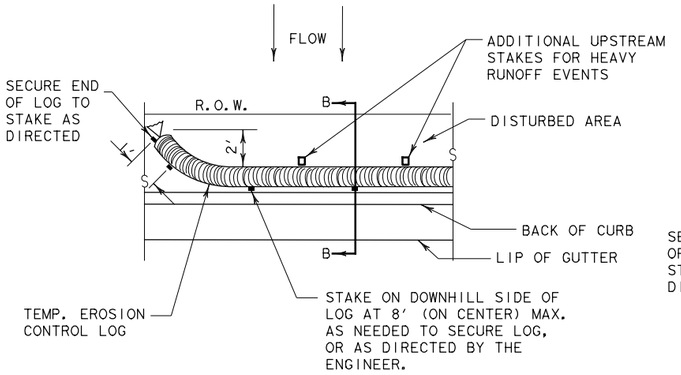
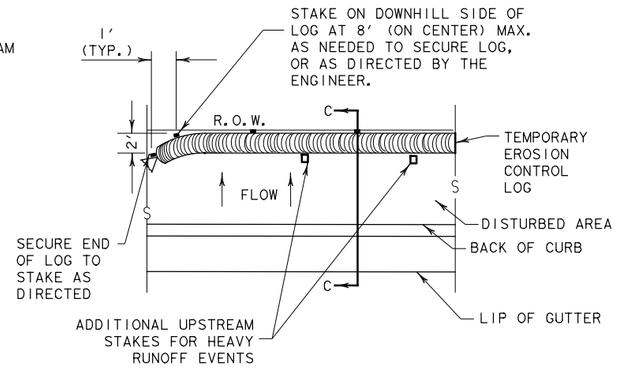


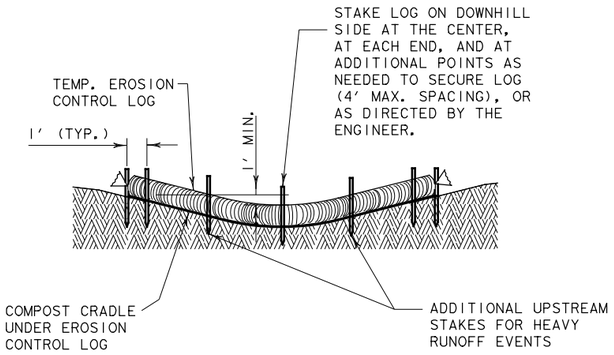
PLAN VIEW



PLAN VIEW



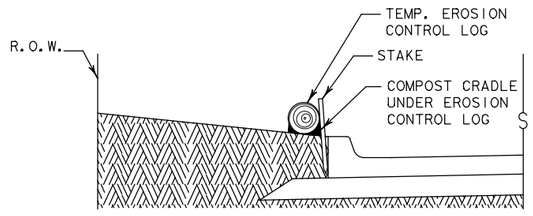
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

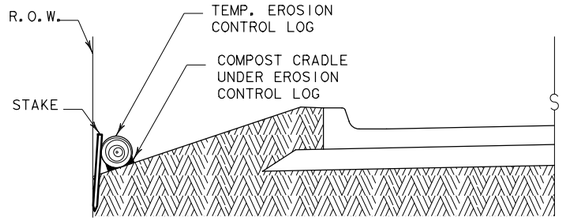
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

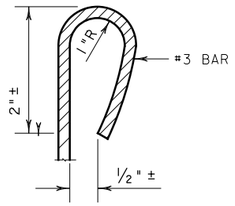
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



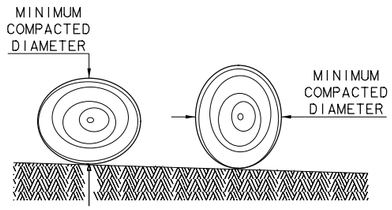
REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

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

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

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133, ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		118

