DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			
DES	6				
GRAPHICS	STATE	CONT	SECT	JOB	HIGHWAY NO.
GRA	TEXAS	0918	46	316	VA
CHECK	CHECK	DIST	COUNTY		SHEET NO.
$CHK1$	$CHK2$	DAL	DENTON		1

NAME OF CONTRACTOR: _____

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

SUMMARY OF CHANGE ORDERS:

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT

NH XX (XX) XX

CSJ: 0918-46-316

SHADY SHORES RD

DENTON COUNTY

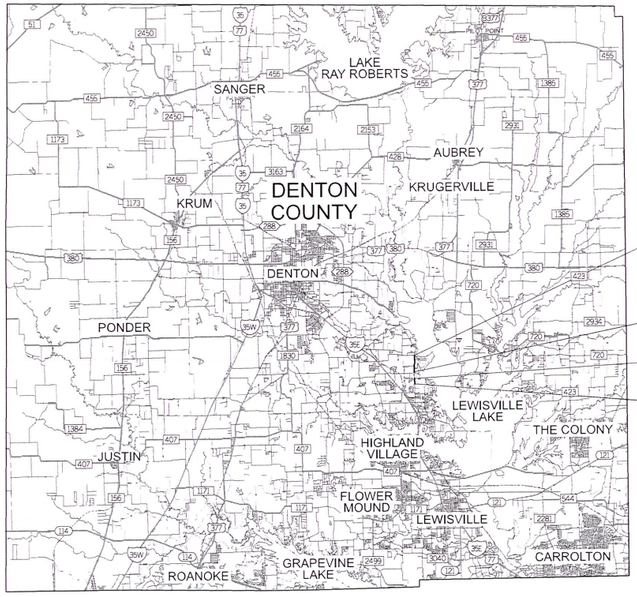
CSJ: 0918-46-316

LIMITS: FROM SILKTREE COURT
TO WEST SHADY SHORES ROAD

TOTAL LENGTH OF PROJECT =				
ROADWAY	= 2,854	FT. =	0.540	MI.
BRIDGE	= 1,710	FT. =	0.324	MI.
TOTAL	= 4,564	FT. =	0.864	MI.

FOR THE CONSTRUCTION OF RECONSTRUCT LOCAL ROAD

CONSISTING OF RECONSTRUCT ROAD FROM 2 TO 2 LANES TO ELEVATE OUT OF FLOODPLAIN WITH DRAINAGE IMPROVEMENTS



N

DENTON COUNTY
0 20,000 40,000
SCALE IN FEET
DALLAS DISTRICT

END PROJECT
END CSJ 0918-46-316
STA 105+63.00
TRM N/A

BEGIN CONSTRUCTION
STA 70+35.77

END CONSTRUCTION
STA 47+00.00

BEGIN PROJECT
BEGIN CSJ 0918-46-316
STA 36+40.00
TRM N/A

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

FUNCTIONAL CLASS = MAJOR COLLECTOR

DESIGN SPEEDS = 35 MPH (SHADY SHORES RD)
30 MPH (CROSS STREETS)

ADT (2024) = 7,200
ADT (2044) = 13,000

NOTE:

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

Registered Accessibility Specialist (RAS) inspection required. TDLR No. TABS2025007570

halff
2601 MEACHAM BLVD
FORT WORTH, TX 76137
T: 817-847-1422

SUBMITTED FOR LETTING 12/03/2025

David A. Bentley , P.E.

DESIGN ENGINEER

DENTON COUNTY

RECOMMENDED FOR LETTING 1/13/2026

Tina M , P.E.

DENTON COUNTY DIRECTOR OF TRANSPORTATION AND ENGINEERING

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING _____

_____ , P.E.

DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING _____

_____ , P.E.

AREA ENGINEER

APPROVED FOR LETTING: _____

_____ , P.E.

DISTRICT ENGINEER

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

_____ , P.E.

Signature of Registrant & Date

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DATE: 12/3/2025 9:16:45 AM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GN-COVR-01

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HALFF ASSOCIATES, INC. TBPELS FIRM #312

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

DAVID A. BURKETT SIGNATURE PE 03/27/2026 DATE

STATE OF TEXAS · DAVID A. BURKETT · 100068 · LICENSED PROFESSIONAL ENGINEER

HALFF ASSOCIATES, INC. TBPELS FIRM #312

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

JAMES C. VESTER SIGNATURE PE 12/01/2025 DATE

STATE OF TEXAS · JAMES C. VESTER · 128858 · LICENSED PROFESSIONAL ENGINEER

HALFF ASSOCIATES, INC. TBPELS FIRM #312

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

ALEXYS GUERRERO SIGNATURE PE 12/01/2025 DATE

STATE OF TEXAS · ALEXYS GUERRERO · 153408 · LICENSED PROFESSIONAL ENGINEER

halff

Texas Department of Transportation

SHADY SHORES

INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		2

CK: DW: CK: DW:

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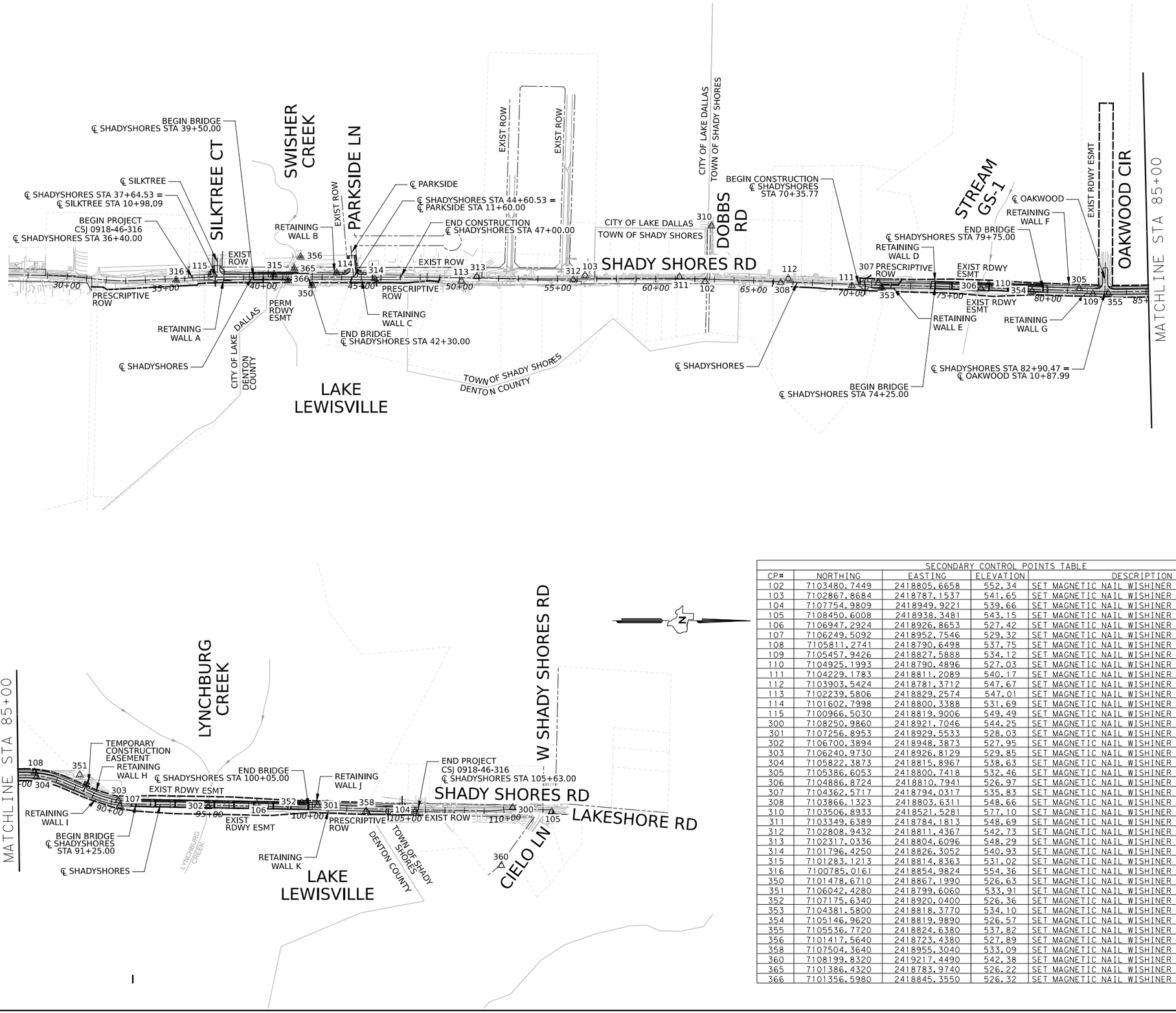

SECONDARY CONTROL POINTS TABLE

CP#	NORTHING	EASTING	ELEVATION	DESCRIPTION
102	7103480.7449	2418805.6658	552.34	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
103	7102867.8684	2418787.1537	541.65	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
104	7107754.9809	2418949.9221	539.66	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
105	7108450.6008	2418938.3481	543.15	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
106	7106947.2924	2418926.8653	527.42	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
107	7106249.5092	2418952.7546	529.32	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
108	7105811.2741	2418790.6498	537.75	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
109	7105457.9426	2418827.5888	534.12	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
110	7104925.1993	2418790.4896	527.03	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
111	7104229.1783	2418811.2089	540.17	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
112	7103903.5424	2418781.3712	547.67	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
113	7102239.5806	2418829.2574	547.01	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
114	7101602.7998	2418800.3388	531.69	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
115	7100966.5030	2418819.9006	549.49	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
300	7108250.9860	2418921.7046	544.25	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
301	7107256.8953	2418929.5533	528.03	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
302	7106700.3894	2418948.3873	527.95	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
303	7106240.9730	2418926.8129	529.85	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
304	7105822.3873	2418815.8967	538.63	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
305	7105386.6053	2418800.7418	532.46	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
306	7104886.8724	2418810.7941	526.97	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
307	7104362.5717	2418794.0317	535.83	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
308	7103866.1323	2418803.6311	548.66	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
310	7103506.8933	2418521.5281	577.10	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
311	7103349.6389	2418784.1813	548.69	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
312	7102808.9432	2418811.4367	542.73	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
313	7102317.0336	2418804.6096	548.29	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
314	7101796.4250	2418826.3052	540.93	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
315	7101283.1213	2418814.8363	531.02	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
316	7100785.0161	2418854.9824	554.36	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
350	7101478.6710	2418867.1990	526.63	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
351	7106042.4280	2418799.6060	533.91	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
352	7107175.6340	2418920.0400	526.36	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
353	7104381.5800	2418818.3770	534.10	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
354	7105146.9620	2418819.9890	526.57	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
355	7105536.7720	2418824.6380	537.82	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
356	7101417.5640	2418723.4380	527.89	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
358	7107504.3640	2418955.3040	533.09	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
360	7108199.8320	2419217.4490	542.38	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
365	7101386.4320	2418783.9740	526.22	SET MAGNETIC NAIL WISHINER TRAVERSE POINT
366	7101356.5980	2418845.3550	526.32	SET MAGNETIC NAIL WISHINER TRAVERSE POINT

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PROJECT LAYOUT AND SURVEY CONTROL

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		3

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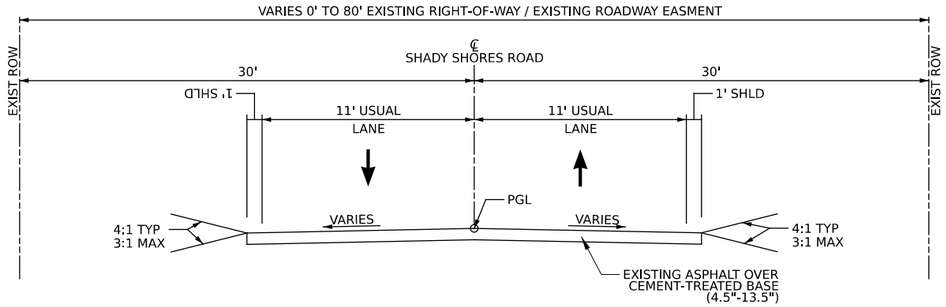
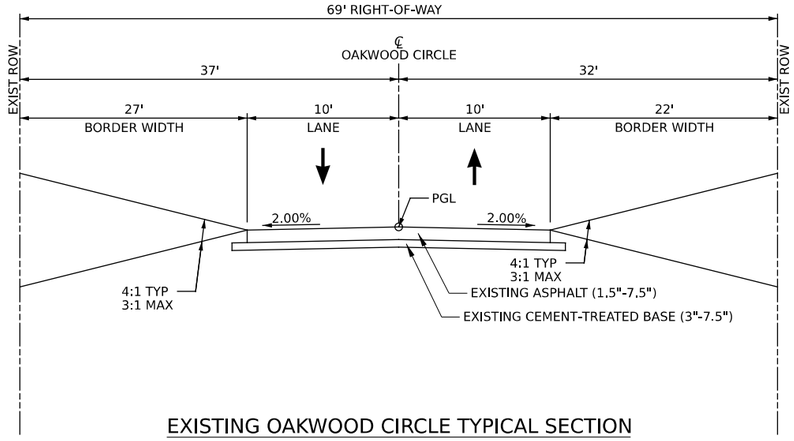


EXISTING SHADY SHORES RD TYPICAL SECTION
STA 36+40.00 TO STA 105+63.00



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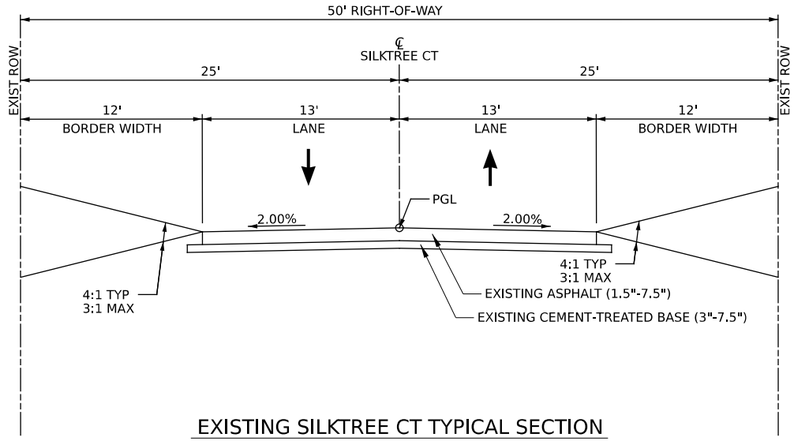

EXISTING SILKTREE CT TYPICAL SECTION
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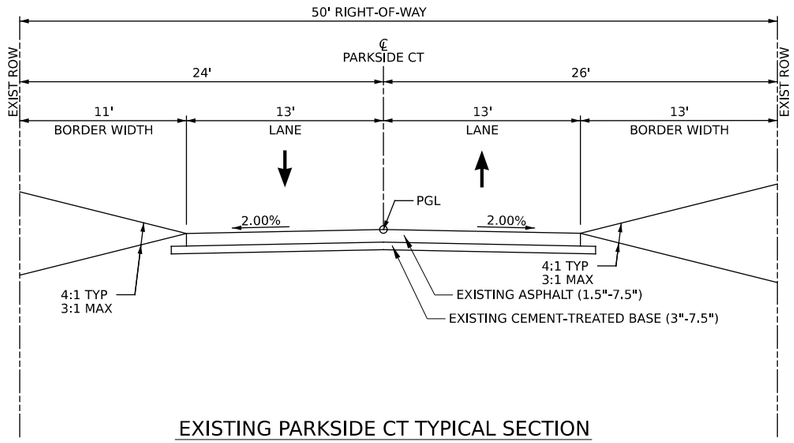

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DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

12-01-2025

TBPELS FIRM #312

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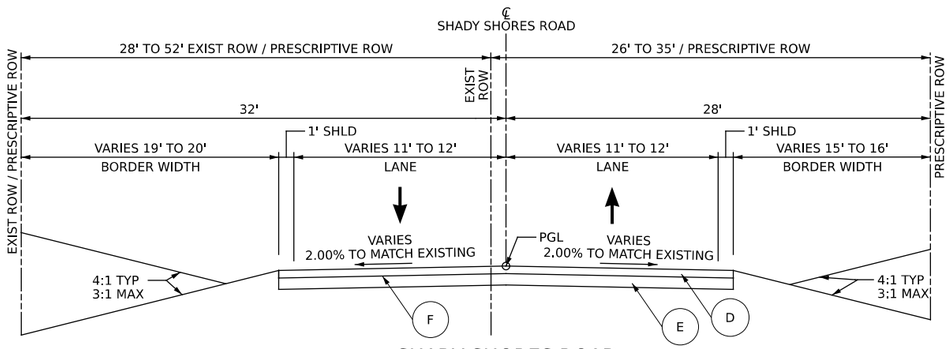
Texas Department of Transportation

SHADY SHORES

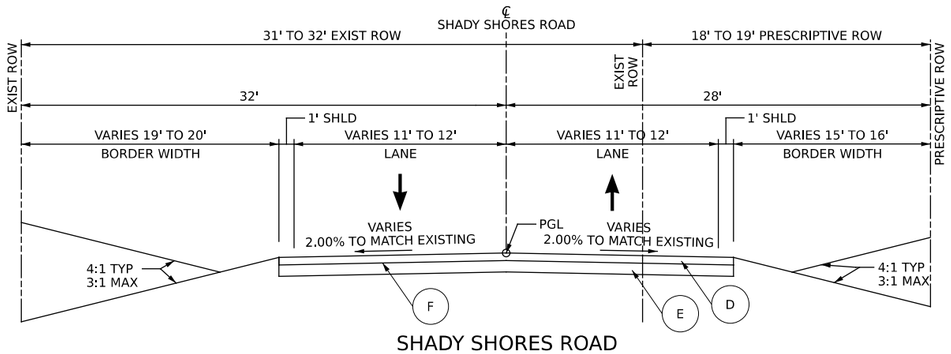
EXISTING TYPICAL SECTIONS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		4



SHADY SHORES ROAD
PROPOSED TRANSITION TYPICAL SECTION
STA 36+40.00 TO STA 37+20.00
STA 46+00.00 TO STA 47+00.00
STA 70+35.77 TO STA 71+00.00



SHADY SHORES ROAD
PROPOSED TRANSITION TYPICAL SECTION
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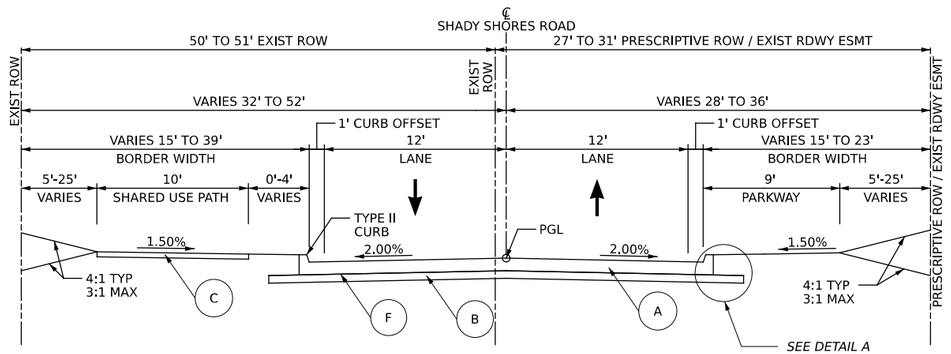
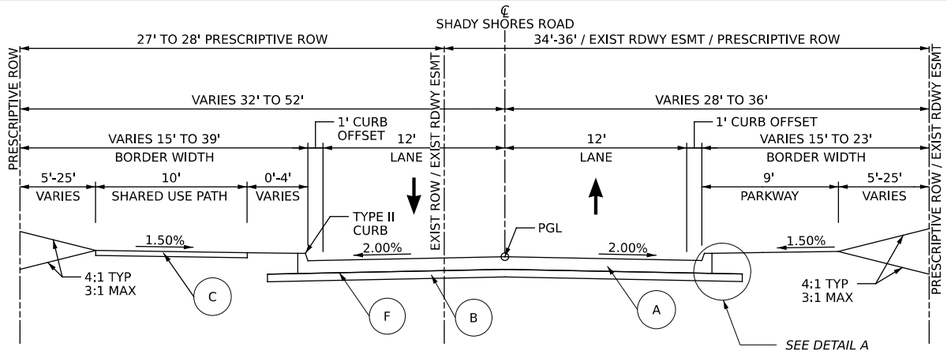
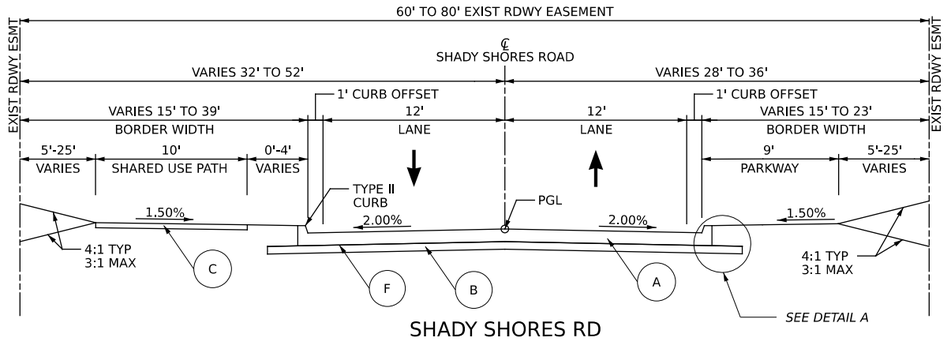


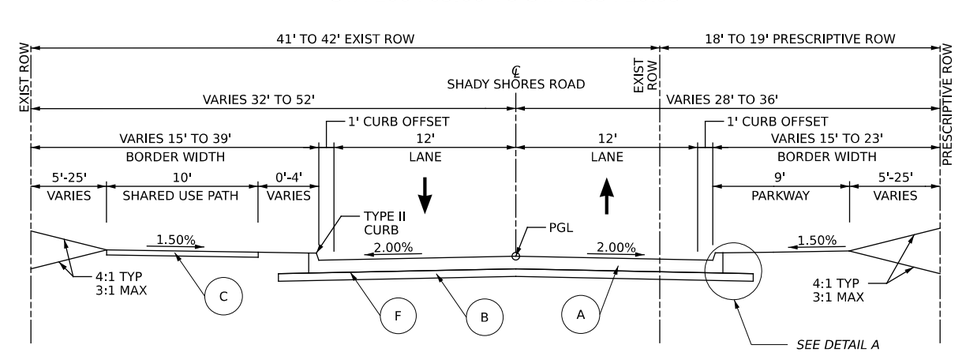
SHADY SHORES RD
PROPOSED TYPICAL SECTION
STA 37+20.00 TO STA 39+50.00
STA 42+30.00 TO STA 46+00.00



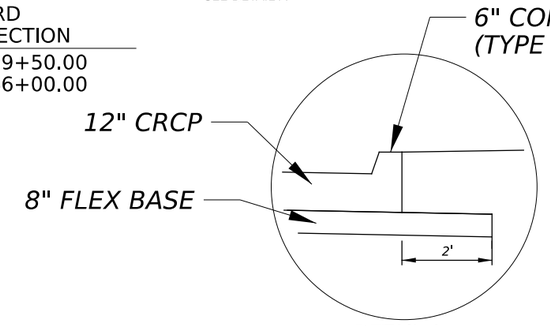
SHADY SHORES RD
PROPOSED TYPICAL SECTION
STA 71+00.00 TO STA 72+56.05



SHADY SHORES RD
PROPOSED TYPICAL SECTION
STA 72+56.05 TO STA 74+25.00
STA 79+75.00 TO STA 91+25.00
STA 100+05.00 TO STA 103+20.95



SHADY SHORES RD
PROPOSED TYPICAL SECTION
STA 103+20.95 TO STA 105+63.00



DETAIL A

LEGEND

- (A) 12" CRCP
- (B) 8" FLEXIBLE BASE
- (C) 5" CONCRETE SIDEWALK
- (D) 4" SP MIXES SP-B PG64-22
- (E) 8" CEMENT-TREATED BASE
- (F) PRIME COAT

NOTE:

FOR GRADING ELEVATIONS UNDER BRIDGES, REFER TO BRIDGE GRADING SHEETS.

DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PROPOSED
TYPICAL SECTIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		5

DATE: 11/25/2025 2:11:57 PM
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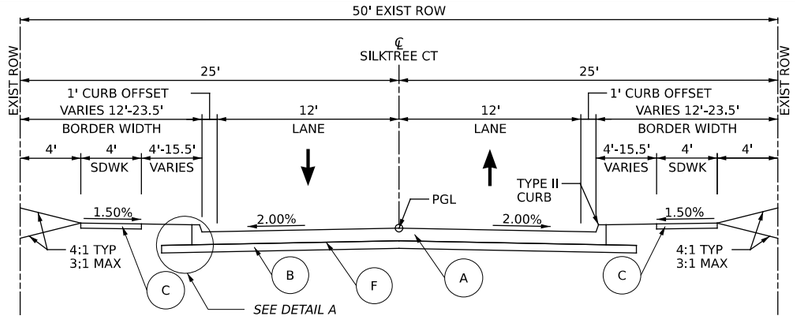
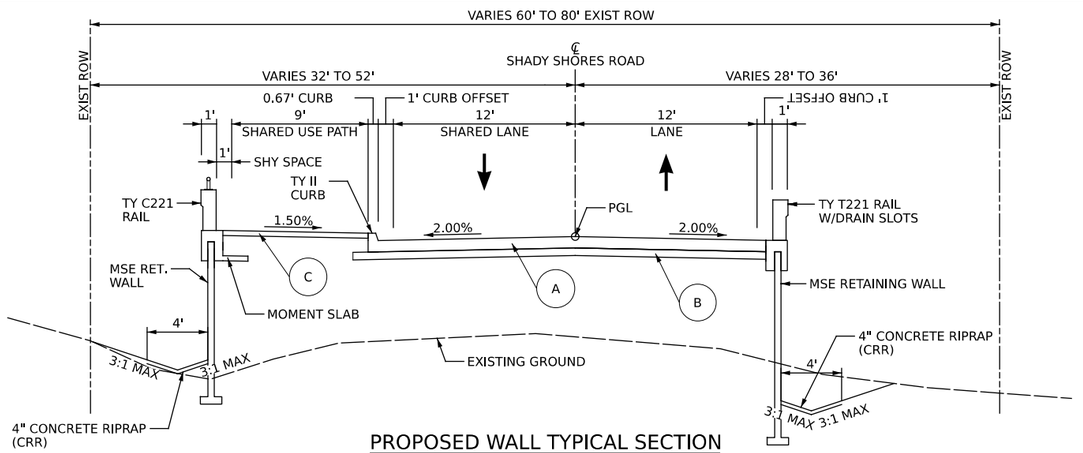


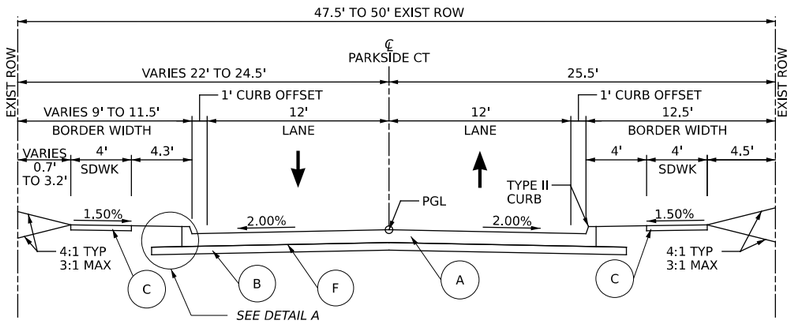
PROPOSED SILKTREE CT TYPICAL SECTION
STA 10+38.57 TO STA 10+98.09



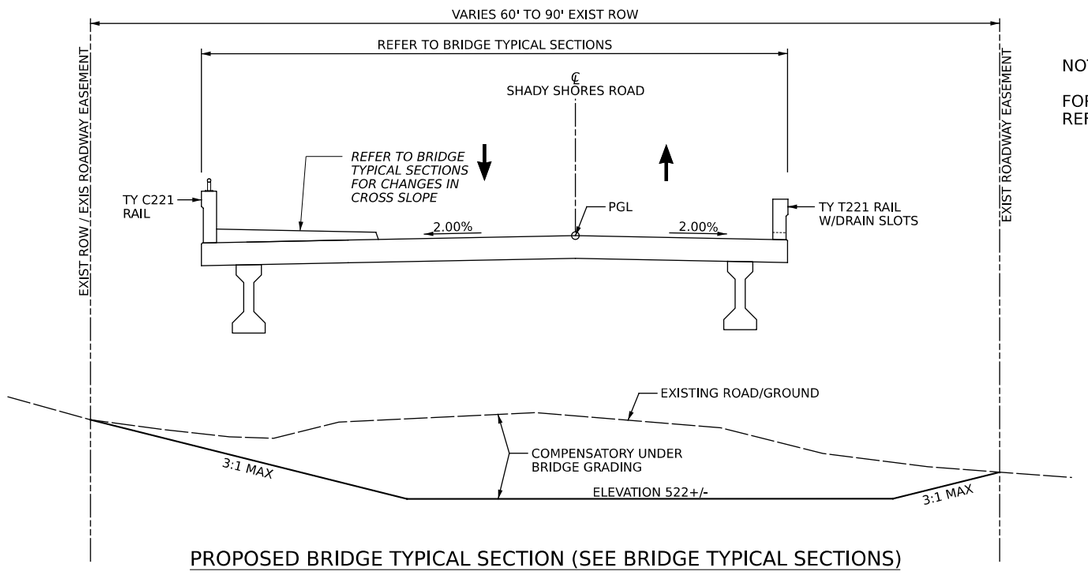
PROPOSED WALL TYPICAL SECTION
SEE RETAINING WALL LAYOUTS FOR LIMITS

LEGEND

- (A) 12" CRCP
- (B) 8" FLEXIBLE BASE
- (C) 5" CONCRETE SIDEWALK
- (D) 4" SP MIXES SP-B PG64-22
- (E) 8" CEMENT-TREATED BASE
- (F) PRIME COAT



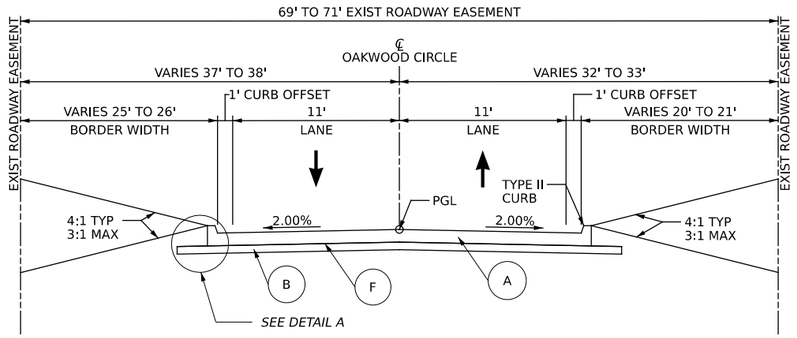
PROPOSED PARKSIDE CT TYPICAL SECTION
STA 10+50.01 TO STA 11+60.00



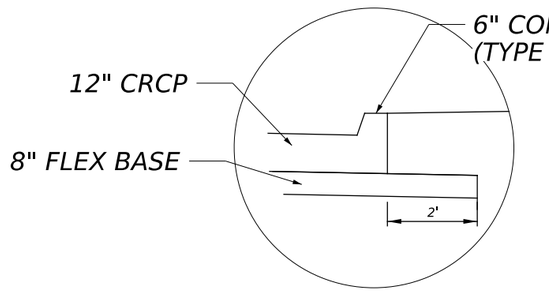
PROPOSED BRIDGE TYPICAL SECTION (SEE BRIDGE TYPICAL SECTIONS)
STA 39+50.00 TO STA 42+30.00 (SWISHER CREEK BRIDGE)
STA 74+25.00 TO STA 79+75.00 (STREAM GS-1 BRIDGE)
STA 91+25.00 TO STA 100+05.00 (LYNCHBURG CREEK BRIDGE)

NOTE:

FOR GRADING ELEVATIONS UNDER BRIDGES, REFER TO BRIDGE GRADING SHEETS.



PROPOSED OAKWOOD CIRCLE TYPICAL SECTION
STA 10+26.00 TO STA 10+87.99



DETAIL A

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312
halff
Texas Department of Transportation

SHADY SHORES

PROPOSED
TYPICAL SECTIONS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		6

DATE: 11/25/2025 2:12:15 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-TYPP-02.dgn

General Notes: 2024 TxDOT Specification – Dallas District General Notes

SPECIFICATION DATA

Table 1: Soil Constants Requirements

Item	Description	Plasticity Index		Note
		Max	Min	
132	EMBANK (FNL)(DC)(TY C1)	40	8	1
132	EMBANK(FNL)(DC)(TY C2)	25	8	2

Note 1: Material excavated from the project must meet the PI requirements when used in the top 10 feet of embankment that supports the pavement structure or other locations shown in the plans. Do not use shale and obtain approval to incorporate shaley clay produced by the construction project.

Note 2: Use as a non-select embankment backfill as defined under Item 423.2.4.1. Use as an embankment to backfill behind abutments to the extent of the approach slab or to backfill areas enclosed by an abutment and / or retaining walls or other locations as shown in the plans.

Table 2: Basis of Estimate for Permanent Construction

Item	Description	Thickness	Rate		Quantity
162	Block Sod	N/A	See Specifications		3838 SY
164	Drill Seed (Perm_Rural_C/S))	N/A	See Specifications		8365 SY
166 *	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	0.07 Ton
168	Vegetative Watering (Warm)**	N/A	12	TGL/Ac/Day	162 TGL
310	Prime Coat	N/A	0.20	Gal/SY	2060 Gal
344	SP MIXES	See Plans	110	Lbs./SY/In	172 Ton

*For contractor's information only
**Use Summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates.

Note: (1) Base material weight based on 1.50 Ton/CY (dry- compacted)
(2) Asphalt weight based on 110 Lbs./SY/In
(3) Subgrade weight based on 1.5 Ton/CY (dry-compacted)
(4) Item 310 and 314 Residual Asphalt 0.20 Gal/SY

Table 3: Basis of Estimate for Temporary Erosion Control Items

Item	Description	Rate		Quantity
164	Drill Seed (Temp_Warm_Cool)	See Specifications		6103 SY
166*	Fertilizer (12-6-6)	500	Lb/Ac	0.35 Ton
168	Vegetative Watering (Warm)**	12	TGL/Ac/Day	85 TGL

*For Contractor's Information Only.
**Use Summer rate for calculation, adjust for Actual Field Conditions/Temperatures as Necessary. See Vegetation Establishment Sheet for estimated daily rates.

Table 4: Basis of Estimate for Finish Colors (Items 427 & 446) [1]

Element	Color	Specification Number [2]
CTB	Light beige	33717
Columns	Light beige	33717
Bent caps	Light beige	33717
Retaining wall	Dark beige	33617
Retaining wall coping	Light beige	33717
Abutment walls	Dark beige	33617
Abutment backwall	Dark beige	33617
Abutment cap	Dark beige	33617
Girders	Dark beige	33617
Bottom of slab overhang	Dark beige	33617
Slab edge	Dark beige	33617
Concrete rail parts	Light beige	33717
Metal rail parts	Galvnaized	N/A
Architectural elements	See plans	See plans

1. Unless otherwise noted, it is the intent of these plans that all exposed surfaces (concrete or steel) of bridges, retaining walls, concrete traffic railing and concrete traffic barrier be given a tinted coating as shown or as directed. Such coating shall meet the applicable provisions of Item 427 or Item 446.

2. SAE AMS-STD 595

GENERAL

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

The disturbed area for this project, as shown on the plans is 2.02 and 5.64 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project required permits with environmental resources agencies. There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 “Project-Specific Locations”, provides a listing of regulatory agencies that may need to be contacted regarding this project.

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

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

Contractor questions will be accepted through email, phone, and in person by:
Tina Massey Tina.Massey@dentoncounty.gov 940.349.3412

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

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

Cross sections may be requested by posting a question to the above Letting Pre-Bid Q&A web page. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

The following standard detail sheets have been modified:

Item 5:
If city, town, or county owned utilities or facilities are present within the Right-of-Way, call the appropriate department of the local city, town, or county a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor’s negligence including, but not limited to, repair or replacement at the Contractor’s expense.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

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

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

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

Item 6:

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

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

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

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

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

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

No significant traffic generator events identified.

Item 8:
This Project will be a Six-Day Workweek in accordance with Article 8.3.1.1.

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

Item 100:
Remove the existing roadway small signs, delineators and object markers as shown on the plans, or as directed, during construction within the right of way. Small sign, delineator and object marker removals are subsidiary to this Item.

The limits of preparing right of way will be measured from Sta. 36+40.00 to Sta. 105+63.00 along the centerline of construction. No other Prep ROW areas will be considered for payment.

Item 104:
Sawing of concrete is not paid for directly, but is considered subsidiary to this item.

Items 105, 251, 305, and 354:
Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

Item 105:
Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at your own expense.

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

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

Item 132:
Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for embankment and is expected to meet all material requirements for embankment regardless of the source.

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no expense to the department. The engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

Earth embankment Type C1 and C2, are mainly composed of material other than shale. Furnish material that is free from vegetation or other objectionable material and that conforms to the requirements of Table 1 (Sheet A). If necessary, treat material with lime slurry in accordance with Item 260, "Lime Treatment (Road-Mixed)" in order to meet these requirements. Use Tex-121-E, figure 1, page 4 to calculate the amount of lime required. When lime treated subgrade is specified, 3000 PPM is the maximum allowed sulfate content in the top 3 feet when material comes from borrow source. Follow recommendations of 260.4.4 for mixing and mellowing. The engineer will test material placed or excavated to a depth of one foot below and laterally to one foot outside the proposed treatment limit. Lime treatment of this material will not be paid for directly, but will be considered subsidiary to this item.

Do not use shaley clays in embankment unless approved in writing.

Use embankment material Type C2 described in Table 1 "Soil Constants Requirements" for embankments behind bridge abutments to the extent of the bridge approach slabs, and other embankments enclosed by an abutment and / or retaining walls.

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

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

Item 169:
Hydraulically apply Flexterra FGM, CocoFlex ET-FGM, or Earth Guard or install North American Green SC150 for erosion control on the specified slopes or areas in the construction plan. Apply as required per manufacturer's recommendations. Use Tables under Item 164 to determine type of seeds to be used. Water for application, seeding, labor, equipment, tools, supplies, materials, fertilizer and incidentals will not be paid for directly but will be subsidiary to this Item.

Item 247:
Construct uniform layer thickness of 12 inches, or less with the required density and moisture content. Minimum PI is equal to three (3) for all grades.

Item 260:
Furnish and distribute MS-2 smoothly and evenly at the rate of 0.20 gallons per square yard (spray rate) to cure lime, as directed.

Provide Quicklime Slurry and apply lime by slurry placement method.

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

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

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

Item 341:
Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class A.

Mixtures used as concrete pavement underlayment is deemed as "Exempt Production".

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

Mixtures used as concrete pavement underlayment is deemed as "Exempt Production".

Item 360:
Use of multiple piece tiebars will be required. Provide chairs for multiple piece tiebars, threaded connectors or other adequate devices, used in concrete paving, or tie them to the pavement reinforcing steel. If approved by the engineer for specific areas, in lieu of multiple piece tiebars, drill holes into the pavement and grout straight tiebars in place with epoxy. Use a non-impact, rotary core drill to prevent damage to the pavement unless otherwise directed. Clean the drill holes and then completely fill with epoxy before inserting the tiebar. Do not bend the tiebars or insert them into plastic concrete without the approval of the engineer.

Provide curbs monolithically constructed with the concrete pavement. If continuous monolithic curb has to be temporarily omitted for any reason, provide dowelled curbs in the proposed areas, as detailed in the plans, and apply an approved epoxy resin to the pavement to receive the curb as directed. This work and materials will not be paid for directly, but is considered subsidiary to this item.

If asphalt curing is used, cure the concrete pavement with MS-2.

Stockpile the concrete aggregates at the plant site.

Provide pavement widening joints, as detailed in the plans, at all locations where concrete pavement is placed adjacent to existing concrete pavement. Installation of these joints is not paid for directly, but is considered subsidiary to this item.

Payment for furnishing and installing the pre-molded expansion joint material between the retaining walls and concrete pavement is not paid for directly, but is considered subsidiary to this item.

Provide a curing machine equipped with rubber tires, or other acceptable arrangement, so that the machine will span the pavement and monolithic curb.

Curb transition is paid for as Type II curb.

The installation of curb openings is not paid for directly, but is considered subsidiary to this item.

Place construction, sawed and contraction joints in accordance with the pavement detail sheet and as directed. Joint locations, other than as shown on the plans, are subject to approval.

Pavement leave outs are required on this project as necessary to provide for traffic at driveways and side streets as shown in the plans or as directed. The cost of providing these leaveouts, including the construction of a suitable crossover connection at each site, is not paid for directly but is considered subsidiary to this item.

If a traveling form paver is used, provide one equipped with an electronically operated horizontal control device.

Use "mechanical steel placing equipment" at the discretion of the engineer.

Provide Class HES concrete at the locations shown on the plans. Design Class HES to meet the requirements of Class P and a minimum average flexural strength of ____ psi or minimum average compressive strength of 3600 psi in 24 hr.

If more than 30% of an area in any 1000-Ft section of roadway requires grinding, action will be taken by the Contractor to make that 1000-Ft full width section uniform without changing ride quality, compromising quality of pavement and decreasing skid resistance. Approved blasting method or other method approved by the Engineer will be performed at the Contractor's expense.

Item 400:
Structural Excavation is not paid for directly but is considered subsidiary to pertinent Items unless otherwise shown on the plans.

When placing concrete storm drain pipe on slopes of greater than 10 percent, provide cement stabilized backfill to a depth shown on the plans.

Item 416:
Provide a minimum of one core per bent, regardless of placement method.

Item 420:
Mass concrete is a plans quantity item.

Apply an ordinary surface finish to all concrete surfaces within 30 days after form removal.

Form columns to a point a minimum of one foot below the proposed future or existing bottom of channel elevation indicated on the bridge layouts by an acceptable method. This form work is not paid for directly, but is considered subsidiary to this item. Existing concrete shall be in a surface saturated dry (SSD) at the time new concrete is placed against it. Use of bonding agents in prohibited.

BENT NUMBERING:

For bridges with four or more spans, number every third bent (counting the abutments) on the up-station and down-station faces of the outside column(s) at approximately the mid height of the column. For structures with three columns or less per bent, place numbers on column A. Where there are four or more columns per bent, place numbers on both outside columns. Bent numbers shall be as shown on the bridge layout.

All materials, labor and incidentals associated with placing bent numbers are subsidiary to the various bid items.

For bridges with aesthetic treatments, the numbering will be incorporated into the aesthetics package.

NATIONAL BRIDGE INVENTORY NUMBERS:

Provide National Bridge Inventory (NBI) numbers on all bridge structures and bridge class culverts.

Where beam types allow access to the face of abutment backwall, place NBI numbers on the face of each abutment backwall using 3" block numbers. Locate NBI numbers between the outside beams at opposite corners of the bridge.

Where beam types do not allow access to the face of abutment backwall, place NBI numbers on the face of each abutment cap using 3" block numbers. Locate NBI numbers below the outside beams at opposite corners of the bridge.

Where a bridge begins, ends or contains a bent common to multiple structures, place NBI numbers on both faces near both ends of the common bent cap. The number placed at each of the four locations will correspond to the NBI number assigned to the bridge immediately above the number. Locate NBI numbers below the outside beam. Place using 3" Block Numbers.

For Bridge Class Culverts, place National Bridge Inventory numbers at the middle of the downstream headwall using 3" block letters.

For Bent Numbering and NBI Numbering, furnish materials that conform to the pertinent requirements of the following items:

- Stencil ink, black 11 oz., spray can (lead, CFC, and CFHC free). Black spray will be waterproof, weather resistance and dry instantly on all surfaces, without smearing, smudging or rippling and
- Die cut stencils or
- Brass stencil, 3 in., numbers and letters, adjustable interlocking stencil, set content 92 piece numbers and letters, legend height 3 in., symbol height 3 in. Stencils must be industrial grade and interlocking.

All materials, labor and incidentals associated with placing NBI numbers are subsidiary to the various bid items.

Item 421:
Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Provide High Performance Concrete (HPC) of the class specified for the following bridge components: approach slabs, abutments, bents, columns, slabs, sidewalks and medians.

Provide High Performance Concrete (HPC) of the class specified for all railing and permanent concrete traffic barrier placed on bridges or approach slabs. HPC concrete is not required for portions of rail or concrete traffic barrier not located on a bridge.

Provide sulfate resistant concrete for box culverts and all drilled shafts.

Strength evaluation using maturity testing, Tex-426-A, may be used for all concrete elements except drilled shafts and mass concrete pours.

Provide a digital hydraulic compression testing Machine and accessories. The machine shall have a minimum testing range of 2500 pounds force to 250,000 pounds force with a hydraulic switching valve to allow for rapid advancing, hold, controlled advancing and rapid retracting. The machine shall have a load cell to measure compressive forces within the testing range and shall be calibrated and verified in accordance with ASTM latest version. The Machine can meet or exceed the following when approved by the Engineer:

ELE International ACCU-TEK250 Digital Compression Tester including accessories or Forney F-250EX Standard Compression Machine including accessories or TxDOT approved equal.
***** Coordinate with the Materials Engineer to determine if equipment is needed. *****

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

Item 423:

Name	Manufacturer	Phone
Jobe Wall System	Jobe Materials, L.P. 12123 Dyer Street El Paso, TX 79934	915-298-9900
Reinforced Earth Walls	The Reinforced Earth Company 1331 Airport Freeway, Suite 302 Euless, TX 76040-4150	817-283-5503
Strengthened Soil Walls	ROSCH Earth Technologies 18390 Wings Corporate Drive Chesterfield, MO 63005	636-519-7770
Structural Embankment MSE Walls	Structural Embankment, LLC P.O. Box 2200 Weatherford, TX 76086	817-599-5700
Tricon Retained Soil Walls	Tricon Precast, Ltd. 15055 Henry Road Houston, TX 77060	281-931-9832
Vist-A-Wall Precast MSE Walls (Grid-Strip, Wide Mesh)	Contech Engineered Solutions LLC 650 Justice Lane Mansfield, TX 76063	800-338-1122

Name	Manufacturer	Phone
VP Wall System	Valley Prestress Products, Inc. 1520 Calhoun Road P.O. Box 309 Eagle Lake, TX 77434	979-234-7899
EarthTec	Ground Improvement Systems, LLC 114 South Collins Street Arlington, TX 76024	817-223-0969
MSE Plus	SSL Construction Products 4740 Scotts Valley Drive, Suite E Scotts Valley, CA 95066	831-430-9300

All retaining walls will have a uniform texture and appearance.

Unless otherwise noted in the plans, the top of the leveling pad is located 2 feet below the proposed ground.

Square foot surface area of retaining wall is measured from the top of retaining wall to the top of the leveling pad. Footing adjustments made to accommodate the available optional retaining walls are not measured.

Unless otherwise shown on the plans, provide Type AS backfill as defined under this item for permanent MSE or concrete block (CB) walls not subject to inundation. Unless otherwise shown on the plans, provide type DS backfill as defined under this item for permanent MSE or CB walls subject to inundation.

Cement-Stabilized Backfill (CSB) is not permitted.

Unless otherwise noted on the plans, provide flowable backfill meeting the requirements of Item 401 between the back of panels and inlets or drainage pipes where the required compaction can not be achieved. Flowable backfill used for this purpose is subsidiary to this item.

Provide earth reinforcements with a minimum length of 8’ or longer as required by RW(MSE)-DD. Earth reinforcement length is measured perpendicular to the wall. Adjust skewed earth reinforcements as necessary of obtain required length.

Submit design calculations supporting the details necessary to incorporate coping, railing, inlets, drainage, electrical conduits and any additional necessary features.

The contractor has the option of constructing any of the types of retaining walls for which details and specifications are included in the plans. Footing adjustments made to accommodate the available optional retaining walls are not measured. Regardless of option or options chosen, use the same fascia pattern throughout the entire project, including cast in place full height retaining walls or retaining wall type abutments.

Submit detailed drawings depicting the patterns and matching of precast with cast-in-place for approval.

Unless otherwise shown on the plans, form the map of Texas emblem into a wall panel next to each bridge abutment. Engineer approval of the exact location of each emblem is required. The cost of forming emblems is considered subsidiary to this item. Inset the map of Texas a minimum of ¾ inch into the face of the panel, and provide a smooth finish with an engineer approved contrasting color.

At contractor's expense, repair all damage to the precast units (such as chips) as required to match the fascia pattern.

Use Embankment Type C2 as non-select embankment backfill as defined under Item 423.2.4.1. For non-select embankment fill behind retaining walls provide and install fill in accordance with Item 132, Type C2.

For cut walls, the backfill between the select fill zone and the existing ground shall be either select material as required for the select fill zone or backfill meeting or exceeding the requirements of Item 132, type C2. Place material in accordance with Item 132, Type C2 requirements. If existing ground is laid back (i.e. not vertical), the lay back shall be done as a series of equal height benches so as to prevent the formation of a smooth surface at the material interface.

Avoid distinct vertical joints between select backfill and embankment (Non-Select) backfill as required by Section 423.3.4. This may be conveniently done by providing a zone of material behind the strap zone (1' min width) in which alternating lifts of select and non-select materials are interlaced.

Items 423 and 427:
Unless otherwise noted on the plans, provide a striated finish on all retaining walls and retaining wall type bridge abutments. Supply form liners providing a finish similar to that derived from ¾" Fractured Fin"-From Symons by Dayton, Ribbed Pattern No. 312 from Sika-by Greenstreak, 16950 Adam's Rib by Fitzgerald Formliners, Maximum depth of the striations is ¾ inch.

~OR~

Unless otherwise noted on the plans, provide a striated finish on all retaining walls and retaining wall type bridge abutments. Supply form liners providing a finish similar to that derived from Ashlar Stone Formliner on all retaining walls and retaining wall type bridge abutments. Supply form liners providing a finish similar to that derived from Pattern No. 16986 "Georgetown Ashlar", by Fitzgerald Formliners 1.5" deep, Pattern No.460 "Ashlar Cut Stone", Sika by Greenstreak, Pattern 167D "Ashlar Stone D" 1.5" Deep, by Scott Systems or equal. Maximum depth of the striations is 1.5 inches.

**** *Note to Designers: Choose one of the above retaining wall finishes - depending on the location of the project.* ***Confirm retaining wall finish with the Area Office.*** ****

For cast in place walls, cast the top two feet smooth.

Retaining wall colors are shown elsewhere in the plans.

Item 425:
Repair "Safety Harness Pole Holes" in beams in accordance with Item 429 and the TXDOT Concrete Repair Manual prior to placement of the Bridge Slab. This work is considered subsidiary to the various bid items.

Item 427:
Finish concrete structures surface area I with an opaque sealer of the color(s) shown elsewhere in the plans in accordance Item 427.

Apply a 4-SF sample of each color on the project surfaces for approval. Adjust color as required by Engineer to compensate for surroundings and natural lighting conditions on the project site.

Ensure that surfaces are free of weak surface material, curing compounds and other surface contaminants prior to coating.

FORM LINER FINISHES: Place architectural concrete treatments as shown. Placement is subsidiary to this item.

Where used, provide fractured fin/ribs/striations that are continuous with no apparent curves or discontinuities. Variations of the fractured ribs from true vertical exceeding ¼" for each 4'-0" of panel height are not acceptable.
*** Note to Designers: Include above note if no other form liner pattern is specified or requested. ***

Provide form liners that release without leaving pieces of liner material on the concrete and without pulling or breaking concrete from the textured surface. Provide form release agents as recommended by the manufacturer. Replace form liners as directed that have become damaged or worn. Replacement of form liners is considered incidental to the work and no additional compensation is provided.

No horizontal splices in the form liner are permitted. Vertical splices may occur only in valleys between fractured ribs.

Provide sample panels a minimum of ten days in advance of starting construction of the textured concrete surfaces. Construct sample panel(s) in accordance with Item 427.4.3.5 "Form Liner Finish" using each type of approved form liner. Sample panels must meet the requirements of the plans and specifications and be approved before any construction form liners may be ordered, obtained or used. Provide panels having a textured portion at least 5'-0" by 5'-0" with a representative un-textured surrounding surface. If directed, construct and finish additional test panels until a satisfactory concrete surface texture is obtained.

The approved sample panel is the standard of comparison for the production concrete surface texture. If directed, build a new test panel to demonstrate acceptability of any proposed change in construction method.

Tool or replace areas requiring surface treatment that do not match their associated sample panels. Upon completion, tooled or replaced panels must match the associated sample panel. Tooling or replacement is at the contractor's expense.

For proper placement of the expansion joint behind the rail, omit surface finish from the top of RW (BTR)DAL or RW(BTR) rail to bottom of panel as directed.

Joint reveal details and location may vary slightly from what is shown to match the adjacent MSE walls as directed. No additional compensation will be allowed.

Item 440:
Provide reinforcing steel with epoxy coating meeting the requirements of item 440 for the following bridge components: approach slab, slab, sidewalk, median, concrete traffic barrier, and rail. Alternative materials will be considered as shown in the *TXDOT Bridge Design Manual-LRFD Chapter 3 Section 2.*

Epoxy coated reinforcing is not required for portions of rail or concrete traffic barrier not located on a bridge.

Reinforcing for abutments, bents and columns are not required to be epoxy coated.

R-bars (I-beams, U-beams, X-Beams and TX Girders), Z-bars (boxes), and H-bars (Slab beams) are not required to be epoxy coated**.**

All ties, chairs and other appurtenances used with epoxy coated reinforcing shall be epoxy coated or non-metallic.

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strip and Rip Rap Items as approved. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved.

Item 442:
Use temperature Zone 1 for CVN testing.

Item 464:
The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

At locations where storm drains dead-end, plug with a concrete plug of a thickness equal to 1 ½ inches per foot of diameter of pipe with a minimum thickness of 3 inches. The cost of the plugs shall be included in the unit price bid per foot of the various storm drain pipes.

Item 465:
All manholes, junction boxes and inlets will require inverts unless otherwise directed.

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

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

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

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

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

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

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

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

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

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

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" plywood sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

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

Item 529:
Provide grooved joints at 10-foot intervals and ¾ inch expansion joint material for doweled curb at the same locations as on the existing pavement.

For Curb and Gutter sections, provide grooved joints at 10-foot intervals and ¾ inch expansion joint material at a maximum of 50-foot centers and at all radius points and inlets.

Curb and Gutter transitions will be paid for by the foot at the unit price for the corresponding curb or curb and gutter section.

Saw joints at the same location as on the existing pavement.

Item 530:
Provide Class "HES" concrete for concrete intersections and driveways listed or shown on the plans.

Item 531:
Joint sealant is required when shown in the plans. This work will not be paid for directly but will be considered subsidiary to this Item.

Item 540:
Furnish one type of post throughout the project except as specifically noted in the plans.

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

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

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

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

Item 585:
Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule _4_ on the travel lanes.

Items 644, 647, and 650:

Prior to taking elevations to determine lengths for fabrication of signposts and/or sign support towers, obtain verification of all proposed locations.

All sign mounts shall have a clamp base system for all small roadside sign assemblies.

A 3-inch strip of red reflective sheeting shall be placed on all Do Not Enter sign assemblies. This sheeting shall be placed directly below the Do Not Enter sign for the entire length of the signpost facing wrong way traffic. This work will be considered subsidiary to Item 644.

The post lengths shown on the Summary of Large Signs are approximations only. After the "X" dimensions are determined, submit actual post lengths to the Engineer for approval. Post lengths and size shall be approved by the Engineer before fabrication.

Torque the anchor bolts for only the Exit Gore signs to 60 foot-pounds.

SUMMARY OF REMOVAL ITEMS																	
LOCATION	100* 7002	104 7001	104 7006	104 7011	104 7013	104 7025	105 7052	496 7004	496 7005	496 7006	496 7007	496 7008	496 6072	542 7001	542 7002	544 7003	560 7012
	PREPARING ROW	REMOV CONC (PAV)	REMOV CONC (RIPRAP)	REMOV CONC (DRIVEWAYS)	REMOV CONC (SIDEWALK, RAMP OR SUP)	REMOV CONC (RETAINING WALLS)	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	REMOV STR (SET)	REMOV STR (WINGWALL)	REMOV STR (HEADWALL)	REMOV STR (PIPE)	REMOV STR (BOX CULVERT)	REMOVING ROCK RIPRAP	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (REMOVE)	RELOCATE EXISTING MAILBOX
	STA	SY	SY	SY	SY	SY	SY	EA	EA	EA	LF	LF	SY	LF	EA	EA	EA
CSJ 0918-46-316																	
SHEET 1 OF 8	6	157	25				1592	2	2		92	86		416	3		
SHEET 2 OF 8	5	145			42		1504		2		127			156	1		1
SHEET 3 OF 8	6			64			1373	2			78		41				1
SHEET 4 OF 8	6		142			108	1424				180		76				
SHEET 5 OF 8	6						1766				40						
SHEET 6 OF 8	6						1495				19		561	502		2	
SHEET 7 OF 8	6						1451			2		193	1130	1200			
SHEET 8 OF 8	6						1341				55			52		2	
TOTALS	47	302	167	64	42	108	11946	4	4	2	591	279	1808	2326	4	4	2

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS				
LOCATION	502 7002	503 7002	700 7006	SP-1
	BARR, SIGNS, TRAFFIC HANDLING ADD ALT1X	PORTABLE CHANGEABLE MESSAGE SIGN	POTHOLE REPAIR (STANDARD)	PROJECT CONSTRUCTION SIGN
	MO	EA	LB	EA
CSJ 0918-46-316	29	2	1500	2
TOTALS	29	2	1500	2

*THE CONTRACTOR SHALL MINIMIZE IMPACTS TO AND PROTECT ALL EXISTING TREES. PRUNING SHALL BE LIMITED TO BRANCHES NECESSARY FOR CONSTRUCTION OF THE PROPOSED FACILITIES.TREE REMOVAL SHALL NOT OCCUR WITHOUT PRIOR NOTIFICATION TO THE LANDOWNER AND THE ENGINEER.

PRIOR TO ANY TREE TRIMMING ACTIVITY, THE TREE TRIMMING PROCEDURE SHALL BE APPROVED BY THE ENGINEER AND SHALL CONFORM TO TXDOT ITEM 100 SPECIFICATIONS.

ALL TREE PROTECTION MEASURES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 100.

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Texas Department of Transportation

SHADY SHORES

SUMMARY OF QUANTITIES REMOVAL AND TRAFFIC CONTROL ITEMS

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		8

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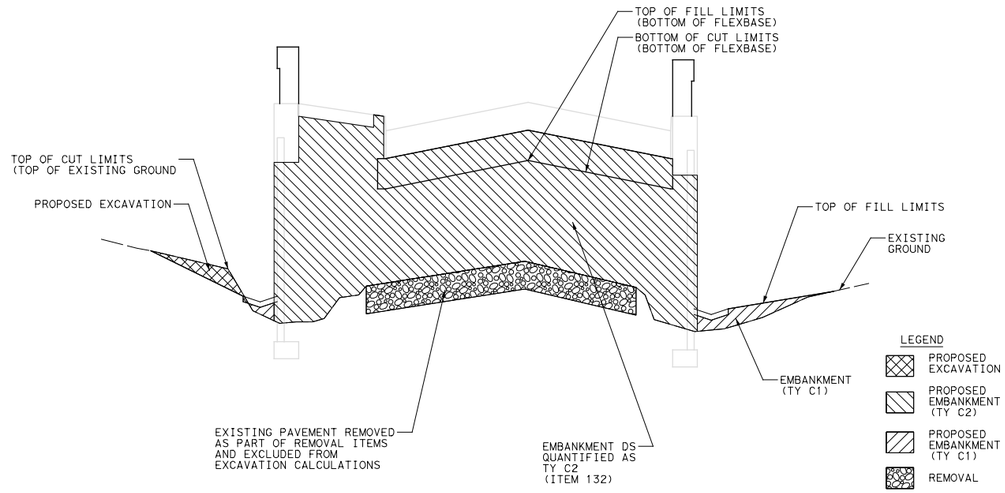
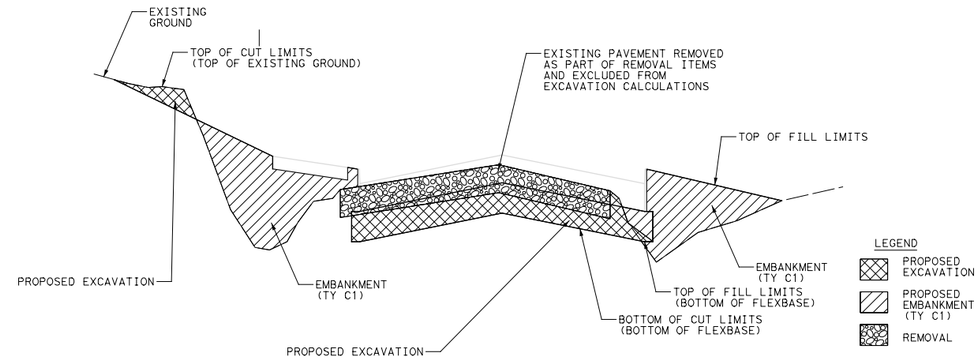
DATE: 4/2/2026 4:14:07 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SUMM-REMV-01

EARTHWORK ITEMS BY STATION (SHADY SHORES)						
STATION	110 7001	132 7008	132 7010	CUMULATIVE		
	EXCAV (ROAD WAY)	EMBANK (FNL) (DC) (TY C1)	EMBANK (FNL) (DC) (TY C2)	EXCAV (ROAD WAY)	EMBANK (FNL) (DC) (TY C1)	EMBANK (FNL) (DC) (TY C2)
	CY	CY	CY	CY	CY	CY
36+40.00						
36+50.00	8	0		8	0	0
37+00.00	54	0		62	0	0
37+50.00	81	0		143	0	0
38+00.00	109		4	252	0	4
38+50.00	119		11	371	0	14
39+00.00	75		64	446	0	78
39+50.00	94		57	540	0	135
40+00.00	233		0	773	0	135
40+50.00	312	0		1086	0	135
41+00.00	430	6.098		1516	6	135
41+50.00	492	6.098		2008	12	135
42+00.00	362		0	2370	12	135
42+50.00	164		236	2534	12	370
43+00.00	40		411	2573	12	781
43+50.00	52		288	2625	12	1069
44+00.00	54		223	2679	12	1292
44+50.00	39		121	2718	12	1413
45+00.00	25		38	2743	12	1451
45+50.00	33	28		2776	40	1451
46+00.00	57	16		2832	56	1451
46+50.00	52	15		2884	72	1451
47+00.00	39	0		2923	72	1451
70+60.00		0		2923	72	1451
71+00.00	26	35		2948	107	1451
71+50.00	13	107		2961	213	1451
72+00.00	0		172	2962	213	1623
72+50.00	10		211	2972	213	1833
73+00.00	23		253	2995	213	2086
73+50.00	27		353	3021	213	2440
74+00.00	40		442	3061	213	2882
74+50.00	220		240	3281	213	3122
75+00.00	423	0		3704	213	3122
75+50.00	500	0		4204	214	3122
76+00.00	558	0		4763	214	3122
76+50.00	562	0		5324	214	3122
77+00.00	743	0		6067	214	3122
77+50.00	696	0		6764	214	3122
78+00.00	470	0		7234	214	3122
78+50.00	471	0		7705	215	3122
79+00.00	486	0		8191	215	3122
79+50.00	489		0	8680	215	3122
80+00.00	534		0	9215	215	3122
80+50.00	309		215	9524	215	3336
81+00.00	34		387	9558	215	3724
81+50.00	20		301	9578	215	4025
82+00.00	9	252		9587	466	4025
82+50.00	0	189		9587	655	4025
83+00.00	23	90		9610	746	4025
83+50.00	69	35		9680	780	4025
84+00.00	116	15		9796	796	4025
84+50.00	143	6		9939	802	4025
85+00.00	141	3		10080	805	4025
85+50.00	132	3		10211	808	4025
86+00.00	127	5		10339	813	4025
86+50.00	112	5		10451	818	4025
87+00.00	104	5		10555	823	4025
87+50.00	108	8		10663	831	4025
88+00.00	97	16		10760	847	4025
88+50.00	71		36	10831	847	4061
89+00.00	43		37	10874	847	4098
89+50.00	35		34	10910	847	4133
90+00.00	43		30	10952	847	4163
90+50.00	77		11	11029	847	4174
91+00.00	170		4	11199	847	4178
91+50.00	286		4	11485	847	4182
92+00.00	575	4		12059	851	4182
92+50.00	747	0		12807	851	4182
93+00.00	710	0		13517	851	4182
93+50.00	750	0		14267	851	4182
94+00.00	755	0		15023	851	4182
94+50.00	758	0		15781	851	4182
95+00.00	782	0		16564	851	4182
95+50.00	397	72		16961	924	4182
96+00.00	330	72		17291	996	4182
96+50.00	692	0		17983	996	4182
97+00.00	716	0		18699	996	4182
97+50.00	665	0		19364	996	4182
98+00.00	595	0		19959	996	4182
98+50.00	554	0		20513	996	4182
99+00.00	504	0		21017	996	4182
99+50.00	444		0.111	21461	996	4182
100+00.00	434		0.111	21894	996	4182
100+50.00	306		0	22200	996	4182
101+00.00	135		263	22335	996	4445
101+50.00	90		502	22425	996	4947
102+00.00	64		445	22489	996	5392
102+50.00	49		367	22538	996	5759
103+00.00	42		270	22581	996	6029
103+50.00	44		167	22625	996	6195
104+00.00	25	90		22650	1086	6195
104+50.00	12	55		22663	1141	6195
105+00.00	30	43		22692	1184	6195
105+50.00	20	27		22712	1212	6195
105+60.00	18	8		22730	1220	6195
SHADY SHORES SUBTOTAL	22730	1220	6195			



EARTHWORK TYPICAL SECTION WITH RETAINING WALLS



EARTHWORK TYPICAL SECTION

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Texas Department of Transportation

SHADY SHORES

SUMMARY OF QUANTITIES
EARTHWORK

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		9

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DATE: 11/25/2025 2:17:26 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SUMM-EWRK-01.dgn

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SUMMARY OF ROADWAY ITEMS 1

LOCATION	110 7001 EXCAV (ROADWAY) CY	132 7008 EMBANK (FNL) (DC) (TY C1) CY	132 7010 EMBANK (FNL) (DC) (TY C2) CY	247 7079 FL BS (CMP IN PLC) (TY D GR 1-2) (8") SY	275 7001 CEMENT TON	275 7018 CEMENT TRT (SUBGRADE) (8") SY	310 7013 PRIME COAT (MC-30 OR AE-P) GAL	344 7009 SP MIXES SP-C PG64-22 TON	360 7006 CONC PVMT (CRCP) (12") SY	432 7013 RIPRAP (MOW STRIP) (4 IN) CY	529 7002 CONC CURB (TY II) LF	530 7007 DRIVEWAYS (CONC) (HES) SY
CSJ 0918-46-316												
SHADY SHORES SHEET 1 OF 8	2008	13	135	767	4	228	182	51	679		258	29
SHADY SHORES SHEET 2 OF 8	915	60	1317	1218	5	266	267	59	1060		337	116
SHADY SHORES SHEET 3 OF 8	1282	143	1671	1071	3	168	222	37	939	6	445	109
SHADY SHORES SHEET 4 OF 8	5375	1	903	740			131		651		300	
SHADY SHORES SHEET 5 OF 8	1085	617	0	2087			347		1731	5	1143	
SHADY SHORES SHEET 6 OF 8	3605	21	158	1067			192		952	3	346	62
SHADY SHORES SHEET 7 OF 8	7194	145	1									
SHADY SHORES SHEET 8 OF 8	1270	224	2013	1631	3	169	320	37	1422		610	96
SILKTREE SHEET 1 OF 1	188	188		188			35		175		66	
PARKSIDE SHEET 1 OF 1	365	365		365			65		324		176	
OAKWOOD SHEET 1 OF 1	379	379		379			66		329		190	
TOTALS	23666	2156	6198	9513	15	831	1827	184	8262	14	3871	412

SUMMARY OF ROADWAY ITEMS 2

LOCATION	531 7002 CONC SIDEWALKS (5") SY	531 7009 CURB RAMPS (TY 6) EA	531 7010 CURB RAMPS (TY 7) EA	531 7011 CURB RAMPS (TY 10) EA	540 7002 MTL W-BEAM GD FEN (STEEL POST) LF	540 7005 MTL BEAM GD FEN TRANS (THRIE-BEAM) EA	544 7001 GUARDRAIL END TREATMENT (INSTALL) EA	545 7005 CRASH CUSH ATTEN (INSTL) (L) (N) (TL2) EA
CSJ 0918-46-316								
SHADY SHORES SHEET 1 OF 8	173		2					1
SHADY SHORES SHEET 2 OF 8	216	2		4				
SHADY SHORES SHEET 3 OF 8	361				25	1	1	
SHADY SHORES SHEET 4 OF 8	250							
SHADY SHORES SHEET 5 OF 8	593		2				1	
SHADY SHORES SHEET 6 OF 8	330				25	1		
SHADY SHORES SHEET 7 OF 8								
SHADY SHORES SHEET 8 OF 8	524							
SILKTREE SHEET 1 OF 1	33							
PARKSIDE SHEET 1 OF 1	83							
OAKWOOD SHEET 1 OF 1								
TOTALS	2563	2	4	4	50	2	2	1

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Texas Department of Transportation

SHADY SHORES

SUMMARY OF QUANTITIES
ROADWAY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		10

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SUMMARY OF RETAINING WALL ITEMS					
	403	423	432	450	450
	7001	7001	7007	7004	7032
LOCATION	TEMPORARY SPL SHORING	RETAINING WALL (MSE)	RIPRAP (CONC) (CL B) (4 IN)	RAIL (TY T221)	RAIL (TY C221)
	SF	SF	CY	LF	LF
CSJ 0918-46-316					
RETAINING WALL A	740	1028	8	120	
RETAINING WALL B	742	1911	11		150
RETAINING WALL C	1341	2569	16	240	
RETAINING WALL D		1705	14		205
RETAINING WALL E		2201	14	205	
RETAINING WALL F		1469	12		160
RETAINING WALL G	446	1744	11	150	
RETAINING WALL H	1305	3133	18		256
RETAINING WALL I	793	2553	18	270	
RETAINING WALL J	360	3427	22		315
RETAINING WALL K	1664	4024	22	315	
TOTALS	7391	25764	166	1300	1086

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Texas Department of Transportation

SHADY SHORES

SUMMARY OF QUANTITIES
RETAINING WALL

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		11

SUMMARY OF DRAINAGE ITEMS															
LOCATION	402 7001	464 7003	464 7005	465 7002	465 7003	465 7006	465 7016	465 7030	465 7031	465 7032	465 7045	465 7158	465 7160	467 7467	467 7469
	TRENCH EXCAVATION PROTECTION	RC PIPE (CL III)(18 IN)	RC PIPE (CL III)(24 IN)	MANH (COMPL)(PRM)(48IN)	MANH (COMPL)(PRM)(60IN)	JCTBOX(COMPL)(PJB)(4FTX4FT)	INLET (COMPL)(PCO)(3FT)(BOTH)	INLET (COMPL)(PCU)(3FT)(LEFT)	INLET (COMPL)(PCU)(3FT)(RIGHT)	INLET (COMPL)(PCU)(3FT)(BOTH)	INLET (COMPL)(PMBD)(4FT)	INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX3FT)	INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT)	SET (TY II) (18 IN) (RCP) (3:1) (P)	SET (TY II) (24 IN) (RCP) (3:1) (P)
	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
CSJ 0918-46-316															
STORM DRAIN SWR-S	225		248	1		3									1
STORM DRAIN SWR-N	213		369		1	5									1
STORM DRAIN SWR LATERAL PROFILES	150	270					1		2	6		3	1		
SWR DRIVEWAY CULVERTS		29												2	
STORM DRAIN GS1-S	130		382			4									1
STORM DRAIN GS1-N	392		378	2		2									1
STORM DRAIN GS1 LATERAL PROFILES	73	117					2	1		6	1	2			
STORM DRAIN LYN-S	483		460	1		5									1
STORM DRAIN LYN-N	548		524	1		5									1
STORM DRAIN LYN LATERAL PROFILES	102	130					2	2	2	5		2	1		
TOTALS	2316	546	2361	5	1	24	5	3	4	17	1	7	2	2	6

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SHADY SHORES

SUMMARY OF QUANTITIES
STORM DRAIN

SHEET 1 OF 1

CONT.	SECT.	JOB	HIGHWAY
0918	46	316	VA
DIST.	COUNTY		SHEET NO.
DAL	DENTON		12

SUMMARY OF BRIDGE QUANTITIES	NBI:													
LOCATION	416	420	420	420	422	422	422	425	432	442	442	450	450	454
	7006	7013	7023	7039	7002	7014	7022	7004	7041	7008	7008	7005	7033	7004
	DRILL SHAFT (36 IN)	CL C CONC (ABUT) (HPC)	CL C CONC (CAP) (HPC)	CL C CONC (COLUMN) (HPC)	REINF CONC SLAB (HPC)	APPROACH SLAB (HPC)	BRIDGE SIDEWALK (HPC)	PRESTR CONC GIRDER (TX46)	RIPRAP (STONE PROTECTIO N) (12 IN)	STR STL (MISC) (BS -EJCP)	STR STL (MISC) (BR SM)	RAIL (TY T221) (HPC)	RAIL (TY C221) (HPC)	SEALED EXPANSION JOINT (4 IN) (SEJ - M)
	LF	CY	CY	CY	SF	CY	SF	LF	CY	LB	LB	LF	LF	LF
CSJ 0918-46-316														
SWISHER CREEK	354	41.0	34.0	8.5	10827	59	3268	1392.78	6315	299		280.0	291.0	54
STREAM GS-1	1331	36.0	85.0	18.0	21230	59	6419	2735.06	5280	448		550.0	550.0	81
LYNCHBURG CREEK	1908	36.0	136.0	36.0	33991	59	10270	4377.58	6375	598	1537	880.0	880.0	108
TOTALS	3593	113.0	255.0	62.5	66048	177	19957	8505.42	17970	1345	1537	1710.0	1721.0	243

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SHADY SHORES

SUMMARY OF QUANTITIES
BRIDGE

SHEET 1 OF 1

CONT.	SECT.	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		13

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SUMMARY OF PAVEMENT MARKING ITEMS														
LOCATION	658 7003 INSTL DEL ASSM (D-SW) SZ 1 (WFLX) GND EA	658 7004 INSTL DEL ASSM (D-SW) SZ 1 (WFLX) GND (BI) EA	658 7013 INSTL DEL ASSM (D-SW) SZ 1 (BRF) CTB (BI) EA	658 7018 INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 EA	658 7019 INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI) EA	666 7036 REFL PAV MRK TY I (W) 24" (SL D) (100MIL) LF	666 7347 PAVEMENT SLER 6" LF	666 7352 PAVEMENT SLER 24" LF	666 7411 REFL PAV MRK TY I (W) 6" (SLD) (100MIL) LF	666 7423 REFL PAV MRK TY I (Y) 6" (SLD) (100MIL) LF	672 7004 REFL PAV MRKR TY II-A-A EA	678 7002 PAV SURF PREP FOR MRK (6") LF	678 7008 PAV SURF PREP FOR MRK (24") LF	678 7033 PAV SURF PREP FOR MRK (RPM) EA
CSJ 0918-46-316														
SHEET 1 OF 8	3		8			72	2201	72	1165	1036	13	2201	72	13
SHEET 2 OF 8	6		7			84	2058	84	1145	913	11	2058	84	11
SHEET 3 OF 8			8	3			2254		1125	1129	13	2254		13
SHEET 4 OF 8	2		12				2400		1200	1200	15	2400		15
SHEET 5 OF 8	1	2				72	2490	72	1371	1119	14	2490	72	14
SHEET 6 OF 8			12		1		2400		1200	1200	15	2400		15
SHEET 7 OF 8			12				2400		1200	1200	15	2400		15
SHEET 8 OF 8	3	1	6				2253		1126	1127	14	2253		14
TOTALS	15	3	65	3	1	228	18456	228	9532	8924	110	18456	228	110

SUMMARY OF SIGNING ITEMS					
LOCATION	644 7001 IN SM RD SN SUP&AM TY10BWG (1) SA (P) EA	644 7063 IN SM RD SN SUP&AM (RAIL MOUNT) EA	644 7078 IN SRSS & AM (RAIL) (90 MPH) (P MOUNT) EA	644 7080 IN SRSS & AM (RAIL) (90 MPH) (T MOUNT) EA	644 7073 REMOVE SM RD SN SUP&AM EA
CSJ 0918-46-316					
SHEET 1 OF 8	6	2			
SHEET 2 OF 8	6	2			
SHEET 3 OF 8			1		1
SHEET 4 OF 8	1				
SHEET 5 OF 8	3				
SHEET 6 OF 8		1	2	2	1
SHEET 7 OF 8					
SHEET 8 OF 8	2				2
PROJECT TOTALS	18	5	3	2	4

NOTE:
REMOVAL OF EXISTING DELINEATORS OR OBJECT MARKERS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEMS 658

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SHADY SHORES

SUMMARY OF QUANTITIES
SIGNING & PAVEMENT
MARKINGS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		14

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	160 7002 FURN & PLACE TOPSOIL (4") SY	162 7002 BLOCK SODDING SY	164 7007 BROADCAST SEED (TEMP_WARM_COOL) SY	164 7010 DRILL SEED (PERM_RURAL_CLAY) SY	168 7001 VEGETATIVE WATERING TGL	169 7001 SOIL RET BLKT(SL_MOD_CLAY_SHORT) SY	506 7002 ROCK FILTER DAMS (INSTALL) (TY 2) LF	506 7003 ROCK FILTER DAMS (INSTALL) (TY 3) LF	506 7011 ROCK FILTER DAMS (REMOVE) LF	506 7020 CONSTRUCTION EXITS (INSTALL) (TY 1) SY	506 7024 CONSTRUCTION EXITS (REMOVE) SY	506 7039 TEMP SEDMT CONT FENCE (INSTALL) LF	506 7040 TEMP SDMT CONT FENCE (INLET PROTECTION) LF	506 7041 TEMP SEDMT CONT FENCE (REMOVE) LF	506 7044 BIODEG EROSN CONT LOGS (INSTL) (12") LF	506 7046 BIODEG EROSN CONT LOGS (REMOVE) LF	SP SWPPP MUSSEL SURVEY LSUM	SP SWPPP MUSSEL RELOCATION DAYS
CSJ 0918-46-316																		
SHEET 1 OF 8	2982	1410	1572	1572	444	1572	80	60	140	78	78	460	90	550	50	50		
SHEET 2 OF 8	1851	1844	7	7	276	7				78	78	110	210	320	70	70		
SHEET 3 OF 8	1803	801	1002	1002	269	1002				78	78	400	120	520	50	50		
SHEET 4 OF 8	2411	368	2043	2043	359	2043	80	45	125			723	60	783	40	40		
SHEET 5 OF 8	1847	1847			275								140	140	30	30		
SHEET 6 OF 8	2471	532	1939	1939	368	1939						600	70	670	70	70		
SHEET 7 OF 8	3571		3571	3571	532	3571	80	155	235			1046		1046				
SHEET 8 OF 8	1093	1093			163					78	78	60	180	240	70	70		
10% CONTINGENCY *																		
TOTALS	18029	7895	10134	10134	2686	10134	240	260	500	312	312	3399	870	4269	380	380	1	20

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SHADY SHORES

SUMMARY OF QUANTITIES
SW3P

SHEET 1 OF 1

CONT.	SECT.	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		15

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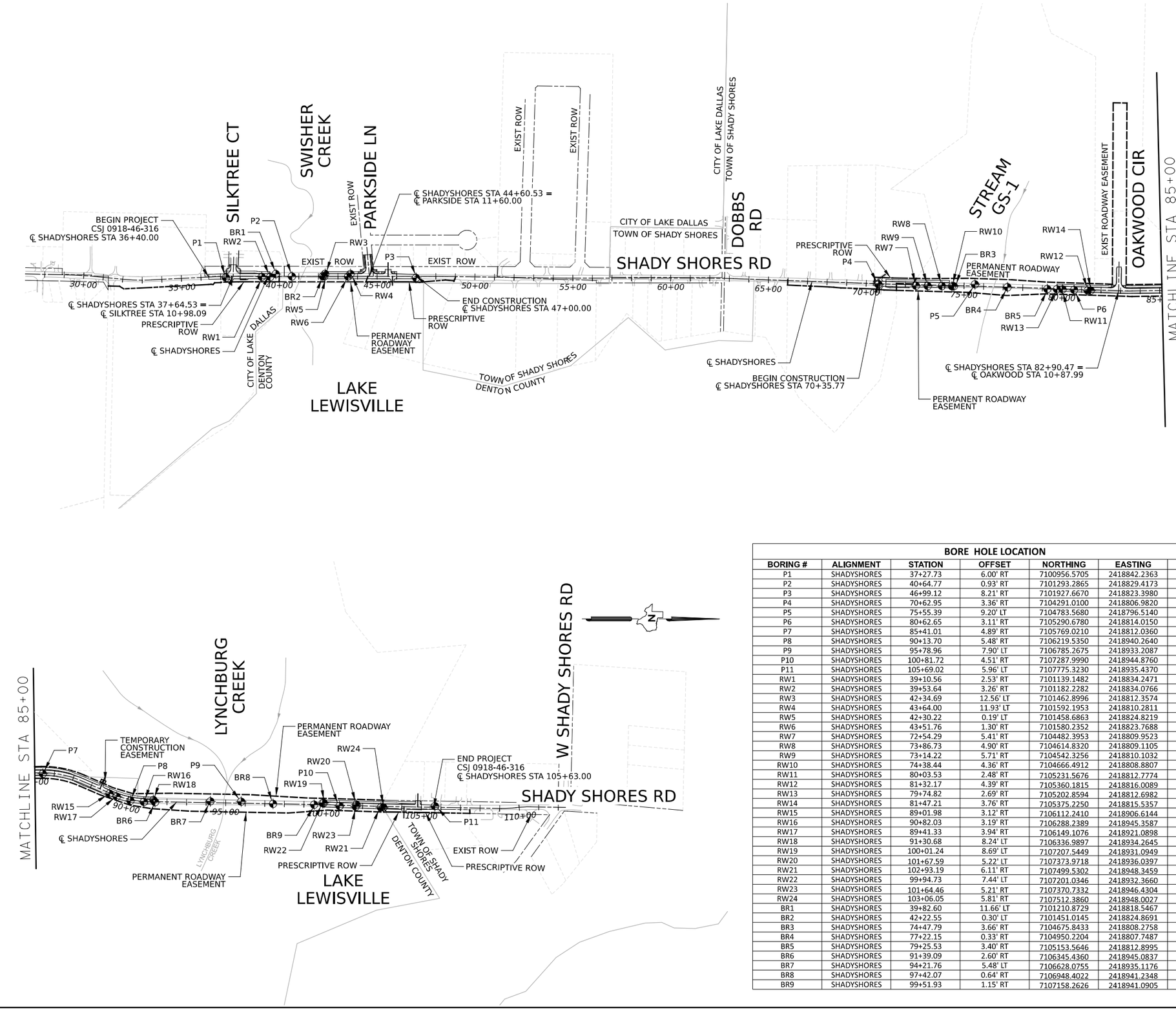

BORE HOLE LOCATION						
BORING #	ALIGNMENT	STATION	OFFSET	NORTHING	EASTING	ELEVATION
P1	SHADYSHORES	37+27.73	6.00' RT	7100956.5705	2418842.2363	550.83
P2	SHADYSHORES	40+64.77	0.93' RT	7101293.2865	2418829.4173	530.73
P3	SHADYSHORES	46+99.12	8.21' RT	7101927.6670	2418823.3980	544.24
P4	SHADYSHORES	70+62.95	3.36' RT	7104291.0100	2418806.9820	538.57
P5	SHADYSHORES	75+55.39	9.20' LT	7104783.5680	2418796.5140	527.04
P6	SHADYSHORES	80+62.65	3.11' RT	7105290.6780	2418814.0150	530.27
P7	SHADYSHORES	85+41.01	4.89' RT	7105769.0210	2418812.0360	539.34
P8	SHADYSHORES	90+13.70	5.48' RT	7106219.5350	2418940.2640	530.62
P9	SHADYSHORES	95+78.96	7.90' LT	7106785.2675	2418933.2087	527.99
P10	SHADYSHORES	100+81.72	4.51' RT	7107287.9990	2418944.8760	528.50
P11	SHADYSHORES	105+69.02	5.96' LT	7107775.3230	2418935.4370	540.06
RW1	SHADYSHORES	39+10.56	2.53' RT	7101139.1482	2418834.2471	540.10
RW2	SHADYSHORES	39+53.64	3.26' RT	7101182.2282	2418834.0766	536.67
RW3	SHADYSHORES	42+34.69	12.56' LT	7101462.8996	2418812.3574	528.62
RW4	SHADYSHORES	43+64.00	11.93' LT	7101592.1953	2418810.2811	532.02
RW5	SHADYSHORES	42+30.22	0.19' LT	7101458.6863	2418824.8219	528.61
RW6	SHADYSHORES	43+51.76	1.30' RT	7101580.2352	2418823.7688	531.61
RW7	SHADYSHORES	72+54.29	5.41' RT	7104482.3953	2418809.9523	531.59
RW8	SHADYSHORES	73+86.73	4.90' RT	7104614.8320	2418809.1105	528.36
RW9	SHADYSHORES	73+14.22	5.71' RT	7104542.3256	2418810.1032	529.95
RW10	SHADYSHORES	74+38.44	4.36' RT	7104666.4912	2418808.8807	527.54
RW11	SHADYSHORES	80+03.53	2.48' RT	7105231.5676	2418812.7774	529.04
RW12	SHADYSHORES	81+32.17	4.39' RT	7105360.1815	2418816.0089	531.98
RW13	SHADYSHORES	79+74.82	2.69' RT	7105202.8594	2418812.6982	528.59
RW14	SHADYSHORES	81+47.21	3.76' RT	7105375.2250	2418815.5357	532.41
RW15	SHADYSHORES	89+01.98	3.12' RT	7106112.2410	2418906.6144	533.13
RW16	SHADYSHORES	90+82.03	3.19' RT	7106288.2389	2418945.3587	529.32
RW17	SHADYSHORES	89+41.33	3.94' RT	7106149.1076	2418921.0898	532.10
RW18	SHADYSHORES	91+30.68	8.24' LT	7106336.9897	2418934.2645	528.67
RW19	SHADYSHORES	100+01.24	8.69' LT	7107207.5449	2418931.0949	527.72
RW20	SHADYSHORES	101+67.59	5.22' LT	7107373.9718	2418936.0397	529.73
RW21	SHADYSHORES	102+93.19	6.11' RT	7107499.5302	2418948.3459	533.26
RW22	SHADYSHORES	99+94.73	7.44' LT	7107201.0346	2418932.3660	527.74
RW23	SHADYSHORES	101+64.46	5.21' RT	7107370.7332	2418946.4304	529.81
RW24	SHADYSHORES	103+06.05	5.81' RT	7107512.3860	2418948.0027	533.67
BR1	SHADYSHORES	39+82.60	11.66' LT	7101210.8729	2418818.5467	534.73
BR2	SHADYSHORES	42+22.55	0.30' LT	7101451.0145	2418824.8691	528.50
BR3	SHADYSHORES	74+47.79	3.66' RT	7104675.8433	2418808.2758	527.44
BR4	SHADYSHORES	77+22.15	0.33' RT	7104950.2204	2418807.7487	527.05
BR5	SHADYSHORES	79+25.53	3.40' RT	7105153.5646	2418812.8995	527.95
BR6	SHADYSHORES	91+39.09	2.60' RT	7106345.4360	2418945.0837	528.57
BR7	SHADYSHORES	94+21.76	5.48' LT	7106628.0755	2418935.1176	528.13
BR8	SHADYSHORES	97+42.07	0.64' RT	7106948.4022	2418941.2348	527.46
BR9	SHADYSHORES	99+51.93	1.15' RT	7107158.2626	2418941.0905	527.62

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

BORING LAYOUT

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		16

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SOUTH PHASE

1. INSTALL ADVANCE WARNING SIGNS, CHANNELIZING DEVICES AND DETOUR ROUTE SIGNS IN ACCORDANCE WITH THE TMUTCD, BC & TCP STANDARDS.

2. CLOSE DOWN SHADY SHORES ROAD TO THROUGH TRAFFIC FROM SOUTH OF SILKTREE COURT TO NORTH OF PARKSIDE LANE, AND DETOUR TRAFFIC IN ACCORDANCE WITH TRAFFIC CONTROL DETOUR LAYOUT.

3. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES AS SHOWN IN THE SW3P LAYOUT AND AS DIRECTED BY THE ENGINEER.

4. PHASE CONSTRUCT SIDE STREETS AND DRIVEWAYS IN HALF WIDTHS ALLOWING INGRESS AND EGRESS.

5. INSTALL PERMANENT PAVEMENT MARKINGS AND SIGNING WHERE APPLICABLE.

NORTH PHASE 1

1. INSTALL ADVANCE WARNING SIGNS, CHANNELIZING DEVICES AND DETOUR ROUTE SIGNS IN ACCORDANCE WITH THE TMUTCD, BC & TCP STANDARDS, AND AS DIRECTED BY THE ENGINEER.

2. CLOSE DOWN SHADY SHORES ROAD TO THRU TRAFFIC FROM SOUTH OF OAKWOOD CIRCLE TO HIGH POINT AT STA 84+37.00, AND DETOUR TRAFFIC IN ACCORDANCE WITH TRAFFIC CONTROL DETOUR LAYOUT.

3. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES AS SHOWN IN THE SW3P LAYOUT AND AS DIRECTED BY THE ENGINEER.

4. PHASE CONSTRUCT DRIVEWAYS IN HALF WIDTHS ALLOWING INGRESS AND EGRESS.

5. INSTALL PERMANENT PAVEMENT MARKINGS AND SIGNING WHERE APPLICABLE.

NORTH PHASE 2

1. INSTALL ADVANCE WARNING SIGNS, CHANNELIZING DEVICES AND DETOUR ROUTE SIGNS IN ACCORDANCE WITH THE TMUTCD, BC & TCP STANDARDS, AND AS DIRECTED BY THE ENGINEER.

2. CLOSE DOWN SHADY SHORES ROAD FROM STA 84+37.00 TO SOUTH OF WEST SHADY SHORES ROAD, AND DETOUR TRAFFIC IN ACCORDANCE WITH TRAFFIC CONTROL DETOUR LAYOUT.

3. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES AS SHOWN IN THE SW3P LAYOUT AND AS DIRECTED BY THE ENGINEER.

4. PHASE CONSTRUCT DRIVEWAYS IN HALF WIDTHS ALLOWING INGRESS AND EGRESS.

5. INSTALL PERMANENT PAVEMENT MARKINGS AND SIGNING WHERE APPLICABLE.

TRAFFIC CONTROL PLAN GENERAL NOTES

1. ALL SIGNS, BARRICADES, WORK ZONE PAVEMENT MARKINGS, AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD), LATEST REVISION.

2. FOR SPACING OF SIGNS AND BARRICADES SEE "BC" & "TCP" STANDARD SHEETS OR AS DIRECTED BY THE ENGINEER. LOCATIONS OF THE BARRICADES, SIGNS, CHANNELIZING DEVICES, AND OTHER TRAFFIC CONTROL DEVICES MAY BE ADJUSTED OR SHIFTED TO ACCOMMODATE FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.

3. ADEQUATE SIGNS AND BARRICADES SHALL BE INSTALLED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO OPENING ANY SECTION TO TRAFFIC. THE ENGINEER MAY DIRECT THE CONTRACTOR TO FURNISH ADDITIONAL SIGNS, BARRICADES, AND CHANNELIZING DEVICES AS REQUIRED TO MAINTAIN TRAFFIC AND MOTORIST SAFETY DURING CONSTRUCTION. ANY SUCH ADDITIONAL TRAFFIC CONTROL DEVICES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.

4. ALL SIGNS, BARRICADES, AND POSTS SHALL BE NEW AND KEPT CLEAN FOR THE DURATION OF THE PROJECT.

5. ALL TEMPORARY LANE CLOSURES SHALL BE IN ACCORDANCE WITH THE APPROPRIATE "BC" & "TCP" STANDARD DETAILS.

6. ALL ARROW BOARDS ARE SUBSIDIARY TO ITEM 502.

7. FOR OFF-PEAK WORK AT NIGHT, THE CONTRACTOR SHALL MAINTAIN ADEQUATE LIGHTING DURING CONSTRUCTION. A LIGHTING PLAN MUST BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. LIGHTING NEEDED TO PERFORM WORK SHALL NOT BE PAID FOR DIRECTLY AND IS SUBSIDIARY TO ITEM 502.

8. MESSAGE BOARDS SHALL BE USED PRIOR TO ANY CHANGES IN TRAFFIC PATTERNS AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE THE ENGINEER TWO WEEKS NOTICE PRIOR TO MAJOR TRAFFIC CHANGES IN ORDER TO NOTIFY THE MEDIA AS REQUIRED. MESSAGE AND LOCATION OF MESSAGE BOARDS MAY BE CHANGED AT ANY TIME BY THE ENGINEER AND THESE CHANGES SHALL BE SUBSIDIARY TO ITEM 503.

TRAFFIC CONTROL PLAN GENERAL NOTES (CONT.)

9. THE CONTRACTOR SHALL PROVIDE FOR INGRESS AND EGRESS TO ADJACENT PROPERTY AND PUBLIC ROADS WITHIN THE PROJECT LIMITS AT ALL TIMES. CONTRACTOR SHALL COORDINATE HIS WORK ACTIVITIES TO MINIMIZE ANY INCONVENIENCE TO THE PUBLIC.

10. THE CONTRACTOR SHALL REMOVE ALL CONFLICTING PAVEMENT MARKINGS AND MARKERS PRIOR TO OPENING ANY SECTION TO TRAFFIC. PAYMENT AND REMOVAL OF THE EXISTING PAVEMENT MARKINGS AND MARKERS SHALL BE IN ACCORDANCE WITH ITEM 677. PAYMENT AND REMOVAL OF WORK ZONE PAVEMENT MARKINGS AND MARKERS SHALL BE IN ACCORDANCE WITH ITEM 662.

11. THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE DURING ALL CONSTRUCTION PHASES.

12. DURING NON-WORKING HOURS, CONTRACTOR SHALL PROVIDE A TEMPORARY 3:1 ACP WEDGE WHERE VERTICAL CUTS EXCEEDING 1 INCH IN HEIGHT EXIST ADJACENT TO THE EDGE OF TRAVELLED WAY AND ARE NOT LOCATED BEHIND TEMPORARY SSCB. THIS WORK AND MATERIALS ARE SUBSIDIARY TO THE VARIOUS BID ITEMS. FOR THESE CONDITIONS, CONTRACTOR WILL ADHERE TO WZ(UL)-13.

13. APPLICABLE EXISTING SIGNS SHALL BE MAINTAINED DURING CONSTRUCTION. ANY CONFLICTING SIGNS SHALL BE COVERED. WORK SHALL BE SUBSIDIARY TO ITEM 502.

14. TEMPORARY SEEDING SHALL BE PLACED AS NEEDED AND UPON THE DIRECTION OF THE ENGINEER. MULTIPLE MOVE-INS MAY BE REQUIRED.

15. SOME UTILITIES WILL REQUIRE MINIMUM COVER DURING CONSTRUCTION. THE CONTRACTOR SHALL USE A SUITABLE MATERIAL TO MAINTAIN COVER UNDER HEAVY EQUIPMENT.

16. INSTALL TEMPORARY SEDIMENT EROSION CONTROL DEVICES AS SHOWN ON THE STORM WATER PREVENTION PLANS AND AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL PLAN GENERAL NOTES (CONT.)

18. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL ONLY BE PLACED IN AREAS WHERE SOIL DISTURBANCE OR POTENTIAL POLLUTANT-GENERATING ACTIVITIES ARE EXPECTED TO OCCUR WITHIN TWO WEEKS.

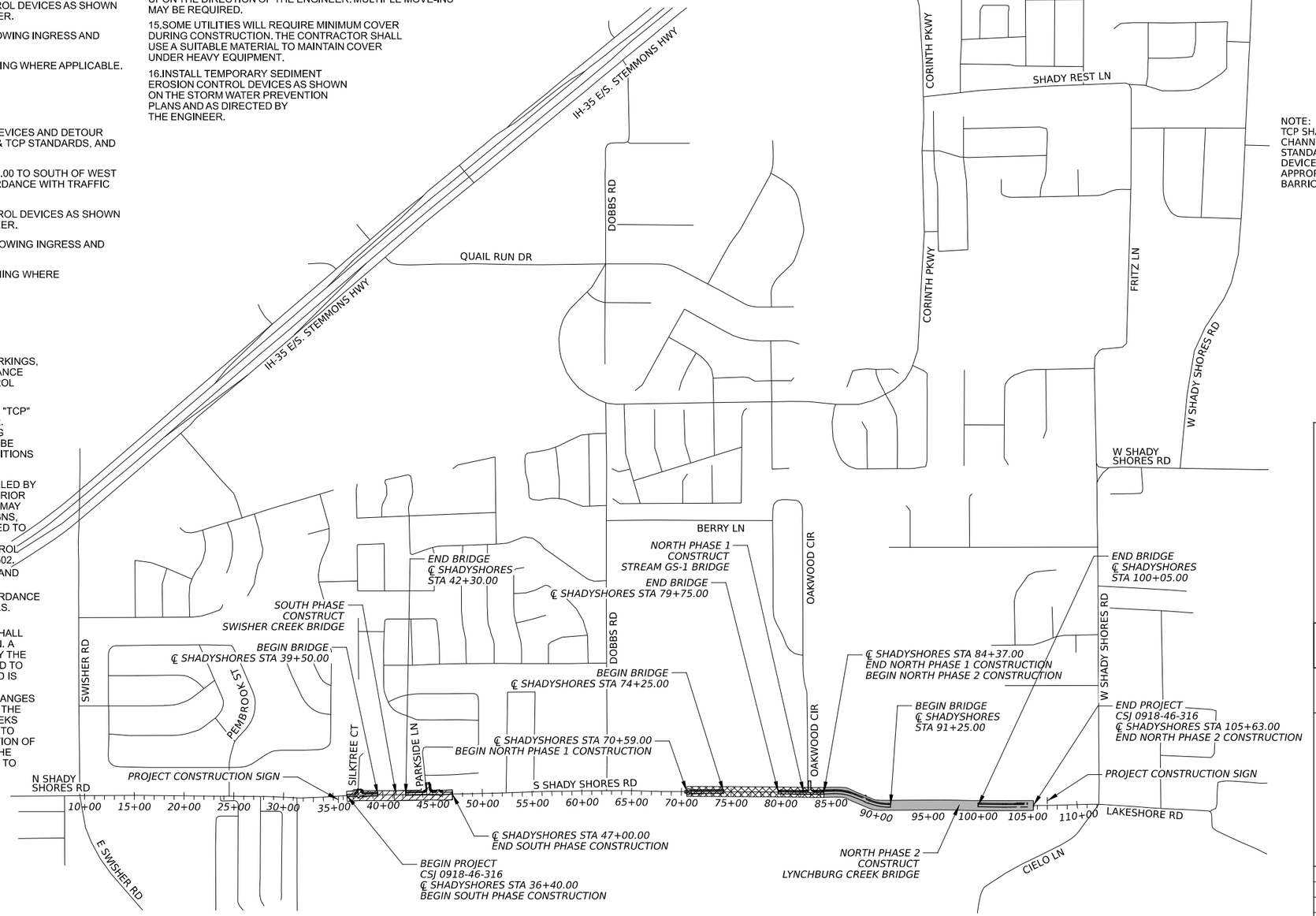
19. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL BE REMOVED IN THEIR CONTROL AREA WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS APPROVED BY THE ENGINEER.

20. ALL TCP SHALL FOLLOW NECESSARY SIGNING, MARKING AND CHANNELIZING DEVICES AS SHOWN ON APPROPRIATE STANDARD DETAILS.

21. THE CONTRACTOR SHALL MINIMIZE IMPACTS TO AND PROTECT ALL EXISTING TREES. PRUNING SHALL BE LIMITED TO BRANCHES NECESSARY FOR CONSTRUCTION OF THE PROPOSED FACILITIES. TREE REMOVAL SHALL NOT OCCUR WITHOUT PRIOR NOTIFICATION TO THE LANDOWNER AND THE ENGINEER.

22. PRIOR TO ANY TREE TRIMMING ACTIVITY, THE TREE TRIMMING PROCEDURE SHALL BE APPROVED BY THE ENGINEER AND SHALL CONFORM TO TXDOT ITEM 100 SPECIFICATIONS.

23. TWO PROJECT SIGNS SHALL BE PLACED AT EACH END OF THE PROJECT. THESE TWO SIGNS SHALL BE PLACED PRIOR TO BEGINNING WORK AND MAINTAINED UNTIL THE END OF THE PROJECT. SEE THE TECHNICAL SPECIFICATION FOR PROJECT CONSTRUCTION SIGN.



LEGEND

SOUTH PHASE CONSTRUCTION

NORTH PHASE 1 CONSTRUCTION

NORTH PHASE 2 CONSTRUCTION

N

0 600 1200

HORIZ. SCALE IN FEET

NOTE:
TCP SHALL FOLLOW NECESSARY SIGNING, MARKING AND CHANNELIZING DEVICES AS SHOWN ON APROPRIATE STANDARD DETAILS. ALL SIGNAGE, MARKING,CHANNELIZING DEVICES, AND BARRICADES NEEDED TO FOLLOW THE APPROPRIATE STANDARDS IS INCLUDED IN BID ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING."