DATE: 3/2/2022
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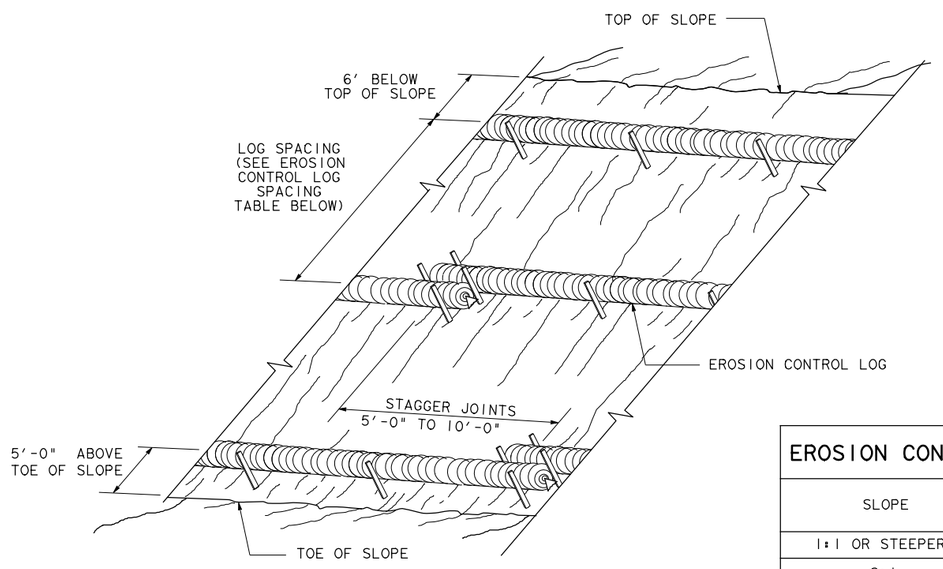
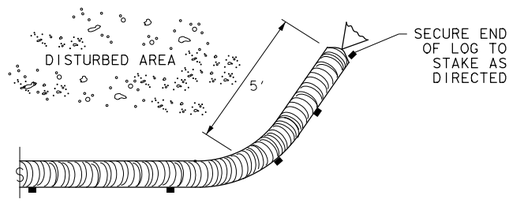


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

CL-SST

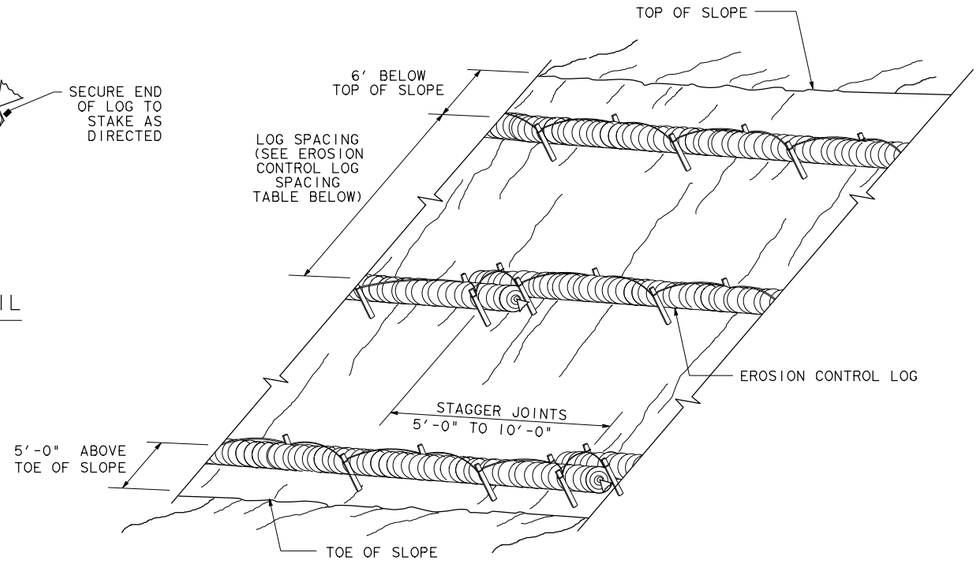


END SECTION RAP DETAIL

EROSION CONTROL LOG SPACING TABLE

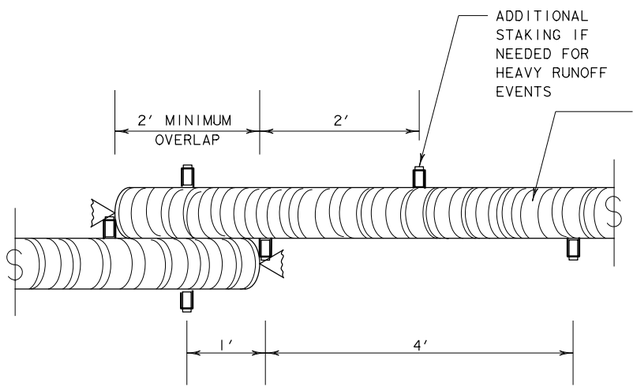
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

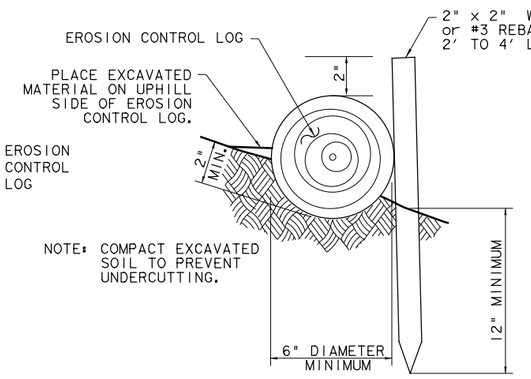
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL



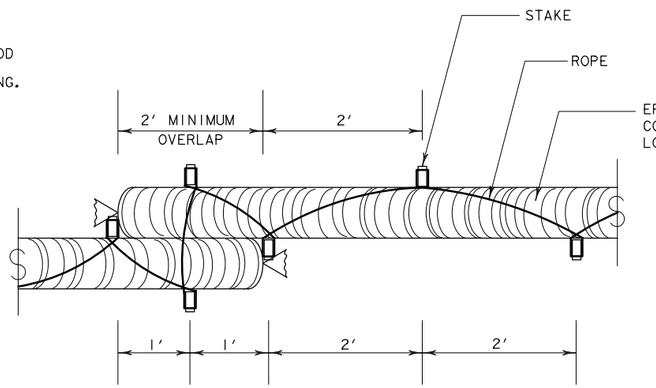


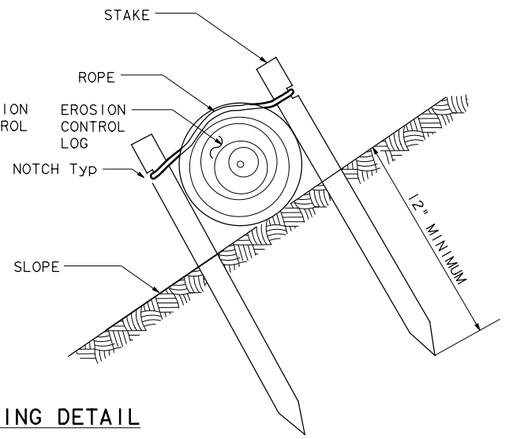
STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

TRENCH DEPTH TABLE

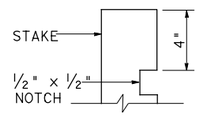
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0902	38	133,ETC	CS
	DIST	COUNTY		SHEET NO.
	FTW	PARKER		119

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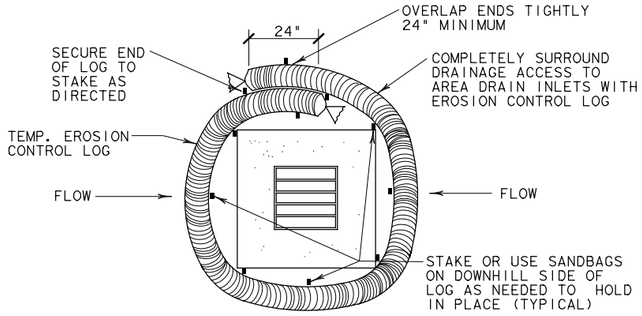
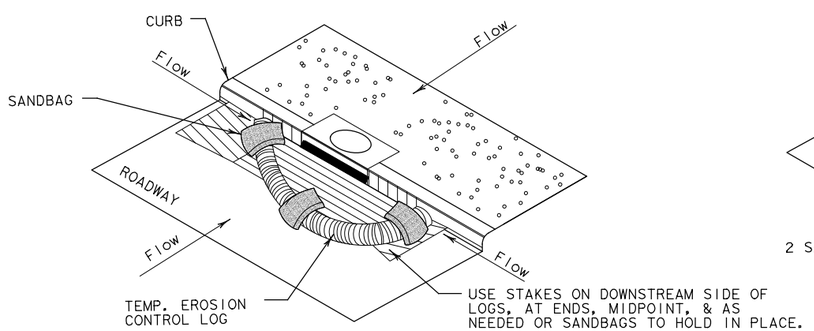