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

03-27-2026

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

TRAFFIC CONTROL NARRATIVE AND OVERALL SEQUENCE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		17

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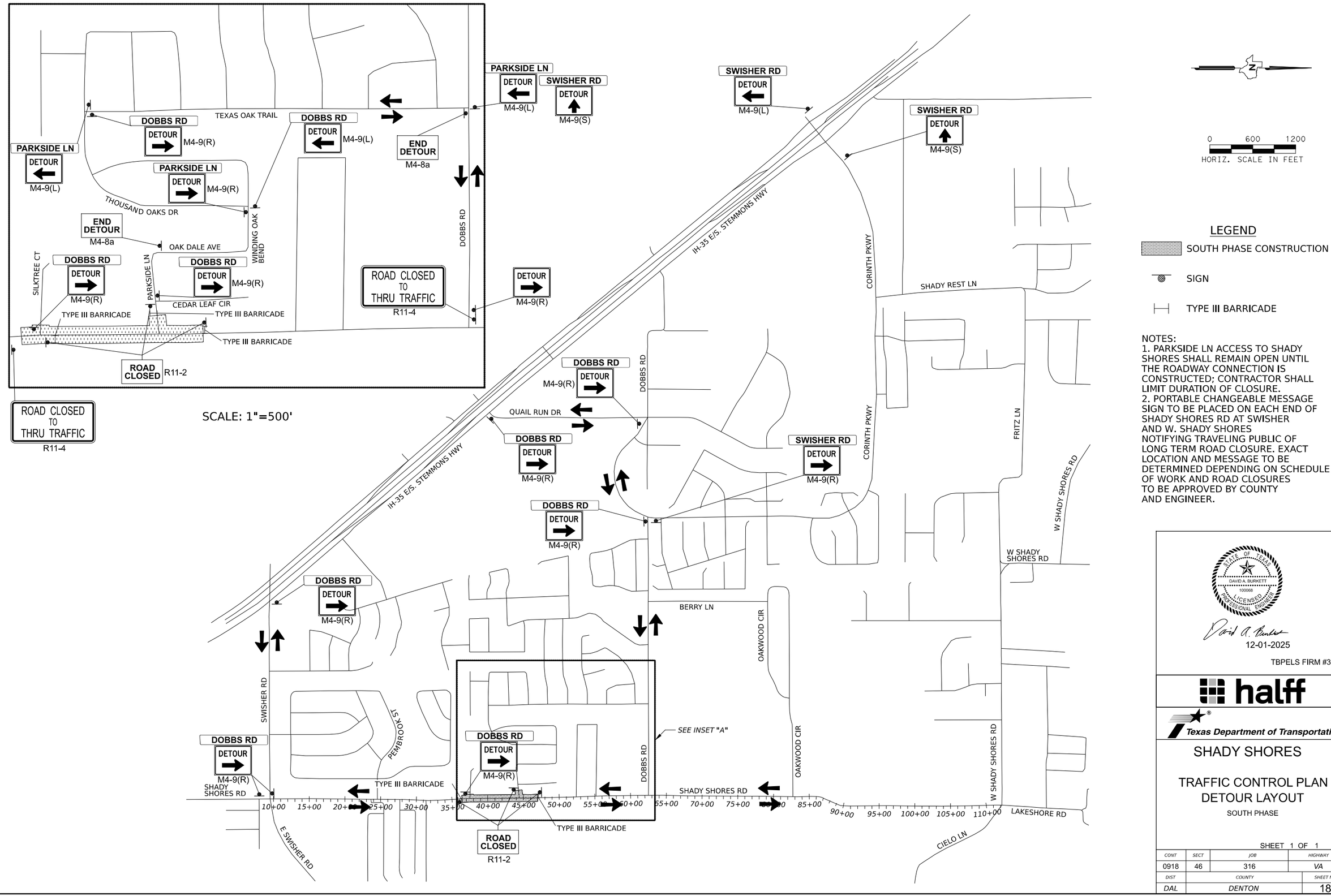

LEGEND

- SOUTH PHASE CONSTRUCTION
- SIGN
- TYPE III BARRICADE

NOTES:
1. PARKSIDE LN ACCESS TO SHADY SHORES SHALL REMAIN OPEN UNTIL THE ROADWAY CONNECTION IS CONSTRUCTED; CONTRACTOR SHALL LIMIT DURATION OF CLOSURE.
2. PORTABLE CHANGEABLE MESSAGE SIGN TO BE PLACED ON EACH END OF SHADY SHORES RD AT SWISHER AND W. SHADY SHORES NOTIFYING TRAVELING PUBLIC OF LONG TERM ROAD CLOSURE. EXACT LOCATION AND MESSAGE TO BE DETERMINED DEPENDING ON SCHEDULE OF WORK AND ROAD CLOSURES TO BE APPROVED BY COUNTY AND ENGINEER.

STATE OF TEXAS
DAVID A. BURKETT
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SHADY SHORES

TRAFFIC CONTROL PLAN DETOUR LAYOUT

SOUTH PHASE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		18

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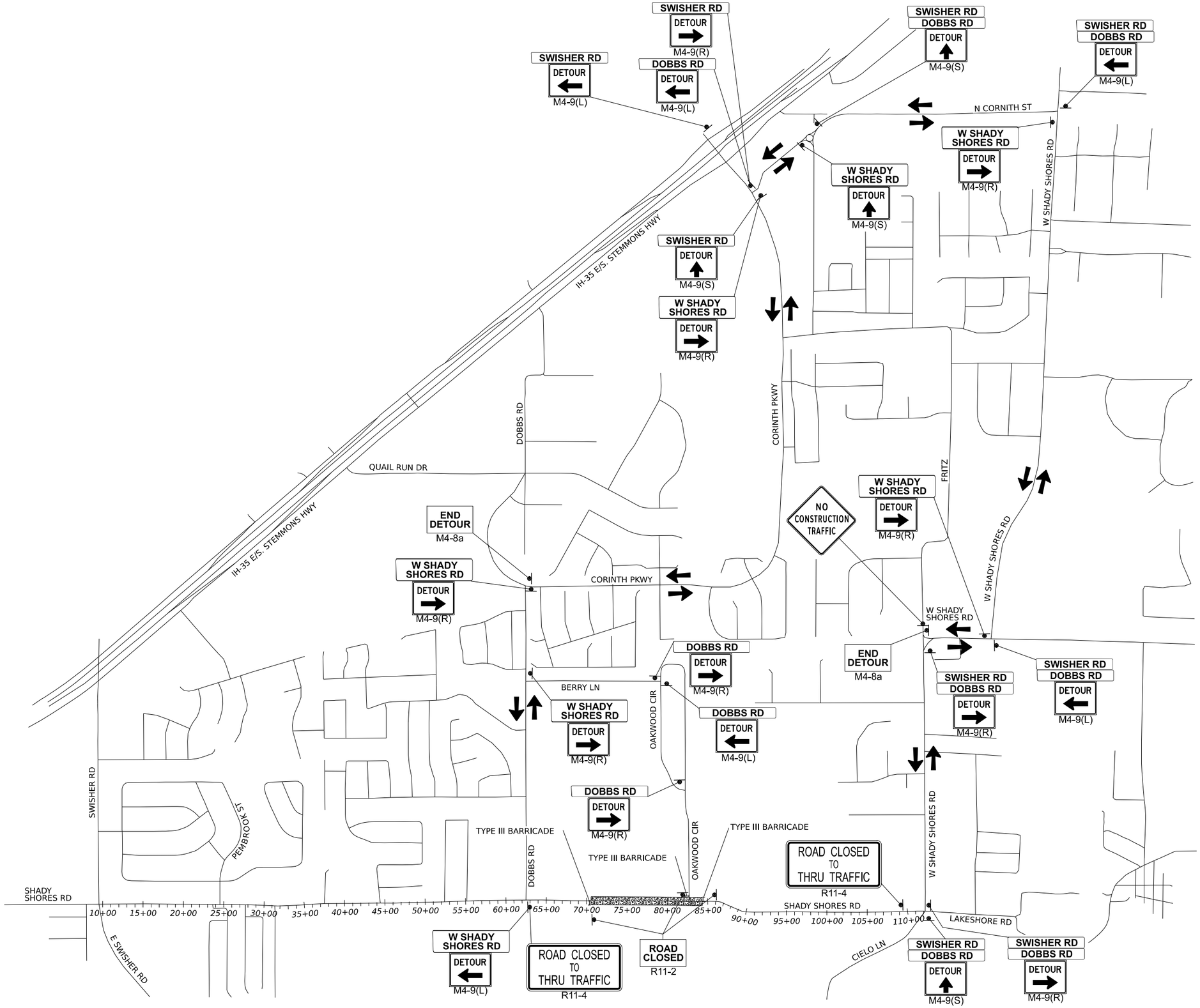

LEGEND

- NORTH PHASE 1 CONSTRUCTION
- SIGN
- TYPE III BARRICADE

NOTES:
1. PARKSIDE LN ACCESS TO SHADY SHORES SHALL REMAIN OPEN UNTIL THE ROADWAY CONNECTION IS CONSTRUCTED; CONTRACTOR SHALL LIMIT DURATION OF CLOSURE.
2.PORTABLECHANGEABLE MESSAGE SIGN TO BE PLACED ON EACH END OF SHADY SHORES RD AT SWISHER AND W. SHADY SHORES NOTIFYING TRAVELING PUBLIC OF LONG TERM ROAD CLOSURE. EXACT LOCATION AND MESSAGE TO BE DETERMINED DEPENDING ON SCHEDULE OF WORK AND ROAD CLOSURES TO BE APPROVED BY COUNTY AND ENGINEER.

STATE OF TEXAS
DAVID A. BURKETT
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LICENSED
PROFESSIONAL ENGINEER

David A. Burkett
03-27-2026

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SHADY SHORES

TRAFFIC CONTROL PLAN
DETOUR LAYOUT

NORTH PHASE 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		19

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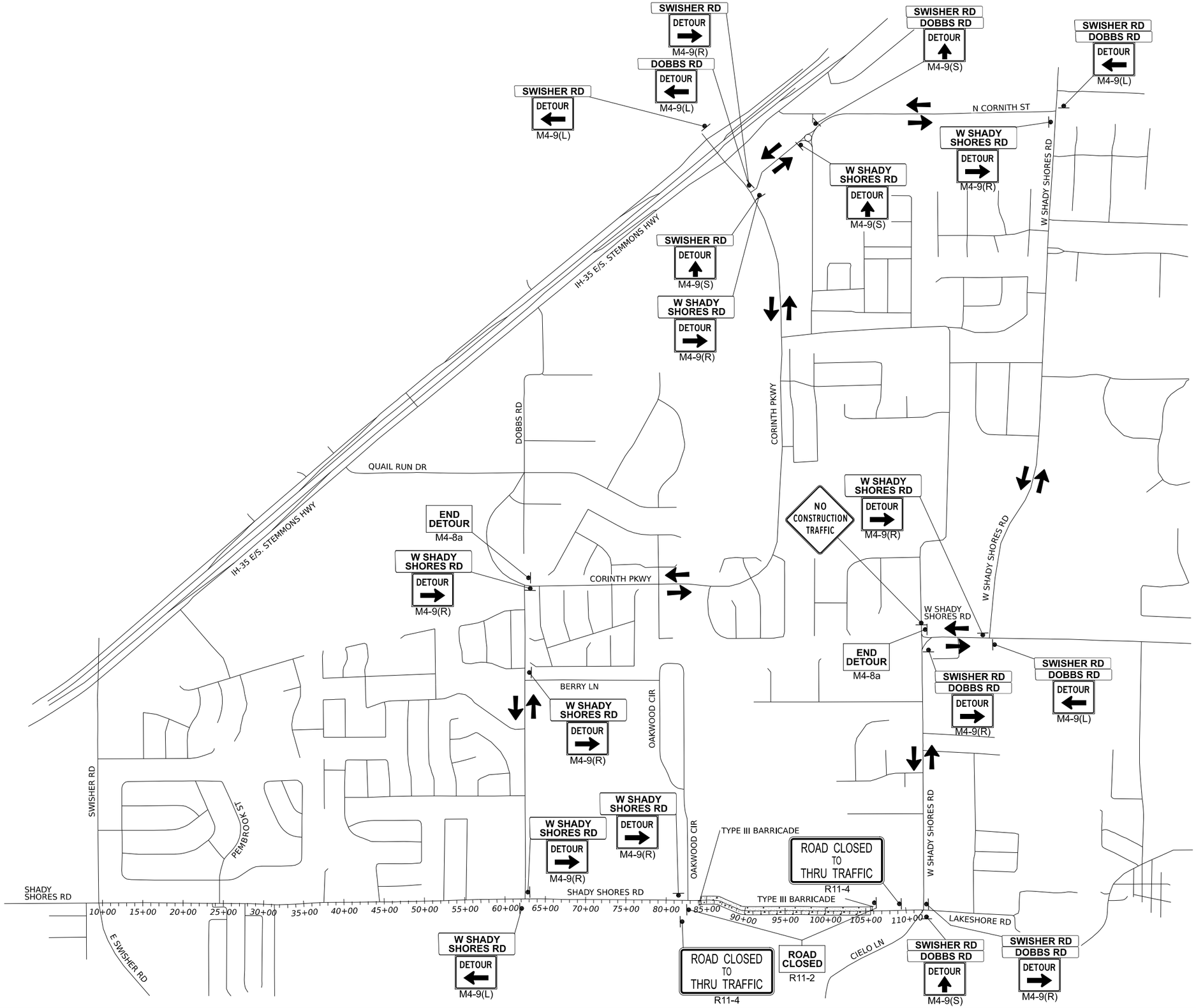

LEGEND

- NORTH PHASE 2 CONSTRUCTION
- SIGN
- TYPE III BARRICADE

NOTES:
1.PARKSIDE LN ACCESS TO SHADY SHORES SHALL REMAIN OPEN UNTIL THE ROADWAY CONNECTION IS CONSTRUCTED; CONTRACTOR SHALL LIMIT DURATION OF CLOSURE.
2. PORTABLE CHANGEABLE MESSAGE SIGN TO BE PLACED ON EACH END OF SHADY SHORES RD AT SWISHER AND W. SHADY SHORES NOTIFYING TRAVELING PUBLIC OF LONG TERM ROAD CLOSURE. EXACT LOCATION AND MESSAGE TO BE DETERMINED DEPENDING ON SCHEDULE OF WORK AND ROAD CLOSURES TO BE APPROVED BY COUNTY AND ENGINEER.

STATE OF TEXAS
DAVID A. BURKETT
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LICENSED
PROFESSIONAL ENGINEER

David A. Burkett
03-27-2026

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Texas Department of Transportation

SHADY SHORES

TRAFFIC CONTROL PLAN
DETOUR LAYOUT

NORTH PHASE 2

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		20

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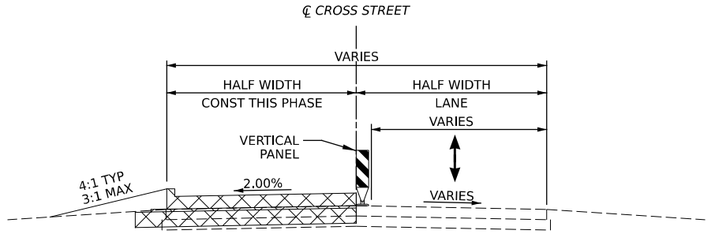
LEGEND

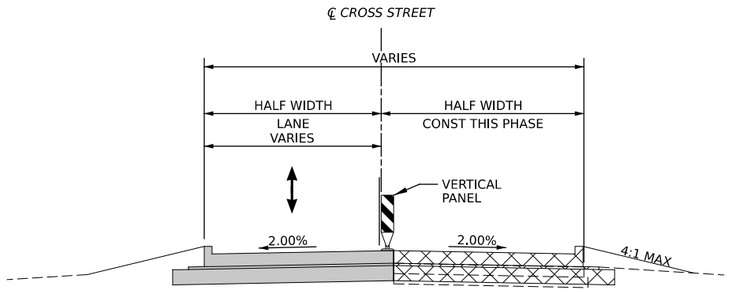
PERMANENT PAVEMENT THIS STEP

PERMANENT PAVEMENT THIS STEP



STEP 1 TYPICAL SECTIONS

N.T.S



STEP 2 TYPICAL SECTIONS

N.T.S

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12-01-2025

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SHADY SHORES

PHASING DETAILS

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		21

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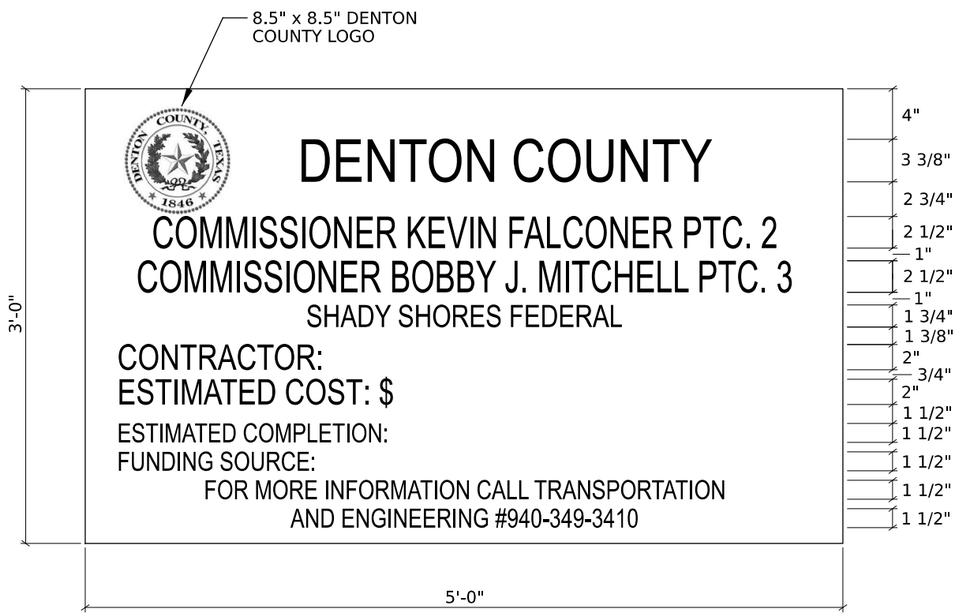

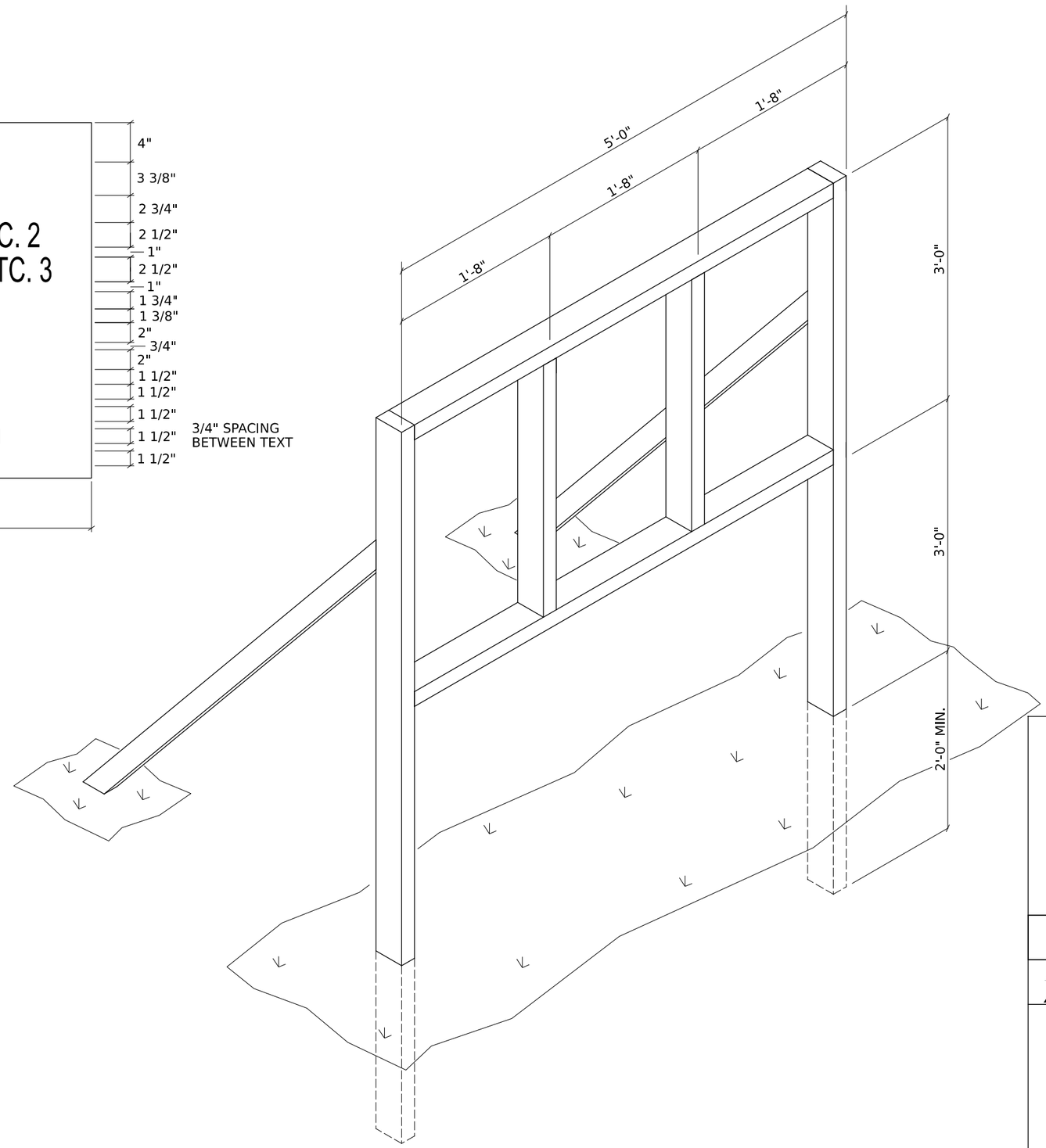

PROJECT SIGN DETAIL

NOTES:

1. A PROJECT SIGNAGE SUBMITTAL SHALL BE REQUIRED FOR PROJECT ENGINEER APPROVAL PRIOR TO INSTALLATION.
2. BOARD SHALL BE 1/4" EXTERIOR OR MARINE GRADE PLYWOOD OR APPROVED EQUAL.
3. DENTON COUNTY LOGO SHALL BE BLACK AND SIZED AS SPECIFIED IN DETAIL.
4. BLOCK LETTERING SHALL BE SIZED AS SPECIFIED IN DETAIL.
5. NEW SIGNS SHALL BE REQUIRED FOR EACH PROJECT. ALL SIGNAGE SHALL BE MOUNTED IN THE GROUND AND STABILIZED WITH A MINIMUM OF 2' BURIED FOR STABILIZATION (SEE DETAIL). IF SPECIFIED BY DENTON COUNTY IN CONTRACT DOCUMENTS, PROJECT SIGNS WILL HAVE T-FOOTING TO ALLOW SIGNAGE RELOCATION THROUGHOUT THE PROJECT (USE SANDBAG STABILIZATION FOR T-FOOTING SIGNAGE).
6. FRAME AND BRACING SHALL BE 2" X 4" STOCK PAINTED WHITE.
7. PROJECT NAME, CONSTRUCTION COST AND FUNDING SOURCE WILL BE PROVIDED FOR EACH PROJECT BY DENTON COUNTY.
8. CONTRACTOR MAY REQUEST A DIGITAL COPY OF DENTON COUNTY LOGO IN JPGE OR TIFF FORMAT.
9. THE BACKGROUND WILL BE BLUE WITH WHITE LETTERING.

PROJECT CONSTRUCTION SIGN
N.T.S.

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
03-27-2026
TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

PROJECT CONSTRUCTION SIGN DETAIL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		21A

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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	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		22

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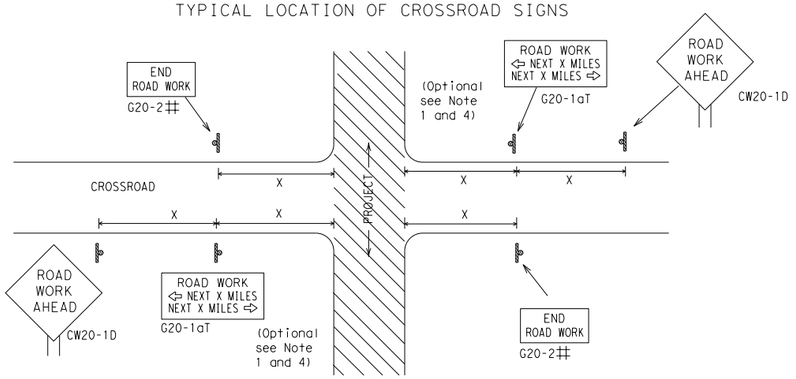
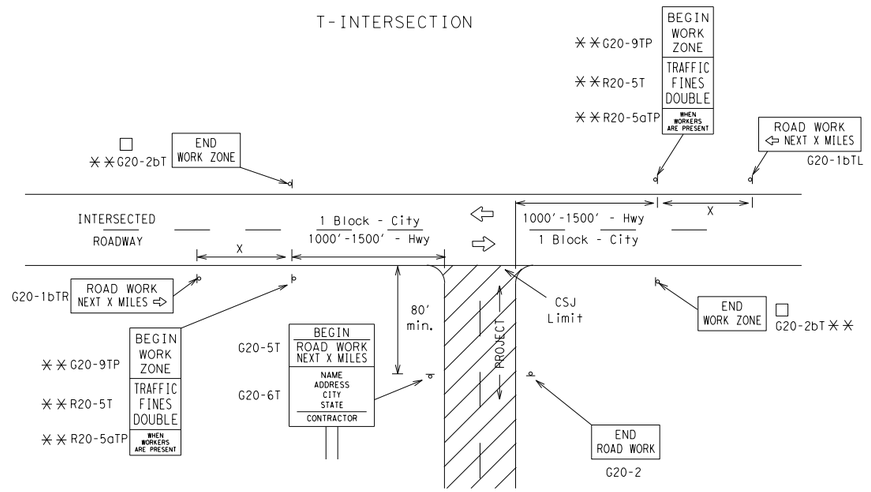
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

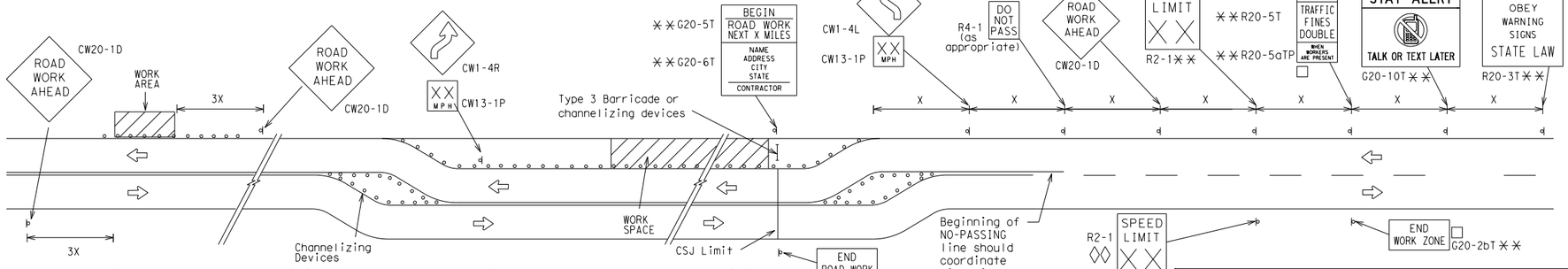
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

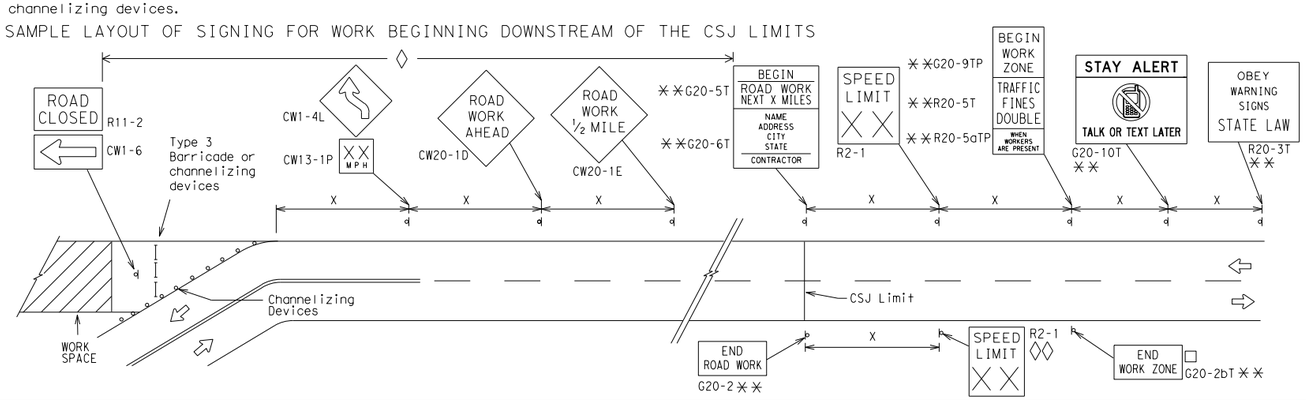
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		23

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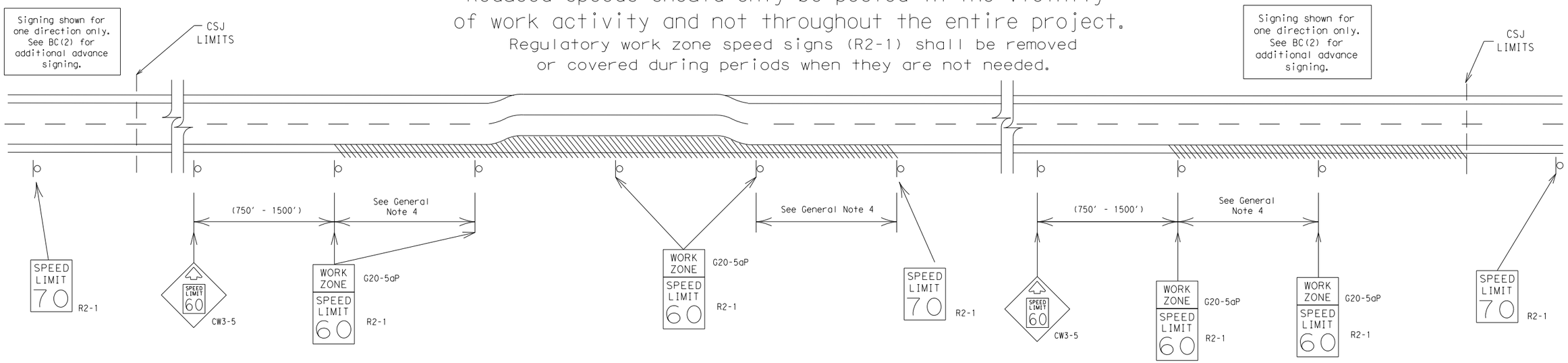
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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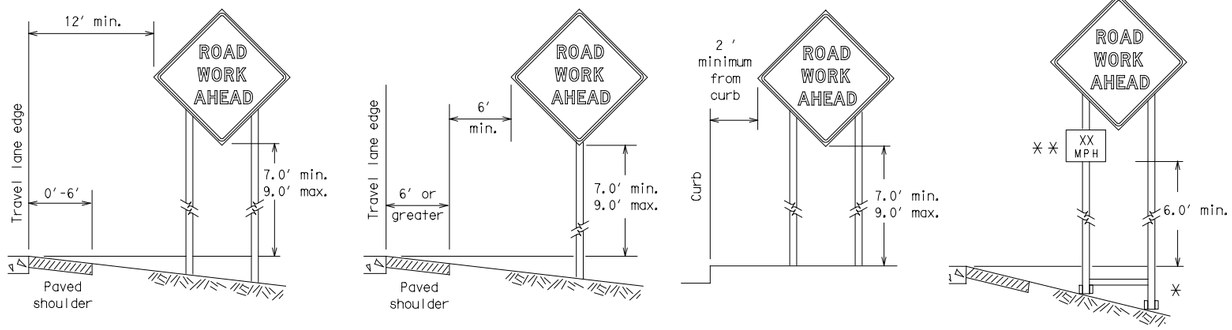
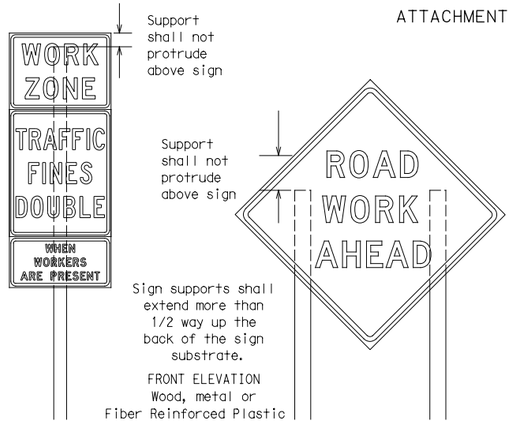
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

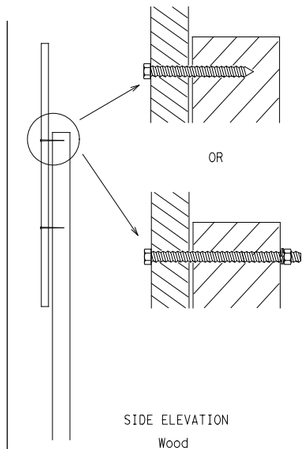


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





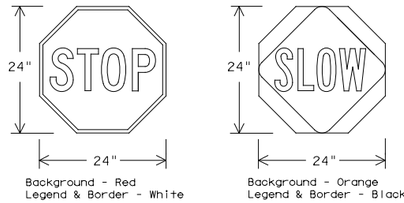
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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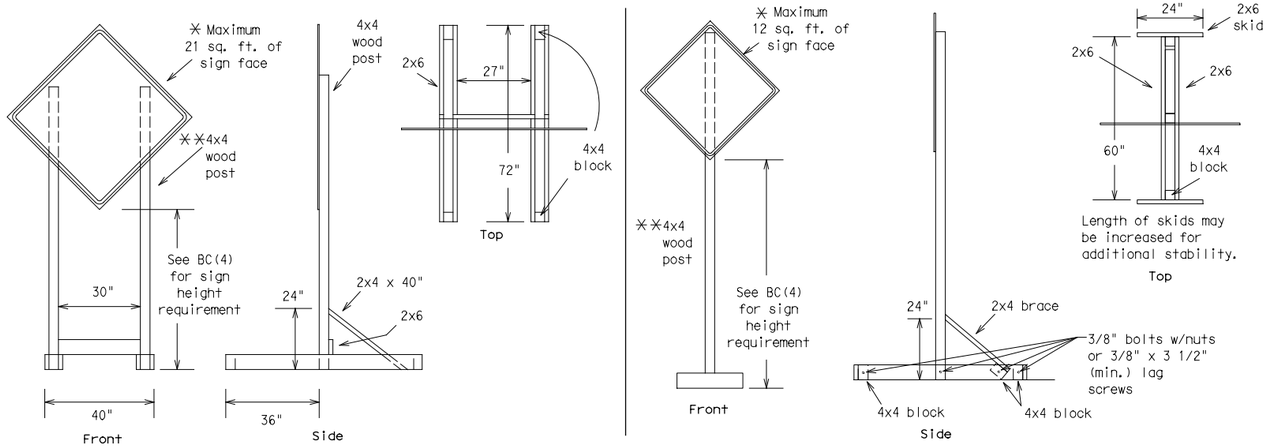
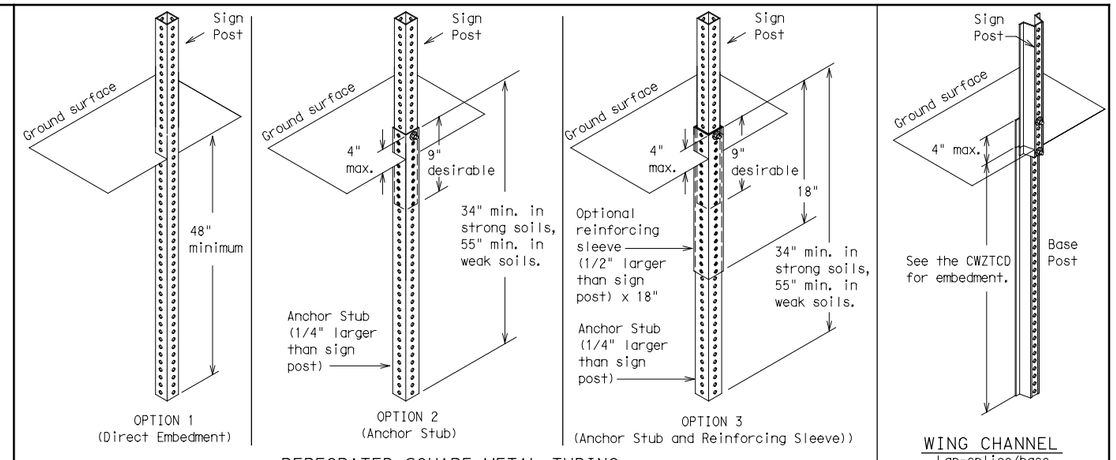


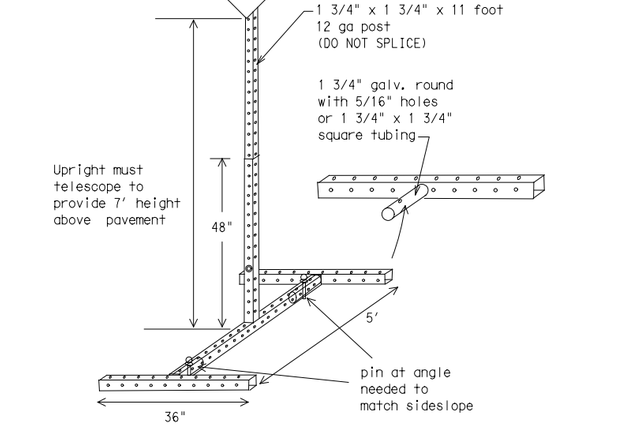
SKID MOUNTED WOOD SIGN SUPPORTS

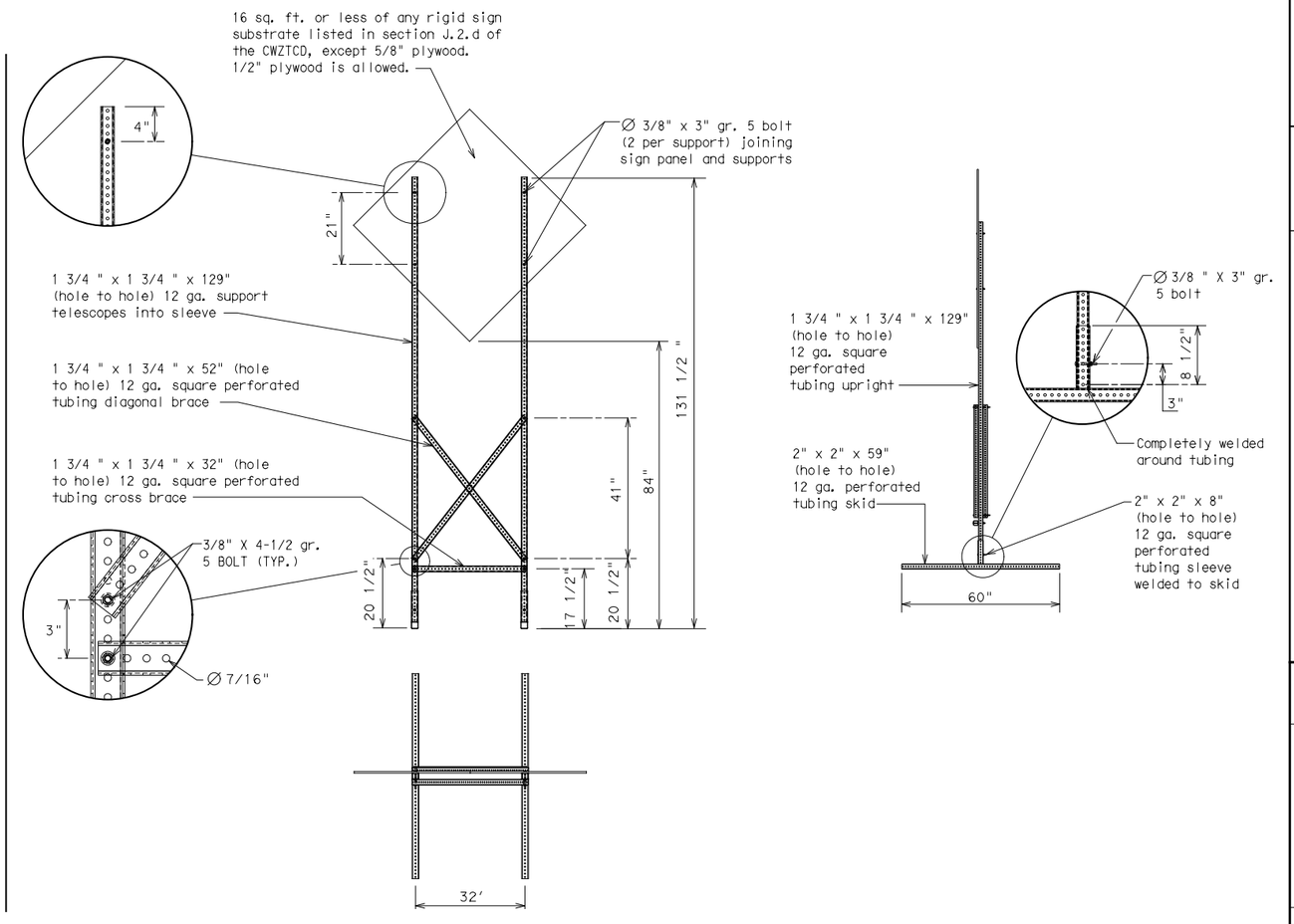
✳ LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



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

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		27

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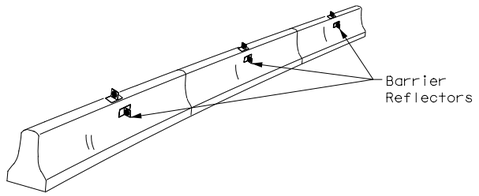
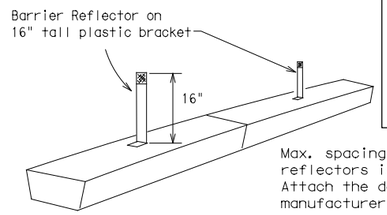
DATE: 11/25/2025 2:21:17 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/bc-21 (1).dgn

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



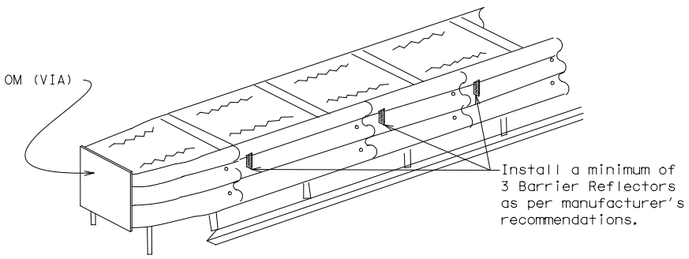
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

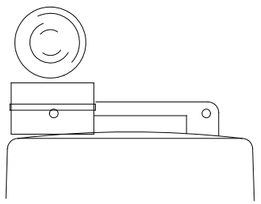
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

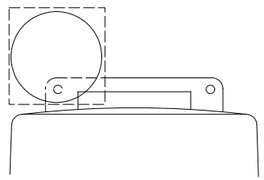
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

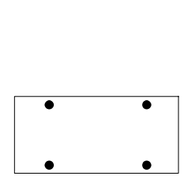
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

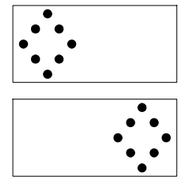
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

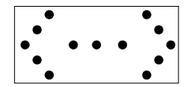


4 CORNER CAUTION

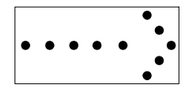
OR



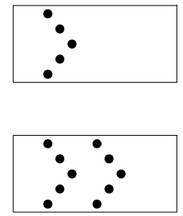
ALTERNATING DIAMOND CAUTION



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	0918	46	316	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	DENTON		28

101

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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:

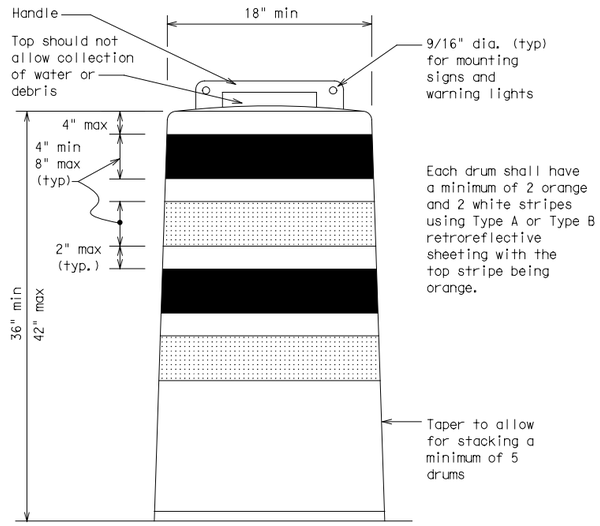
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

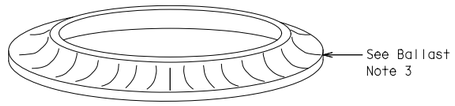
RETROREFLECTIVE SHEETING

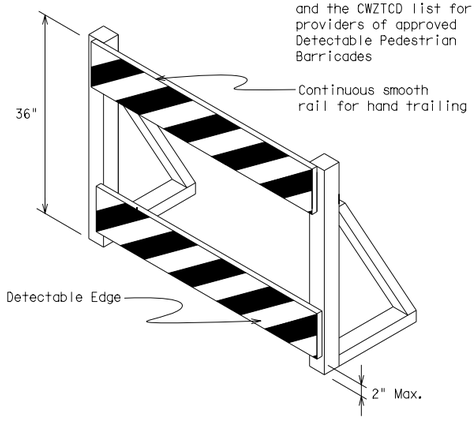
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

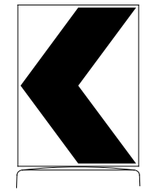




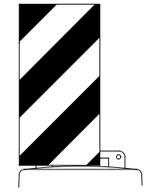


DETECTABLE PEDESTRIAN BARRICADES

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

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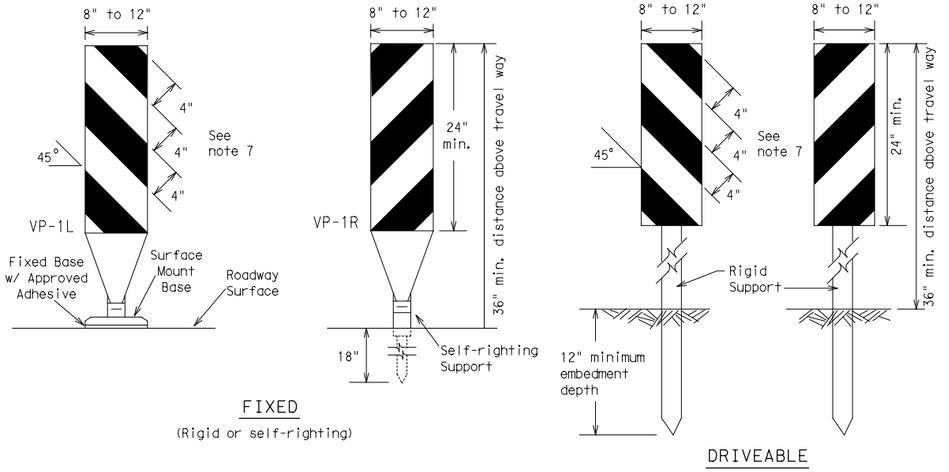
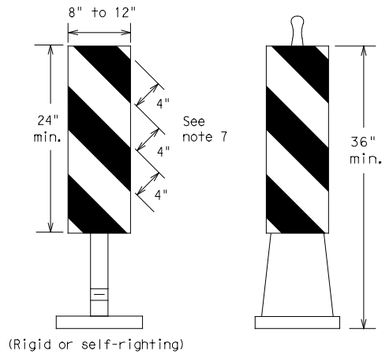


FIXED

(Rigid or self-righting)

DRIVEABLE

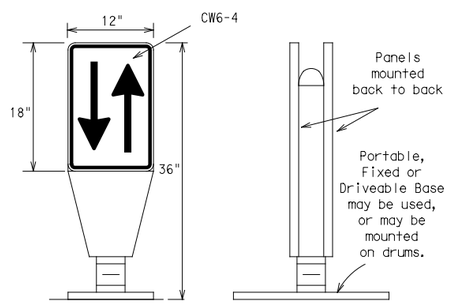


(Rigid or self-righting)

PORTABLE

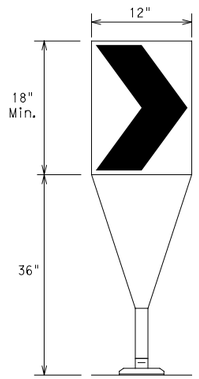
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



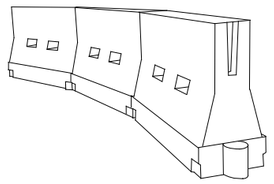
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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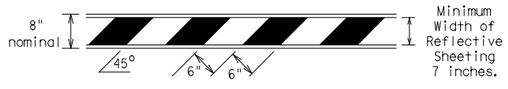
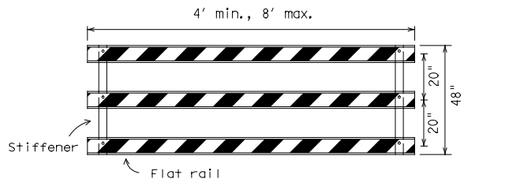
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



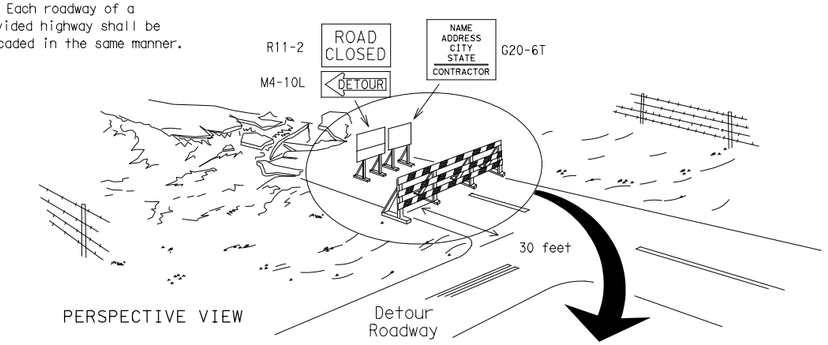
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

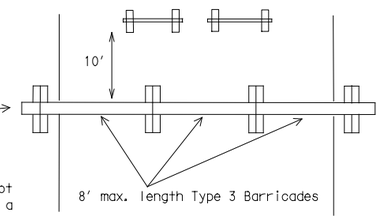
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

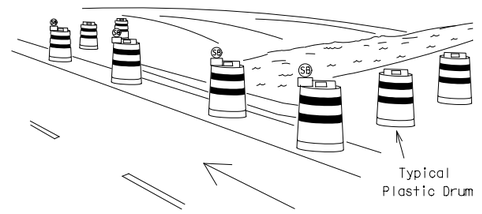
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

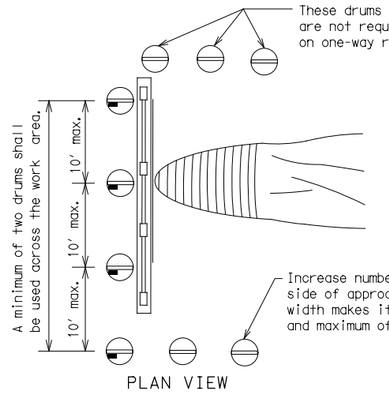
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

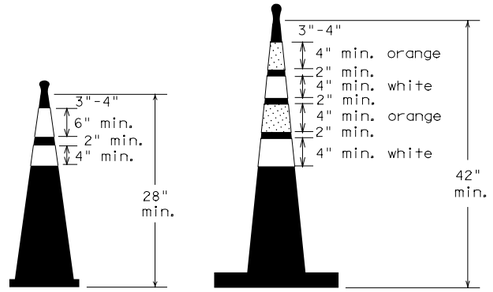
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

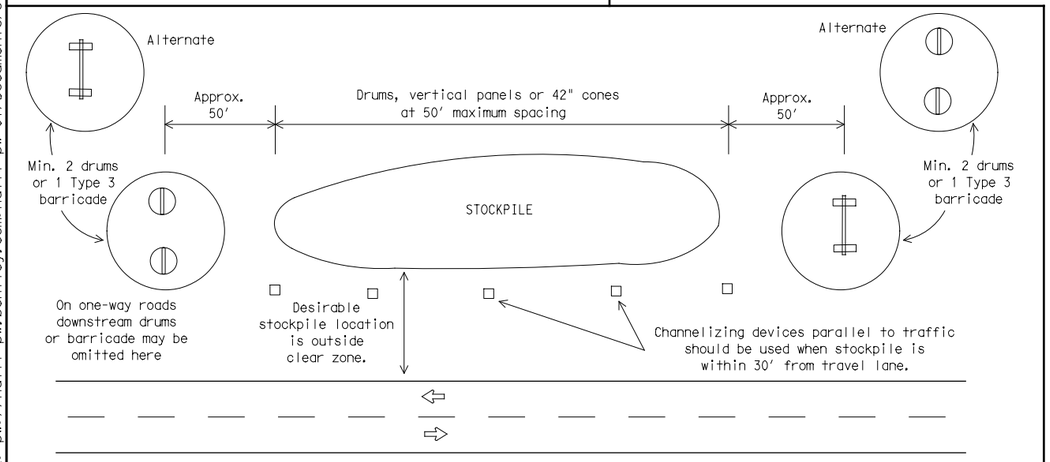
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

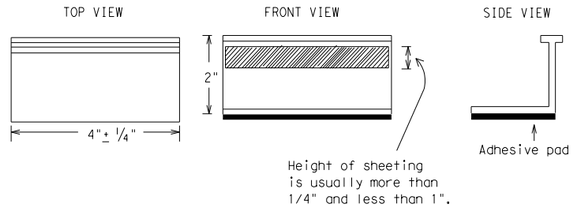
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		32

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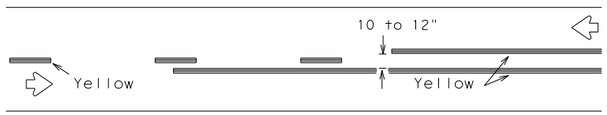
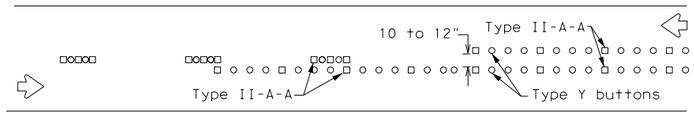
DATE: DATE/TIME: 5/2/2005 2:21:20 PM
FILE: DOCUMENT NAME: c:\entley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/bc-21 (1).dgn

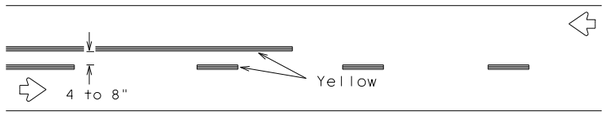
PAVEMENT MARKING PATTERNS



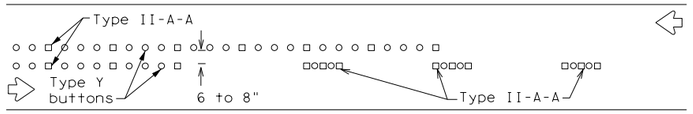
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



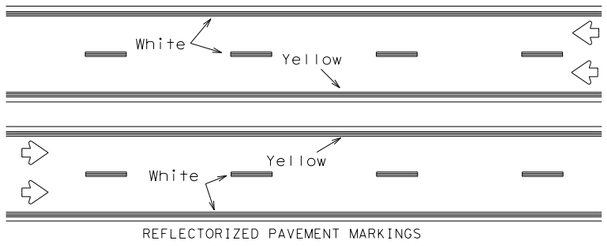
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



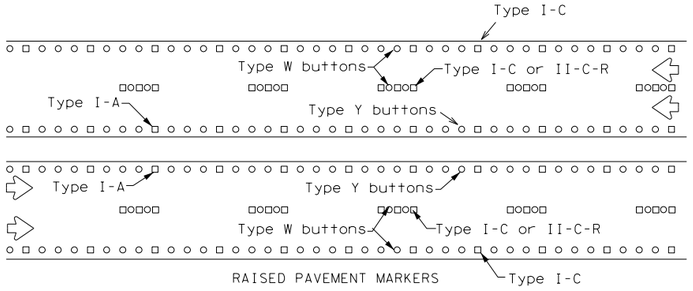
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



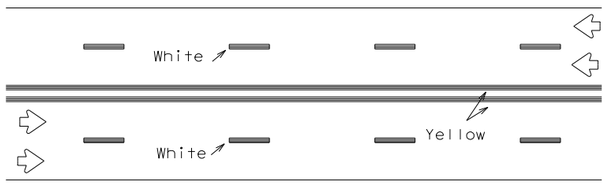
REFLECTORIZED PAVEMENT MARKINGS



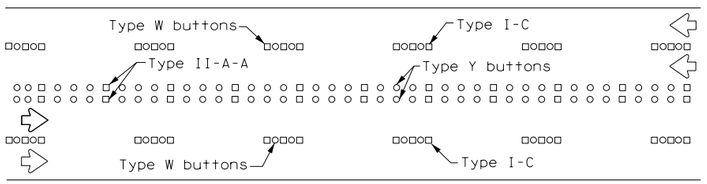
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



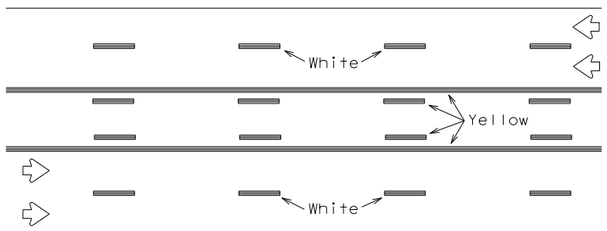
REFLECTORIZED PAVEMENT MARKINGS



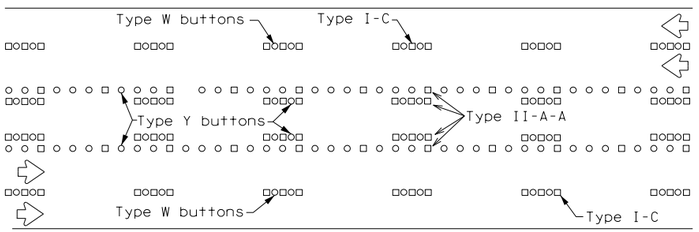
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

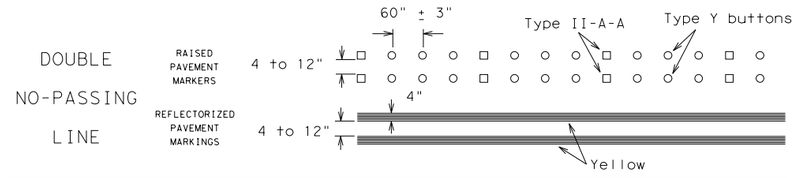
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

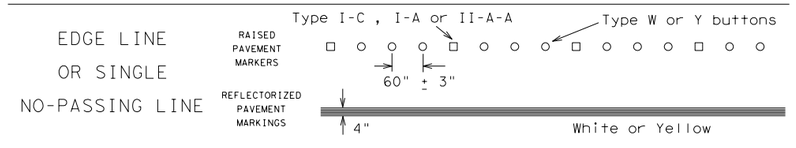
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

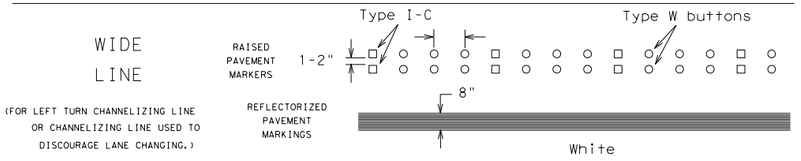


EDGE LINE OR SINGLE NO-PASSING LINE



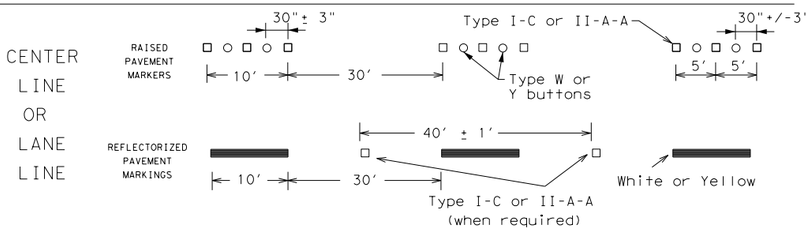
WIDE LINE

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

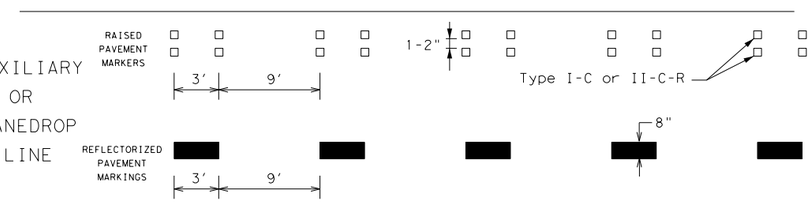


BROKEN LINES

CENTER LINE OR LANE LINE

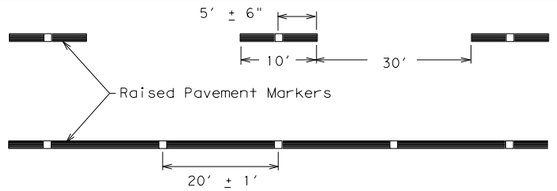


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		33

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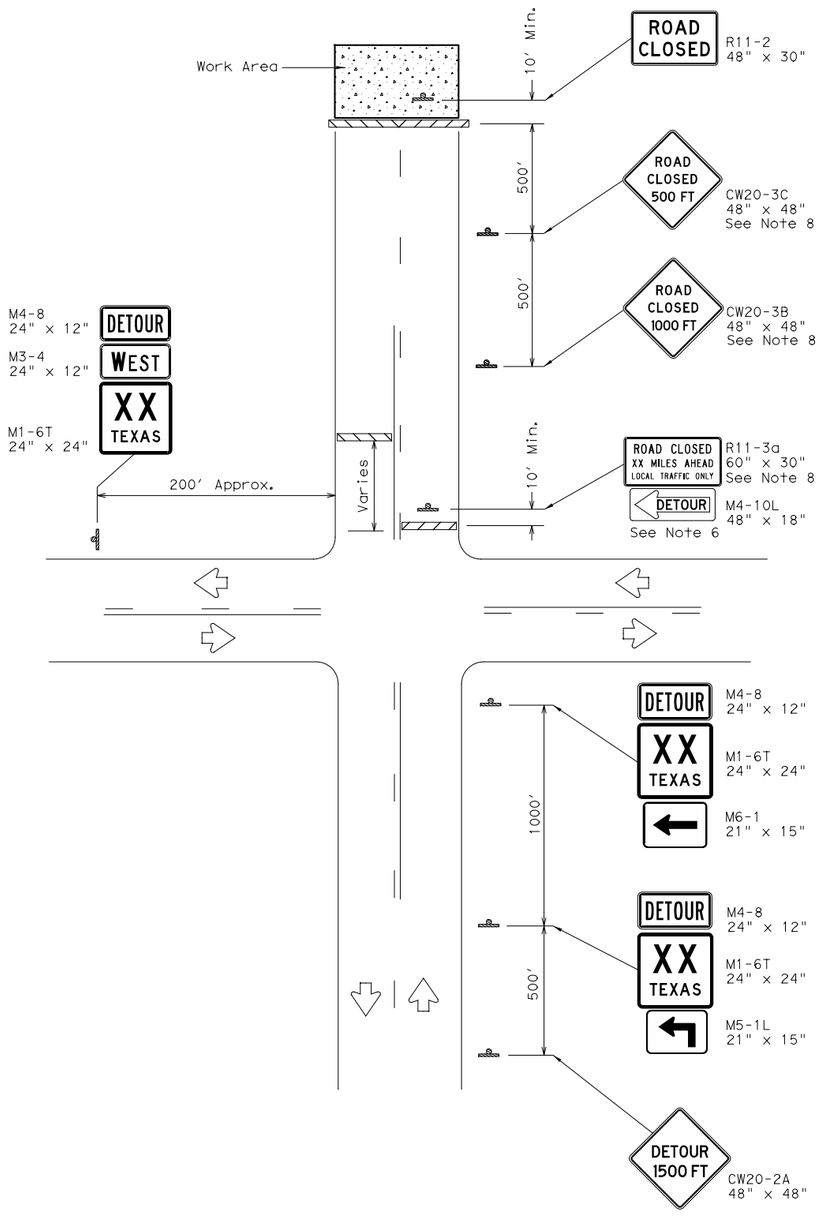
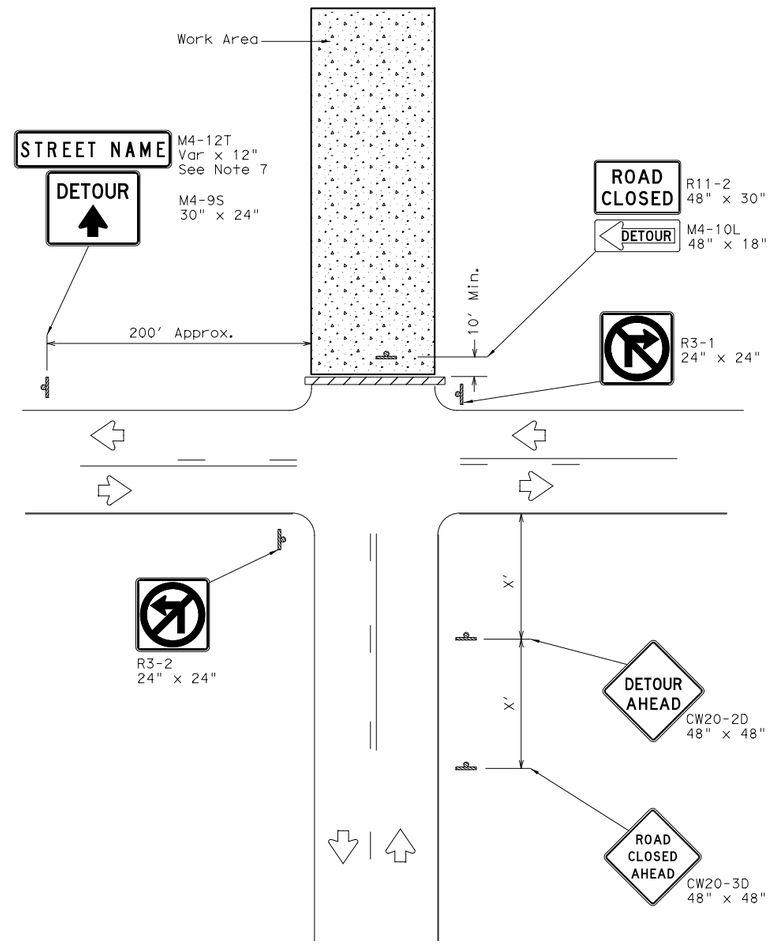
DATE: 11/25/2025 2:21:37 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road #3562/50%/Sheets/wzrcd-13.dgn



ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	DAL	DENTON		34

113

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DATE: 11/25/2025 2:21:54 PM
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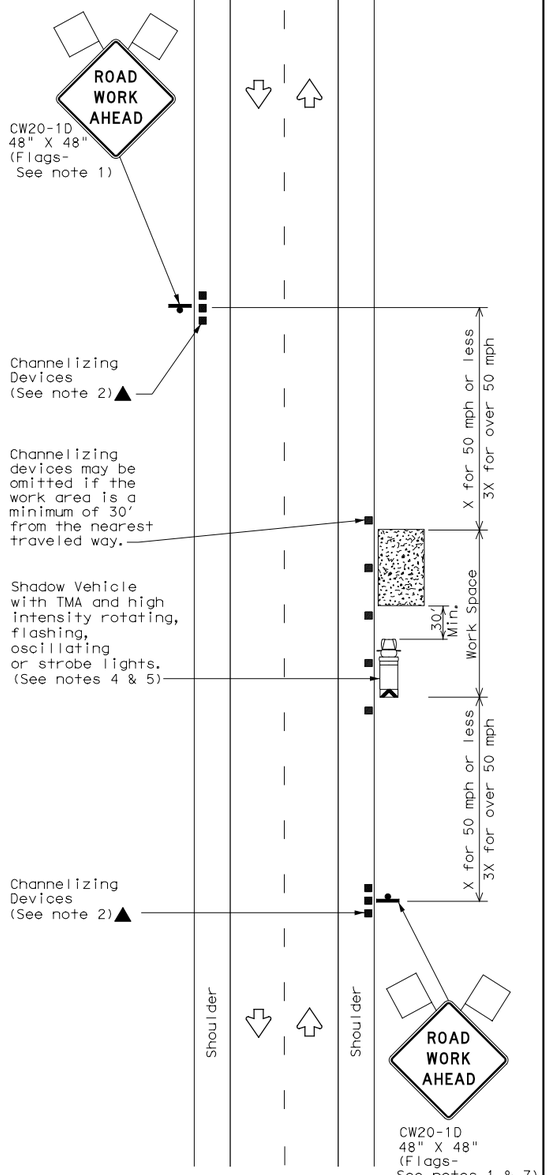
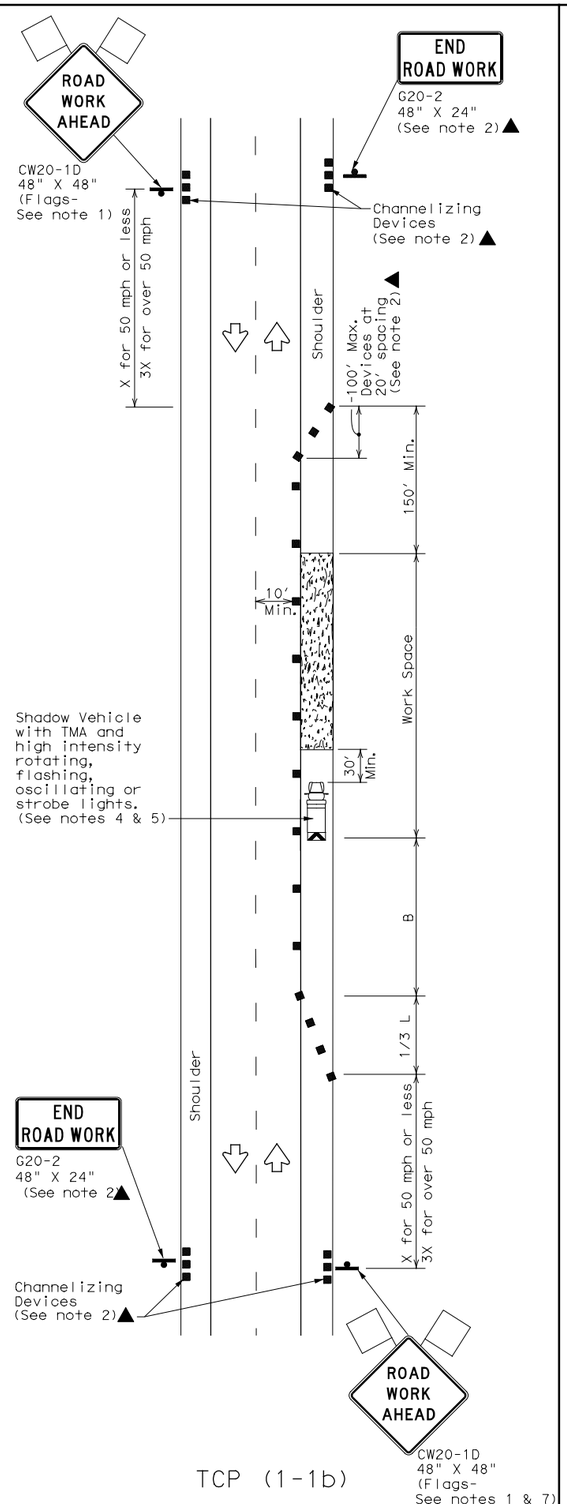


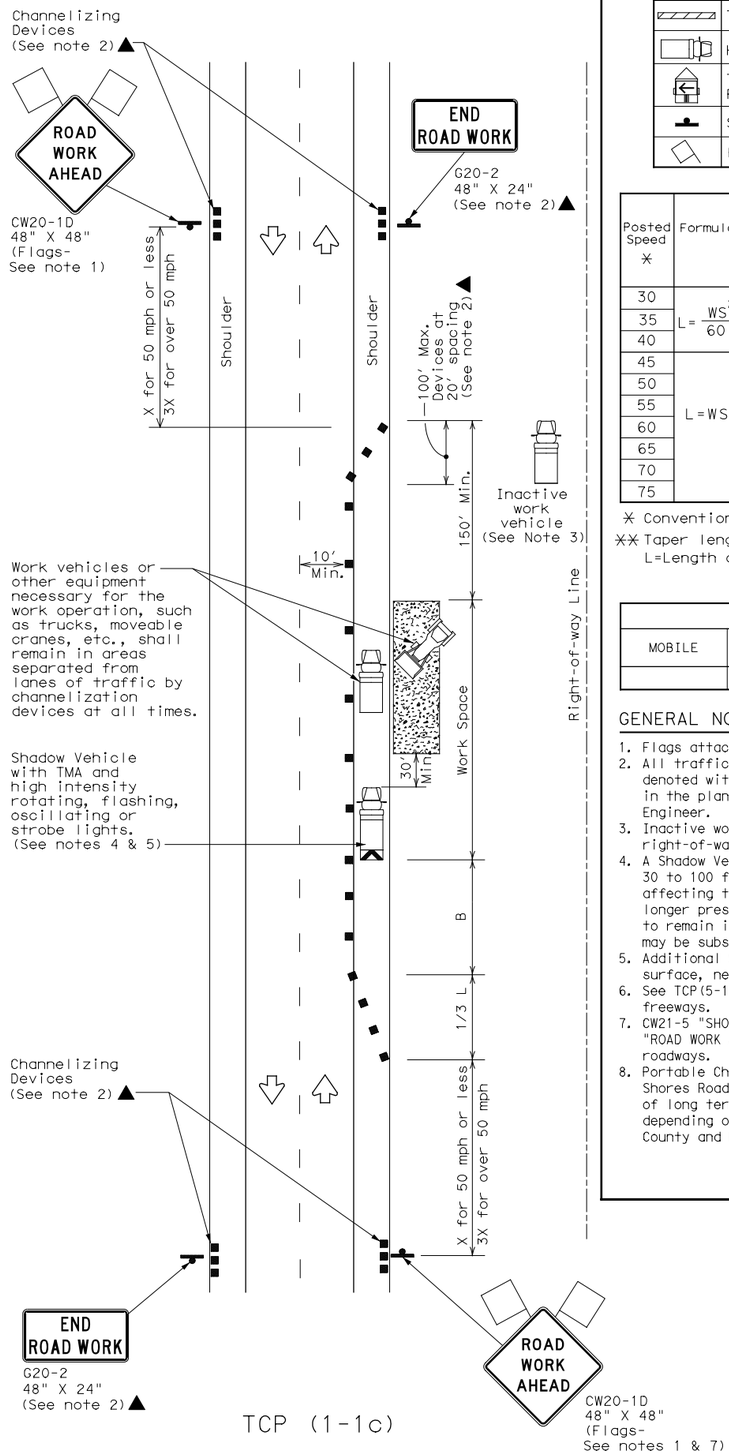
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	DAL	DENTON		35
1-97 2-18				

151

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DATE: 11/25/2025 2:22:13 PM
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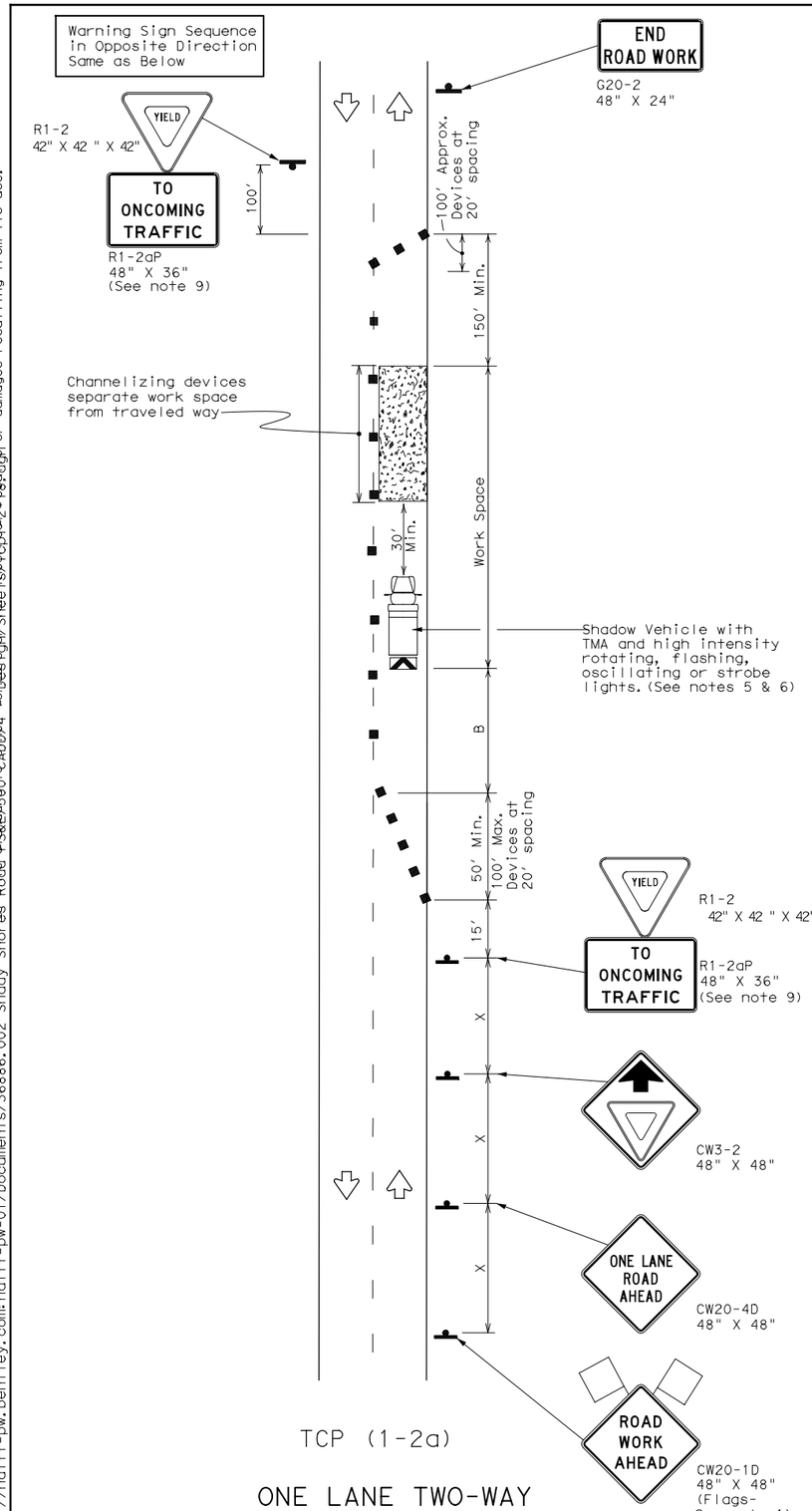
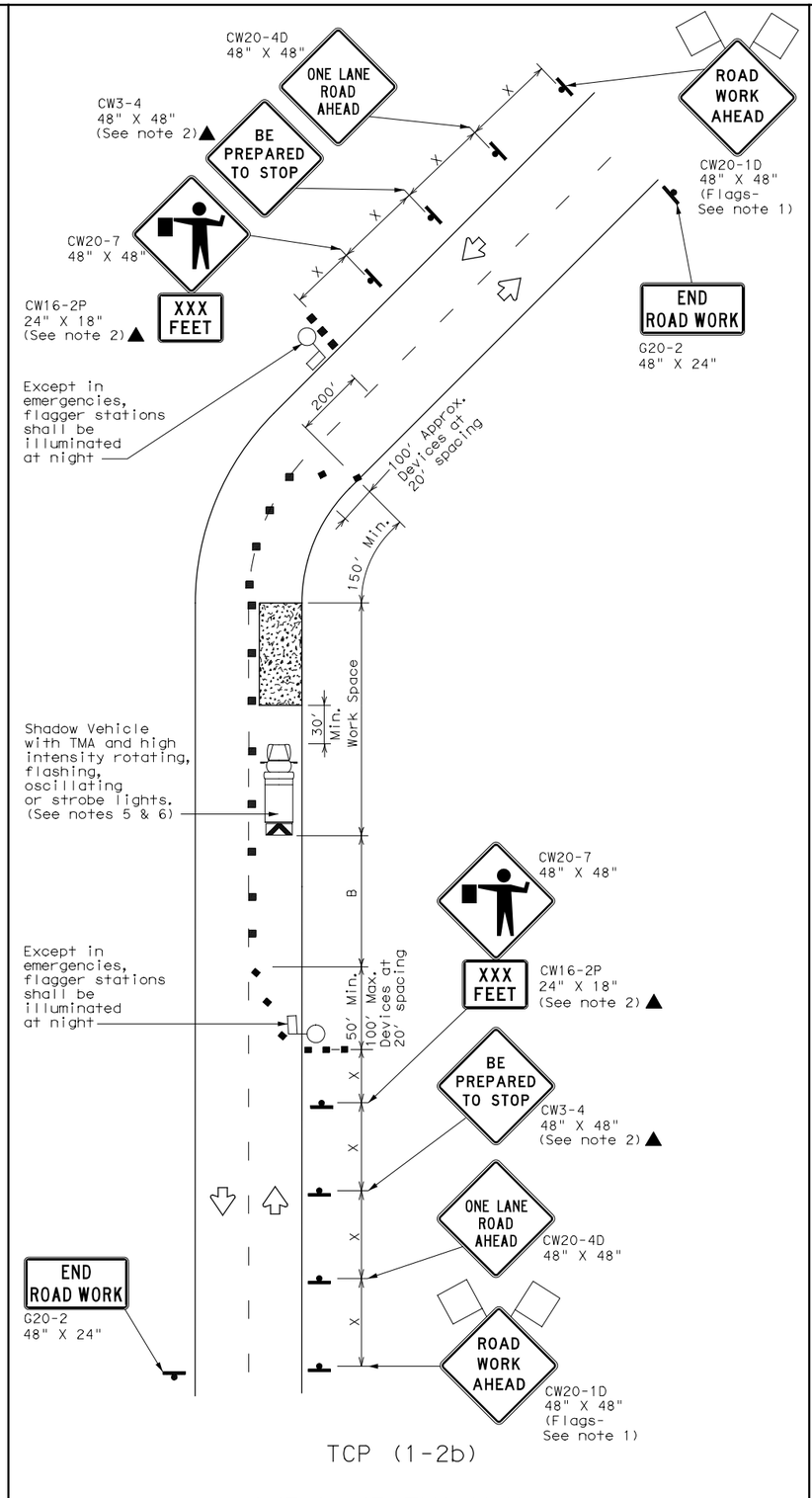


TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 8)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10′ Offset	11′ Offset	12′ Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′	120′	90′	200′
35		205′	225′	245′	35′	70′	160′	120′	250′
40		265′	295′	320′	40′	80′	240′	155′	305′
45	L=WS	450′	495′	540′	45′	90′	320′	195′	360′
50		500′	550′	600′	50′	100′	400′	240′	425′
55		550′	605′	660′	55′	110′	500′	295′	495′
60		600′	660′	720′	60′	120′	600′	350′	570′
65		650′	715′	780′	65′	130′	700′	410′	645′
70		700′	770′	840′	70′	140′	800′	475′	730′
75		750′	825′	900′	75′	150′	900′	540′	820′

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
7. Portable Changeable Message Sign to be placed on each end of Shady Shores Road at Swisher and W. Shady Shores notifying traveling public of long term road closure. Exact location and message to be determined depending on schedule of work and road closures to be approved by County and Engineer.

TCP (1-2a)

8. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
9. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

10. Flaggers should use two-way radios or other methods of communication to control traffic.
11. Length of work space should be based on the ability of flaggers to communicate.
12. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
13. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
14. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98	0918	46	316	VA
2-94 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	DAL	DENTON		36

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DATE: 11/25/2025 2:22:30 PM
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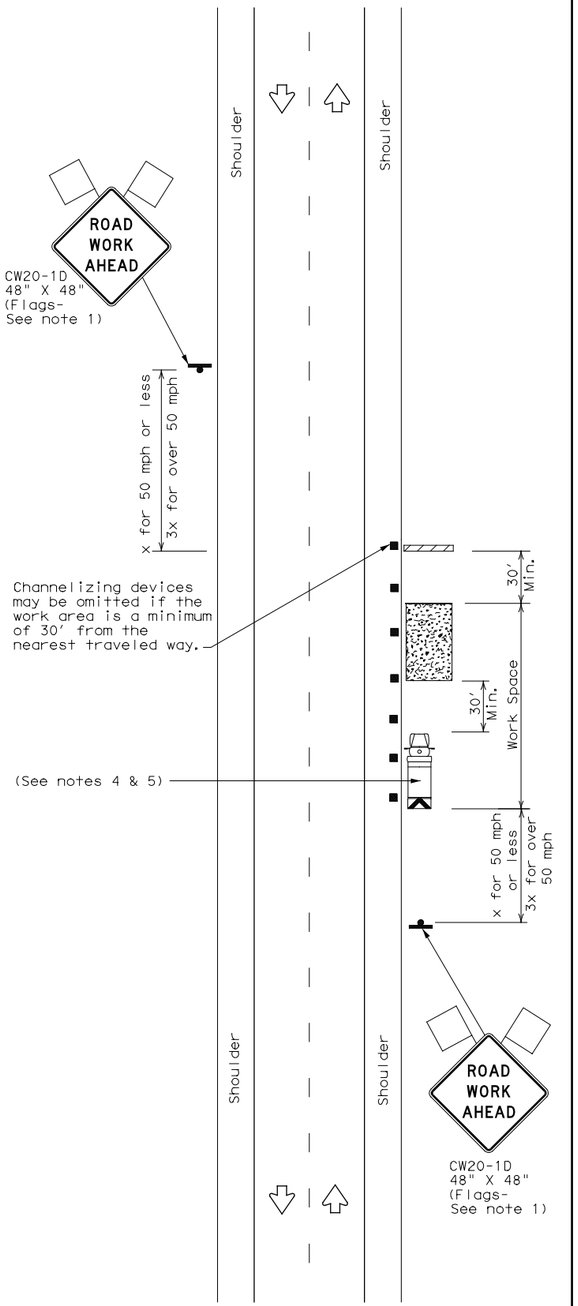
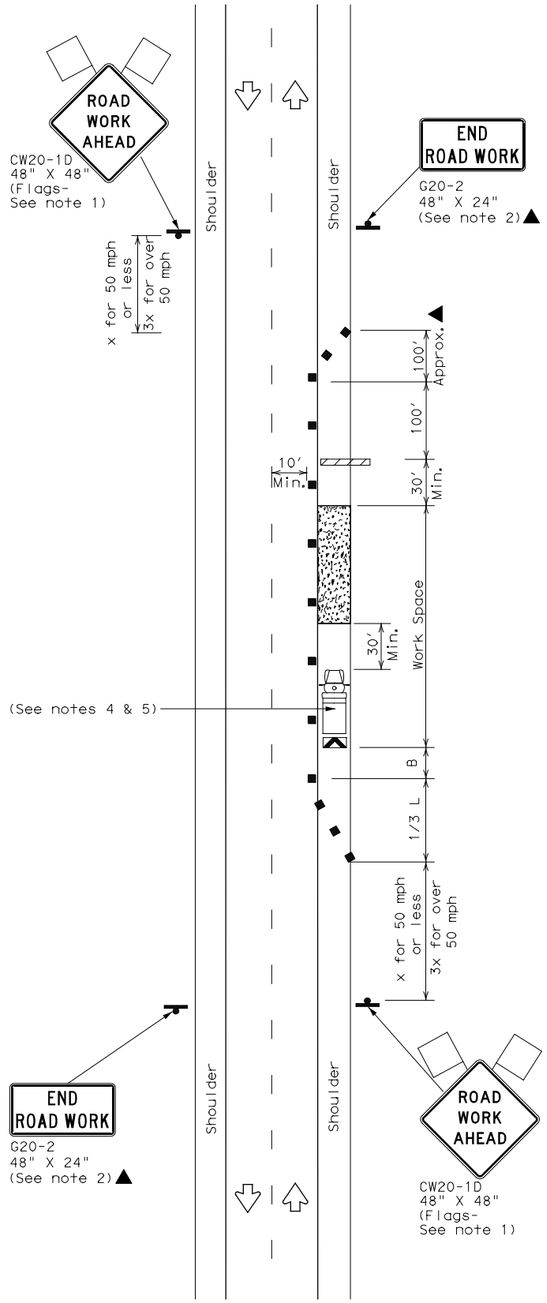


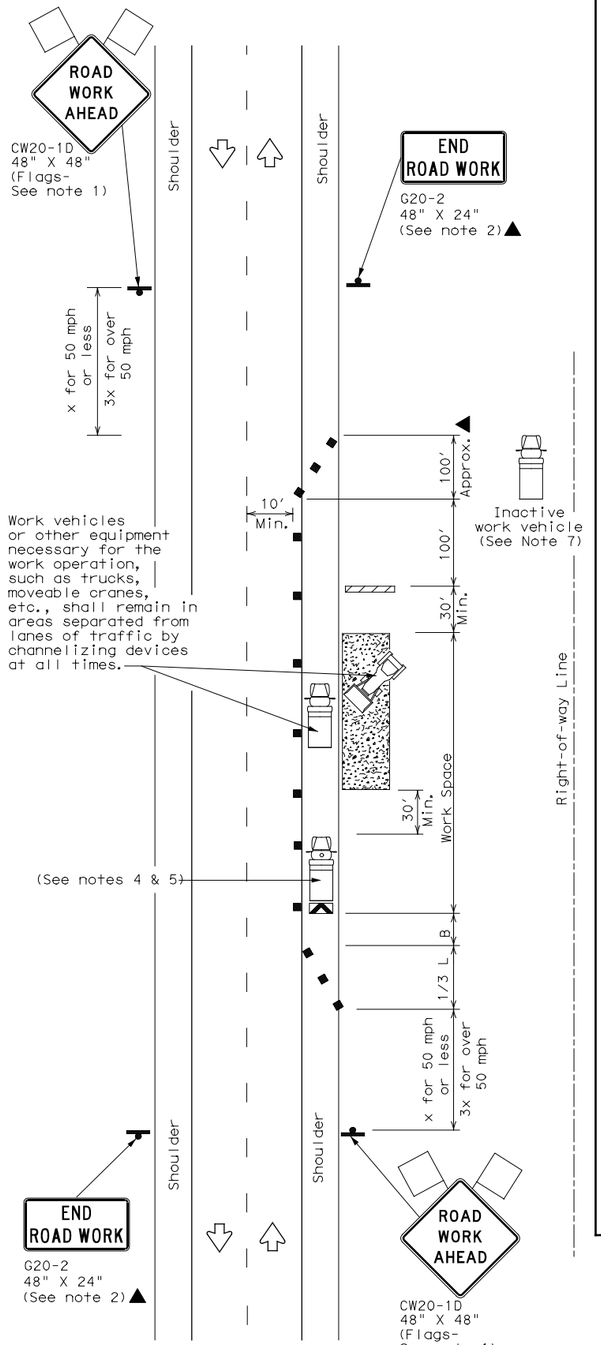
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12				
1-97 2-18	DAL	DENTON		37

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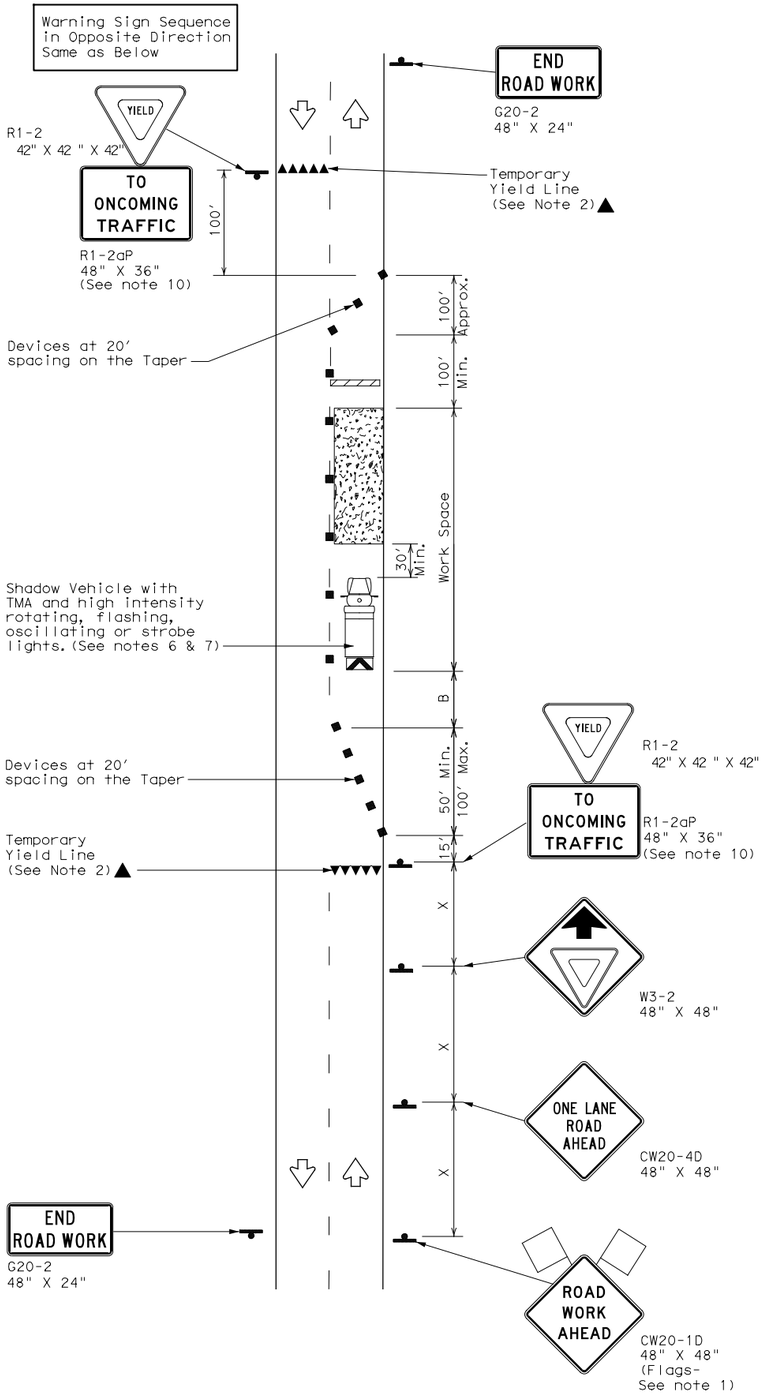
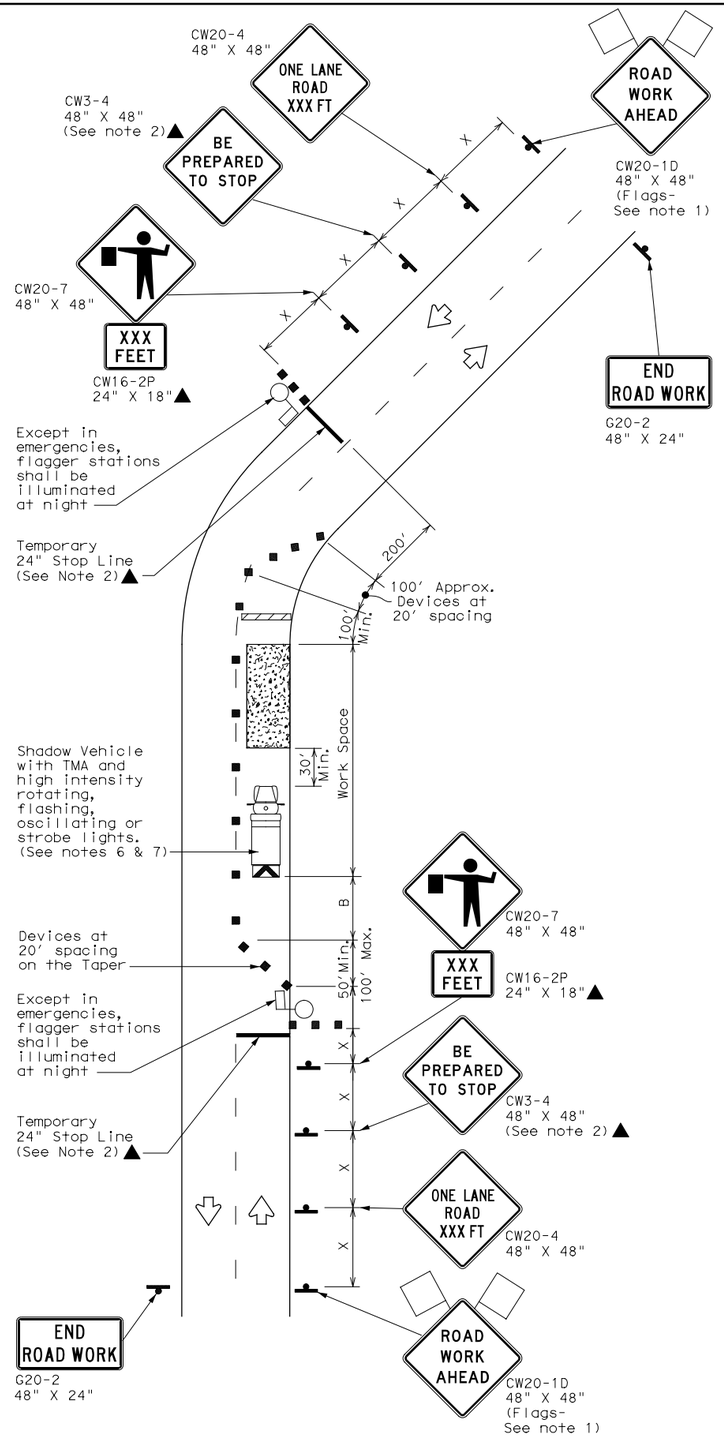
DATE: 11/25/2025 2:22:48 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PSM/05 Traffic/Sheets/tcp2-2-18.dgn



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 10)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
8. Portable Changeable Message Sign to be placed on each end of Shady Shores Road at Swisher and W. Shady Shores notifying traveling public of long term road closure. Exact location and message to be determined depending on schedule of work and road closures to be approved by County and Engineer.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	DAL	DENTON		38
4-98 2-18				

℄ SHADYSHORES

Element:	Linear			
	POT	1000	N7098230.1853	E2418841.8067
	PC	2916.66	N7100146.8396	E2418845.2580
	Tangential Direction:	N00°06′11.42"E		
	Tangential Length:	1916.66		
Element:	Circular			
	PC	2916.66	N7100146.8396	E2418845.2580
	PI	2994.06	N7100224.2461	E2418845.3974
	CC		N7100143.2418	E2420843.2548
	PT	3071.39	N7100301.4097	E2418851.5251
	Radius:	1998		
	Delta:	04°26′14.24" Right		
	Degree of Curvature (Arc):	02°52′03.56"		
	Length:	154.74		
	Tangent:	77.41		
	Chord:	154.7		
	Middle Ordinate:	1.5		
	External:	1.5		
	Back Tangent Direction:	N00°06′11.42"E		
	Back Radial Direction:	S89°53′48.58"E		
	Chord Direction:	N02°19′18.54"E		
	Ahead Radial Direction:	S85°27′34.33"E		
	Ahead Tangent Direction:	N04°32′25.67"E		
Element:	Linear			
	PT	3071.39	N7100301.4097	E2418851.5251
	PC	3196.95	N7100426.5748	E2418861.4648
	Tangential Direction:	N04°32′25.67"E		
	Tangential Length:	125.56		
Element:	Circular			
	PC	3196.95	N7100426.5748	E2418861.4648
	PI	3272.52	N7100501.9074	E2418867.4471
	CC		N7100505.8962	E2417862.6094
	PT	3347.81	N7100577.2851	E2418862.0631
	Radius:	1002		
	Delta:	08°37′33.76" Left		
	Degree of Curvature (Arc):	05°43′05.31"		
	Length:	150.85		
	Tangent:	75.57		
	Chord:	150.71		
	Middle Ordinate:	2.84		
	External:	2.85		
	Back Tangent Direction:	N04°32′25.67"E		
	Back Radial Direction:	S85°27′34.33"E		
	Chord Direction:	N00°13′38.78"E		
	Ahead Radial Direction:	N85°54′51.90"E		
	Ahead Tangent Direction:	N04°05′08.10"W		
Element:	Linear			
	PT	3347.81	N7100577.2851	E2418862.0631
	PC	3641.22	N7100869.9562	E2418841.1582
	Tangential Direction:	N04°05′08.10"W		
	Tangential Length:	293.42		
Element:	Circular			
	PC	3641.22	N7100869.9562	E2418841.1582
	PI	3716.72	N7100945.2631	E2418835.7791
	CC		N7101083.5530	E2421831.5395
	PT	3792.19	N7101020.7454	E2418834.1974
	Radius:	2998		
	Delta:	02°53′06.57" Right		
	Degree of Curvature (Arc):	01°54′40.08"		
	Length:	150.97		
	Tangent:	75.5		
	Chord:	150.95		
	Middle Ordinate:	0.95		
	External:	0.95		
	Back Tangent Direction:	N04°05′08.10"W		
	Back Radial Direction:	N85°54′51.90"E		
	Chord Direction:	N02°38′34.81"W		
	Ahead Radial Direction:	N88°47′58.47"E		
	Ahead Tangent Direction:	N01°12′01.53"W		
Element:	Linear			
	PT	3792.19	N7101020.7454	E2418834.1974
	PC	4792.19	N7102020.5317	E2418813.2475
	Tangential Direction:	N01°12′01.53"W		
	Tangential Length:	1000.01		

Element:	Circular			
	PC	4792.19	N7102020.5317	E2418813.2475
	PI	4814.37	N7102042.7018	E2418812.7829
	CC		N7102083.3393	E2421810.5895
	PT	4836.54	N7102064.8763	E2418812.6464
	Radius:	2998		
	Delta:	00°50′51.25" Right		
	Degree of Curvature (Arc):	01°54′40.08"		
	Length:	44.35		
	Tangent:	22.17		
	Chord:	44.35		
	Middle Ordinate:	0.08		
	External:	0.08		
	Back Tangent Direction:	N01°12′01.53"W		
	Back Radial Direction:	N88°47′58.47"E		
	Chord Direction:	N00°46′35.90"W		
	Ahead Radial Direction:	N89°38′49.72"E		
	Ahead Tangent Direction:	N00°21′10.28"W		
Element:	Linear			
	PT	4836.54	N7102064.8763	E2418812.6464
	PC	5393.04	N7102621.3643	E2418809.2192
	Tangential Direction:	N00°21′10.28"W		
	Tangential Length:	556.5		
Element:	Circular			
	PC	5393.04	N7102621.3643	E2418809.2192
	PI	5429.6	N7102657.9249	E2418808.9940
	CC		N7102590.5597	E2413807.3141
	PT	5466.16	N7102694.4782	E2418808.2345
	Radius:	5002		
	Delta:	00°50′15.26" Left		
	Degree of Curvature (Arc):	01°08′43.65"		
	Length:	73.12		
	Tangent:	36.56		
	Chord:	73.12		
	Middle Ordinate:	0.13		
	External:	0.13		
	Back Tangent Direction:	N00°21′10.28"W		
	Back Radial Direction:	N89°38′49.72"E		
	Chord Direction:	N00°46′17.91"W		
	Ahead Radial Direction:	N88°48′34.46"E		
	Ahead Tangent Direction:	N01°11′25.54"W		
Element:	Linear			
	PT	5466.16	N7102694.4782	E2418808.2345
	PC	6147.91	N7103376.0751	E2418794.0710
	Tangential Direction:	N01°11′25.54"W		
	Tangential Length:	681.74		
Element:	Circular			
	PC	6147.91	N7103376.0751	E2418794.0710
	PI	6234.06	N7103462.2110	E2418792.2811
	CC		N7103479.9105	E2423790.9922
	PT	6320.2	N7103548.3575	E2418793.4609
	Radius:	4998		
	Delta:	01°58′30.40" Right		
	Degree of Curvature (Arc):	01°08′46.95"		
	Length:	172.29		
	Tangent:	86.15		
	Chord:	172.28		
	Middle Ordinate:	0.74		
	External:	0.74		
	Back Tangent Direction:	N01°11′25.54"W		
	Back Radial Direction:	N88°48′34.46"E		
	Chord Direction:	N00°12′10.34"W		
	Ahead Radial Direction:	S89°12′55.14"E		
	Ahead Tangent Direction:	N00°47′04.86"E		
Element:	Linear			
	PT	6320.2	N7103548.3575	E2418793.4609
	PC	7133.37	N7104361.4509	E2418804.5972
	Tangential Direction:	N00°47′04.86"E		
	Tangential Length:	813.17		
Element:	Circular			
	PC	7133.37	N7104361.4509	E2418804.5972
	PI	7149.6	N7104377.6814	E2418804.8195
	CC		N7104388.8680	E2416802.7849
	PT	7165.83	N7104393.9134	E2418804.7786
	Radius:	2002		
	Delta:	00°55′44.68" Left		
	Degree of Curvature (Arc):	02°51′42.94"		
	Length:	32.46		
	Tangent:	16.23		
	Chord:	32.46		
	Middle Ordinate:	0.07		
	External:	0.07		
	Back Tangent Direction:	N00°47′04.86"E		
	Back Radial Direction:	S89°12′55.14"E		
	Chord Direction:	N00°19′12.52"E		
	Ahead Radial Direction:	N89°51′20.18"E		
	Ahead Tangent Direction:	N00°08′39.82"W		

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

HORIZONTAL
ALIGNMENT DATA

SHEET 1 OF 3

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		39

CK: DW: CK: DW:

DATE: 11/25/2025 2:23:06 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-GEOM-DATA-01

℄ SHADYSHORES (CONT.)