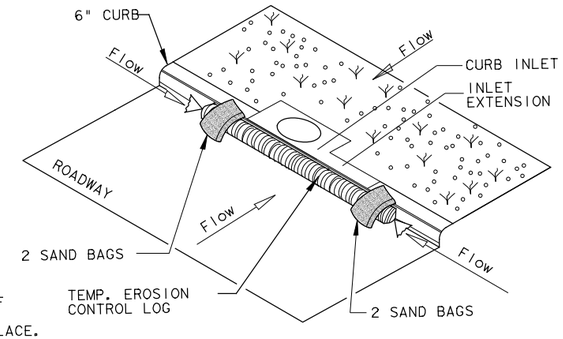
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

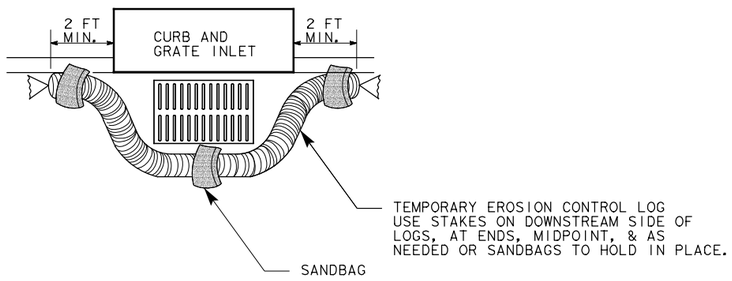
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

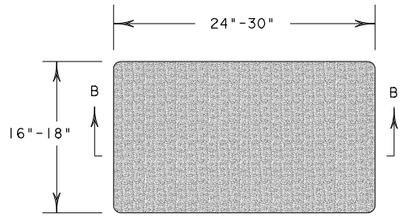
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0902	38	133,ETC		CS	
	DIST	COUNTY			SHEET NO.	
	FTW	PARKER			120	

A. GENERAL SITE DATA

1. PROJECT LIMITS: *Highway: CHERRY STREET*
At: GRASSY CREEK

LATITUDE: 32° 44′ 55.54"N LONGITUDE: 98° 0′ 35.78"W

2. PROJECT SITE MAPS:

- *Project Location Map: Title Sheet (Sheet 1)*
- *Drainage Patterns: Drainage Area Maps (Sheet 47)*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Typical Sections (Sheet 5)*
- *Major Controls and Locations of Stabilization Practices: (Sheet 114) SW3P Site Map Sheets*
- *Project Specific Locations:*
  To be specified by Project Field Office and located in the Project SW3P File
- *Surface Waters and Discharge Locations: Drainage and Culvert Layout Sheets (Sheet 47)*

3. PROJECT DESCRIPTION:
CONSTRUCTION OF BRIDGE REPLACEMENT

4. MAJOR SOIL DISTURBING ACTIVITIES:
EXISTING ASPHALT PAVEMENT AND BRIDGE REMOVAL.
PROPOSED ASPHALT PAVING AND BRIDGE CONSTRUCTION

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
GRASSY PARKWAYS, 74% EXISTING VEGETATIVE COVER

6. TOTAL PROJECT AREA: *0.55* Acres

7. TOTAL AREA TO BE DISTURBED: *0.55* Acres (*100* % OF TOTAL PROJECT AREA)

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: *0.46*
AFTER CONSTRUCTION: *0.66*

9. NAME OF RECEIVING WATERS:
GRASSY BRANCH

10. ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORIC PROPERTY:
No Endangered Species, Designated Critical Habitat or Historic Property has been found on this project site.

The documentation satisfying TPDES Construction General Permit eligibility pertaining to the existence or of any protective action taken with regards to endangered species or designated critical habitat or historical property in this project area is contained in the project's Enviromental document (EA or EIS) and can be viewed under the State Open Records Act at the address shown below:

TEXAS DEPARTMENT OF TRANSPORTATION
FORT WORTH DISTRICT HEADQUARTERS
DISTRICT DESIGN SECTION
2501 SW LOOP
FORT WORTH, TX 76133
PHONE: 817-370-6500

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

(Select T = Temporary or P = Permanent, as applicable)

T	TEMPORARY SEEDING		PRESERVATION OF NATURAL RESOURCES
	MULCHING (Hay or Straw)		FLEXIBLE CHANNEL LINER
	BUFFER ZONES		RIGID CHANNEL LINER
	PLANTING		SOIL RETENTION BLANKET
P	SEEDING		COMPOST MANUFACTURED TOPSOIL
	SODDING		OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES:

(Select T = Temporary or P = Permanent, as applicable)

T	SILT FENCES		DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
	HAY BALES		DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
	ROCK FILTER DAMS		DIVERSION DIKE AND SWALE COMBINATIONS
	PIPE SLOPE DRAINS	T	ROCK BEDDING AT CONSTRUCTION EXIT
	PAVED FLUMES		TIMBER MATTING AT CONSTRUCTION EXIT
	CHANNEL LINERS		STONE OUTLET STRUCTURES
	SEDIMENT TRAPS	T	VELOCITY CONTROL DEVICES
	SEDIMENT BASINS		CURBS AND GUTTERS
	STORM SEWERS		STORM INLET SEDIMENT TRAP
T	OTHER: *EROSION CONTROL LOGS*		

3. STORM WATER MANAGEMENT:

1. Storm water drainage will be provided by the ditches, inlets that will carry drainage within the R.O.W. to Grassy Creek

2. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4:1 or flatter slopes with permanent vegetative cover.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

(Describe Storm Water Management Activities by Phases)

5. NON-STORM WATER DISCHARGES:
Non-storm water discharges should be filtered, or held in 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.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
100675
LICENSED
PROFESSIONAL ENGINEER

3/1/2022

CHERRY STREET

HAYDEN CONSULTANTS, INC.
A GEI Company
5646 MILTON STREET, SUITE 500
DALLAS, TX 75206
PHONE 214.753.8100
FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

Texas Department of Transportation

Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 1 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
DATE	REVISIONS	6	BR 2021(445) ETC		121
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY	
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	PARKER	
08/2013	ADDED SIGN	CONT.	SECT.	JOB	HIGHWAY NO.
05/2019	2-SHEET FORMAT	0902	38	33,ETC	CS

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed at the earliest date possible but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

2. INSPECTION:

An inspection shall be performed by a TxDOT Inspector every 14 calendar days as well as within 24 hours after any rainfall of one-half inch or more is recorded on a non-freezing rain gauge to be located at the project site, or every 7 calendar days. An Inspection and Maintenance Report shall be filed for each inspection. Based on the inspection results, the controls shall be revised in accordance with the inspection report.

3. WASTE MATERIALS:

Except as noted below, all waste materials shall be collected in a metal dumpster having a secure cover. The dumpster shall meet all state and local solid waste management regulations. All trash and debris from construction shall be deposited in the dumpster. The dumpster shall be emptied, as necessary or as required by local regulation, and hauled to a local approved land fill site. The burying of construction waste on the project site shall not be permitted.

Concrete washout areas shall be required and shall consist of a pit, lined with an impervious material, of sufficient size to contain, until evaporation, all water used and washout material produced during concrete washout operations. The concrete washout locations shall be as directed by the engineer.

Lime slaking tanks shall be surrounded by an earthen berm, capable of containing any overflow.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

As a minimum, any products in the following categories are considered to be hazardous: paints, acids, solvents, asphalt products, chemical additives for soil stabilization, and concrete curing compounds or additives. In the event of a spill which may be hazardous, the spill coordinator shall be contacted immediately.

5. SANITARY WASTE:

All sanitary waste shall be collected from the portable units, as necessary or as required by local regulation, by a licensed sanitary waste management contractor.

6. OFFSITE VEHICLE TRACKING:

The Contractor shall be required, on a regular basis or as may be directed by the Engineer, to dampen haul roads for dust control, stabilize construction entrances and to remove excess dirt from the roadway.

7. MANAGEMENT PRACTICES: *(Example Below - May be used as applicable, revised or expanded)*

1. Disposal areas, stockpiles and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed.

2. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.

3. All temporary fills placed in waterways shall be built of erosion resistant material. (NWP 14)

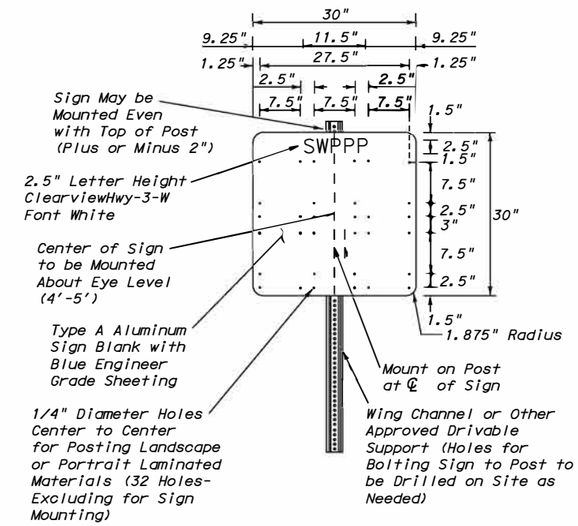
4. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

8. OTHER:

1. Listing of construction materials stored on site to be provided by Project Field Office.

2. The Project SW3P File located at the project field office shall contain the N.O.I., CGP Coverage Notice, TCEQ TPDES Form, Signature Authorization, Certification/Qualification Statements, Inspection Reports, Required Maps, and a copy of the TPDES General Permit No. TXR150000.