Element:	Linear			
	PT	7165.83	N7104393.9134	E2418804.7786
	PC	7384.98	N7104613.0622	E2418804.2263
	Tangential Direction:	N00°08′39.82"W		
	Tangential Length:	219.15		
Element:	Circular			
	PC	7384.98	N7104613.0622	E2418804.2263
	PI	7404.1	N7104632.1828	E2418804.1781
	CC		N7104620.6176	E2421802.2168
	PT	7423.22	N7104651.3024	E2418804.3738
	Radius:	2998		
	Delta:	00°43′51.00" Right		
	Degree of Curvature (Arc):	01°54′40.08"		
	Length:	38.24		
	Tangent:	19.12		
	Chord:	38.24		
	Middle Ordinate:	0.06		
	External:	0.06		
	Back Tangent Direction:	N00°08′39.82"W		
	Back Radial Direction:	N89°51′20.18"E		
	Chord Direction:	N00°13′15.68"E		
	Ahead Radial Direction:	S89°24′48.82"E		
	Ahead Tangent Direction:	N00°35′11.18"E		
Element:	Linear			
	PT	7423.22	N7104651.3024	E2418804.3738
	PC	8335.67	N7105563.7065	E2418813.7128
	Tangential Direction:	N00°35′11.18"E		
	Tangential Length:	912.45		
Element:	Circular			
	PC	8335.67	N7105563.7065	E2418813.7128
	PI	8347.23	N7105575.2615	E2418813.8311
	CC		N7105568.9469	E2418301.7397
	PT	8358.78	N7105586.8100	E2418813.4279
	Radius:	512		
	Delta:	02°35′09.00" Left		
	Degree of Curvature (Arc):	11°11′26.09"		
	Length:	23.11		
	Tangent:	11.56		
	Chord:	23.11		
	Middle Ordinate:	0.13		
	External:	0.13		
	Back Tangent Direction:	N00°35′11.18"E		
	Back Radial Direction:	S89°24′48.82"E		
	Chord Direction:	N00°42′23.32"W		
	Ahead Radial Direction:	N88°00′02.18"E		
	Ahead Tangent Direction:	N01°59′57.82"W		
Element:	Linear			
	PT	8358.78	N7105586.8100	E2418813.4279
	PC	8531.37	N7105759.2885	E2418807.4067
	Tangential Direction:	N01°59′57.82"W		
	Tangential Length:	172.58		
Element:	Circular			
	PC	8531.37	N7105759.2885	E2418807.4067
	PI	8641.05	N7105868.9029	E2418803.5800
	CC		N7105777.0819	E2419317.0962
	PT	8747.44	N7105970.3990	E2418845.1550
	Radius:	510		
	Delta:	24°16′28.00" Right		
	Degree of Curvature (Arc):	11°14′04.08"		
	Length:	216.07		
	Tangent:	109.68		
	Chord:	214.46		
	Middle Ordinate:	11.4		
	External:	11.66		
	Back Tangent Direction:	N01°59′57.82"W		
	Back Radial Direction:	N88°00′02.18"E		
	Chord Direction:	N10°08′16.18"E		
	Ahead Radial Direction:	S67°43′29.82"E		
	Ahead Tangent Direction:	N22°16′30.18"E		
Element:	Linear			
	PT	8747.44	N7105970.3990	E2418845.1550
	PC	8903.72	N7106115.0210	E2418904.3953
	Tangential Direction:	N22°16′30.18"E		
	Tangential Length:	156.28		

Element:	Circular			
	PC	8903.72	N7106115.0210	E2418904.3953
	PI	9005.35	N7106209.0671	E2418942.9185
	CC		N7106309.0963	E2418430.6033
	PT	9104.37	N7106310.6969	E2418942.6008
	Radius:	512		
	Delta:	22°27′15.00" Left		
	Degree of Curvature (Arc):	11°11′26.09"		
	Length:	200.65		
	Tangent:	101.63		
	Chord:	199.37		
	Middle Ordinate:	9.8		
	External:	9.99		
	Back Tangent Direction:	N22°16′30.18"E		
	Back Radial Direction:	S67°43′29.82"E		
	Chord Direction:	N11°02′52.68"E		
	Ahead Radial Direction:	N89°49′15.18"E		
	Ahead Tangent Direction:	N00°10′44.82"W		
Element:	Linear			
	PT	9104.37	N7106310.6969	E2418942.6008
	PC	10006.9	N7107213.2223	E2418939.7793
	Tangential Direction:	N00°10′44.82"W		
	Tangential Length:	902.53		
Element:	Circular			
	PC	10006.9	N7107213.2223	E2418939.7793
	PI	10020.41	N7107226.7255	E2418939.7371
	CC		N7107219.4684	E2420937.7696
	PT	10033.91	N7107240.2281	E2418939.8774
	Radius:	1998		
	Delta:	00°46′28.00" Right		
	Degree of Curvature (Arc):	02°52′03.56"		
	Length:	27.01		
	Tangent:	13.5		
	Chord:	27.01		
	Middle Ordinate:	0.05		
	External:	0.05		
	Back Tangent Direction:	N00°10′44.82"W		
	Back Radial Direction:	N89°49′15.18"E		
	Chord Direction:	N00°12′29.18"E		
	Ahead Radial Direction:	S89°24′16.82"E		
	Ahead Tangent Direction:	N00°35′43.18"E		
Element:	Linear			
	PT	10033.91	N7107240.2281	E2418939.8774
	PC	10255.58	N7107461.8838	E2418942.1806
	Tangential Direction:	N00°35′43.18"E		
	Tangential Length:	221.67		
Element:	Circular			
	PC	10255.58	N7107461.8838	E2418942.1806
	PI	10269.03	N7107475.3380	E2418942.3204
	CC		N7107482.6850	E2416940.2887
	PT	10282.49	N7107488.7928	E2418942.2794
	Radius:	2002		
	Delta:	00°46′12.46" Left		
	Degree of Curvature (Arc):	02°51′42.94"		
	Length:	26.91		
	Tangent:	13.45		
	Chord:	26.91		
	Middle Ordinate:	0.05		
	External:	0.05		
	Back Tangent Direction:	N00°35′43.18"E		
	Back Radial Direction:	S89°24′16.82"E		
	Chord Direction:	N00°12′36.95"E		
	Ahead Radial Direction:	N89°49′30.71"E		
	Ahead Tangent Direction:	N00°10′29.29"W		
Element:	Linear			
	PT	10282.49	N7107488.7928	E2418942.2794
	PC	10908.85	N7108115.1572	E2418940.3684
	Tangential Direction:	N00°10′29.29"W		
	Tangential Length:	626.37		
Element:	Circular			
	PC	10908.85	N7108115.1572	E2418940.3684
	PI	10946.52	N7108152.8185	E2418940.2535
	CC		N7108113.5952	E2418428.3708
	PRC	10984.04	N7108190.0577	E2418934.6291
	Radius:	512		
	Delta:	08°24′50.14" Left		
	Degree of Curvature (Arc):	11°11′26.09"		
	Length:	75.19		
	Tangent:	37.66		
	Chord:	75.12		
	Middle Ordinate:	1.38		
	External:	1.38		
	Back Tangent Direction:	N00°10′29.29"W		
	Back Radial Direction:	N89°49′30.71"E		
	Chord Direction:	N04°22′54.36"W		
	Ahead Radial Direction:	N81°24′40.57"E		
	Ahead Tangent Direction:	N08°35′19.43"W		

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

HORIZONTAL
ALIGNMENT DATA

SHEET 2 OF 3

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		40

DATE: 11/25/2025 2:23:24 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-GEOM-DATA-02

℄ SHADYSHORES (CONT.)

Element:	Circular			
	PRC	10984.04	N7108190.0577	E2418934.6291
	PI	11021.56	N7108227.1514	E2418929.0267
	CC		N7108266.2215	E2419438.9098
	PT	11058.94	N7108264.6656	E2418928.9122
	Radius:	510		
	Delta:	08°24'50.14" Right		
	Degree of Curvature (Arc):	11°14'04.08"		
	Length:	74.89		
	Tangent:	37.51		
	Chord:	74.83		
	Middle Ordinate:	1.37		
	External:	1.38		
	Back Tangent Direction:	N08°35'19.43"W		
	Back Radial Direction:	N81°24'40.57"E		
	Chord Direction:	N04°22'54.36"W		
	Ahead Radial Direction:	N89°49'30.71"E		
	Ahead Tangent Direction:	N00°10'29.29"W		
Element:	Linear			
	PT	11058.94	N7108264.6656	E2418928.9122
	POT	11236.58	N7108442.3123	E2418928.3702
	Tangential Direction:	N00°10'29.29"W		
	Tangential Length:	177.65		

℄ SILKTREE

Element:	Linear			
	POT	1000	N7100993.9400	E2418736.8088
	PC	1098.09	N7100993.3917	E2418834.8955
	Tangential Direction:	S89°40'47.51"E		
	Tangential Length:	98.09		

℄ PARKSIDE

Element:	Linear			
	POT	1000	N7101671.9901	E2418661.0961
	PC	1160	N7101688.9461	E2418820.1957
	Tangential Direction:	N83°55'00.09"E		
	Tangential Length:	160		

℄ OAKWOOD

Element:	Linear			
	POT	1000	N7105517.5185	E2418666.3724
	PC	1146.88	N7105518.5069	E2418813.2502
	Tangential Direction:	N89°36'51.98"E		
	Tangential Length:	146.88		

CK | DW | CK | DW

STATE OF TEXAS
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12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

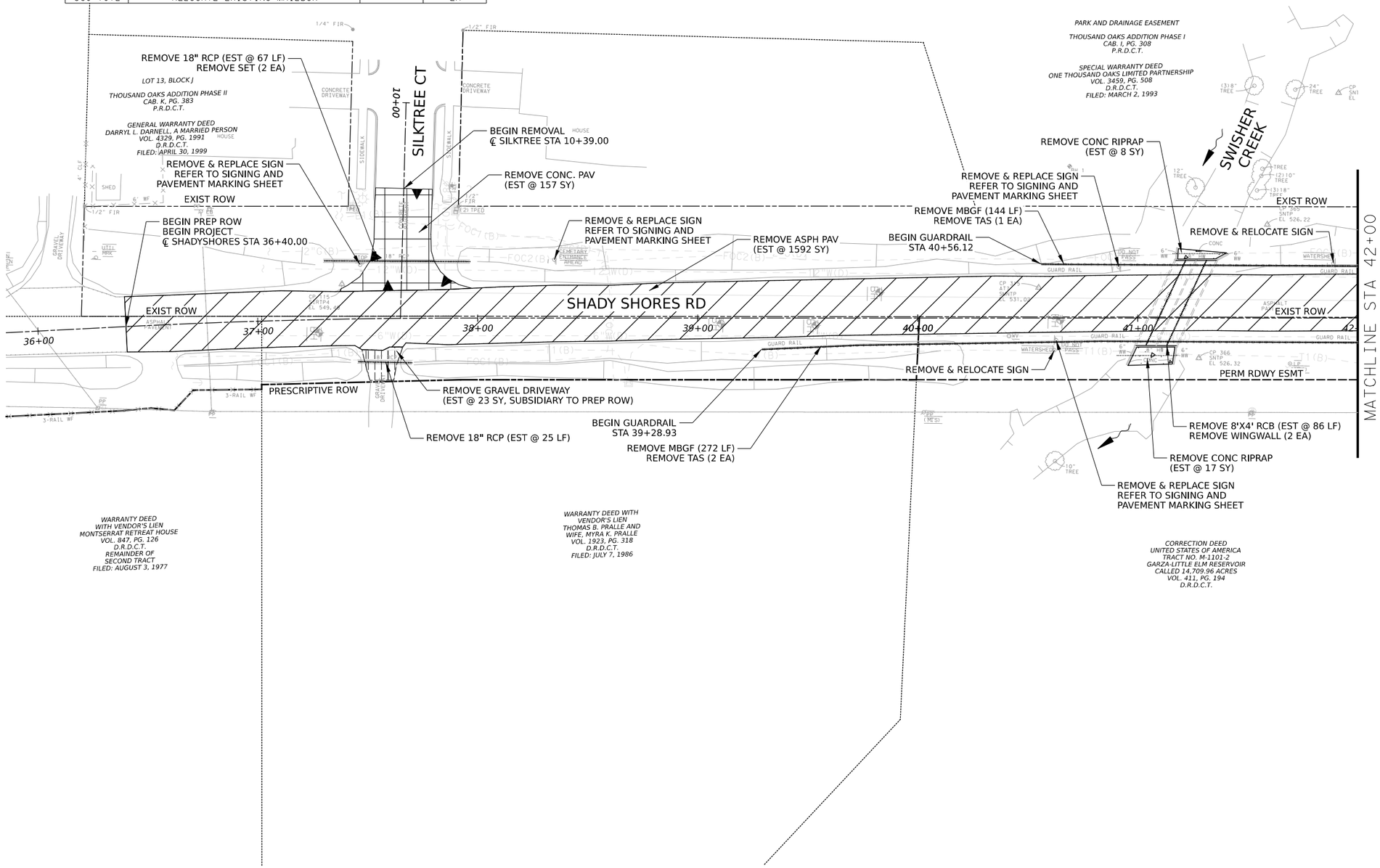
HORIZONTAL
ALIGNMENT DATA

SHEET 3 OF 3

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		41

DATE: 11/25/2025 2:23:42 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-GEOM-DATA-03

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)	157	SY
104-7006	REMOV CONC (RIPRAP)	25	SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1592	SY
496-7004	REMOV STR (SET)	2	EA
496-7005	REMOV STR (WINGWALL)	2	EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	92	LF
496-7008	REMOV STR (BOX CULVERT)	86	LF
496-6072	REMOVING ROCK RIP RAP		SY
542-7001	REMOVE METAL BEAM GUARD FENCE	416	LF
542-7002	REMOVE TERMINAL ANCHOR SECTION	3	EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)		EA
560-7012	RELOCATE EXISTING MAILBOX		EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

THE CONTRACTOR SHALL MINIMIZE IMPACTS TO AND PROTECT ALL EXISTING TREES. PRUNING SHALL BE LIMITED TO BRANCHES NECESSARY FOR CONSTRUCTION OF THE PROPOSED FACILITIES. TREE REMOVAL SHALL NOT OCCUR WITHOUT PRIOR NOTIFICATION TO THE LANDOWNER AND THE ENGINEER.

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

03-27-2026

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

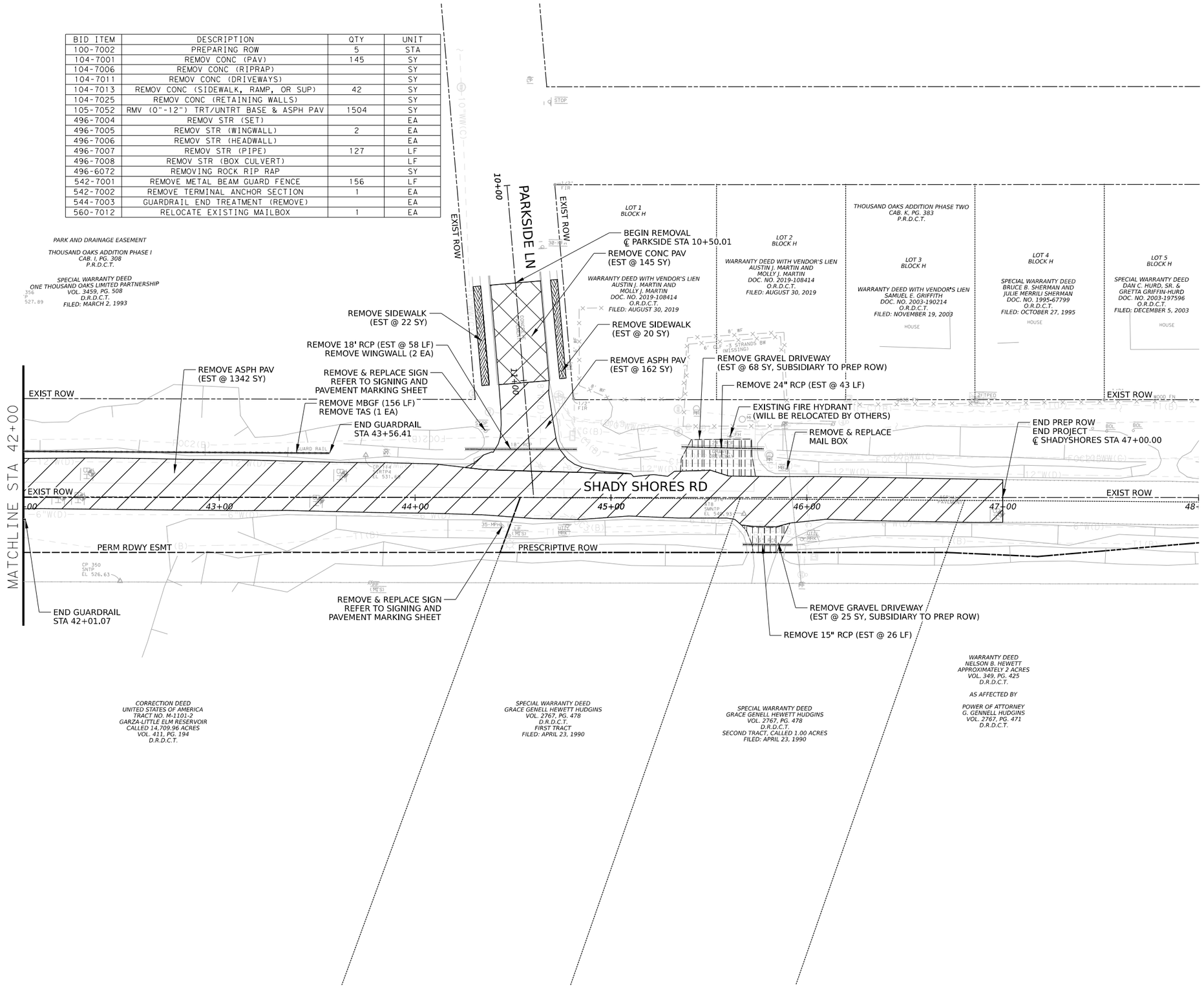
SHADY SHORES
BEGIN TO STA 42+00

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		42

DATE: 3/30/2026 6:25:42 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-CE-REMV-01

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	5	STA
104-7001	REMOV CONC (PAV)	145	SY
104-7006	REMOV CONC (RIPRAP)		SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)	42	SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1504	SY
496-7004	REMOV STR (SET)		EA
496-7005	REMOV STR (WINGWALL)	2	EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	127	LF
496-7008	REMOV STR (BOX CULVERT)		LF
496-6072	REMOVING ROCK RIP RAP		SY
542-7001	REMOVE METAL BEAM GUARD FENCE	156	LF
542-7002	REMOVE TERMINAL ANCHOR SECTION	1	EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)		EA
560-7012	RELOCATE EXISTING MAILBOX	1	EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

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0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
03-27-2026

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

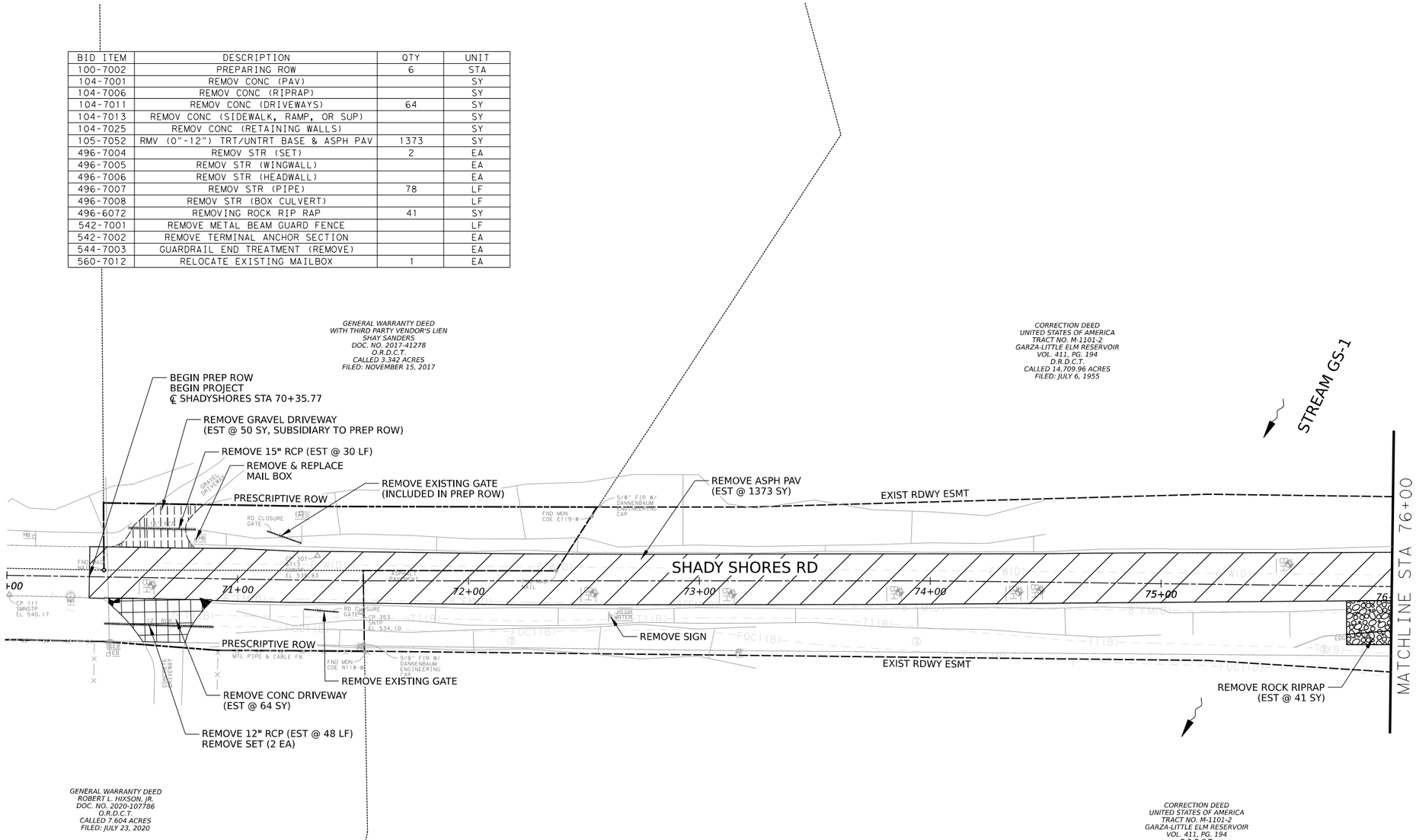
SHADY SHORES
STA 42+00 TO END

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		43

DATE: 3/30/2026 6:25:55 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-CE-REMV-02

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)		SY
104-7006	REMOV CONC (RIPRAP)		SY
104-7011	REMOV CONC (DRIVEWAYS)	64	SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1373	SY
496-7004	REMOV STR (SET)	2	EA
496-7005	REMOV STR (WINGWALL)		EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	78	LF
496-7008	REMOV STR (BOX CULVERT)		LF
496-6072	REMOVING ROCK RIP RAP	41	SY
542-7001	REMOVE METAL BEAM GUARD FENCE		LF
542-7002	REMOVE TERMINAL ANCHOR SECTION		EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)		EA
560-7012	RELOCATE EXISTING MAILBOX	1	EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

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0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

03-27-2026

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

SHADY SHORES
BEGIN TO STA 76+00

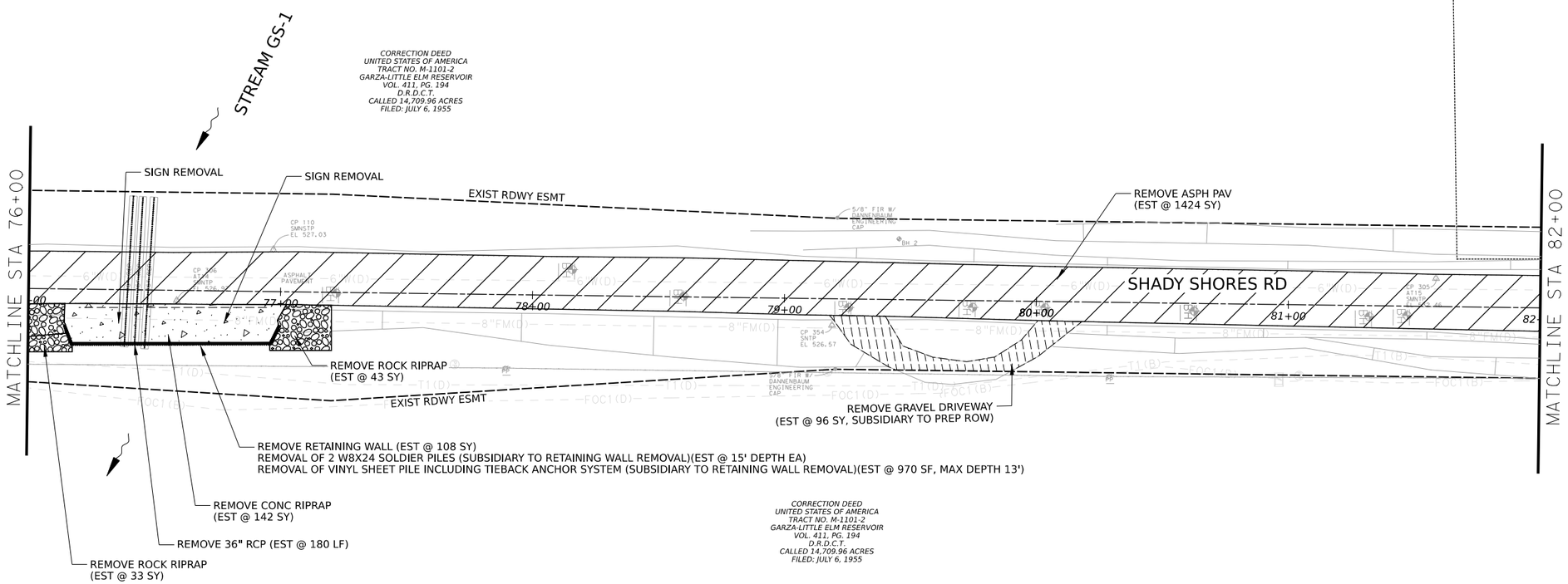
SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		44

CK | DW | CK | DW

DATE: 3/30/2026 6:26:09 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-CE-REMV-03

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)		SY
104-7006	REMOV CONC (RIPRAP)	142	SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)	108	SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1424	SY
496-7004	REMOV STR (SET)		EA
496-7005	REMOV STR (WINGWALL)		EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	180	LF
496-7008	REMOV STR (BOX CULVERT)		LF
496-6072	REMOVING ROCK RIP RAP	76	SY
542-7001	REMOVE METAL BEAM GUARD FENCE		LF
542-7002	REMOVE TERMINAL ANCHOR SECTION		EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)		EA
560-7012	RELOCATE EXISTING MAILBOX		EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

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0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

03-27-2026

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

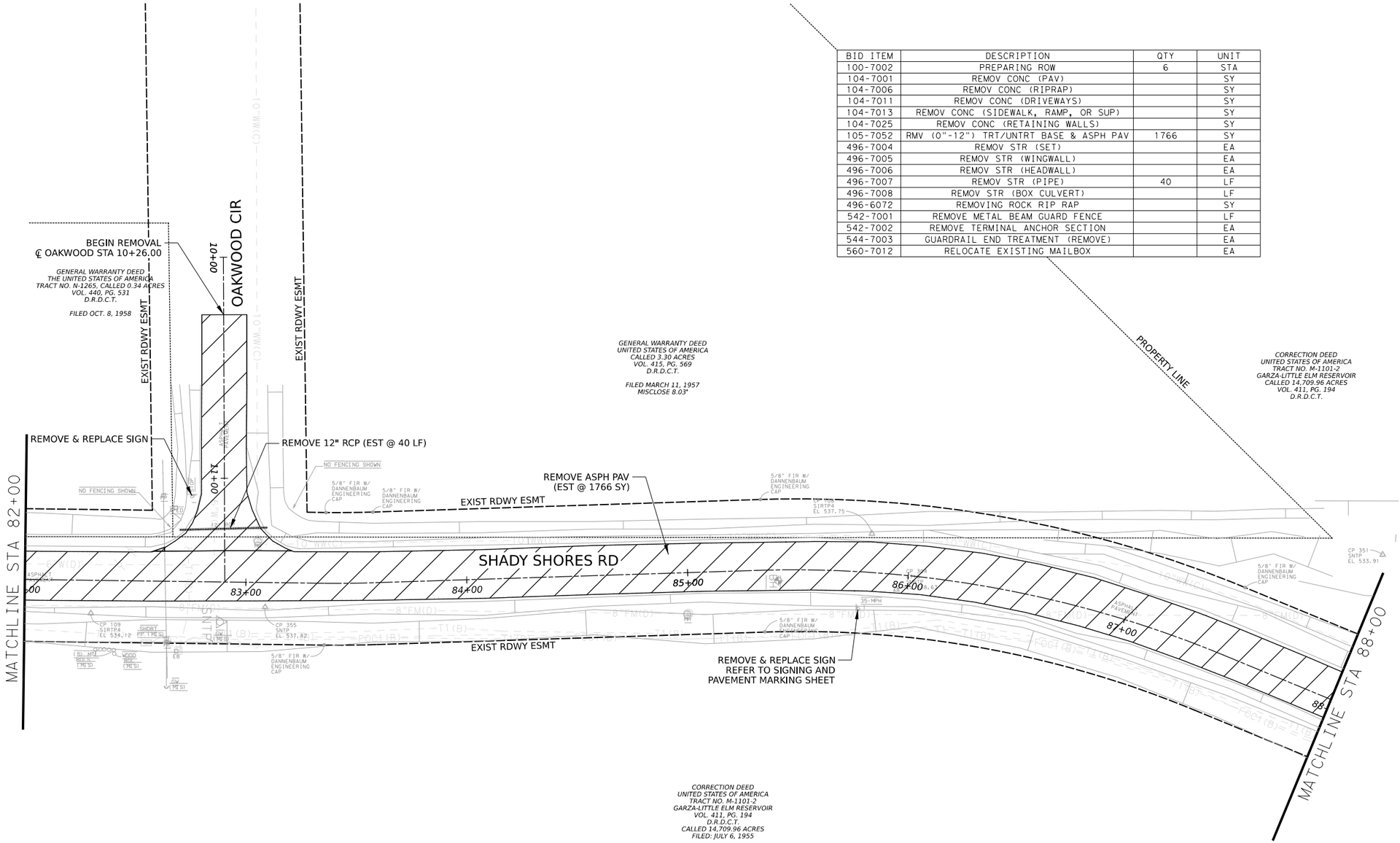
SHADY SHORES
STA 76+00 TO STA 82+00

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		45

DATE: 3/30/2026 6:26:22 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-CE-REMV-04

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)		SY
104-7006	REMOV CONC (RIPRAP)		SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1766	SY
496-7004	REMOV STR (SET)		EA
496-7005	REMOV STR (WINGWALL)		EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	40	LF
496-7008	REMOV STR (BOX CULVERT)		LF
496-6072	REMOVING ROCK RIP RAP		SY
542-7001	REMOVE METAL BEAM GUARD FENCE		LF
542-7002	REMOVE TERMINAL ANCHOR SECTION		EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)		EA
560-7012	RELOCATE EXISTING MAILBOX		EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

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0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100088
LICENSED
PROFESSIONAL ENGINEER

David A. Burkett

03-27-2026

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

SHADY SHORES
STA 82+00 TO 88+00

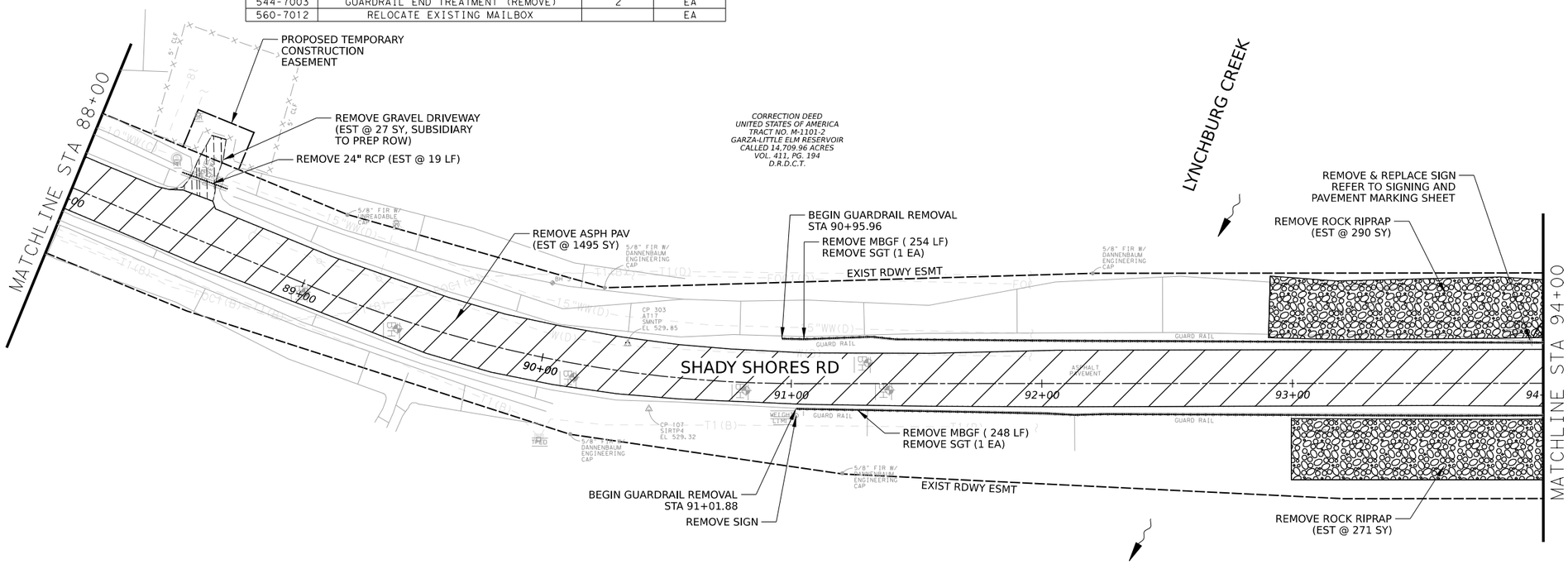
SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		46

DATE: 3/30/2026 6:26:36 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-CE-REMV-05

CK DW CK DW

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)		SY
104-7006	REMOV CONC (RIPRAP)		SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1495	SY
496-7004	REMOV STR (SET)		EA
496-7005	REMOV STR (WINGWALL)		EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	19	LF
496-7008	REMOV STR (BOX CULVERT)		LF
496-6072	REMOVING ROCK RIP RAP	561	SY
542-7001	REMOVE METAL BEAM GUARD FENCE	502	LF
542-7002	REMOVE TERMINAL ANCHOR SECTION		EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)	2	EA
560-7012	RELOCATE EXISTING MAILBOX		EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

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0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

03-27-2026

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

SHADY SHORES
STA 88+00 TO STA 94+00

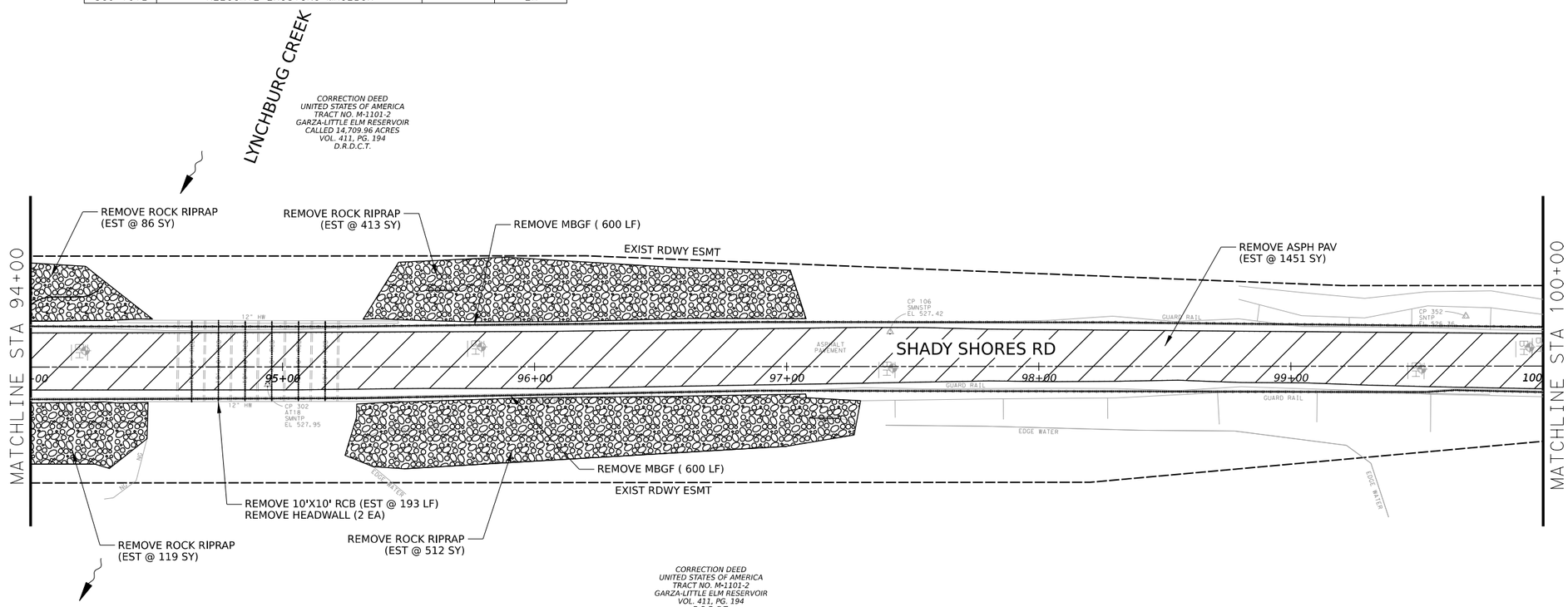
SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		47

DATE: 3/30/2026 6:26:50 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-CE-REMV-06

CK DW CK DW

BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)		SY
104-7006	REMOV CONC (RIPRAP)		SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1451	SY
496-7004	REMOV STR (SET)		EA
496-7005	REMOV STR (WINGWALL)		EA
496-7006	REMOV STR (HEADWALL)	2	EA
496-7007	REMOV STR (PIPE)		LF
496-7008	REMOV STR (BOX CULVERT)	193	LF
496-6072	REMOVING ROCK RIP RAP	1130	SY
542-7001	REMOVE METAL BEAM GUARD FENCE	1200	LF
542-7002	REMOVE TERMINAL ANCHOR SECTION		EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)		EA
560-7012	RELOCATE EXISTING MAILBOX		EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

THE CONTRACTOR SHALL MINIMIZE IMPACTS TO AND PROTECT ALL EXISTING TREES. PRUNING SHALL BE LIMITED TO BRANCHES NECESSARY FOR CONSTRUCTION OF THE PROPOSED FACILITIES. TREE REMOVAL SHALL NOT OCCUR WITHOUT PRIOR NOTIFICATION TO THE LANDOWNER AND THE ENGINEER.

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

David A. Burkett
03-27-2026

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

SHADY SHORES
STA 94+00 TO STA 100+00

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		48

CK: DW: CK: DW:

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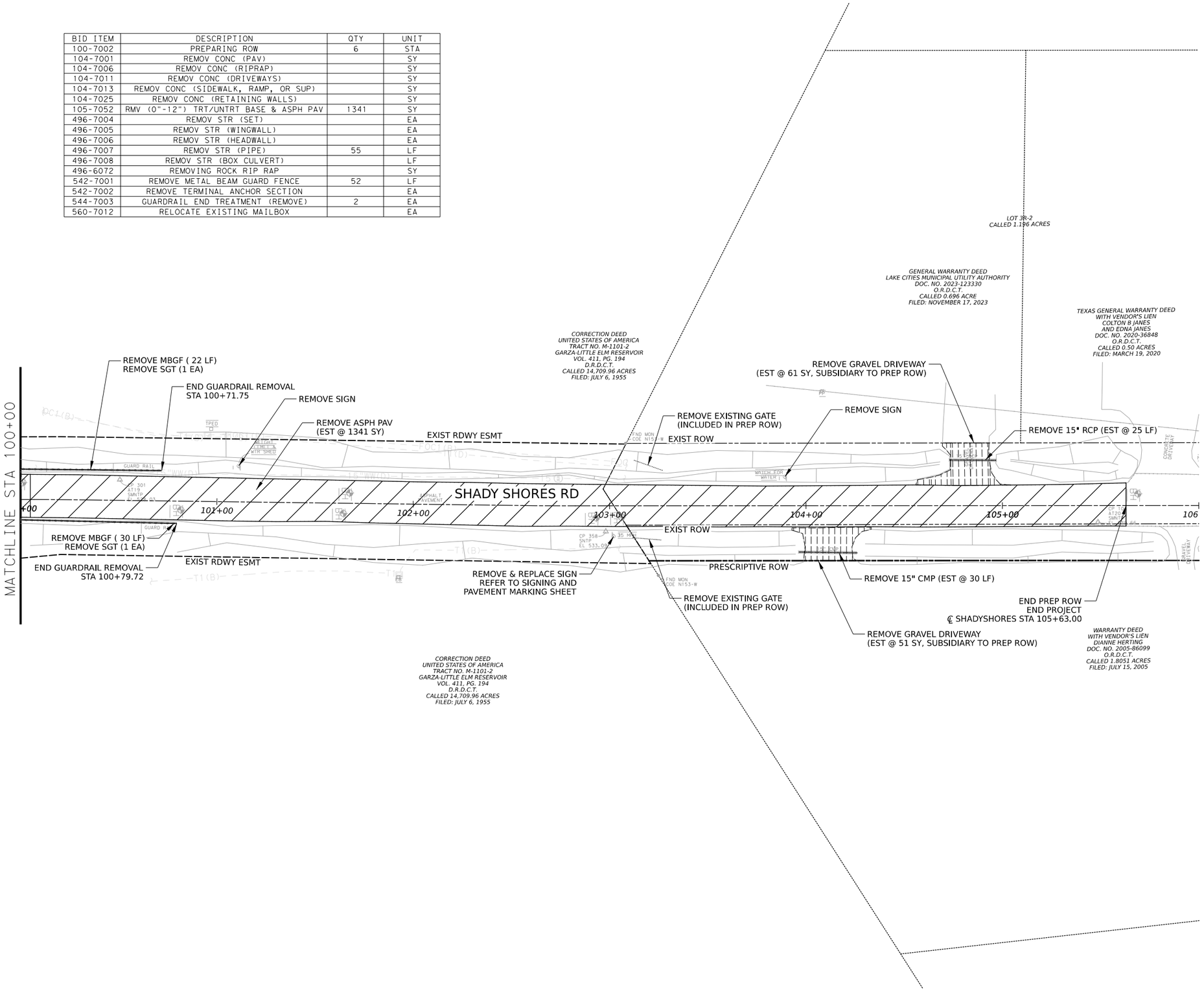
BID ITEM	DESCRIPTION	QTY	UNIT
100-7002	PREPARING ROW	6	STA
104-7001	REMOV CONC (PAV)		SY
104-7006	REMOV CONC (RIPRAP)		SY
104-7011	REMOV CONC (DRIVEWAYS)		SY
104-7013	REMOV CONC (SIDEWALK, RAMP, OR SUP)		SY
104-7025	REMOV CONC (RETAINING WALLS)		SY
105-7052	RMV (0"-12") TRT/UNTRT BASE & ASPH PAV	1341	SY
496-7004	REMOV STR (SET)		EA
496-7005	REMOV STR (WINGWALL)		EA
496-7006	REMOV STR (HEADWALL)		EA
496-7007	REMOV STR (PIPE)	55	LF
496-7008	REMOV STR (BOX CULVERT)		LF
496-6072	REMOVING ROCK RIP RAP		SY
542-7001	REMOVE METAL BEAM GUARD FENCE	52	LF
542-7002	REMOVE TERMINAL ANCHOR SECTION		EA
544-7003	GUARDRAIL END TREATMENT (REMOVE)	2	EA
560-7012	RELOCATE EXISTING MAILBOX		EA



LEGEND

- REMOVE ASPH PVMT (9")
- REMOVE CONC PVMT
- REMOVE CONC DW
- REMOVE GRAVEL DW
- REMOVE ROCK RIPRAP
- REMOVE CONC RIPRAP
- REMOVE SIDEWALK
- REMOVE STRUCTURE
- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.

NOTE:

THE CONTRACTOR SHALL MINIMIZE IMPACTS TO AND PROTECT ALL EXISTING TREES. PRUNING SHALL BE LIMITED TO BRANCHES NECESSARY FOR CONSTRUCTION OF THE PROPOSED FACILITIES. TREE REMOVAL SHALL NOT OCCUR WITHOUT PRIOR NOTIFICATION TO THE LANDOWNER AND THE ENGINEER.

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100065
LICENSED
PROFESSIONAL ENGINEER

03-27-2026

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

REMOVAL PLAN

SHADY SHORES
STA 100+00 TO END

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		49

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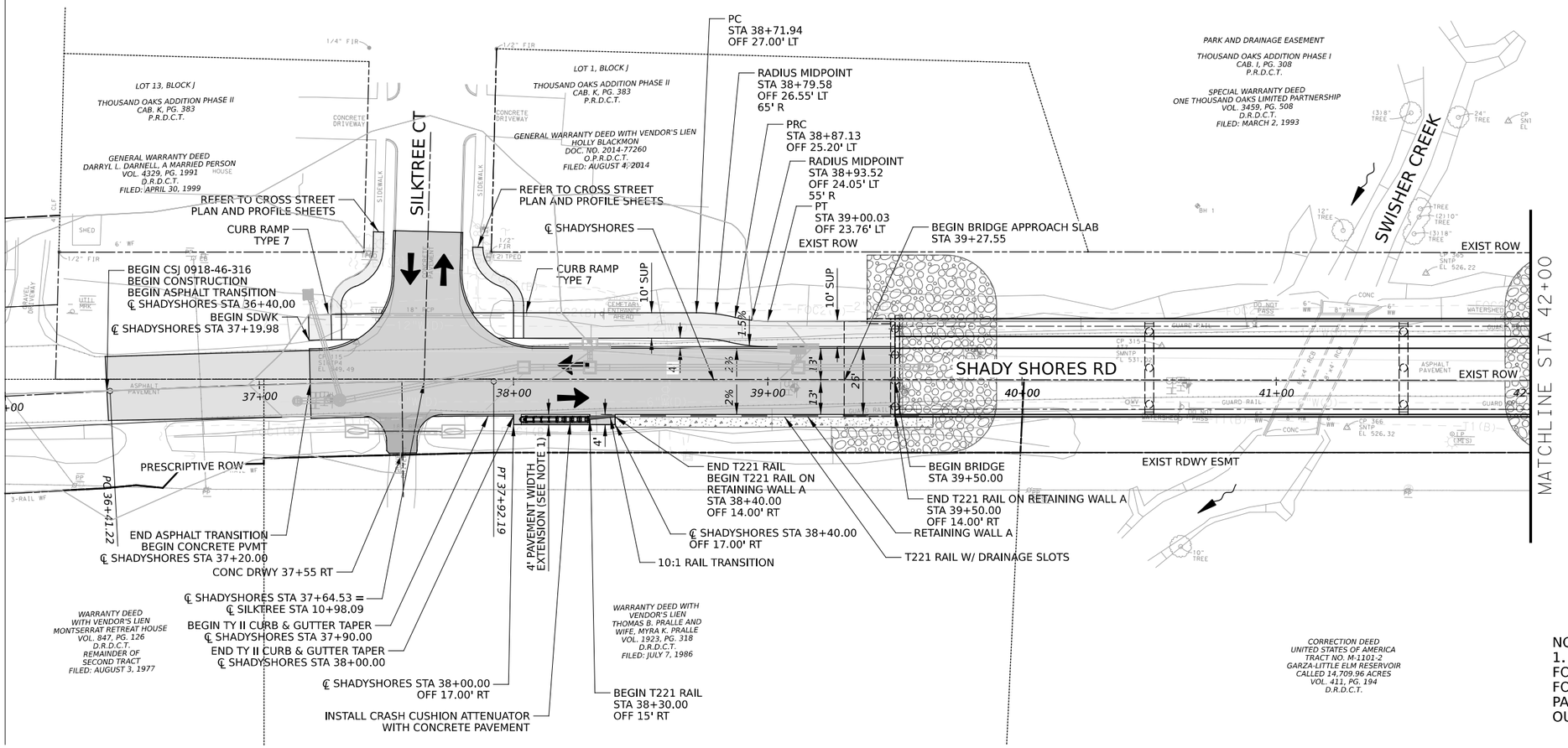


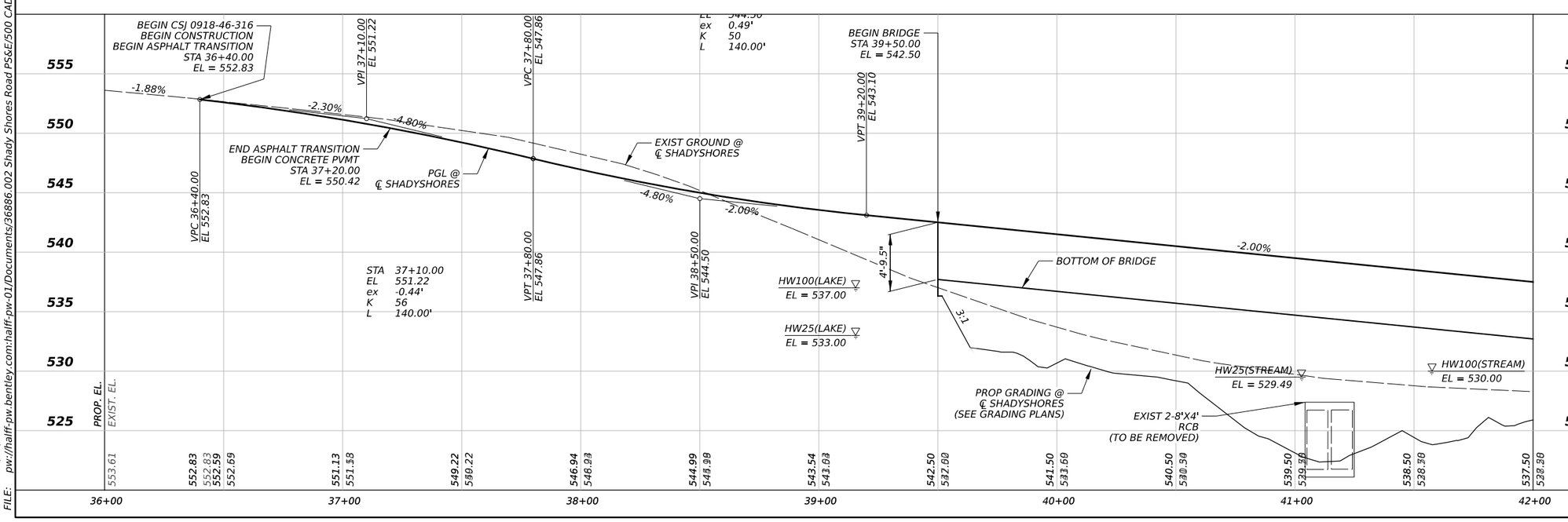
LEGEND

- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.
- MAIN CONCRETE PAVEMENT
- TRANSITION PAVEMENT
- SUP
- DRIVEWAY PAVEMENT
- ROCK RIPRAP

HORIZ. SCALE IN FEET: 0 25 50

VERT. SCALE IN FEET: 0 5 10

NOTES:
1. 10'X4' FULL DEPTH PAVEMENT WING TO ALLOW FOR BARRIER AND ATTENUATOR MOUNT. PAID FOR AS PART OF THE FULL DEPTH ROADWAY PAVEMENT QUANTITIES. NO CURB INSTALLED ON OUTSIDE EDGE.



STATE OF TEXAS
DAVID A. BURKETT
100088
LICENSED
PROFESSIONAL ENGINEER
David A. Burkett
12-01-2025
TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE
SHADY SHORES RD

BEGIN TO STA 42+00

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		50

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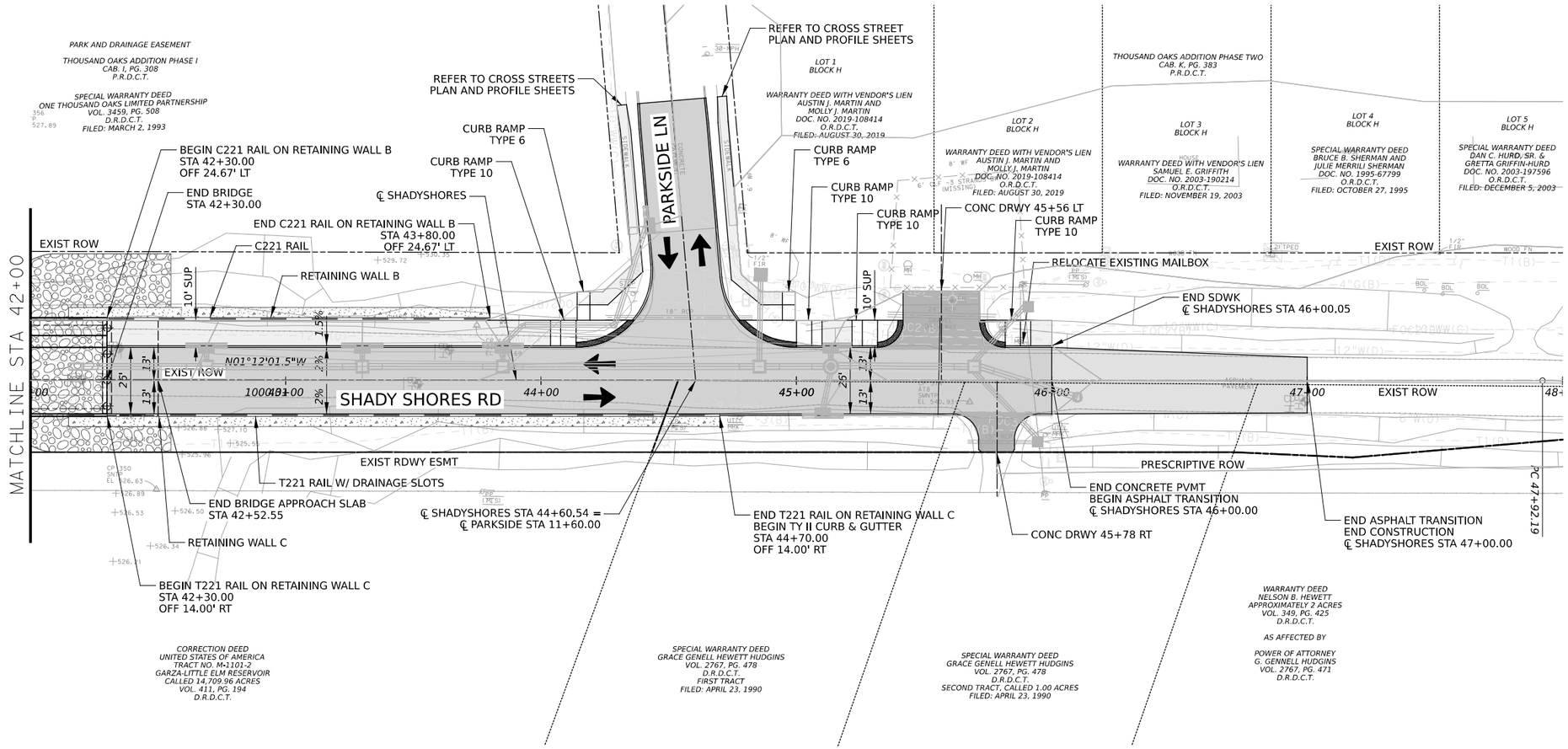

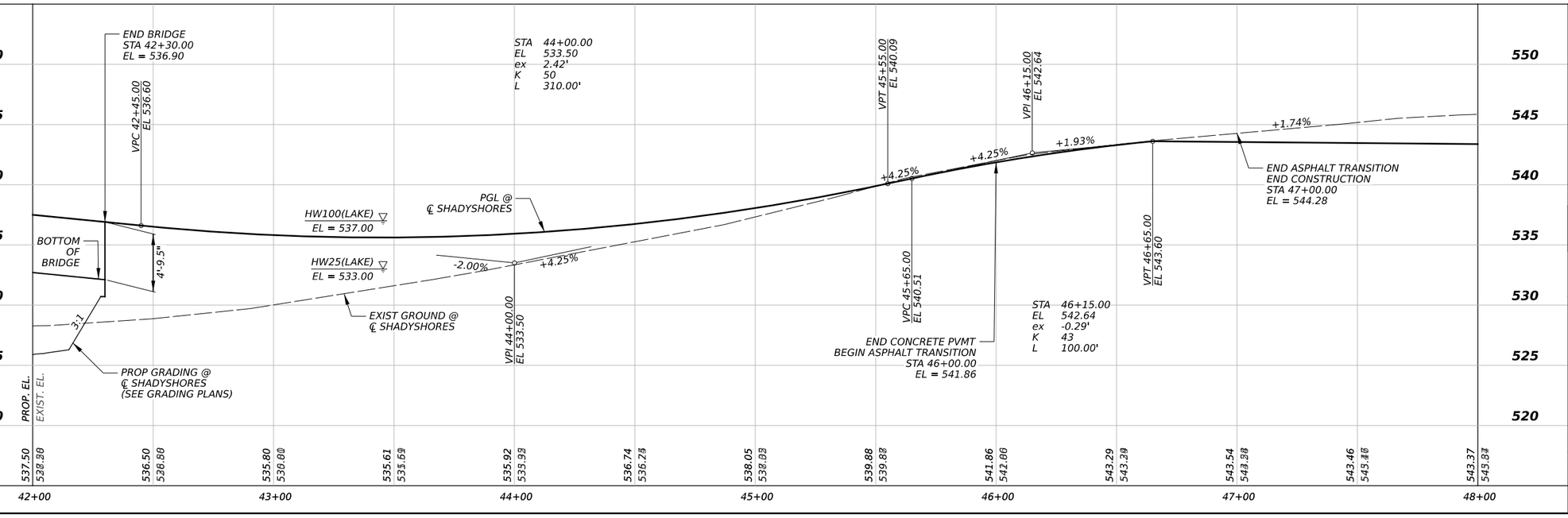

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12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

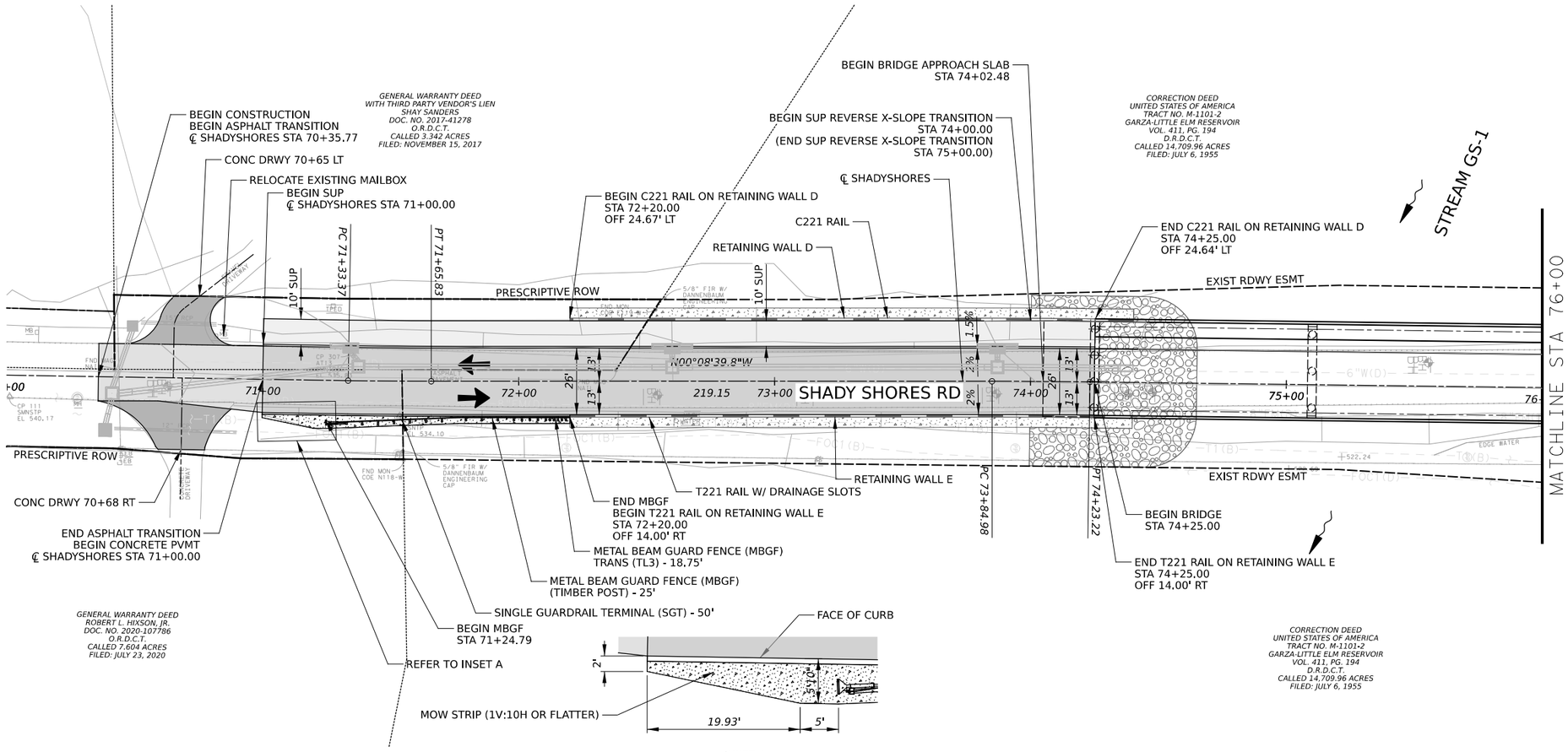
SHADY SHORES

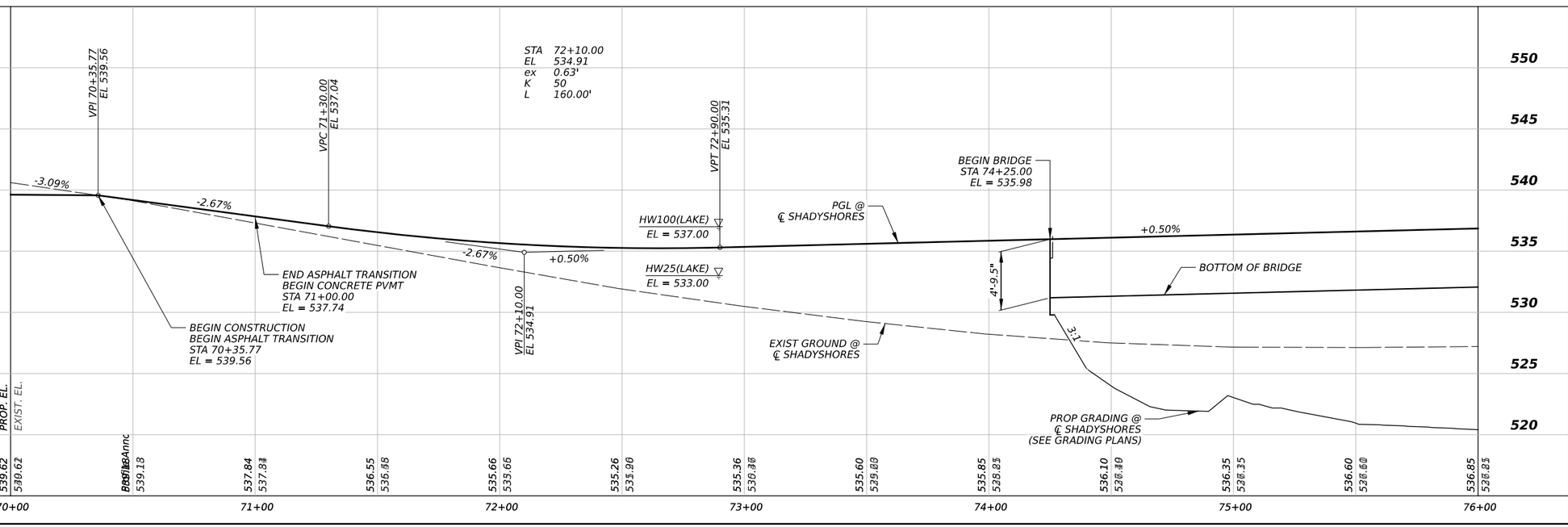
PLAN AND PROFILE SHADY SHORES RD

STA 42+00 TO STA 48+00

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		51





STATE OF TEXAS
DAVID A. BURKETT
100086
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE
SHADY SHORES RD

STA 70+00 TO STA 76+00

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		52

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DW

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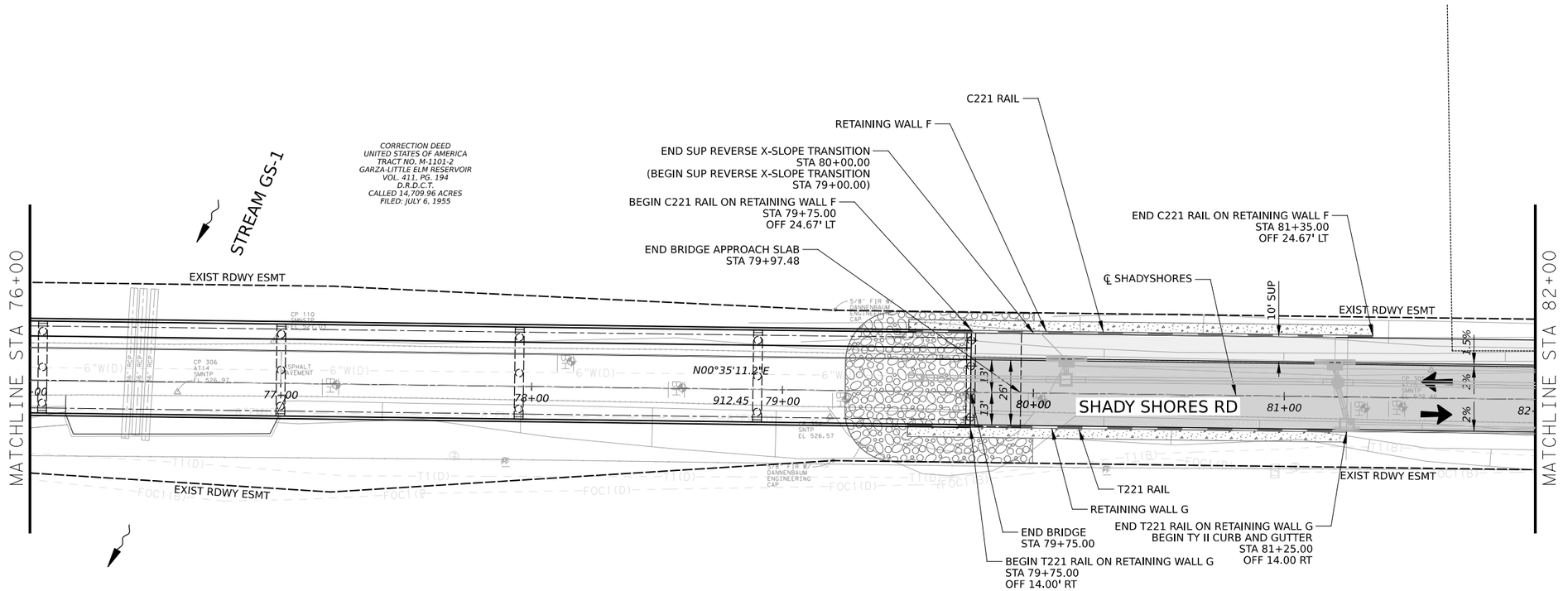
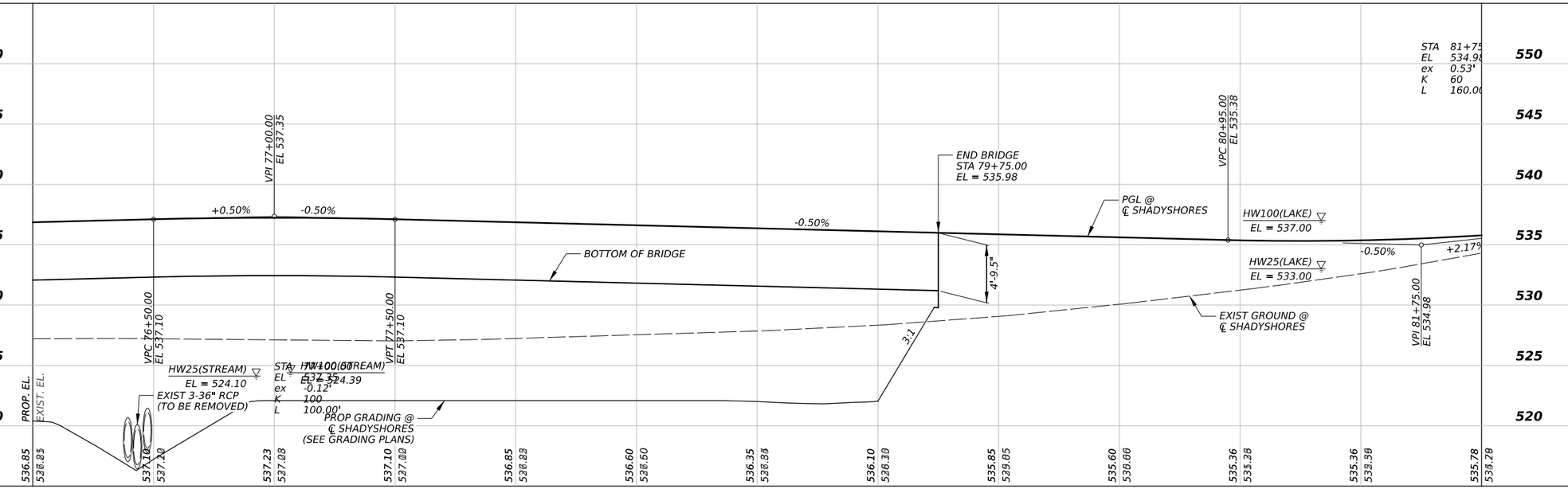


LEGEND

- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.
- MAIN CONCRETE PAVEMENT
- TRANSITION PAVEMENT
- SUP
- DRIVEWAY PAVEMENT
- ROCK RIPRAP

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET



STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

David A. Burkett

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

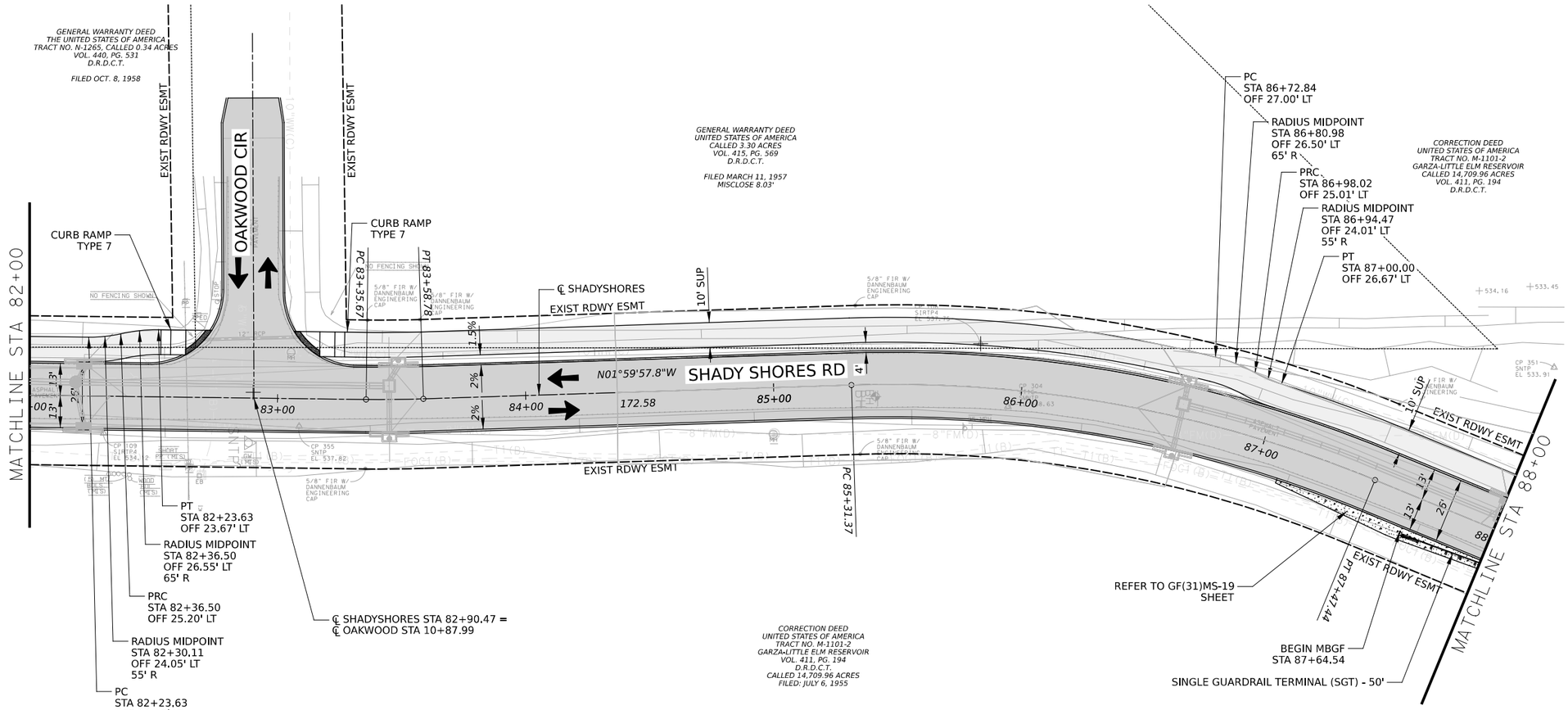
SHADY SHORES

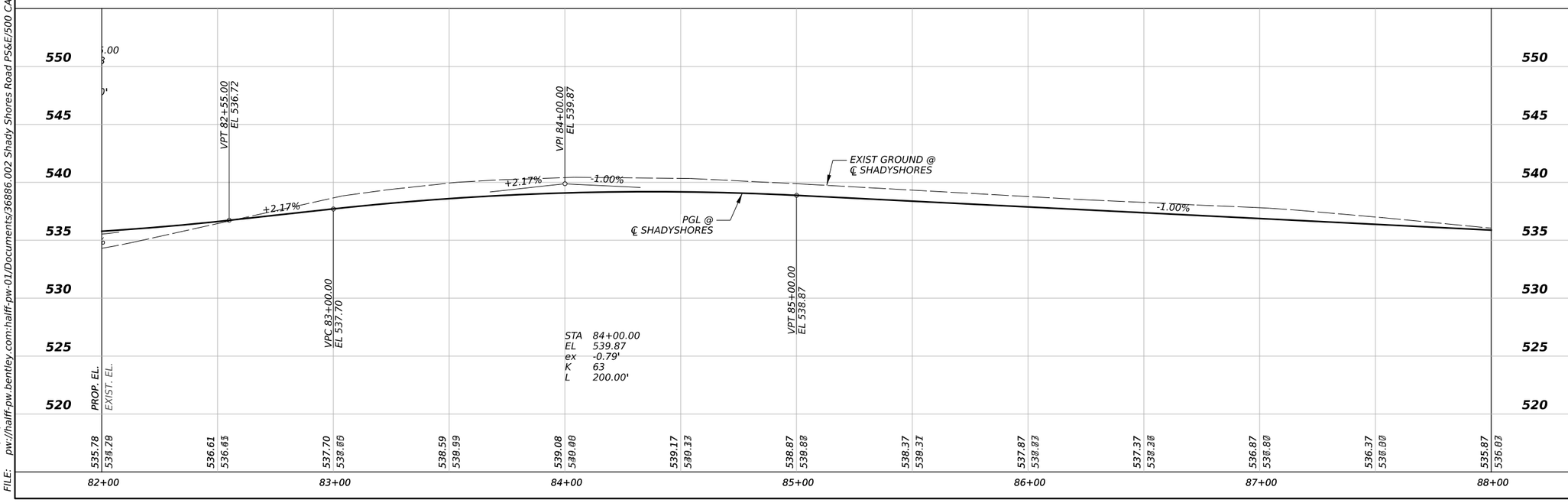
PLAN AND PROFILE
SHADY SHORES RD

STA 76+00 TO STA 82+00

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		53





STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE
SHADY SHORES RD

STA 82+00 TO STA 88+00

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		54

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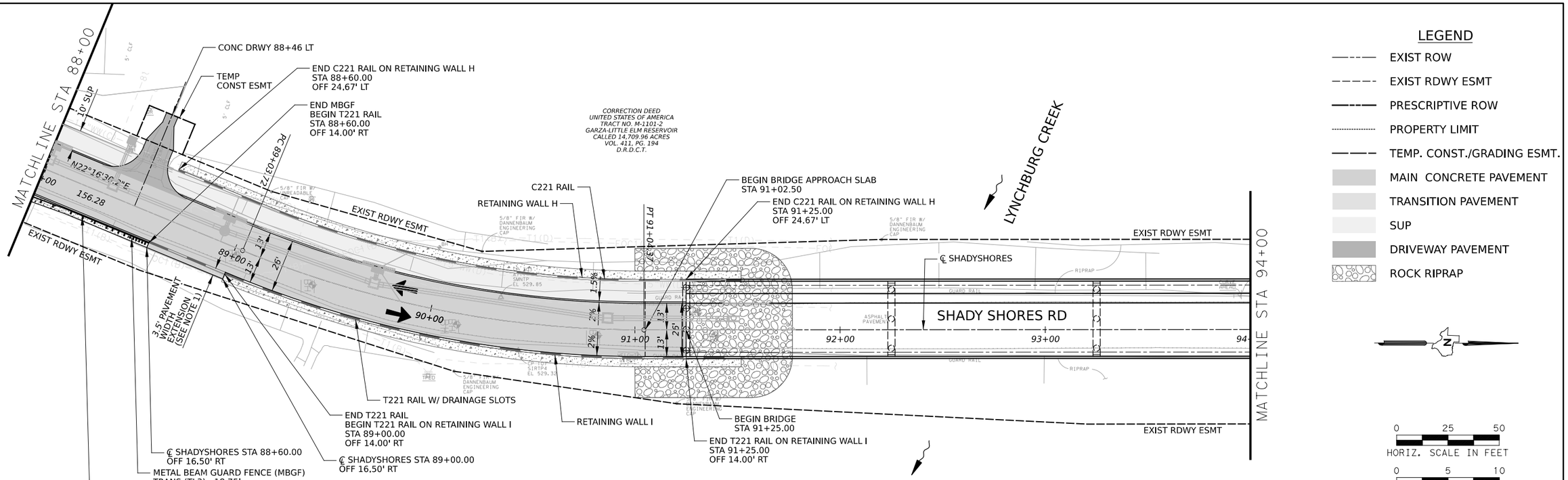
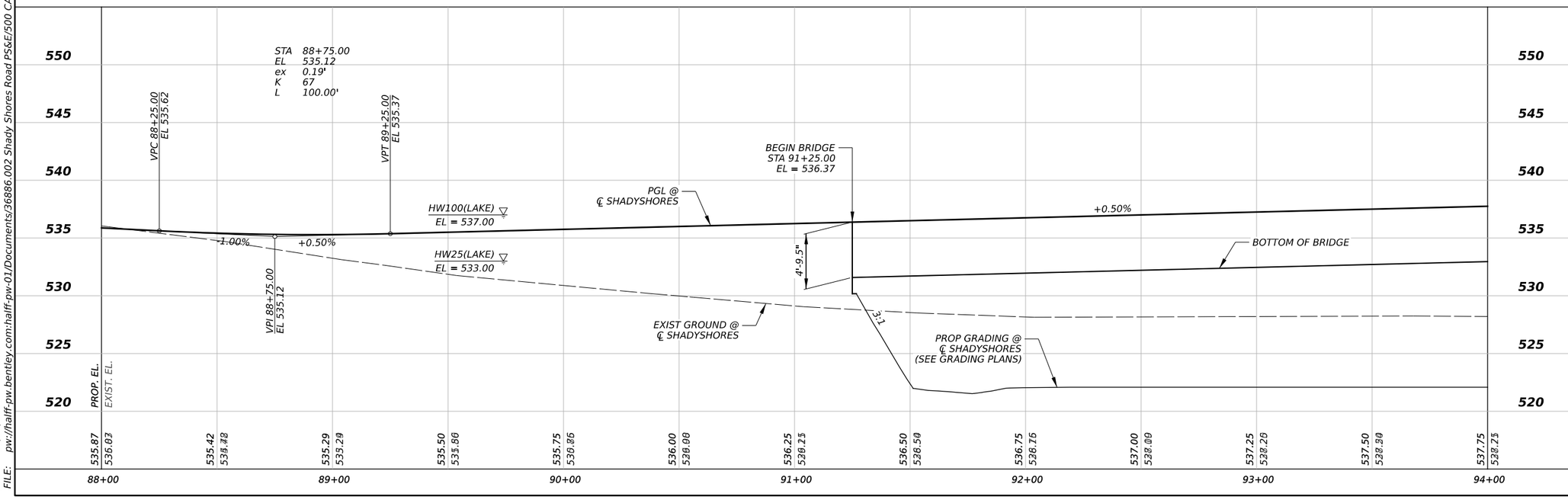


NOTES:
1. 40'X3.5' FULL DEPTH PAVEMENT WING TO ALLOW FOR BARRIER AND ATTENUATOR MOUNT. PAID FOR AS PART OF THE FULL DEPTH ROADWAY PAVEMENT QUANTITIES. NO CURB INSTALLED ON OUTSIDE EDGE.



STATE OF TEXAS
DAVID A. BURKETT
100008
LICENSED PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312
halff
Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE SHADY SHORES RD

STA 88+00 TO STA 94+00

SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		55

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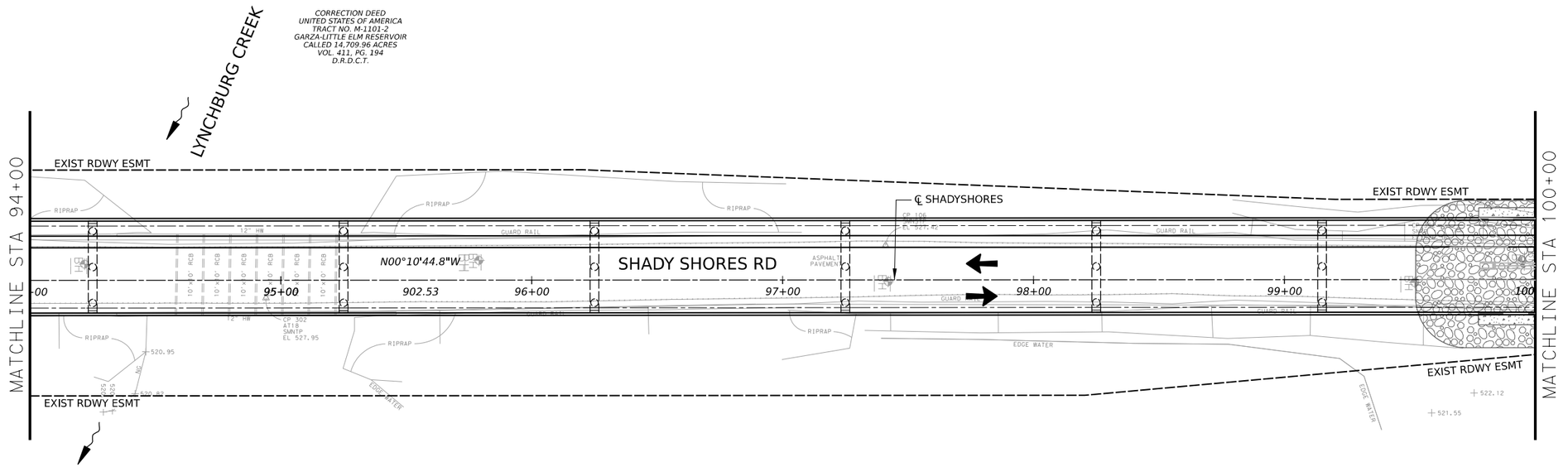


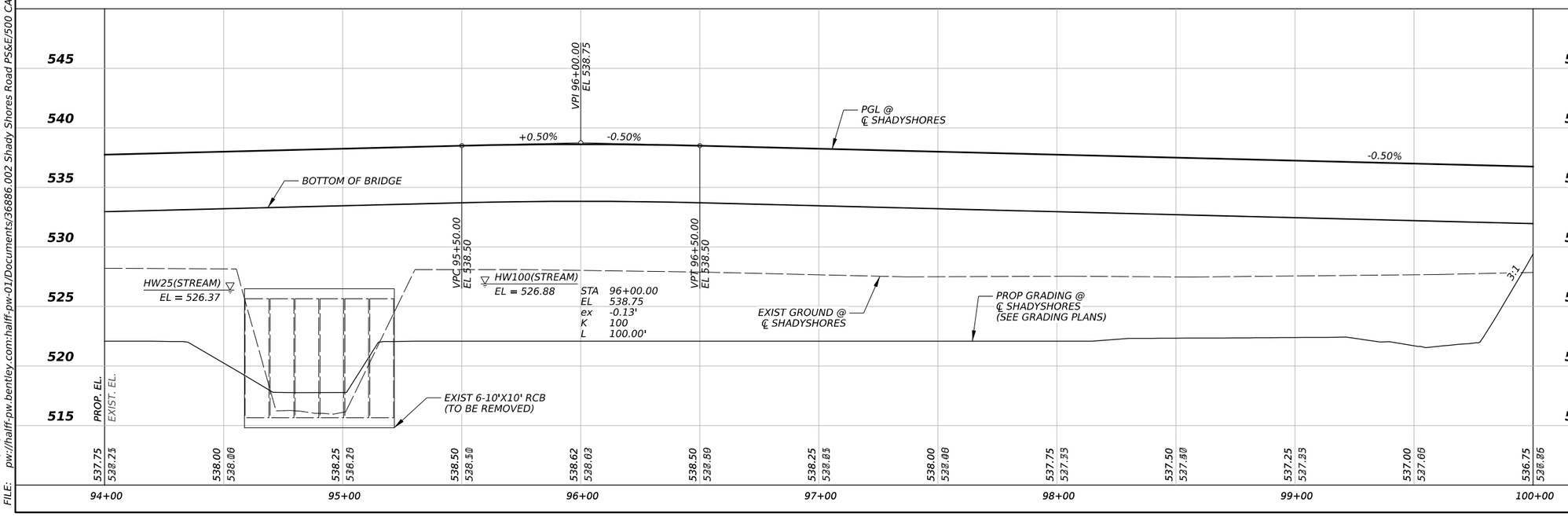
LEGEND

- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.
- MAIN CONCRETE PAVEMENT
- TRANSITION PAVEMENT
- SUP
- DRIVEWAY PAVEMENT
- ROCK RIPRAP

N

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET



DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE
SHADY SHORES RD

STA 94+00 TO STA 100+00

SHEET 7 OF 8

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		56

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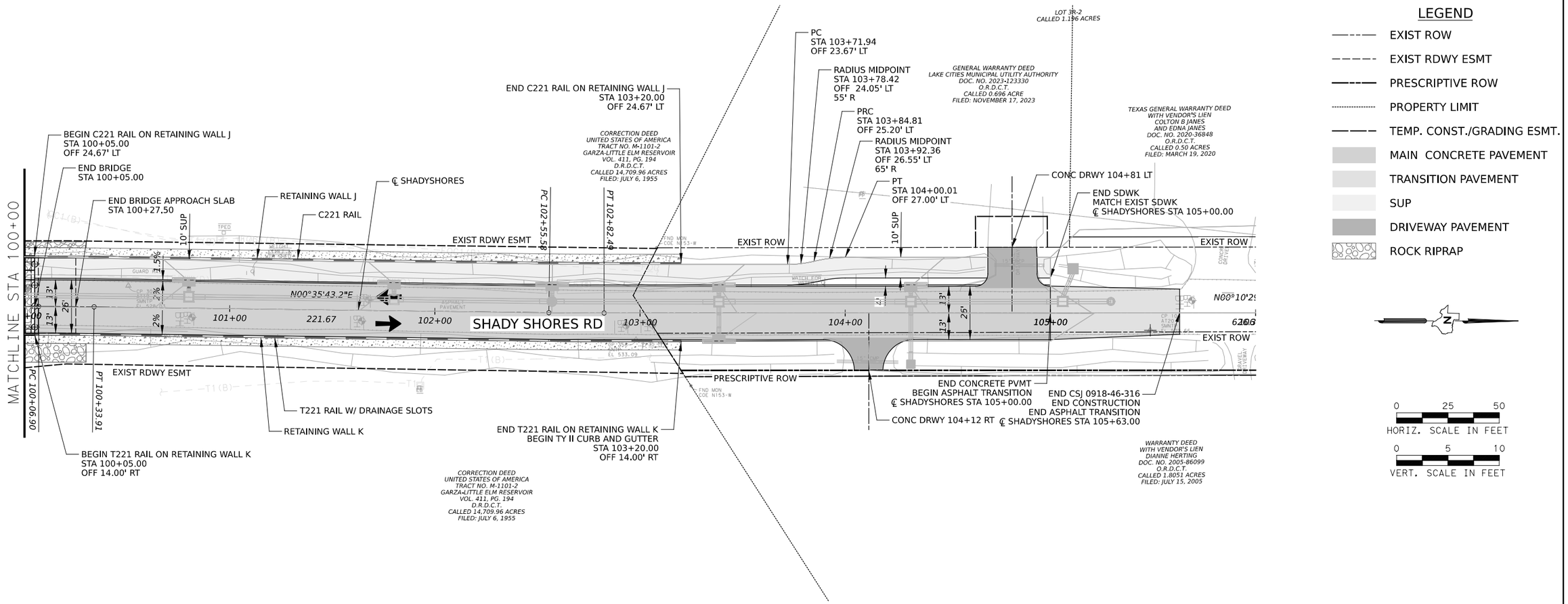

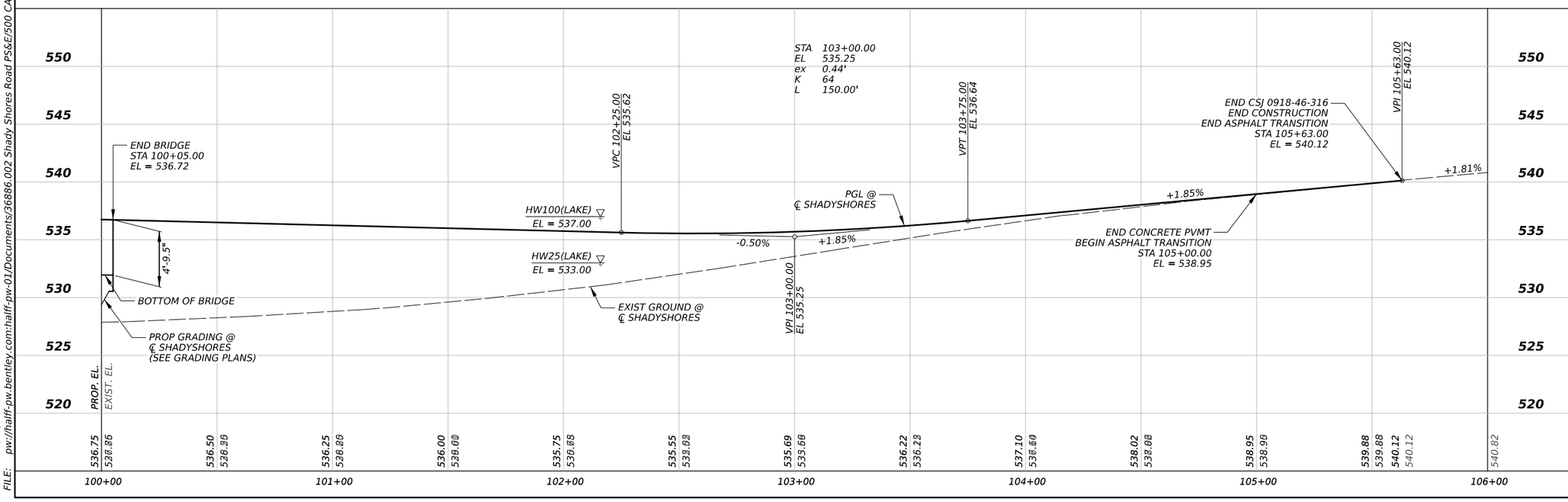

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DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312

halff

Texas Department of Transportation

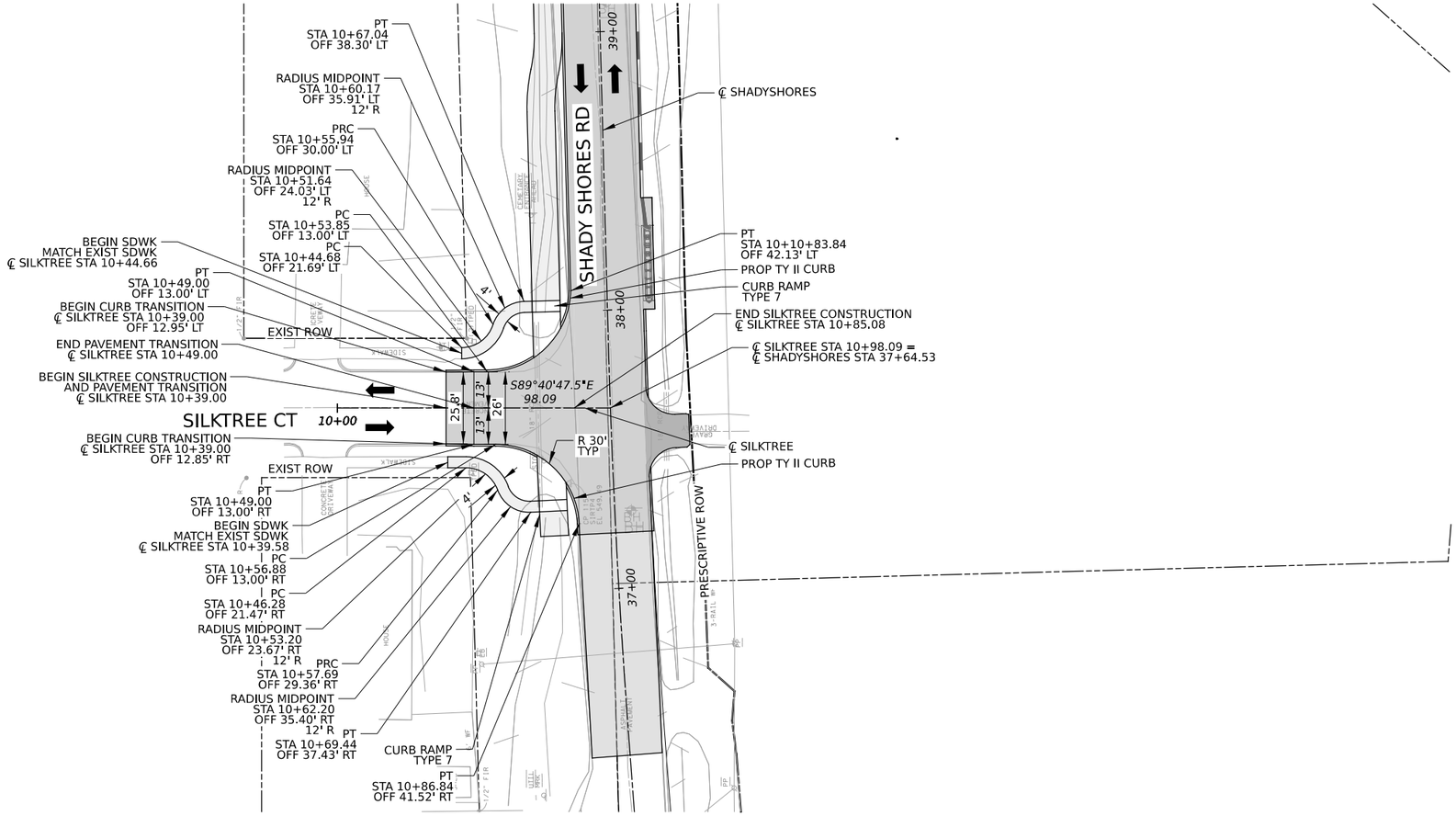
SHADY SHORES

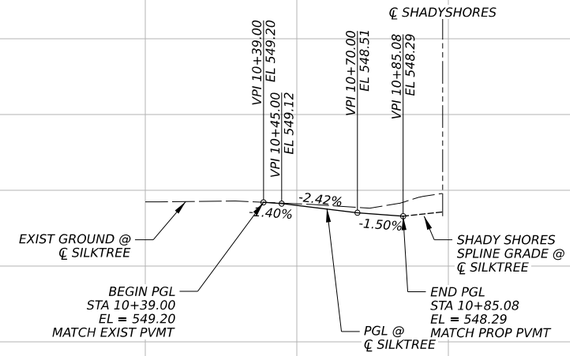
PLAN AND PROFILE
SHADY SHORES RD

STA 100+00 TO END

SHEET 8 OF 8

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		57





PROP. EL.
EXIST. EL.