STORM WATER POLLUTION PREVENTION PLAN PERMIT POSTING



No Permanent Installation Allowed.
Sign to be Removed After Project Completion.

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
106675
LICENSED
PROFESSIONAL ENGINEER
3/1/2022

CHERRY STREET

HAYDEN CONSULTANTS, INC.
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DALLAS, TX 75206
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FIRM REGISTRATION NO. 00640
WWW.HAYDENCONSULTANTS.COM

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Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 2 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6	BR 2021(445) ETC	122
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	PARKER
08/2013	ADDED SIGN	CONT.	SECT.	JOB / HIGHWAY NO.
05/2019	2-SHEET FORMAT	0902	38	133,ETC CS

A. GENERAL SITE DATA

1. PROJECT LIMITS: *Highway: PINE STREET*
At: GRASSY CREEK

LATITUDE: 32° 44' 56.01"N LONGITUDE: 98° 0' 30.97"W

2. PROJECT SITE MAPS:

- *Project Location Map: Title Sheet (Sheet 1)*
- *Drainage Patterns: Drainage Area Maps (Sheet 47)*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Typical Sections (Sheet 6)*
- *Major Controls and Locations of Stabilization Practices: (Sheet 115) SW3P Site Map Sheets*
- *Project Specific Locations:*
  To be specified by Project Field Office and located in the Project SW3P File
- *Surface Waters and Discharge Locations: Drainage and Culvert Layout Sheets (Sheet 47)*

3. PROJECT DESCRIPTION:
CONSTRUCTION OF BRIDGE REPLACEMENT

4. MAJOR SOIL DISTURBING ACTIVITIES:
EXISTING ASPHALT PAVEMENT AND BRIDGE REMOVAL.
PROPOSED ASPHALT PAVING AND BRIDGE CONSTRUCTION

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
GRASSY PARKWAYS, 66% EXISTING VEGETATIVE COVER

6. TOTAL PROJECT AREA: *0.45* Acres

7. TOTAL AREA TO BE DISTURBED: *0.45* Acres (*100* % OF TOTAL PROJECT AREA)

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: *0.51*
AFTER CONSTRUCTION: *0.62*

9. NAME OF RECEIVING WATERS:
GRASSY BRANCH

10. ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORIC PROPERTY:
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STATE OF TEXAS
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3/1/2022

PINE STREET

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Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 1 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6	BR 2021(445) ETC	123
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	PARKER
08/2013	ADDED SIGN	CONT.	SECT.	JOB / HIGHWAY NO.
05/2019	2-SHEET FORMAT	0902	38	133,ETC CS

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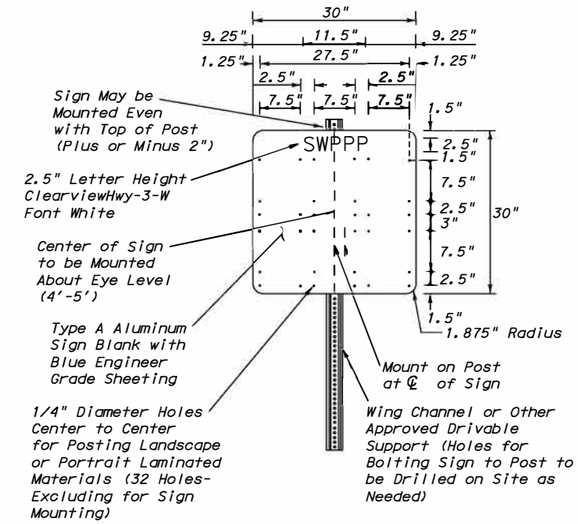
STORM WATER POLLUTION PREVENTION PLAN PERMIT POSTING



No Permanent Installation Allowed.
Sign to be Removed After Project Completion.

PINE STREET

HAYDEN CONSULTANTS, INC.
F-00640

STATE OF TEXAS
GEORGE H. AMEN
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LICENSED
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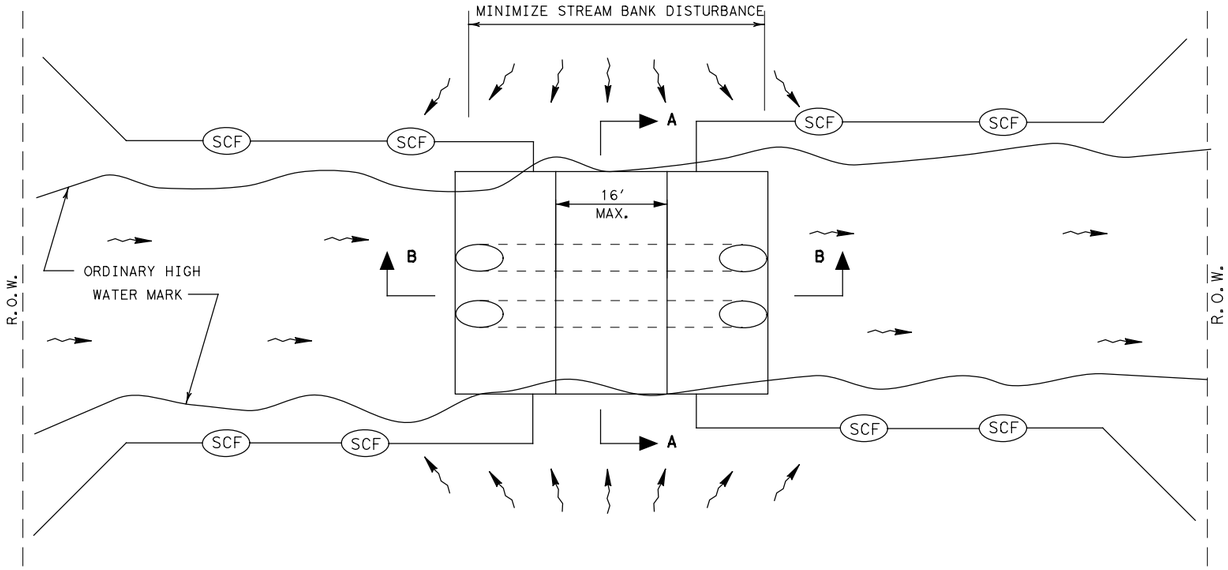
Fort Worth District Standard

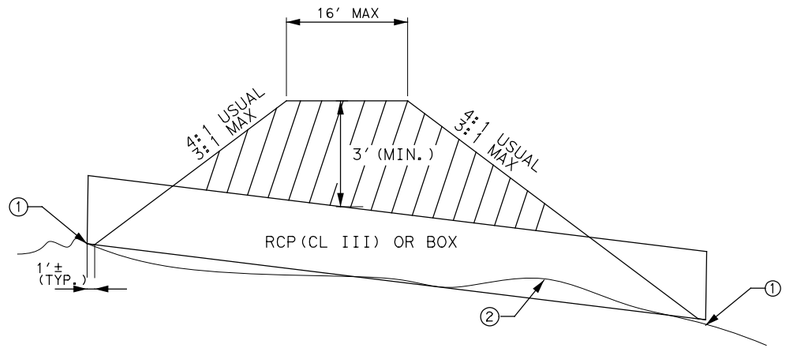
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 2 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6	BR 2021(445) ETC	124
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	PARKER
08/2013	ADDED SIGN	CONT.	SECT.	JOB	HIGHWAY NO.
05/2019	2-SHEET FORMAT	0902	38	133,ETC	CS



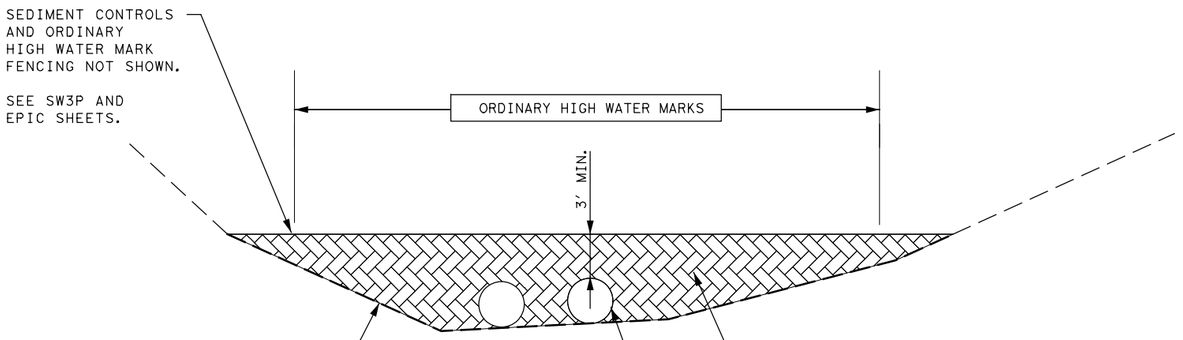
PLAN VIEW
N.T.S.