565 560 555 550 545 540 535 530

549.24 549.20 549.00 549.10

10+00

LEGEND

- EXIST ROW
- EXIST RDWY ESMT
- PRESCRIPTIVE ROW
- PROPERTY LIMIT
- TEMP. CONST./GRADING ESMT.
- MAIN CONCRETE PAVEMENT
- TRANSITION PAVEMENT
- SUP
- DRIVEWAY PAVEMENT
- ROCK RIPRAP

N

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE
SILKTREE CT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		58

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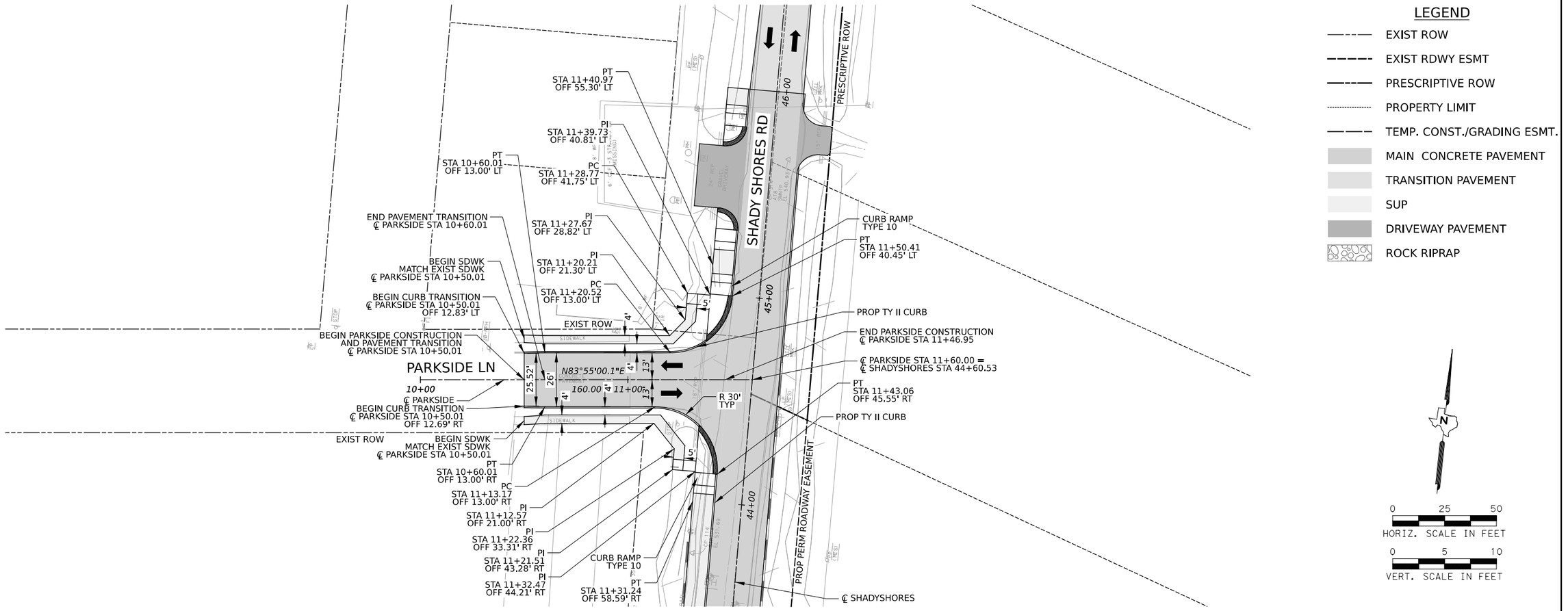

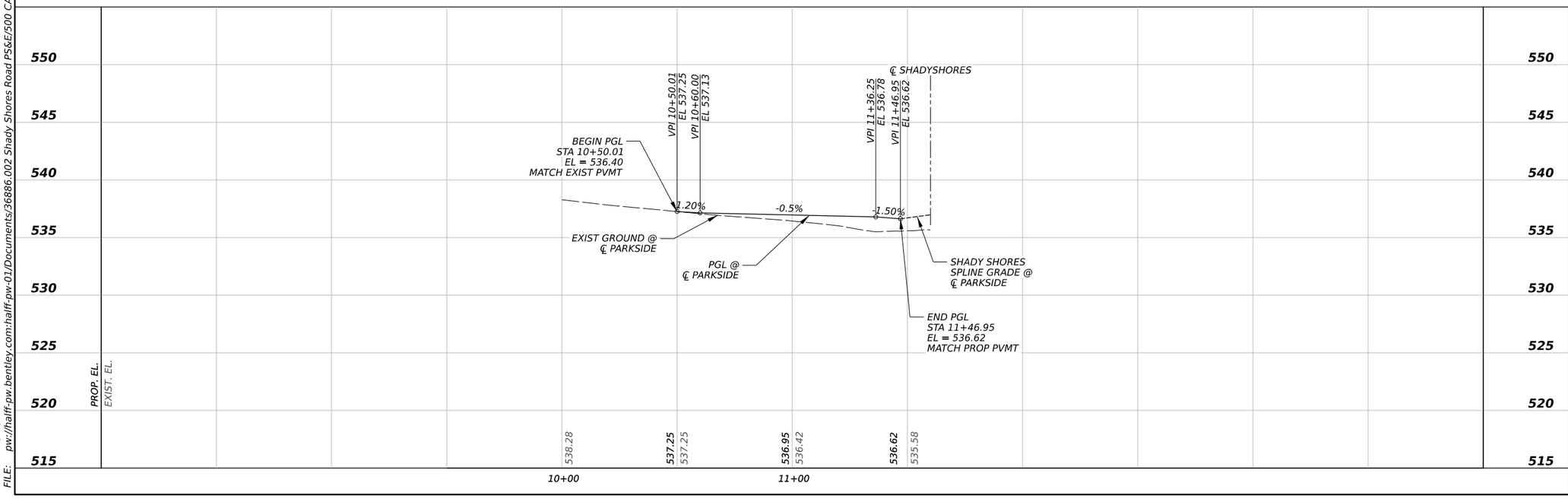

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CK | DW | CK | DW

STATE OF TEXAS
DAVID A. BURKETT
100065
LICENSED
PROFESSIONAL ENGINEER

David A. Burkett
12-01-2025

TBPELS FIRM #312

halff

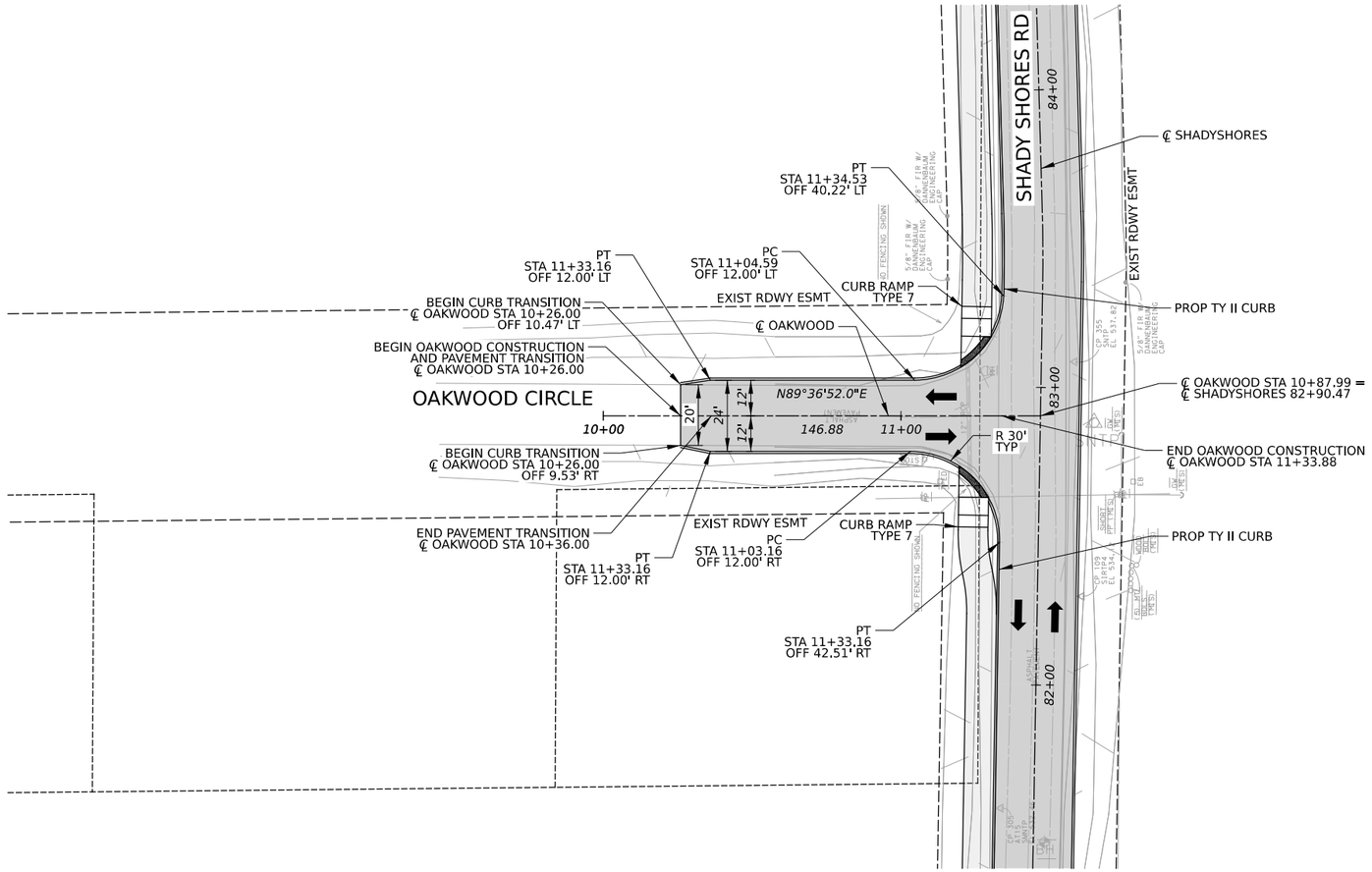
Texas Department of Transportation

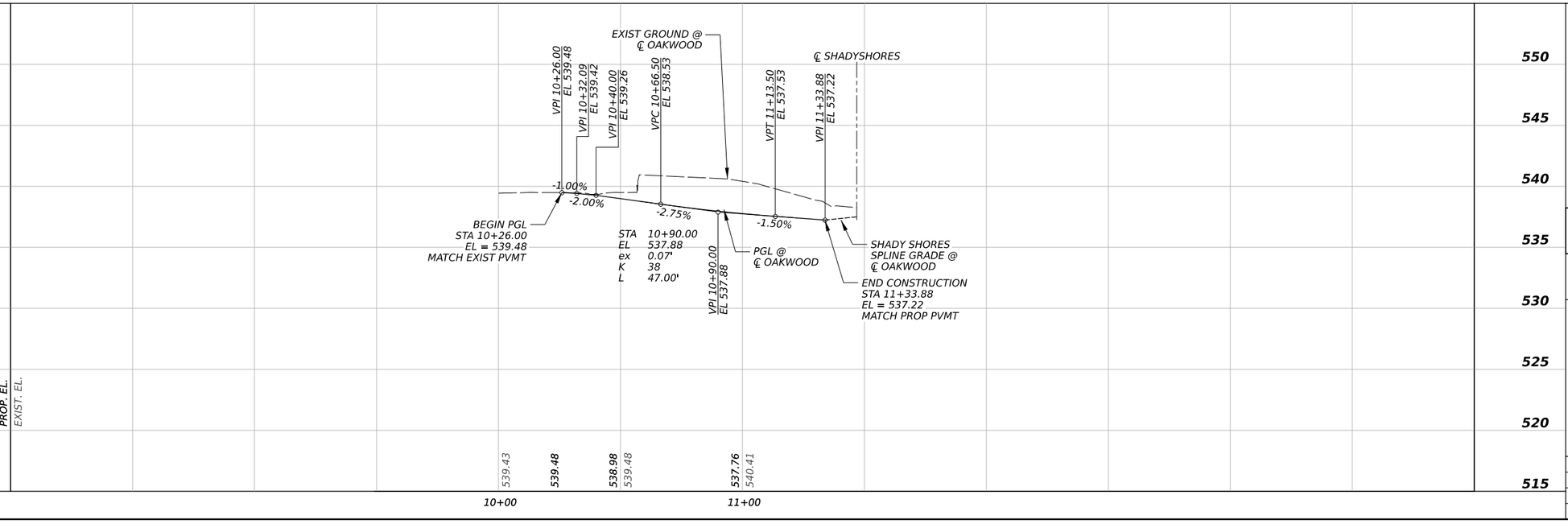
SHADY SHORES

PLAN AND PROFILE
PARKSIDE LN

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		59





STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

PLAN AND PROFILE OAKWOOD CIRCLE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		60

DATE: 11/25/2025 2:29:43 PM
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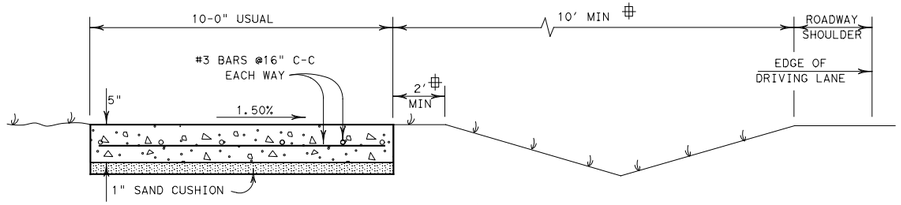
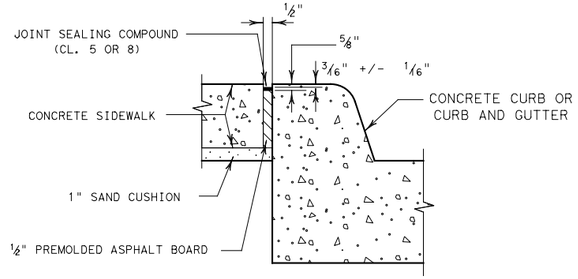


SIDEWALK TO BE 10' MIN. FROM EDGE OF SHOULDER OR 2' MIN. FROM TOP OF DITCH BACK SLOPE, WHICHEVER IS GREATER (10' MIN. FROM EDGE OF SHOULDER IF NO DITCH.)

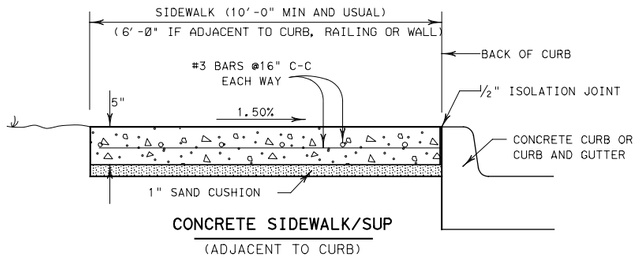
CONCRETE SIDEWALK/SUP
(ROADWAY W/O CURB)



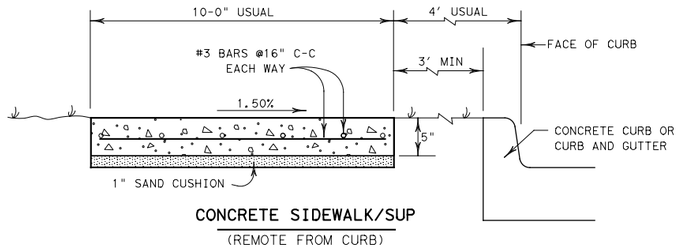
1/2" ISOLATION JOINT
(SIDEWALK ADJACENT TO CURB)

GENERAL NOTES:

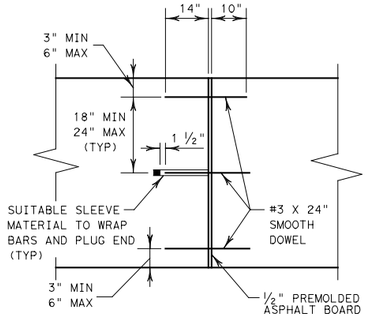
1. CONCRETE FOR SPECIAL CONCRETE SIDEWALK W/ INTEGRATED RETAINING WALL SHALL BE CLASS "C". ALL OTHER CONCRETE SIDEWALK SHALL BE CLASS "A".
2. ALL REINFORCING STEEL SHALL BE GRADE 60, # 4 BARS UNLESS OTHERWISE INDICATED.
3. SEE PLAN SHEETS FOR LOCATIONS OF SIDEWALKS AND RETAINING WALLS.
4. LONGITUDINAL SLOPE OF SIDEWALKS SHALL NOT EXCEED 5% EXCEPT IN CASES WHERE THE ADJACENT ROADWAY SLOPE EXCEEDS 5%. IF ROADWAY SLOPE EXCEEDS 5%, LONGITUDINAL SLOPE OF SIDEWALK MAY MATCH THAT OF ROADWAY.
5. IF SIDEWALK WIDTH IS LESS THAN 5', PROVIDE 5' X 5' PASSING AREAS AT INTERVALS NOT TO EXCEED 200' SPACING.
6. RETAINING WALL WILL BE SUBSIDIARY TO THE ITEM, "CONC SIDEWALKS (SPECIAL) (TYPE A)" OR "CONC SIDEWALKS (SPECIAL)(TYPE B)", WITH LIMITS OF PAY AS SHOWN.
7. SURFACE TREATMENT OF RETAINING WALL FACE DETAILED ELSEWHERE IN THE PLANS.
8. SEE PED STANDARDS FOR TREATMENT AT INTERSECTIONS AND CROSSWALKS.



CONCRETE SIDEWALK/SUP
(ADJACENT TO CURB)



CONCRETE SIDEWALK/SUP
(REMOTE FROM CURB)



TRANSVERSE EXPANSION JOINT

CONCRETE SIDEWALK DETAILS
N.T.S.

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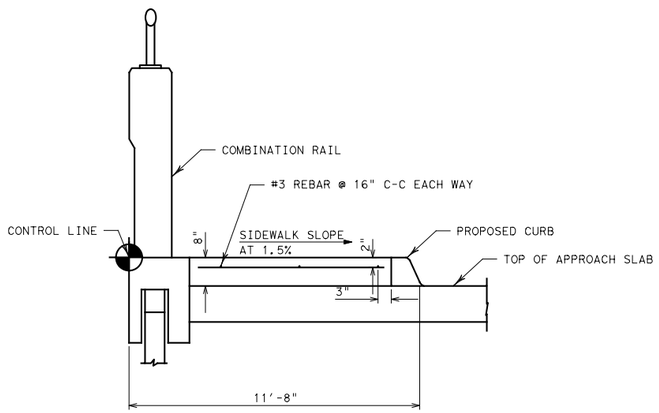

TYPICAL SIDEWALK ADJACENT TO RETAINING WALL
N.T.S.

GENERAL NOTES:

1. REFER TO C221 AND RW(TRF) STANDARD FOR ADDITIONAL INFORMATION.
2. QUANTITY FOR SIDEWALKS ON THE APPROACH SLAB IS INCLUDED WITH PAY ITEM 422-7014 APPROACH SLAB (HPC).
3. TRANSITION FROM 5-3/4" CURB TO 8" CURB OCCURS ACROSS SIDEWALK PANEL ADJACENT TO APPROACH SLAB, ADDITIONAL CONCRETE FOR CURB IS SUBSIDIARY TO PAY ITEM 529-7002.

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

David A. Burkett
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

CONCRETE SIDEWALK/SUP DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		61

DATE: 11/25/2025 2:30:01 PM
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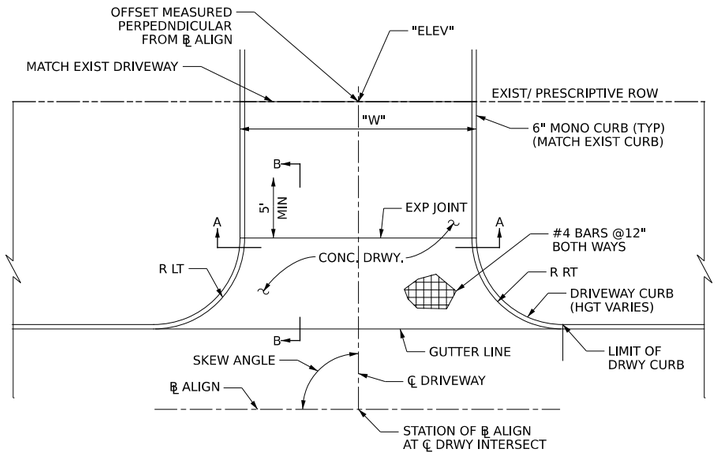
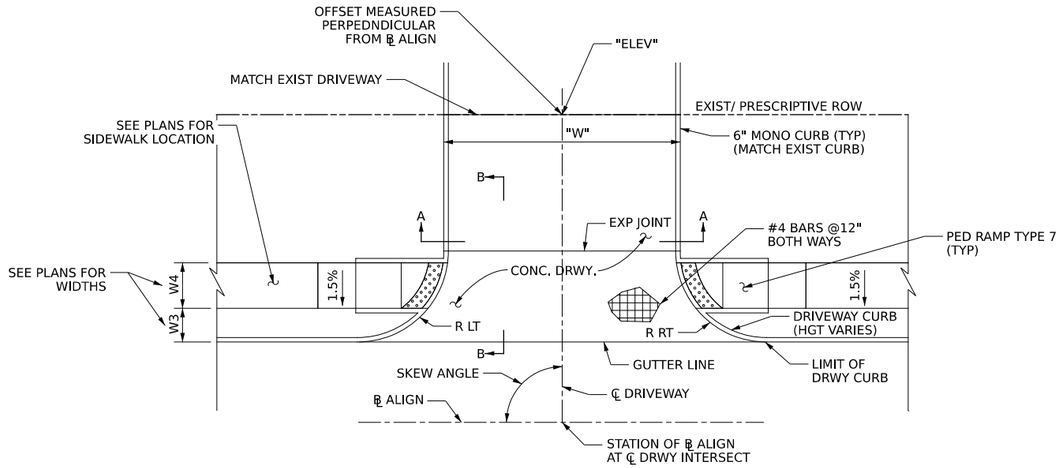
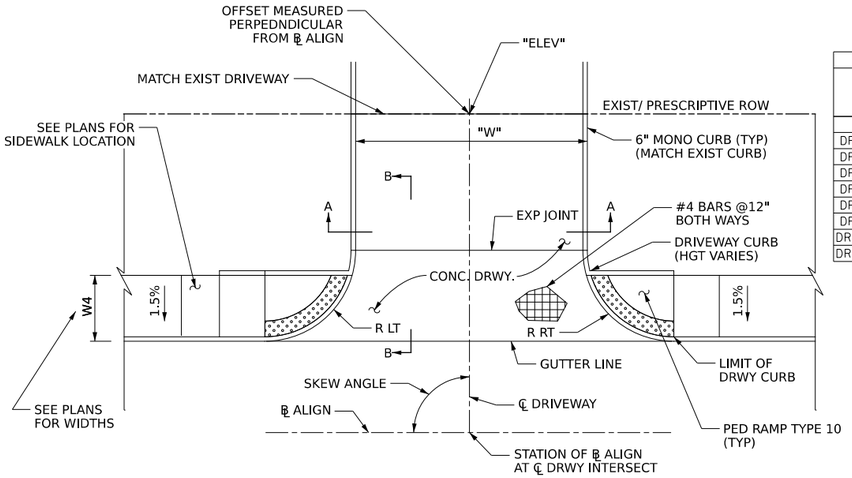


PLAN
PROPOSED CONCRETE DRIVEWAY DETAIL
CURB AND GUTTER - W/O SIDEWALK
N.T.S.



PLAN
PROPOSED CONCRETE DRIVEWAY DETAIL
CURB AND GUTTER - WITH SIDEWALK SET BACK FROM CURB
N.T.S.

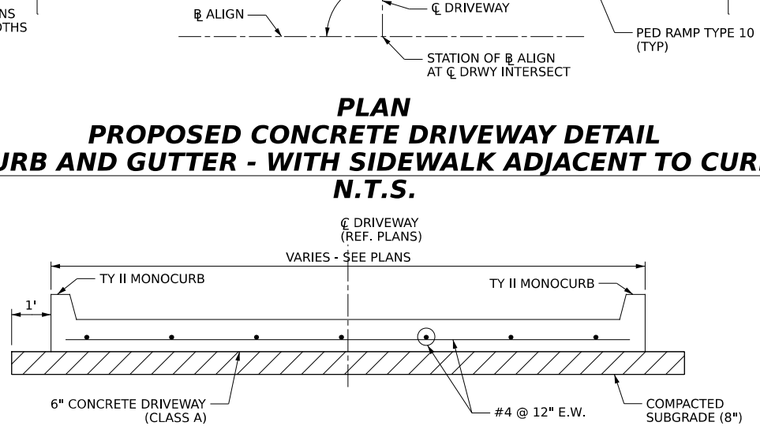


PLAN
PROPOSED CONCRETE DRIVEWAY DETAIL
CURB AND GUTTER - WITH SIDEWALK ADJACENT TO CURB
N.T.S.

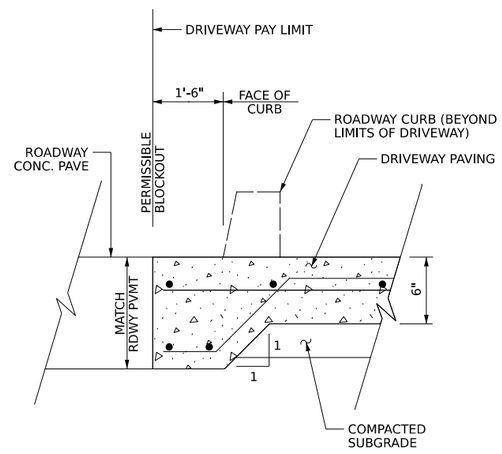
DRIVEWAY GEOMETRIC TABLE

ID	BEGIN DRIVEWAY			END DRIVEWAY			SKEW ANGLE	W LT	W RT	R LT	R RT	CURB
	DRIVEWAY STATION	ROADWAY STATION	ROADWAY OFFSET	DRIVEWAY STATION	ROADWAY STATION	ROADWAY OFFSET	DEG	LF	LF	LF	LF	Y/N
DRWY 37+56 RT	10+13.00	37+56.08	13.00	10+28.00	37+56.08	28.00	90°00'00"	5.43	5.43	10	10	N
DRWY 45+56 LT	10+55.87	45+56.78	13.00	10+33.87	45+56.78	35.00	90°00'00"	15.00	15.00	10	10	N
DRWY 45+78 RT	10+13.00	45+78.60	13.00	10+28.00	45+78.60	28.00	90°00'00"	6.09	6.09	10	10	N
DRWY 70+65 LT	10+49.56	70+65.04	13.05	10+26.60	70+74.77	32.00	90°00'00"	9.90	9.90	15	10	N
DRWY 70+68 RT	10+10.05	70+68.57	10.05	10+28.00	70+68.57	28.00	90°00'00"	9.09	9.09	30	30	N
DRWY 88+46 LT	10+52.26	88+46.81	13.00	10+17+26	88+46.81	48.00	90°00'00"	3.00	3.00	15	15	N
DRWY 104+12 RT	10+13.00	104+11.51	13.00	10+28.00	104+11.51	28.00	90°00'00"	7.00	7.00	15	15	N
DRWY 104+81 LT	10+53.35	104+81.36	13.00	10+34.42	104+81.36	32.00	90°00'00"	11.83	11.83	6	6	N

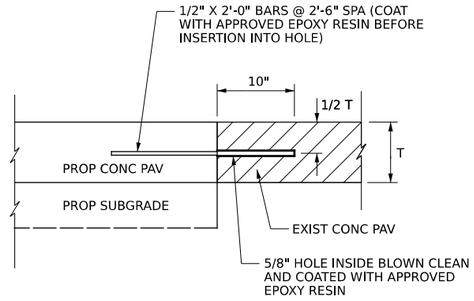
NOTE:
1. SEE DRIVEWAY DETAILS SHEET 2 OF 2 FOR ADDITIONAL INFORMATION.
2. SEE SPECIAL DRIVEWAY P&P SHEETS FOR ADDITIONAL INFORMATION.



SECTION A-A
CONCRETE DRIVEWAY DETAIL
N.T.S.



SECTION B-B
N.T.S.



ANCHOR JOINT DETAIL
N.T.S.

TO BE USED WHERE PROPOSED CONCRETE PAVEMENT MEETS EXISTING CONCRETE PAVEMENT

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

DRIVEWAY DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		62

DATE: 11/25/2025 2:30:18 PM
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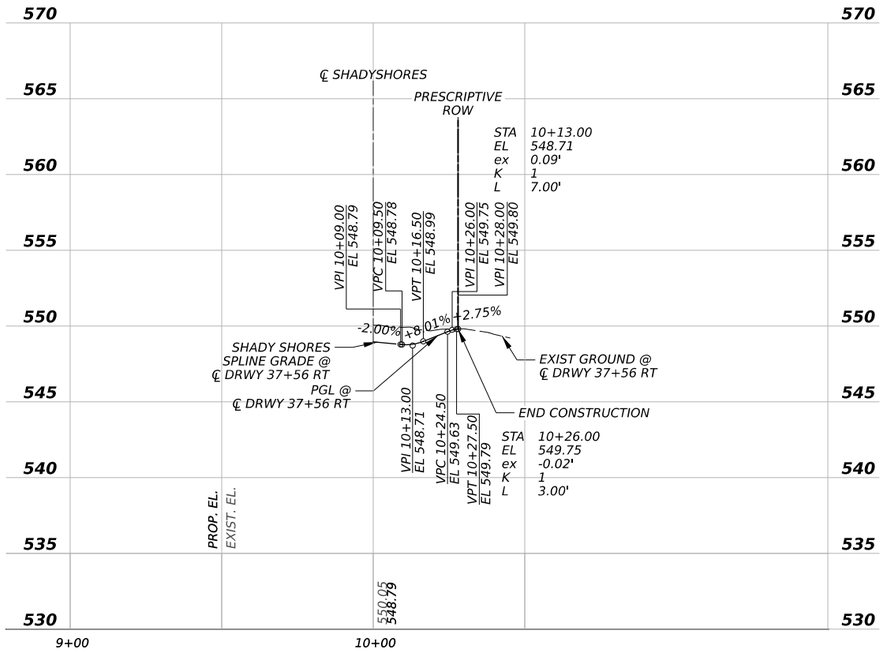
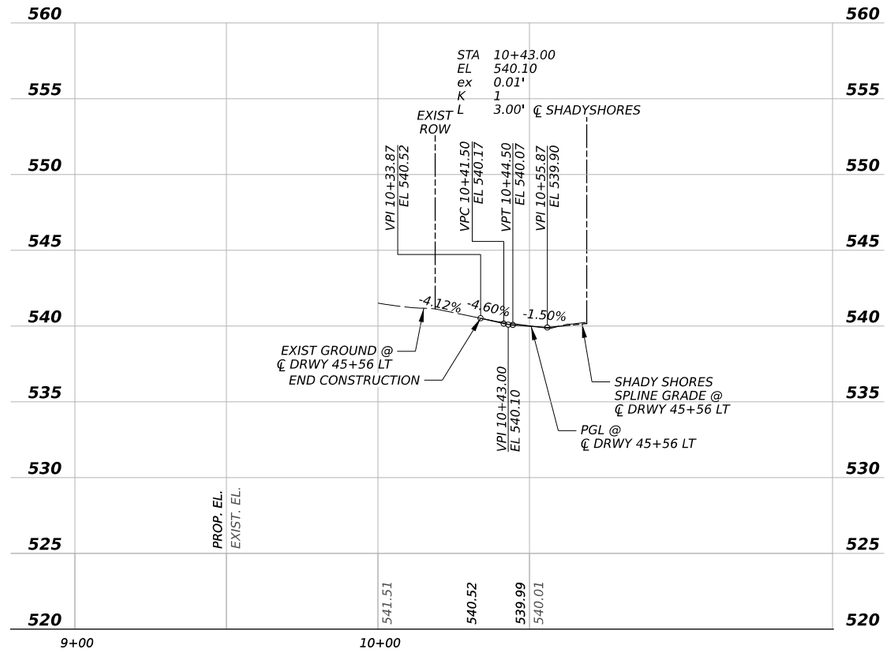
CK DW CK DW



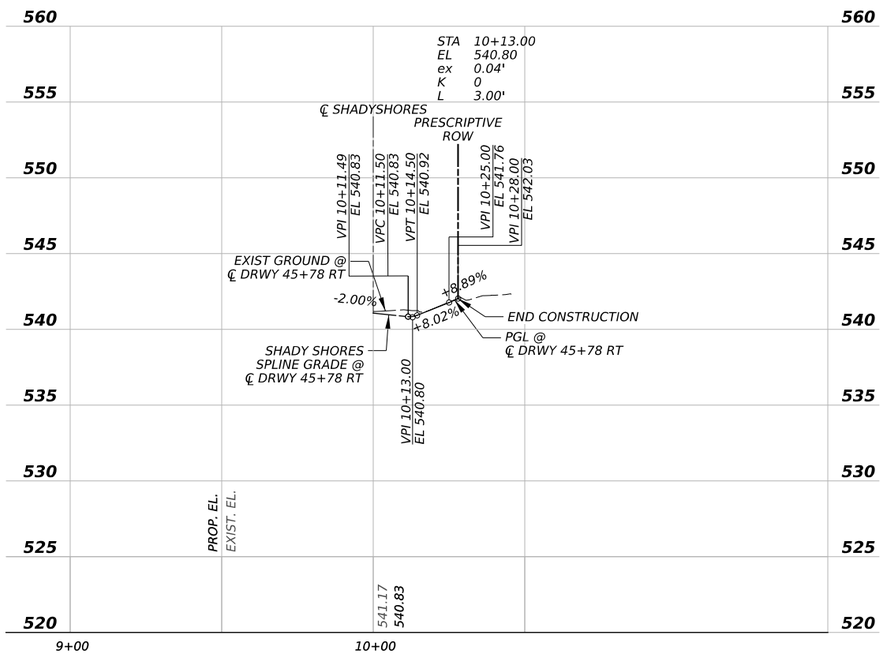
DRWY 37+56 RT



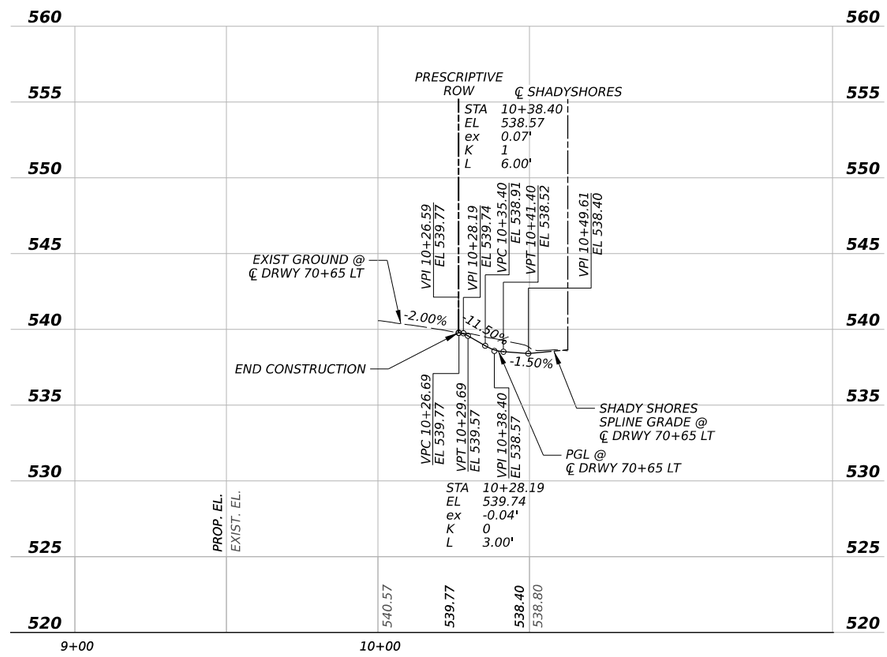
DRWY 45+56 LT

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET



DRWY 45+78 RT



DRWY 70+65 LT

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

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SHADY SHORES

DRIVEWAY PROFILES

SHEET 1 OF 2

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		63

DATE: 11/25/2025 2:30:38 PM
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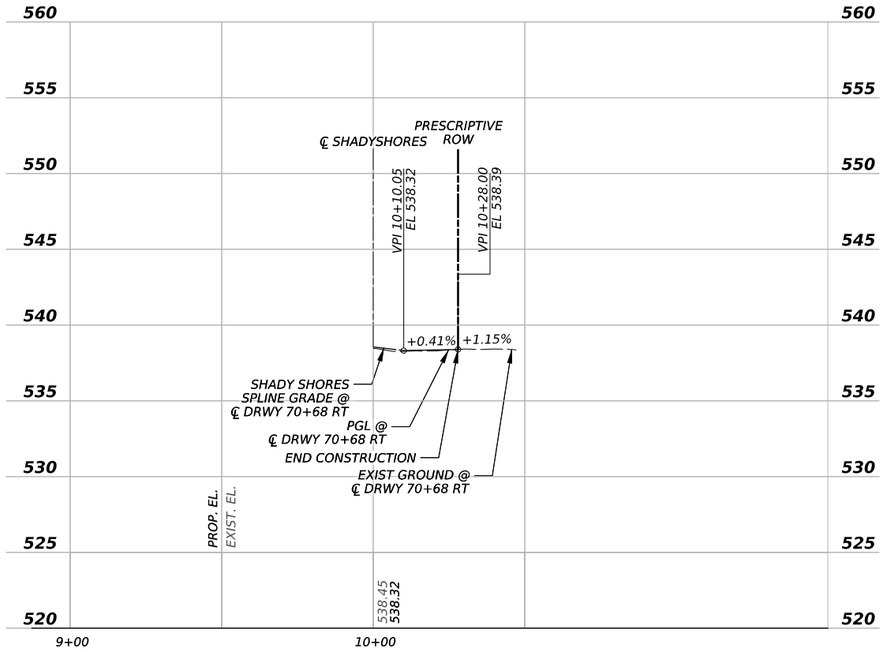
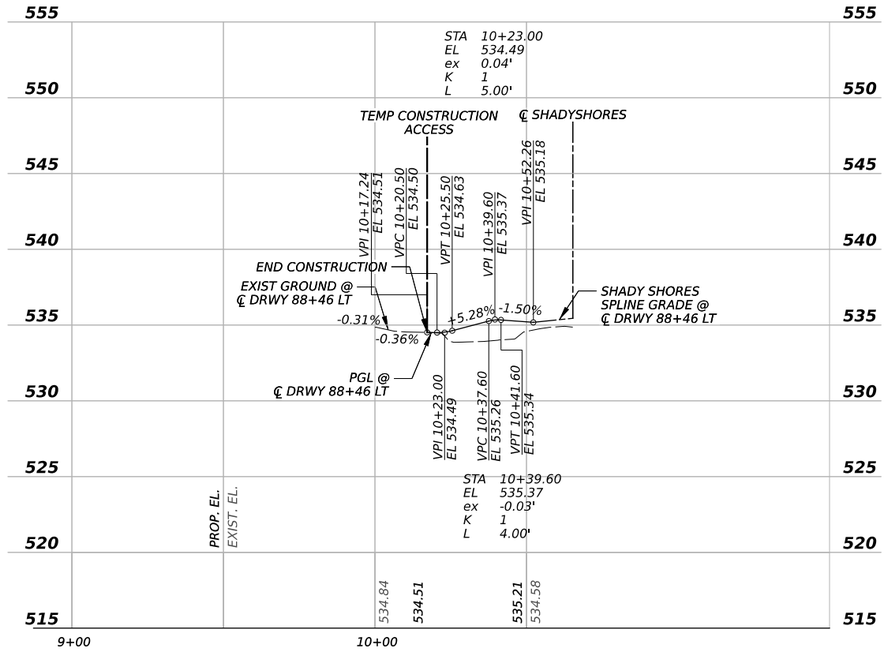
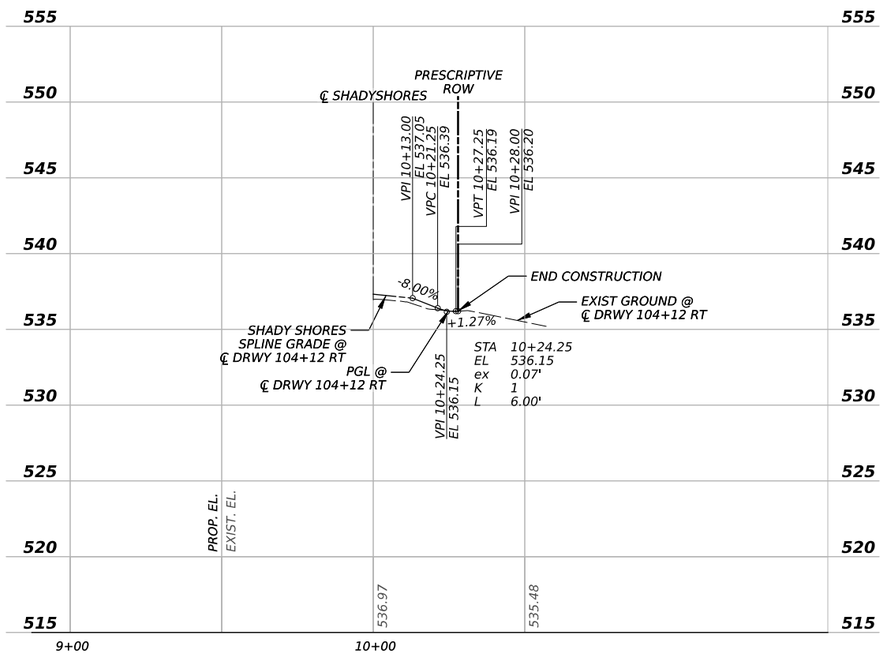
DW: CK: DW: CK:



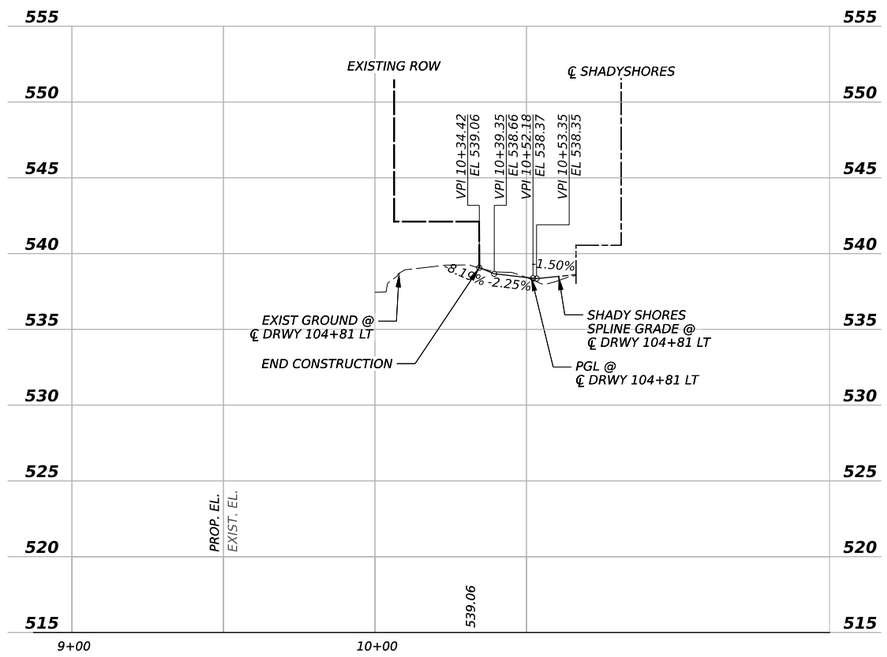
DRWY 70+68 RT



DRWY 88+46 LT



DRWY 104+12 RT



DRWY 104+81 LT

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

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Texas Department of Transportation

SHADY SHORES

DRIVEWAY PROFILES

SHEET 2 OF 2

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		64

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CK DW CK DW

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	P1	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/11/23
CSJ	0918-46-316	Station	37+27.74	Grnd. Elev.	550.52 ft
		Offset	5.99' 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
550.3			ASPHALT, 1.5 inches							
550.1			BASE, 3 inches							
			SAND, compact; reddish tan, light brown; trace oxide stains; silty (SM)							
						9.2				P.P. = 4.5+
						8.4	NP	NP	101.3	P.P. = 4.5+, -#200: 34.9
						10.7				P.P. = 4.5+
						15.0				P.P. = 3.0, -#200: 23.6
										P.P. = 0.25
540.5						7.9	NP	NP		SPT MOD: 39, 50 = 3" (50), -#200: 22.0

Remarks: N 7100956.5840, E 2418842.2250
-dry during drilling
-dry at completion
-SPT modified with 170 lb hammer and a 24" drop height

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	P2	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/19/23
CSJ	0918-46-316	Station	40+64.78	Grnd. Elev.	530.57 ft
		Offset	0.92' 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
530.0			ASPHALT, 7.5 inches							
529.5			BASE, 6 inches							
			CLAY, very stiff; gray, light brown; trace to few oxide stains (CH)			6.2				P.P. = 4.5+; Sulfate PPM = 140
						15.4	60	39	113.0	P.P. = 4.5+, -#200: 96.3
524.6			CLAY, very stiff; gray, light brown; trace to few oxide stains; with sand (CL)			12.3				P.P. = 4.5+, -#200: 94.7
						12.2	43	22		P.P. = 4.5+, -#200: 71.3
520.6						11.1				P.P. = 4.5+

Remarks: N 7101293.3000, E 2418829.4060
-dry during drilling
-dry at completion

Driller: Kevin Kavadas (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
GEOTEX FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
PAVEMENT

SHEET 1 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		65

DATE: 11/25/2025 2:31:15 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-01.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	P3	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
CSJ	0918-46-316	Station	46+99.14	Grnd. Elev.	544.18 ft
		Offset	8.20' 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
544.1			ASPHALT, 2.5 inches							
543.8			BASE, 3 inches							
1			CLAY, very stiff; reddish brown, light brown; trace ferrous nodules and oxide stains; sandy (CL)							P.P. = 4.5+
2						11.5	34	15		P.P. = 4.5+, -#200: 57.4
3										
4						9.7				P.P. = 4.5+; Sulfate PPM = 160
5										
6						9.6	37	19	131.1	P.P. = 4.5+, -#200: 55.6
7										
8						10.2				P.P. = 4.5+
9										
534.2 10						16.0				P.P. = 4.5+, -#200: 55.4
11										
12										
13										
14										
15										

Remarks: N 7101927.6670, E 2418823.3980
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	P4	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
CSJ	0918-46-316	Station	70+62.97	Grnd. Elev.	538.49 ft
		Offset	3.35' 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
538.3			ASPHALT, 2.5 inches							
538.0			BASE, 4 inches							
1			CLAY, very stiff; reddish brown, light gray, light brown; few to little ferrous nodules and oxide stains; sandy (CL)							Sulfate PPM = 180
2						11.4				P.P. = 4.5+
3										
4						9.6	30	13	110.0	P.P. = 4.5+, -#200: 66.2
5										
6						10.3				P.P. = 4.5+, -#200: 74.9
7										
8						10.3				P.P. = 4.5+
9										
528.5 10						10.7	37	19		P.P. = 4.5+, -#200: 64.9
11										
12										
13										
14										
15										

Remarks: N 7104291.0100, E 2418806.9820
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
PAVEMENT

SHEET 2 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		66

DATE: 11/25/2025 2:31:42 PM
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DRILLING LOG

1 of 1

WinCore Version 3.1	County	Denton	Hole	P5	District	Dallas
	Highway	Shady Shores Road	Structure	Pavement	Date	10/19/23
	CSJ	0918-46-316	Station	75+55.40	Grnd. Elev.	526.85 ft
			Offset	9.21' LT	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
526.7			ASPHALT, 2.5 inches							
			BASE, 6.5 inches							
526.1			CLAY, stiff; light brown, reddish brown; trace ferrous nodules; sandy (CL)							
						5.7				P.P. = 3.0
						18.1	37	26		P.P. = 1.5; Sulfate PPM = 160, -#200: 69.6
520.9			SAND, loose to slightly compact; reddish tan, gray; silty (SM)			19.2				P.P. = 2.0
						9.8	NP	NP	114.3	P.P. = 1.0, -#200: 40.3
516.9						15.3				P.P. = 1.75, -#200: 39.3

Remarks: N 7104783.5680, E 2418796.5140
-dry during drilling
-dry at completion

Driller: Kevin Kavadas (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

1 of 1

WinCore Version 3.1	County	Denton	Hole	P6	District	Dallas
	Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
	CSJ	0918-46-316	Station	80+62.66	Grnd. Elev.	530.19 ft
			Offset	3.09' 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
530.0			ASPHALT, 2.5 inches							
			BASE, 6.5 inches							
529.4			SAND, slightly compact; reddish brown, brown; trace ferrous nodules and cemented sand fragments; silty; clayey (SC-SM)			7.2	20	7		P.P. = 4.0; Sulfate PPM = 160, -#200: 30.1
526.2			SAND, slightly compact to compact; reddish brown, brown; trace ferrous nodules and cemented sand fragments (SC)			11.8				P.P. = 4.5+
						11.1	24	10	119.5	P.P. = 4.5+, -#200: 42.3
						5.3				P.P. = 4.5+
520.2						8.9				P.P. = 0.25, -#200: 36.9

Remarks: N 7105290.6780, E 2418814.0150
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
PAVEMENT

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		67

DATE: 11/25/2025 2:32:10 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-03.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	P7	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/20/23
CSJ	0918-46-316	Station	85+41.02	Grnd. Elev.	539.16 ft
		Offset	4.88' 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
538.9			ASPHALT, 4.5 inches							
538.6			BASE, 3 inches							
			CLAY, very stiff; gray, reddish tan; few to little ferrous nodules and oxide stains; with sand; clayey sand inclusion at 8 feet (CL)			15.9				P.P. = 4.5+; Sulfate PPM = 120
						11.2	36	20	121.0	P.P. = 4.5+, -#200: 71.5
						11.1				P.P. = 4.5+
						9.8				P.P. = 4.5+, -#200: 25.6
529.2						12.9	39	23		P.P. = 4.5+, -#200: 81.5

Remarks: N 7105769.0210, E 2418812.0360
-dry during drilling
-dry at completion

Driller: Kevin Kavadas (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	P8	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
CSJ	0918-46-316	Station	90+13.71	Grnd. Elev.	530.41 ft
		Offset	5.47' 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
530.2			ASPHALT, 2.5 inches							
			BASE, 6 inches							
529.6			CLAY, very stiff; reddish brown, light brown; trace ferrous nodules and oxide stains; sandy (CL)			9.8				P.P. = 4.5; Sulfate PPM = 120
						10.7	39	23		P.P. = 4.5, -#200: 63.8
						13.7				P.P. = 4.5
522.4			CLAY, very stiff; reddish brown, brown; trace ferrous nodules and oxide stains (CL)			17.8				P.P. = 4.5, -#200: 95.2
520.4						17.0	45	26		P.P. = 4.25, -#200: 91.8

Remarks: N 7106219.5350, E 2418940.2640
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025
STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
Mark G. Thomas
GEOTEX ENGINEERING TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
PAVEMENT

SHEET 4 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		68

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DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	P9	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
CSJ	0918-46-316	Station	95+78.96	Grnd. Elev.	527.87 ft
		Offset	7.90' LT	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
527.7			ASPHALT, 2.5 inches							
			BASE, 6.5 inches							
527.1			CLAY, very stiff; dark brown, brown; sandy, silty (CL-ML)			22.2	26	6		P.P. = 4.5+; Sulfate PPM = 160, -#200: 56.9
523.9			SILT, soft to stiff; dark brown, brown; sandy (ML)			11.1				P.P. = 4.0
						12.3	NP	NP	118.4	P.P. = 1.75, -#200: 57.8
						19.8				P.P. = 0.5
519.1			CLAY, soft; dark brown, brown; with silt seams (CL) (CL)							
517.9						22.8				P.P. = 1.25, -#200: 50.1

Remarks: N 7106785.2540, E 2418933.2200
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	P10	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
CSJ	0918-46-316	Station	100+81.73	Grnd. Elev.	528.29 ft
		Offset	4.50' 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
528.1			ASPHALT, 2.5 inches							
			BASE, 4.5 inches							
527.5			SAND, compact; reddish brown, light brown; trace ferrous nodules and cemented sand fragments; clayey (SC)			18.6				P.P. = 4.5+; Sulfate PPM = 120
						9.5	22	10	113.6	P.P. = 4.5+, -#200: 41.6
						9.0				P.P. = 4.5+
520.3			CLAY, soft to very stiff; reddish brown, brown; trace ferrous nodules; sandy (CL)			11.2				P.P. = 4.5+, -#200: 46.0
518.3						15.1	30	16		P.P. = 1.0, -#200: 56.1

Remarks: N 7107287.9990, E 2418944.8760
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
PAVEMENT

SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		69

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DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	P11	District	Dallas
Highway	Shady Shores Road	Structure	Pavement	Date	10/12/23
CSJ	0918-46-316	Station	105+69.04	Grnd. Elev.	540.06 ft
		Offset	5.97' LT	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
539.9			ASPHALT, 2.5 inches							
			BASE, 7.5 inches							
539.2			SAND, loose to slightly compact; reddish brown; some cemented sand fragments; poorly graded with silt (SP-SM)			8.3	NP	NP		P.P. = 2.0, -#200: 8.8
538.1			CLAY, very stiff; brown; trace to few ferrous and calcareous nodules; with sand (CL)							
						16.6				P.P. = 4.5+; Sulfate PPM = 140
						13.6	43	27	114.3	P.P. = 4.5+, -#200: 77.6
533.1			CLAY, very stiff; reddish tan; sandy (CL)							
						12.7				P.P. = 4.5+
						8.9				P.P. = 4.5+, -#200: 51.2
530.1										

Remarks: N 7107775.3230, E 2418935.4370
-dry during drilling
-dry at completion

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER
TBPE FIRM #12196

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
PAVEMENT

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		70

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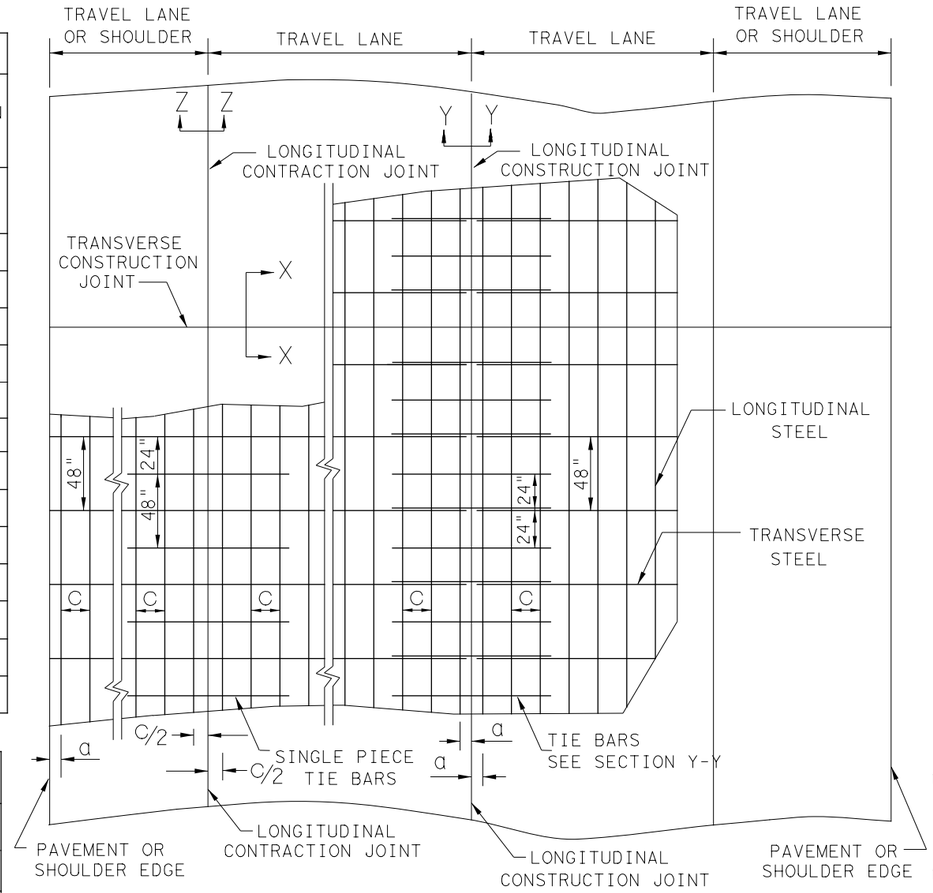
TABLE NO.1 LONGITUDINAL STEEL				
SLAB THICKNESS AND BAR SIZE		LONGITUDINAL STEEL BARS	FIRST SPACING AT EDGE OR JOINT	LONG. STEEL VERTICAL POSITION FROM BOTTOM OF PAVEMENT
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	T1 (IN.)
7.0	#5	6.5	3 TO 4	3.5
7.5	#5	6.0	3 TO 4	3.75
8.0	#6	9.0	3 TO 4	4.0
8.5	#6	8.5	3 TO 4	4.25
9.0	#6	8.0	3 TO 4	4.5
9.5	#6	7.5	3 TO 4	4.75
10.0	#6	7.0	3 TO 4	5.0
10.5	#6	6.75	3 TO 4	5.5
11.0	#6	6.5	3 TO 4	6.0
11.5	#6	6.25	3 TO 4	6.5
12.0	#6	6.0	3 TO 4	7.0
12.5	#6	5.75	3 TO 4	7.5
13.0	#6	5.5	3 TO 4	8.0

TABLE NO.2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5*	48	#5*	48	#5*	24
8.0 - 13.0	#5*	48	#6	48	#6	24

*CONTRACTOR MAY USE #6 REINFORCING STEEL INSTEAD OF #5 REINFORCING STEEL OR COMBINATION OF EACH SIZE

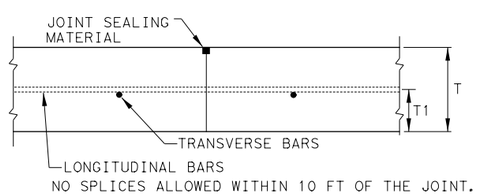


TYPICAL PAVEMENT LAYOUT

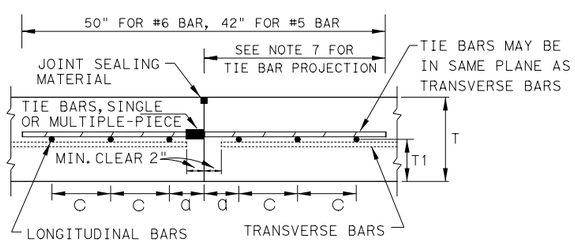
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

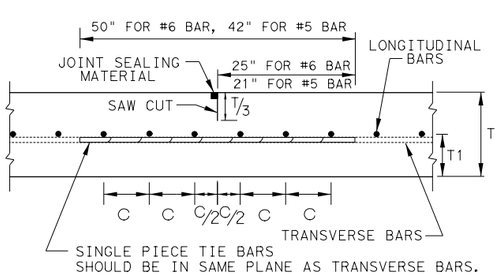
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. FOR PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT, ADDITIONAL DETAIL MAY BE SHOWN ELSEWHERE IN THE PLANS.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1.
5. ADJUST REINFORCING STEEL VERTICALLY USING SHIMS OR OTHER METHODS, AS APPROVED, TO MEET VERTICAL TOLERANCES PRIOR TO CONCRETE PLACEMENT.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE MINIMUM PROJECTION OF TIE BARS INTO THE ADJACENT PLACEMENT IS 22.5 IN. for #6 BARS AND 18.5 IN. FOR #5 BARS.
8. SEE STANDARD SHEET "CONCRETE CURB AND CURB AND GUTTER," FOR DETAILS WHEN TYING CONCRETE CURB OR CURB GUTTER AT A LONGITUDINAL JOINT.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."
12. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25-IN.



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-24

FILE: crcp124.dgn	DN: CES	CK: KM	DW: CES	CK: AN
©TxDOT: Sept 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		71

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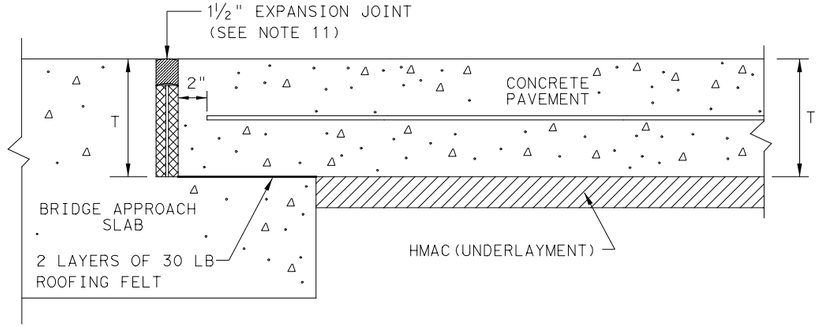
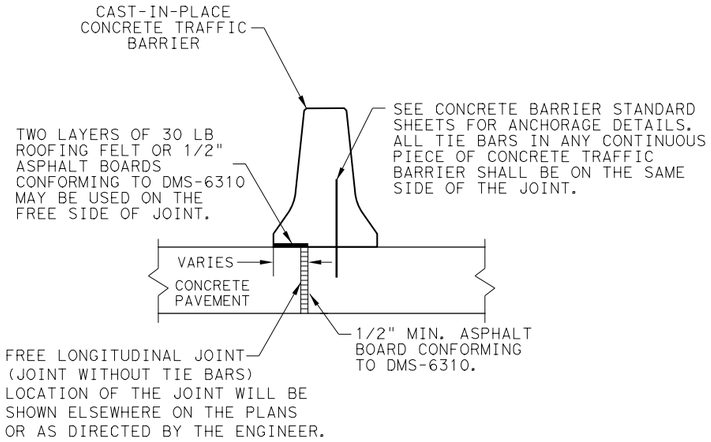
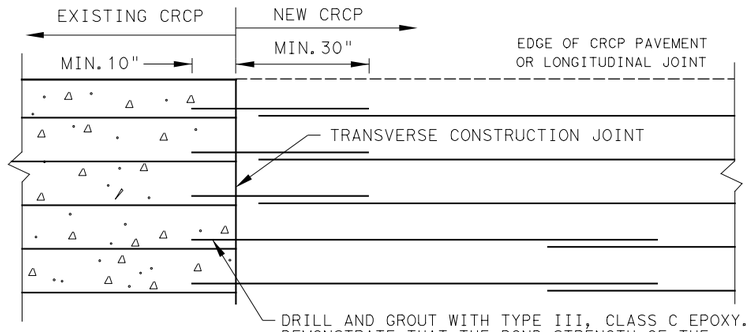


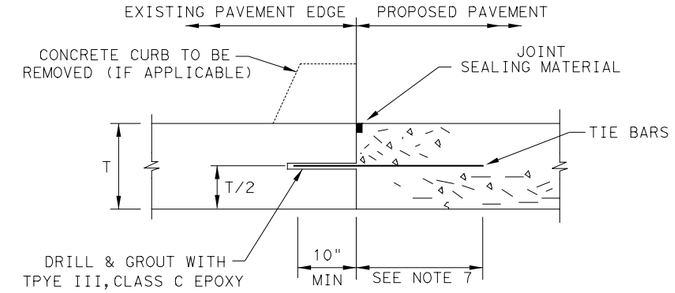
TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH



CENTERLINE FREE LONGITUDINAL JOINT DETAIL

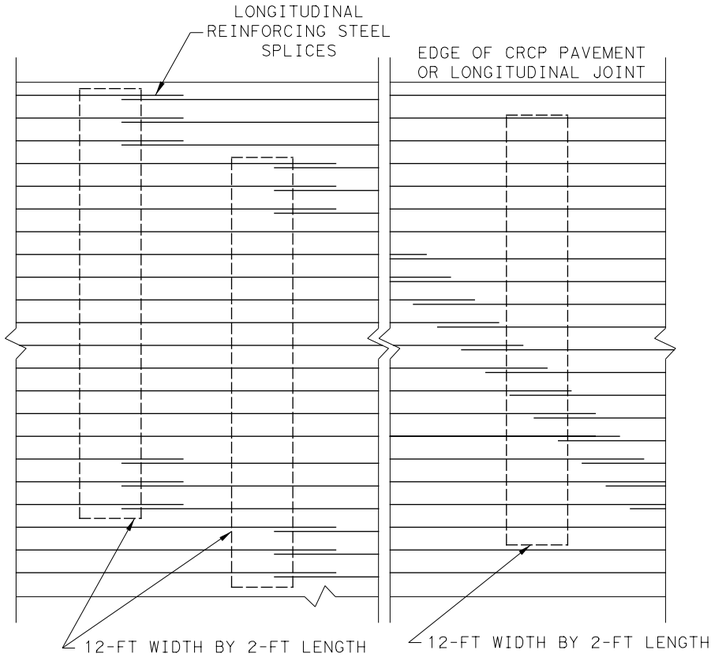


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



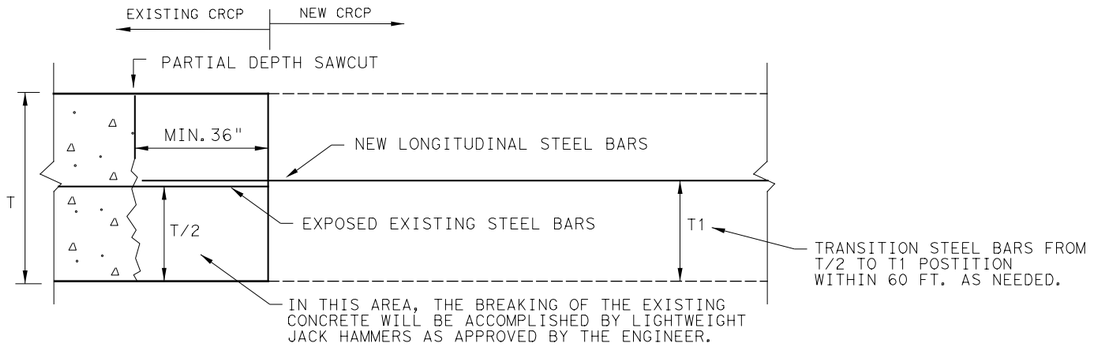
1. BEFORE CONCRETE PLACEMENT, PERFORM PULL-OUT TESTS ON EPOXY-GROUTED TIE BARS IN ACCORDANCE WITH ITEM 360.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER PAVEMENTS, USE #5 TIE BARS FOR LESS THAN 8" THICK PAVEMENTS.

LONGITUDINAL WIDENING JOINT DETAIL



STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-24

FILE: crcp124.dgn	DN: TxDOT	CK: KM	DW: CES	CK: AN
©TxDOT: Sept 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		72

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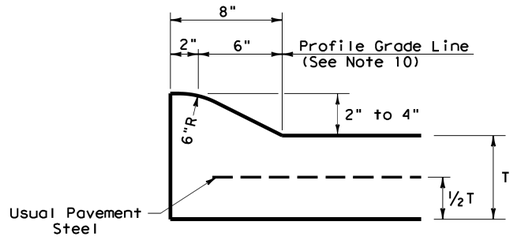
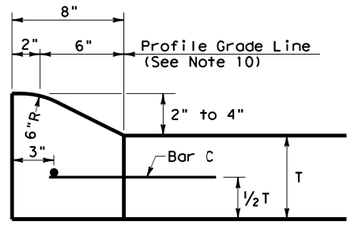
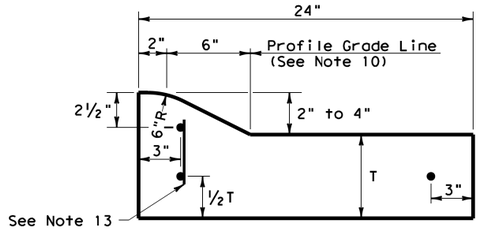


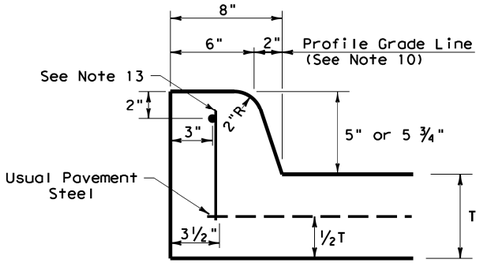
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



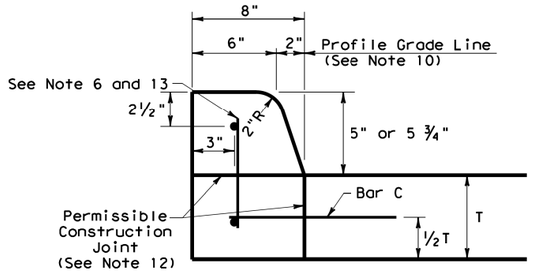
TYPE I CURB
2" - 4" HEIGHT



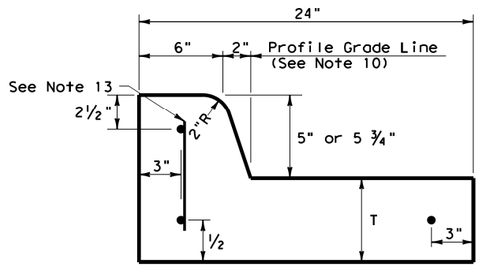
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



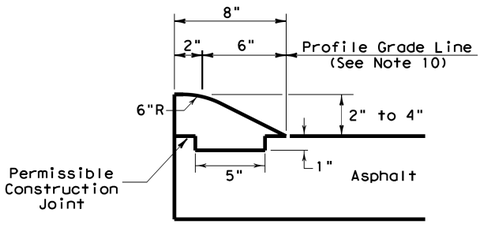
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



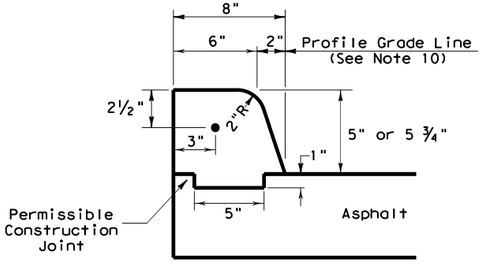
TYPE II CURB
5" - 5 ¾" HEIGHT



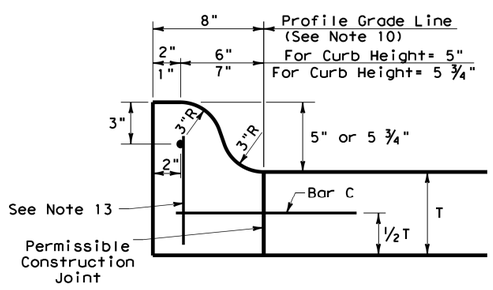
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



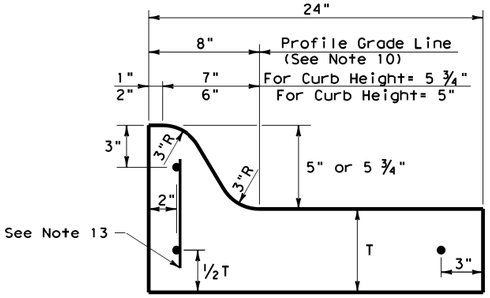
TYPE III CURB (KEYED)
2" - 4" HEIGHT



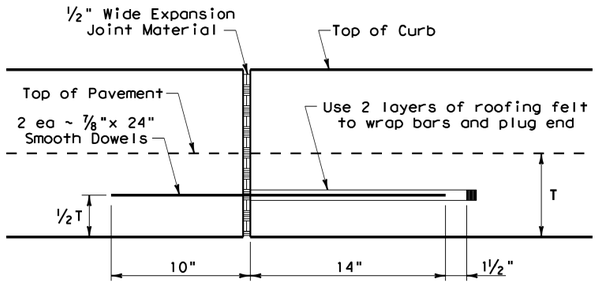
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

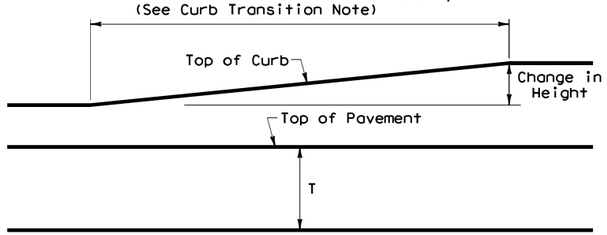


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

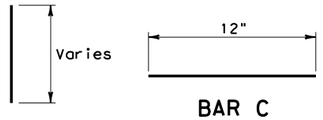
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
©TxDOT: JUNE 2022 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		73

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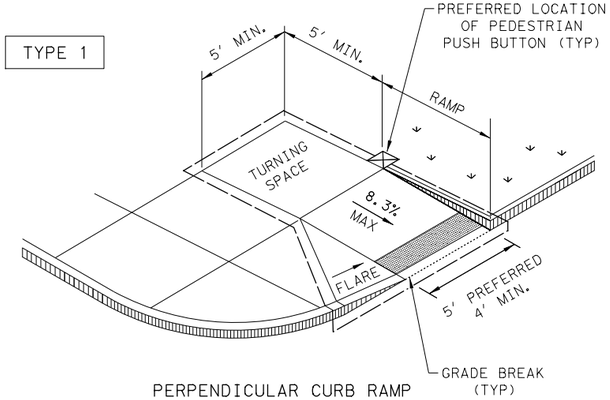
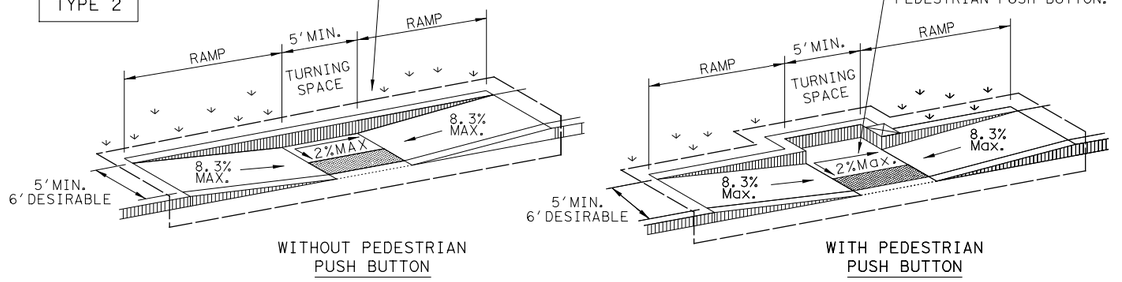
DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/ped18.dgn

TYPE 1



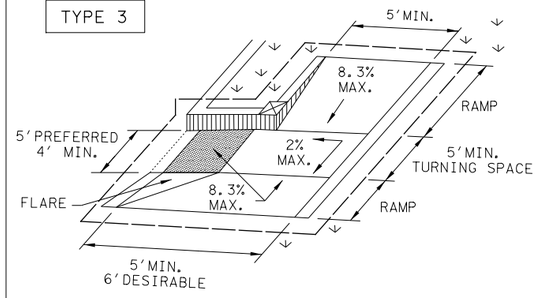
PERPENDICULAR CURB RAMP

TYPE 2

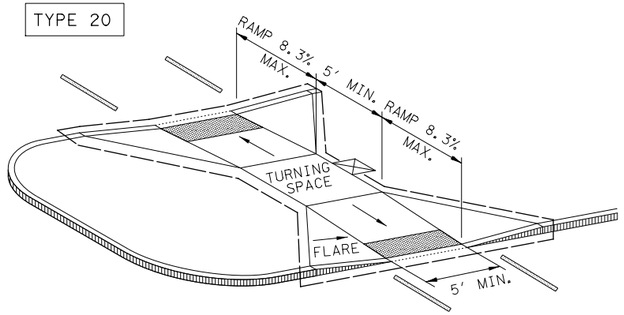


PARALLEL CURB RAMP

TYPE 3

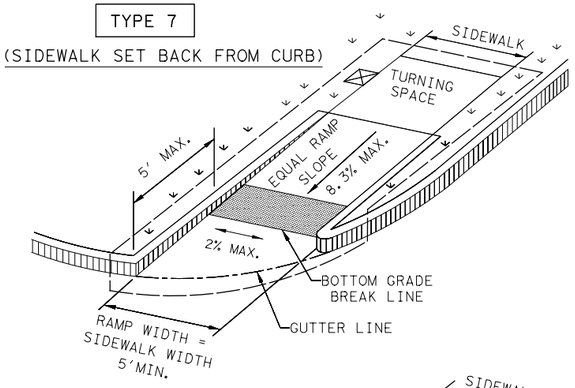


TYPE 20

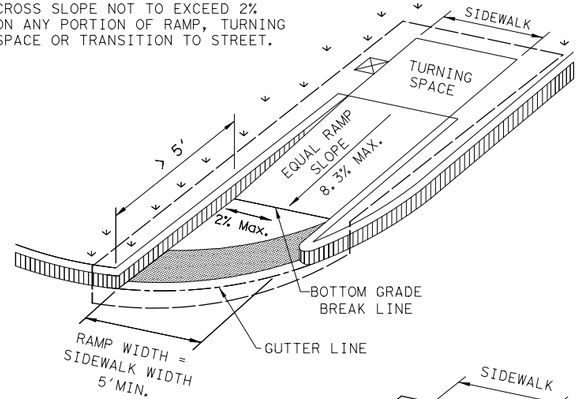


CURB RAMPS AT MEDIAN ISLANDS

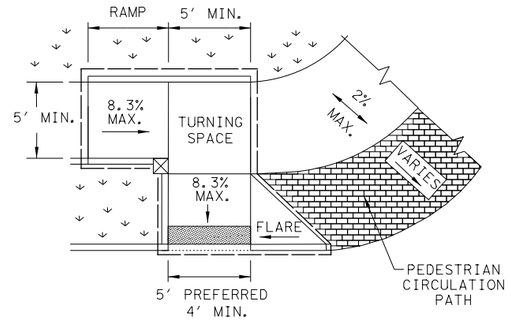
TYPE 7
(SIDEWALK SET BACK FROM CURB)



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

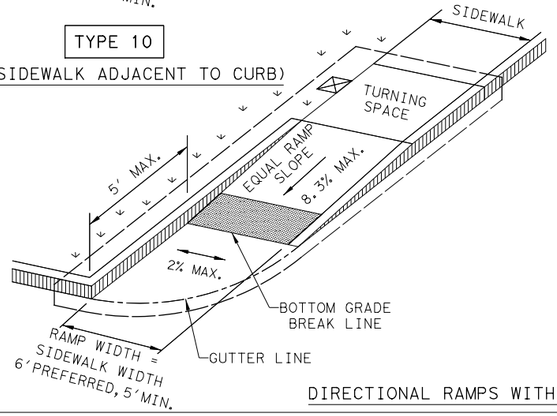


TYPE 6

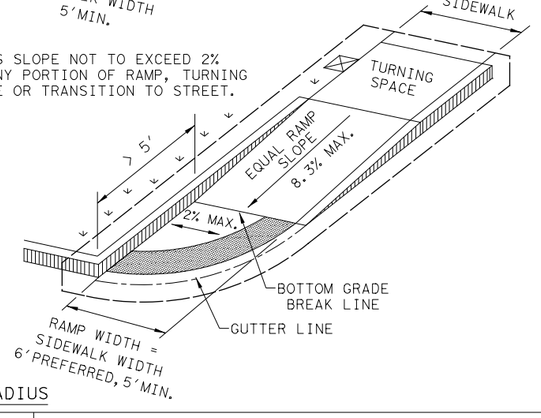


COMBINATION CURB RAMPS

TYPE 10
(SIDEWALK ADJACENT TO CURB)

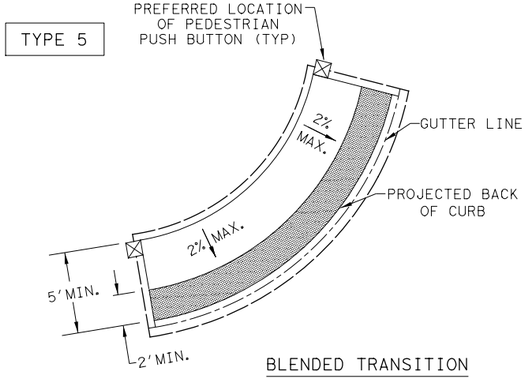


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

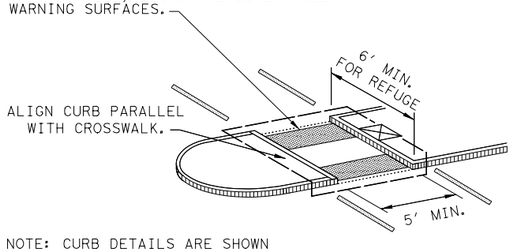
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

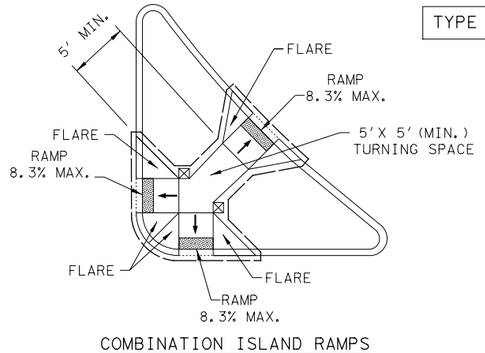
TYPE 21

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



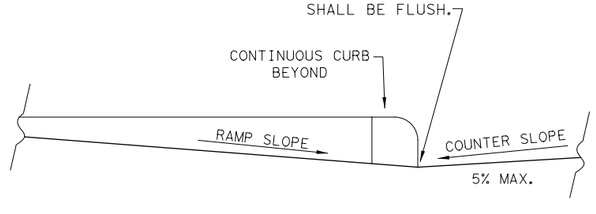
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0918	46	316		VA
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	DAL	DENTON			74

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DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/ped18.dgn

GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

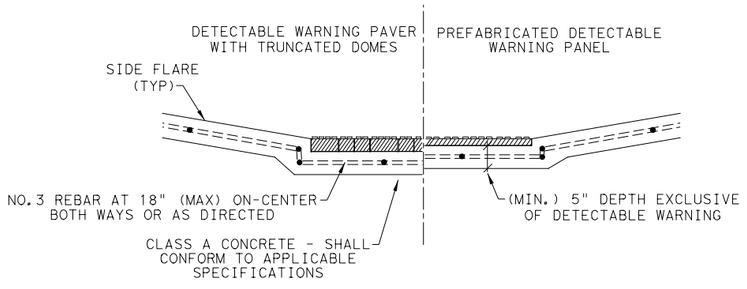
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

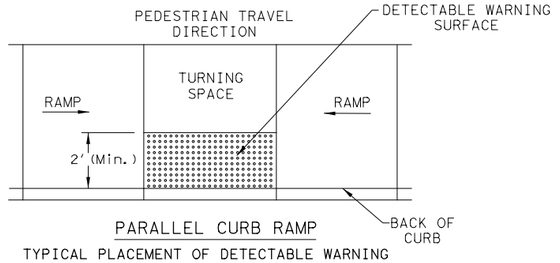
SIDEWALKS

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

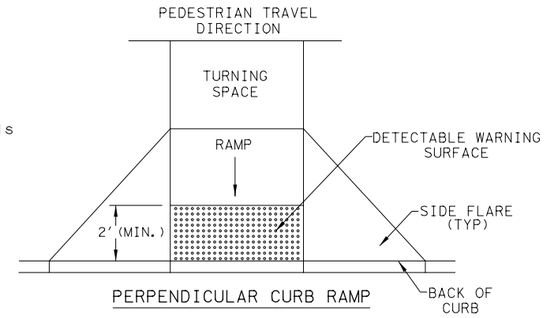


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

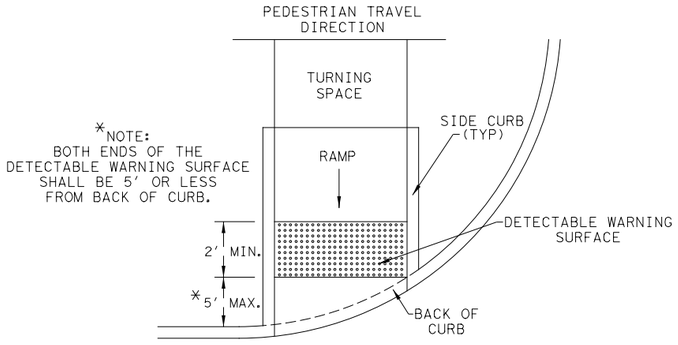
DETECTABLE WARNING SURFACE DETAILS



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



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



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

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0918	46	316		VA
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	DAL	DENTON			75

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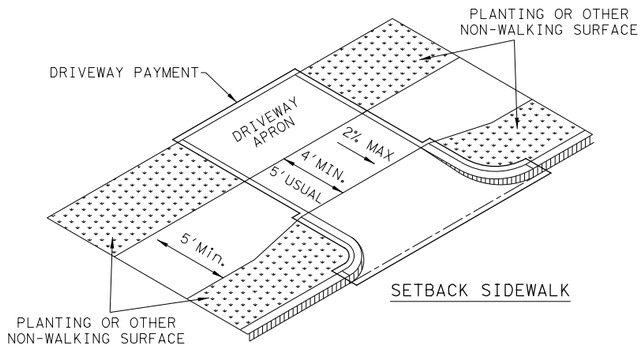
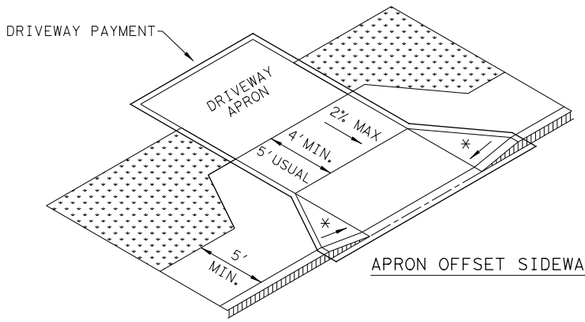
DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/ped18.dgn

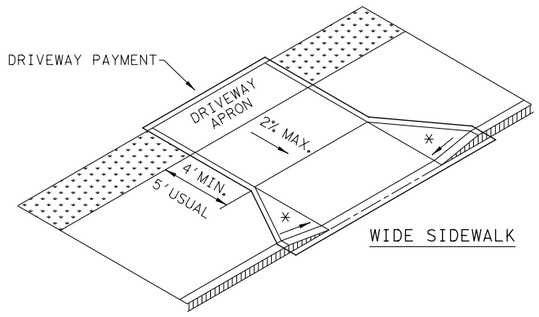
SIDEWALK TREATMENT AT DRIVEWAYS



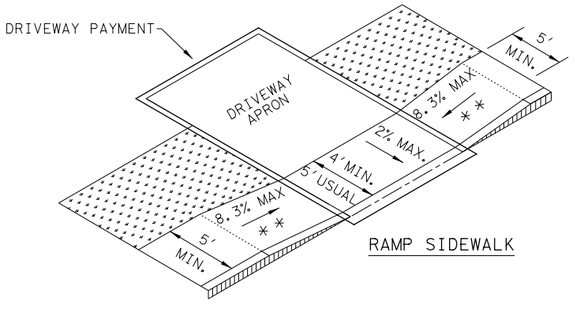
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

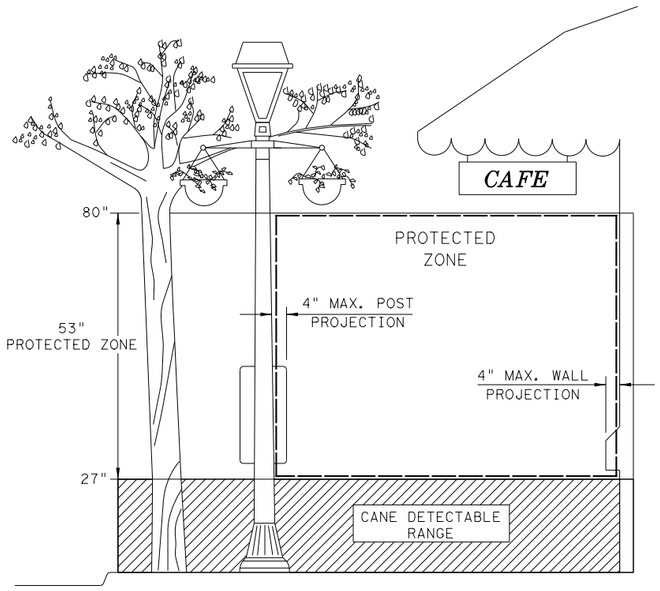


RAMP SIDEWALK

NOTES:

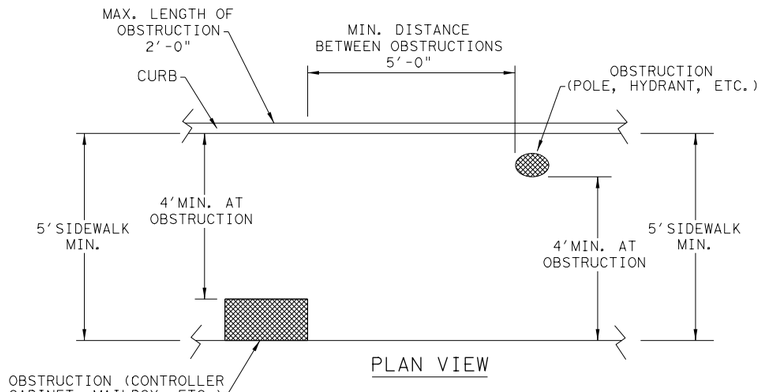
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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



PROTECTED ZONE

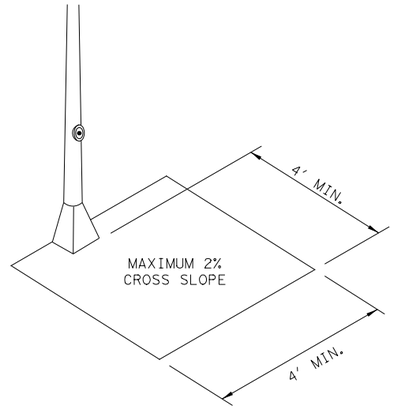
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



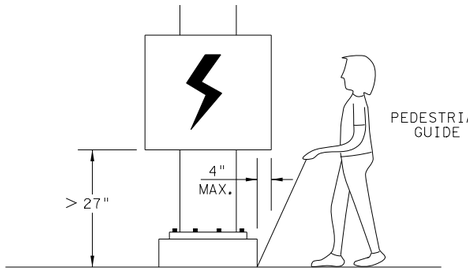
PLAN VIEW

PLACEMENT OF STREET FIXTURES

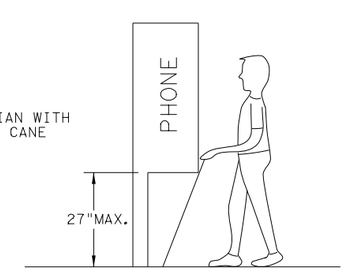
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0918	46	316		VA
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	DAL	DENTON			76

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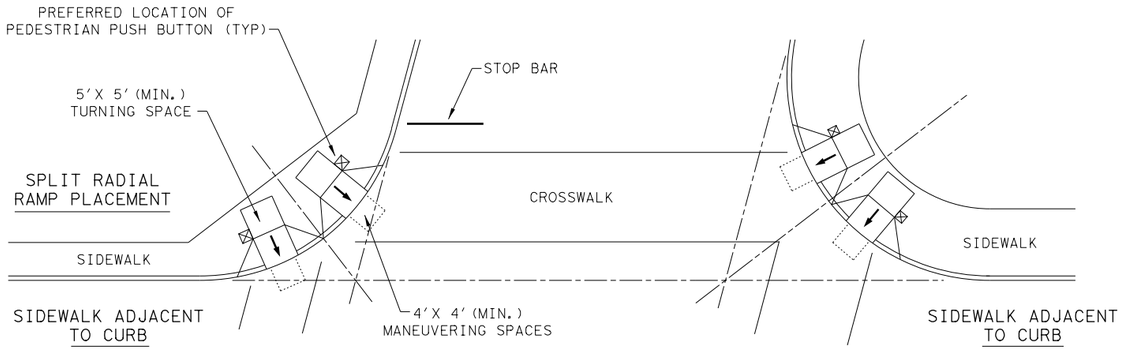
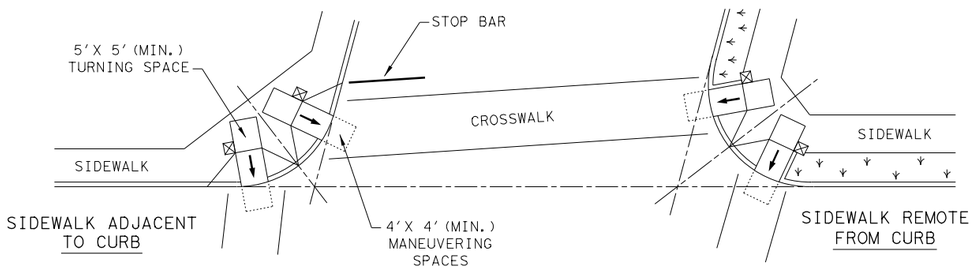
TYPICAL CROSSING LAYOUTS

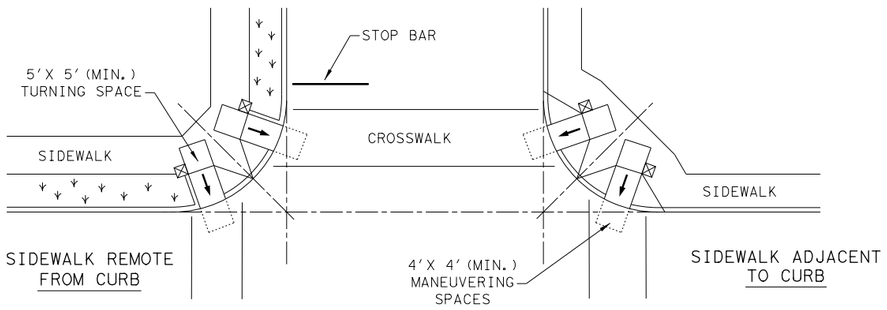
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



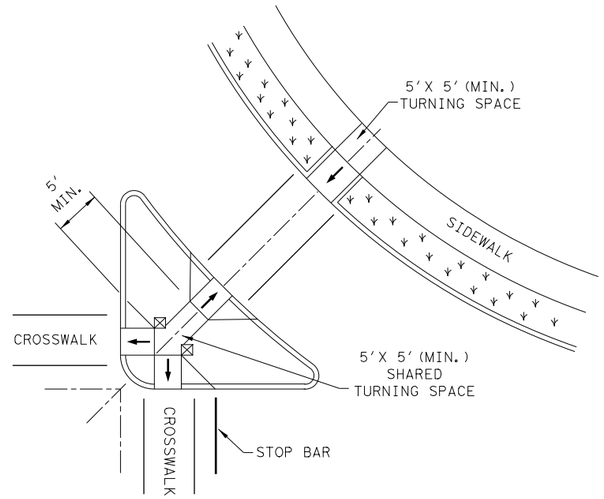
SKEWED INTERSECTION WITH "LARGE" RADIUS



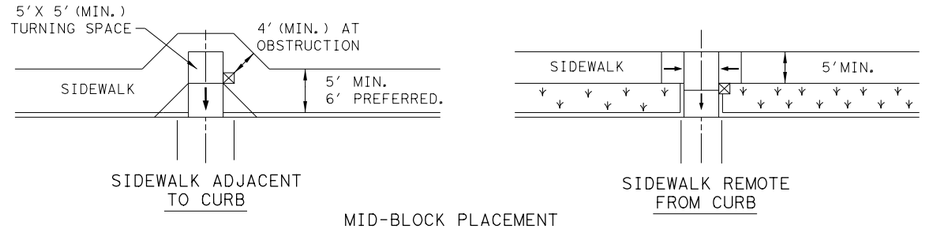
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

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

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
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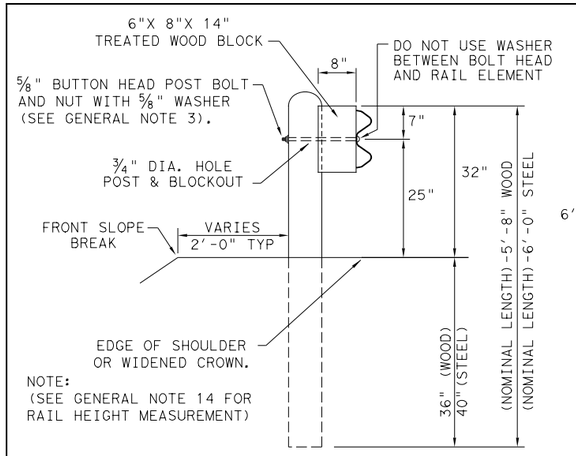
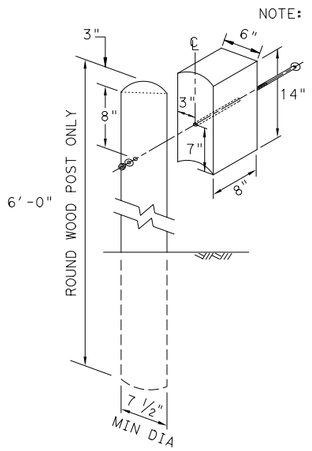
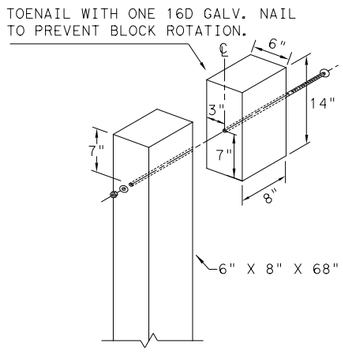


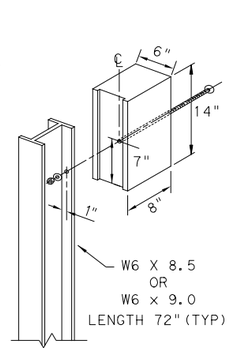
TYPICAL POST PLACEMENT



WOOD BLOCK TO
ROUND WOOD POST

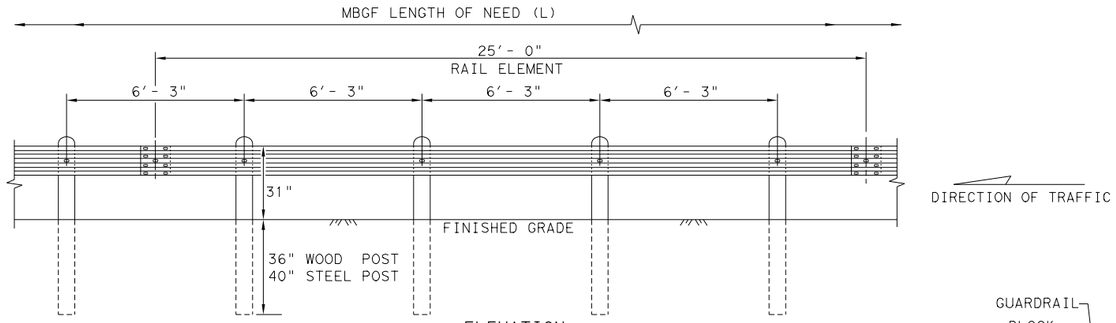


WOOD BLOCK TO
RECTANGULAR WOOD POST



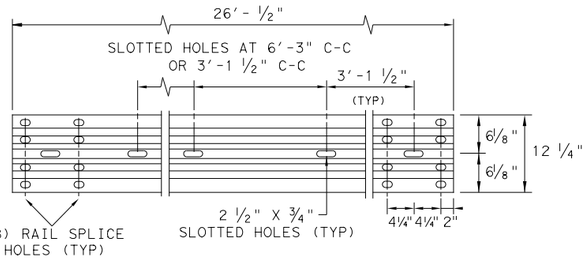
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

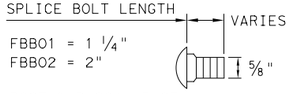
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

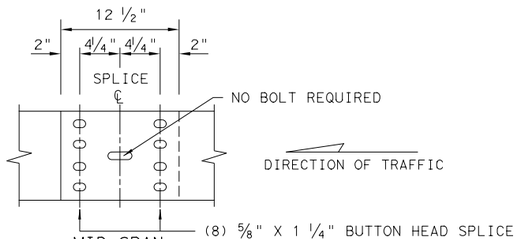
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



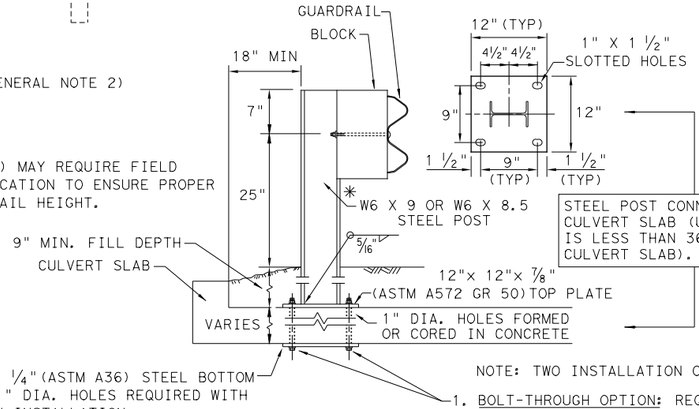
BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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.

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.

Texas Department of Transportation | Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0918	46	316	VA	
	DIST	COUNTY		SHEET NO.	
	DAL	DENTON		78	

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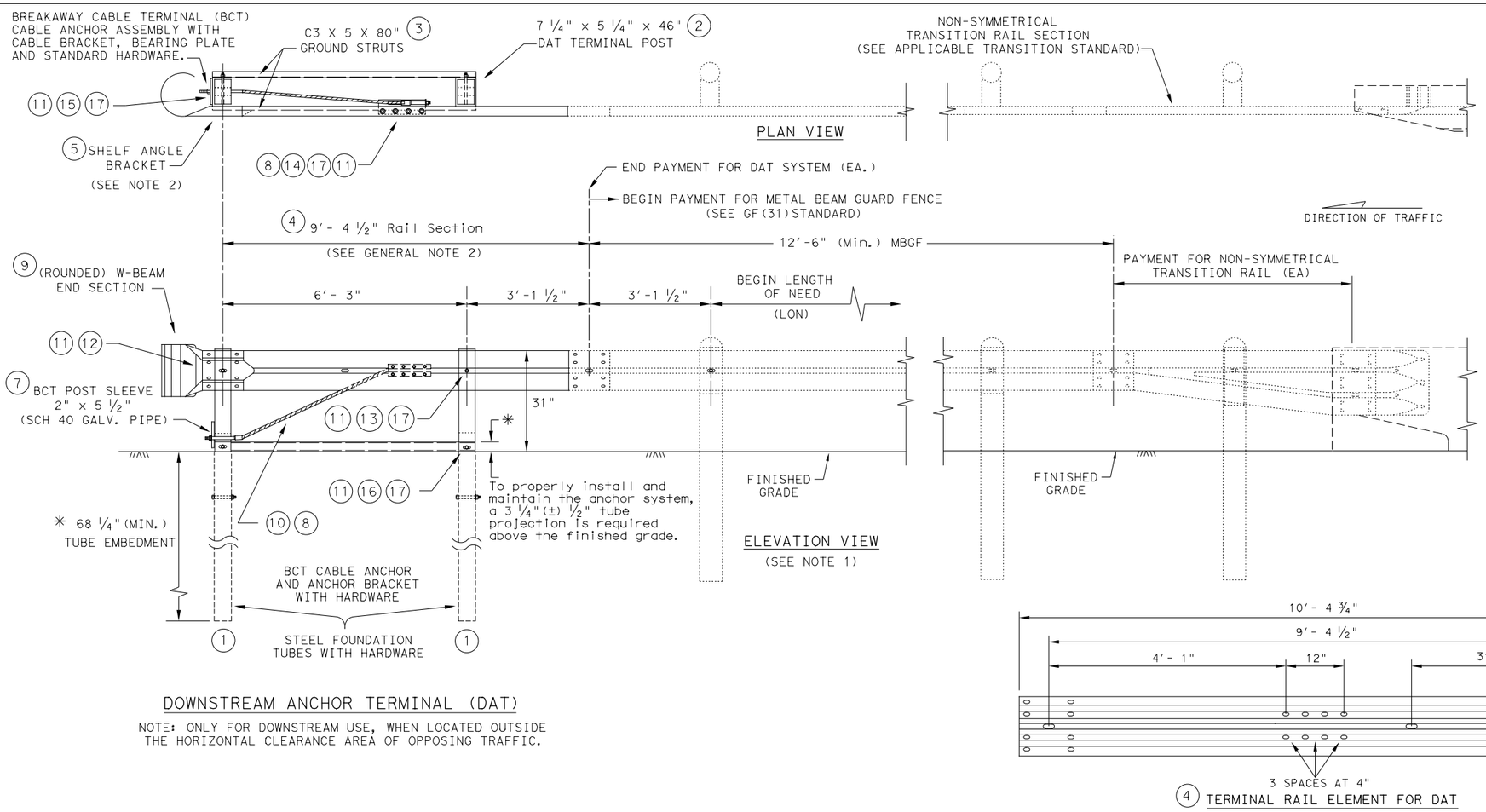


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

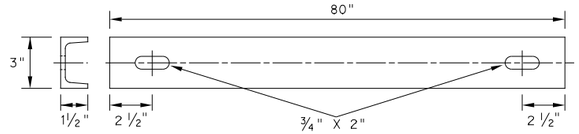
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 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

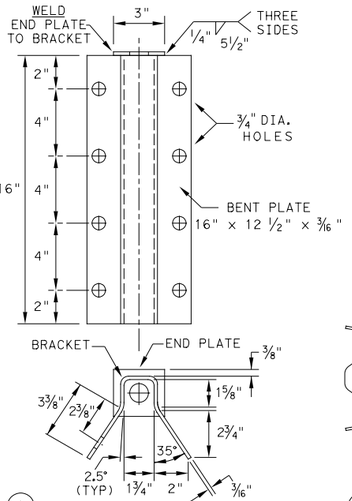
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(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

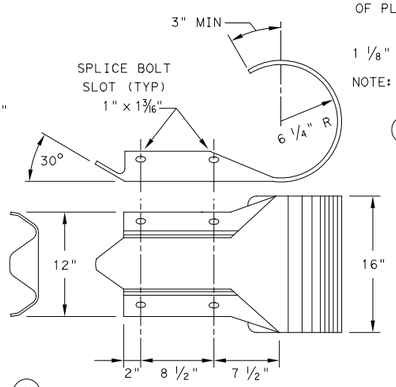
(4) TERMINAL RAIL ELEMENT FOR DAT



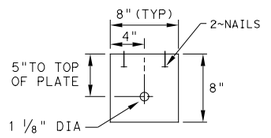
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

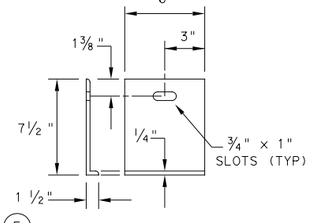


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

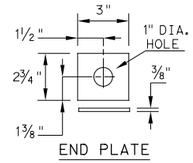


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

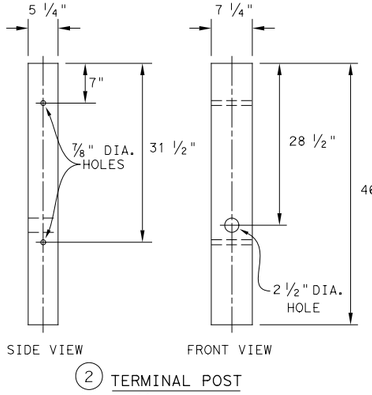
(6) BEARING PLATE
8"x 8"x 5/8" PL



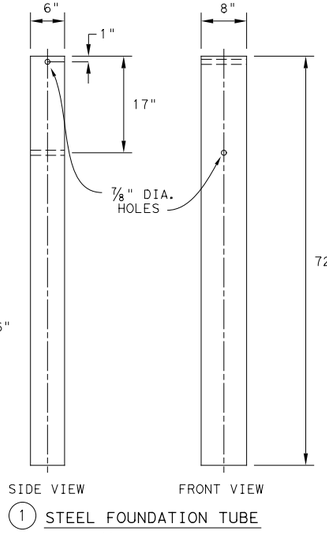
(5) SHELF ANGLE BRACKET



END PLATE



(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	
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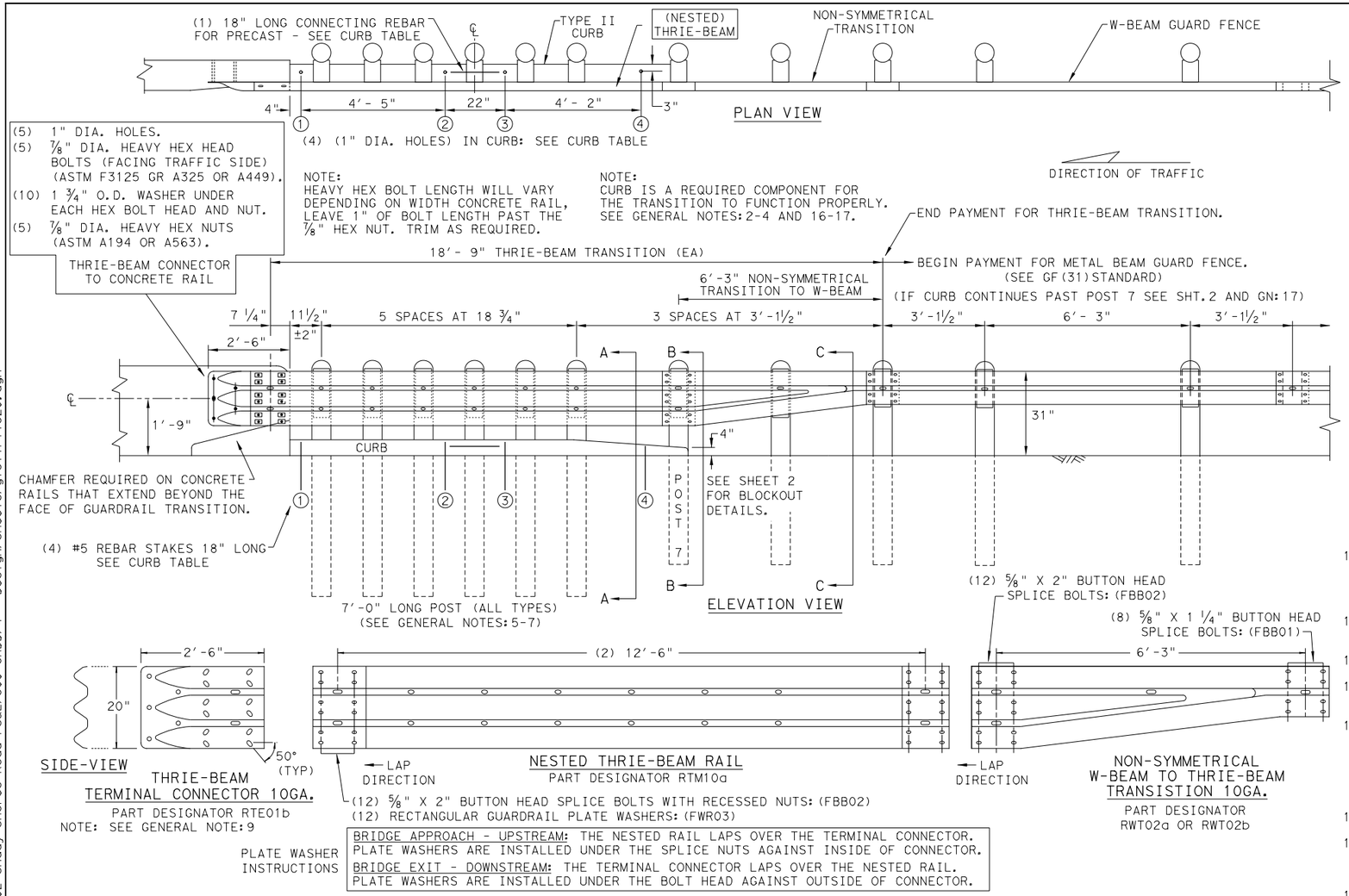
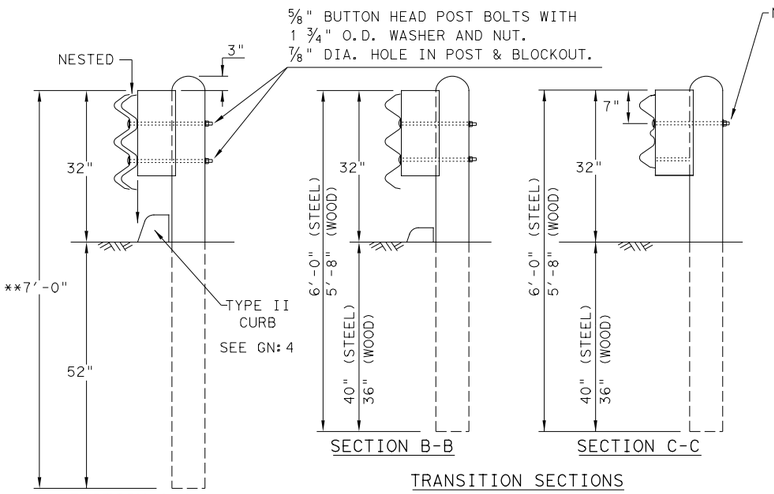
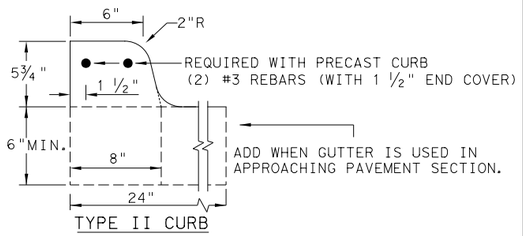
DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/gf31tr+1320.dgn





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



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

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

TYPE II CURB DETAILS

GENERAL NOTES

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

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0918	46	316	VA	
	DIST	COUNTY		SHEET NO.	
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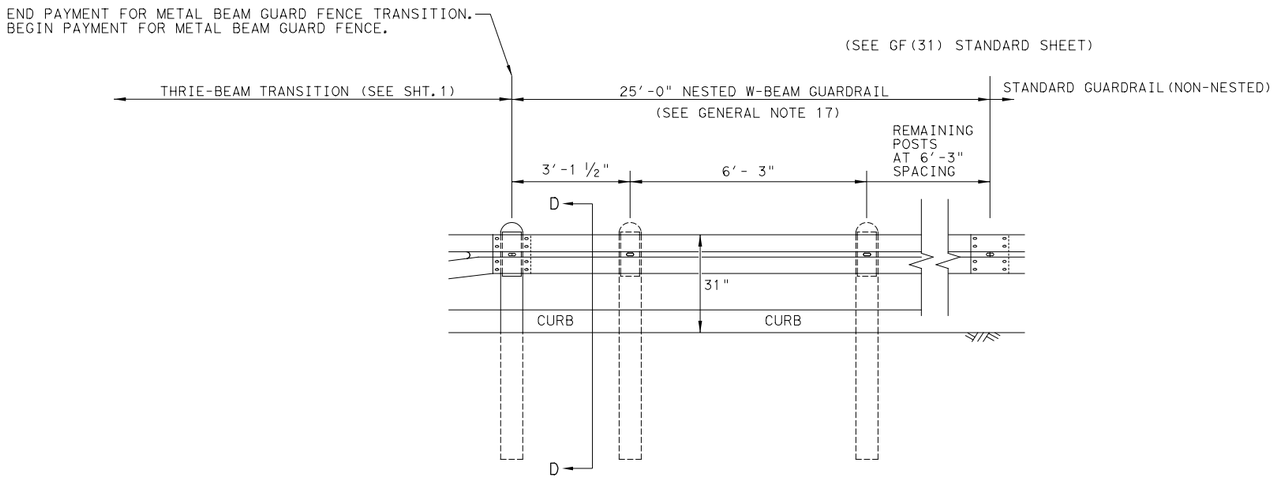
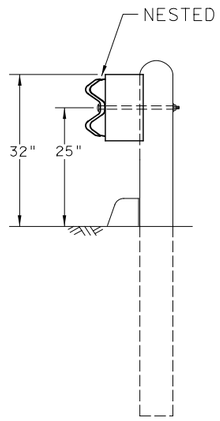
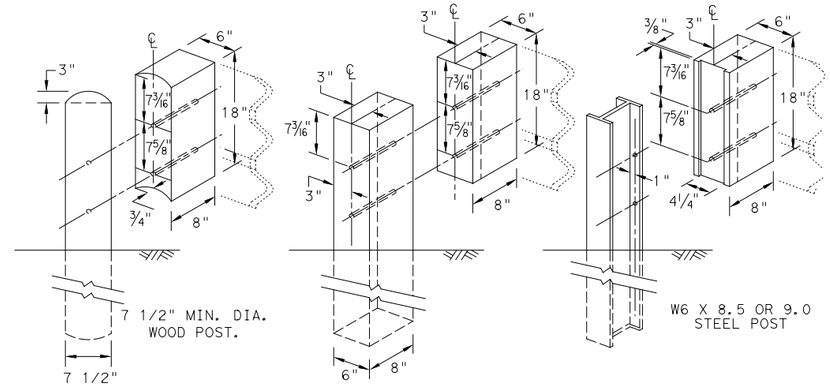
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

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

GF(31)TR TL3-20

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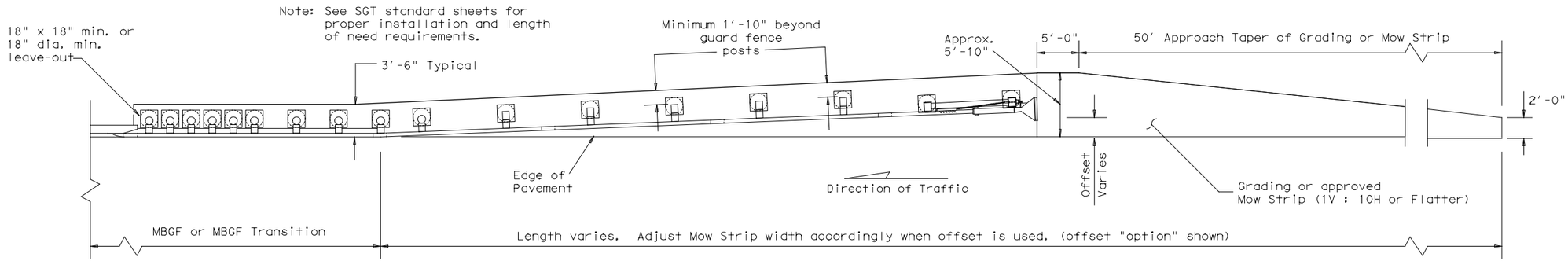
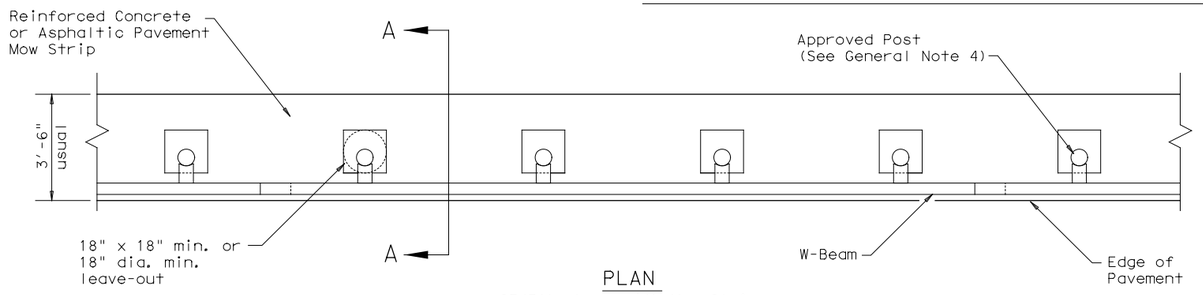
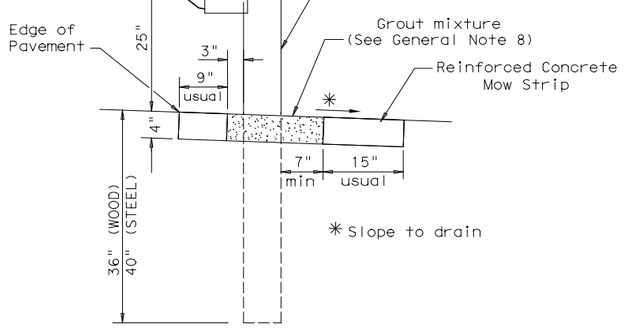


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



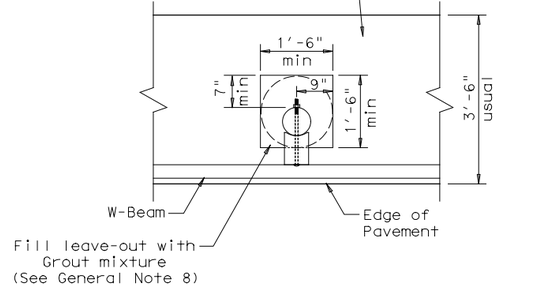
PLAN

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.

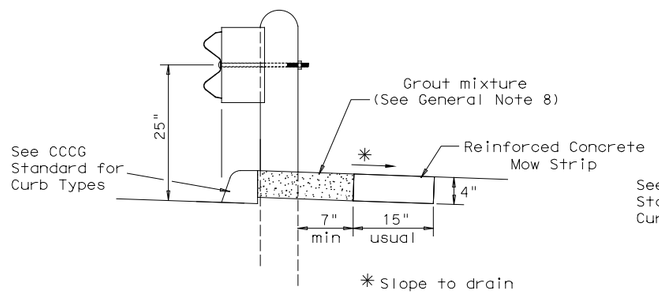
Note: Site Condition(s)

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

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

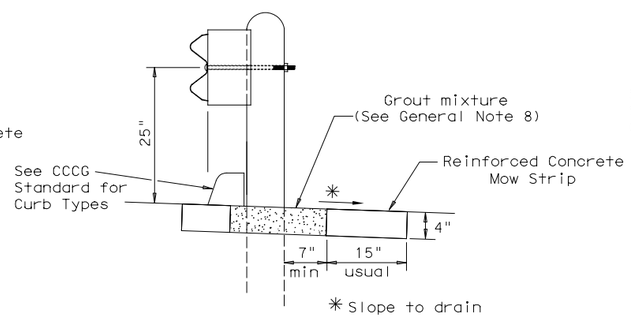
GENERAL NOTES

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



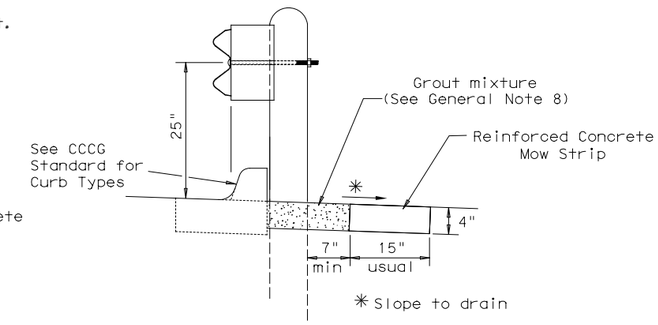
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

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	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
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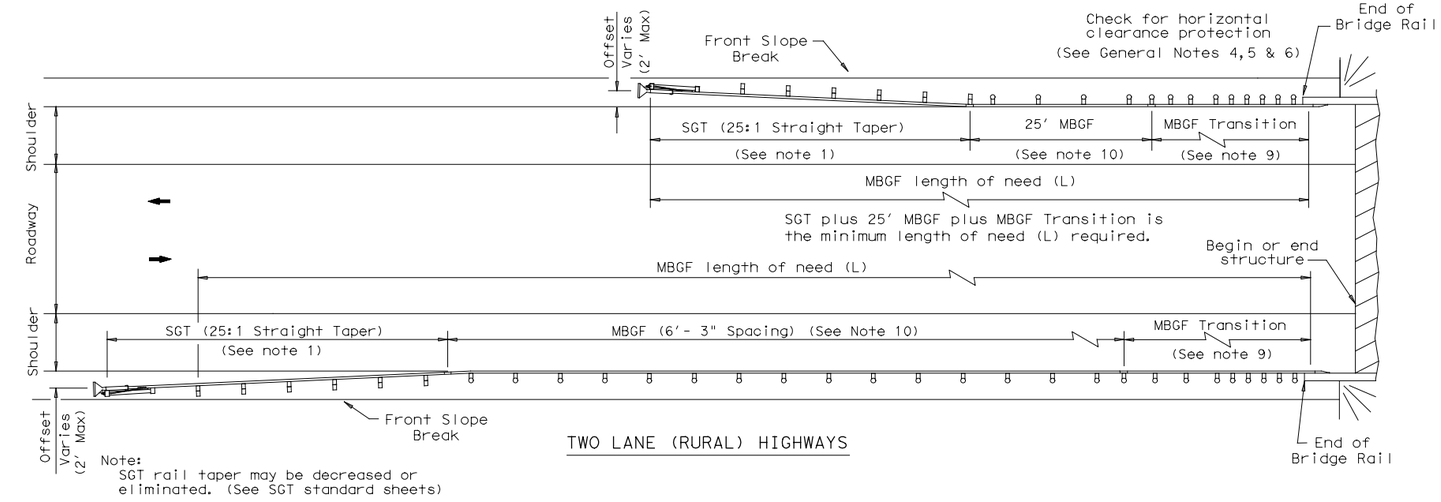
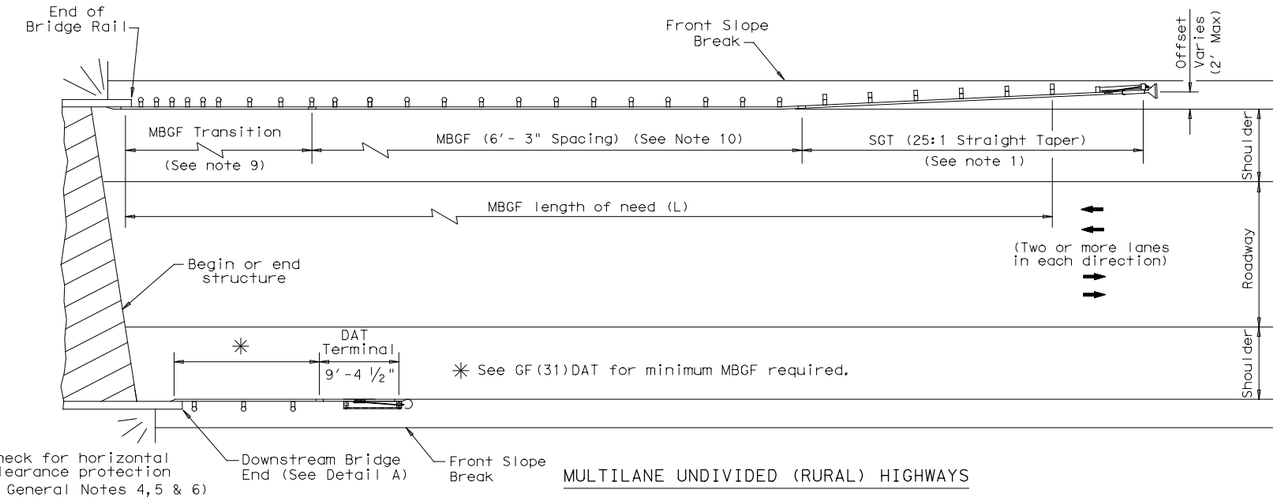
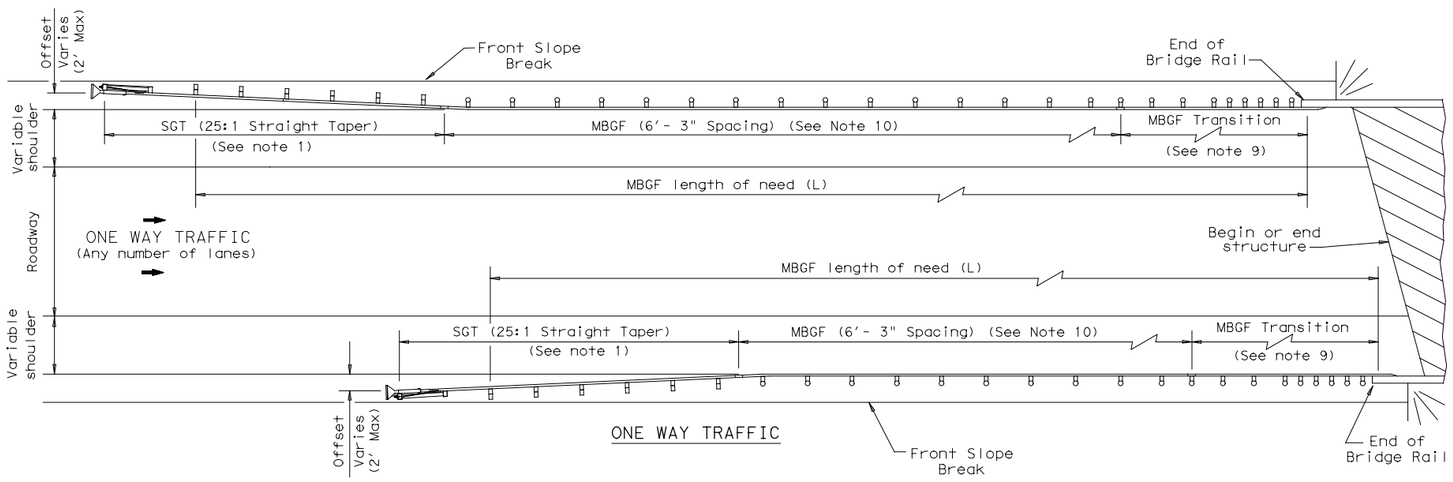


TWO LANE (RURAL) HIGHWAYS

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



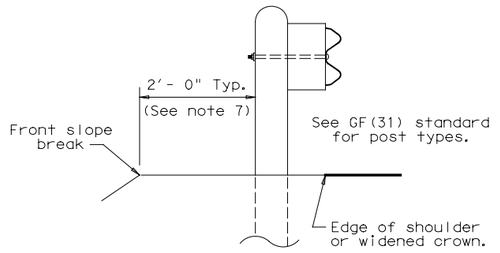
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



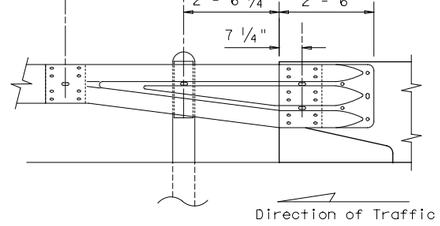
ONE WAY TRAFFIC

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
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NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(1) POST(0)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

BEGIN LENGTH OF NEED

TRAFFIC FLOW

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE: B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

SEE NOTE: C

POST 32" HEIGHT

31" RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

(8) ⅝"x 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"x 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

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

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G
ANGLE STRUT PN: 15202G
(2) ⅝" WASHERS PN 4372G
(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1
SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT
(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN: 105286
(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2
SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G
ANCHOR PLATE WASHER ½" THICK PN: 15206G
1" ROUND WASHER F463 PN: 4902G
(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G
(2) ⅝" ROUND WASHER (WIDE) PN: 3240G
ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6
ANCHOR PADDLE PN: 15204A
(2) ⅝" HEX NUT A563 GR. DH PN: 3245G
1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.
W-BEAM FLATTENED (4 PLIES)
ANGLE STRUT PN: 15202G
SEE NOTE: A
(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G
(4) ¾" FLAT WASHER (TYP) PN: 3701G
(2) ¾" HEX NUT (TYP) PN: 3704G
(2) ANCHOR POST ANGLE PN: 15201G
6'-1 ⅜" POST DEPTH

DETAIL 3
AT POST(0)
6'-5 ⅜" (W6 X 15)
I-BEAM POST PN: 15205A

TRAFFIC FLOW

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6
4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

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

8" 6" 14"

⅝" HGR NUT PN: 3340G
⅝" X 10" HGR POST BOLT PN: 3500G
13/16"DIAMETER YIELDING HOLES LOCATED IN FLANGES
FINISHED GRADE
(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW
POST(1 & 2)
W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

W-BEAM RAIL 25'-0"
6" X 8" X 14" BLOCKOUT WOOD
⅝" X 10" HGR POST BOLT PN: 3500G
⅝" HGR NUT PN: 3340G
POST HEIGHT 32"
31" RAIL HEIGHT
40"
LINE POST (3, 4, 5, 6, 7 & 8)
FINISHED GRADE

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

W-BEAM RAIL 25'-0"
6" X 8" X 14" BLOCKOUT WOOD
⅝" X 10" HGR POST BOLT PN: 3500G
⅝" HGR NUT PN: 3340G
POST HEIGHT 32"
31" RAIL HEIGHT
40"
POST(2)
FINISHED GRADE

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)

POST 17"- ½" HEIGHT
4'- 9 ½"
13/16"DIA. YIELDING HOLES
40"
POST(1)

FRONT VIEW POST(1)
4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"
5'-0"
50' APPROACH GRADING
2'-0"
STANDARD MBGF
EDGE OF PAVEMENT
NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)
2'-0" MAX. RAIL OFFSET
APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

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

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		84

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DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Rd Roadway Design/Sheet Files/sgt11s3118.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE SEE DETAIL (C)

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-5/8" FROM REFERENCE LINE

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

RAIL 4 RAIL 3 RAIL 2 RAIL 1

NO BLOCKOUT
AT (POST 1)

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

MBGF
RAIL 2

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

INSTALLATION LENGTH 55'- 1/2"

49'-8 9/16"

6'-3" 6'-3" 6'-3" 6'- 3/4" 6'-3" 6'-3" 6'-3" 37 1/2" 5'-3 11/16"

RAIL
HEIGHT
31"

ARROWS

DETAIL
(D)

ITEM (13) RAIL 4
ITEM (13) RAIL 3
ITEM (13) RAIL 2
ITEM (13) RAIL 1

RAIL
HEIGHT
31"

HEAD
HEIGHT

DETAIL
(B)

32-1/4"

68-1/8"

FINISHED
GRADE

CABLES

FINISHED
GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2 POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

SOIL
ANCHOR POST
ITEM (1)

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE

DETAIL (D)

HEAD
HEIGHT
32-1/4"

TOP OF POST

31-7/8"

FINISHED
GRADE

40-1/8"

68-1/8"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9

(NOTE: ITEM (4) POST 1 (NOT SHOWN), TO BE INSTALLED AT SAME DEPTH AS LINE POSTS.)

SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16"

2 1/8"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL 5/8" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

TRAFFIC FLOW

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX.
RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

GENERAL NOTES

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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	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

Texas Department of Transportation

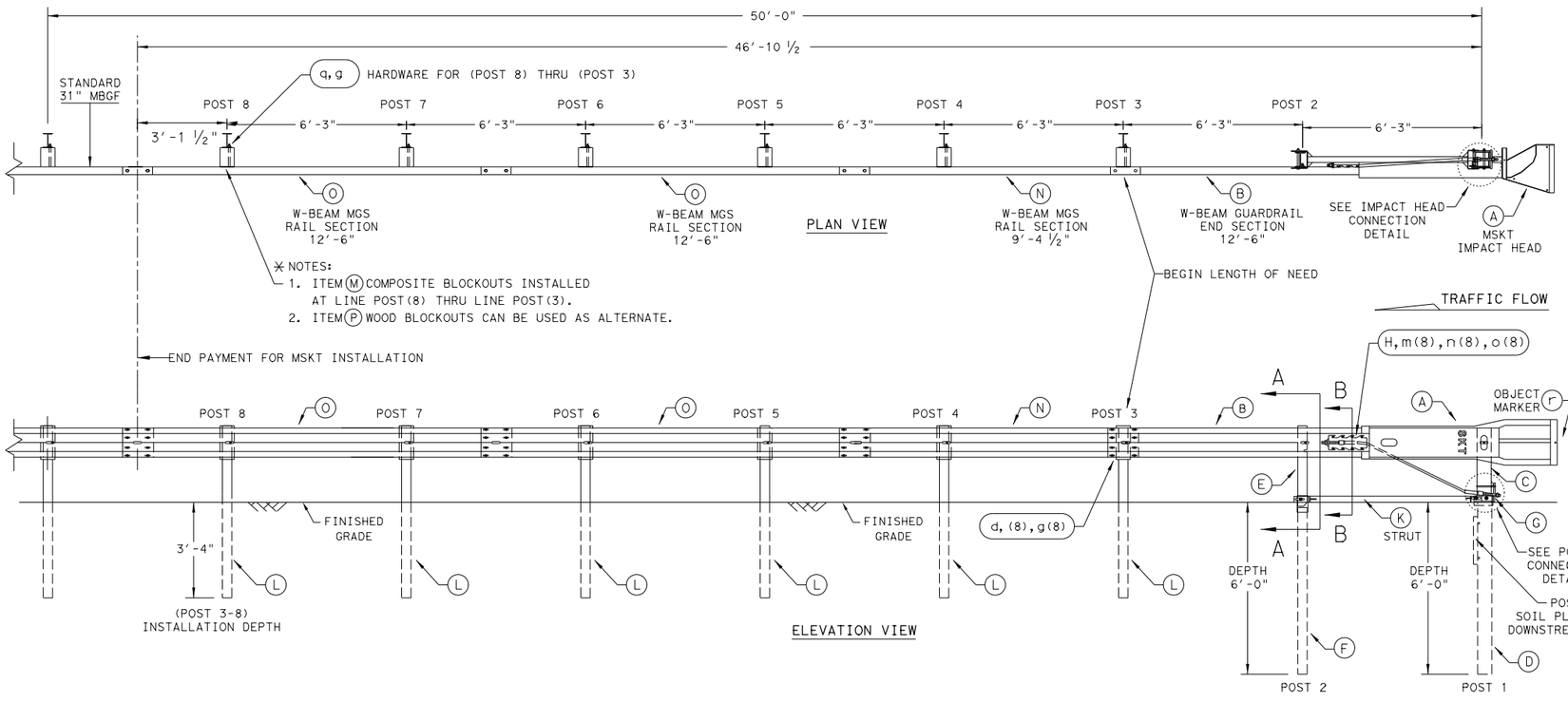
Design Division Standard

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	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		85

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER.
TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSIONOF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/sgt12s3118 (2).dgn



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

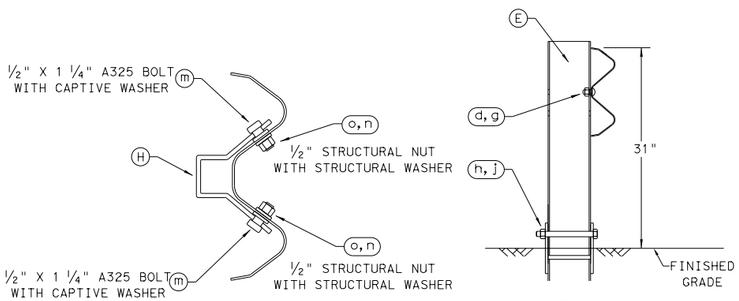
GENERAL NOTES

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

SEE NOTES: ✳

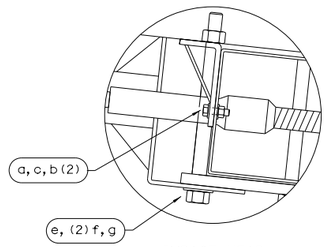
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE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

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

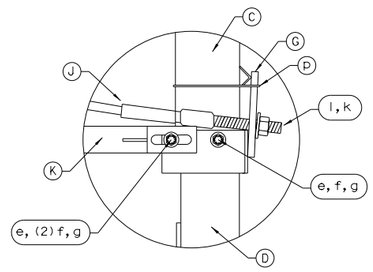


SECTION B-B
ANCHOR BRACKET

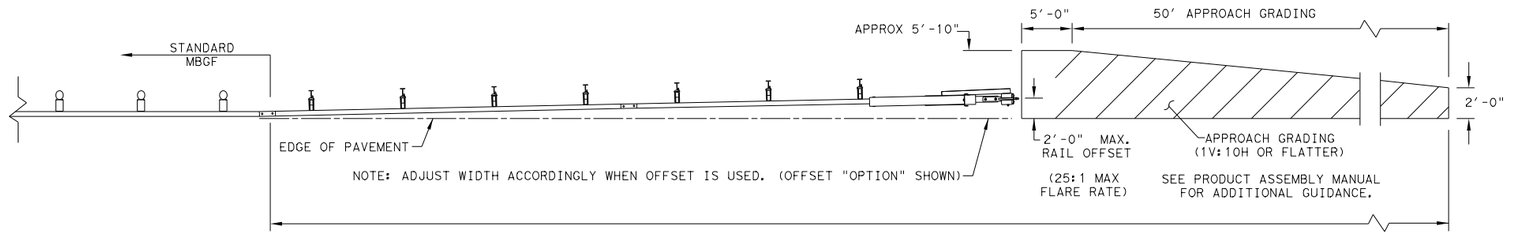
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0918	46	316	VA	
	DIST	COUNTY		SHEET NO.	
	DAL	DENTON		86	

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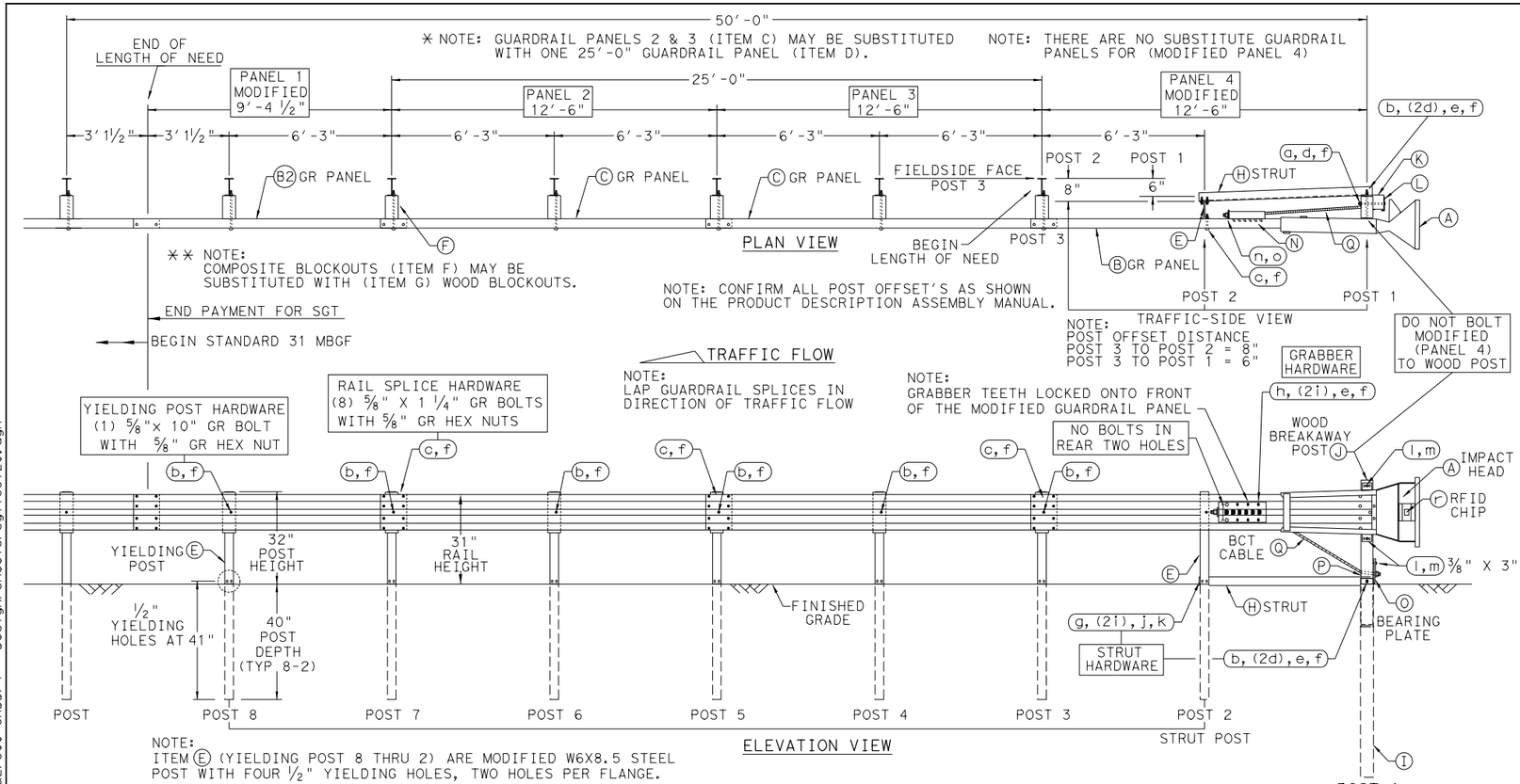
DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/sgt153120.dgn

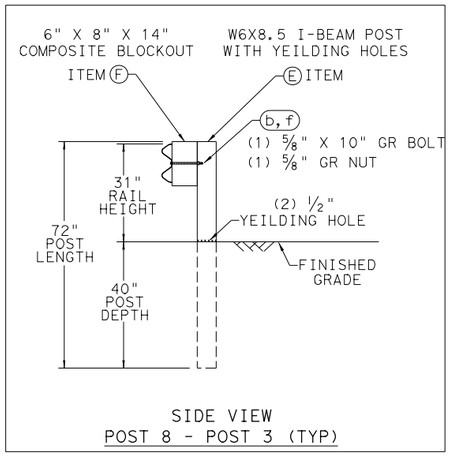


GENERAL NOTES

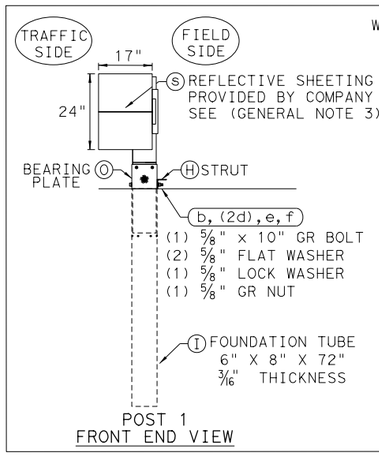
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

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

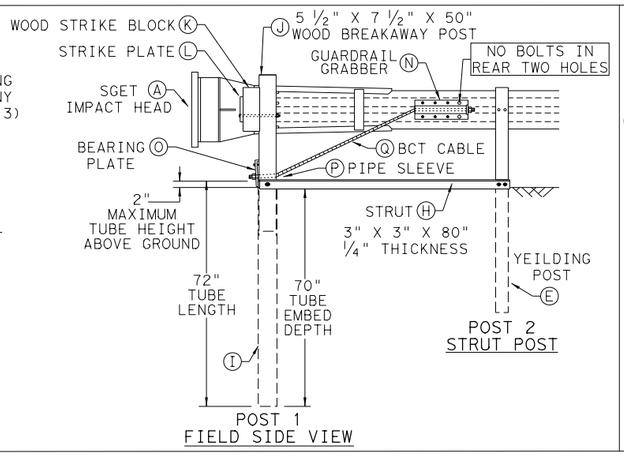
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

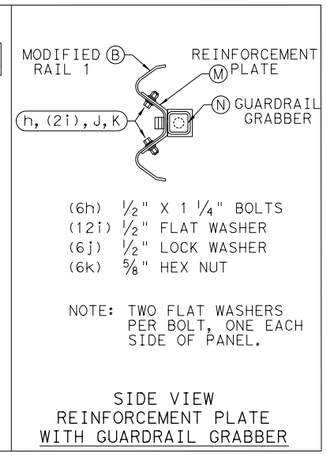


POST 1
FRONT END VIEW

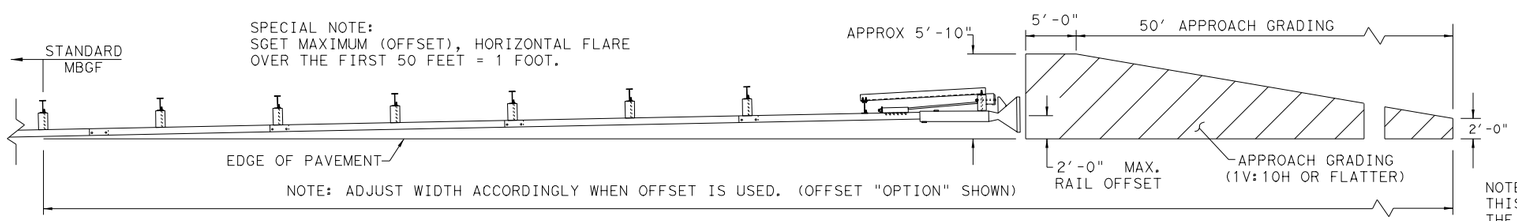


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation
Design Division Standard

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

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		87

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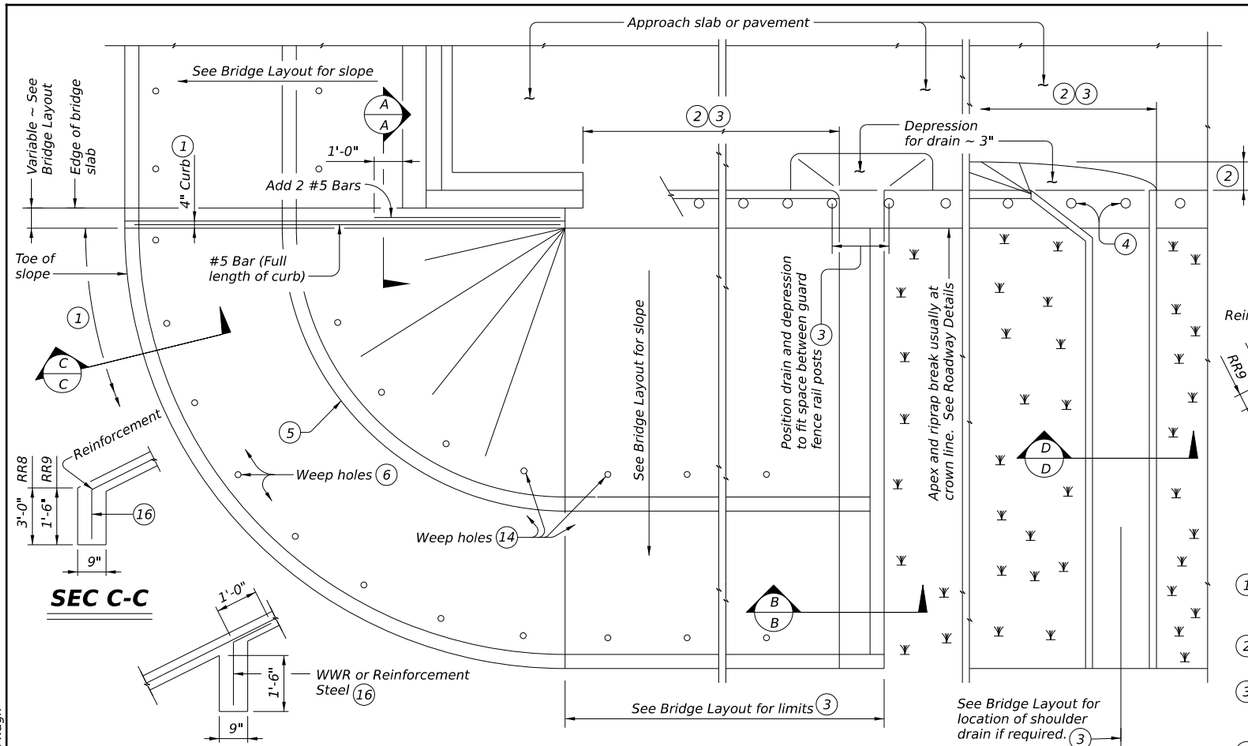
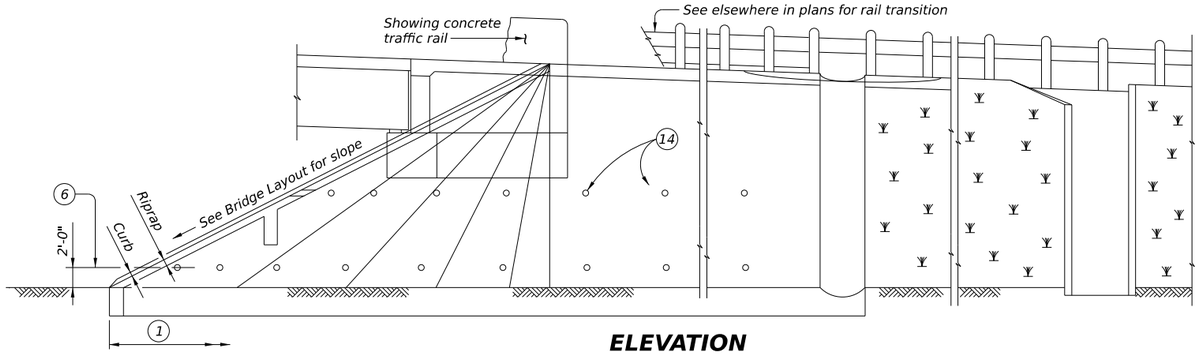
DATE: 11/25/2025 2:37:52 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/MS-CRR-24.dgn



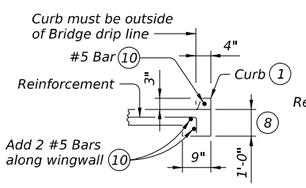
PLAN

SEC C-C

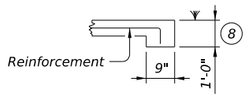
INTERMEDIATE TOEWALL (5)



ELEVATION

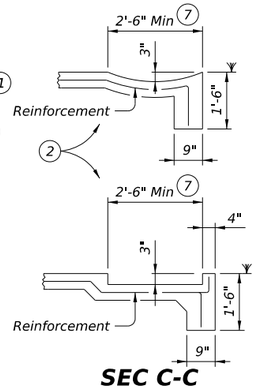


SEC A-A



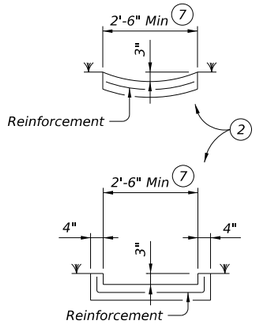
SEC B-B

(No drain)



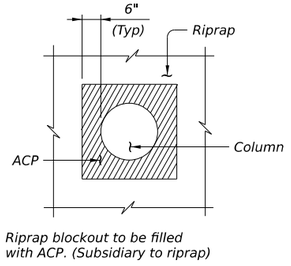
SEC C-C

(Shoulder drain integral with riprap)



SEC D-D

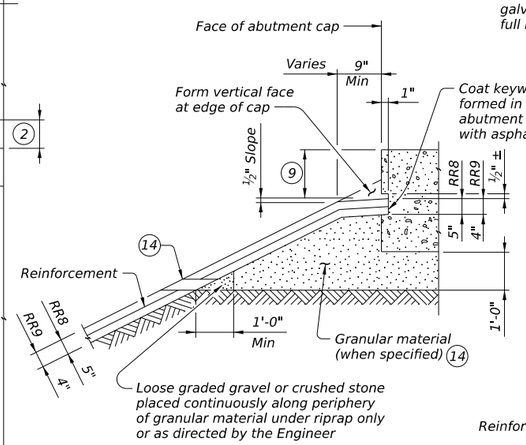
(Shoulder drain)



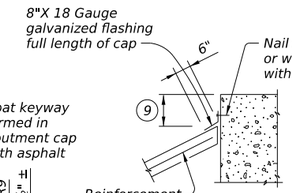
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

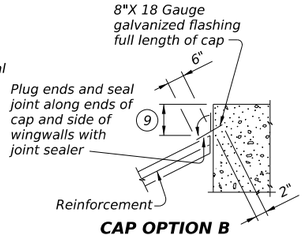
(As directed by the Engineer)



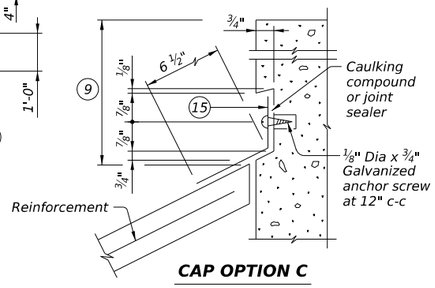
SHOWING KEYWAY OPTION



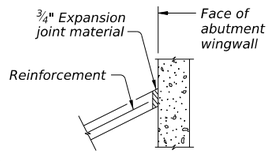
CAP OPTION A



CAP OPTION B

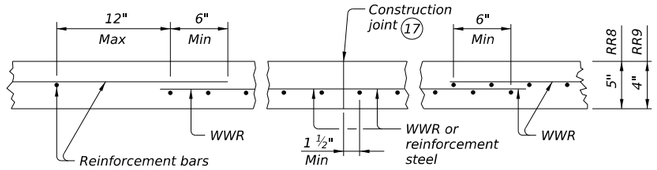


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

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

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

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.
Provide Grade 60 reinforcing steel.
Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
Optionally synthetic fibers may be used if approved by the Engineer.
Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap."
See Bridge Layout for limits of riprap.
RR8 is to be used on stream crossings.
RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
BRIDGE END EMBANKMENTS (TYPES RR8 & RR9)
CRR

FILE: MS-CRR-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		88

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LOC NO.	TCP PHASE	PLAN SHEET NUMBER (optional)	LOCATION DESCRIPTION OF LOCATION. (CROSS STREET, GORE, LEFT OR RIGHT, ETC)	STA APPROX. STATION NUMBER OF CC	TEST LEVEL TL2=<=45MPH TL3=ALL SPEEDS	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD: PROPOSED MATERIAL (WHAT MATERIAL WILL THE CRASH CUSHION BE ANCHORED TO? CONCRETE , ASPHALT, ETC)	FOUNDATION PAD: PROPOSED THICKNESS	FOUNDATION PAD: IS THE EXISTING SURFACE SUFFICIENT TO ANCHOR THE CRASH CUSHION? (YES/NO)	BACKUP SUPPORT (OBJECT BEING SHIELDED): DESCRIPTION (SINGLE SLOPE, F-SHAPE, BRIDGE RAIL TYPE)	BACKUP SUPPORT: WIDTH (WIDEST WIDTH OF OBJECT BEING SHIELDED)	BACKUP SUPPORT: HEIGHT (HEIGHT OF OBJECT BEING SHIELDED)	AVAILABLE SITE LENGTH (LONGITUDINAL SPACE AVAILABLE TO INSTALL CRASH CUSHION)	CRASH CUSHION: INSTALL	CRASH CUSHION: REMOVE	MOVE / RESET: MOVE/ RESET	MOVE / RESET: FROM LOC.#	L N	L W	R N	R W	S N	S W	ENTER REF# FOR EACH STANDARD TO BE CONSIDERED AT EACH INSTALL LOCATION (SEE TABLE)
1	PERM	XXX	BEGINNING OF PROJECT	38+30	TL2	BI	CONC	6"	NO	T221	48"	32"		X						X				10,12

12-01-2025

TBPELS FIRM #312

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

1. If all standard sheets for selected category are not relevant an explanation is required under item 545 in general notes.

Ref.	# Low Mainenance	Ref.	# Reusable	Ref.	# Sacrificial
1	QGELITE(M10)(N)	10	QGUARD(M10)(N)	19	SSCC
2	QGELITE(M10)(W)	11	QG(M)(W)	20	CATCB(1)
3	REACT(M)	12	TAU(M)(N)	21	MATT(1)
4	REACT(W)	13	TAU-II(W)	22	ABSORB(M)
5	SMTC(N)	14	TRACC(W)	23	SLEDMINI
6	SMTC(W)	15	DELTACC	24	SLED
7	TAU-XR(N)	16		25	VIA(SFPM)
8	TAU-II-R(W)	17		26	
9		18		27	

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.

http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

VERSION 09-06-2024

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: CES	CK: KM		CK:
© TxDOT Sept 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST		COUNTY	SHEET NO.
	DAL		DENTON	89

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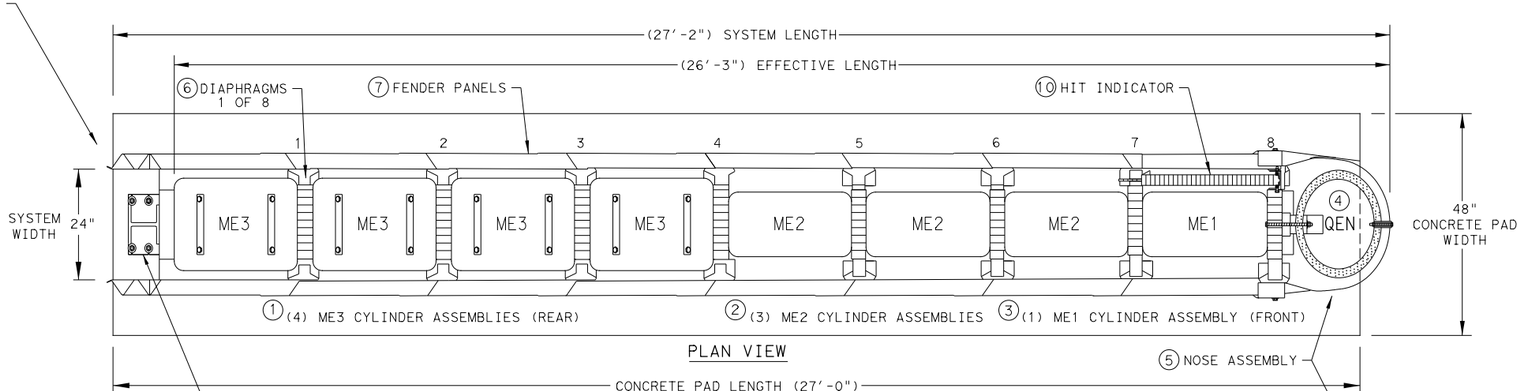
DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/qgelitem10n20.dgn

NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD ELITE M10 TO THE OBJECT BEING SHIELDED.

QUADGUARD EITE M10 24" WIDE (8 BAY) SYSTEM



PLAN VIEW

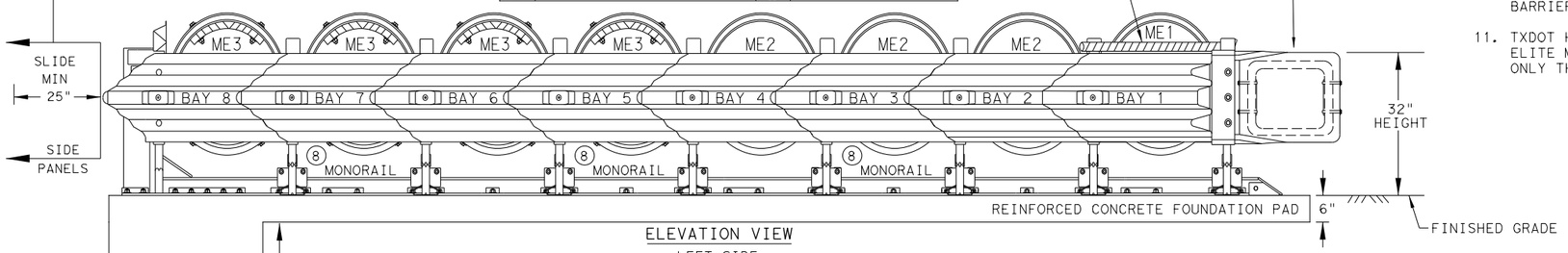
⑨ SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

KEY		KEY	
①	ME3 CYLINDER ASSEMBLIES	⑥	DIAPHRAGMS
②	ME2 CYLINDER ASSEMBLIES	⑦	FENDER PANELS
③	ME1 CYLINDER ASSEMBLY	⑧	MONORAILS
④	QEN CYLINDER	⑨	TYPE OF BACKUP
⑤	NOSE BELT ASSEMBLY	⑩	HIT INDICATOR

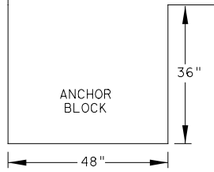
④ QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY ⑤

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 25" MIN.

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.



ELEVATION VIEW
LEFT SIDE



NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD ELITE M10 FIELD INSTALATION AND INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY REQUIRED FOR THE TRANSITION WILL BE PROVIDED BY THE MANUFACTURER TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

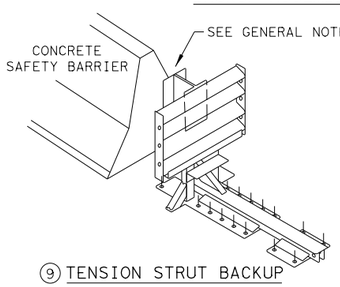
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

NOTE:
THE QUADGUARD ELITE M10 8-BAY, 24" WIDE - NARROW SYSTEM TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024E	CYLINDER TYPES IN BAYS			
BAYS	8	TYPE-ME3	TYPE-ME2	TYPE-ME1	TYPE-QEN
DIAPHRAGMS	8	4	3	1	1
WIDTH	24"	REAR	FRONT		NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS

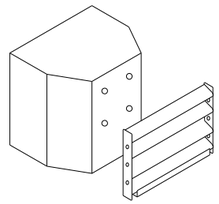


⑨ TENSION STRUT BACKUP

SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD ELITE M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).



⑨ CONCRETE BACKUP

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD ELITE M10 SYSTEM AND IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1(888)323-6374.
2. SEE THE RECENT QUADGUARD ELITE M10 PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD ELITE M10 AT ANY GIVEN LOCATION.
3. FOR BI-DIRECTIONAL TRAFFIC: THE LOCATION AND OR WIDTH OF THE QUADGUARD ELITE M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD ELITE M10, THE QUADGUARD ELITE M10 SHOULD NOT EXTEND FURTHER INTO THE TRAFFIC-SIDE OF THE BARRIER THAN THE OBSTACLE. ANY TRANSITION INSTALLED MUST EITHER BE TANGENT TO BOTH QUADGUARD ELITE M10 AND OBSTACLE OR MUST ANGLE TOWARD FIELD SIDE OF THE BARRIER.
4. SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD ELITE M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
5. COMPONENTS FOR THE QUADGUARD ELITE (M10) BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
6. CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa [4,000 PSI] (P.C.) OR 8" MIN. NON-REINFORCED 28MPa [4,000 PSI] CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
7. IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
8. THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS,OR DEPRESSIONS.
9. THE QUADGUARD ELITE M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
10. FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
11. TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD ELITE M10 SYSTEM. THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION AND ASSEMBLY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD ELITE M10 (MASH TL-3)

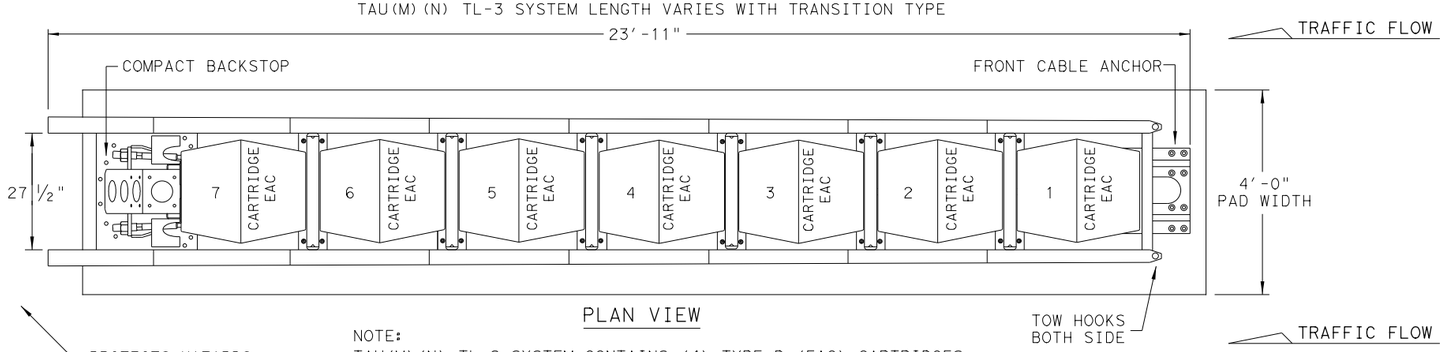
QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		90

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 11/25/2025
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/taumn19.dgn

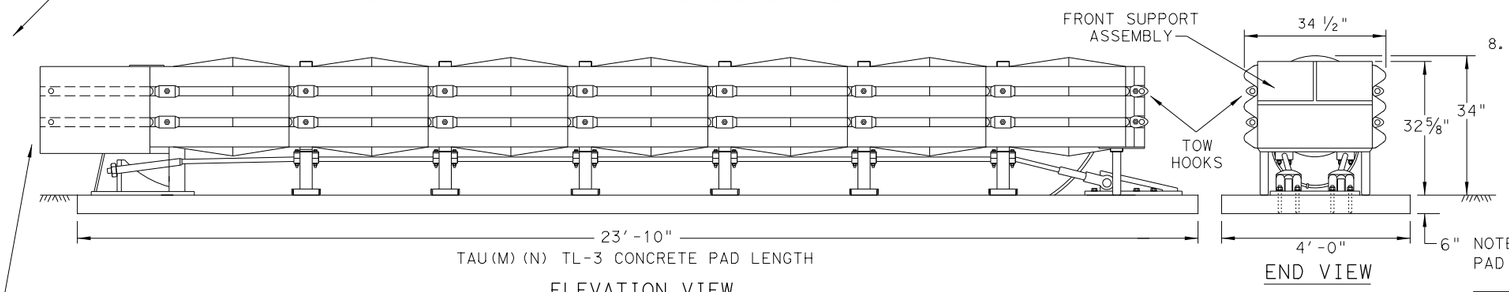
TAU(M)(N) TL-3 SYSTEM LENGTH VARIES WITH TRANSITION TYPE



PLAN VIEW

PROTECTS HAZARDS UP TO 30" WIDTH

NOTE:
TAU(M)(N) TL-2 SYSTEM CONTAINS (4) TYPE B (EAC) CARTRIDGES. INSTALLED ON ROADWAYS WITH MAXIMUM SPEEDS OF 45 MPH.



ELEVATION VIEW

END VIEW

NOTE:
PAD THICKNESS VARIES - SEE FOUNDATION OPTIONS

NOTES:
TRANSITIONS AND ATTACHMENTS TO VARIOUS BARRIER SHAPES, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS MANUAL FOR ADDITIONAL TRANSITION DETAILS.

NOTE:
CONCRETE FOUNDATION PAD LENGTH VARIES WITH TL-3 AND TL-2 SYSTEMS, SEE SYSTEM & FOUNDATION LENGTH TABLE.

FOUNDATION OPTIONS
6" REINFORCED CONCRETE
8" UNREINFORCED CONCRETE
ASPHALT OVER CONCRETE WITH MINIMUM 6" EMBEDMENT IN CONCRETE
⚹ 6" ASPHALT OVER 6" COMPACT SUBBASE
⚹ 8" MINIMUM ASPHALT

SYSTEM & FOUNDATION LENGTH TABLE	
SYSTEM LENGTH	FOUNDATION LENGTH
TL-2 = 15′-5"	TL-2 = 15′-4"
TL-3 = 23′-11"	TL-3 = 23′-10"

⚹ NOTE:
REQUIRES AN ASPHALT ANCHORAGE PACKAGE: INCLUDES ADDITIONAL BRACES FOR THE FRONT CABLE ANCHOR AND THE COMPACT BACKSTOP, AND ASPHALT HARDWARE KIT. THE TL-3 ASPHALT CONFIGURATION ALSO REQUIRES NESTED SLIDER PANELS AND SHIMS AT THE LAST TWO BAYS. SEE MANUFACTURER'S INSTALLATION INSTRUCTION MANUAL FOR DETAILS.

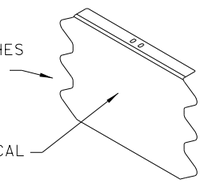
NOTE:
SEE MANUFACTURER'S INSTALLATION INSTRUCTION MANUAL FOR FOUNDATION SPECIFICATIONS THAT INCLUDE, STONE AGGREGATE MIX, COMPRESSION STRENGTH, STEEL SIZE, ANCHOR SIZE, AND EMBEDMENT DEPTH.

TRANSITION OPTIONS	
USE THE COMPACT BACKSTOP	VERTICAL WALL
	CONCRETE TRAFFIC BARRIERS
	W-BEAM GUARDRAIL
	THRIE BEAM GUARDRAIL

NOTE:
FOR BI-DIRECTIONAL TRANSITION PANELS AND BRIDGE RAIL END SHOE DETAILS. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS MANUAL.

⚹⚹ NOTE:
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
DELINEATION BRACKET ATTACHES TO FRONT SUPPORT ASSEMBLY.



DELINEATION BRACKET

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE DELINEATION BRACKET. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. REFER TO THE LATEST (LTS) INSTALLATION INSTRUCTION MANUAL FOR IMPORATANT SAFETY MESSAGES, COMPLETE SYSTEM ASSEMBLY, AND ANCHOR INSTALLATION REQUIREMENTS FOR THE NINE (9) DIFFERENT SITE TRANSITIONS.
3. INSTALLATION DETAILS FOR THE COMPACT BACKSTOP, FRONT CABLE ANCHOR AND FOUNDATION OPTIONS ARE SHOWN ON THE INSTALLATION INSTRUCTION MANUAL FURNISHED TO THE ENGINEER.
4. CONCRETE SHALL BE CLASS "S" WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 P.S.I.
5. IF THE CROSS-SLOPES VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE TAU(M)(N) SYSTEM SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTER LINE OF MERGING BARRIERS.
8. THIS DRAWING REPRESENTS THE UNIVERSAL TAU(M)(N) TL-3 SYSTEM, A RE-DIRECTIVE NON-GATING CRASH CUSHION THAT CAN PROTECT HAZARDS UP TO 30-INCHES IN WIDTH. ALSO AVAILABLE IN TL-2 CONFIGURATION.

BILL OF MATERIALS FOR TAU(M)(N) TL-3 & TL-2 SYSTEMS		QUANTITIES	
PART NUMBER	PART DESCRIPTION	TL-3 SYSTEM	TL-2 SYSTEM
BSI-1708019-00	SLIDING PANEL GALVANIZED TAU(M)(N)	14	8
BSI-1708030-00	END PANEL, THRIE BEAM, GALV, TAU(M)(N)	2	2
BSI-1706001-00	CABLE ASSEMBLY, 7 BAY, TAU(M)(N)	2	-
BSI-1805036-00	CABLE ASSEMBLY, 4 BAY, TAU(M)(N)	-	2
BSI-1708018-00	FRONT CABLE ANCHOR	1	1
BSI-1707034-00	COMPACT BACKSTOP	1	1
B030703	MIDDLE SUPPORT ASSEMBLY	6	3
B030704	FRONT SUPPORT	1	1
B010722	ENERGY ABSORBING CARTRIDGE, TYPE B	7	4
K001005	TAU-II FRONT SUPPORT LEG KIT	1	1
BSI-1709083-KT	TETHER KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1809041-KT	SLIDER KIT (INCLUDES ALL HARDWARE)	7	4
BSI-1808033-KT	CABLE GUIDE KIT (INCLUDES ALL HARDWARE)	6	3
BSI-1809040-KT	TOW HOOK KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1808034-KT	DELINEATION BRACKET KIT(INCLUDES ALL HARDWARE)	1	1
BSI-1808035-KT	END PANEL MOUNT KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1808036-KT	CONCRETE ANCHORING KIT	1	1
⚹⚹ SEE NOTE	HIGH REFLECTIVE DECAL	1	1
ECN 3883	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

NOTES:
UPGRADE KITS ARE AVAILABLE TO RETROFIT EXISTING NCHRP 350 TAU-II SYSTEMS TO MASH COMPLIANT SYSTEMS. SEE MANUFACTURER'S PRODUCT INFORMATION.

THE TAU(M)(N) UNIDIRECTIONAL SYSTEM IS FREE STANDING AND IS NOT REQUIRED TO BE CONNECTED TO THE HAZARD.

TRANSITIONS TO GUARD FENCE, BRIDGE RAILS AND ROADSIDE BARRIERS SHALL BE IN ACCORDANCE WITH TxDOT'S POLICY.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE UNIVERSAL TAU(M)(N) SYSTEM, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTION MANUAL.

REUSABLE

Texas Department of Transportation — Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS

UNIVERSAL CRASH CUSHION (MASH TL-3 & TL-2)

TAU(M)(N)-19

FILE: taumn19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: APRIL 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		91

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW1	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/11/23
CSJ	0918-46-316	Station	39+10.56	Grnd. Elev.	539.96 ft
		Offset	2.53' RT	GW Elev.	509.96 ft

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
539.5			ASPHALT, 6 inches							
539.2			BASE, 3 inches							
		33 (6) 31 (6)	CLAY, very stiff to hard; reddish brown; trace ferrous nodules; sandy (CL)			5.3				P.P. = 4.5+
						9.6	34	21		P.P. = 4.5+; Sulfate PPM : 320, -#200=52.5
535.0	5	44 (6) 47 (6)	CLAY, very stiff; reddish brown; trace ferrous nodules; with sand (CL)			12.6				P.P. = 4.5+
						10.6	32	19		P.P. = 4.5+, -#200=87.9
530.0	10	21 (6) 50 (5)	SHALE, moderately weathered; soft to very hard; brown, gray; with sand seams			11.2				P.P. = 4.5+
	15	50 (1.5) 50 (0.5)				16.1				P.P. = 4.5+
	20	50 (0.5) 50 (0.75)				14.0				P.P. = 4.5+
	25	50 (1.5) 50 (0.75)				15.4				Bag Sample (Grab)
	30	50 (0.5) 50 (0.5)				16.3				Bag Sample (Grab)
505.0	35	50 (3) 50 (2)				29.6				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7101139.1482 2418834.2471
-seepage at 30 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW2	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/23/23
CSJ	0918-46-316	Station	39+53.64	Grnd. Elev.	536.13 ft
		Offset	3.26' RT	GW Elev.	506.13 ft

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
535.6			ASPHALT, 6 inches							
535.4			BASE, 2 inches							
		4 (6) 13 (6)	CLAY, soft to stiff; brown, reddish tan; trace ferrous nodules; with shale fragments below 2 feet (CH)			7.3				P.P. = 4.5+
						13.6	53	36		P.P. = 4.5+, -#200=92.0
	5	50 (3) 50 (4.5)				9.6				P.P. = 4.5+, Sulfate PPM = 1,480
530.1			SHALE, highly to completely weathered; soft to hard; brown, tan, gray; trace ferrous stains, sand seams			15.1				SPT MOD = 14, 16, 22 (38), -#200=83.1
	10	50 (5.5) 50 (4)				13.2				SPT MOD = 4, 11, 31 (42)
	15	50 (1) 50 (1.5)				12.7				P.P. = 4.5+
	20	50 (1.5) 50 (1.5)				14.1				Bag Sample (Grab)
512.1			SHALE, fresh; soft to hard; gray, dark gray; with sandstone layers							
	25	50 (1) 50 (2)				15.7				Bag Sample (Grab)
	30	38 (6) 47 (6)				19.5				Bag Sample (Grab)
501.1	35	50 (2.5) 20 (2.5)				28.5				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7101182.2282 2418834.0766
-seepage at 30 feet during drilling
-water measured at 30 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 1 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		92

DATE: 11/25/2025 2:39:05 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-07.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW3	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/21/23
CSJ	0918-46-316	Station	42+34.70	Grnd. Elev.	528.53 ft
		Offset	12.57' LT	GW Elev.	514.53 ft

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
528.5			ASPHALT, 1 inch							
527.5			CONCRETE, 11 inches							
		7 (6) 5 (6)	SAND, loose; brown; silty (SM)			12.7				P.P. = 1.5
523.5	5	8 (6) 9 (6)	SAND, loose to slightly compact; brown; silty, clayey (SC-SM)			14.6	NP	NP		P.P. = 1.0, Sulfate PPM = 120, -#200=34.5
						14.8				P.P. = 1.75
	10	2 (6) 4 (6)				16.3	20	5		P.P. = 0.5, -#200=41.0
514.5			GRAVEL, slightly compact; tan; poorly-graded; with clay (GP-GC)							
	15	13 (6) 13 (6)				17.4				P.P. =1.0
	20	10 (6) 12 (6)				11.9				Bag Sample (Grab), -#200=7.6
504.5			SHALE, fresh; very soft to hard; gray, dark gray							
	25	16 (6) 15 (6)				15.3				Bag Sample (Grab)
	30	50 (2.5) 50 (0.25)				24.6				Bag Sample (Grab)
493.5	35	50 (1) 50 (6)				18.8				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7101462.8996 2418812.3574
-seepage at 14 feet during drilling
-water measured at 14 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW4	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/21/23
CSJ	0918-46-316	Station	43+64.01	Grnd. Elev.	531.89 ft
		Offset	11.94' LT	GW Elev.	516.89 ft

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
531.5			ASPHALT, 4.5 inches							
531.3			CONCRETE, 3 inches			18.1				P.P. = 4.5+
529.4		25 (6) 15 (6)	FILL, SAND; slightly compact; reddish tan, brown, gray; trace cemented sand fragments (SC)			7.9				P.P. = 4.5+
	5	4 (6) 3 (6)	SAND, loose; reddish tan, brown, gray; trace cemented sand fragments; clayey (SC)			7.9	23	9		P.P. = 4.5+, -#200=28.4
						15.5				P.P. = 1.25, Sulfate PPM = 120
521.9	10	16 (6) 31 (6)	SHALE, highly to completely weathered; soft to hard; brown, gray; trace sand seams			17.9				P.P. = 3.75
	15	50 (2) 50 (1)				19.0				P.P. = 1.5
511.9	20	50 (0.25) 50 (1)	SHALE, fresh; soft to very hard; gray, dark gray			20.1				Bag Sample (Grab)
	25	50 (1) 50 (0.5)				15.1				Bag Sample (Grab)
	30	50 (4) 34 (6)				19.0				Bag Sample (Grab)
496.9	35	50 (1.5) 50 (0.25)				22.1				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7101592.1953 2418810.2811
-seepage at 15 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025
MARK G. THOMAS 103791 LICENSED PROFESSIONAL ENGINEER
Mark G. Thomas
TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 2 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		93

DATE: 11/25/2025 2:39:33 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-08.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW5	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/23/23
CSJ	0918-46-316	Station	42+30.23	Grnd. Elev.	528.39 ft
		Offset	0.20' LT	GW Elev.	511.39 ft

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
527.6			ASPHALT, 10 inches			43.5				
		4 (6) 16 (6)	FILL, SAND; slightly compact; reddish brown, dark gray; trace gravel (SM)			7.3	NP	NP		P.P. = 3.0
523.4	5	4 (6) 5 (6)				17.1				P.P. = 1.5, -#200=35.9
			SAND, slightly compact; brown; silty, clayey (SC-SM)							P.P. = 1.5
						21.7				P.P. = 0.25
	10	6 (6) 16 (6)				19.7	20	5		P.P. = 1.0, -#200=37.2
515.4			SAND, loose; brown; clayey (SC)							
	15	5 (6) 8 (6)				20.6	34	18		P.P. = 1.75, -#200=42.2
508.4	20	50 (0.5) 50 (0.25)	SHALE, highly to completely weathered; soft to very hard; brown, gray			26.7				Bag Sample (Grab)
	25	28 (6) 44 (6)				34.0				Bag Sample (Grab)
498.4	30	50 (1.5) 50 (1)	SHALE, fresh; hard; gray			36.8				Bag Sample (Grab)
493.4	35	50 (1.5) 50 (0.25)				17.7				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7101458.6863 2418824.8219
-seepage at 17 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW6	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/31/23
CSJ	0918-46-316	Station	43+51.78	Grnd. Elev.	531.52 ft
		Offset	1.34' RT	GW Elev.	503.52 ft

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
531.0			ASPHALT, 6.5 inches			6.3				P.P. = 4.5+
		24 (6) 26 (6)	SAND, loose to compact; reddish brown; trace ferrous nodules; silty (SM)			9.6	20	3		P.P. = 4.5+, -#200=17.0
	5	28 (6) 28 (6)				7.3				
						11.0	NP	NP		P.P. = 2.5, -#200=17.3
521.5	10	31 (6) 42 (6)				17.4				P.P. = 4.0
			SILT, very stiff; brown, gray (ML)							
516.5	15	21 (6) 50 (1.5)	SHALE, fresh; soft to hard; gray			15.7	NP	NP		P.P. = 3.0, -#200=67.2
	20	50 (3.25) 50 (4.5)				19.7				Bag Sample (Grab)
	25	50 (1.75) 50 (0.25)				25.1				Bag Sample (Grab)
	30	28 (6) 29 (6)				35.1				Bag Sample (Grab)
496.5	35	50 (1.75) 50 (1.25)				24.1				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7101580.2352 2418823.7688
-seepage at 28 feet during drilling
-water measured at 28 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER

Mark G. Thomas

GEOTEX ENGINEERING
TBPELS FIRM #12796

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 3 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		94

DATE: 11/25/2025 2:40:00 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-09.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW7	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/21/23
CSJ	0918-46-316	Station	72+54.50	Grnd. Elev.	531.41 ft
		Offset	5.36' RT	GW Elev.	509.41 ft

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
531.3			ASPHALT, 1 inch							
530.8			CONCRETE, 4 inches							
529.9			FILL, SAND; slightly compact; reddish tan, brown, gray; trace cemented sand fragments (SC)			14.2				P.P. = 4.5+
		22 (6) 17 (6)				5.4				P.P. = 4.5+, Sulfate PPM = 140
	5	14 (6) 12 (6)	SAND, slightly compact; reddish brown, light brown; trace ferrous nodules; poorly-graded with silt (SP-SM)			1.8	NP	NP		Bag Sample (Grab), -#200=7.9
525.4			CLAY, soft to stiff; brown, reddish brown; trace ferrous nodules; with sand (CL)							
						14.8				P.P. = 4.5+
	10	6 (6) 6 (6)				18.8	47	32		P.P. = 4.5+, -#200=77.1
516.4	15	50 (6) 50 (3.5)	SHALE, highly to completely weathered; soft to hard; brown			18.7				P.P. = 4.5+
	20	23 (6) 19 (6)				22.5				Bag Sample (Grab)
506.4	25	50 (2.75) 50 (1.25)	SHALE, fresh; soft to hard; gray			24.0				Bag Sample (Grab)
	30	50 (1) 50 (1)				16.5				Bag Sample (Grab)
496.4	35	50 (3.5) 50 (4.5)				20.8				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7104482.3953 2418809.9523
seepage at 22 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrera (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW8	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/20/23
CSJ	0918-46-316	Station	73+86.74	Grnd. Elev.	528.21 ft
		Offset	4.89' RT	GW Elev.	512.21 ft

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
528.0			ASPHALT, 2.5 inches							
527.2			FILL, SAND; slightly compact; brown; some gravel (SC)			13.1				P.P. = 4.5+
		13 (6) 16 (6)	CLAY, stiff; reddish brown; trace ferrous nodules; sandy, silty (CL-ML) (CL)			12.9				P.P. = 4.5+
523.2	5	11 (6) 12 (6)	SAND, slightly compact; reddish brown; trace ferrous nodules; silty (SM)			5.7	19	6		P.P. = 4.5+, -#200=50.3
						9.9				P.P. = 1.5
	10	7 (6) 7 (6)				13.9	NP	NP		P.P. = 1.75, Sulfate PPM = 120, -#200=34.0
	15	15 (6) 15 (6)				16.6				P.P. = 0.5
510.2			SAND, very loose to slightly compact; brown, reddish brown; silty (SM)							
	20	11 (6) 8 (6)				19.8				P.P. = 0.5
	25	2 (6) 1 (6)				17.5	NP	NP		P.P. = 0.75, -#200=27.2
498.2	30	19 (6) 14 (6)	SHALE, fresh; hard; gray			22.5				SPT MOD = 42, 50=6" (50)
493.2	35	50 (1) 50 (1.25)				19.8				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7104614.8320 2418809.1105
-seepage at 16 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrera (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 4, 2025

MARK G. THOMAS 103791 LICENSED PROFESSIONAL ENGINEER

TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 4 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		95

DATE: 11/25/2025 2:40:27 PM
FILE: pw://halff-pw.bentley.com:halff_pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-10.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	RW9	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/31/23
CSJ	0918-46-316	Station	73+14.23	Grnd. Elev.	529.81 ft
		Offset	5.70' RT	GW Elev.	507.81 ft

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
529.7			ASPHALT, 2 inches							
529.3			CONCRETE, 4 inches							
			CLAY, soft to stiff; reddish brown; trace ferrous nodules; sandy (CL)			11.5				P.P. = 4.5+
		2 (6) 2 (6)				19.2	26	12		P.P. = 4.5+, -#200=68.3
524.8	5	30 (6) 25 (6)				7.7				Bag Sample (Grab)
			CLAY, soft; brown, gray; with sand (CL)							
						13.1	43	25		P.P. = 3.0, -#200=81.4
	10	8 (6) 9 (6)				13.4				P.P. = 2.5
516.8			CLAY, soft; brown; sandy (CL)							
	15	6 (6) 10 (6)				17.3	31	17		P.P. = 0.25, -#200=50.4
511.8			SHALE, fresh; soft to hard; gray, dark gray							
	20	50 (2.75) 50 (1.5)				20.2				Bag Sample (Grab)
	25	50 (1.25) 50 (0.75)				18.5				P.P. = 1.25
						30.4				
	30	50 (3) 50 (0.5)								Bag Sample (Grab)
494.8	35	50 (2) 50 (3.5)				21.8				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7104542.3256 2418810.1032
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	RW10	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/1/23
CSJ	0918-46-316	Station	74+38.46	Grnd. Elev.	527.20 ft
		Offset	4.35' RT	GW Elev.	513.20 ft

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
527.0			ASPHALT, 2 inches							
526.6			BASE, 5.5 inches							
			CLAY, soft to stiff; reddish brown, brown; trace ferrous nodules; sandy; some gravel below 25 feet (CL)			18.3				P.P. = 4.5+
		3 (6) 2 (6)								P.P. = 2.0
	5	8 (6) 10 (6)				17.2	28	15		P.P. = 1.5, -#200=67.9
						15.1				P.P. = 3.0
	10	6 (6) 9 (6)				15.3	25	13		P.P. = 2.5, -#200=65.8
	15	4 (6) 11 (6)				19.8				P.P. = 2.0
	20	16 (6) 10 (6)				11.1	23	10		Bag Sample (Grab), -#200=55.3
502.2	25	50 (4) 50 (1.25)	SHALE, fresh; soft to hard; gray, dark gray; trace sandstone fragments			29.0				Bag Sample (Grab)
	30	50 (3.25) 50 (1)				19.3				P.P. = 4.5+
492.2	35	50 (4) 50 (1)				24.9				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7104666.4912 2418808.8807
-seepage at 14 feet during drilling
-water measured at 14 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
GEOTEX ENGINEERING FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 5 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		96

DATE: 11/25/2025 2:40:54 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-11.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1	County	Denton	Hole	RW11	District	Dallas
	Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/20/23
	CSJ	0918-46-316	Station	80+03.54	Grnd. Elev.	528.81 ft
			Offset	2.46' RT	GW Elev.	508.81 ft

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
528.5			ASPHALT, 3.5 inches							
			BASE, 20 inches							
526.8						11.8				P.P. = 4.5+
		24 (6) 30 (6)	SAND, compact; brown, reddish brown; clayey, silty (SC-SM)			10.8				P.P. = 4.5+
5		24 (6) 24 (6)				7.1	18	6		P.P. = 4.5+, -#200=29.4
520.8						16.2				P.P. = 0.25, Sulfate PPM = 120
			SAND, compact; brown, reddish brown; clayey (SC)							
10		12 (6) 13 (6)				11.0	20	8		P.P. = 0.50, -#200=33.9
513.8		9 (6) 9 (6)				15.6				Bag Sample (Grab)
15			SAND, loose to compact; brown, gray; trace gravel and ferrous nodules; poorly-graded with silt (SP-SM)							
20		14 (6) 17 (6)				16.5				P.P. = 0.25
25		25 (6) 25 (6)				17.1	NP	NP		SPT MOD = 18, 18, 24 (42), -#200=6.7
30		12 (6) 11 (6)				15.9				SPT MOD = 24, 23, 22 (45)
493.8		18 (6) 18 (6)				17.1				SPT MOD = 20, 27, 26 (53)
35										

Remarks: -Northing/ Easting: 7105231.5676 2418812.7774
-seepage at 20 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1	County	Denton	Hole	RW12	District	Dallas
	Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/20/23
	CSJ	0918-46-316	Station	81+32.18	Grnd. Elev.	531.72 ft
			Offset	4.38' RT	GW Elev.	514.72 ft

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
531.5			ASPHALT, 2.5 inches							
			BASE, 17 inches							
530.2			SAND, compact; reddish brown; trace to few ferrous nodules; clayey (SC)			11.9				P.P. = 4.5+
		24 (6) 25 (6)				10.6				P.P. = 4.5+
5		24 (6) 36 (6)				10.9	26	13		P.P. = 4.5+, Sulfate PPM = 120, -#200=49.2
						6.8				P.P. = 4.5+
521.7	10	17 (6) 13 (6)				5.0				P.P. = 0.25
			SAND, loose to slighly compact; reddish brown, tan; poorly-graded with silt (SP-SM)							
15		15 (6) 13 (6)				15.3	NP	NP		P.P. = 0.25, -#200=10.9
20		10 (6) 8 (6)				17.5				P.P. = 1.25
508.7			SAND, slightly compact to compact; reddish brown, tan; silty (SM)							
25		17 (6) 18 (6)				18.8	NP	NP		Bag Sample (Grab), -#200=17.7
30		23 (6) 24 (6)				20.1				SPT MOD = 14, 24, 29 (54)
496.7		37 (6) 27 (6)				17.6				SPT MOD = 24, 27, 22 (49)
35										

Remarks: -Northing/ Easting: 7105360.1815 2418816.0089
-seepage at 17 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

MARK G. THOMAS 103791 PROFESSIONAL ENGINEER

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 6 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		97

DATE: 11/25/2025 2:41:22 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-12.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW13	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/1/23
CSJ	0918-46-316	Station	79+74.84	Grnd. Elev.	528.24 ft
		Offset	2.68' RT	GW Elev.	514.24 ft

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
527.6			ASPHALT, 8 inches							
			SAND, loose to compact; reddish brown, tan; clayey (SC)			8.1				P.P. = 4.5+
		3 (6) 6 (6)				13.0				P.P. = 4.5+
5		23 (6) 19 (6)				9.3	25	13		P.P. = 4.5+, -#200=47.5
520.2						8.4				P.P. = 3.5
			SAND, loose to slightly compact; reddish brown, tan; little to few gravel; silty (SP-SM)							
10		15 (6) 14 (6)				7.2	NP	NP		Bag Sample (Grab), -#200=11.8
15		8 (6) 9 (6)				16.9				Bag Sample (Grab)
510.2			SAND, compact; reddish brown, tan; poorly-graded (SP)							
20		28 (6) 22 (6)				17.8	NP	NP		SPT MOD = 3, 2, 2 (4), -#200=3.6
25		25 (6) 35 (6)				19.6				SPT MOD = 6, 17, 30 (47)
500.2			SAND, slightly compact; reddish brown, tan; poorly-graded with silt (SP-SM)							
30		16 (6) 19 (6)				17.3	NP	NP		Bag Sample (Grab), -#200=10.8
493.2		15 (6) 17 (6)				16.8				Bag Sample (Grab)
35										

Remarks: -Northing/ Easting: 7105202.8594 2418812.6982
-seepage at 14 feet during drilling
-water measured at 14 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW14	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/1/23
CSJ	0918-46-316	Station	81+47.22	Grnd. Elev.	532.14 ft
		Offset	3.75' 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
532.1			ASPHALT, 1 inch							
531.5			CONCRETE, 6.5 inches							
			CLAY, soft to very stiff; reddish brown; trace ferrous nodules and gravel; sandy (CL)			14.2				P.P. = 4.5+
		4 (6) 5 (6)				12.9				P.P. = 4.5+
5		30 (6) 36 (6)				10.8	28	16		P.P. = 4.5+, -#200=50.4
524.1						7.1				P.P. = 4.5+
			SAND, loose to slightly compact; reddish brown; some gravel; poorly-graded (SP)							
10		12 (6) 20 (6)				4.4				P.P. = 0.25
15		14 (6) 16 (6)				19.0	NP	NP		SPT MOD = 2, 6, 40 (46), -#200=3.9
509.1			SAND, slighty compact; reddish brown; clayey (SC)							
20		5 (6) 6 (6)				17.0				SPT MOD = 8, 21, 21 (42)
25		6 (6) 14 (6)				14.5	25	10		Bag Sample (Grab), -#200=21.4
503.1			CLAY, stiff; brown, gray; trace cemented sandstone fragments (CL)							
30		10 (6) 13 (6)				19.2				Bag Sample (Grab)
497.1		15 (6) 10 (6)				21.7				Bag Sample (Grab)
35										

Remarks: -Northing/ Easting: 7105375.2250 2418815.5357
-dry during drilling
-dry upon completion
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

MARK G. THOMAS 103791 LICENSED PROFESSIONAL ENGINEER

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 7 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		98

DATE: 11/25/2025 2:41:49 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-13.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	RW15	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/20/23
CSJ	0918-46-316	Station	89+01.99	Grnd. Elev.	532.99 ft
		Offset	3.11' RT	GW Elev.	507.99 ft

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
532.4			ASPHALT, 7 inches			9.2				
		6 (6) 8 (6)	CLAY, soft to stiff; brown, reddish brown, gray; trace ferrous nodules; sandy; with shale fragments (CL)			7.6	24	11		P.P. = 4.5+ P.P. = 4.5+, -#200=62.4
	5	11 (6) 15 (6)				9.5				P.P. = 4.5+
526.0			CLAY, very stiff; brown, reddish brown, gray; with sand and shale fragments (CL)			11.3	41	28		P.P. = 4.5+; Sulfate PPM : 240, -#200=77.7
	10	27 (6) 20 (6)				9.1				P.P. = 4.5+
519.0			CLAY, very stiff; gray; with ferrous stains; with sand and shale fragments (CH)			24.3	60	40		P.P. = 3.0, -#200=82.0
	15	16 (6) 13 (6)								
514.0			SAND, compact; dark brown, tan; trace to few cemented sand fragments; silty (SM)			16.0				P.P. = 0.75
	20	32 (6) 35 (6)								
	25	20 (6) 25 (6)				18.5	NP	NP		P.P. = 1.5, -#200=26.6
	30	24 (6) 30 (6)				14.7				Bag Sample (Grab)
498.0	35	26 (6) 20 (6)				19.9				P.P. = 0.25

Remarks: -Northing/ Easting: 7106112.2410 2418906.6144
-seepage at 25 feet during drilling
-water measured at 25 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	RW16	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/20/23
CSJ	0918-46-316	Station	90+82.04	Grnd. Elev.	529.36 ft
		Offset	3.18' RT	GW Elev.	509.36 ft

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
528.9			ASPHALT, 6 inches			8.9				P.P. = 2.0
		10 (6) 10 (6)	SAND, slightly compact to compact; reddish brown; with ferrous and calcareous nodules; clayey (SC)			12.0				P.P. = 4.5+
	5	15 (6) 25 (6)				8.3	25	14		P.P. = 4.5+; Sulfate PPM : 120, -#200=32.4
523.4			CLAY, very stiff; brown; with some ferrous nodules, ferrous stains, calcareous nodules and shale fragments (CL)			11.1				P.P. = 4.5+
	10	20 (6) 18 (6)				15.2	46	32		P.P. = 4.5+, -#200=92.5
515.4			SAND, slightly compact to compact; brown, gray; silty (SM)			21.2				P.P. = 0.75
	15	11 (6) 20 (6)								
	20	21 (6) 43 (6)				20.9				SPT MOD = 6, 6, 9
504.4	25	50 (3.25) 50 (3)	SHALE, completely weathered; soft; brown			16.0				SPT MOD = 14, 30, 32 (62)
	30	8 (6) 22 (6)				16.3				SPT MOD = 12, 19, 33 (52)
494.4	35	50 (4.5) 50 (3)				11.5				SPT MOD = 18, 20, 40 (60)

Remarks: -Northing/ Easting: 7106288.2389 2418945.3587
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
Mark G. Thomas
TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 8 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		99

DATE: 11/25/2025 2:42:16 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-14.dgn

DRILLING LOG

1 of 1

WinCore
Version 3.1

County	Denton	Hole	RW17	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/21/23
CSJ	0918-46-316	Station	89+41.34	Grnd. Elev.	531.86 ft
		Offset	3.92' RT	GW Elev.	513.86 ft

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
531.7			ASPHALT, 2.5 inches							
531.4			CONCRETE, 3.25 inches							
530.4			BASE, 11 inches			11.4				P.P. = 4.5+, Sulfate PPM = 360
		13 (6) 11 (6)	CLAY, soft to stiff; brown; with sand (CL)			11.8				P.P. = 4.5+
5		9 (6) 8 (6)				15.2	43	27		P.P. = 4.5+, -#200=78.6
						18.7				P.P. = 4.5+
10		9 (6) 11 (6)				17.5	42	27		P.P. = 4.5+, -#200=77.3
516.9	15	13 (6) 13 (6)	CLAY, stiff; brown; sandy (CL)			17.7				P.P. = 1.5
		12 (6) 12 (6)				17.8	28	16		P.P. = 0.75, -#200=58.7
506.9	25	50 (4) 50 (3.25)	SHALE, highly to completely weathered; soft; brown; trace to some sand seams			19.7				P.P. = 1.5
	30	32 (6) 28 (6)				19.7				Bag Sample (Grab)
496.9	35	50 (5) 50 (5)				21.1				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7106149.1076 2418921.0898
-seepage at 18 feet during drilling
-water measured at 18 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrera (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore
Version 3.1

County	Denton	Hole	RW18	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/20/23
CSJ	0918-46-316	Station	91+30.69	Grnd. Elev.	528.57 ft
		Offset	8.25' LT	GW Elev.	508.57 ft

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
528.4			ASPHALT, 2.5 inches							
527.9			CONCRETE, 6 inches							
		7 (6) 7 (6)	CLAY, soft to stiff; reddish brown; trace ferrous nodules; sandy (CL)			12.4	27	15		P.P. = 4.5+, -#200=54.3
523.6	5	13 (6) 8 (6)				7.1				P.P. = 4.5+
			SAND, slightly compact to dense; light brown; silty, clayey (SC-SM)			12.7				P.P. = 2.0, Sulfate PPM = 120
	10	11 (6) 13 (6)				16.6				P.P. = 1.5
	15	17 (6) 27 (6)				17.1	19	5		P.P. = 0.75, -#200=47.9
508.6	20	35 (6) 50 (5)	SAND, slightly compact to compact brown; reddish brown; some gravel; poorly-graded with silt (SP-SM)			18.1				P.P. = 0.25
	25	15 (6) 22 (6)				13.1				SPT MOD = 2, 3, 9 (12)
	30	20 (6) 24 (6)				11.4	NP	NP		SPT MOD = 10, 18, 19 (33), -#200=7.2
493.6	35	9 (6) 14 (6)				16.7				SPT MOD = 4, 3, 3 (6)

Remarks: -Northing/ Easting: 7106336.9897 2418934.2645
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrera (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 9 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		100

DATE: 11/25/2025 2:42:43 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-15.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW19	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/17/23
CSJ	0918-46-316	Station	100+01.25	Grnd. Elev.	527.60 ft
		Offset	8.70' LT	GW Elev.	507.60 ft

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
527.4			ASPHALT, 2.5 inches							
			BASE, 14.5 inches			23.5				P.P. = 2.5
526.1			CLAY, stiff; reddish tan; trace to few gravel; sandy (CL)							
		10 (6) 12 (6)				18.1	28	17		P.P. = 4.0, -#200=58.2
523.6			SAND, loose to slightly compact; reddish brown; silty, clayey (SC-SM)							
5		10 (6) 10 (6)				20.7				P.P. = 0.5
						10.2				P.P. = 1.0, Sulfate PPM = 140
10		6 (6) 4 (6)				13.9	21	5		P.P. = 1.0, -#200=31.2
512.6		7 (6) 7 (6)				18.1				SPT MOD = 4, 6, 6 (12)
15			SAND, loose to compact; brown; poorly-graded with silt (SP-SM)							
20		29 (6) 25 (6)				16.8				SPT MOD = 3, 3, 3 (6)
25		19 (6) 18 (6)				17.7	NP	NP		SPT MOD = 12, 14, 16 (30), -#200=9.3
30		19 (6) 17 (6)				17.3				SPT MOD = 9, 10, 15 (25)
492.6	35	8 (6) 12 (6)				18.8				SPT MOD = 5, 5, 7 (12)

Remarks: -Northing/ Easting: 7107207.5449 2418931.0949
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW20	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/17/23
CSJ	0918-46-316	Station	101+67.61	Grnd. Elev.	529.61 ft
		Offset	5.23' LT	GW Elev.	505.61 ft

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
529.4			ASPHALT, 3 inches							
			BASE, 13 inches			12.2				P.P. = 4.5+
528.1			CLAY, soft; brown, reddish brown; trace to calcareous nodules; sandy (CL)							
		6 (6) 7 (6)				13.6				P.P. = 3.5, Sulfate PPM = 120
524.6	5	9 (6) 9 (6)	SAND, loose to slightly compact; brown, reddish tan; silty (SM)			18.4	38	23		P.P. = 3.75, -#200=68.9
						12.8				P.P. = 4.5+
10		9 (6) 9 (6)				9.1	NP	NP		P.P. = 0.25, -#200=18.4
15		9 (6) 15 (6)				17.1				P.P. = 0.25
509.6	20	15 (6) 18 (6)	SAND, slightly compact to compact; brown; poorly-graded (SP)			22.9				Bag Sample (Grab)
25		35 (6) 23 (6)				18.8	NP	NP		SPT MOD = 16, 11, 11 (22), -#200=4.0
30		11 (6) 9 (6)				17.0				SPT MOD = 12, 12, 12 (24)
494.6	35	46 (6) 33 (6)				18.2				SPT MOD = 50=4.5" (50)

Remarks: -Northing/ Easting: 7107373.9718 2418936.0397
-seepage at 24 feet during drilling
-water measured at 24 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

GEOTEX ENGINEERING
TBPE FIRM #12796

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 10 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		101

DATE: 11/25/2025 2:43:10 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-16.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	RW21	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	10/19/23
CSJ	0918-46-316	Station	102+93.21	Grnd. Elev.	533.08 ft
		Offset	6.10' RT	GW Elev.	513.08 ft

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
532.6			ASPHALT, 6 inches							
			BASE, 12 inches							
531.1			CLAY, soft to stiff; light brown; sandy (CL)			12.1				P.P. = 4.5+
						14.6				P.P. = 4.5+, Sulfate PPM = 180
529.1			SAND, loose to slightly compact; reddish tan, light brown; trace to few ferrous nodules; silty, clayey (SC-SM)			5.4	18	4		P.P. = 2.0, -#200=30.0
	5	6 (6) 11 (6)								
525.1			SILT, hard; brown, gray; trace ferrous nodules (ML)			8.4				P.P. = 3.0
	10	49 (6) 42 (6)				18.2	NP	NP		P.P. = 2.5, -#200=85.8
519.1			SAND, slightly compact to dense; reddish brown; brown; silty (SM)			20.7	NP	NP		Bag Sample (Grab)
	15	26 (6) 29 (6)								
	20	50 (4.5) 50 (3)								
508.1	25	11 (6) 15 (6)	SAND, slighity compact; brown; few to little sandstone fragments; clayey (SC)			18.2				Bag Sample (Grab)
	30	18 (6) 18 (6)				20.7	41	28		Bag Sample (Grab), -#200=19.3
498.1	35	10 (6) 14 (6)				23.9				Bag Sample (Grab)

Remarks: -Northing/ Easting: 7107499.5302 2418948.3459
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Dustin Smith (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	RW22	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/7/23
CSJ	0918-46-316	Station	99+94.74	Grnd. Elev.	527.63 ft
		Offset	7.45' LT	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
527.3			ASPHALT, 4 inches							
526.6			BASE, 8 inches							
			CLAY, soft to very stiff; reddish brown, tan; trace ferrous nodules; sandy (CL)			8.5				P.P. = 4.5+
		8 (6) 13 (6)				12.0				P.P. = 4.5+
	5	28 (6) 34 (6)				10.6	26	11		P.P. = 4.5+, -#200=54.1
										P.P. = 4.5+
						7.0				P.P. = 3.5
517.6	10	6 (6) 7 (6)	SAND, loose to slightly compact; tan, brown; trace to few gravel; poorly-graded with silt; with weathered shale fragments below 34 feet (SP-SM)			14.4				
	15	10 (6) 12 (6)				16.7	NP	NP		SPT MOD = 2, 3, 4 (7), -#200=6.1
	20	16 (6) 21 (6)				18.1				SPT MOD = 6, 4, 4 (8)
	25	14 (6) 22 (6)				17.0				SPT MOD = 22, 20, 18 (38)
	30	9 (6) 11 (6)				17.2	NP	NP		SPT MOD = 10, 7, 5 (12), -#200=10.4
492.6	35	50 (3.75) 50 (3)				12.9				SPT MOD = 28, 32, 31 (63)

Remarks: -Northing/ Easting: 7107201.0346 2418932.3660
-dry during drilling
-dry upon completion
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 11 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		102

DATE: 11/25/2025 2:43:38 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-17.dgn

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW23	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/14/23
CSJ	0918-46-316	Station	101+64.48	Grnd. Elev.	529.63 ft
		Offset	5.20' RT	GW Elev.	516.63 ft