(1) MATCH EXISTING STREAM BED ELEVATION. MULTIPLE PIPES MAY HAVE DIFFERENT PROFILES.

(2) CROSSING LOCATION TO BE SELECTED SO THAT PIPES PROVIDE POSITIVE DRAINAGE WITH MINIMAL DISTURBANCE OF THE STREAM BED.

SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

GENERAL NOTES

1. THIS DETAIL IS TO BE USED AT ANY LOCATIONS WHERE A TEMPORARY STREAM CROSSING IS NEEDED. A STREAM CROSSING IS ANY LOCATION WHERE CONCENTRATED FLOWING WATER OCCURS OR IS EXPECTED TO OCCUR FOLLOWING A RAIN EVENT. TEMPORARY CROSSINGS ARE NOT PERMITTED TO IMPOUND WATER BY BLOCKING A NATURAL WATERCOURSE.
2. THE CONTRACTOR WILL SUBMIT, IN WRITING AND ACCOMPANIED BY APPROPRIATE DRAWINGS, THE TYPE AND LOCATION OF EACH PROPOSED TEMPORARY STREAM CROSSING. THE SUBMTTAL WILL SHOW, IN DETAIL, THE PROPOSED WORK SEQUENCE AND THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE CROSSING. THE SUBMITTAL WILL BE EVALUATED BY THE TXDOT DISTRICT ENVIRONMENTAL QUALITY COORDINATOR AND APPROVED BY THE ENGINEER.
3. USE REINFORCED CONCRETE PIPE (CLASS III) OR PRECAST BOX CULVERTS UNLESS OTHERWISE APPROVED. DO NOT USE CORRUGATED METAL PIPE.
4. TEMPORARY STREAM CROSSINGS WILL BE PERMITTED ONLY WHEN NECESSARY AS DETERMINED BY THE ENGINEER. TXDOT WILL EVALUATE ACCESS FROM BOTH SIDES OF THE BRIDGE OR CULVERT AND ALSO EVALUATE THE CONTRACTOR'S PROPOSED DEMOLITION AND CONSTRUCTION TECHNIQUES.
5. ORDINARY HIGH WATER MARKS ARE ESTABLISHED BY THE FLUCTUATIONS OF WATER IN THE STREAM AND ARE INDICATED BY PHYSICAL CHARACTERISTICS SUCH AS A CLEAR NATURAL LINE IMPRESSED ON THE BANK, SHELVING, CHANGES IN THE SOIL CHARACTER, ABSENCE OF TERRESTRIAL VEGETATION, PRESENCE OF LITTER OR DEBRIS, OR OTHER APPROPRIATE MEANS THAT CONSIDER THE CHARACTERISTICS OF THE SURROUNDING AREAS.
6. DO NOT PUSH OR MOVE SOIL FROM ABOVE OR OUTSIDE THE ORDINARY HIGH WATER MARKS TO BELOW OR INSIDE THE ORDINARY HIGH WATER MARKS. NON-COMPLIANT WORK WILL BE REMOVED AT THE CONTRACTOR'S EXPENSE.
7. DAMAGE TO ANY TEMPORARY STREAM CROSSING WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
8. REMOVE ANY TEMPORARY STREAM CROSSINGS AS SOON AS POSSIBLE.
9. EXCEPT FOR SEDIMENT CONTROL FENCE, THE MATERIALS AND LABOR REQUIRED FOR CONSTRUCTION OF TEMPORARY STREAM CROSSINGS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

~→	DIRECTION OF FLOW
—(SCF)—	SEDIMENT CONTROL FENCE

Texas Department of Transportation

Fort Worth District Standard

TEMPORARY STREAM CROSSING DETAIL
TSCD-FTW

ORIGINAL DRAWING: 05/2019	tscdftw.dgn	PROJECT NO.			SHEET NO.
DATE	REVISIONS	BR 202I(445) ETC			125
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY	
		TEXAS	FTW	PARKER	
		CONT.	SECT.	JOB	HIGHWAY NO.
		0902	38	33,ETC	CS