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
529.4			ASPHALT, 3 inches							
528.9			BASE, 6 inches							
			CLAY, stiff; tan; reddish brown; sandy, silty (CL-ML) (CL)			8.4				P.P. = 4.5+
		16 (6) 15 (6)				8.3	20	4		P.P. = 4.5+, -#200=58.3
		16 (6) 18 (6)				11.8				P.P. = 4.5+
524.6	5		SAND, loose; reddish brown; silty, clayey (SC-SM)							
						13.8				P.P. = 4.5+
	10	9 (6) 8 (6)				14.8	22	6		P.P. = 4.5+, -#200=48.8
516.6			SAND, slighlty compact to compact; reddish tan, brown; trace gravel; poorly-graded with silt (SP-SM)							
	15	15 (6) 15 (6)				19.6				SPT MOD = 6, 7, 6 (13)
	20	16 (6) 13 (6)				16.1	NP	NP		SPT MOD = 13, 16, 20 (36), -#200=8.7
	25	16 (6) 18 (6)				15.4				SPT MOD = 12, 14, 25 (39)
	30	20 (6) 24 (6)				15.7	NP	NP		SPT MOD = 27, 20, 16 (36), -#200=8.8
494.6	35	28 (6) 26 (6)				15.0				SPT MOD = 40, 50=4.5" (50)

Remarks: -Northing/ Easting: 7107370.7332 2418946.4304
-seepage at 13 feet during drilling
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

DRILLING LOG

1 of 1

WinCore Version 3.1

County	Denton	Hole	RW24	District	Dallas
Highway	Shady Shores Road	Structure	Retaining Wall	Date	11/17/23
CSJ	0918-46-316	Station	103+06.06	Grnd. Elev.	533.47 ft
		Offset	5.80' RT	GW Elev.	508.47 ft

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
533.2			ASPHALT, 3 inches							
532.2			BASE, 12 inches							
531.5			SAND, loose; brown, light brown; silty (SM)			14.1				P.P. = 4.5+
		11 (6) 8 (6)	SAND, loose to compact; brown; trace ferrous nodules; silty (SM)			6.9				P.P. = 3.5
		12 (6) 16 (6)				11.2	NP	NP		P.P. = 0.25, -#200=38.9
	5					23.2				P.P. = 3.5, Sulfate PPM = 140
523.5	10	8 (6) 10 (6)	SAND, loose to compact; brown; trace ferrous nodules; silty, clayey (SC-SM)			27.1				P.P. = 4.0
	15	14 (6) 16 (6)				11.8	20	6		P.P. = 0.25, -#200=32.1
	20	37 (6) 42 (6)				15.0				P.P. = 0.25
508.5	25	11 (6) 16 (6)	CLAY, stiff to hard; brown, reddish tan; with weathered shale fragments; sandy (CL)			26.1				SPT MOD = 8, 10, 13 (23)
	30	50 (3) 50 (5)				21.0	36	20		Bag Sample (Grab), -#200=66.7
498.5	35	12 (6) 12 (6)				16.7				SPT MOD = 5, 4, 4 (8)

Remarks: -Northing/ Easting: 7107512.3860 2418948.0027
-seepage at 25 feet during drilling
-water measured at 25 feet after 15 minutes
-SPT Modified with a 170 lb hammer and a 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
RETAINING WALL

SHEET 12 OF 12

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		103

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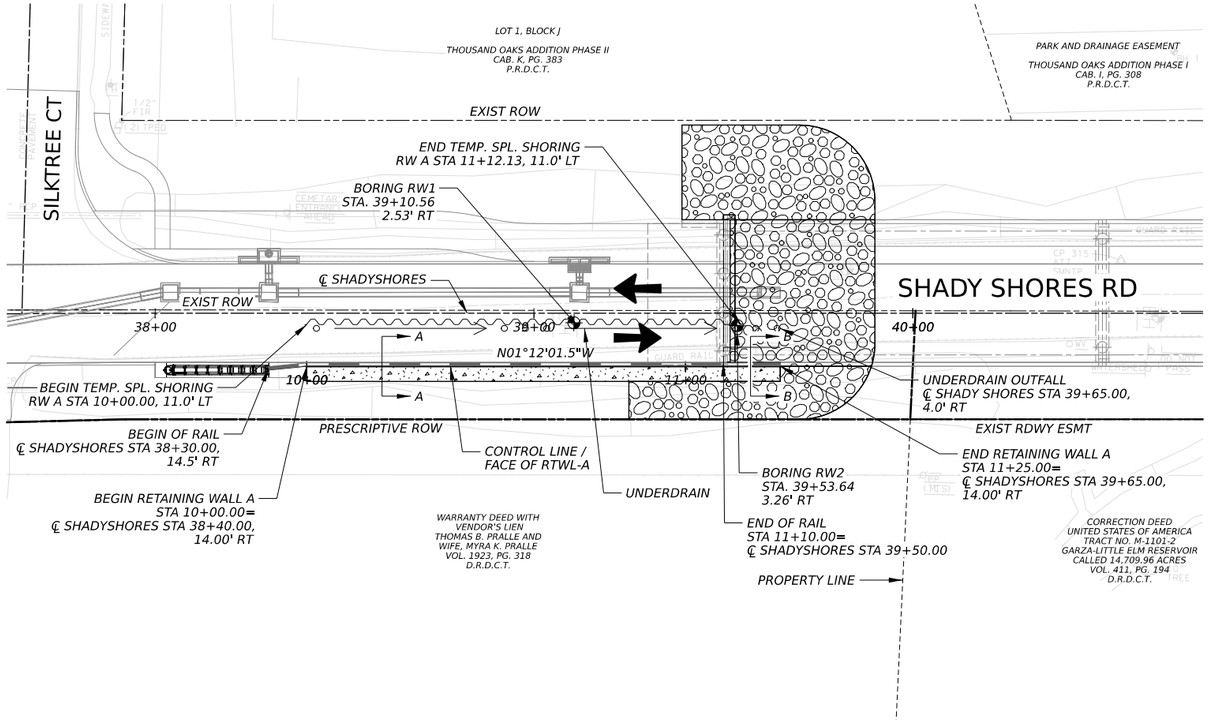

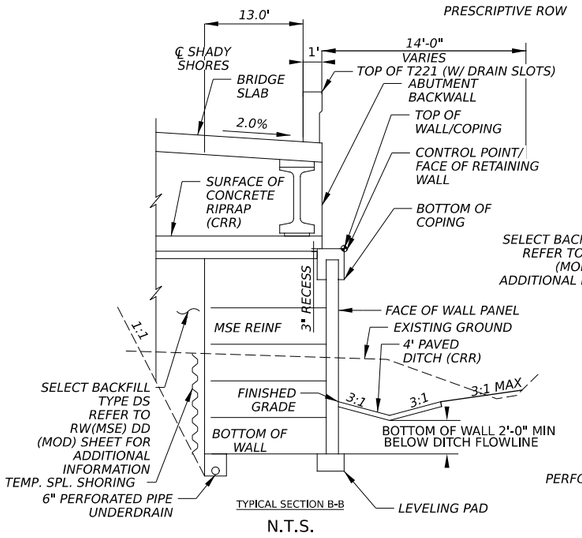

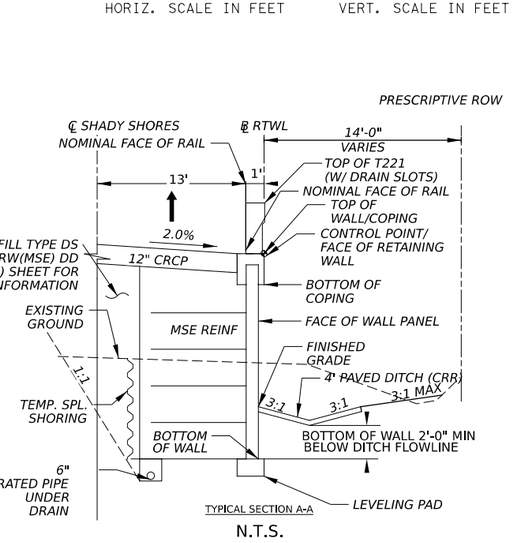

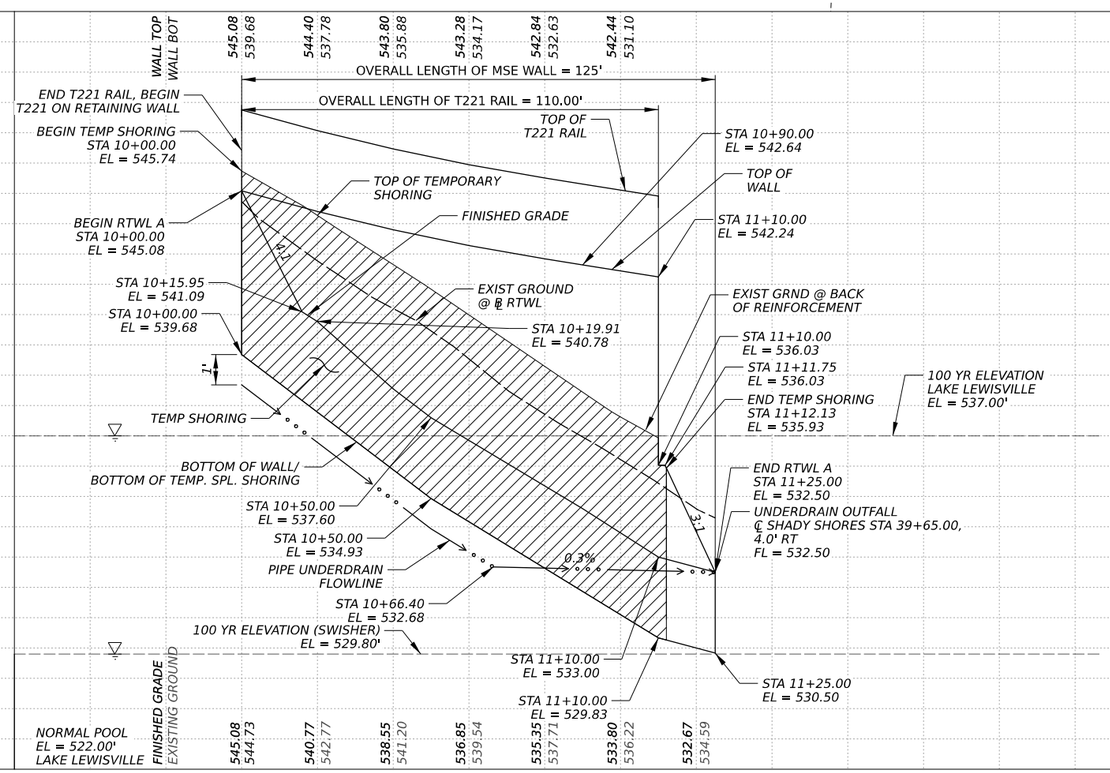

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JAMES C. VESTER RESPONSIBLE FOR STRUCTURAL WALL DESIGN.
DAVID A. BURKETT RESPONSIBLE FOR WALL LAYOUT, DIMENSIONING & OTHER CIVIL ELEMENTS

STATE OF TEXAS — JAMES C. VESTER — 128858 — LICENSED PROFESSIONAL ENGINEER
12-01-2025

STATE OF TEXAS — DAVID A. BURKETT — 100068 — LICENSED PROFESSIONAL ENGINEER
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL A LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		104

DATE: 11/26/2025 TIME: 8:45:02 AM
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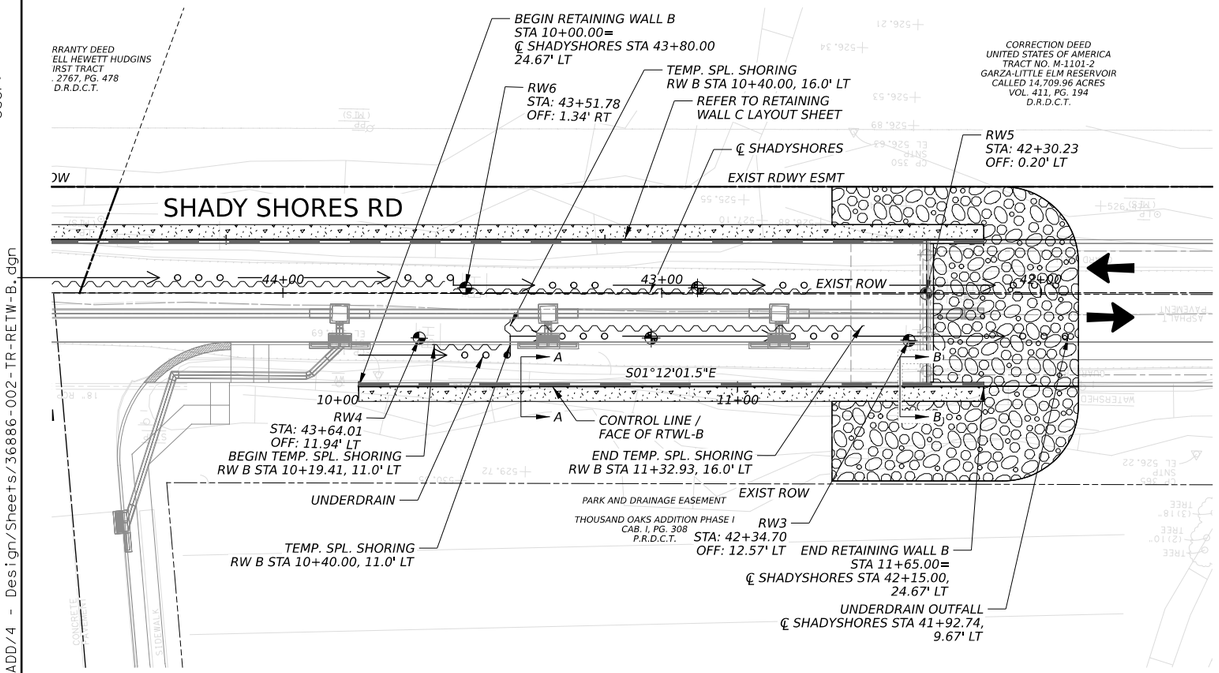

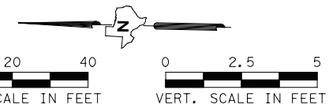

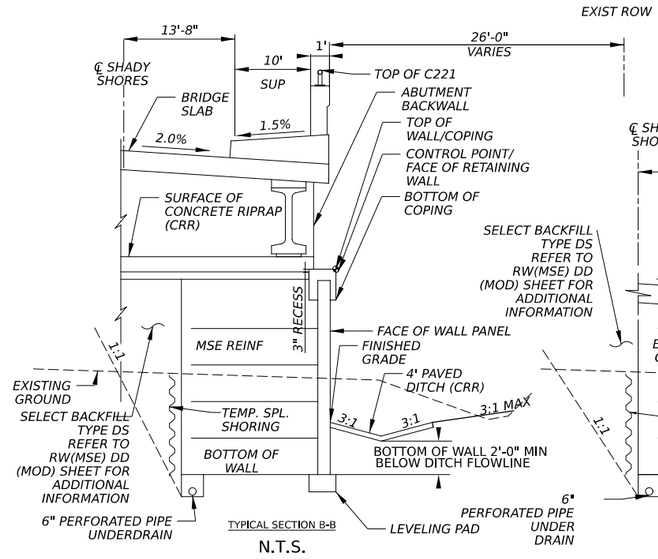

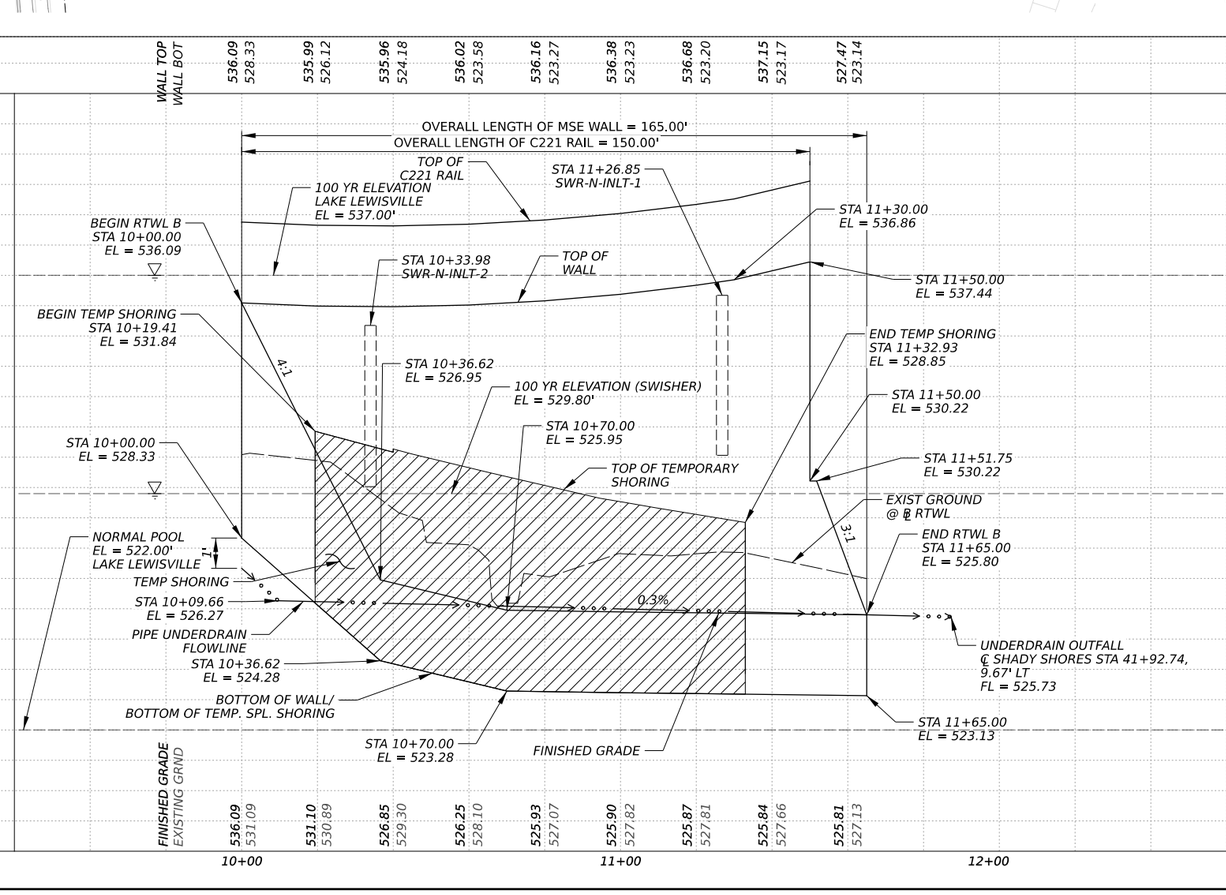

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STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL B LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		105

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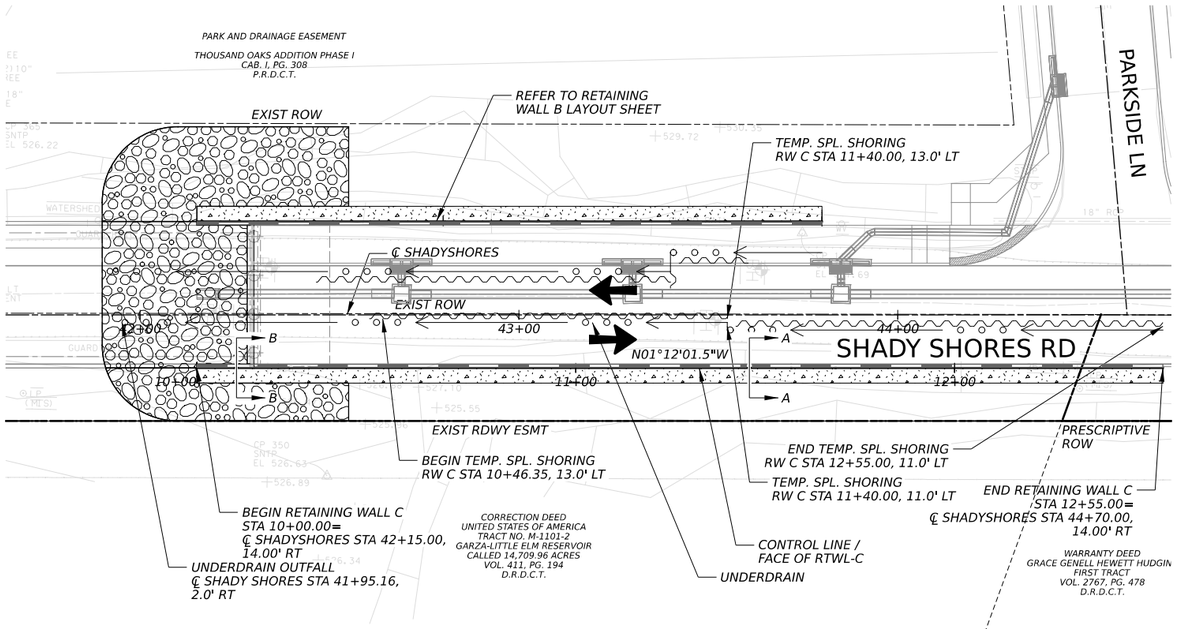
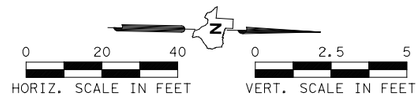
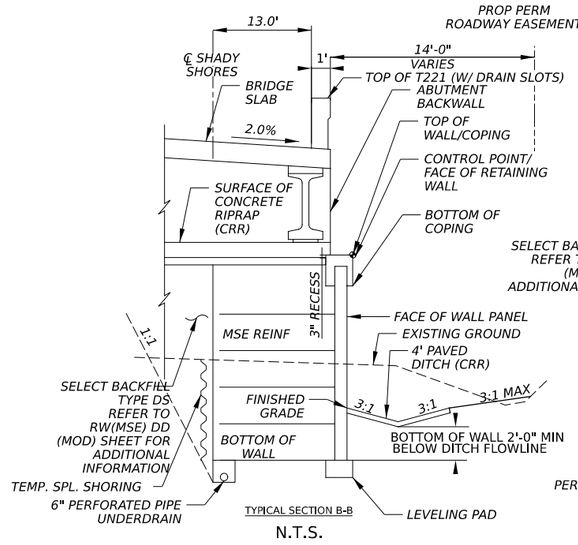
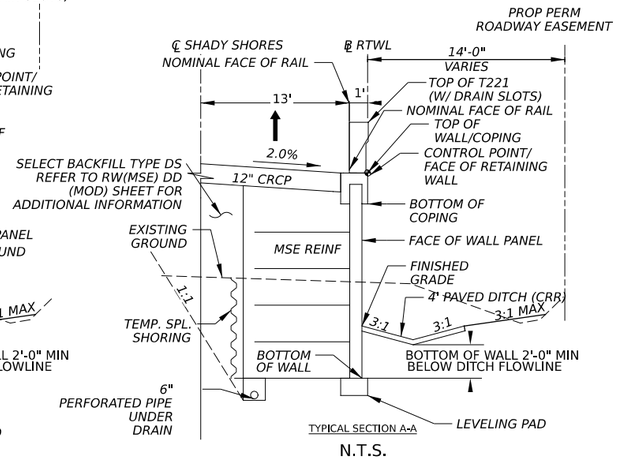
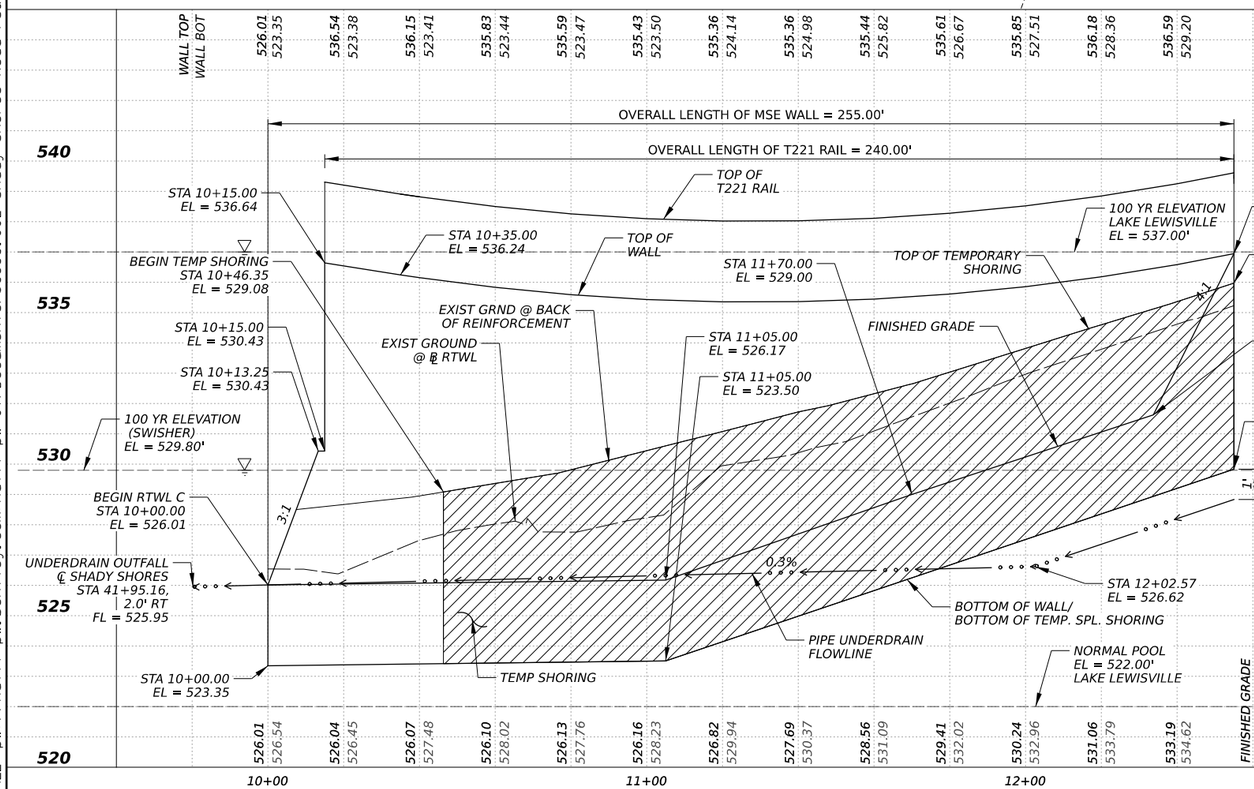








JAMES C. VESTER RESPONSIBLE FOR STRUCTURAL WALL DESIGN.
DAVID A. BURKETT RESPONSIBLE FOR WALL LAYOUT, DIMENSIONING & OTHER CIVIL ELEMENTS



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JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL C LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	DAL	DENTON		106

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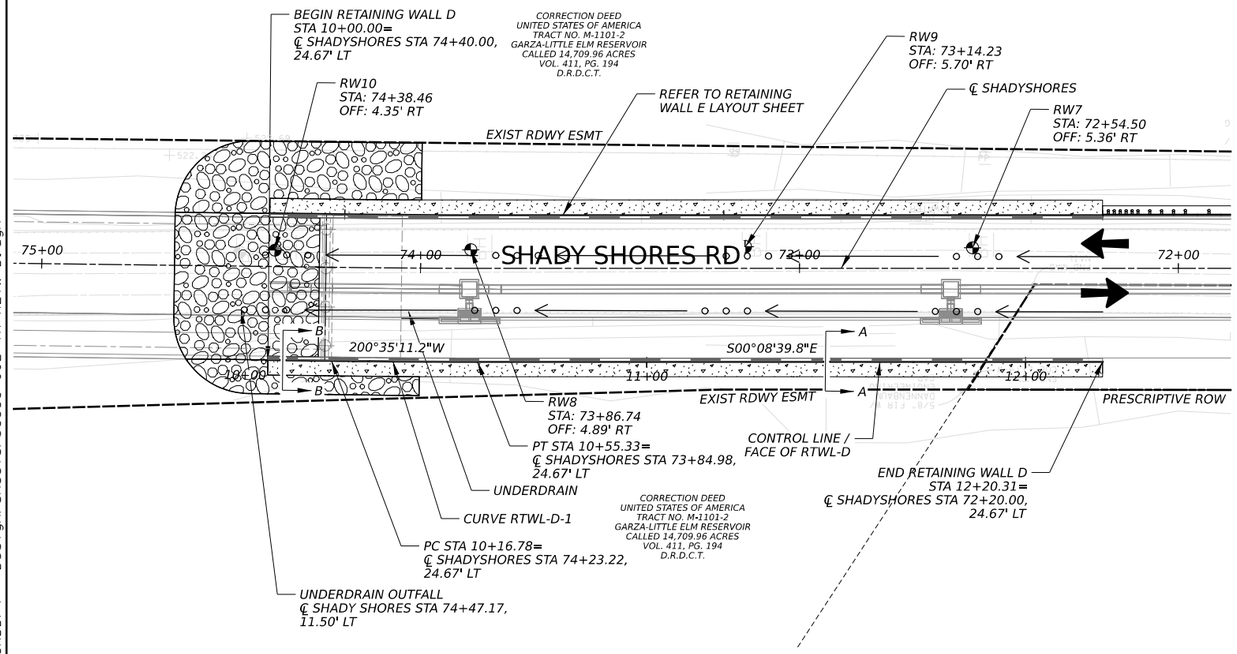

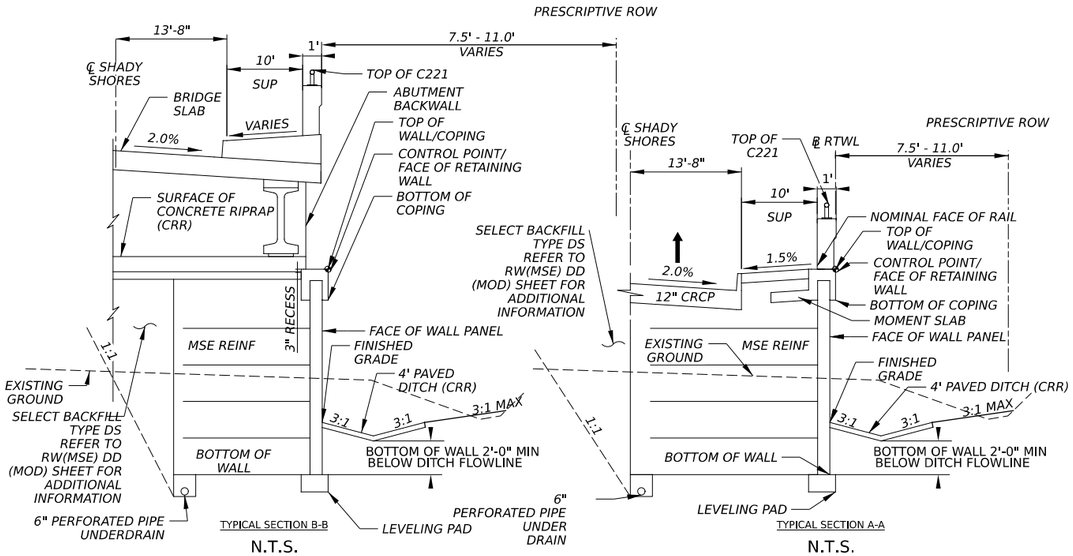

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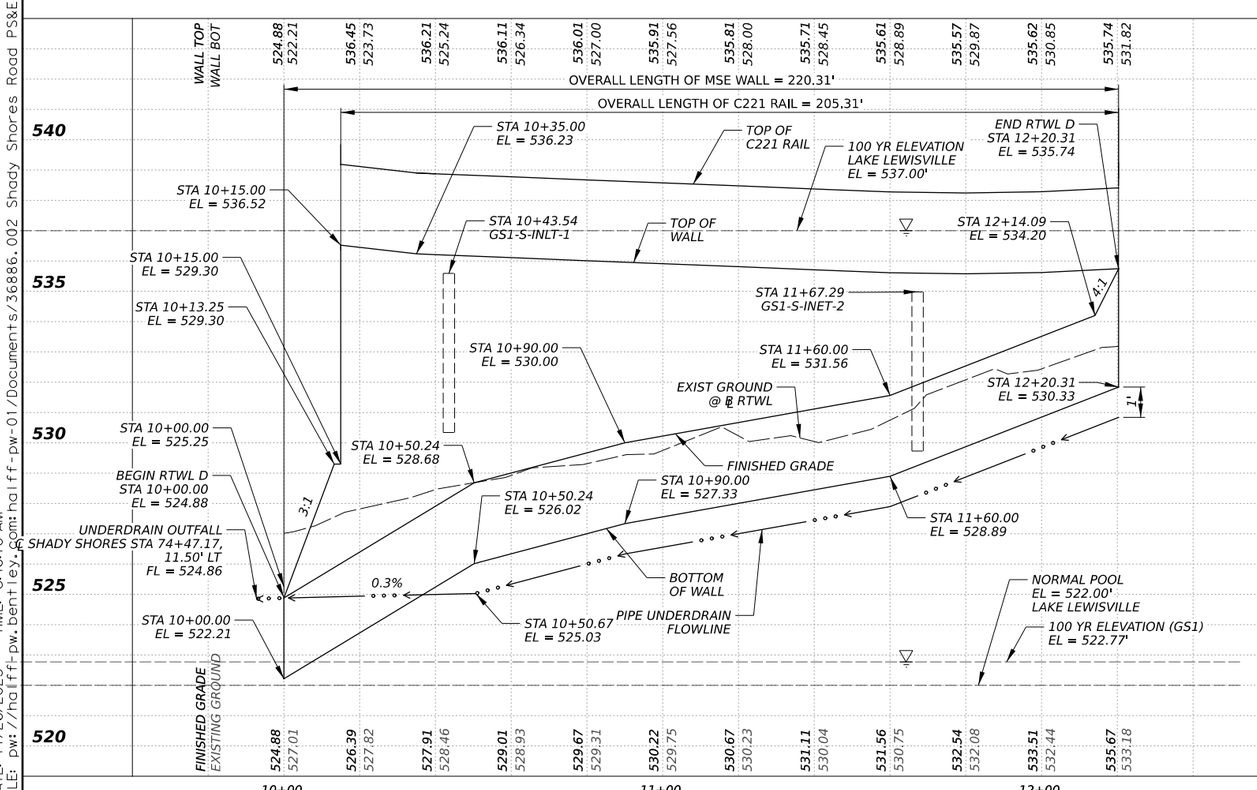

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TBPELS FIRM #312

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Texas Department of Transportation

Dallas
District
Bridge

SHADY SHORES ROAD
RETAINING WALL D
LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		107

DATE: 11/26/2025 TIME: 8:46:10 AM
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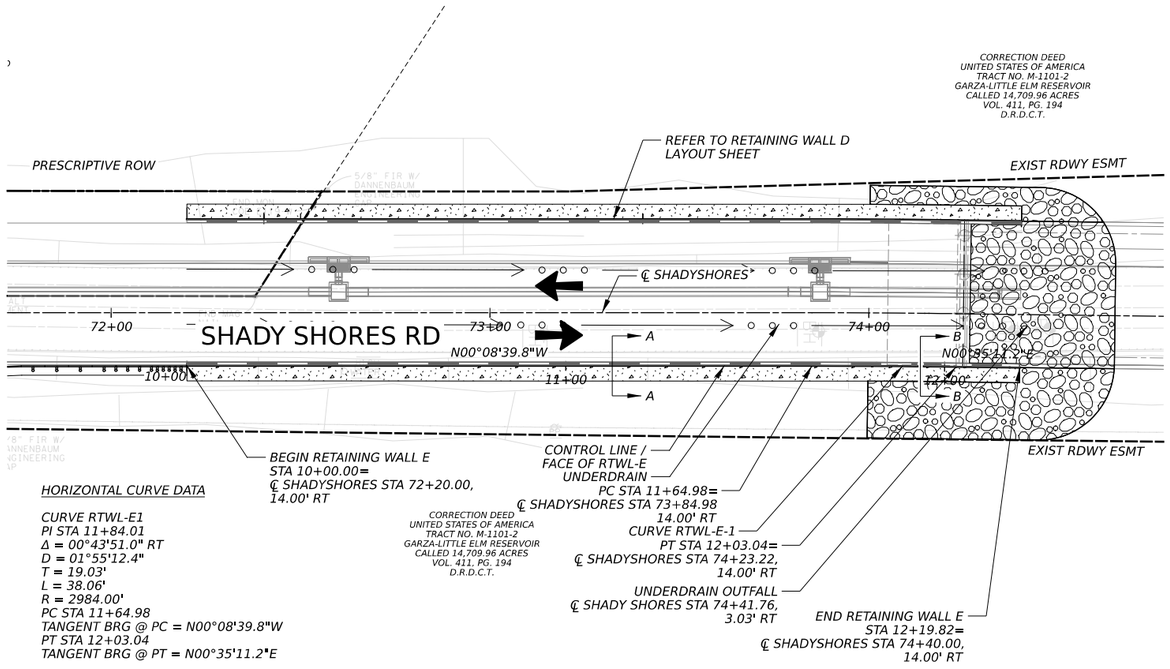

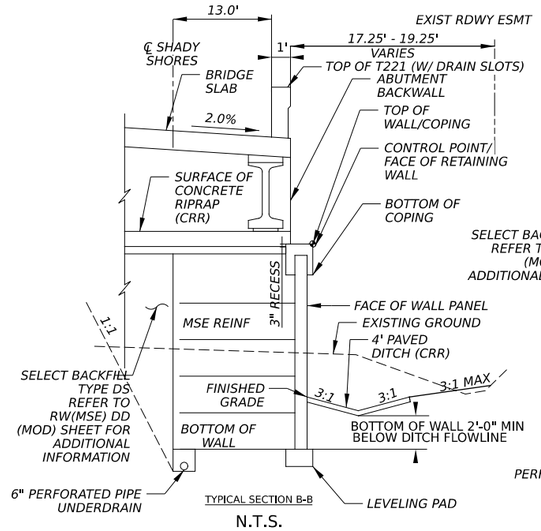

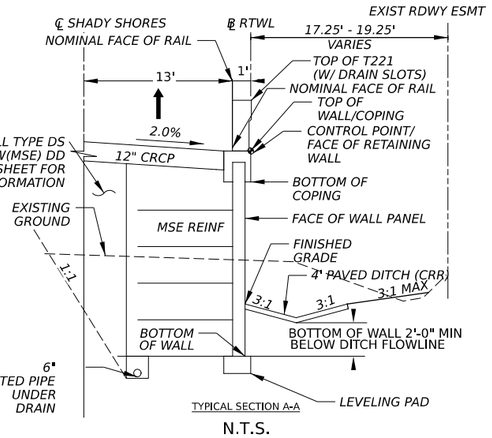

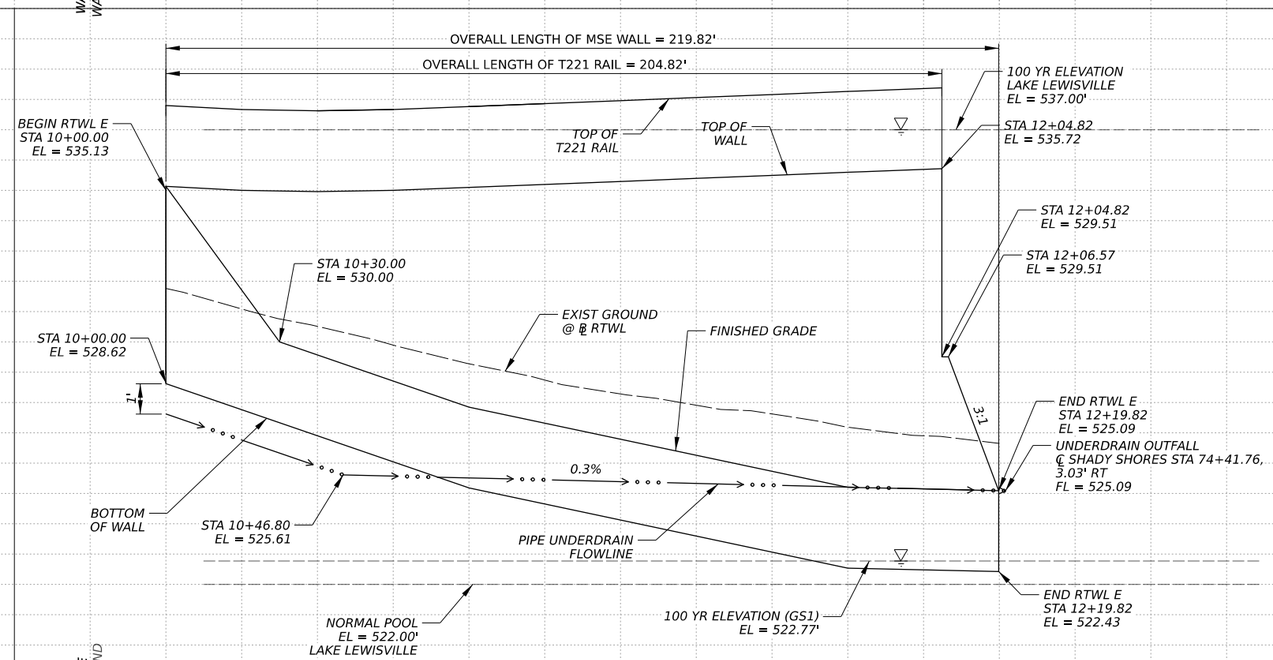

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6. RETAINING WALL HORIZONTAL ALIGNMENT AND TOP OF WALL PROFILE BASED ON ROADWAY OR SUP ALIGNMENT, PROFILE, AND CROSS SLOPE EXCEPT AT SECTIONS OF RETAINING WALL LOCATED AT PROPOSED BRIDGE ABUTMENTS.
7. VOLUME OF SELECT BACKFILL MATERIAL BEHIND PROPOSED WALL IS NOT MEASURED SEPERATELY. THE MEASUREMENT OF ANY ADDITIONAL VOLUME FOR EMBANKMENT AND EXCAVATION IS MEASURED ACCORDING TO STANDARD DRAWING RW(EM).
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JAMES C. VESTER RESPONSIBLE FOR STRUCTURAL WALL DESIGN.
DAVID A. BURKETT RESPONSIBLE FOR WALL LAYOUT, DIMENSIONING & OTHER CIVIL ELEMENTS

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL E LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		108

User:

DATE: 11/26/2025 TIME: 8:46:30 AM
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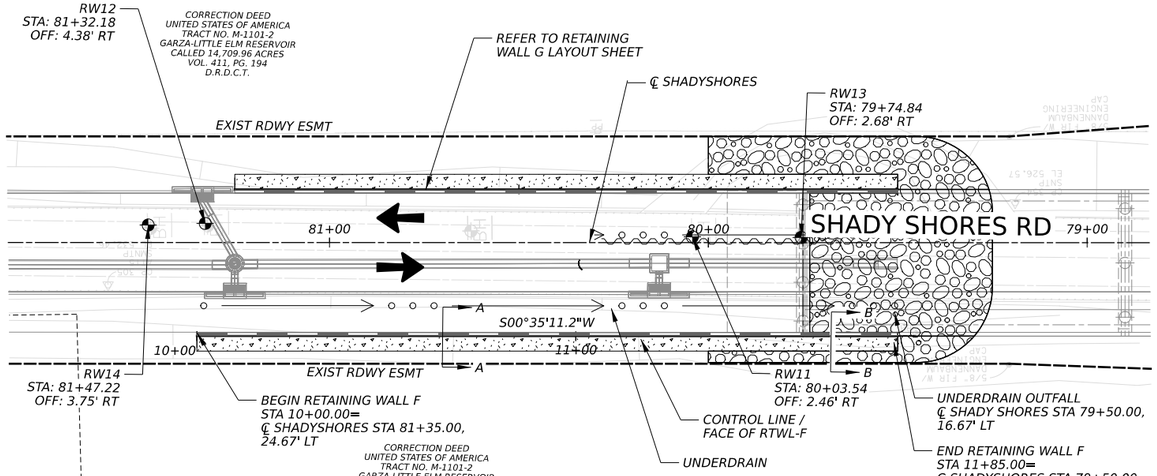

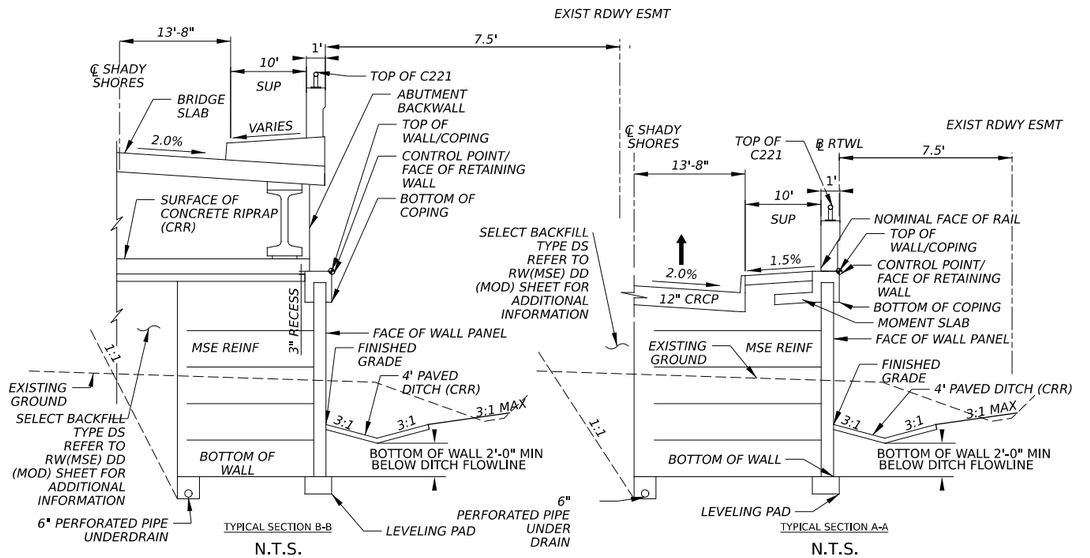

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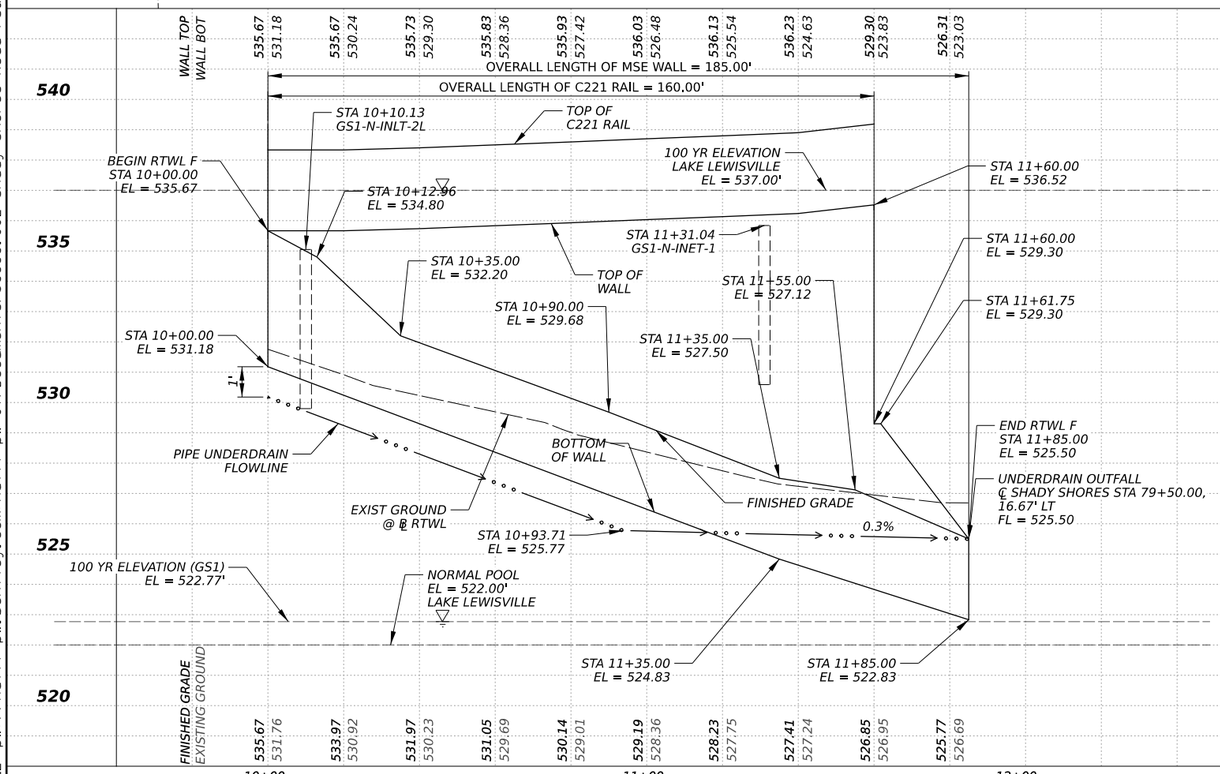

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TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL F LAYOUT

FILE: SEE PATH		DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0918	46	316	VA	
	DIST	COUNTY		SHEET NO.	
	DAL	DENTON		109	

User:

DATE: 11/26/2025 TIME: 8:46:52 AM
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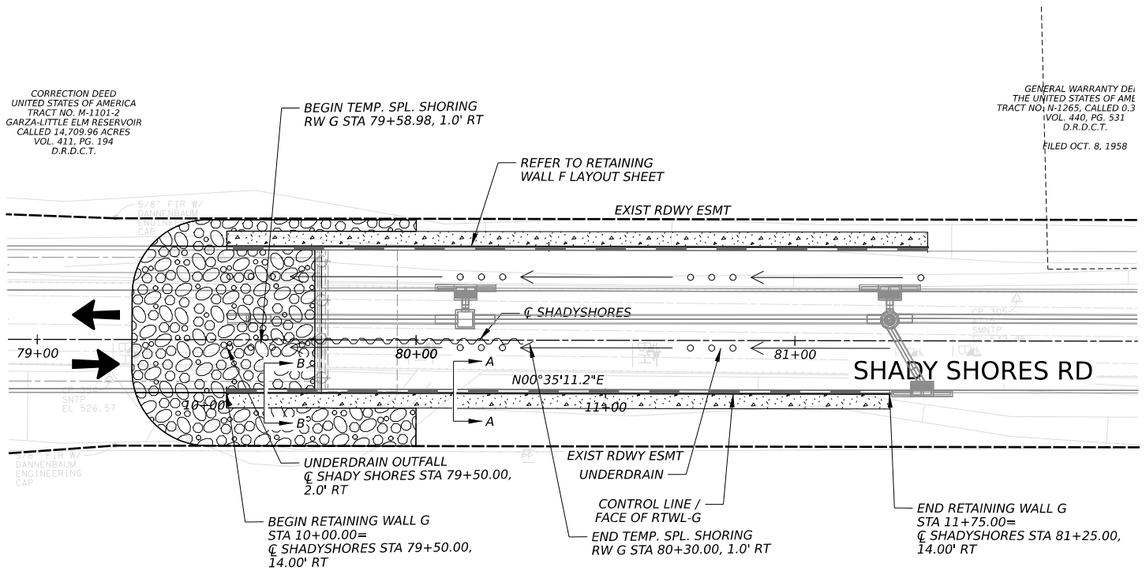

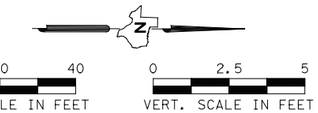

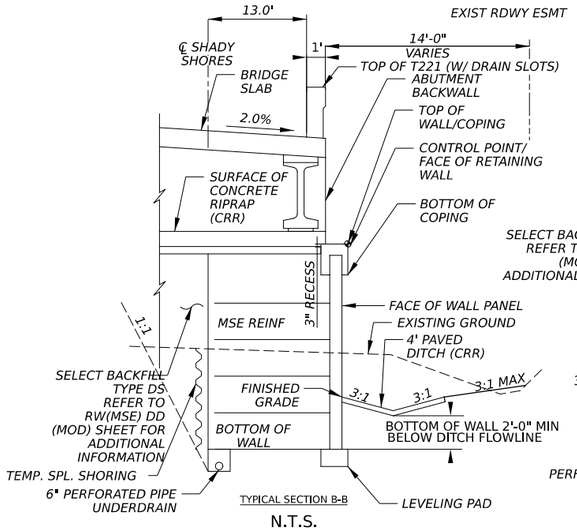

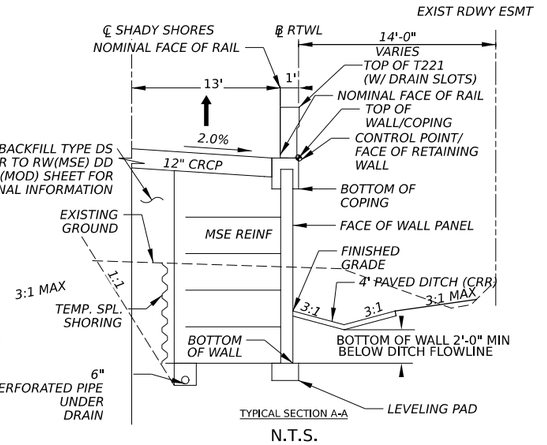

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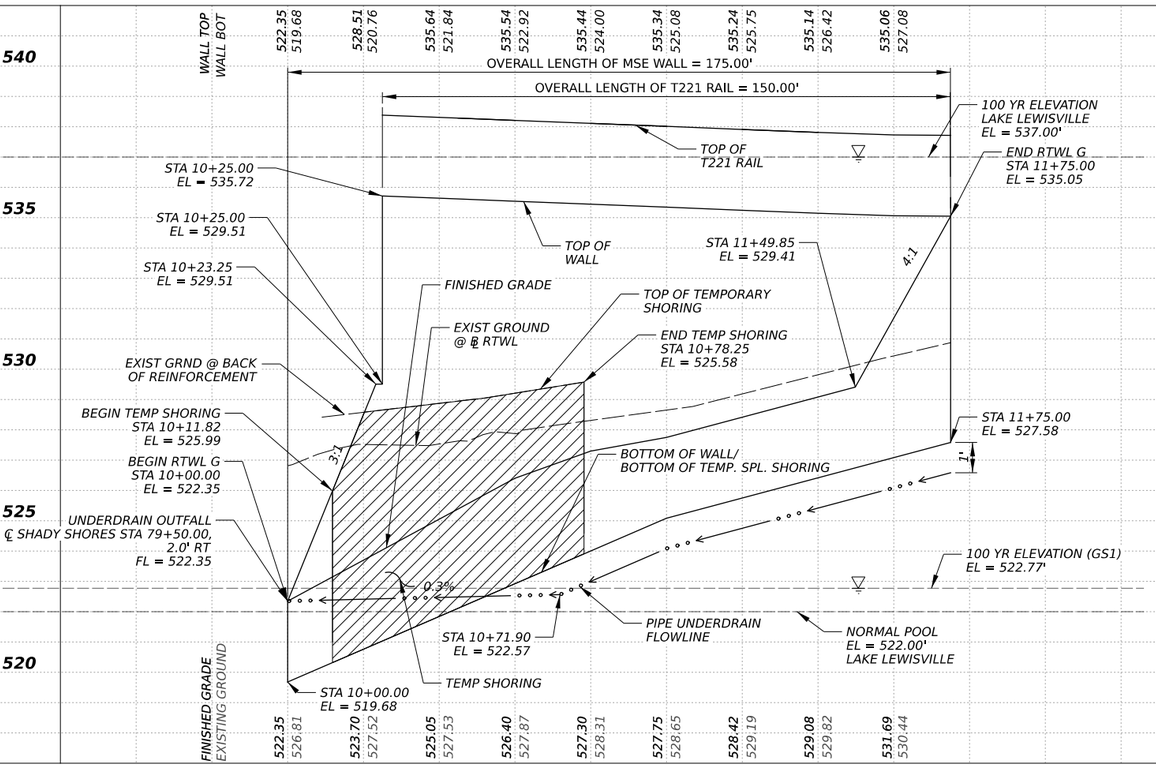

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TBPELS FIRM #312

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Texas Department of Transportation

Dallas
District
Bridge

SHADY SHORES ROAD RETAINING WALL G LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		110

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DATE: 11/26/2025 TIME: 8:47:12 AM
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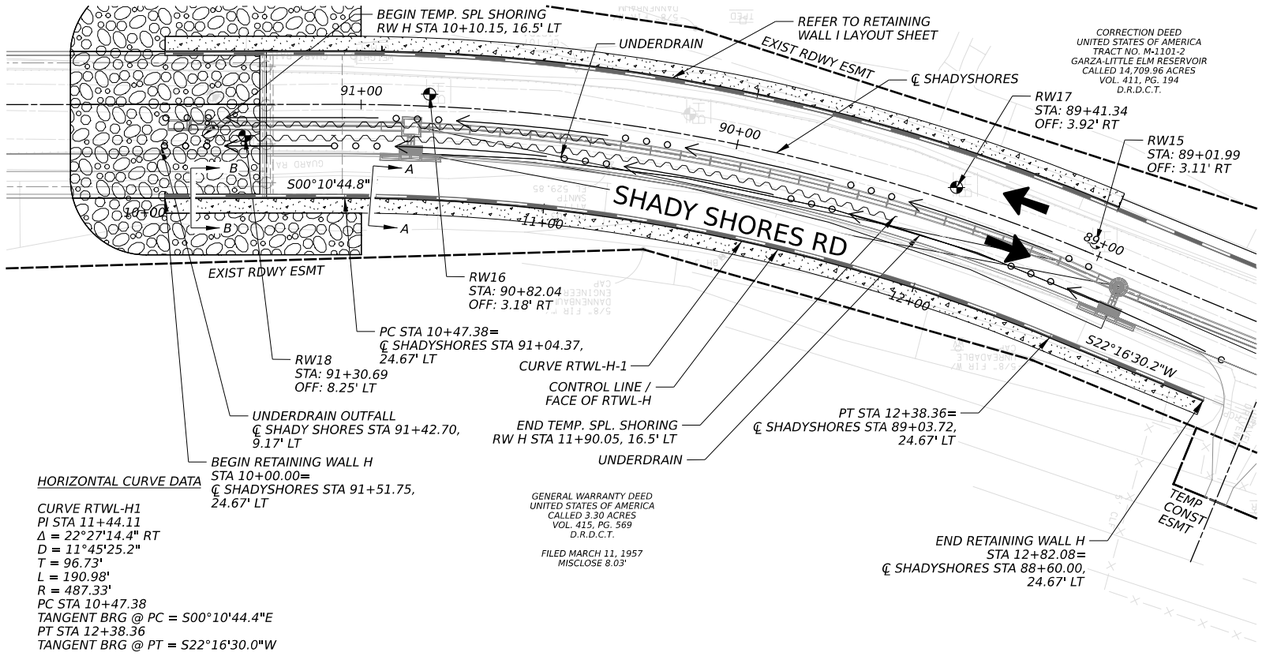


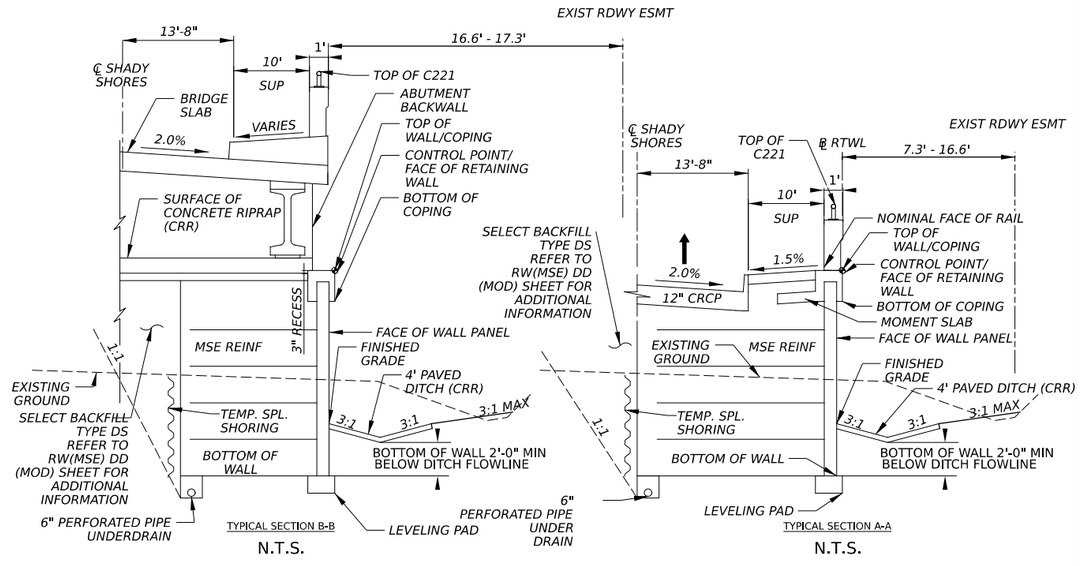
HORIZ. SCALE IN FEET 0 20 40

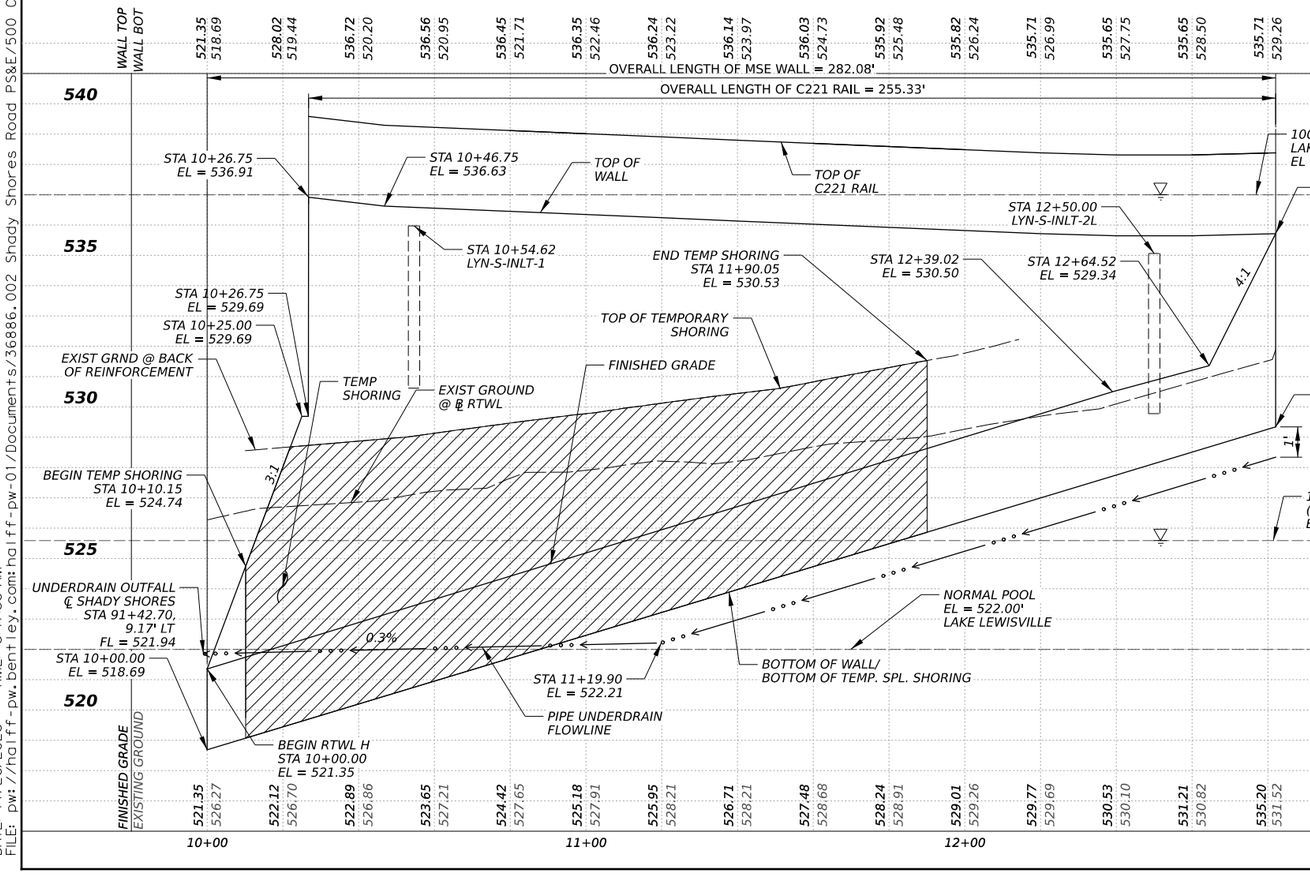
VERT. SCALE IN FEET 0 2.5 5

N

HORIZONTAL CURVE DATA

CURVE RTWL-H1
PI STA 11+44.11
Δ = 22°27'14.4" RT
D = 11°45'25.2"
T = 96.73'
L = 190.98'
R = 487.33'
PC STA 10+47.38
TANGENT BRG @ PC = S00°10'44.4"E
PT STA 12+38.36
TANGENT BRG @ PT = S22°16'30.0"W





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STATE OF TEXAS · JAMES C. VESTER · 128858 · LICENSED PROFESSIONAL ENGINEER
12-01-2025

STATE OF TEXAS · DAVID A. BURKETT · 100068 · LICENSED PROFESSIONAL ENGINEER
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL H LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		111

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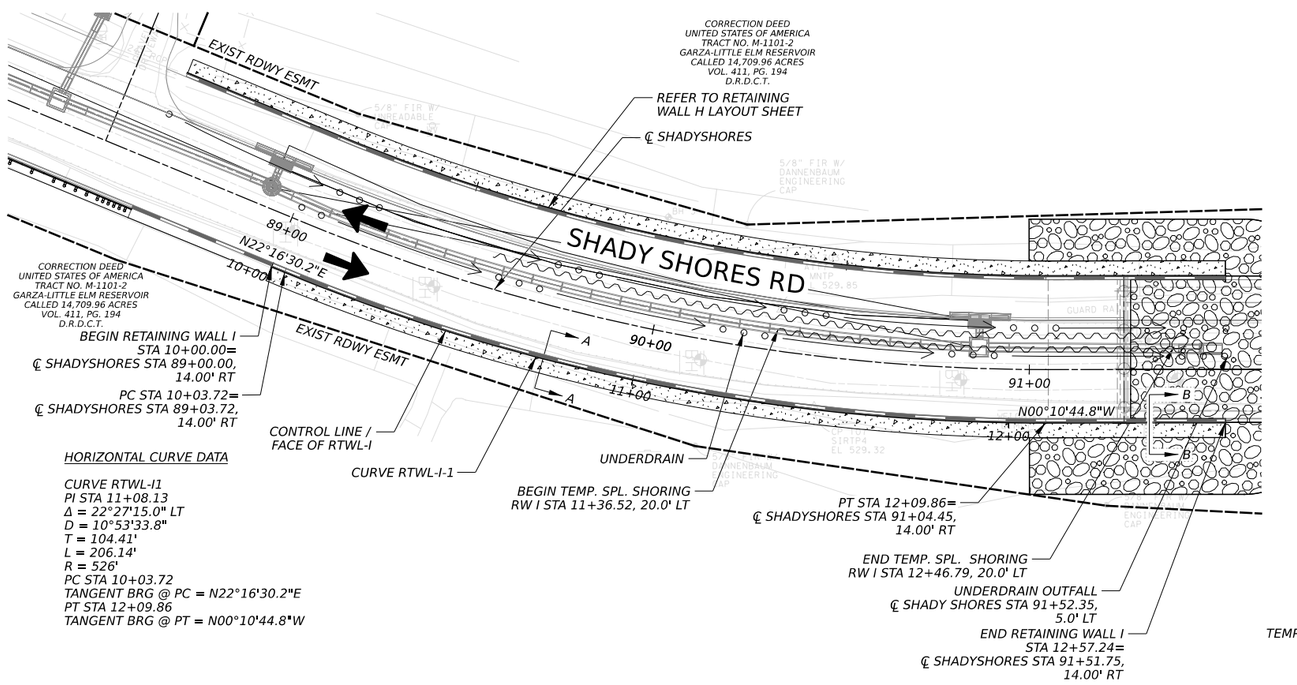

HORIZONTAL CURVE DATA

CURVE RTWL-I1
PI STA 11+08.13
Δ = 22°27'15.0" LT
D = 10°53'33.8"
T = 104.41'
L = 206.14'
R = 526'
PC STA 10+03.72
TANGENT BRG @ PC = N22°16'30.2"E
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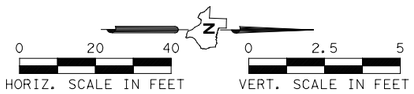

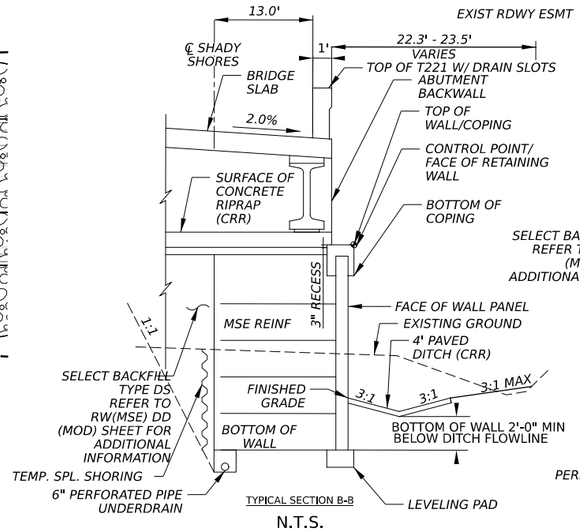

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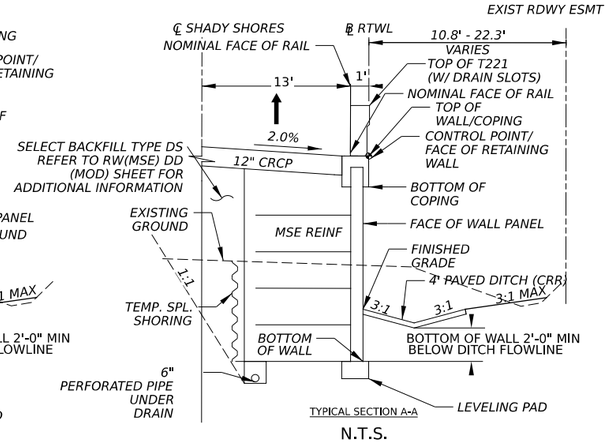

TYPICAL SECTION A-A
N.T.S.

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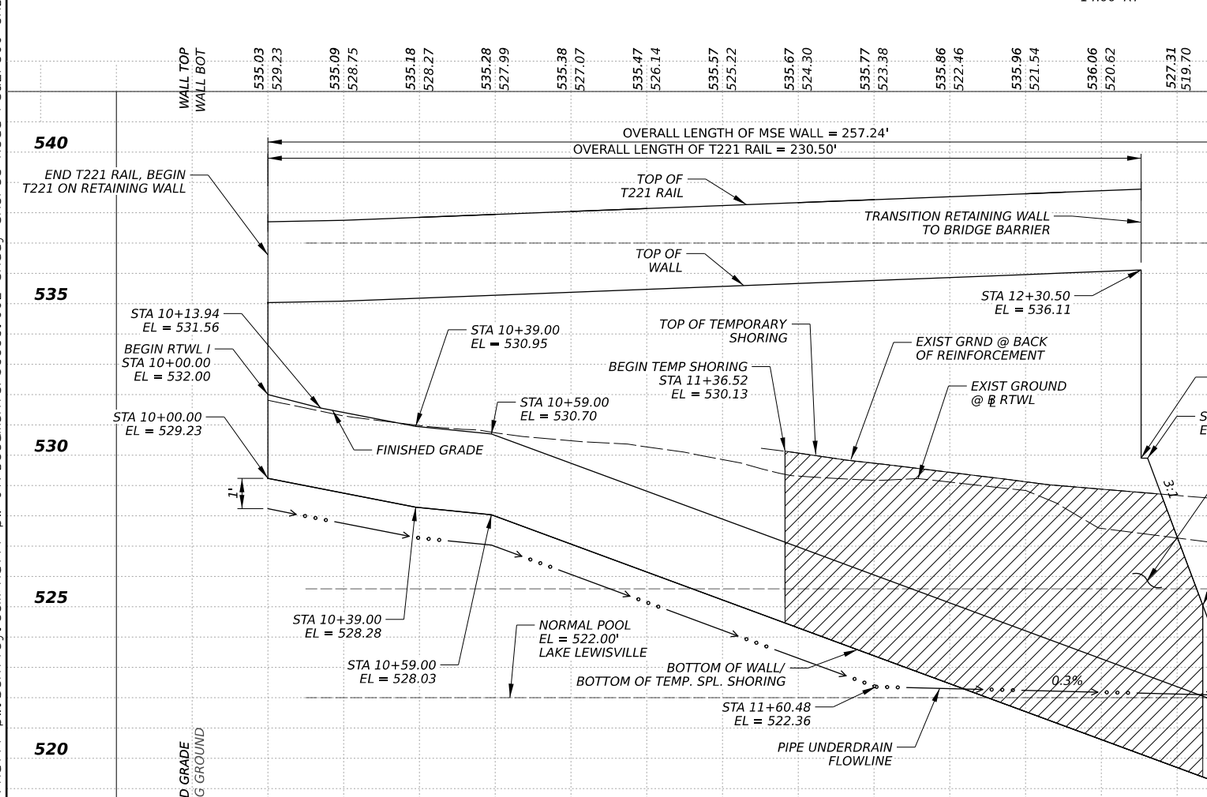

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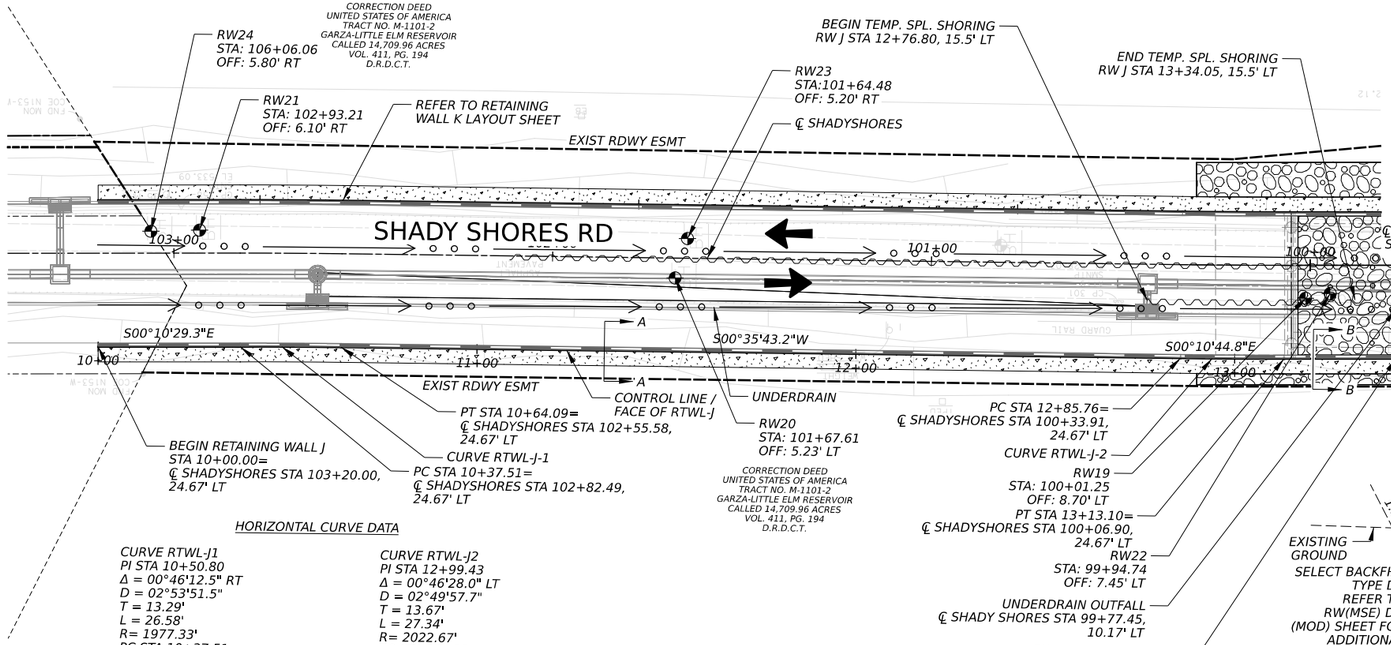
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		112



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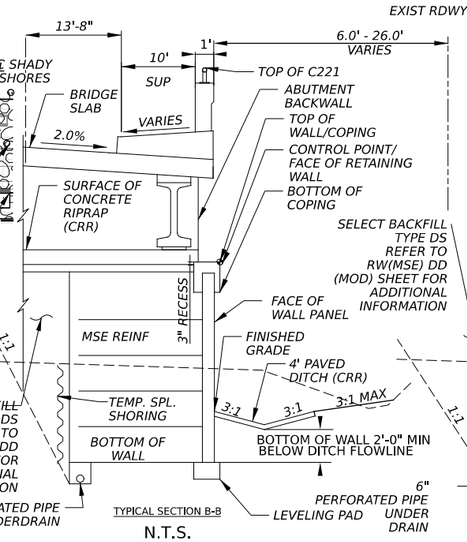
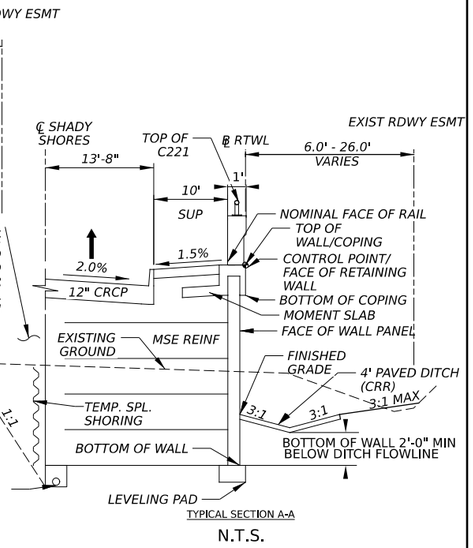
CURVE RTWL-J1
PI STA 10+50.80
Δ = 00°46'12.5" RT
D = 02°53'51.5"
T = 13.29'
L = 26.58'
R= 1977.33'
PC STA 10+37.51
TANGENT BRG @ PC = S00°10'29.3"E
PT STA 10+64.09
TANGENT BRG @ PT = S00°35'43.2"W

CURVE RTWL-J2
PI STA 12+99.43
Δ = 00°46'28.0" LT
D = 02°49'57.7"
T = 13.67'
L = 27.34'
R= 2022.67'
PC STA 12+85.76
TANGENT BRG @ PC = S00°35'43.2"W
PT STA 13+13.10
TANGENT BRG @ PT = S00°10'44.8"E

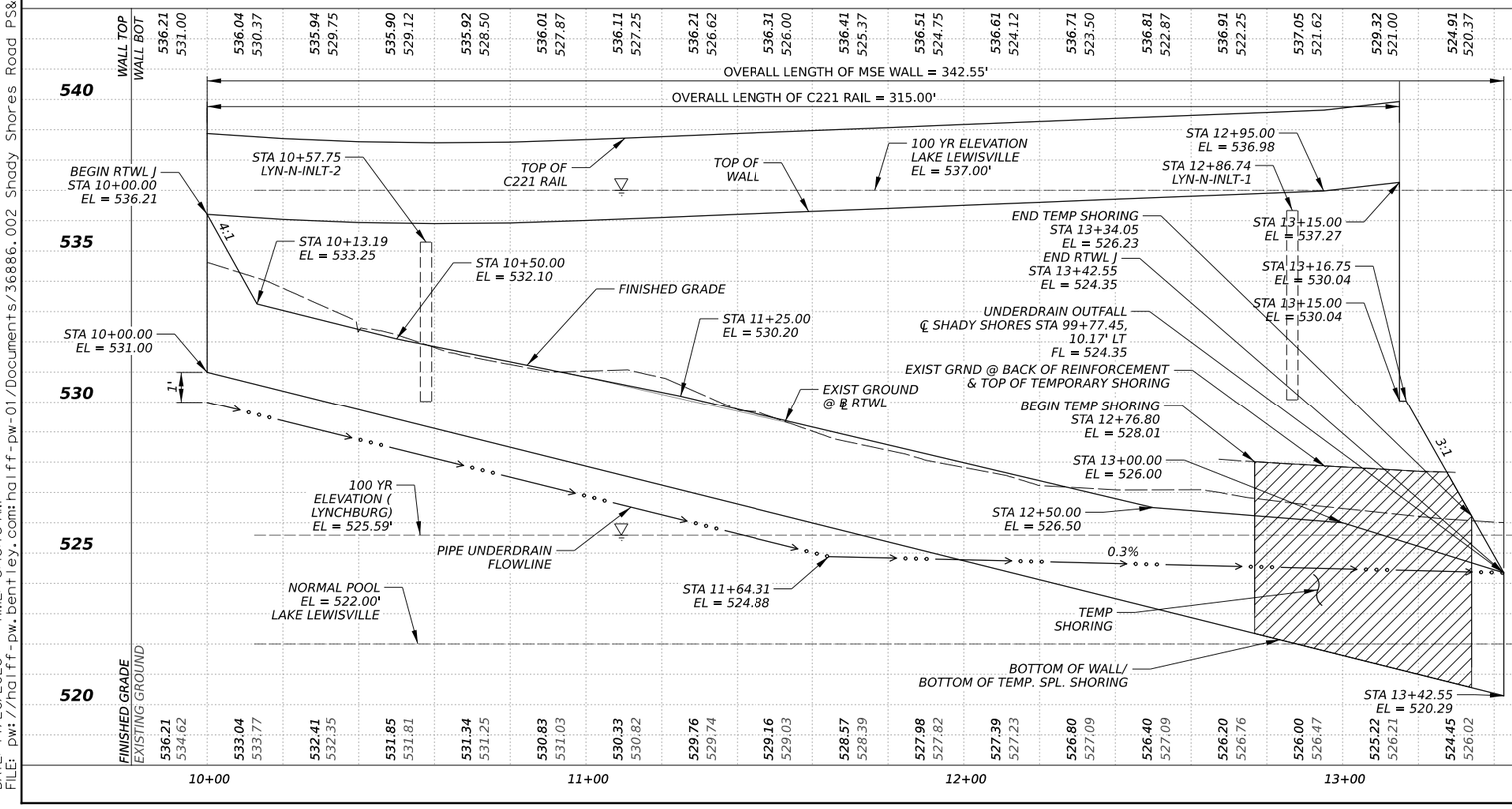


TYPICAL SECTION B-B
N.T.S.



TYPICAL SECTION A-A
N.T.S.

JAMES C. VESTER RESPONSIBLE FOR STRUCTURAL WALL DESIGN.
DAVID A. BURKETT RESPONSIBLE FOR WALL LAYOUT,
DIMENSIONING & OTHER CIVIL ELEMENTS



GENERAL NOTES:

1. ALL RETAINING WALL MEASUREMENTS ARE TO THE WALL CONTROL POINT UNLESS OTHERWISE NOTES. SEE RETAINING WALL TYPICAL SECTIONS.
2. SURFACE AREA OF RETAINING WALLS IS MEASURED BETWEEN TOP OF WALL AND TOP OF LEVELING PAD IN THE PLANS. THE TOP OF LEVELING PAD IS SET AT A MINIMUM OF 2 FEET BELOW DITCH FLOWLINE OR FINISHED GRADE AT FACE OF WALL, WHICHEVER IS LOWER.
3. ANY ADJUSTMENTS MADE TO ACCOMMODATE THE AVAILABLE DESIGNS WILL NOT BE MEASURED. THE QUANTITY FOR WHICH PAYMENT IS MADE IS SHOWN IN THE PLANS.
4. SEE RETAINING WALL BORING LOG SHEETS FOR GEOTECHNICAL INFORMATION.
5. THE CONTRACTOR SHALL LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
6. RETAINING WALL HORIZONTAL ALIGNMENT AND TOP OF WALL PROFILE BASED ON ROADWAY OR SUP ALIGNMENT, PROFILE, AND CROSS SLOPE EXCEPT AT SECTIONS OF RETAINING WALL LOCATED AT PROPOSED BRIDGE ABUTMENTS.
7. VOLUME OF SELECT BACKFILL MATERIAL BEHIND PROPOSED WALL IS NOT MEASURED SEPERATELY. THE MEASUREMENT OF ANY ADDITIONAL VOLUME FOR EMBANKMENT AND EXCAVATION IS MEASURED ACCORDING TO STANDARD DRAWING RW(EM).
8. THE OFFSET SHOWN FO THE TEMPORARY SPECIAL SHORING IS APPROXIMATE. CONTRACTOR CAN ADJUST THE LOCATION OF THE TEMPORARY SPECIAL SHORING BASED ON THE ACTUAL STRAP LENGTH USED.
9. CONTRACTOR SHALL USE SELECT BACKFILL TYPE "DS" FOR THIS MSE WALL (SUBSIDIARY TO WALL ITEMS). CEMENT STABILIZED BACKFILL IS NOT PERMITTED.
10. SEE RW(MSE)DD (MOD) SHEET FOR MINIMUM EARTH REINFORCEMENT LENGTH.
11. INSTALL RETAINING WALL TRAFFIC RAILING FOUNDATIONS RW(TRF) ALONG THE TOP OF MSE WALL SECTION. THE COPING AND THE MOMENT SLABS SHALL BE CONSIDERED SUBSIDIARY TO THE ITEM "RETAINING WALL".
12. CONTRACTOR SHALL USE A COFFERDAM NOT TO EXCEED A HEIGHT OVER 5.0' OR OTHER APPROVED METHODS AS NECESSARY TO PREVENT LAKE WATER FROM ENTERING THE CONSTRUCTION SITE. CONTRACTOR SHALL PROVIDE WORKING DRAWINGS ACCORDING TO STANDARD SPECIFICATION ITEM 400. COST FOR COFFERDAM OR OTHER APPROVED METHODS SHALL BE SUBSIDIARY TO THE ITEM "RETAINING WALL".
13. ANY AND ALL PIPE UNDERDRAIN IS TO BE SUBSIDIARY TO THE ITEM "RETAINING WALL"

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL J LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		113

DATE: 11/26/2025 TIME: 8:48:18 AM
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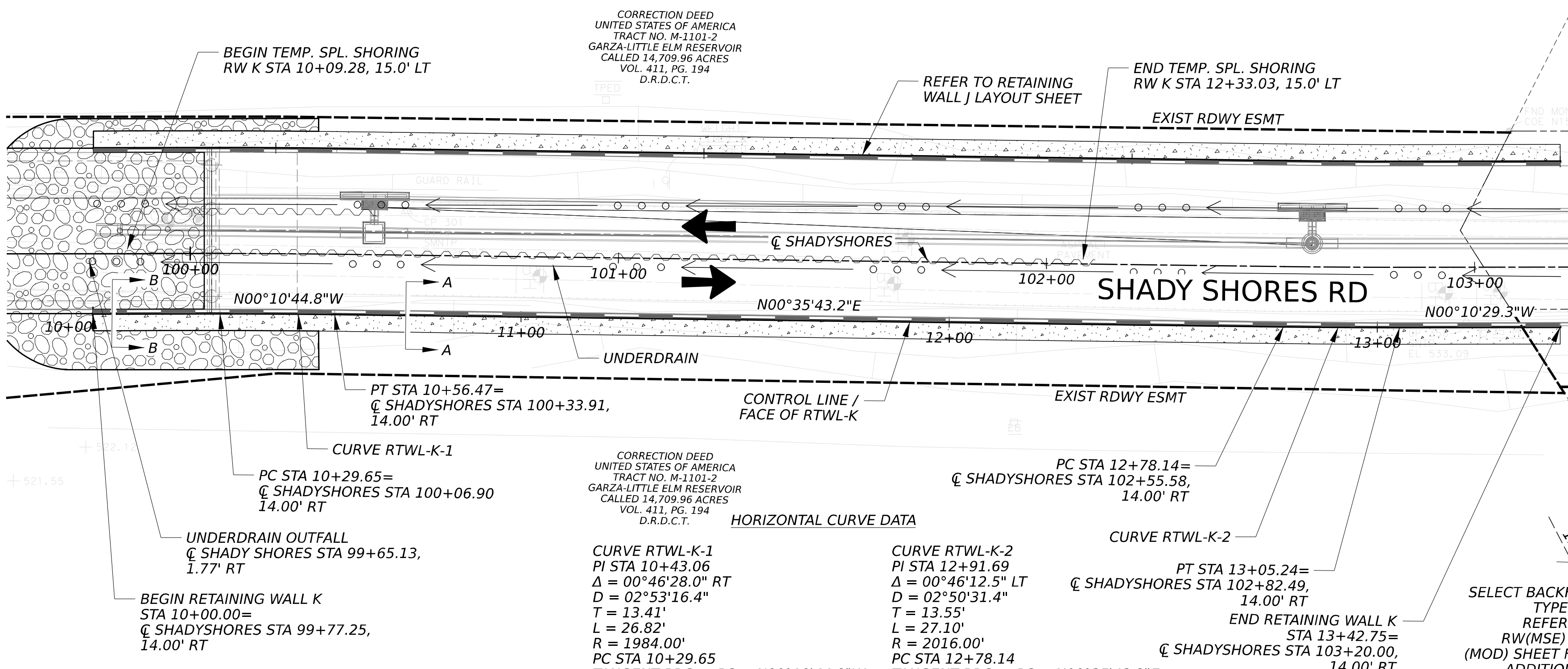
User:



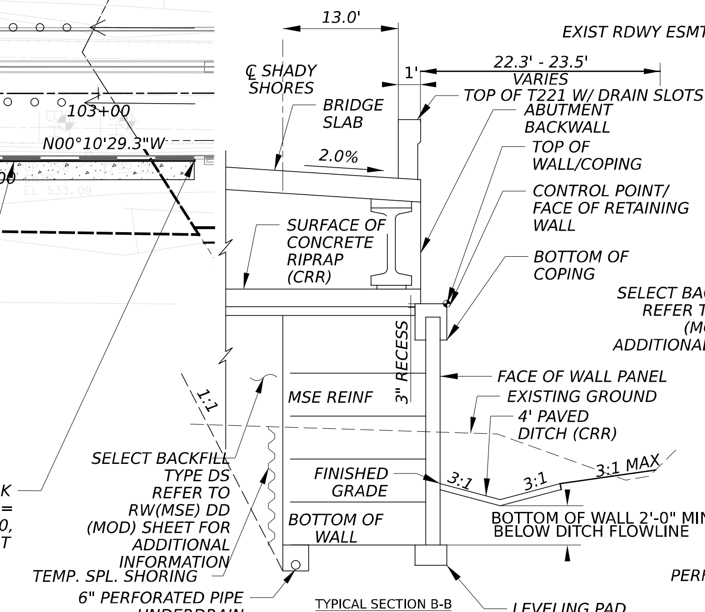
CORRECTION DEED
UNITED STATES OF AMERICA
TRACT NO. M-1101-2
GARZA-LITTLE ELM RESERVOIR
CALLED 14,709.96 ACRES
VOL. 411, PG. 194
D.R.D.C.T.

HORIZONTAL CURVE DATA

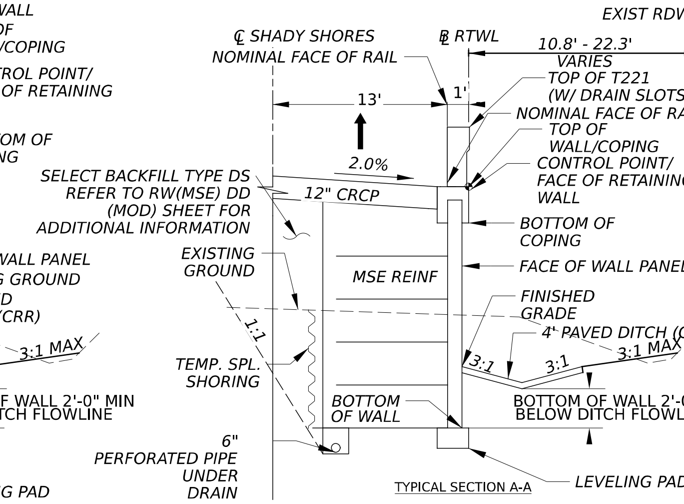
CURVE RTWL-K-1
PI STA 10+43.06
Δ = 00°46'28.0" RT
D = 02°53'16.4"
T = 13.41'
L = 26.82'
R = 1984.00'
PC STA 10+29.65
TANGENT BRG @ PC = N00°10'44.8"W
PT STA 10+56.47
TANGENT BRG @ PT = N00°35'43.2"E

CURVE RTWL-K-2
PI STA 12+91.69
Δ = 00°46'12.5" LT
D = 02°50'31.4"
T = 13.55'
L = 27.10'
R = 2016.00'
PC STA 12+78.14
TANGENT BRG @ PC = N00°35'43.2"E
PT STA 13+05.24
TANGENT BRG @ PT = N00°10'29.3"W

0 20 40 HORIZ. SCALE IN FEET
0 2.5 5 VERT. SCALE IN FEET



TYPICAL SECTION B-B
N.T.S.



TYPICAL SECTION A-A
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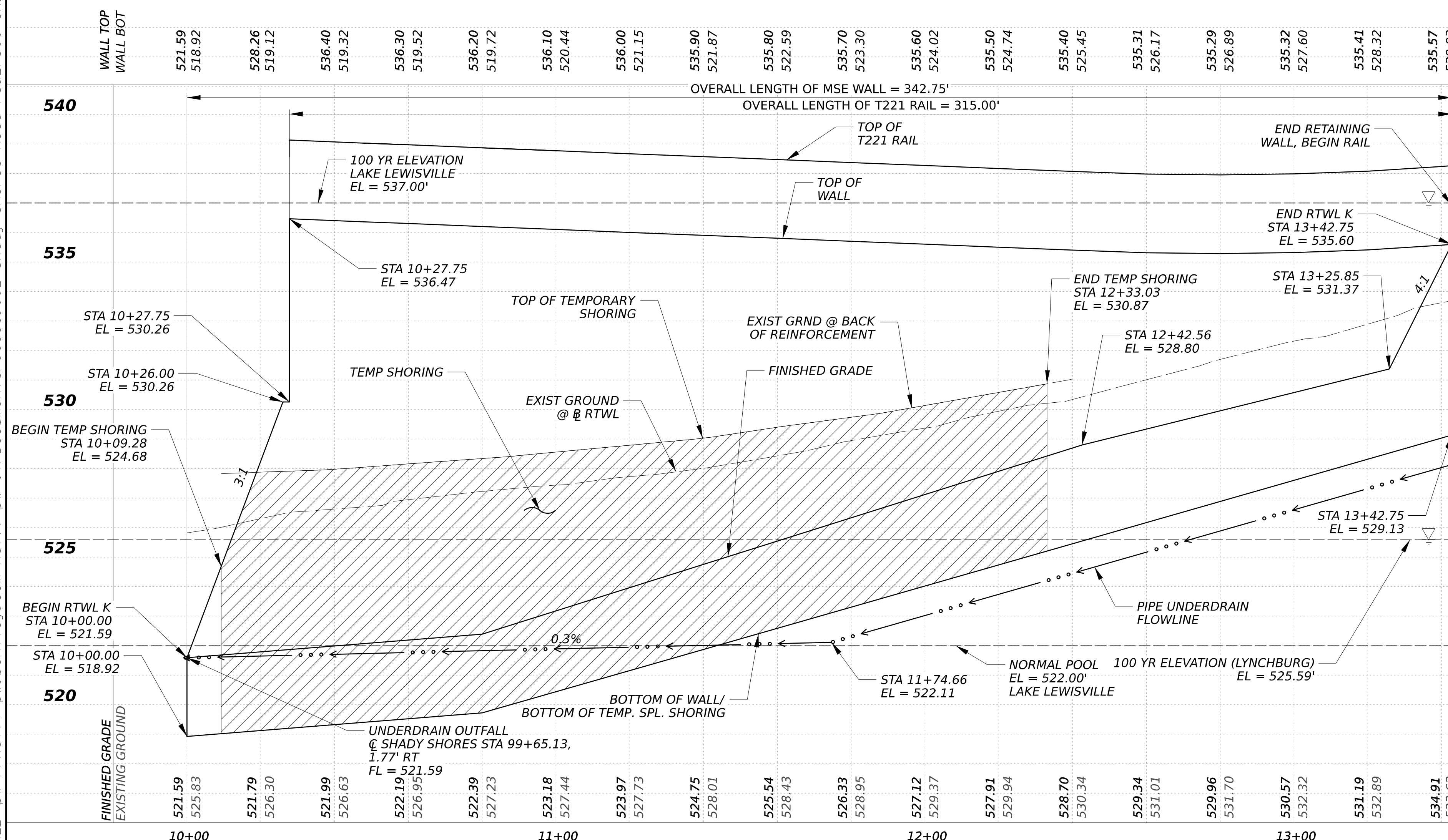

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STATE OF TEXAS — JAMES C. VESTER — 128858 — LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

STATE OF TEXAS — DAVID A. BURKETT — 100068 — LICENSED PROFESSIONAL ENGINEER
David A. Burkett
12-01-2025

TBPELS FIRM #312

Sheet 1 of 1 Sheets

halff

Texas Department of Transportation — Dallas District Bridge

SHADY SHORES ROAD RETAINING WALL K LAYOUT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV

©TxDOT 2025

REVISIONS

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA

DIST	COUNTY	SHEET NO.
DAL	DENTON	114

DATE: 11/26/2025 TIME: 8:48:38 AM
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User:

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DATE: 11/25/2025 2:49:04 PM
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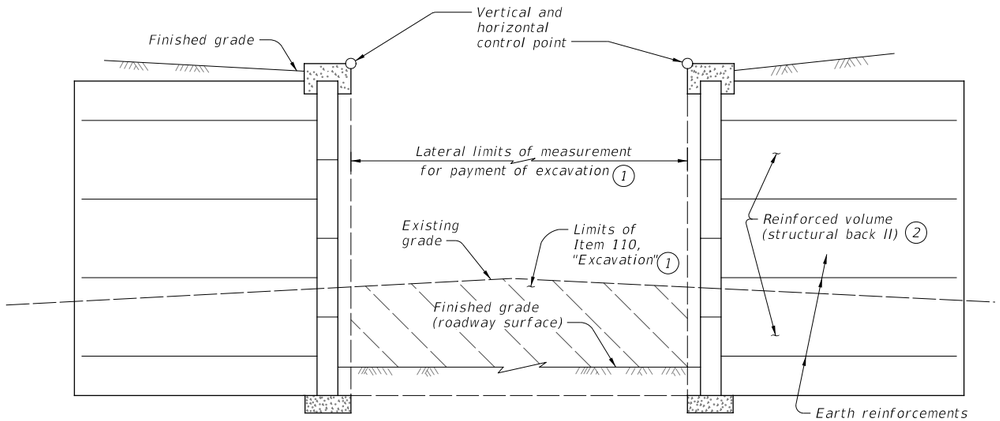
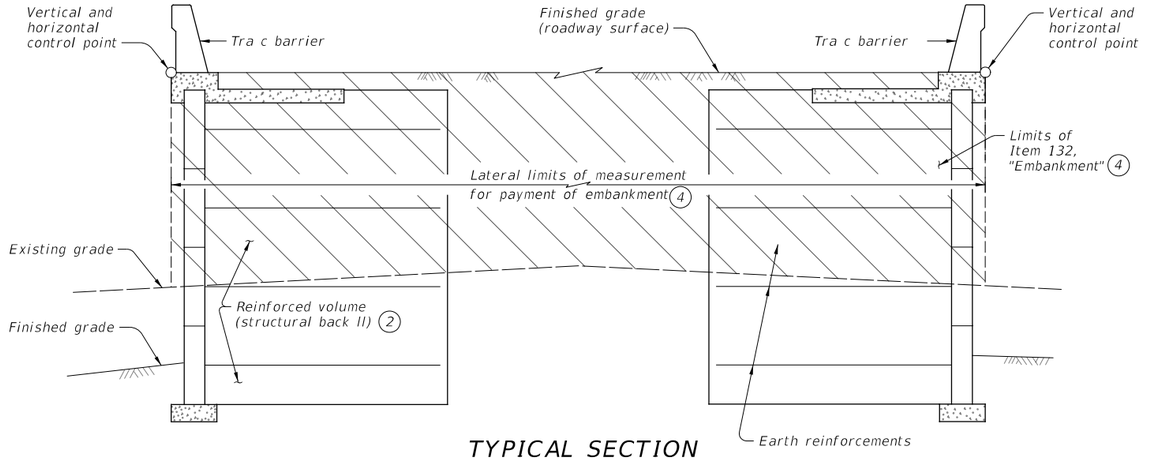


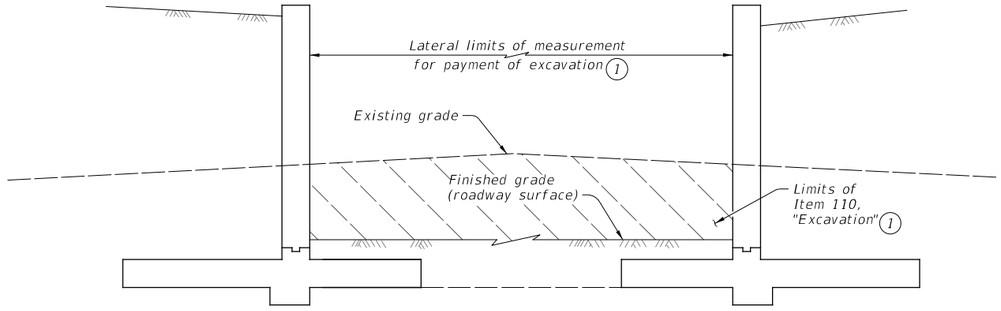
TYPICAL SECTION

(Excavation between MSE retaining walls.) (3)



TYPICAL SECTION

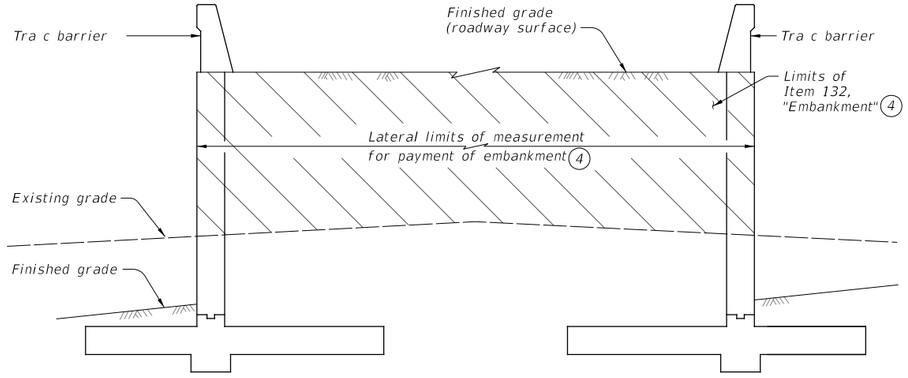
(Embankment between MSE retaining walls.) (3)



TYPICAL SECTION

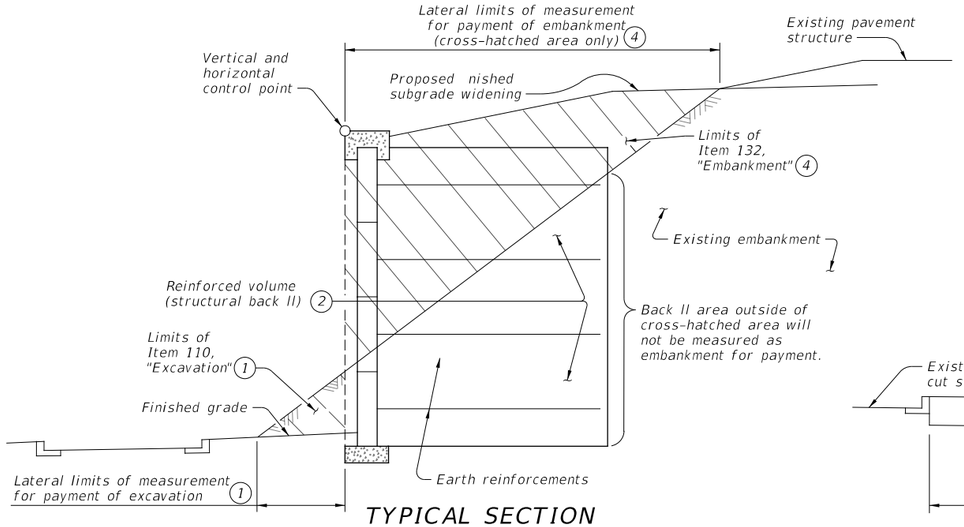
(Excavation between conventional retaining walls.)

1. Only the excavation above the proposed subgrade elevation will be measured for payment.
2. Meeting requirements for Item 423, "Retaining Walls."
3. Earthwork measurement with other retaining wall types will be made to the outside nished face in the same manner.
4. Only the embankment above the existing ground line will be measured for payment.



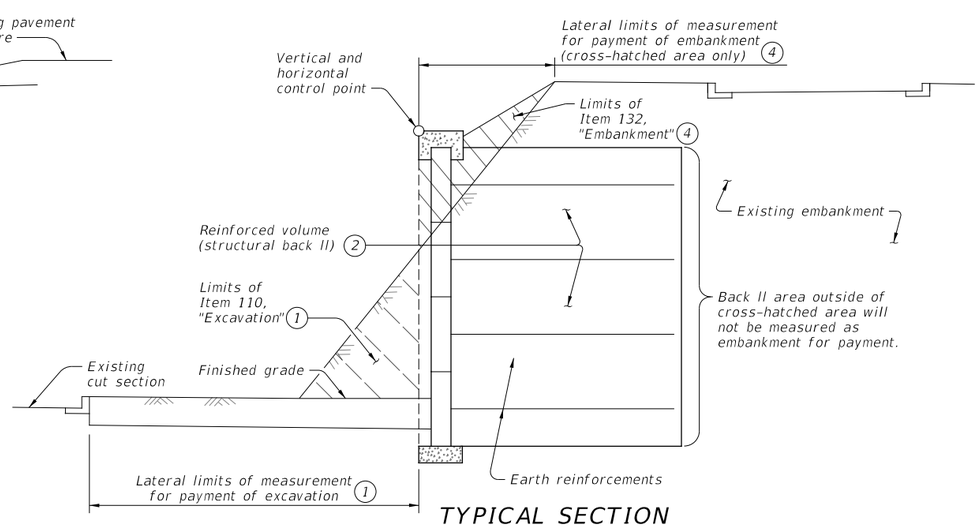
TYPICAL SECTION

(Embankment between conventional retaining walls.)



TYPICAL SECTION

(Widening embankment with MSE retaining walls.) (3)



TYPICAL SECTION

(Widening cut section with MSE retaining walls.) (3)

Texas Department of Transportation

Bridge Division Standard

EARTHWORK MEASUREMENT AT RETAINING WALL

RW(EM)

FILE: RW-EM-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		115

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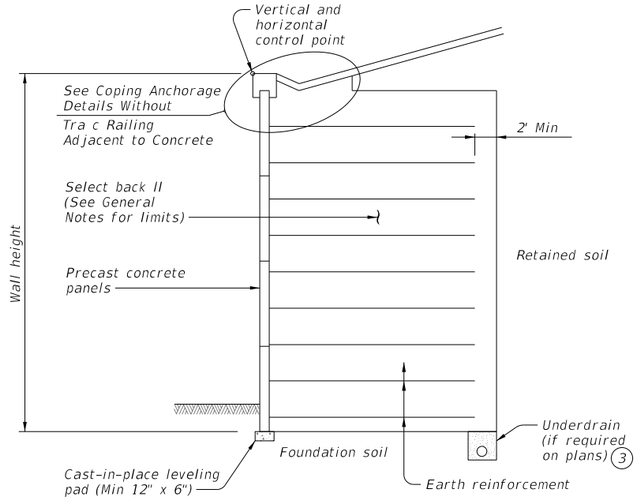
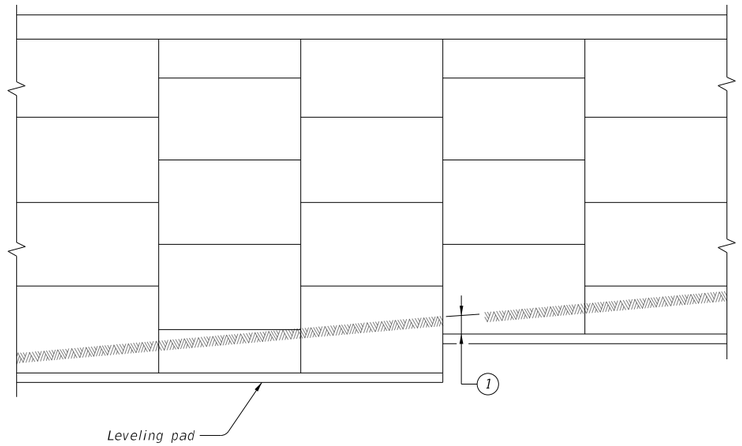
DATE:
FILE:



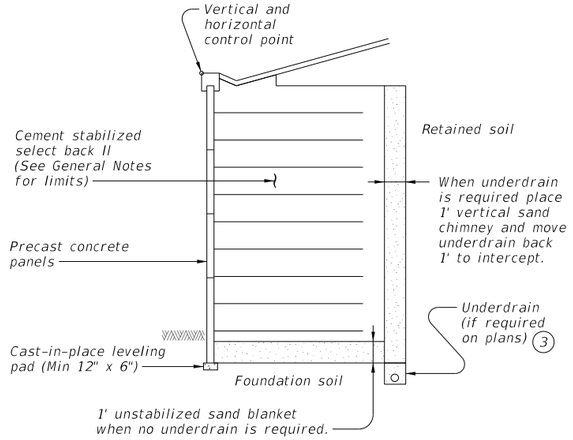
TYPICAL SECTION

(Wall at bottom of slope.)



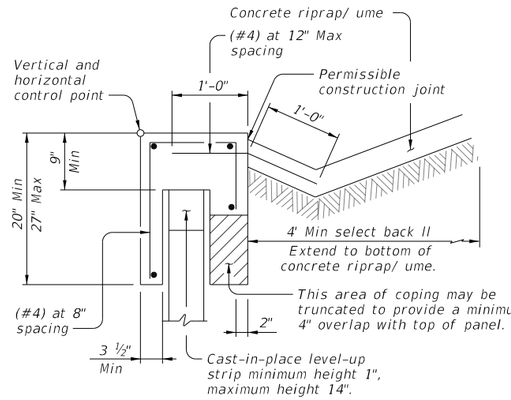
ELEVATION

1. Minimum embedment conforming to values given on the RW(MSE)DD standard.
2. Form map of Texas emblem into a wall panel next to each bridge abutment. Submit the exact location of each emblem to the Engineer for approval. The cost of forming the emblems will not be paid for directly, but is subsidiary to Item 423, "Retaining Walls." Inset the map of Texas a minimum of 3/4" into the face of the panel with a smooth nish. Finish the inset area in a contrasting color as approved by the Engineer.
3. Provide underdrain pipe and lter material in accordance with Item 556, "Pipe Underdrains."
4. Anchor precast coping to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Provide details that include coping reinforcement. Concrete ume (if required) is paid for separately from Item 423, "Retaining Walls."



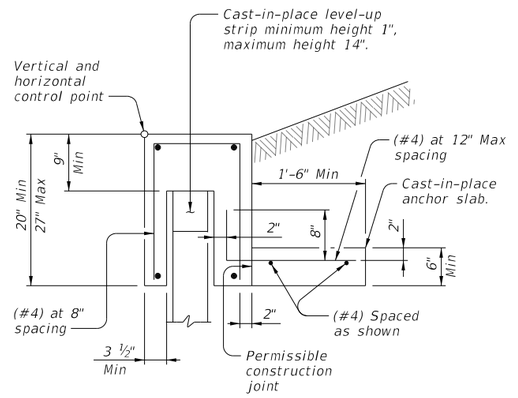
SPECIAL DRAINAGE PROVISIONS

(When cement stabilized back ll is used.)



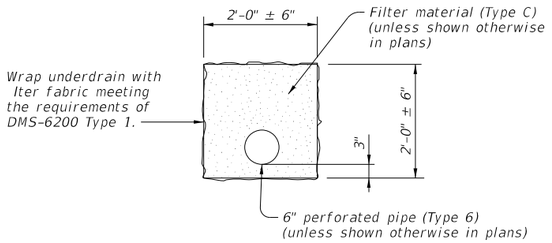
ADJACENT TO CONCRETE

(Excluding concrete pavement)

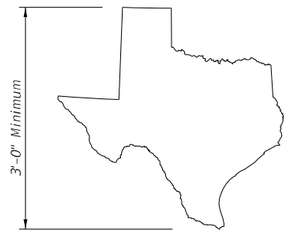


ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING 4



UNDERDRAIN DETAIL 3



MAP OF TEXAS EMBLEM 2

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: RW-MSE-ASD-25.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT October 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		116

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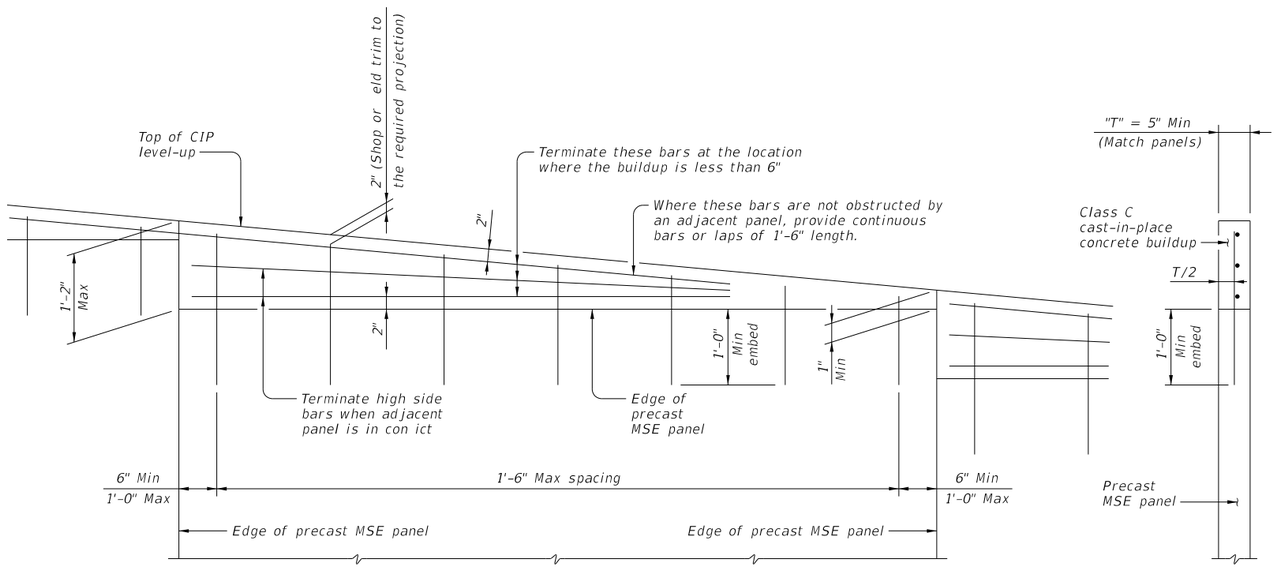
DATE:
FILE:



ELEVATION SECTION

LEVEL UP DETAIL (5)

DESIGN CRITERIA NOTES:

Design Parameters:

Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Retained Soil	Unit Weight = 125 pcf ϕ = (6) C = 0 psf
Foundation Soil	ϕ = (6) C = 0 psf
Select Back ll	Unit Weight = See Table (7) ϕ = 34° C = 0 psf
Cement Stabilized Select Back ll	Unit Weight = 125 pcf ϕ = 45° C = 0 psf

Limit stress in steel and concrete in accordance with current AASHTO Standard Speci cations for Highway Bridges and Interim Speci cations.

The minimum length of earth reinforcement are as shown on the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard.

Stability Criteria:

Stability criteria applies to both dry and drawdown analysis. Base design on the following factors of safety.

Sliding along the base of the structure	Factor of Safety ≥ 1.5
Overturning	Factor of Safety ≥ 2.0
Pullout of Earth Reinforcement at each level	Factor of Safety ≥ 1.5

Design the wall such that the base pressure resultant falls within the middle third of the retaining wall.

Determine pullout resistance from test data evaluated at $\frac{3}{4}$ inch strain.

Corrosion Criteria:

Design the earth reinforcement elements to have a minimum design life of 75 years, using current AASHTO corrosion rates.

Perform stress calculations (rupture) on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

(5) Cast vertical bars into the top of panels. At Contractor's option vertical bars may be embedded 4 inches with a Type III Class C epoxy anchorage system. Follow manufacturer's directions for installing the epoxy vertical bars.

(6) Soil design parameters must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

(7)

SELECT BACKFILL UNIT WEIGHT			
Type AS, BS & DS	Unit Weight	Internal Stability	External Stability
	105 PCF	Pullout	Sliding, Overturning, Eccentricity
	125 PCF	Rupture	Bearing

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Provide precast coping in 10-foot minimum lengths (typical.) To optimize coping lengths at radiuses, ends of runs, or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant ush with coping surface. The purpose of the joint sealing is to reduce surface drainage in ltration into the retaining wall back ll. Sealing coping joint is considered subsidiary to other items.

EARTH REINFORCEMENT:

Place the uppermost earth reinforcement no more than 3 feet below the top of wall.

Place the lowest level of earth reinforcement no more than 2 feet above the top of the leveling pad.

Provide earth reinforcement with a minimum wire size of W7.0. If di erent longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire must be at least 50% of the cross sectional area of the larger wire.

A maximum of four wire mesh con gurations (wire sizes) will be allowed on a project. Provide unique transverse bar spacing for each mesh con guration, di ering from other con gurations by a minimum of 3 inches. Step earth reinforcement lengths in increments no ner than 12 inches.

PANELS:

Fabricate standard precast concrete panels to a maximum height of 6 feet and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel must not exceed 7 ft.-6 in. Provide a minimum panel thickness of 5 inches. Arrange panels to provide o set horizontal joints.

Provide an open joint around the perimeter of the concrete panels. Con gure joints such that 1) the lter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between $\frac{3}{8}$" and $\frac{3}{4}$".

Provide a one-piece corner panel for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.

MATERIAL NOTES:

Provide Class C concrete for reinforced concrete and precast coping.
Provide Class H concrete for precast concrete panels.
Provide Class A concrete for unreinforced concrete.
Provide Grade 60 reinforcing steel.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Determine speci c geometry based on wall layouts and other plan information.

Extend select back ll speci ed for use within the mechanically stabilized earth volume horizontally from the back of the panels a minimum 2 feet beyond the end of the earth reinforcement. Extend select back ll vertically to the top of the panels from either the top of the leveling pad, or from 4 inches below the lowest earth reinforcement, whichever is lower.

Provide concrete coping along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall.

Provide details and calculations that establish support for panels that are a ected when obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcement in their normal locations. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcement, no adjustment in length is needed for skew angles less than or equal to 10 degrees. Adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall when skew angles are greater than 10 degrees. Provide calculations that justify any alterations made to the soil reinforcement or modi cations to their normal placement. Do not use panels without any soil reinforcement connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting soil reinforcement attached to them and as approved by the Engineer.

Coping and anchor slabs are considered subsidiary to the Item 423, "Retaining Walls."

Use these details in conjunction with the retaining wall layout, the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard and other applicable standards.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: RW-MSE-ASD-25.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE			
©TxDOT October 2025	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0918	46	316	VA			
	DIST	COUNTY		SHEET NO.			
	DAL	DENTON		117			

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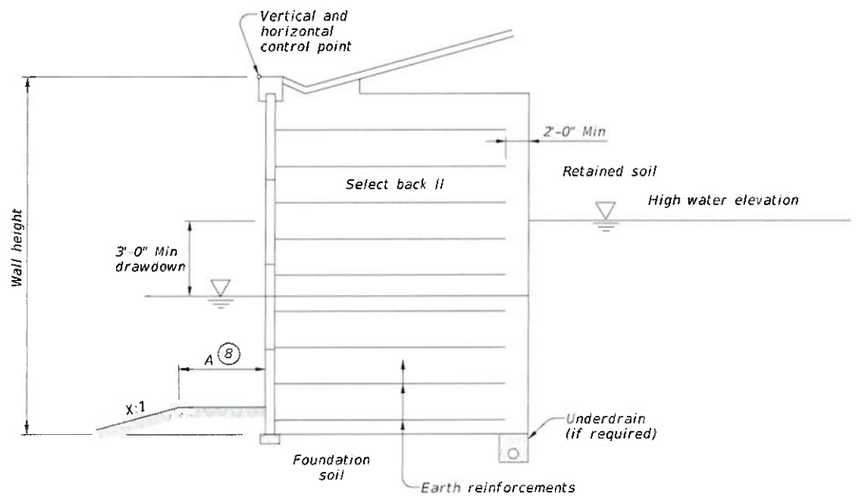
DATE: 12/1/2025 9:22:23 AM
FILE: pw://hal-pw.bentley.com:hal-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/RW-MSE(DD)-ASD-25.dgn

WALL SUMMARY

MSE Retaining Wall	Begin Station (1)	End Station (1)	Retained Soil Friction Angle (2)	Foundation Soil Friction Angle (2)	Ground Improvement (3)	Min Earth Reinf. Length (4)	Min Wall Embedment (5)	Underdrain Required (6)	Drawdown Analysis (7)	Bench Width (8)
A	10+00.00	11+25.00	34°	25°	-	0.8 H	2 feet	Yes	Yes	2 feet
B	10+00.00	10+40.00	34°	29°	-	8 feet	2 feet	Yes	Yes	2 feet
	10+40.00	11+65.00	34°	29°	-	0.95 H	2 feet	Yes	Yes	2 feet
C	10+00.00	11+40.00	34°	30°	-	0.75 H	2 feet	Yes	Yes	2 feet
	11+40.00	12+55.00	34°	30°	-	8 feet	2 feet	Yes	Yes	2 feet
D	10+00.00	12+20.31	34°	26°	-	0.85 H	2 feet	Yes	Yes	2 feet
E	10+00.00	10+80.00	34°	28°	-	8 feet	2 feet	Yes	Yes	2 feet
	10+80.00	12+19.82	34°	28°	-	0.75 H	2 feet	Yes	Yes	2 feet
F	10+00.00	10+40.00	34°	30°	-	8 feet	2 feet	Yes	Yes	2 feet
	10+40.00	11+85.00	34°	30°	-	0.75 H	2 feet	Yes	Yes	2 feet
G	10+00.00	11+28.00	34°	29°	-	0.7 H	2 feet	Yes	Yes	2 feet
	11+28.00	11+75.00	34°	29°	-	8 feet	2 feet	Yes	Yes	2 feet
H	10+00.00	11+80.00	34°	31°	-	0.7 H	2 feet	Yes	Yes	2 feet
	11+80.00	12+82.08	34°	27°	-	0.8 H	2 feet	Yes	Yes	2 feet
I	10+00.00	11+00.00	34°	24°	-	8 feet	2 feet	Yes	Yes	2 feet
	11+00.00	12+57.24	34°	24°	-	1.1 H	2 feet	Yes	Yes	2 feet
J	10+00.00	11+00.00	34°	30°	-	8 feet	2 feet	Yes	Yes	2 feet
	11+00.00	12+00.00	34°	30°	-	0.75 H	2 feet	Yes	Yes	2 feet
	12+00.00	13+42.55	34°	30°	-	0.8 H	2 feet	Yes	Yes	2 feet
K	10+00.00	12+00.00	34°	29°	-	0.75 H	2 feet	Yes	Yes	2 feet
	12+00.00	13+42.75	34°	29°	-	0.7 H	2 feet	Yes	Yes	2 feet



TYPICAL SECTION
(Rapid drawdown condition.)

(1) Indicate limits for which the stated soil design requirements and assumptions are applicable.

(2) Base the listed retained and foundation friction angle on local experience or measured/correlated long term strength values.

(3) Indicate if ground improvement is required or not required. If shown as required, refer to ground improvement detail(s) shown elsewhere in the plans for additional information.

(4) Indicate on table both the minimum length and length ratio required. The minimum default length of earth reinforcements is either 8 feet or 70% of the wall height, whichever is greater. Wall height and design wall height may differ depending on project geometry and loading conditions. Note: Wall height at bridge abutments is equal to the distance between the top of leveling pad and finished grade at the bridge abutment backwall.

(5) Guidance to wall designer of record for determination of minimum wall embedment. Unless noted elsewhere in the plans, provide a minimum embedment from the top of leveling pad to finish grade of
- 1 foot for level ground where there is no potential for erosion or future excavation, or
- 2 feet for sloping ground (4.0H:1.0V or steeper) or where there is potential for removal of soil in front of the wall.

(6) Indicate if underdrain is required or not required.

(7) Indicate if rapid drawdown analysis is required.

(8) Horizontal bench width at base of wall varies. Use the following criteria to establish base width:
A = 2-foot Min for X > 4 or
A = 4-foot Min for X ≤ 4
Applicable to both drawdown and dry condition.

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

SPECIAL NOTES:
This sheet is to be filled out by the wall designer of record at time of plan preparation to provide soil strength parameters for the design of the specified walls.
The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA

RW(MSE)DD

FILE: RW-MSE(DD)-ASD-25.dgn	DW: TxDOT	CK: RLE	DW: JER	CK: RLE
©TxDOT October 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		118

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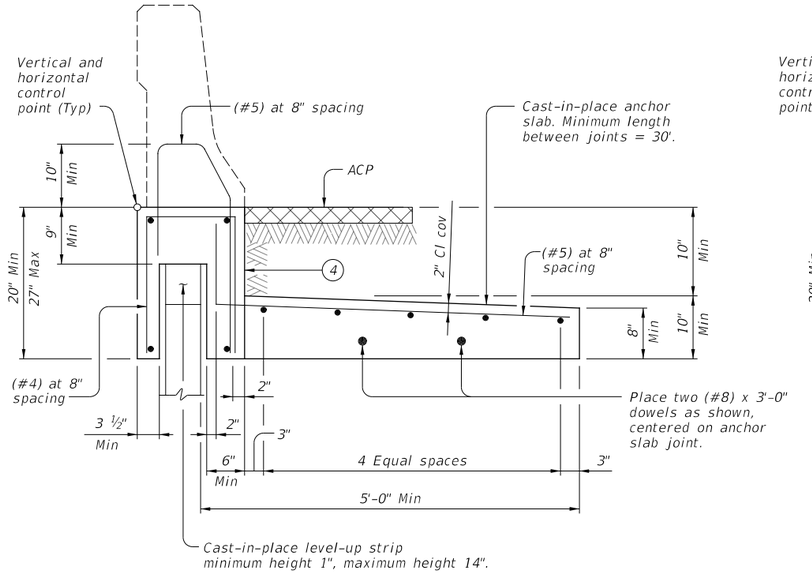
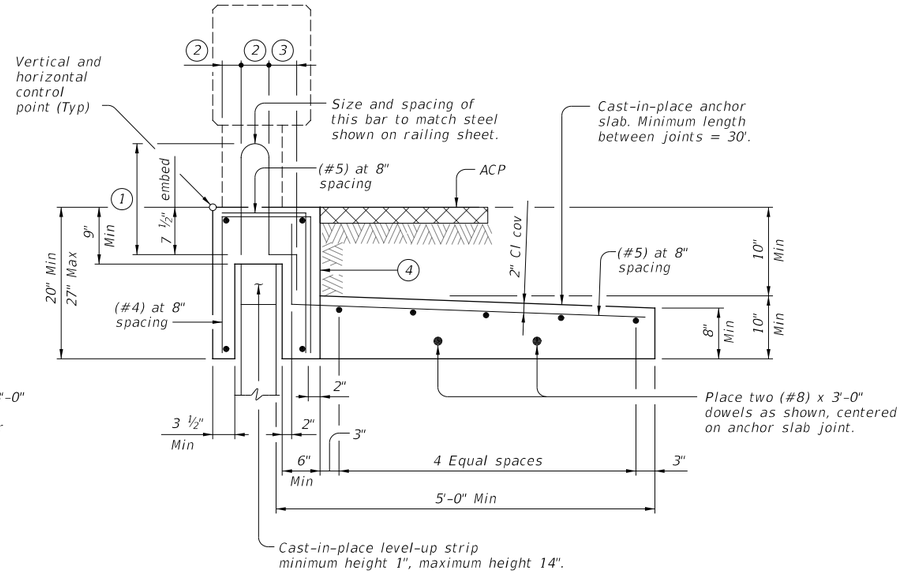
DATE: 11/25/2025 2:50:44 PM
FILE: pw:/halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/RW-TRF-22.dgn



"WIDE BASED" ADJACENT TO ACP

(Showing T551 Rail, other rails listed similar.)



"NARROW BASED" ADJACENT TO ACP

(Showing T223 Rail, other rails listed similar.)

Rail Type	Detail	Precasting Rail with Coping Allowed
T1F/T1W/C1W/T2P/C2P	NARROW	NO
T221/C221/T222	NARROW	YES
T223/C223	NARROW	NO
T402/C402	NARROW	NO
T411/C411	NARROW	NO
T551/T552	WIDE	YES
T66	NARROW	NO
SSTR	WIDE	YES

CAST-IN-PLACE COPINGS:

Provide compressible material to isolate precast panel from cast-in-place coping to prevent cracking. Attach compressible material to both sides of precast panel prior to casting concrete for coping.

When cast-in-place coping is anchored to reinforced concrete pavement, provide a smooth level-up strip on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.

Align coping and railing joints with precast panel joints. Optional rail joints are allowed as approved by Engineer. Provide railing construction joints or expansion joints at 100-foot maximum spacing.

PRECAST COPINGS:

Provide a smooth level-up strip on top of the precast panels prior to installation of the coping. Shims may be used on top of level-up strips to facilitate alignment. Total shim thickness not to exceed 1 inch.

Provide precast coping in 10-foot minimum lengths.

JOINTED CONCRETE PAVEMENT:

When coping is adjacent to and anchored into jointed concrete pavement, align the coping joints with the pavement joints.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant ush with coping surface. The purpose of the joint sealing is to reduce surface drainage in ltration into the retaining wall back ll. Sealing coping joint is considered subsidiary to other items.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi.)
Provide Grade 60 reinforcing steel.
Provide #4 longitudinal bars, unless otherwise shown.

GENERAL NOTES:

Details on this sheet are to be used in development of speci c details for mounting tra c railing on mechanically stabilized earth (MSE) walls.

The speci c details proposed must have strengths equivalent to those shown on this sheet and must be submitted for approval. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.

Submit shop drawings for the tra c railing foundations to the Engineer in accordance with Item 423, "Retaining Walls." The shop drawings must include bar bending details.

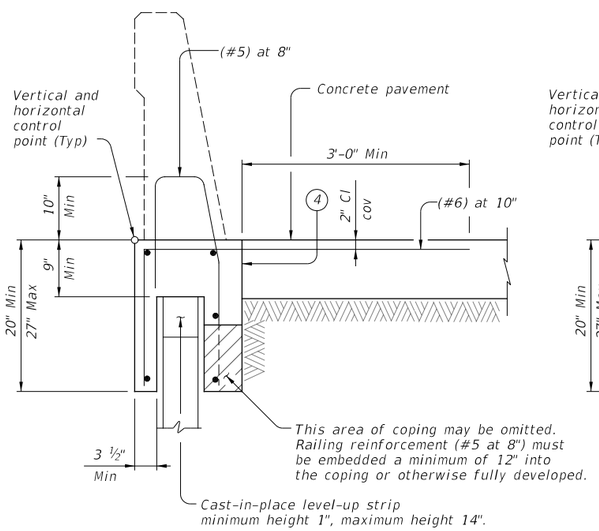
Precasting of railing with the coping will be allowed as noted in the table on this sheet.

The Contractor's attention is directed to the fact that various con gurations of precast coping/railing combinations are covered by patent. The Contractor must provide for use of these systems in accordance with Article 7.5.

Coping and anchor slabs are considered subsidiary to Item 423, "Retaining Walls." Payment for tra c railing is per the linear foot for the appropriate railing type.

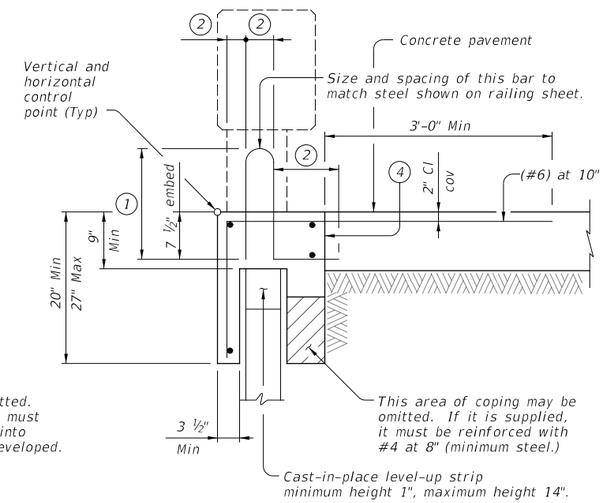
Cover dimensions are clear dimensions, unless noted otherwise.

1. Reinforcement length equal to length shown on the appropriate rail standard plus 1 inch.
2. Match dimension on the appropriate rail standard.
3. Match dimension on the appropriate rail standard. Bend end of rail anchorage reinforcing as shown as required to maintain clear cover.
4. See "Coping Joint Sealer Details."



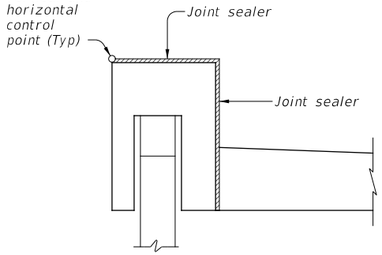
"WIDE BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing SSTR Rail, other rails listed similar.)

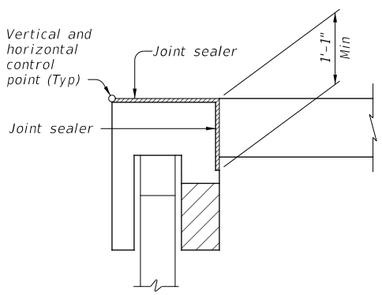


"NARROW BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing T223 Rail, other rails listed similar.)



ADJACENT TO ACP



ADJACENT TO CONCRETE PAVEMENT

COPING JOINT SEALER DETAILS

(Reinforcing steel not shown for clarity.)

Texas Department of Transportation

Bridge Division Standard

RETAINING WALL TRAFFIC RAILING FOUNDATIONS

RW(TRF)

FILE: RW-TRF-22.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
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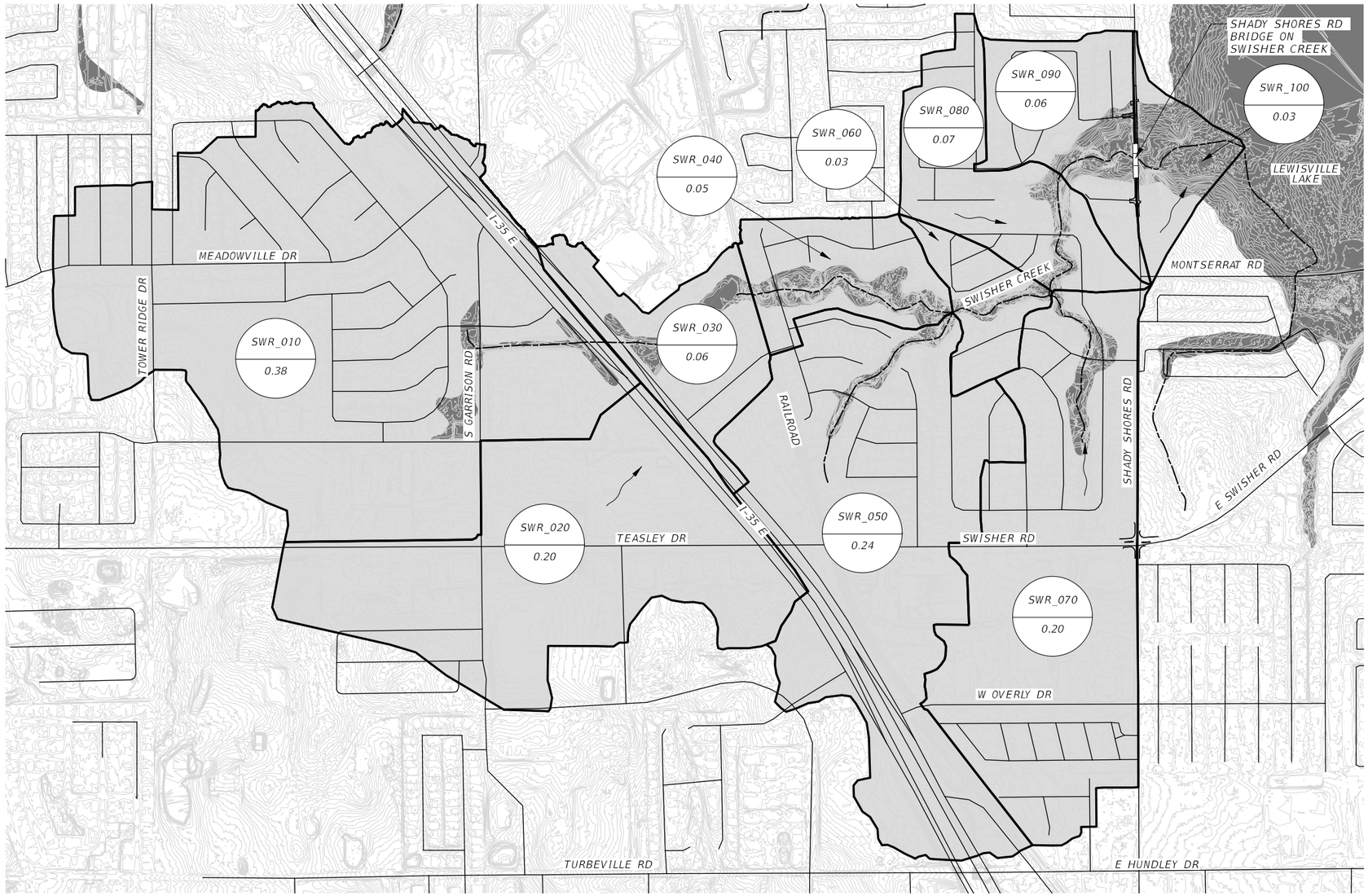
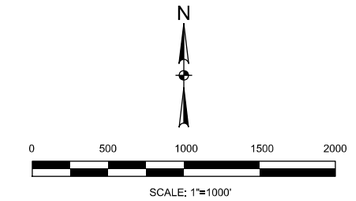
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		119



DRAINAGE AREA MAP



LEGEND

- XXX / XXX.XX — DRAINAGE AREA NO. / DRAINAGE AREA SIZE: (SQ MI.)
- DRAINAGE AREA BOUNDARY
- DIRECTION OF FLOW
- EXIST FEMA ZONE AE
- STREAM CENTERLINE

NOAA ATLAS 14, VOLUME 11, VERSION 2 RAINFALL DATA					
LOCATION NAME: DENTON, TX 33.1456, -97.0405 (LAT,LONG)					
PDS-BASED PERCIPITATION FREQUENCY ESTIMATES WITH 90% CONFIDENCE INTERVALS (IN INCHES)					
DURATION	AVERAGE RECURRENCE INTERVAL (YEARS)				
	10	25	50	100	500
5-MIN	0.689	0.812	0.903	0.993	1.210
15-MIN	1.370	1.610	1.790	1.970	2.390
1-HR	2.480	2.910	3.240	3.570	4.390
2-HR	3.110	3.700	4.160	4.620	5.820
3-HR	3.510	4.210	4.750	5.320	6.790
6-HR	4.230	5.110	5.810	6.550	8.470
12-HR	5.010	6.070	6.900	7.770	10.100
1-DAY	5.860	7.100	8.060	9.080	11.800

NRCS UNIT HYDROGRAPH DRAINAGE METHOD										
DA I.D.	SWR_01	SWR_02	SWR_03	SWR_04	SWR_05	SWR_06	SWR_07	SWR_08	SWR_09	SWR_10
CONTRIBUTING AREA (SQ MI)	0.38	0.20	0.06	0.05	0.24	0.03	0.20	0.07	0.06	0.03
WEIGHTED CURVE NUMBER	72.46	73.06	75.23	72.00	72.64	68.89	71.69	67.48	69.06	76.28
WEIGHTED PERCENT IMPERVIOUS (%)	53.82	65.11	46.55	40.09	64.82	29.93	56.49	37.77	45.16	10.62
LAG TIME (MIN)	20.22	14.87	13.61	13.08	24.94	9.32	36.64	8.01	23.86	6.67
STORM DURATION (HR)	24	24	24	24	24	24	24	24	24	24
PEAK FLOW RATE (10-YR, CFS)	727.9	468.8	131.8	102.9	437.5	61.5	265.7	164.5	90.4	78.0
PEAK FLOW RATE (25-YR, CFS)	891.6	567.2	161.8	128.1	529.9	78.3	325.4	207.8	112.6	99.3
PEAK FLOW RATE (50-YR, CFS)	1016.8	642.0	184.6	147.3	600.6	91.2	371.5	241.1	129.7	115.4
PEAK FLOW RATE (100-YR, CFS)	1143.3	717.2	207.6	166.8	671.9	104.4	418.2	274.9	147.2	131.6
PEAK FLOW RATE (500-YR, CFS)	1452.4	898.8	262.9	214.2	847.1	136.4	534.9	357.4	190.3	170.4

GENERAL NOTES:

1) CALCULATIONS ARE BASED ON THE TxDOT HYDRAULIC DESIGN MANUAL (SEP 2019) PROCEDURES.

2) THE PORTION OF SWISHER CREEK THAT EXTENDS THROUGH THE PROJECT AREA HAS BEEN STUDIED BY DETAILED METHODS AS PART OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE STUDY (FIS) FOR DENTON COUNTY AND INCORPORATED AREAS (MAP #: 48121C0395H, REVISED DATA: JUNE 19, 2020).

3) SWISHER CREEK HAS A DESIGNATED SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE FLOODPLAIN THROUGHOUT THE PROJECT REACH IN WHICH BASE FLOOD ELEVATIONS (BFE'S) AND FLOODWAYS HAVE BEEN DETERMINED.

4) ALL ELEVATIONS REPORTED ARE BASED ON THE NAVD88 VERTICAL DATUM.

5) MODELS UTILIZE A NORMAL DEPTH BOUNDARY CONDITION.

6) TOPOGRAPHIC DATA SOURCE, 2017 TEXAS NATURAL RESOURCE INFORMATION (TRNIS) LIGHT DETECTION AND RADAR (LIDAR) DATA.

7) USACE HEC-RAS VERSIONS 5.0.7 WAS UTILIZED FOR THE ANALYSIS.

8) H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR WENDY WITHERS ON 9/14/2022.

12-01-2025

TBPELS FIRM #312

Sheet | of | Sheets

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Texas Department of Transportation | Dallas District Bridge

SHADY SHORES ROAD DRAINAGE AREA MAP SWISHER CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		120

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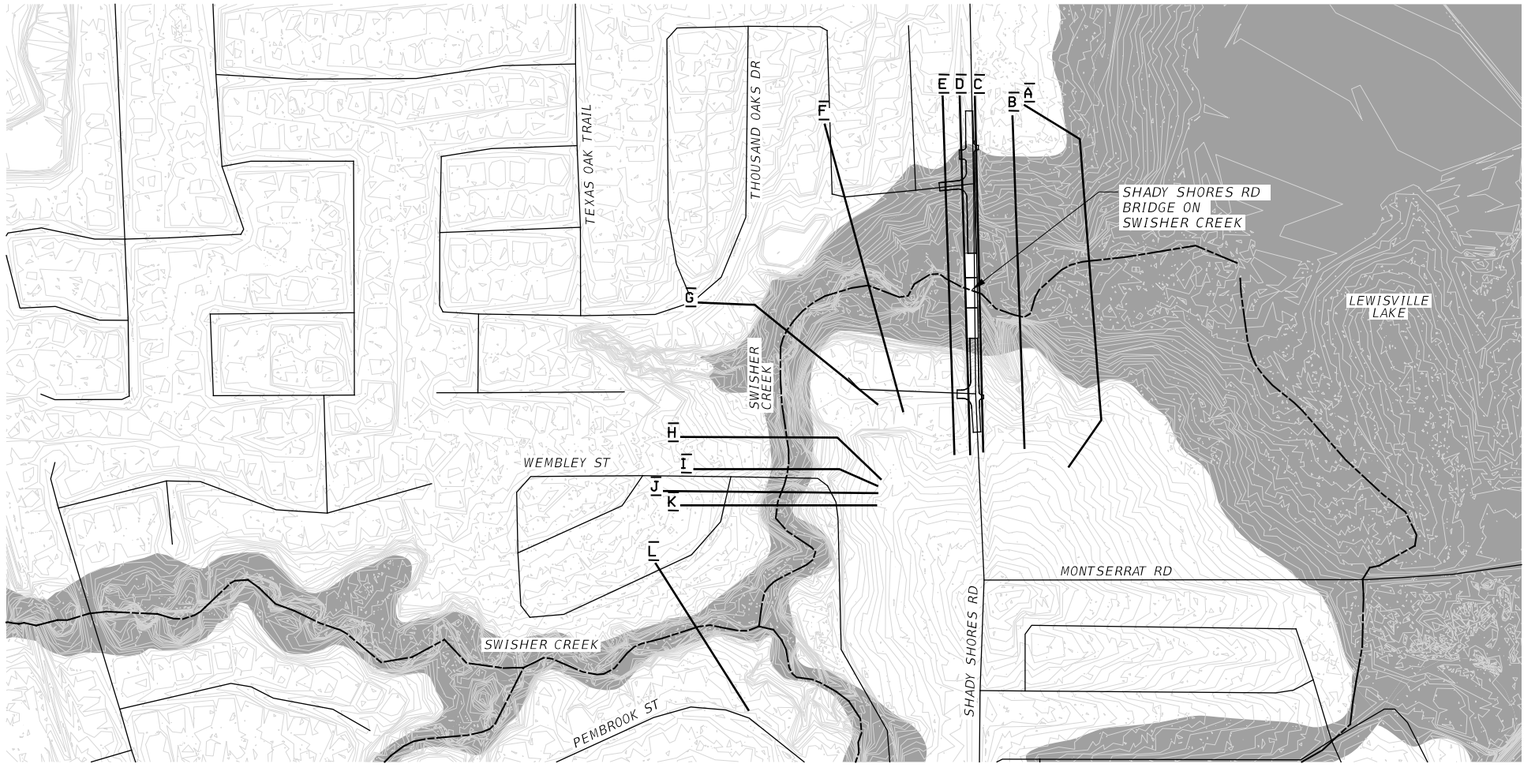
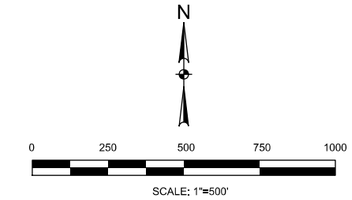


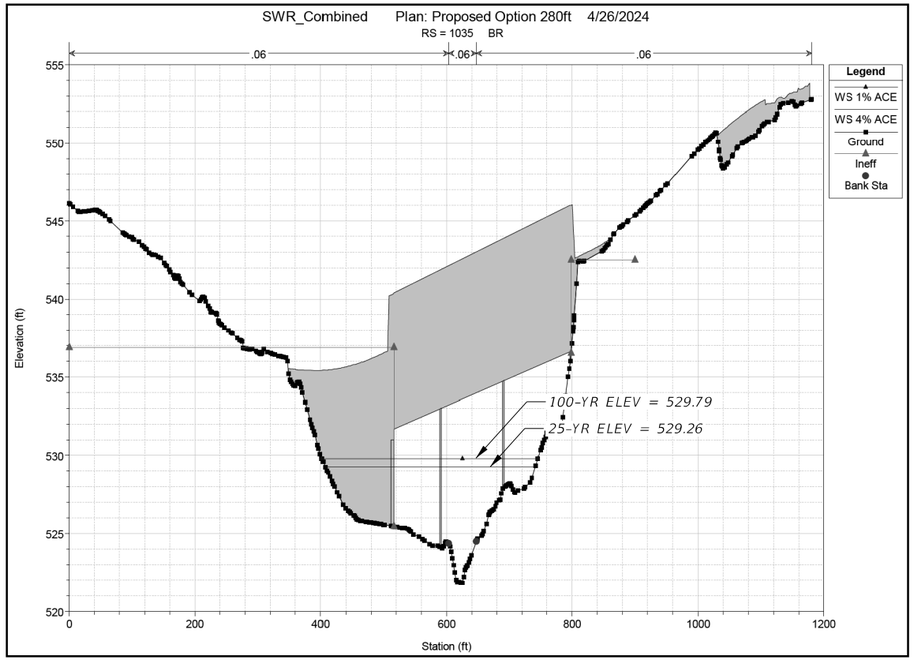
HEC-RAS CROSS SECTION LOCATION MAP

Stream X-Section	RAS River Station
A	512
B	830
C	987
BRIDGE AT SHADY SHORES RD	1035
D	1041
E	1098
F	1409
G	1731
H	2088
I	2194
J	2273
K	2318
L	3083

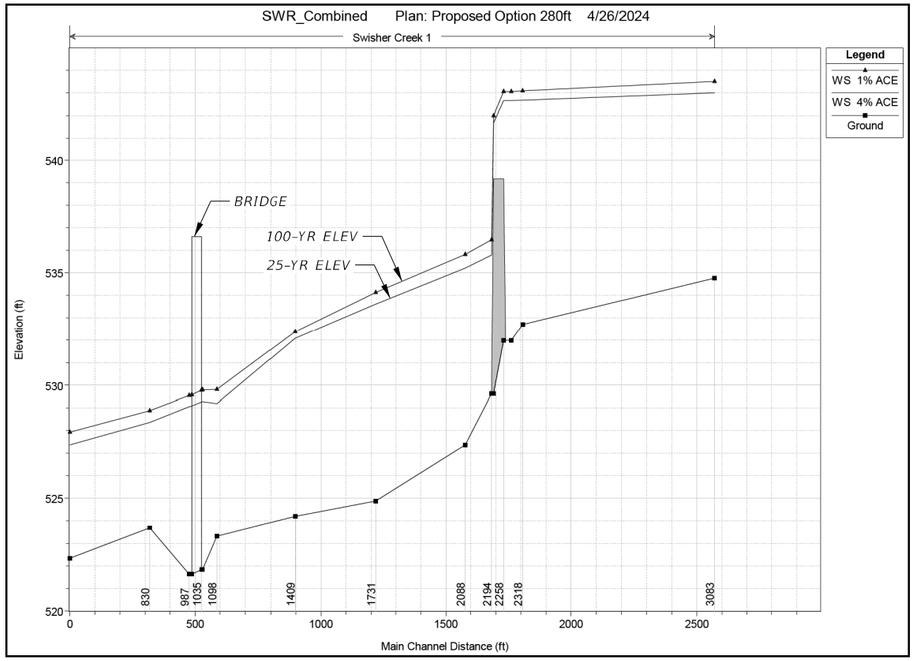


LEGEND

- EXIST FEMA ZONE AE
- HEC-RAS CROSS SECTION
- STREAM CENTERLINE



PROPOSED BRIDGE CROSS SECTION AT SHADY SHORES RD



PROPOSED SWISHER CREEK PROFILE

12-01-2025

TBPELS FIRM #312

Sheet 1 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD HYDRAULIC DATA SHEET SWISHER CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		121

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DATE: 11/25/2025 TIME: 4:31:27 PM
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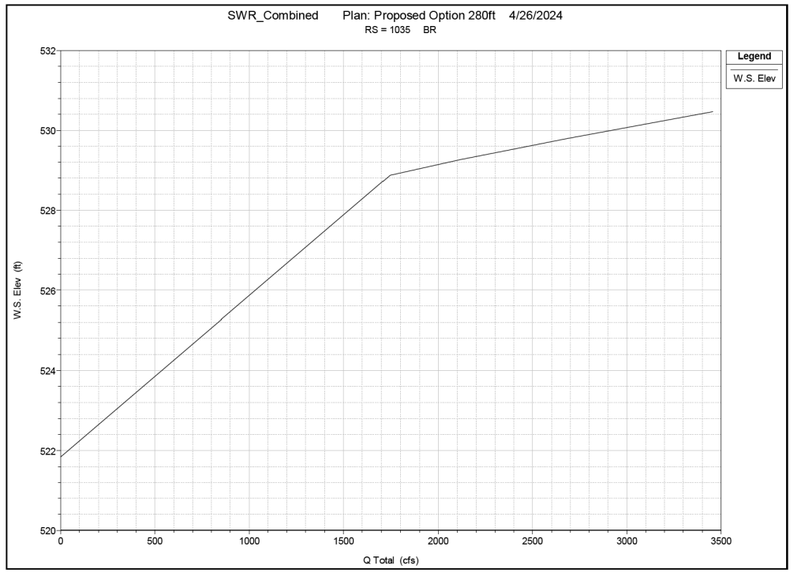
User:

HYDRAULIC CALCULATIONS

Location Description	Reach	HEC-RAS River Station	Return Interval	Flow (cfs)		Water Surface Elevation (ft)		Delta in WSEL (ft)	Main Channel Velocity (ft/s)		Delta in Velocity (ft/s)
				Existing	Proposed	Existing	Proposed	Proposed-Existing	Existing	Proposed	Proposed-Existing
UPSTREAM OF BRIDGE	1	3083	25-year	1722	1722	543.04	542.98	-0.06	4.25	4.30	0.05
UPSTREAM OF BRIDGE	1	2318	25-year	1722	1722	542.72	542.66	-0.06	1.70	1.72	0.02
UPSTREAM OF BRIDGE	1	2273	25-year	1722	1722	542.71	542.64	-0.07	1.72	1.74	0.02
INL STRUCTURE		2258									
UPSTREAM OF BRIDGE	1	2194	25-year	1722	1722	535.78	535.78	0.00	3.23	3.23	0.00
UPSTREAM OF BRIDGE	1	2088	25-year	1722	1722	535.20	535.20	0.00	5.21	5.21	0.00
UPSTREAM OF BRIDGE	1	1731	25-year	2078	2078	533.57	533.60	0.03	5.37	5.33	-0.04
UPSTREAM OF BRIDGE	1	1409	25-year	2078	2078	531.73	532.08	0.35	5.91	5.29	-0.62
UPSTREAM OF BRIDGE	1	1098	25-year	2078	2078	530.87	529.20	-1.67	3.53	7.84	4.31
UPSTREAM OF BRIDGE	1	1041	25-year	2117	2117	530.84	529.27	-1.57	2.21	3.06	0.85
BRIDGE AT SHADY SHORES RD		1035									
DOWNSTREAM OF BRIDGE	1	987	25-year	2117	2117	529.30	529.06	-0.24	3.89	4.00	0.11
DOWNSTREAM OF BRIDGE	1	830	25-year	2117	2117	528.36	528.36	0.00	5.19	5.19	0.00
DOWNSTREAM OF BRIDGE	1	512	25-year	2122	2122	527.36	527.36	0.00	2.99	2.99	0.00

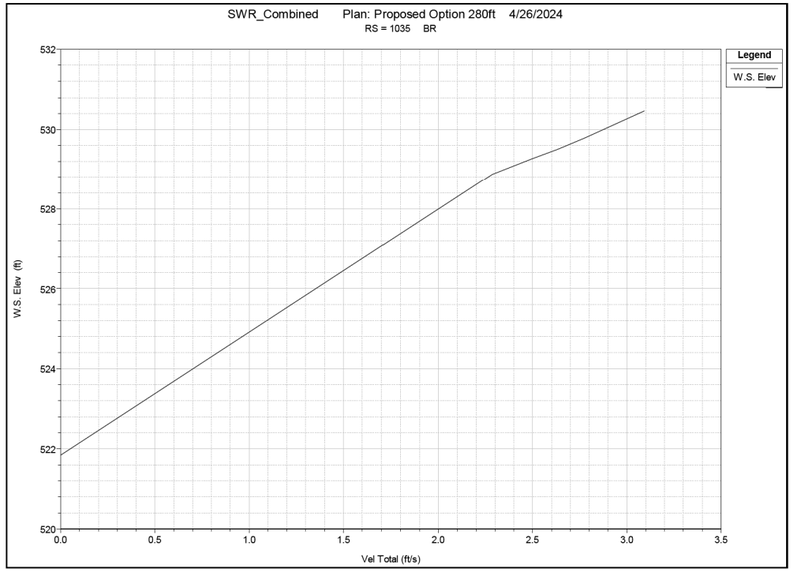


CONVEYANCE CURVE

HYDRAULIC CALCULATIONS

Location Description	Reach	HEC-RAS River Station	Return Interval	Flow (cfs)		Water Surface Elevation (ft)		Delta in WSEL (ft)	Main Channel Velocity (ft/s)		Delta in Velocity (ft/s)
				Existing	Proposed	Existing	Proposed	Proposed-Existing	Existing	Proposed	Proposed-Existing
UPSTREAM OF BRIDGE	1	3083	100-year	2160	2160	543.55	543.49	-0.06	4.86	4.91	0.05
UPSTREAM OF BRIDGE	1	2318	100-year	2160	2160	543.14	543.07	-0.07	2.02	2.04	0.02
UPSTREAM OF BRIDGE	1	2273	100-year	2160	2160	543.12	543.05	-0.07	2.05	2.07	0.02
INL STRUCTURE		2258									
UPSTREAM OF BRIDGE	1	2194	100-year	2160	2160	536.47	536.46	-0.01	3.54	3.54	0.00
UPSTREAM OF BRIDGE	1	2088	100-year	2160	2160	535.81	535.81	0.00	5.78	5.78	0.00
UPSTREAM OF BRIDGE	1	1731	100-year	2609	2609	534.12	534.12	0.00	5.78	5.77	-0.01
UPSTREAM OF BRIDGE	1	1409	100-year	2609	2609	532.17	532.38	0.21	6.49	6.05	-0.44
UPSTREAM OF BRIDGE	1	1098	100-year	2609	2609	531.26	529.81	-1.45	3.81	7.15	3.34
UPSTREAM OF BRIDGE	1	1041	100-year	2675	2675	531.22	529.80	-1.42	2.53	3.38	0.85
BRIDGE AT SHADY SHORES RD		1035									
DOWNSTREAM OF BRIDGE	1	987	100-year	2675	2675	529.74	529.55	-0.19	4.21	4.47	0.26
DOWNSTREAM OF BRIDGE	1	830	100-year	2675	2675	528.88	528.88	0.00	5.26	5.26	0.00
DOWNSTREAM OF BRIDGE	1	512	100-year	2686	2686	527.93	527.93	0.00	3.23	3.23	0.00

GENERAL NOTES:
1) A HYDRAULIC IMPACT ANALYSIS HAS BEEN CONDUCTED AND NO SIGNIFICANT ADVERSE IMPACTS ARE ANTICIPATED FOR THE PROPOSED CONDITIONS.



VELOCITY CURVE

Rebekah E Franz
12-01-2025

TBPELS FIRM #312

Sheet 2 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD HYDRAULIC DATA SHEET SWISHER CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		122

SCOUR CALCULATIONS		
	SCOUR DESIGN FLOOD	SCOUR CHECK FLOOD
EROSION CATEGORY	2	2
τ_c (lb/ft²)	0.00	0.00
V_c	0.60	0.60
$\tau_{f(c)}$ (lb/ft²)	0.01	0.01
$\tau_{f(p)}$ (lb/ft²)	2.54	2.77
$Z_{f(c)}$ (in/day)	0.13	0.13
$Z_{f(p)}$ (in/day)	0.19	0.19
$Z_{max(c)}$ (ft)	2.15	2.36
$Z_{max(p)}$ (ft)	1.24	1.23
$t_{e(c)}$ (hrs)	14221.40	15494.75
$t_{e(p)}$ (hrs)	166.88	182.23

SUMMARY OF CALCULATED SCOUR DEPTH (ft)		
	SCOUR DESIGN FLOOD	SCOUR CHECK FLOOD
$Z_{f(c)}$ (ft)	1.60	1.75
$Z_{f(p)}$ (ft)	0.10	0.11
Z_{total} (ft)	1.70	1.86

SCOUR DESIGN FLOOD						
	UPSTREAM APPROACH RIVER STA 1098			CONTRACTED SECTION AT BRIDGE RIVER STA 1041		
	LEFT OVERBAN	MAIN CHANNEL	RIGHT OVERBANK	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK
A (sq. ft.)	229.28	158.98	88.52	755.46	287.73	221.70
WP (ft)	153.76	37.30	68.02	87.17	44.44	96.03
n	0.06	0.06	0.06	0.06	0.06	0.06
Q (cfs)	842.09	1176.01	296.90	1089.66	924.95	358.38
V (ft/s)	3.67	7.40	3.35	2.62	3.21	1.62
y (ft)	1.49	4.43	1.30	4.77	6.54	2.32
W (ft)	153.70	35.91	67.95	199.27	44.02	95.71
WSEL (ft)	529.49			529.52		

SCOUR CHECK FLOOD						
	UPSTREAM APPROACH RIVER STA 1098			CONTRACTED SECTION AT BRIDGE RIVER STA 1041		
	LEFT OVERBAN	MAIN CHANNEL	RIGHT OVERBANK	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK
A (sq. ft.)	279.63	170.27	111.56	812.46	300.23	249.23
WP (ft)	166.65	37.30	79.14	87.17	44.44	98.53
n	0.06	0.06	0.06	0.06	0.06	0.06
Q (cfs)	1026.42	1217.97	364.61	1224.63	1013.35	437.02
V (ft/s)	3.67	7.15	3.27	2.78	3.38	1.75
y (ft)	1.68	4.74	1.41	5.05	6.82	2.54
W (ft)	166.58	35.91	79.07	202.11	44.02	98.20
WSEL (ft)	529.81			529.80		

CHANNEL MATERIAL	
CHANNEL BED MATERIAL DESCRIPTION	CHANNEL AND BANKS INCLUDE SILTY SANDS IN THE TOP 5 FEET OF BANK. THE SILTY SANDS ARE UNDERLAIN WITH CLAYEY SAND, SHALE, AND SANDSTONE AT THE END OF THE LOG.
BASIS OF CHANNEL BED MATERIAL DESCRIPTION	LABORATORY TESTS ON SOIL BORING SAMPLE BR2
NON-ERODIBLE STRATA	SANDSTONE (ELEVATION 509)

SUMMARY OF RETURN PERIODS	
DESIGN FLOOD	25-YEAR
SCOUR DESIGN FLOOD	50-YEAR
SCOUR DESIGN CHECK FLOOD	100-YEAR

* THE RETURN PERIOD FOR THE DESIGN FLOOD WAS OBTAINED FROM THE TxDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019. THE RETURN PERIODS FOR THE SCOUR DESIGN FLOOD AND SCOUR CHECK FLOOD WERE OBTAINED FROM THE TxDOT SCOUR EVALUATION GUIDE, SEPTEMBER 2023.

ANALYSIS NOTES

THIS SCOUR EVALUATION WAS CONDUCTED USING THE SOIL RATE IN COHESIVE SOILS (SRICOS) METHOD, IN ACCORDANCE WITH THE STATE'S SCOUR EVALUATION GUIDE, SEPTEMBER 2023.

SCOUR WAS CALCULATED USING SOIL BORINGS FROM THE DECEMBER 2020 PRELIMINARY GEOTECHNICAL REPORT PREPARED DURING SCHEMATIC DESIGN. ANALYSIS WILL BE UPDATED ONCE A FINAL REPORT IS RECEIVED.

REFER TO THE DRAINAGE AREA SHEET AND THE HYDRAULIC DATA SHEETS FOR ADDITIONAL HYDROLOGIC AND HYDRAULIC INFORMATION.

STATE OF TEXAS
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Rebekah E Franz

12-01-2025

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD BRIDGE SCOUR DATA AT SWISHER CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		123

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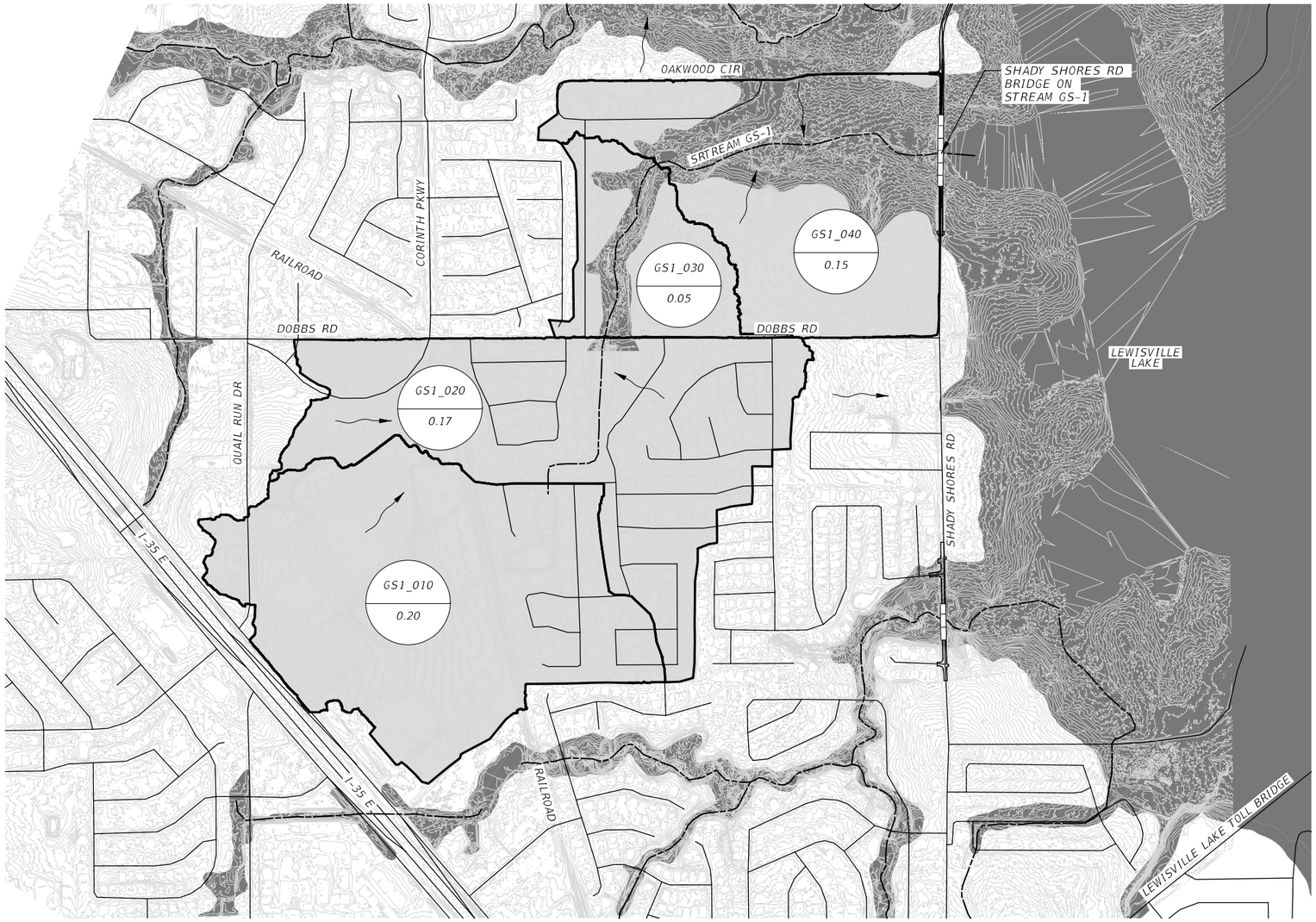

DRAINAGE AREA MAP

NRCS UNIT HYDROGRAPH DRAINAGE METHOD				
D.A.I.D.	GS1_010	GS1_020	GS1_030	GS1_040
CONTRIBUTING AREA (SQ MI)	0.20	0.17	0.05	0.15
WEIGHTED CURVE NUMBER	74.95	66.47	65.17	66.93
WEIGHTED PERCENT IMPERVIOUS (%)	53.06	49.15	43.06	24.46
LAG TIME (MIN)	20.76	15.34	18.15	24.26
STORM DURATION (HR)	24	24	24	24
PEAK FLOW RATE (10-YR, CFS)	386.8	338.8	85.4	193.0
PEAK FLOW RATE (25-YR, CFS)	472.3	421.2	107.4	250.2
PEAK FLOW RATE (50-YR, CFS)	537.7	484.6	124.5	294.8
PEAK FLOW RATE (100-YR, CFS)	603.5	549.2	142.0	340.7
PEAK FLOW RATE (500-YR, CFS)	764.0	707.5	185.3	456.0

NOAA ATLAS 14, VOLUME 11, VERSION 2 RAINFALL DATA					
LOCATION NAME: DENTON, TX 33.1456, -97.0405 (LAT, LONG)					
PDS-BASED PERCIPITATION FREQUENCY ESTIMATES WITH 90% CONFIDENCE INTERVALS (IN INCHES)					
DURATION	AVERAGE RECURRENCE INTERVAL (YEARS)				
	10	25	50	100	500
5-MIN	0.689	0.812	0.903	0.993	1.210
15-MIN	1.370	1.610	1.790	1.970	2.390
1-HR	2.480	2.910	3.240	3.570	4.390
2-HR	3.110	3.700	4.160	4.620	5.820
3-HR	3.510	4.210	4.750	5.320	6.790
6-HR	4.230	5.110	5.810	6.550	8.470
12-HR	5.010	6.070	6.900	7.770	10.100
1-DAY	5.860	7.100	8.060	9.080	11.800

GENERAL NOTES:

1) CALCULATIONS ARE BASED ON THE TxDOT HYDRAULIC DESIGN MANUAL (SEP 2019) PROCEDURES.

2) THE PORTION OF STREAM GS-1 THAT EXTENDS THROUGH THE PROJECT AREA HAS BEEN STUDIED BY DETAILED METHODS AS PART OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE STUDY (FIS) FOR DENTON COUNTY AND INCORPORATED AREAS (MAP #: 48121C0395H, REVISED DATE: JUNE 19, 2020).

3) STREAM GS-1 HAS A DESIGNATED SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE FLOODPLAIN THROUGHOUT THE PROJECT REACH IN WHICH BASE FLOOD ELEVATIONS (BFE'S) HAVE BEEN DETERMINED.

4) ALL ELEVATIONS REPORTED ARE BASED ON THE NAVD88 VERTICAL DATUM.

5) MODELS UTILIZE A NORMAL DEPTH BOUNDARY CONDITION.

6) TOPOGRAPHIC DATA SOURCE, 2017 TEXAS NATURAL RESOURCE INFORMATION (TRNIS) LIGHT DETECTION AND RADAR (LIDAR) DATA.

7) USACE HEC-RAS VERSIONS 5.0.3 AND 5.0.7 WERE UTILIZED FOR THE ANALYSIS.

8) H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR WENDY WITHERS ON 9/14/2022.

N

0 500 1000 1500 2000

SCALE: 1"=1000'

LEGEND

XXX — DRAINAGE AREA NO.

XXX.XX — DRAINAGE AREA SIZE: (SQ MI.)

DRAINAGE AREA BOUNDARY

DIRECTION OF FLOW

EXIST FEMA ZONE AE

STREAM CENTERLINE

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12-01-2025

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SHADY SHORES ROAD DRAINAGE AREA MAP STREAM GS-1

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		124

DATE: 11/25/2025 TIME: 4:32:20 PM
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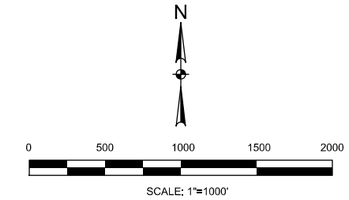
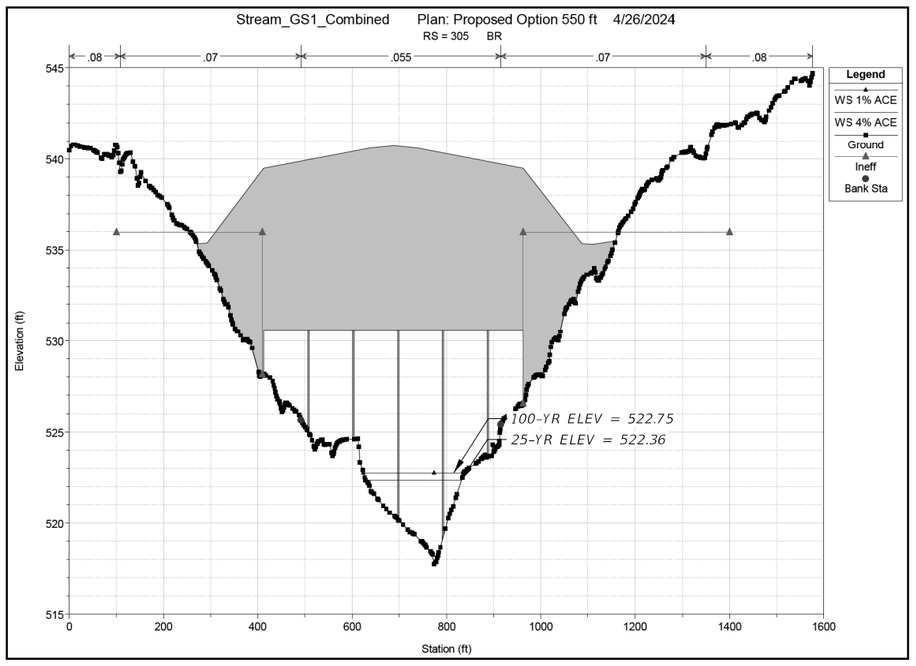
User:

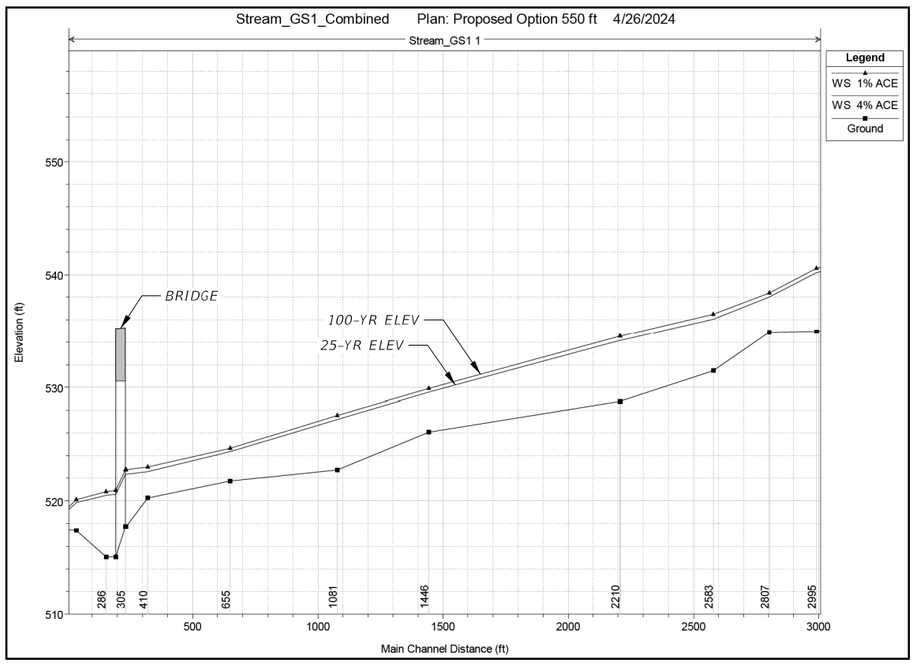
HEC-RAS CROSS SECTION LOCATION MAP

Stream X-Section	RAS River Station
A	132
B	167
C	286
BRIDGE AT SHADY SHORES RD	305
D	324
E	410
F	655
G	1081
H	1446
I	2210
J	2583
K	2807





PROPOSED BRIDGE CROSS SECTION AT SHADY SHORES RD



PROPOSED STREAM GS-1 PROFILE

STATE OF TEXAS
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12-01-2025

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Dallas District Bridge

SHADY SHORES ROAD HYDRAULIC DATA SHEET STREAM GS-1

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		125

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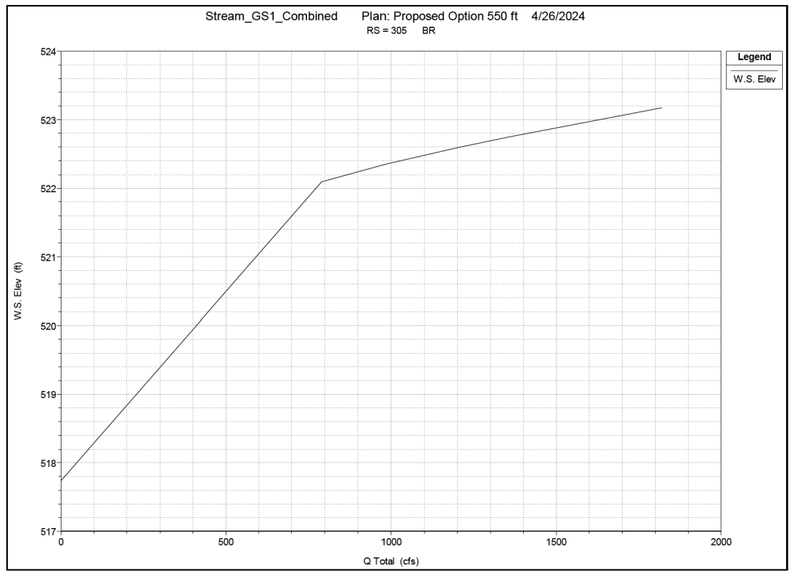
User:

HYDRAULIC CALCULATIONS

Location Description	Reach	HEC-RAS River Station	Return Interval	Flow (cfs)		Water Surface Elevation (ft)		Delta in WSEL (ft)	Main Channel Velocity (ft/s)		Delta in Velocity (ft/s)
				Existing	Proposed	Existing	Proposed	Proposed-Existing	Existing	Proposed	Proposed-Existing
UPSTREAM OF BRIDGE	1	2807	25-year	850	850	538.08	538.05	-0.03	5.64	5.75	0.11
UPSTREAM OF BRIDGE	1	2583	25-year	850	850	536.00	536.07	0.07	4.34	4.20	-0.14
UPSTREAM OF BRIDGE	1	2210	25-year	850	850	534.57	534.18	-0.39	3.20	3.77	0.57
UPSTREAM OF BRIDGE	1	1446	25-year	850	850	529.04	529.58	0.54	6.76	4.29	-2.47
UPSTREAM OF BRIDGE	1	1081	25-year	990	990	527.84	527.20	-0.64	2.72	4.10	1.38
UPSTREAM OF BRIDGE	1	655	25-year	990	990	527.75	524.38	-3.37	0.78	3.20	2.42
UPSTREAM OF BRIDGE	1	410	25-year	990	990	527.74	522.61	-5.13	0.42	2.19	1.77
UPSTREAM OF BRIDGE	1	324	25-year	990	990	527.74	522.37	-5.37	0.39	2.14	1.75
BRIDGE AT SHADY SHORES RD		305									
DOWNSTREAM OF BRIDGE	1	286	25-year	990	990	520.97	520.49	-0.48	4.14	2.30	-1.84
DOWNSTREAM OF BRIDGE	1	167	25-year	990	990	519.86	519.86	0.00	3.09	2.96	-0.13
DOWNSTREAM OF BRIDGE	1	132	25-year	990	990	519.14	519.15	0.01	4.64	4.52	-0.12

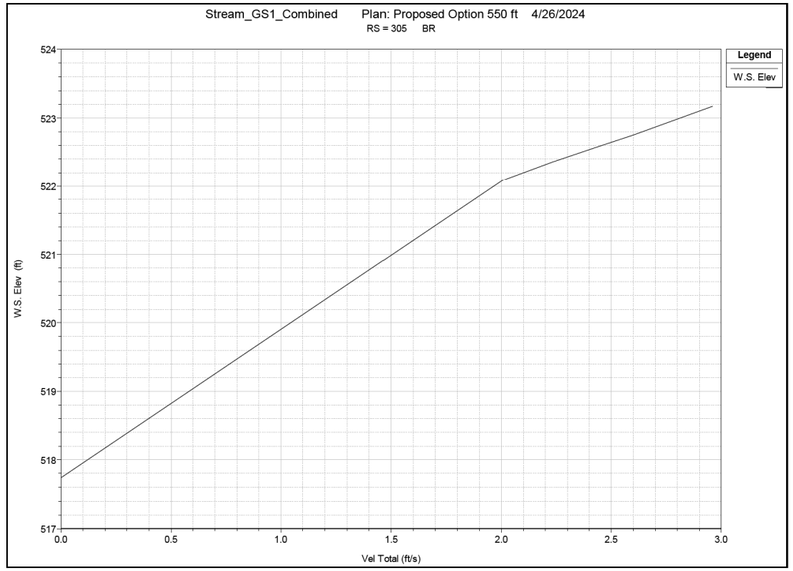


CONVEYANCE CURVE

HYDRAULIC CALCULATIONS

Location Description	Reach	HEC-RAS River Station	Return Interval	Flow (cfs)		Water Surface Elevation (ft)		Delta in WSEL (ft)	Main Channel Velocity (ft/s)		Delta in Velocity (ft/s)
				Existing	Proposed	Existing	Proposed	Proposed-Existing	Existing	Proposed	Proposed-Existing
UPSTREAM OF BRIDGE	1	2807	100-year	1120	1120	538.42	538.40	-0.02	6.01	6.05	0.04
UPSTREAM OF BRIDGE	1	2583	100-year	1120	1120	536.47	536.50	0.03	4.62	4.55	-0.07
UPSTREAM OF BRIDGE	1	2210	100-year	1120	1120	534.80	534.56	-0.24	3.86	4.23	0.37
UPSTREAM OF BRIDGE	1	1446	100-year	1120	1120	529.56	529.91	0.35	5.77	4.62	-1.15
UPSTREAM OF BRIDGE	1	1081	100-year	1360	1360	528.15	527.56	-0.59	3.20	4.42	1.22
UPSTREAM OF BRIDGE	1	655	100-year	1360	1360	528.02	524.67	-3.35	1.01	3.59	2.58
UPSTREAM OF BRIDGE	1	410	100-year	1360	1360	528.00	523.03	-4.97	0.55	2.35	1.80
UPSTREAM OF BRIDGE	1	324	100-year	1360	1360	528.00	522.77	-5.23	0.51	2.49	1.98
BRIDGE AT SHADY SHORES RD		305									
DOWNSTREAM OF BRIDGE	1	286	100-year	1360	1360	521.30	520.83	-0.47	4.77	2.66	-2.11
DOWNSTREAM OF BRIDGE	1	167	100-year	1360	1360	520.14	520.13	-0.01	3.49	3.33	-0.16
DOWNSTREAM OF BRIDGE	1	132	100-year	1360	1360	519.35	519.37	0.02	5.19	5.03	-0.16

GENERAL NOTES:
1) A HYDRAULIC IMPACT ANALYSIS HAS BEEN CONDUCTED AND NO SIGNIFICANT ADVERSE IMPACTS ARE ANTICIPATED FOR THE PROPOSED CONDITIONS.



VELOCITY CURVE

STATE OF TEXAS
REBEKAH E. FRANZ
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Rebekah E Franz

12-01-2025

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Dallas District Bridge

SHADY SHORES ROAD HYDRAULIC DATA SHEET STREAM GS-1

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		126

	SCOUR CALCULATIONS	
	SCOUR DESIGN FLOOD	SCOUR CHECK FLOOD
EROSION CATEGORY	3	3
τ_c (lb/ft²)	0.03	0.03
V_c	1.60	1.60
$\tau_{i(c)}$ (lb/ft²)	0.03	0.03
$\tau_{i(p)}$ (lb/ft²)	2.76	2.79
$Z_{T(c)}$ (in/day)	0.14	0.14
$Z_{T(p)}$ (in/day)	0.21	0.21
$Z_{max(c)}$ (ft)	0.63	0.74
$Z_{max(p)}$ (ft)	2.02	2.02
$t_{e(c)}$ (hrs)	7815.76	8619.89
$t_{e(p)}$ (hrs)	96.31	106.31

	SUMMARY OF CALCULATED SCOUR DEPTH (ft)	
	SCOUR DESIGN FLOOD	SCOUR CHECK FLOOD
Z_{Tc} (ft)	0.54	0.63
Z_{Tp} (ft)	0.07	0.07
Z_{total} (ft)	0.61	0.71

	SCOUR DESIGN FLOOD					
	UPSTREAM APPROACH RIVER STA 410			CONTRACTED SECTION AT BRIDGE RIVER STA 342		
	LEFT OVERBAN	MAIN CHANNEL	RIGHT OVERBANK	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK
A (sq. ft.)	-	525.26	-	-	511.57	-
WP (ft)	-	300.96	-	-	210.14	-
n	0.08	0.055	0.08	0.08	0.055	0.08
Q (cfs)	-	1200.00	-	-	1200.00	-
V (ft/s)	-	2.28	-	-	2.35	-
y (ft)	-	1.75	-	-	2.44	-
W (ft)	-	300.82	-	-	209.82	-
WSEL (ft)	522.85			522.61		

	SCOUR CHECK FLOOD					
	UPSTREAM APPROACH RIVER STA 410			CONTRACTED SECTION AT BRIDGE RIVER STA 342		
	LEFT OVERBAN	MAIN CHANNEL	RIGHT OVERBANK	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK
A (sq. ft.)	-	577.90	-	-	546.13	-
WP (ft)	-	306.38	-	-	213.51	-
n	0.08	0.055	0.08	0.08	0.055	0.08
Q (cfs)	-	1360.00	-	-	1360.00	-
V (ft/s)	-	2.35	-	-	2.49	-
y (ft)	-	1.89	-	-	2.56	-
W (ft)	-	306.23	-	-	213.18	-
WSEL (ft)	523.03			522.77		

CHANNEL MATERIAL	
CHANNEL BED MATERIAL DESCRIPTION	CHANNEL AND BANKS INLCUDE CLAYS IN THE TOP 14 FEET OF BANK. THE CLAYS ARE UNDERLAIN WITH SILTY SAND, CLAYEY SANDS, AND SHALE AT THE END OF THE LOG.
BASIS OF CHANNEL BED MATERIAL DESCRIPTION	LABORATORY TESTS ON SOIL BORING SAMPLE BR4
NON-ERODIBLE STRATA	SHALE (ELEVATION 486.8)

SUMMARY OF RETURN PERIODS	
DESIGN FLOOD	25-YEAR
SCOUR DESIGN FLOOD	50-YEAR
SCOUR DESIGN CHECK FLOOD	100-YEAR

* THE RETURN PERIOD FOR THE DESIGN FLOOD WAS OBTAINED FROM THE TxDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019. THE RETURN PERIODS FOR THE SCOUR DESIGN FLOOD AND SCOUR CHECK FLOOD WERE OBTAINED FROM THE TxDOT SCOUR EVALUATION GUIDE, SEPTEMBER 2023.

ANALYSIS NOTES

THIS SCOUR EVALUATION WAS CONDUCTED USING THE SOIL RATE IN COHESIVE SOILS (SRICOS) METHOD, IN ACCORDANCE WITH THE STATE'S SCOUR EVALUATION GUIDE, SEPTEMBER 2023.

SCOUR WAS CALCULATED USING SOIL BORINGS FROM THE DECEMBER 2020 PRELIMINARY GEOTECHNICAL REPORT PREPARED DURING SCHEMATIC DESIGN. ANALYSIS WILL BE UPDATED ONCE A FINAL REPORT IS RECEIVED.

REFER TO THE DRAINAGE AREA SHEET AND THE HYDRAULIC DATA SHEETS FOR ADDITIONAL HYDROLOGIC AND HYDRAULIC INFORMATION.

STATE OF TEXAS
REBEKAH E. FRANZ
141954
LICENSED PROFESSIONAL ENGINEER
Rebekah E Franz
12-01-2025

TBPELS FIRM #312

Sheet 1 of 1 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD BRIDGE SCOUR DATA AT STREAM GS-1

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		127

DATE: 11/25/2025 TIME: 4:33:31 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-WR-GS-1-SCR-01.dgn
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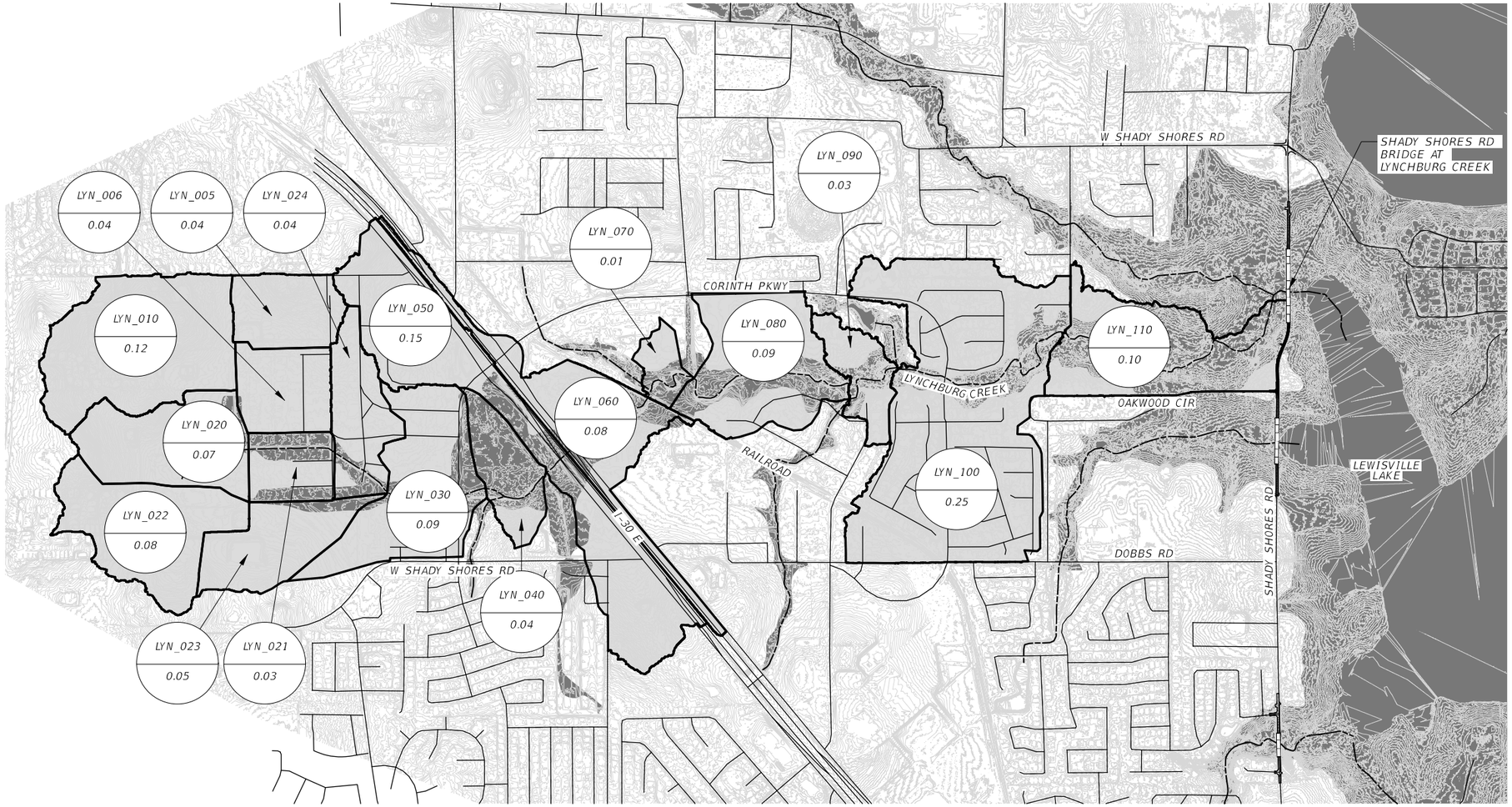

DRAINAGE AREA MAP

N

0 750 1500 2250 3000

SCALE: 1"=1500'

LEGEND

- XXX / XXX.XX — DRAINAGE AREA NO. / DRAINAGE AREA SIZE: (SQ MI.)
- DRAINAGE AREA BOUNDARY
- DIRECTION OF FLOW
- EXIST FEMA ZONE AE
- STREAM CENTERLINE

NOAA ATLAS 14, VOLUME 11, VERSION 2 RAINFALL DATA					
LOCATION NAME: DENTON, TX 33.1456, -97.0405 (LAT,LONG)					
PDS-BASED PERCIPITATION FREQUENCY ESTIMATES WITH 90% CONFIDENCE INTERVALS (IN INCHES)					
DURATION	AVERAGE RECURRENCE INTERVAL (YEARS)				
	10	25	50	100	500
5-MIN	0.689	0.812	0.903	0.993	1.210
15-MIN	1.370	1.610	1.790	1.970	2.390
1-HR	2.480	2.910	3.240	3.570	4.390
2-HR	3.110	3.700	4.160	4.620	5.820
3-HR	3.510	4.210	4.750	5.320	6.790
6-HR	4.230	5.110	5.810	6.550	8.470
12-HR	5.010	6.070	6.900	7.770	10.100
1-DAY	5.860	7.100	8.060	9.080	11.800

NRCS UNIT HYDROGRAPH DRAINAGE METHOD																		
D.A.I.D.	LYN_005	LYN_006	LYN_010	LYN_020	LYN_021	LYN_022	LYN_023	LYN_024	LYN_030	LYN_040	LYN_050	LYN_060	LYN_070	LYN_080	LYN_090	LYN_100	LYN_110
CONTRIBUTING AREA (SQ MI)	0.04	0.04	0.12	0.07	0.03	0.08	0.05	0.04	0.09	0.04	0.15	0.08	0.01	0.09	0.03	0.25	0.10
WEIGHTED CURVE NUMBER	71.55	79.03	72.30	72.42	80.00	70.13	78.07	72.01	70.85	70.40	68.50	64.41	74.64	69.07	61.29	64.98	65.79
WEIGHTED PERCENT IMPERVIOUS (%)	35.26	52.69	29.93	7.12	52.60	10.57	12.99	44.30	37.52	4.37	60.77	78.17	30.47	18.09	17.55	51.00	12.05
LAG TIME (MIN)	5.71	14.77	11.95	10.12	14.77	17.79	17.73	12.16	14.89	15.13	21.99	21.84	13.51	12.85	11.78	16.73	25.07
STORM DURATION (HR)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
PEAK FLOW RATE (10-YR, CFS)	119.7	96.6	261.6	143.2	73.2	118.8	93.3	93.5	180.0	62.0	273.7	159.2	21.6	162.4	44.5	473.5	108.3
PEAK FLOW RATE (25-YR, CFS)	150.2	117.1	330.0	186.8	88.6	156.2	117.5	115.8	225.5	82.4	334.3	191.1	27.0	211.1	60.1	588.3	145.3
PEAK FLOW RATE (50-YR, CFS)	173.3	132.7	382.2	220.1	100.2	185.0	135.9	132.8	260.3	98.2	380.8	215.6	31.2	248.7	72.4	676.9	174.4
PEAK FLOW RATE (100-YR, CFS)	196.7	148.3	435.3	254.1	111.9	214.6	154.5	150.1	295.9	114.4	428.0	240.3	35.3	287.3	85.2	767.5	204.6
PEAK FLOW RATE (500-YR, CFS)	253.2	185.6	563.7	336.8	139.9	287.7	199.6	191.7	382.4	154.2	544.0	300.9	45.4	382.2	117.5	990.4	281.0

GENERAL NOTES:

1) CALCULATIONS ARE BASED ON THE TxDOT HYDRAULIC DESIGN MANUAL (SEP 2019) PROCEDURES.

2) THE PORTION OF LYNCHBURG CREEK THAT EXTENDS THROUGH THE PROJECT AREA HAS BEEN STUDIED BY DETAILED METHODS AS PART OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE STUDY (FIS) FOR DENTON COUNTY AND INCORPORATED AREAS (MAP #: 48121C0395H, REVISED DATE: JUNE 19, 2020).

3) LYNCHBURG CREEK HAS A DESIGNATED SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE FLOODPLAIN THROUGHOUT THE PROJECT REACH IN WHICH BASE FLOOD ELEVATIONS (BFE'S) HAVE BEEN DETERMINED.

4) ALL ELEVATIONS REPORTED ARE BASED ON THE NAVD88 VERTICAL DATUM.

5) MODELS UTILIZE A NORMAL DEPTH BOUNDARY CONDITION.

6) TOPOGRAPHIC DATA SOURCE, 2017 TEXAS NATURAL RESOURCE INFORMATION (TRNIS) LIGHT DETECTION AND RADAR (LIDAR) DATA.

7) USACE HEC-RAS VERSIONS 5.0.3 AND 5.0.7 WERE UTILIZED FOR THE ANALYSIS.

8) H&H FILES WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR WENDY WITHERS ON 9/14/2022.

STATE OF TEXAS
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Rebekah E Franz

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD DRAINAGE AREA MAP LYNCHBURG CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		128

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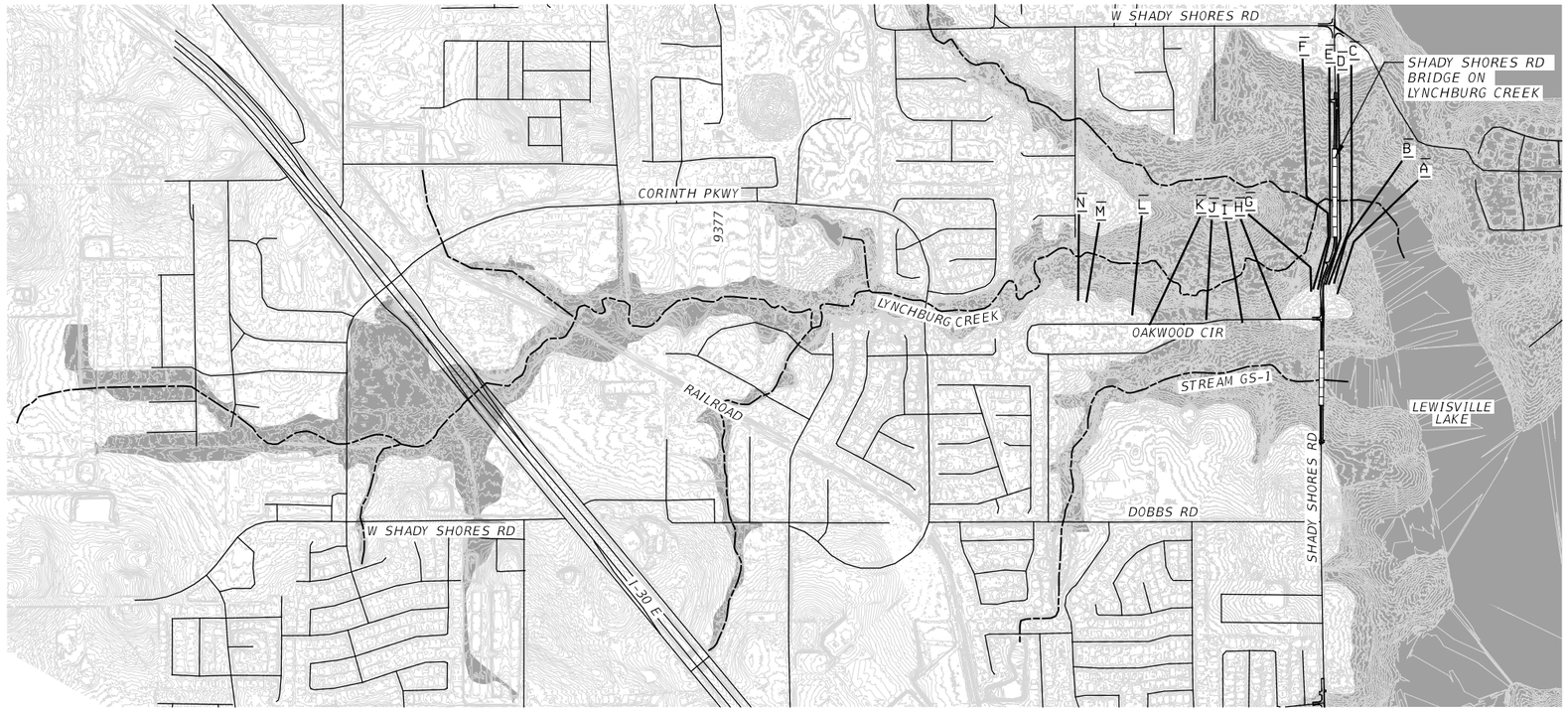


HEC-RAS CROSS SECTION LOCATION MAP

Stream X-Section	RAS River Station
A	393
B	548
C	710
D	852
BRIDGE AT SHADY SHORES RD	903
E	954
F	1102
G	1778
H	2390
I	2739
J	3057
K	3512
L	4102
M	4550
N	4715

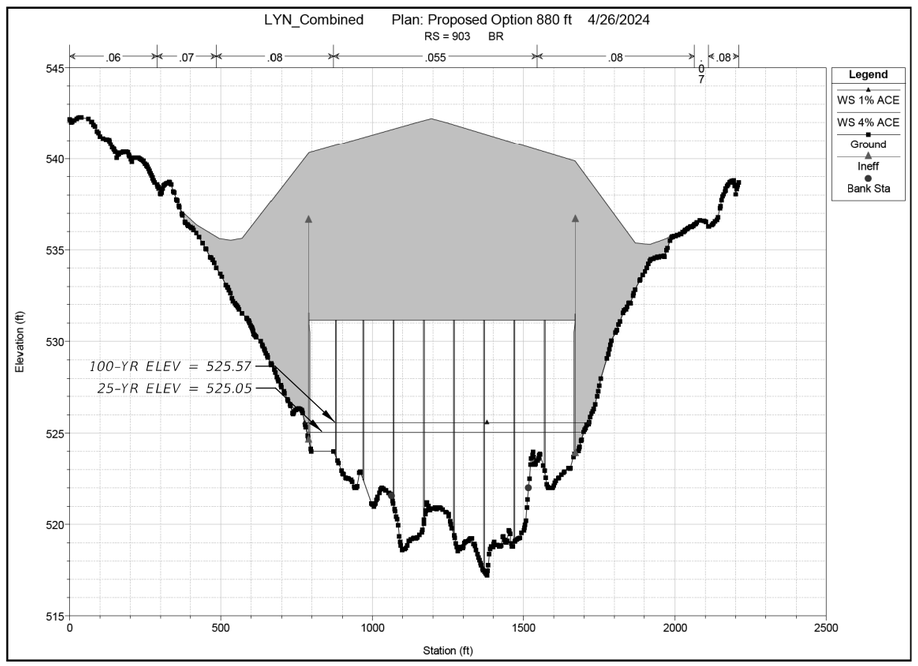
N

0 750 1500 2250 3000

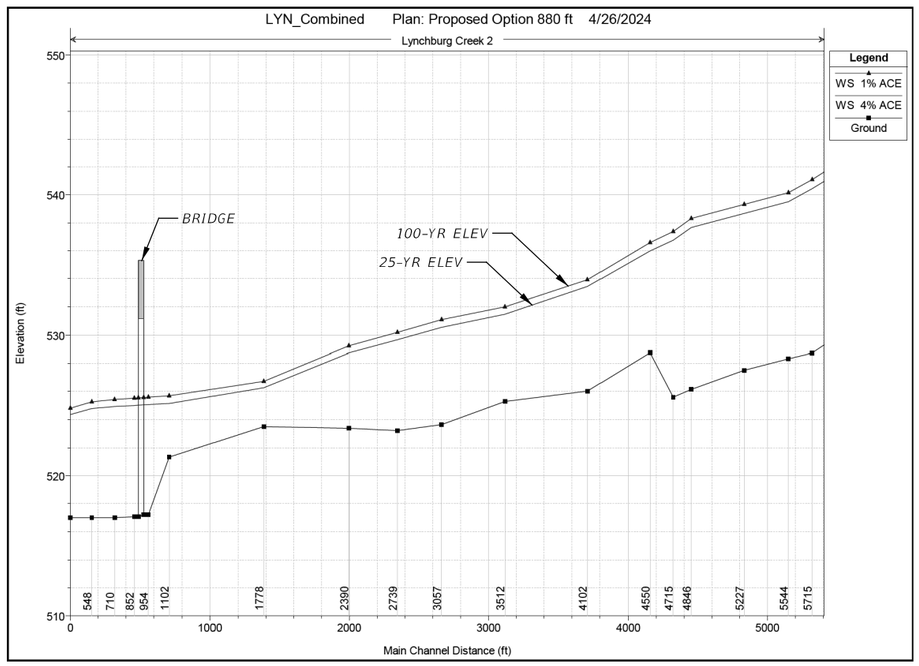
SCALE: 1"=1500'

LEGEND

- EXIST FEMA ZONE AE
- HEC-RAS CROSS SECTION
- STREAM CENTERLINE



PROPOSED CROSS SECTION AT SHADY SHORES RD



PROPOSED LYNCHBURG CREEK PROFILE

STATE OF TEXAS
REBEKAH E. FRANZ
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PROFESSIONAL ENGINEER

Rebekah E Franz

12-01-2025

TBPELS FIRM #312

Sheet 1 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD HYDRAULIC DATA SHEET LYNCHBURG CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		129

DATE: 11/25/2025 TIME: 4:34:46 PM
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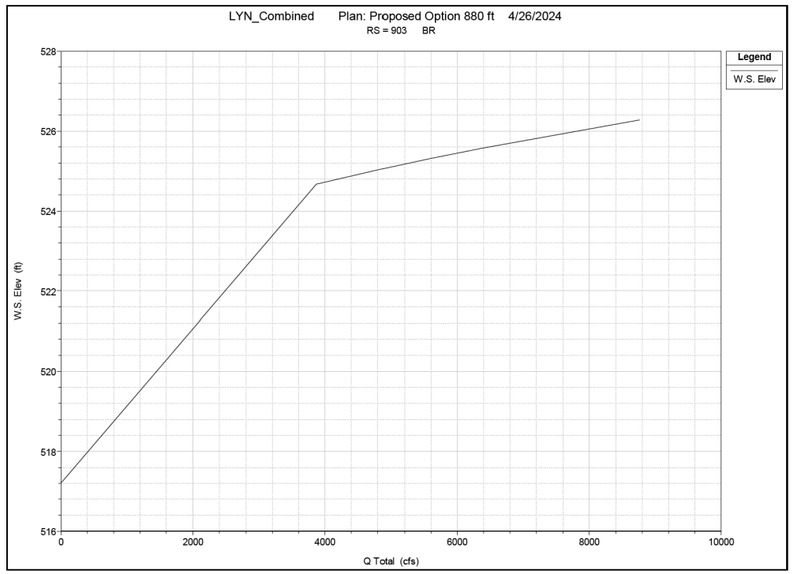
HYDRAULIC CALCULATIONS

Location Description	Reach	HEC-RAS River Station	Return Interval	Flow (cfs)		Water Surface Elevation (ft)		Delta in WSEL (ft)	Main Channel Velocity (ft/s)		Delta in Velocity (ft/s)
				Existing	Proposed	Existing	Proposed	Proposed-Existing	Existing	Proposed	Proposed-Existing
UPSTREAM OF BRIDGE	2	4715	25-year	3560	3560	536.75	536.75	0.00	7.19	7.19	0.00
UPSTREAM OF BRIDGE	2	4550	25-year	3560	3560	535.99	535.99	0.00	6.18	6.18	0.00
UPSTREAM OF BRIDGE	2	4102	25-year	3560	3560	533.46	533.46	0.00	5.86	5.86	0.00
UPSTREAM OF BRIDGE	2	3512	25-year	3560	3560	531.46	531.46	0.00	4.28	4.28	0.00
UPSTREAM OF BRIDGE	2	3057	25-year	3560	3560	530.53	530.54	0.01	3.65	3.64	-0.01
UPSTREAM OF BRIDGE	2	2739	25-year	3540	3540	529.63	529.65	0.02	4.61	4.57	-0.04
UPSTREAM OF BRIDGE	2	2390	25-year	3540	3540	528.65	528.73	0.08	3.40	3.30	-0.10
UPSTREAM OF BRIDGE	2	1778	25-year	3540	3540	527.01	526.26	-0.75	4.34	6.38	2.04
UPSTREAM OF BRIDGE	2	1102	25-year	3540	3540	526.80	525.15	-1.65	0.98	1.60	0.62
UPSTREAM OF BRIDGE	2	954	25-year	4850	4850	526.77	525.07	-1.70	1.04	1.59	0.55
BRIDGE AT SHADY SHORES RD		903									
DOWNSTREAM OF BRIDGE	2	852	25-year	4850	4850	525.00	525.00	0.00	1.65	1.60	-0.05
DOWNSTREAM OF BRIDGE	2	710	25-year	4850	4850	524.93	524.93	0.00	1.97	1.97	0.00
DOWNSTREAM OF BRIDGE	2	548	25-year	4850	4850	524.78	524.78	0.00	2.30	2.30	0.00
DOWNSTREAM OF BRIDGE	2	393	25-year	4850	4850	524.37	524.37	0.00	3.14	3.14	0.00

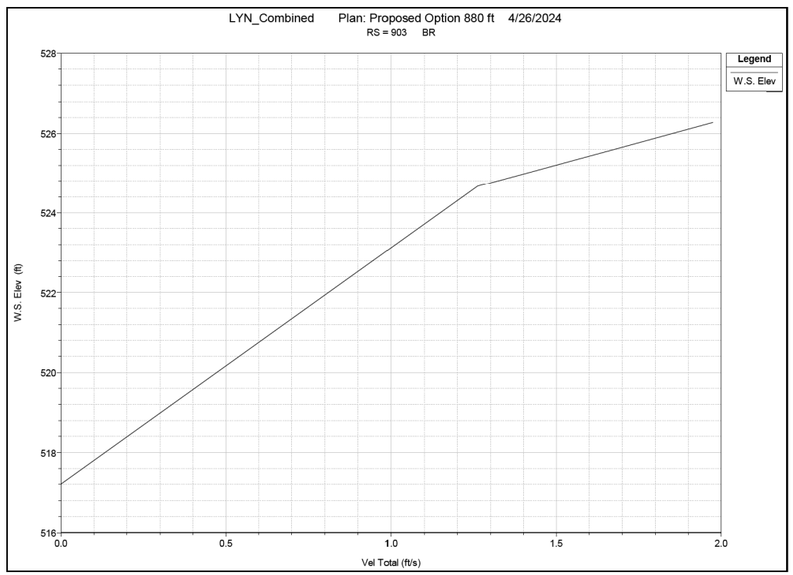


CONVEYANCE CURVE

HYDRAULIC CALCULATIONS

Location Description	Reach	HEC-RAS River Station	Return Interval	Flow (cfs)		Water Surface Elevation (ft)		Delta in WSEL (ft)	Main Channel Velocity (ft/s)		Delta in Velocity (ft/s)
				Existing	Proposed	Existing	Proposed	Proposed-Existing	Existing	Proposed	Proposed-Existing
UPSTREAM OF BRIDGE	2	4715	100-year	4690	4690	537.36	537.36	0.00	7.79	7.79	0.00
UPSTREAM OF BRIDGE	2	4550	100-year	4690	4690	536.59	536.59	0.00	6.64	6.64	0.00
UPSTREAM OF BRIDGE	2	4102	100-year	4690	4690	533.93	533.93	0.00	6.49	6.49	0.00
UPSTREAM OF BRIDGE	2	3512	100-year	4690	4690	532.01	532.00	-0.01	4.38	4.40	0.02
UPSTREAM OF BRIDGE	2	3057	100-year	4690	4690	531.10	531.08	-0.02	4.03	4.05	0.02
UPSTREAM OF BRIDGE	2	2739	100-year	4620	4620	530.21	530.18	-0.03	4.79	4.80	0.01
UPSTREAM OF BRIDGE	2	2390	100-year	4620	4620	529.30	529.22	-0.08	3.72	3.83	0.11
UPSTREAM OF BRIDGE	2	1778	100-year	4620	4620	528.23	526.72	-1.51	3.70	6.50	2.80
UPSTREAM OF BRIDGE	2	1102	100-year	4620	4620	528.09	525.69	-2.40	0.97	1.74	0.77
UPSTREAM OF BRIDGE	2	954	100-year	6370	6370	528.06	525.59	-2.47	1.11	1.85	0.74
BRIDGE AT SHADY SHORES RD		903									
DOWNSTREAM OF BRIDGE	2	852	100-year	6370	6370	525.53	525.53	0.00	1.91	1.86	-0.05
DOWNSTREAM OF BRIDGE	2	710	100-year	6370	6370	525.44	525.44	0.00	2.29	2.29	0.00
DOWNSTREAM OF BRIDGE	2	548	100-year	6370	6370	525.25	525.25	0.00	2.66	2.66	0.00
DOWNSTREAM OF BRIDGE	2	393	100-year	6370	6370	524.80	524.80	0.00	3.49	3.49	0.00

GENERAL NOTES:
1) A HYDRAULIC IMPACT ANALYSIS HAS BEEN CONDUCTED AND NO SIGNIFICANT ADVERSE IMPACTS ARE ANTICIPATED FOR THE PROPOSED CONDITIONS.



VELOCITY CURVE

12-01-2025

TBPELS FIRM #312

Sheet 2 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD HYDRAULIC DATA SHEET LYNCHBURG CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		130

SCOUR CALCULATIONS		
	SCOUR DESIGN FLOOD	SCOUR CHECK FLOOD
EROSION CATEGORY	2	2
τ_c (lb/ft^2)	0.00	0.00
V_c	0.60	0.60
$\tau_{f(c)}$ (lb/ft^2)	0.01	0.01
$\tau_{f(p)}$ (lb/ft^2)	0.76	0.85
$Z_{f(c)}$ (in/day)	0.23	0.23
$Z_{f(p)}$ (in/day)	0.05	0.05
$Z_{max(c)}$ (ft)	0.91	1.04
$Z_{max(p)}$ (ft)	1.23	1.23
$t^*_{e(c)}$ (hrs)	3411.55	3870.19
$t^*_{e(p)}$ (hrs)	74.77	83.83

SUMMARY OF CALCULATED SCOUR DEPTH (ft)		
	SCOUR DESIGN FLOOD	SCOUR CHECK FLOOD
$Z_{(c)}$ (ft)	0.68	0.78
$Z_{(p)}$ (ft)	0.01	0.02
Z_{total} (ft)	0.69	0.80

SCOUR DESIGN FLOOD						
	UPSTREAM APPROACH RIVER STA 1102			CONTRACTED SECTION AT BRIDGE RIVER STA 954		
	LEFT OVERBAN	MAIN CHANNEL	RIGHT OVERBANK	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK
A (sq. ft.)	896.52	1484.77	881.96	709.43	2677.93	399.68
WP (ft)	392.86	419.21	344.23	274.69	454.30	154.80
n	0.08	0.055	0.08	0.08	0.055	0.08
Q (cfs)	773.99	2487.43	818.59	721.52	4621.22	257.26
V (ft/s)	0.86	1.68	0.93	1.02	1.73	0.69
y (ft)	2.28	3.55	2.57	2.57	5.91	2.40
W (ft)	392.36	418.65	343.41	284.01	453.47	189.10
WSEL (ft)	525.43			525.34		

SCOUR CHECK FLOOD						
	UPSTREAM APPROACH RIVER STA 1102			CONTRACTED SECTION AT BRIDGE RIVER STA 954		
	LEFT OVERBAN	MAIN CHANNEL	RIGHT OVERBANK	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK
A (sq. ft.)	1003.51	1596.30	974.32	783.00	2794.59	449.68
WP (ft)	405.32	419.21	348.76	274.69	454.30	154.80
n	0.08	0.055	0.08	0.08	0.055	0.08
Q (cfs)	899.68	2773.59	946.72	870.11	5181.18	318.71
V (ft/s)	0.90	1.74	0.97	1.12	1.85	0.78
y (ft)	2.48	3.81	2.80	2.83	6.16	2.66
W (ft)	404.78	418.65	347.93	287.72	453.47	199.52
WSEL (ft)	525.73			525.59		

CHANNEL MATERIAL	
CHANNEL BED MATERIAL DESCRIPTION	CHANNEL AND BANKS INLCUDE STIFF SILTS IN THE TOP 8 FEET OF BANK. THE SILTS ARE UNDERLAIN WITH SILTY SAND, POORLY GRADED SAND, SHALE, AND SANDSTONE AT THE END OF THE LOG.
BASIS OF CHANNEL BED MATERIAL DESCRIPTION	LABORATORY TESTS ON SOIL BORING SAMPLE BR7
NON-ERODIBLE STRATA	SHALE (ELEVATION 472.90)

SUMMARY OF RETURN PERIODS	
DESIGN FLOOD	25-YEAR
SCOUR DESIGN FLOOD	50-YEAR
SCOUR DESIGN CHECK FLOOD	100-YEAR

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STATE OF TEXAS
REBEKAH E. FRANZ
141954
LICENSED PROFESSIONAL ENGINEER

Rebekah E Franz
12-01-2025

TBPELS FIRM #312

Sheet 1 of 1 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD BRIDGE SCOUR DATA AT LYNCHBURG CREEK

FILE: SEE PATH	DN: REF	CK: SAR	DW: SC	CK: REF
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		131

User:
DATE: 11/25/2025 TIME: 4:35:31 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-WR-LYNCH-SCR-01.dgn

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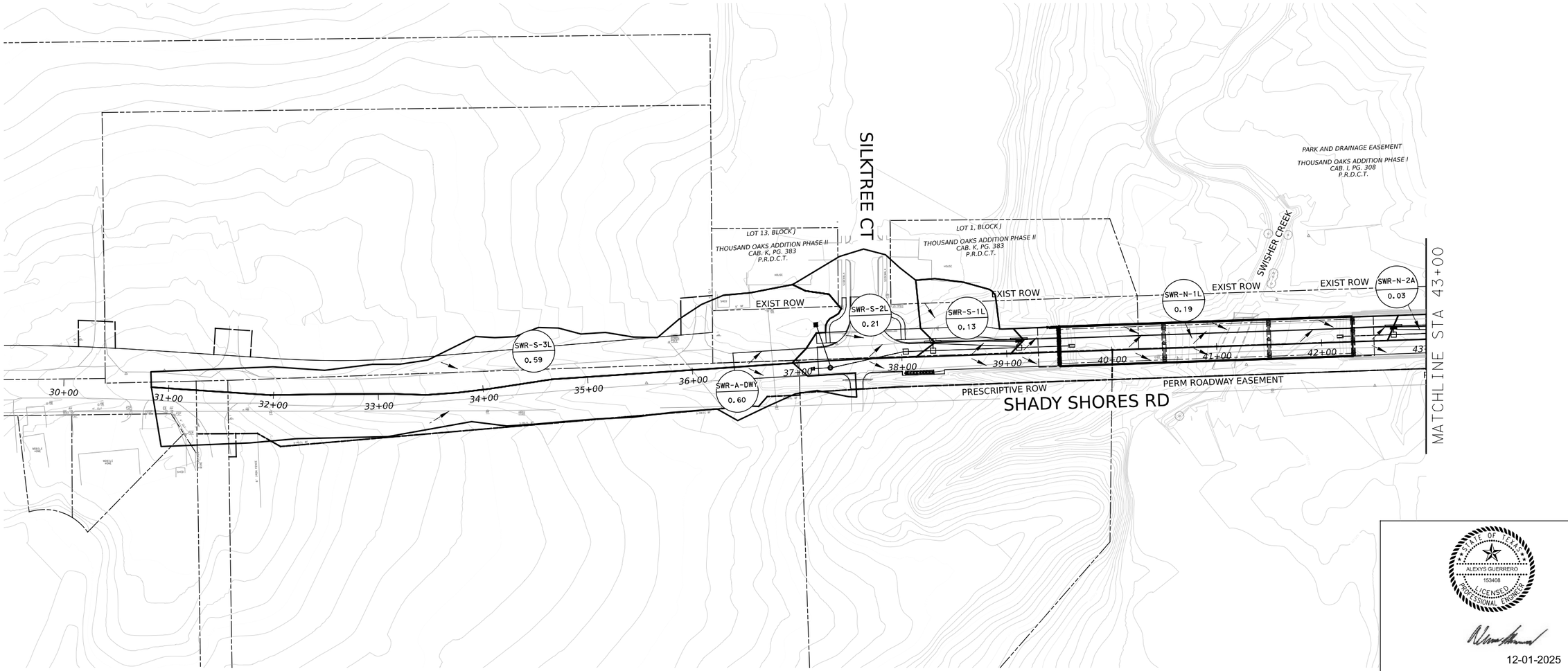

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN
DRAINAGE AREA MAP

SHEET 1 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		132

DATE: 12/2/2025 10:47:23 AM
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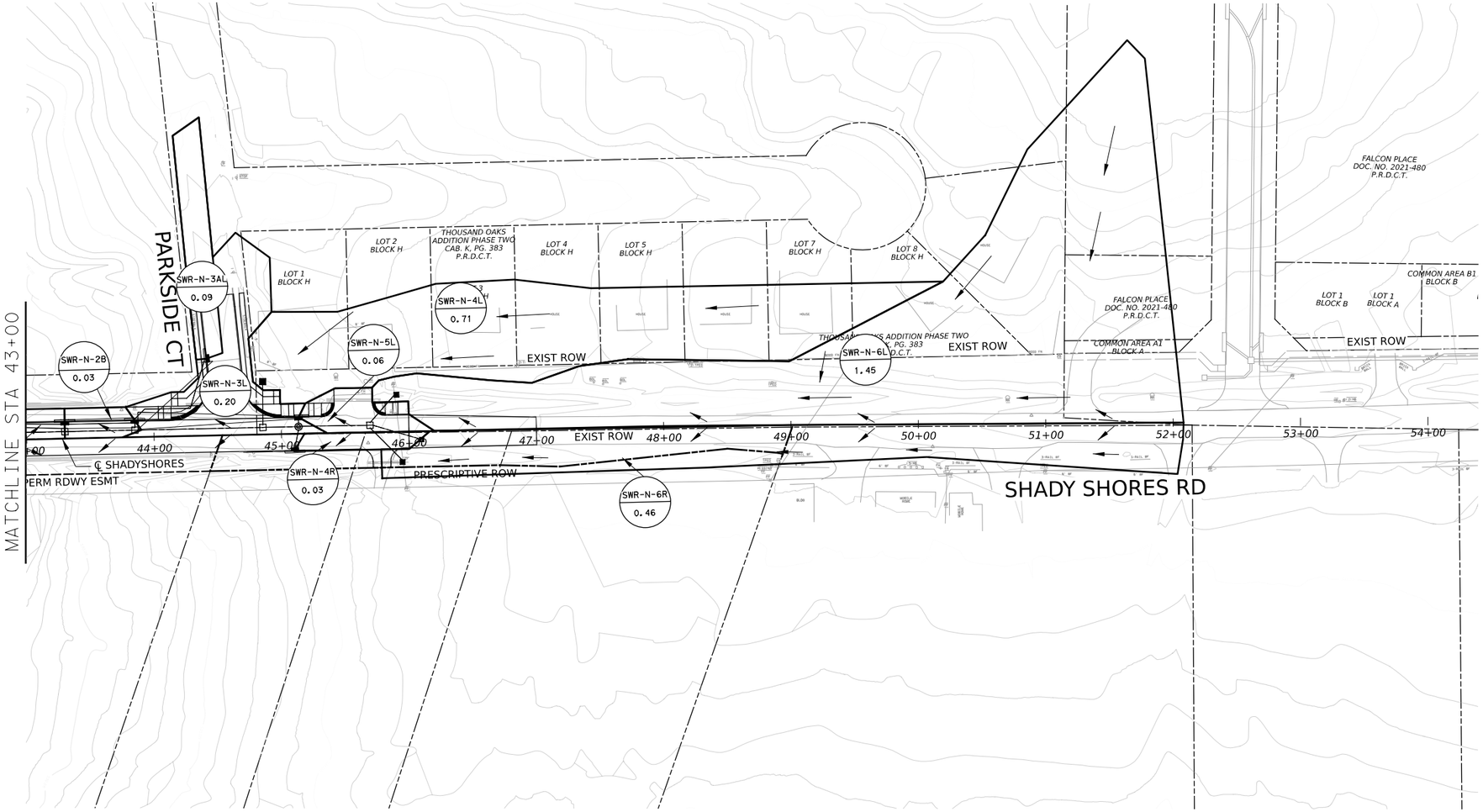

0 50 100
HORIZ. SCALE IN FEET

LEGEND

XX / XX — AREA NAME / ACRES

DRAINAGE BOUNDARY

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

STORM DRAIN DRAINAGE AREA MAP

SHEET 2 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		133

DATE: 11/25/2025 4:13:53 PM
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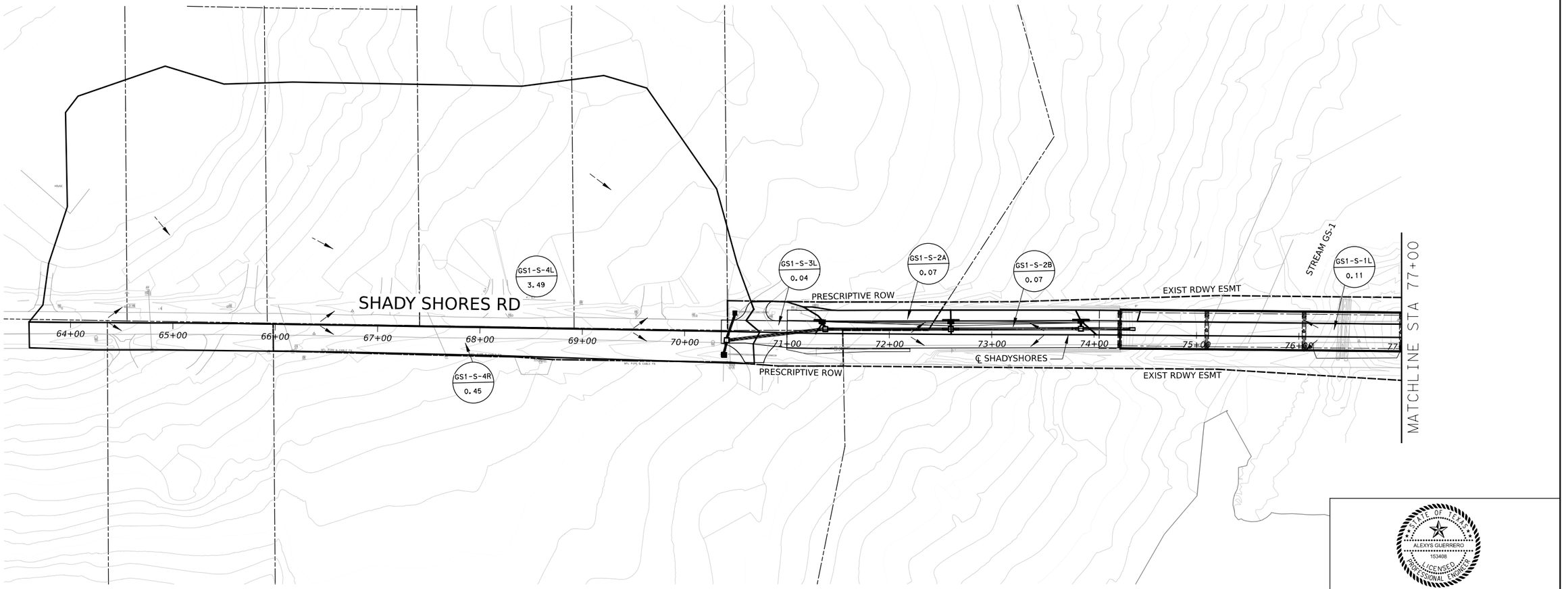

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HORIZ. SCALE IN FEET

LEGEND

XX / XX — AREA NAME / ACRES

DRAINAGE BOUNDARY

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

STORM DRAIN DRAINAGE AREA MAP

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		134

DATE: 11/25/2025 4:14:13 PM
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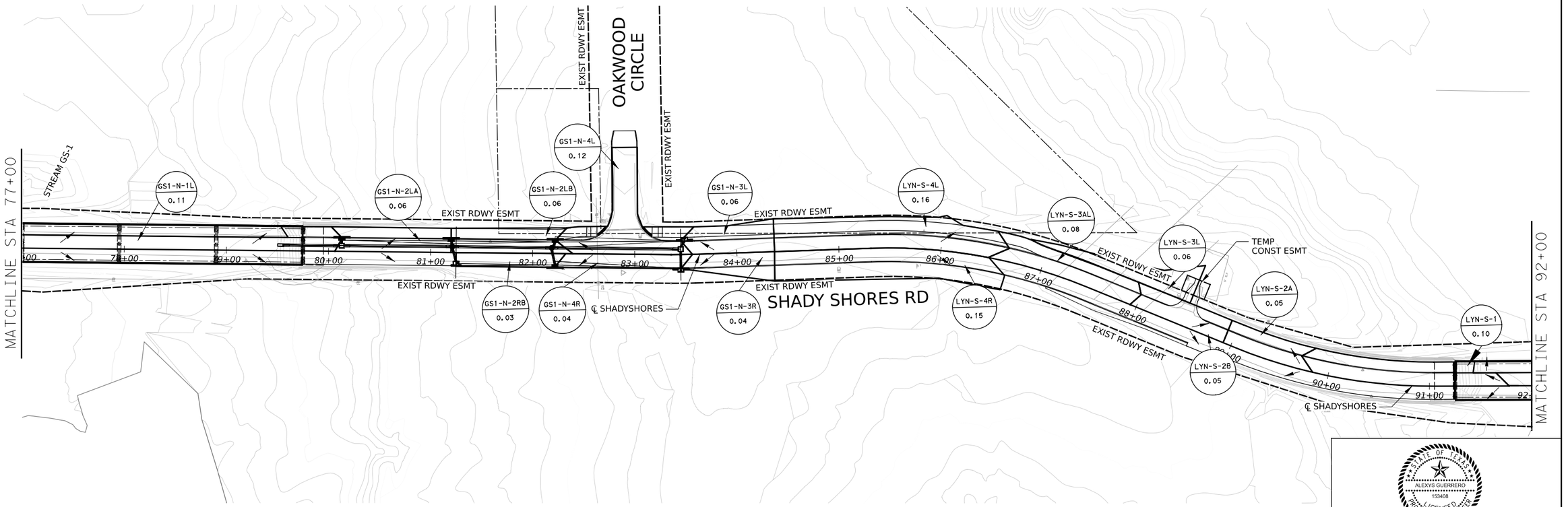

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

STORM DRAIN DRAINAGE AREA MAP

SHEET 4 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		135

DATE: 11/25/2025 4:14:44 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-DU-DAM-04.dgn

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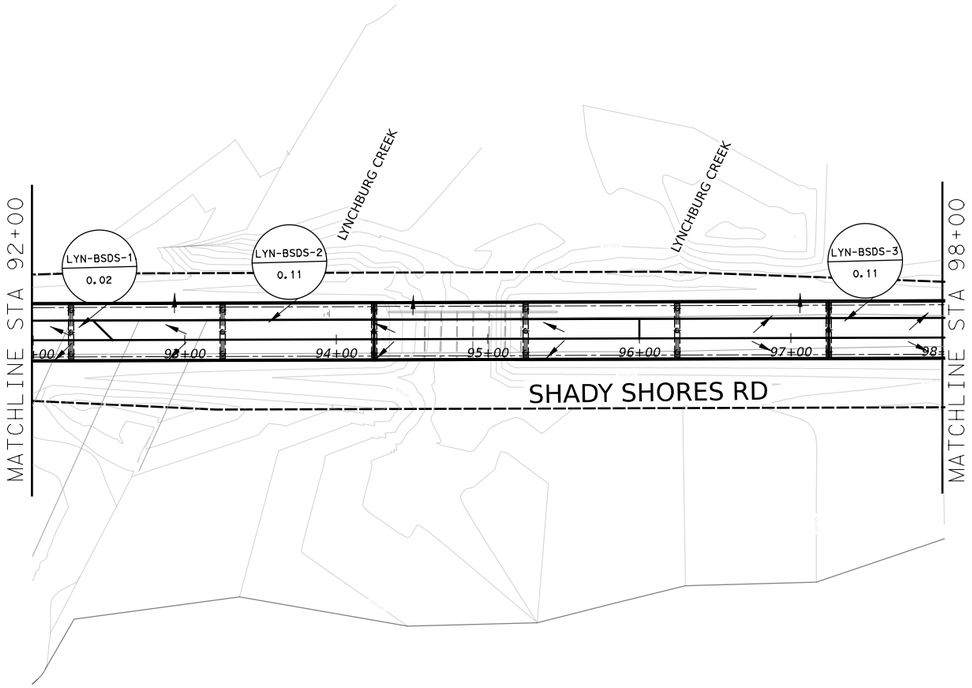

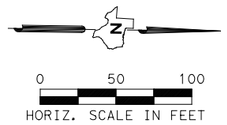

LEGEND

XX / XX — AREA NAME / ACRES

DRAINAGE BOUNDARY

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

STORM DRAIN
DRAINAGE AREA MAP

SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		135A

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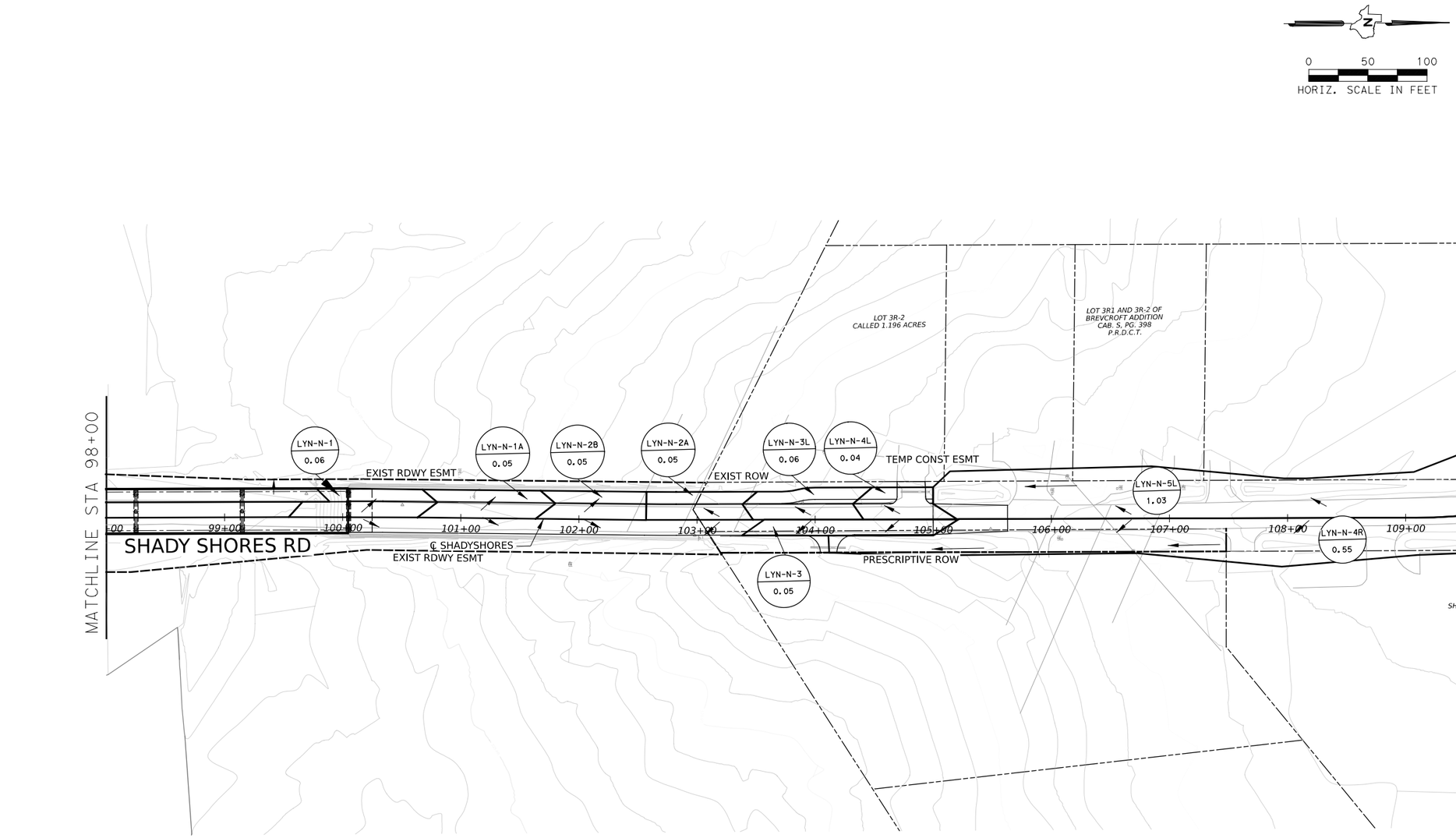

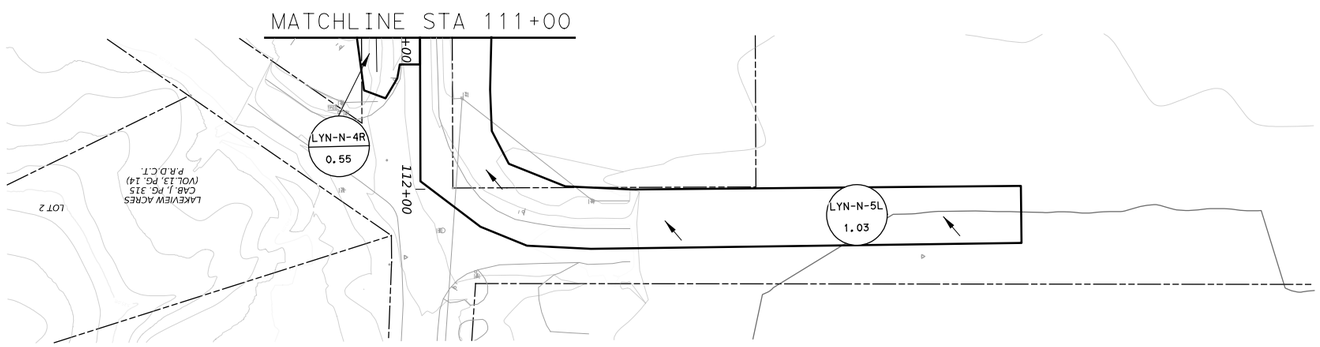

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN
DRAINAGE AREA MAP

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		136

DATE: 11/25/2025 4:15:27 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-DU-DAM-05.dgn

SWR RUNOFF CALCULATIONS (10 YR)						
DRAINAGE AREA	AREA (AC)	C	CA	Tc (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)
SWR-N-1L	0.19	0.95	0.18	10	6.56	1.22
SWR-N-2A	0.03	0.95	0.03	10	6.56	0.21
SWR-N-2B	0.03	0.95	0.03	10	6.56	0.18
SWR-N-3L	0.20	0.90	0.18	10	6.56	1.21
SWR-N-3AL	0.09	0.94	0.09	10	6.56	0.57
SWR-N-4L	0.71	0.35	0.25	10	6.56	1.65
SWR-N-4R	0.03	0.95	0.03	10	6.56	0.19
SWR-N-5L	0.06	0.92	0.05	10	6.56	0.34
SWR-N-6L	1.45	0.45	0.65	10	6.56	4.31
SWR-N-6R	0.46	0.25	0.11	10	6.56	0.76
SWR-S-1L	0.13	0.60	0.08	10	6.56	0.50
SWR-S-2L	0.21	0.67	0.14	10	6.56	0.95
SWR-S-3L	0.59	0.56	0.33	10	6.56	2.20
SWR-A-DWY	0.60	0.50	0.30	10	6.56	1.97

GS1 RUNOFF CALCULATIONS (10 YR)						
DRAINAGE AREA ID	AREA (AC)	C	CA	Tc (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)
GS1-N-1L	0.11	0.93	0.10	10	6.56	0.65
GS1-N-2LA	0.06	0.93	0.06	10	6.56	0.37
GS1-N-2LB	0.06	0.93	0.06	10	6.56	0.38
GS1-N-2RB	0.03	0.93	0.03	10	6.56	0.20
GS1-N-3L	0.06	0.93	0.05	10	6.56	0.34
GS1-N-3R	0.04	0.93	0.04	10	6.56	0.26
GS1-N-4L	0.12	0.93	0.11	10	6.56	0.74
GS1-N-4R	0.04	0.93	0.04	10	6.56	0.24
GS1-S-1L	0.11	0.93	0.10	10	6.56	0.67
GS1-S-2A	0.07	0.93	0.07	10	6.56	0.43
GS1-S-2B	0.07	0.93	0.07	10	6.56	0.44
GS1-S-3L	0.04	0.93	0.04	10	6.56	0.26
GS1-S-4L	3.49	0.50	1.74	10	6.56	11.53
GS1-S-4R	0.45	0.60	0.27	10	6.56	1.79

LYN RUNOFF CALCULATIONS (10 YR)						
DRAINAGE AREA ID	AREA (AC)	C	CA	Tc (MIN)	INTENSITY (IN/HR)	DISCHARGE (CFS)
LYN-N-1	0.06	0.95	0.05	10	6.56	0.35
LYN-N-1A	0.05	0.95	0.05	10	6.56	0.34
LYN-N-2A	0.05	0.95	0.05	10	6.56	0.30
LYN-N-2B	0.05	0.95	0.04	10	6.56	0.29
LYN-N-3	0.05	0.95	0.05	10	6.56	0.32
LYN-N-3L	0.06	0.95	0.05	10	6.56	0.35
LYN-N-4L	0.04	0.95	0.04	10	6.56	0.26
LYN-N-4R	0.55	0.55	0.30	10	6.56	1.98
LYN-N-5L	1.03	0.54	0.56	10	6.56	3.68
LYN-S-1	0.10	0.95	0.09	10	6.56	0.61
LYN-S-2A	0.05	0.95	0.04	10	6.56	0.28
LYN-S-2B	0.05	0.95	0.05	10	6.56	0.32
LYN-S-3L	0.06	0.39	0.02	10	6.56	0.15
LYN-S-3AL	0.08	0.95	0.07	10	6.56	0.49
LYN-S-4L	0.16	0.88	0.14	10	6.56	0.91
LYN-S-4R	0.15	0.63	0.09	10	6.56	0.62
LYN-BSDS-1	0.02	0.93	0.02	10	6.56	0.12
LYN-BSDS-2	0.11	0.93	0.10	10	6.56	0.67
LYN-BSDS-3	0.11	0.93	0.10	10	6.56	0.67

NOTE:
1. HYDROLOGY BASED ON 10 YR STORM EVENT , NOAA ATLAS 14 CRITERIA AND TxDOT HYDRAULIC DESIGN MANUAL DATED SEPTEMBER 2019.

STATE OF TEXAS
ALEXIS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES STORM DRAIN HYDROLOGIC AND HYDRAULIC CALCULATIONS

(RUNOFF)
SCALE: N.T.S.

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		137

CK: DW: CK: DW:

DATE: 11/25/2025 4:15:55 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-DR-DACA-01.dgn

SWR STORM SEWER CALCULATIONS															
PIPE ID	U/S NODE	D/S NODE	FREQ (YR)	FLOW (CFS)	U/S FL	D/S FL	HYD LENGTH	SLOPE (%)	N-VALUE	SECTION SIZE	HYD DEPTH	ACT VEL @ DS	U/S HG	D/S HG	CAP. (CFS)
SWR-N-SD-0	SWR-N-JCT-1	SWR-N-OUT	10	10.35	526.55	526.27	49.00	0.57	0.013	24	1.12	3.30	529.36	529.26	17.07
SWR-N-SD-1	SWR-N-JCT-2	SWR-N-JCT-1	10	9.26	528.00	526.55	61.00	2.38	0.013	24	0.70	9.38	529.38	529.39	34.88
SWR-N-SD-2	SWR-N-JCT-3	SWR-N-JCT-2	10	8.73	528.78	528.00	55.00	1.42	0.013	24	0.78	7.65	529.83	529.40	26.94
SWR-N-SD-3	SWR-N-JCT-4	SWR-N-JCT-3	10	7.16	530.40	528.78	100.50	1.61	0.013	24	0.68	7.59	531.35	529.88	28.72
SWR-N-SD-4	SWR-N-JCT-5	SWR-N-JCT-4	10	5.54	531.80	530.40	28.00	5.00	0.013	24	0.45	10.57	532.63	531.38	50.58
SWR-N-SD-5	SWR-N-JCT-6	SWR-N-JCT-5	10	5.04	535.00	531.80	56.10	5.70	0.013	24	0.41	10.77	535.79	532.66	54.03
SWR-N-SD-6	SWR-N-PLUG	SWR-N-JCT-6	10	0.00	536.96	535.00	42.15	4.65	0.013	24	-	0.00	536.96	535.86	48.78
SWR-N-LAT-1L	SWR-N-INLT-1L	SWR-N-JCT-1	10	1.16	531.09	530.98	7.25	1.52	0.013	18	0.30	4.54	531.49	531.31	12.94
SWR-N-LAT-2L	SWR-N-INLT-2L	SWR-N-JCT-2	10	0.58	530.03	529.50	7.25	7.36	0.013	18	0.15	6.41	530.32	529.66	28.49
SWR-N-LAT-3L	SWR-N-INLT-3L	SWR-N-JCT-3	10	1.63	529.50	528.78	7.25	9.93	0.013	18	0.23	9.72	529.98	529.87	33.10
SWR-N-LAT-3AL	SWR-N-INLT-3AL	SWR-N-INLT-3L	10	0.28	531.45	529.50	89.18	2.18	0.013	18	0.14	3.36	531.64	530.03	15.52
SWR-N-LAT-4L	SWR-N-INLT-4L	SWR-N-JCT-4	10	1.65	534.20	534.02	36.00	0.51	0.013	18	0.48	3.41	534.69	534.50	7.52
SWR-N-LAT-4R	SWR-N-INLT-4R	SWR-N-JCT-5	10	0.19	531.96	531.80	18.53	0.86	0.013	18	0.14	2.15	532.64	532.64	9.76
SWR-N-LAT-5L	SWR-N-INLT-5L	SWR-N-JCT-5	10	0.33	533.01	531.80	7.25	16.67	0.013	18	0.09	7.23	533.22	532.64	42.89
SWR-N-LAT-6L	SWR-N-INLT-6L	SWR-N-JCT-6	10	4.31	536.99	535.00	31.65	6.28	0.013	18	0.41	10.98	537.78	535.88	26.31
SWR-N-LAT-6R	SWR-N-INLT-6R	SWR-N-JCT-6	10	0.76	535.69	535.00	38.60	1.79	0.013	18	0.24	4.24	536.01	535.85	14.04
SWR-S-SD-0	SWR-S-JCT-1	SWR-S-OUT	10	23.15	532.35	531.89	48.00	0.96	0.013	24	1.74	8.00	534.09	533.60	22.14
SWR-S-SD-1	SWR-S-JCT-2	SWR-S-JCT-1	10	22.55	537.21	535.00	82.00	2.70	0.013	24	1.12	12.39	538.9	536.17	37.14
SWR-S-SD-2	SWR-S-JCT-3	SWR-S-JCT-2	10	21.75	538.60	537.61	26.00	3.81	0.013	24	0.99	14.00	540.27	538.79	44.14
SWR-S-SD-3	SWR-S-JCT-4	SWR-S-JCT-3	10	21.76	542.64	540.00	73.49	3.59	0.013	24	1.01	13.70	544.31	541.07	42.87
SWR-S-SD-4	SWR-S-PLUG	SWR-S-JCT-4	10	0.00	545.84	542.64	16.66	19.20	0.013	24	-	0.00	545.84	544.60	99.13
SWR-S-LAT-1L	SWR-S-INLT-1L	SWR-S-JCT-1	10	0.63	537.69	537.00	7.25	9.45	0.013	18	0.14	7.17	537.98	537.16	32.29
SWR-S-LAT-2L	SWR-S-INLT-2L	SWR-S-JCT-2	10	0.81	540.29	539.82	9.50	4.94	0.013	18	0.19	6.17	540.62	540.02	23.35
SWR-S-LAT-3L	SWR-S-INLT-3L	SWR-S-JCT-4	10	2.20	543.51	542.64	43.32	2.01	0.013	18	0.39	6.03	544.34	544.37	14.89

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES
STORM DRAIN
HYDROLOGIC AND
HYDRAULIC CALCULATIONS

(STORM SEWER SWR)
SCALE: N.T.S.

SHEET 2 OF 4

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		138

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CK
DW

GS1 STORM SEWER CALCULATIONS

PIPE ID	U/S NODE	D/S NODE	FREQ (YR)	FLOW (CFS)	U/S FL	D/S FL	HYD LENGTH	SLOPE (%)	N-VALUE	SECTION SIZE	HYD DEPTH	ACT VEL @ DS	U/S HG	D/S HG	CAP. (CFS)
GS1-N-SD-0	GS1-N-JCT-1	GS1-N-OUT	10	2.96	522.29	522.00	57.76	0.50	0.013	24	0.58	3.89	522.89	522.75	16.03
GS1-N-SD-1	GS1-N-JCT-2	GS1-N-JCT-1	10	2.40	522.83	522.29	108.36	0.50	0.013	24	0.52	3.66	523.37	522.93	15.97
GS1-N-SD-2	GS1-N-JCT-4	GS1-N-JCT-2	10	1.53	523.20	522.83	97.32	0.38	0.013	24	0.45	2.92	523.65	523.39	13.95
GS1-N-SD-3	GS1-N-JCT-3	GS1-N-JCT-4	10	0.60	523.83	523.20	126.30	0.50	0.013	24	0.27	2.44	524.1	523.66	15.98
GS1-N-LAT-1L	GS1-N-INLT-1L	GS1-N-JCT-1	10	0.65	530.59	530.40	7.12	2.72	0.013	18	0.20	4.69	530.89	530.61	17.32
GS1-N-LAT-2L	GS1-N-INLT-2L	GS1-N-JCT-2	10	0.75	529.80	529.72	7.17	1.08	0.013	18	0.27	3.55	530.12	529.99	10.93
GS1-N-LAT-2R	GS1-N-INLT-2R	GS1-N-JCT-2	10	0.20	528.88	528.50	17.13	2.23	0.013	18	0.12	3.05	529.04	528.62	15.68
GS1-N-LAT-3L	GS1-N-INLT-3L	GS1-N-JCT-3	10	0.34	533.46	532.45	10.24	9.92	0.013	18	0.11	6.07	533.68	532.56	33.09
GS1-N-LAT-3R	GS1-N-INLT-3R	GS1-N-JCT-3	10	0.26	533.53	530.98	20.50	12.47	0.013	18	0.09	6.10	533.72	531.07	37.1
GS1-N-LAT-4L	GS1-N-INLT-4L	GS1-N-JCT-4	10	0.74	530.59	530.47	8.01	1.39	0.013	18	0.25	3.85	530.9	530.73	12.38
GS1-N-LAT-4R	GS1-N-INLT-4R	GS1-N-JCT-4	10	0.24	530.59	529.77	18.56	4.37	0.013	18	0.11	4.10	530.77	529.88	21.97
GS1-S-SD-0	GS1-S-JCT-1	GS1-S-OUT	10	14.71	525.74	525.37	47.97	0.77	0.013	24	-	6.93	527.12	526.65	19.9
GS1-S-SD-1	GS1-S-JCT-2	GS1-S-JCT-1	10	14.16	529.30	525.74	127.10	2.80	0.013	24	0.85	11.18	530.66	527.20	37.85
GS1-S-SD-2	GS1-S-JCT-3	GS1-S-JCT-2	10	13.44	530.67	529.30	122.62	1.12	0.013	24	1.07	7.83	531.99	530.72	23.89
GS1-S-SD-3	GS1-S-JCT-4	GS1-S-JCT-3	10	13.30	531.50	530.67	96.84	0.86	0.013	24	1.16	7.07	532.81	532.08	20.99
GS1-S-LAT-1L	GS1-S-INLT-1L	GS1-S-JCT-1	10	0.67	530.34	530.15	7.25	2.59	0.013	18	0.20	4.65	530.64	530.37	16.91
GS1-S-LAT-2L	GS1-S-INLT-2L	GS1-S-JCT-2	10	0.87	529.73	529.30	7.25	5.91	0.013	18	0.19	6.73	530.67	530.67	25.53
GS1-S-LAT-3L	GS1-S-INLT-3L	GS1-S-JCT-3	10	0.26	531.85	530.67	7.88	15.02	0.013	18	0.09	6.41	532.04	532.04	40.71
GS1-S-LAT-4L	GS1-S-INLT-4L	GS1-S-JCT-4	10	11.53	533.37	531.50	27.57	6.76	0.013	18	0.68	14.80	534.66	533.08	27.32
GS1-S-LAT-4R	GS1-S-INLT-4R	GS1-S-JCT-4	10	1.79	531.78	531.50	14.62	1.88	0.013	18	0.36	5.54	532.87	532.88	14.39

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STATE OF TEXAS
ALEXYS GUERRIERO
153408
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES
STORM DRAIN HYDROLOGIC AND HYDRAULIC CALCULATIONS

(STORM SEWER GS1)
SCALE: N.T.S.

CONT.	SECT.	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		139

LYN STORM SEWER CALCULATIONS															
PIPE ID	U/S NODE	D/S NODE	FREQ (YR)	FLOW (CFS)	U/S FL	D/S FL	HYD LENGTH	SLOPE (%)	N-VALUE	SECTION SIZE	HYD DEPTH	ACT VEL @ DS	U/S HG	D/S HG	CAP. (CFS)
LYN-N-SD-0	LYN-N-JCT-1	LYN-N-OUT	10	10.28	522.50	522.01	97.07	0.50	0.013	24	1.16	3.27	525.25	525.05	16.07
LYN-N-SD-1	LYN-N-JCT-1A	LYN-N-JCT-1	10	10.08	523.00	522.50	100.00	0.50	0.013	24	1.15	3.21	525.49	525.29	15.99
LYN-N-SD-1A	LYN-N-JCT-2	LYN-N-JCT-1A	10	9.80	524.00	523.00	77.00	1.30	0.013	24	0.85	7.65	525.59	525.51	25.78
LYN-N-SD-2	LYN-N-JCT-3	LYN-N-JCT-2	10	9.27	525.00	524.00	81.43	1.23	0.013	24	0.84	7.38	526.09	525.63	25.07
LYN-N-SD-3	LYN-N-JCT-4	LYN-N-JCT-3	10	8.68	525.50	525.00	93.50	0.53	0.013	24	1.03	5.33	526.55	526.14	16.54
LYN-N-SD-4	LYN-N-JCT-5	LYN-N-JCT-4	10	6.50	526.00	525.50	74.00	0.68	0.013	24	0.82	5.39	526.90	526.60	18.59
LYN-N-SD-5	LYN-N-PLUG	LYN-N-JCT-5	10	0.00	527.00	526.00	23.50	4.26	0.013	24	-	0.00	527.00	526.95	46.66
LYN-N-LAT-1L	LYN-N-INLT-1L	LYN-N-JCT-1	10	0.35	529.00	528.50	7.25	6.90	0.013	18	0.12	5.37	529.22	528.62	27.58
LYN-N-LAT-1AL	LYN-N-INLT-1AL	LYN-N-JCT-1A	10	0.33	526.00	525.50	7.25	6.90	0.013	18	0.12	5.31	526.21	525.62	27.58
LYN-N-LAT-2L	LYN-N-INLT-2L	LYN-N-JCT-2	10	0.60	530.04	529.80	7.25	3.26	0.013	18	0.18	4.86	530.32	530.00	18.98
LYN-N-LAT-3L	LYN-N-INLT-3L	LYN-N-JCT-3	10	0.34	529.50	529.00	7.25	6.90	0.013	18	0.12	5.36	529.72	529.12	27.58
LYN-N-LAT-3R	LYN-N-INLT-3R	LYN-N-JCT-3	10	0.32	530.46	525.00	18.25	29.89	0.013	18	0.08	8.69	530.66	526.10	57.43
LYN-N-LAT-4L	LYN-N-INLT-4L	LYN-N-JCT-4	10	0.26	530.50	529.83	7.25	9.24	0.013	18	0.10	5.43	530.69	529.93	31.93
LYN-N-LAT-4R	LYN-N-INLT-4R	LYN-N-JCT-4	10	1.98	532.22	529.83	30.50	7.84	0.013	18	0.26	9.48	532.75	530.10	29.40
LYN-N-LAT-5L	LYN-N-INLT-5L	LYN-N-JCT-5	10	3.68	526.30	526.00	16.76	1.79	0.013	18	0.52	6.70	527.03	526.99	14.05
LYN-S-SD-0	LYN-S-JCT-1	LYN-S-OUT	10	3.23	523.50	522.00	59.31	2.53	0.013	24	0.41	7.09	525.05	525.05	35.96
LYN-S-SD-1	LYN-S-JCT-1A	LYN-S-JCT-1	10	3.27	525.00	523.50	115.00	1.30	0.013	24	0.48	5.63	525.63	525.06	25.84
LYN-S-SD-1A	LYN-S-JCT-2	LYN-S-JCT-1A	10	2.71	527.00	525.00	77.22	2.59	0.013	24	0.37	6.79	527.57	525.66	36.40
LYN-S-SD-2	LYN-S-JCT-3	LYN-S-JCT-2	10	2.12	528.50	527.00	58.50	2.56	0.013	24	0.33	6.30	529.01	527.59	36.22
LYN-S-SD-3	LYN-S-JCT-3A	LYN-S-JCT-3	10	1.98	529.01	528.50	33.50	1.53	0.013	24	0.36	5.14	529.50	529.02	27.94
LYN-S-SD-3A	LYN-S-JCT-4	LYN-S-JCT-3A	10	1.53	531.63	529.01	135.88	1.93	0.013	24	0.30	5.17	532.06	529.51	31.40
LYN-S-LAT-1AL	LYN-S-INLT-1AL	LYN-S-JCT-1A	10	0.61	526.00	525.00	7.25	13.79	0.013	18	0.13	8.11	526.29	525.65	39.01
LYN-S-LAT-2L	LYN-S-INLT-2L	LYN-S-JCT-2	10	0.61	529.78	529.35	7.25	5.90	0.013	18	0.16	6.05	530.07	529.52	25.52
LYN-S-LAT-3AL	LYN-S-INLT-3AL	LYN-S-JCT-3A	10	0.49	529.50	529.01	7.25	6.74	0.013	18	0.14	5.91	529.76	529.51	27.27
LYN-S-LAT-3L	LYN-S-INLT-3L	LYN-S-JCT-3	10	0.15	529.84	528.50	23.50	5.72	0.013	18	0.08	3.87	529.98	529.01	25.12
LYN-S-LAT-4L	LYN-S-INLT-4L	LYN-S-JCT-4	10	0.91	532.17	531.63	9.50	5.71	0.013	18	0.20	6.74	532.53	532.08	25.10
LYN-S-LAT-4R	LYN-S-INLT-4R	LYN-S-JCT-4	10	0.62	532.17	531.63	20.50	2.64	0.013	18	0.20	4.58	532.46	532.07	17.07

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES
STORM DRAIN
HYDROLOGIC AND
HYDRAULIC CACLULATIONS

(STORM SEWER LYN)
SCALE: N.T.S.

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		140

CK
DW
CK
DW

DATE: 11/25/2025 4:17:03 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-DR-DACA-07.dgn

CK
DW
CK
DW

SWR INLET CALCULATIONS																	
INLET ID	BASELINE	OFFSET	INLET	INLET TYPE	STORM FREQUENCY (YR)	AREA (ACRES)	FLOW (CFS)	CARRYOVER FLOW (CFS)	TOTAL FLOW TO INLET (CFS)	N-VALUE	LONG. SLOPE (FT/FT)	CROSS SLOPE (FT/FT)	PONDING DEPTH (FT)	PONDING WIDTH (FT)	ALLOWED PONDING WIDTH (FT)	INTERCEPTED FLOW (CFS)	BYPASS FLOW (CFS)	BYPASS TARGET
SWR-N-INLT-1L	42+69.00	-13.00	PCU 3' - Both	On Grade	10	0.19	1.22	0.00	1.22	0.013	0.016	0.020	0.13	6.58	7	1.16	0.06	SWR-N-INLT-2L
SWR-N-INLT-2L	43+30.00	-13.00	PCU 3' - Both	In Sag	10	0.06	0.39	0.18	0.58	-	-	0.020	0.13	3.35	7	0.58	0.00	-
SWR-N-INLT-3L	43+85.00	-13.00	PCU 3' - Both	On Grade	10	0.29	1.21	0.30	1.51	0.013	0.022	0.020	0.13	6.74	7	1.38	0.13	SWR-N-INLT-2L
SWR-N-INLT-4L	44+86.00	-41.50	PAZD_FG_4x4_4x4	In Sag	10	0.71	1.65	0.00	1.65	-	-	-	0.53	11.57	-	1.65	0.00	-
SWR-N-INLT-4R	45+10.30	13.00	PCU 3' - Both	On Grade	10	0.03	0.19	0.00	0.19	0.013	0.034	0.020	0.05	2.74	7	0.19	0.00	-
SWR-N-INLT-5L	45+13.50	-13.00	PCU 3' - Right	On Grade	10	0.06	0.34	0.00	0.34	0.013	0.040	0.020	0.07	3.45	7	0.33	0.00	-
SWR-N-INLT-6L	45+90.80	-29.00	PAZD FG 3x3-3x3	In Sag	10	1.45	4.31	0.00	4.31	-	-	-	0.08	4.56	-	4.31	0.00	-
SWR-N-INLT-6R	45+94.50	24.00	PAZD FG 3x3-3x3	In Sag	10	0.46	0.76	0.00	0.76	-	-	-	0.32	6.24	-	0.76	0.00	-
SWR-N-INLT-3AL	44+42.33	-60.50	PCU 3' - Right	On Grade	10	0.09	0.57	0.00	0.57	0.013	0.025	0.020	0.04	1.91	7	0.28	0.29	SWR-N-INLT-3L
SWR-S-INLT-1L	39+12.00	-13.00	PCU 3' - Both	On Grade	10	0.13	0.50	0.14	0.64	0.013	0.029	0.020	0.09	4.62	7	0.63	0.00	-
SWR-S-INLT-2L	38+30.00	-13.00	PCO 3' - Both	On Grade	10	0.21	0.95	0.00	0.95	0.013	0.040	0.020	0.10	5.05	7	0.81	0.14	SWR-S-INLT-1L
SWR-S-INLT-3L	37+20.00	-35.00	PAZD FG 3x3-3x3	In Sag	10	0.59	2.20	0.00	2.20	-	-	-	0.05	4.38	-	2.20	0.00	-

DATE: 11/25/2025 4:17:32 PM
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STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN
INLET CALCULATIONS

(INLET SWR)
SCALE: N.T.S.

SHEET 1 OF 3

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		141

CK
DW
CK
DW

GS1 INLET CALCULATIONS

INLET ID	BASELINE	OFFSET	INLET	INLET TYPE	STORM FREQUENCY (YR)	AREA (ACRES)	FLOW (CFS)	CARRYOVER FLOW (CFS)	TOTAL FLOW TO INLET (CFS)	N-VALUE	LONG. SLOPE (FT/FT)	CROSS SLOPE (FT/FT)	PONDING DEPTH (FT)	PONDING WIDTH (FT)	ALLOWED PONDING WIDTH (FT)	INTERCEPTED FLOW (CFS)	BYPASS FLOW (CFS)	BYPASS TARGET
GS1-N-INLT-1L	80+13.00	-13.00	PCU 3' - Both	On Grade	10	0.11	0.65	0.00	0.65	0.013	0.005	0.020	0.13	6.46	7	0.65	0.00	-
GS1-N-INLT-2L	81+20.00	-13.00	PCU 3' - Both	In Sag	10	0.12	0.75	0.00	0.75	-	-	0.020	0.31	2.76	7	0.75	0.00	-
GS1-N-INLT-2R	81+25.10	13.00	PMBD 4'	In Sag	10	0.03	0.20	0.00	0.20	-	-	0.020	0.04	2.13	7	0.20	0.00	-
GS1-N-INLT-3L	83+48.90	-13.00	PCO 3' - Both	On Grade	10	0.06	0.34	0.00	0.34	0.013	0.019	0.020	0.08	3.94	7	0.34	0.00	-
GS1-N-INLT-3R	83+45.00	13.00	PCO 3' - Both	On Grade	10	0.04	0.26	0.00	0.26	0.013	0.019	0.020	0.07	3.59	7	0.26	0.00	-
GS1-N-INLT-4L	82+22.00	-13.00	PCU 3' - Both	On Grade	10	0.12	0.74	0.00	0.74	0.013	0.016	0.020	0.11	5.44	7	0.74	0.00	-
GS1-N-INLT-4R	82+22.00	13.00	PCU 3' - Both	On Grade	10	0.04	0.24	0.00	0.24	0.013	0.016	0.020	0.07	3.56	7	0.24	0.00	-
GS1-S-INLT-1L	73+87.10	-13.00	PCU 3' - Both	On Grade	10	0.11	0.67	0.00	0.67	0.013	0.005	0.020	0.13	6.52	7	0.67	0.00	-
GS1-S-INLT-2L	72+60.00	-13.00	PCU 3' - Both	In Sag	10	0.14	0.87	0.00	0.87	-	-	0.020	0.30	2.51	7	0.87	0.00	-
GS1-S-INLT-3L	71+34.20	-13.00	PCU 3' - Left	On Grade	10	0.04	0.26	0.00	0.26	0.013	0.033	0.020	0.06	3.21	7	0.26	0.00	-
GS1-S-INLT-4L	70+48.80	-20.00	PAZD FG 3x3-3x3	In Sag	10	3.49	11.53	0.00	11.53	-	-	-	0.57	0.46	-	11.53	0.00	-
GS1-S-INLT-4R	70+38.70	20.90	PAZD FG 3x3-3x3	In Sag	10	0.45	1.79	0.00	1.79	-	-	-	0.16	0.12	-	1.79	0.00	-

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STATE OF TEXAS
ALEXYS GUERRIERO
153408
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN
INLET CALCULATIONS

(INLET GS1)
SCALE: N.T.S.

SHEET 2 OF 3

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		142

CK
DW
CK
DW

LYN INLET CALCULATIONS																	
INLET ID	BASELINE	OFFSET	INLET	INLET TYPE	STORM FREQUENCY (YR)	AREA (ACRES)	FLOW (CFS)	CARRYOVER FLOW (CFS)	TOTAL FLOW TO INLET (CFS)	N-VALUE	LONG. SLOPE (FT/FT)	CROSS SLOPE (FT/FT)	PONDING DEPTH (FT)	PONDING WIDTH (FT)	ALLOWED PONDING WIDTH (FT)	INTERCEPTED FLOW (CFS)	BYPASS FLOW (CFS)	BYPASS TARGET
LYN-N-INLT-1L	100+80.00	-13.00	PCU 3' - Left	On Grade	10	0.06	0.35	0.00	0.35	0.013	0.021	0.020	0.08	3.95	7	0.35	0.00	-
LYN-N-INLT-1AL	101+80.00	-13.00	PCU 3' - Left	On Grade	10	0.05	0.34	0.00	0.34	0.013	0.021	0.020	0.08	3.89	7	0.33	0.00	-
LYN-N-INLT-2L	102+57.00	-13.00	PCU 3' - Both	In Sag	10	0.09	0.59	0.01	0.60	-	-	0.020	0.13	3.39	7	0.60	0.00	-
LYN-N-INLT-3L	103+38.50	-13.00	PCU 3' - Right	On Grade	10	0.06	0.35	0.00	0.35	0.013	0.012	0.020	0.09	4.32	7	0.34	0.00	-
LYN-N-INLT-3R	103+38.50	13.00	PCU 3' - Both	On Grade	10	0.05	0.32	0.00	0.32	0.013	0.023	0.020	0.07	3.70	7	0.32	0.00	-
LYN-N-INLT-4L	104+32.00	-13.00	PCU 3' - Right	On Grade	10	0.04	0.26	0.00	0.26	0.013	0.027	0.020	0.07	3.33	7	0.26	0.00	-
LYN-N-INLT-4R	104+32.00	25.00	PAZD FG 3x3-3x3	In Sag	10	0.55	1.98	0.00	1.98	-	-	0.017	0.17	10.14	-	1.98	0.00	-
LYN-N-INLT-5L	105+11.00	-21.50	PAZD FG 4x4-4x4	In Sag	10	1.03	3.68	0.00	3.68	-	-	0.030	0.22	7.26	-	3.68	0.00	-
LYN-S-INLT-1A	89+70.00	-13.00	PCU 3' - Both	On Grade	10	0.10	0.61	0.00	0.61	0.013	0.021	0.020	0.10	4.84	7	0.61	0.00	-
LYN-S-INLT-2L	88+92.00	-13.00	PCU 3' - Both	In Sag	10	0.10	0.61	0.01	0.61	-	-	0.020	0.13	3.43	7	0.61	0.00	-
LYN-S-INLT-3L	88+33.50	-29.00	PAZD FG 3x3-3x3	In Sag	10	0.06	0.15	0.00	0.15	-	-	0.030	0.02	0.54	-	0.15	0.00	-
LYN-S-INLT-3AL	88+00.00	-13.00	PCU 3' - Both	On Grade	10	0.08	0.49	0.00	0.49	0.013	0.022	0.020	0.09	4.39	7	0.49	0.00	-
LYN-S-INLT-4L	86+65.00	13.00	PCO 3' - Both	On Grade	10	0.16	0.91	0.00	0.91	0.013	0.010	0.020	0.13	6.45	7	0.91	0.00	-
LYN-S-INLT-4R	86+65.00	-13.00	PCO 3' - Both	On Grade	10	0.15	0.62	0.00	0.62	0.013	0.010	0.020	0.11	5.57	7	0.62	0.00	-

STATE OF TEXAS
ALEXYS GUERRIERO
153408
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PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN
INLET CALCULATIONS

(INLET LYN)
SCALE: N.T.S.

SHEET 3 OF 3

CONT.	SECT.	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		143

DATE: 11/25/2025 4:18:13 PM
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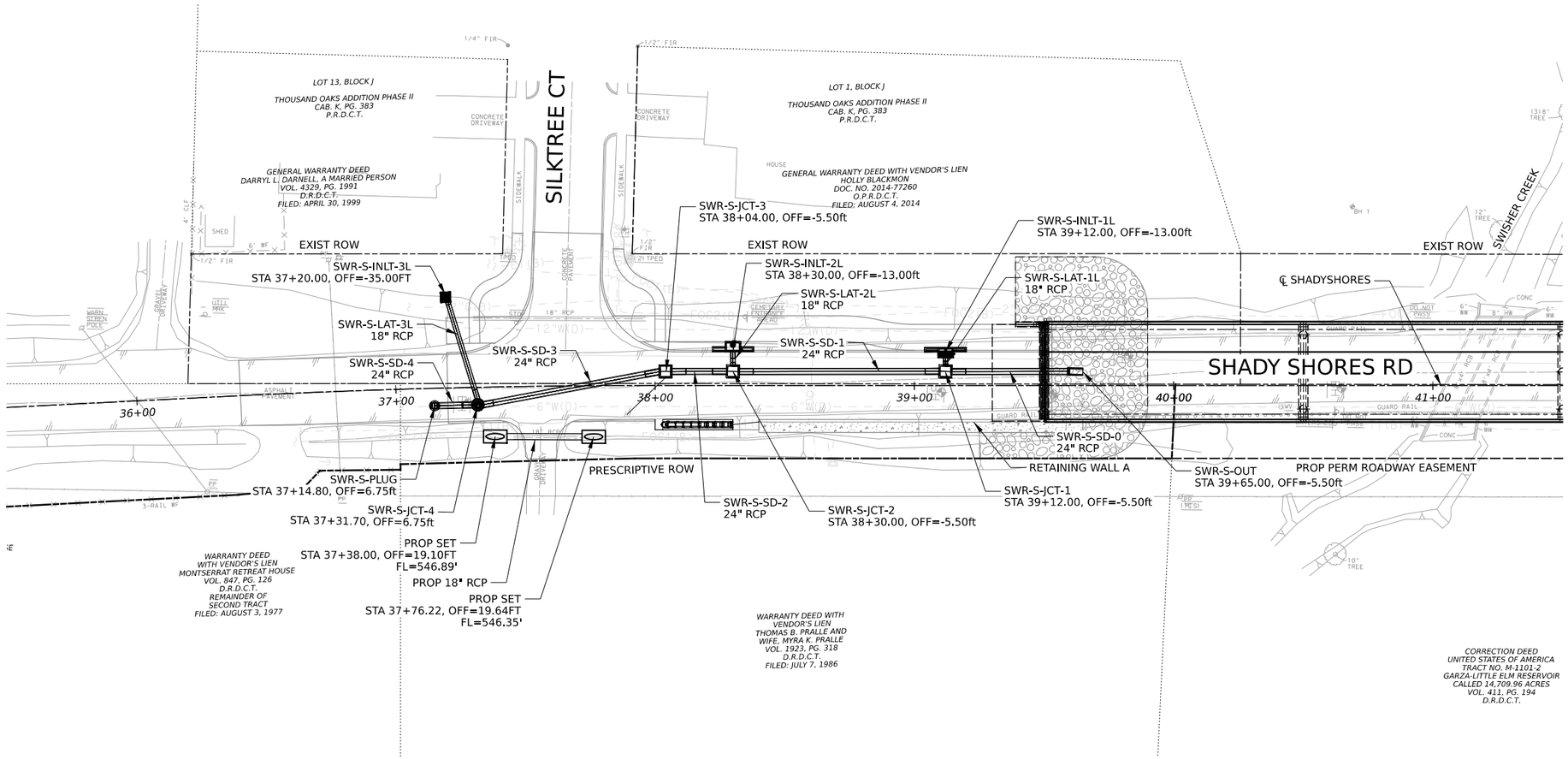


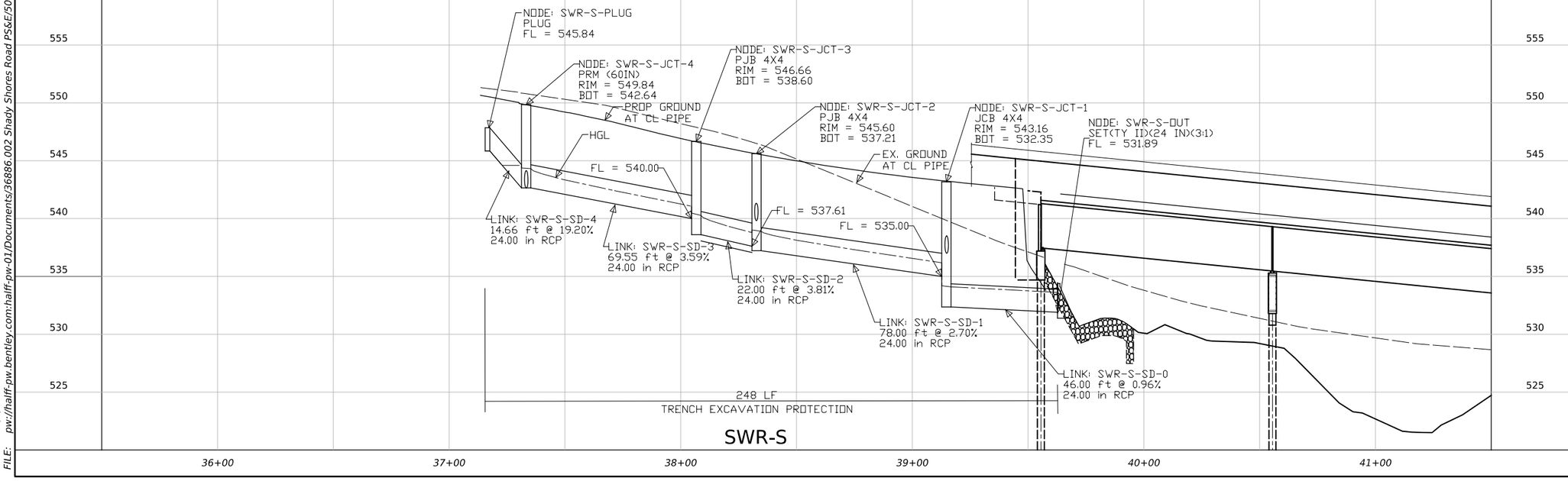
LEGEND

- PROPOSED GROUND
- EXIST GROUND
- 10-YR HGL

0 25 50
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NOTE:

1. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.



SWR-S

STATE OF TEXAS
ALEXYS GUERRIERO
153408
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN SWR-S
PLAN AND PROFILE

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		144

DATE: 12/3/2025 10:53:35 AM
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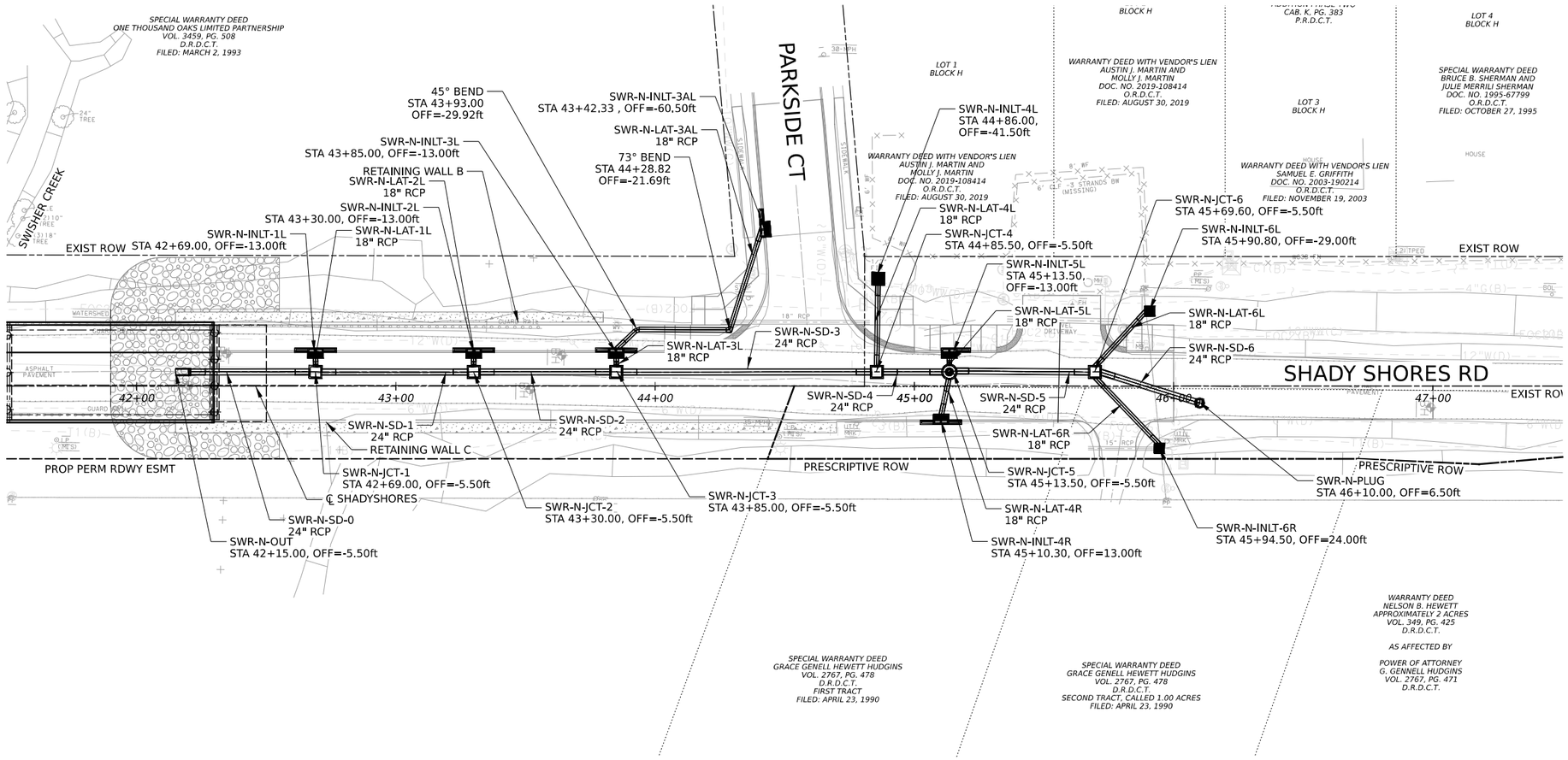


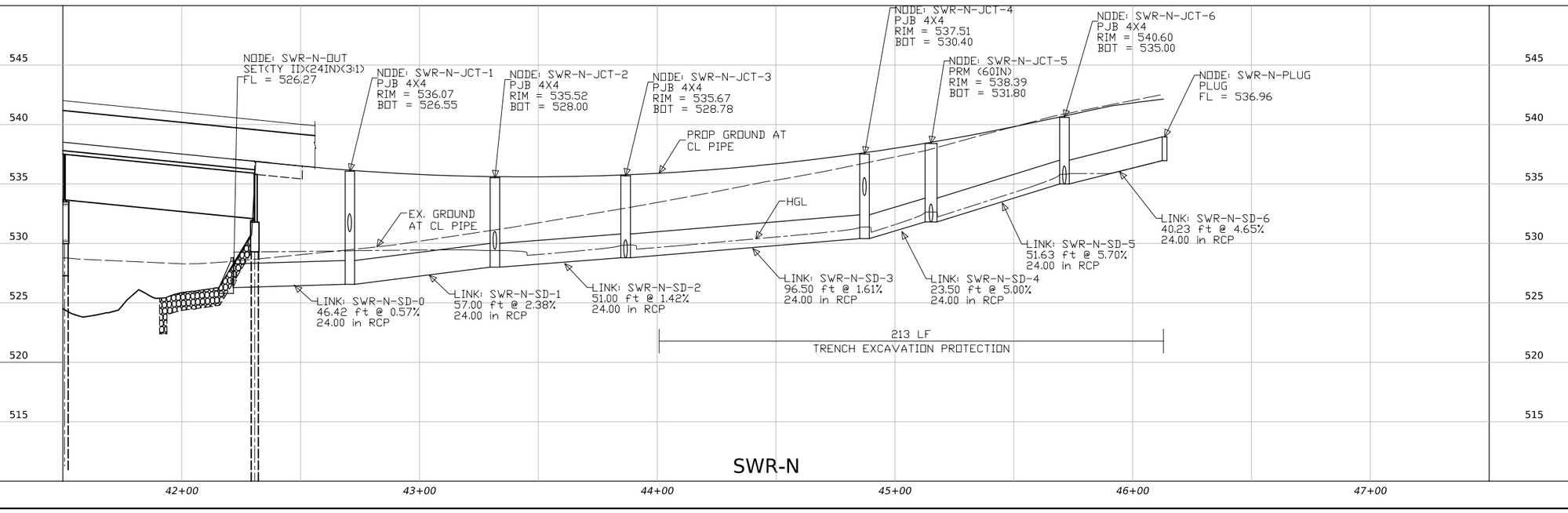
LEGEND

- PROPOSED GROUND
- EXIST GROUND
- 10-YR HGL

0 25 50
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NOTE:

1. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.



SWR-N

ALEXYS GUERRERO
153408
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STATE OF TEXAS

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN SWR-N PLAN AND PROFILE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		145

DATE: 11/25/2025 4:19:15 PM
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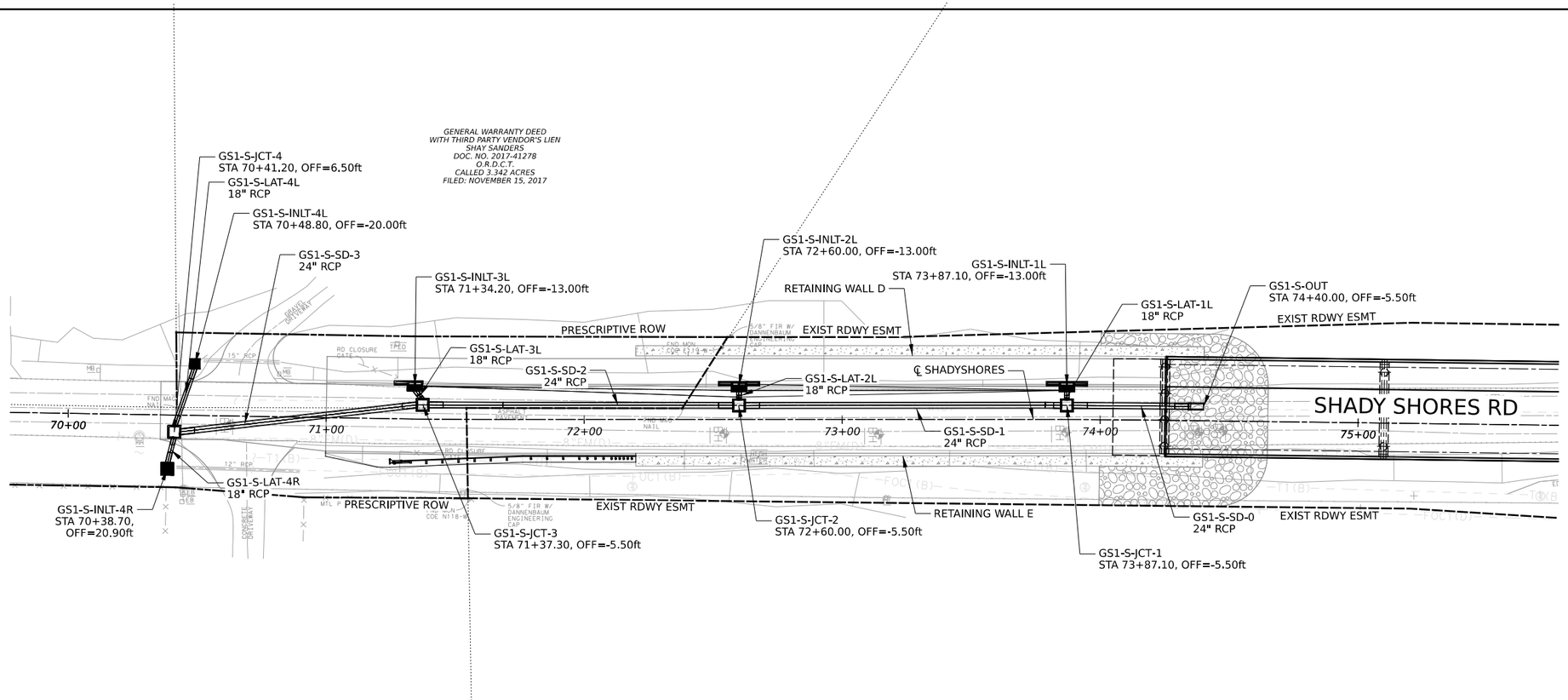
DW: CK: DW: CK:



LEGEND

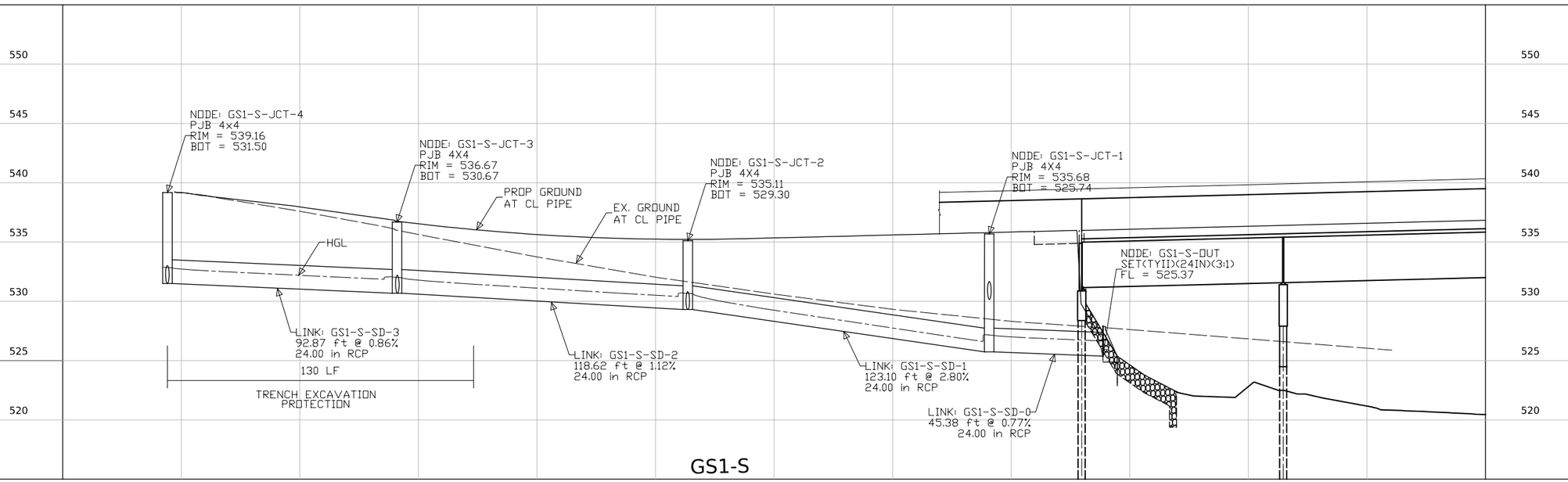
- PROPOSED GROUND
- EXIST GROUND
- 10-YR HGL

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NOTE:

1. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.



STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN GS1-S
PLAN AND PROFILE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		146

DATE: 11/25/2025 4:19:49 PM
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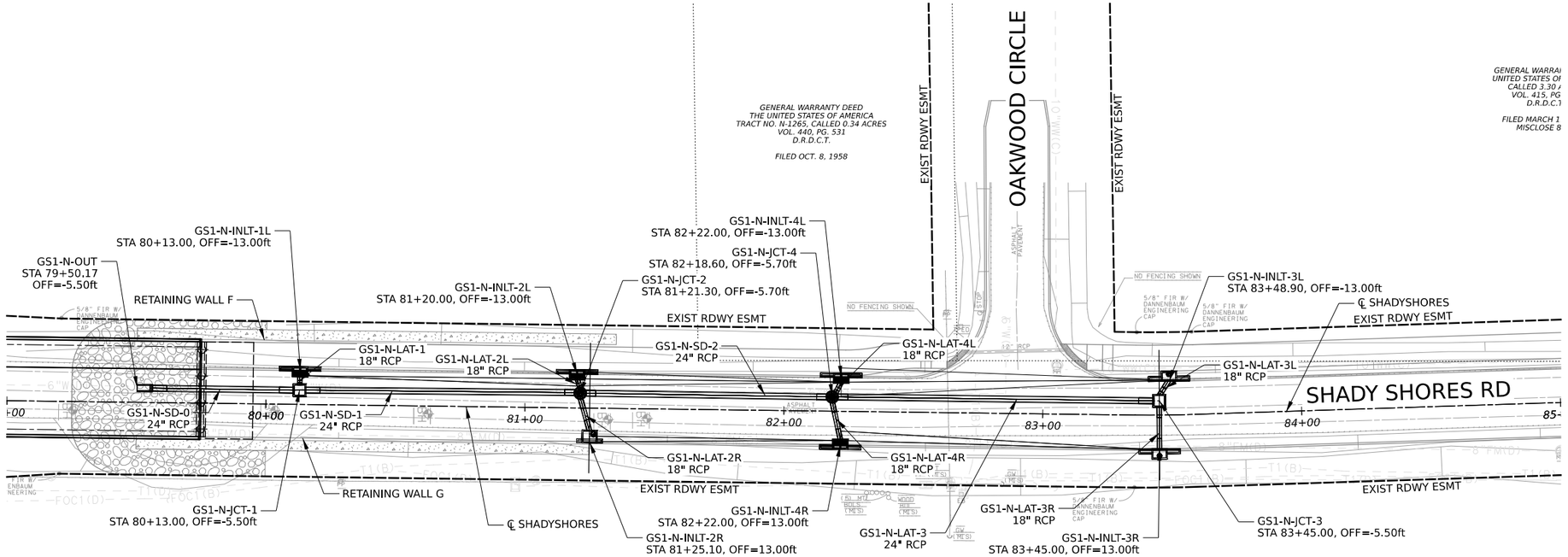

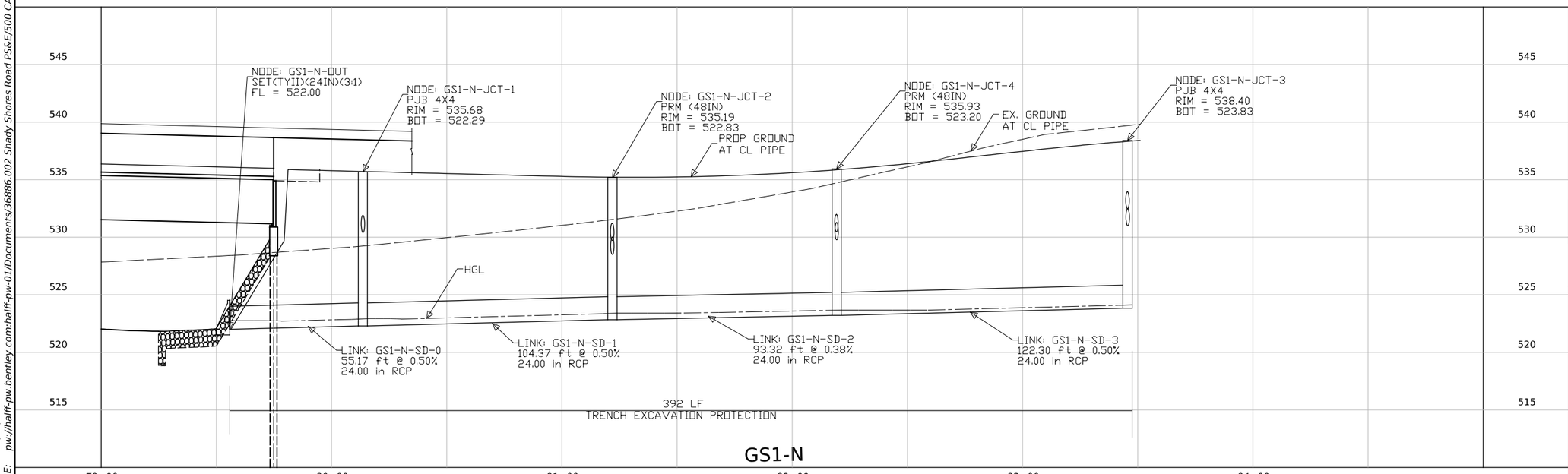

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN GS1-N
PLAN AND PROFILE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		147

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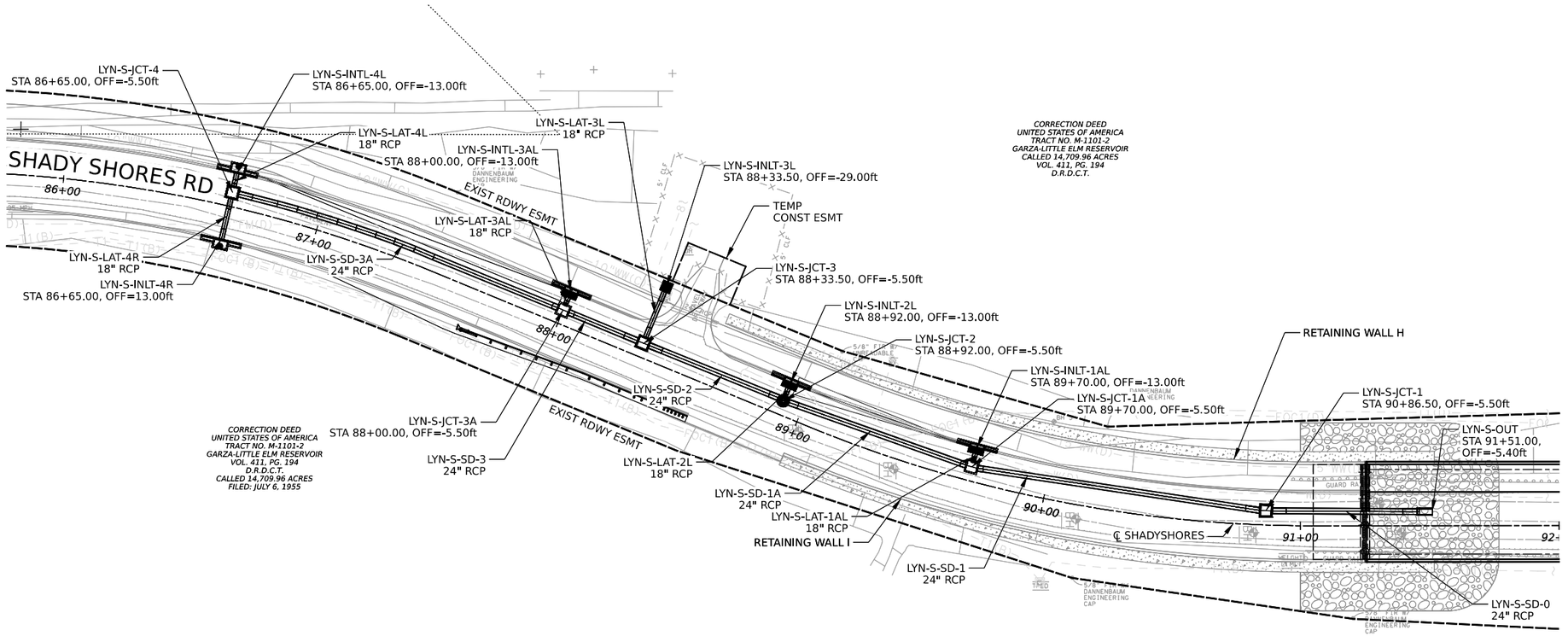


LEGEND

- PROPOSED GROUND
- EXIST GROUND
- 10-YR HGL

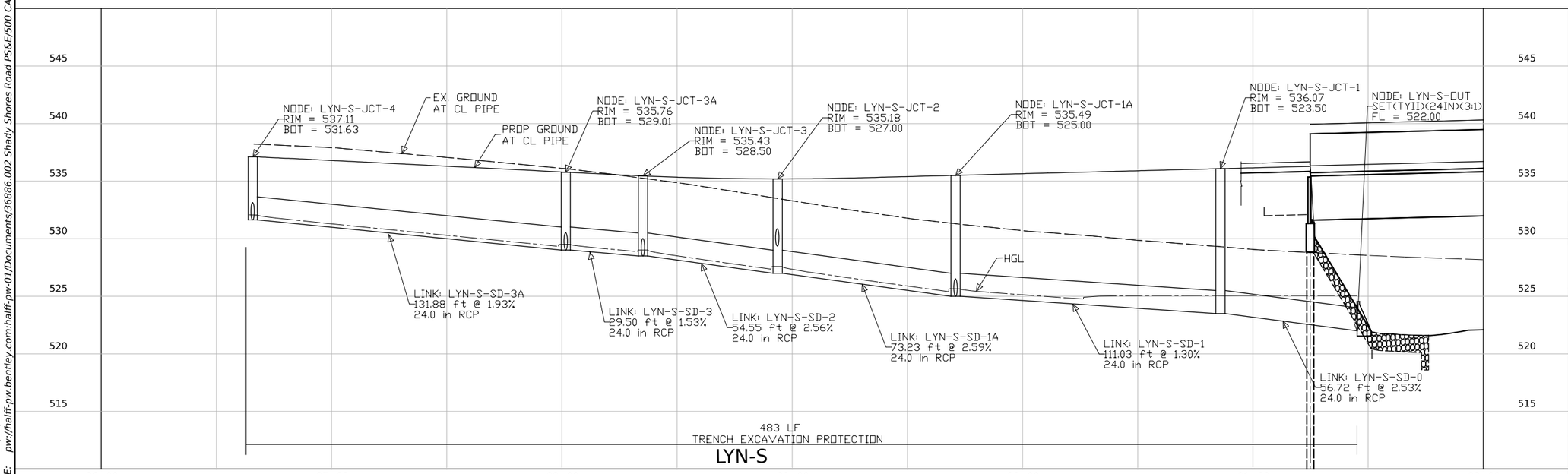
N

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NOTE:

1. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.



STATE OF TEXAS
ALEXYS GUERRERO
153408
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PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN LYN-S
PLAN AND PROFILE

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		148

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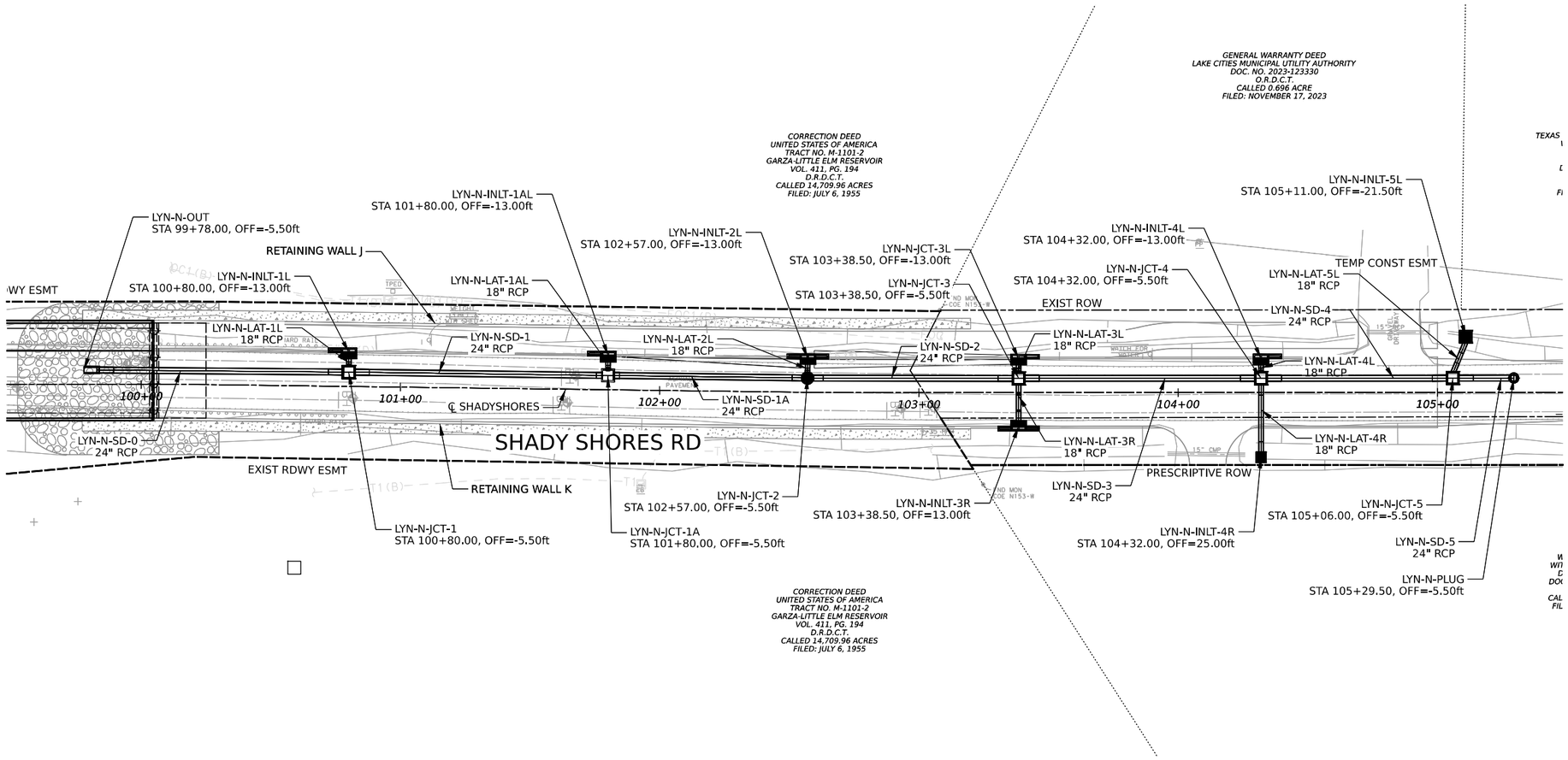
DW
CK
DW

CK:
DW:
CK:
DN:



LEGEND

- PROPOSED GROUND
- EXIST GROUND
- 10-YR HGL

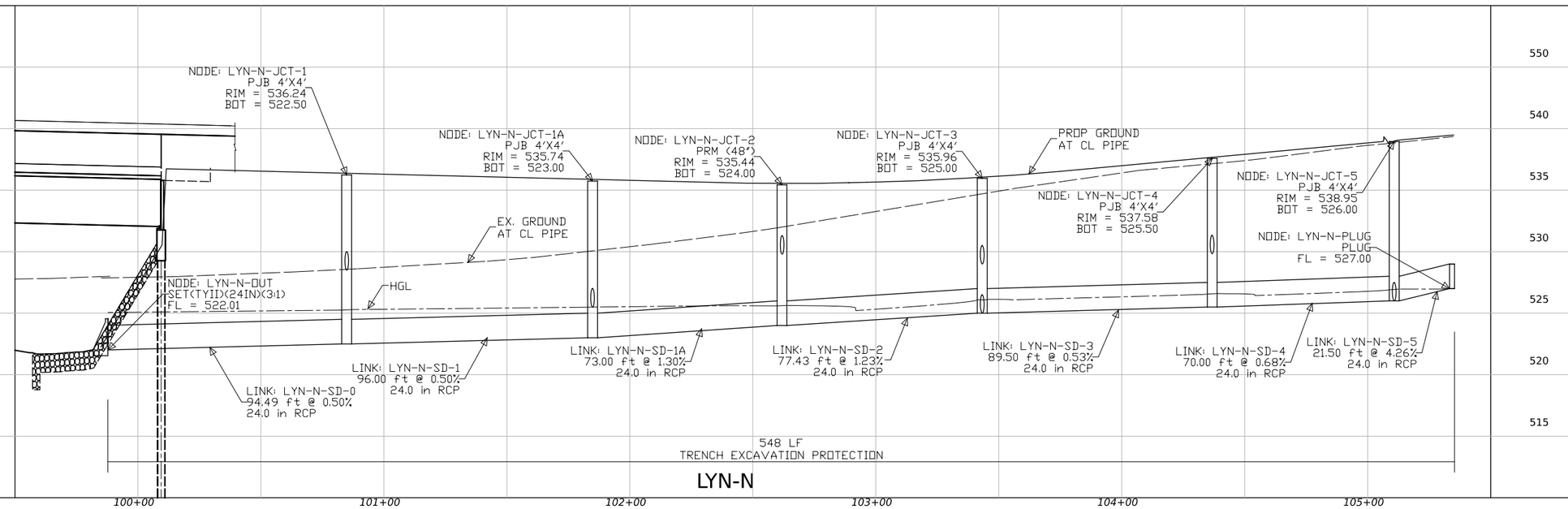
N

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NOTE:

1. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.



12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN LYN-N
PLAN AND PROFILE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		149

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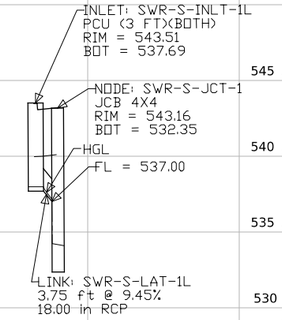
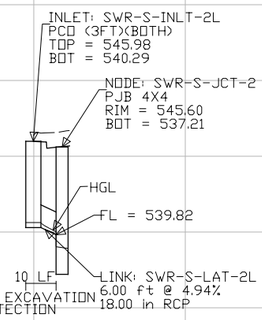


SWR-S-LAT-1L



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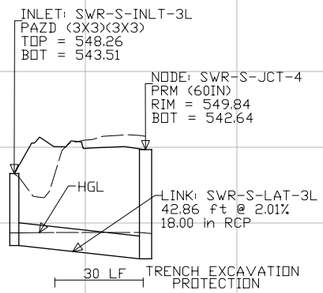

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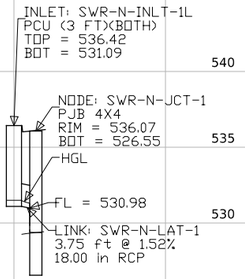

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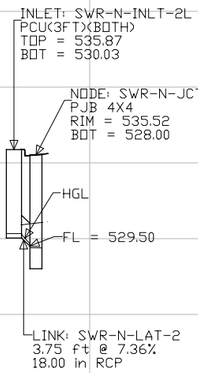

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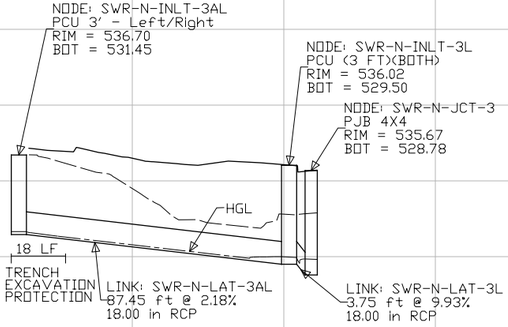

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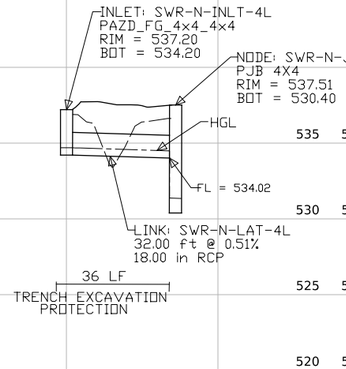
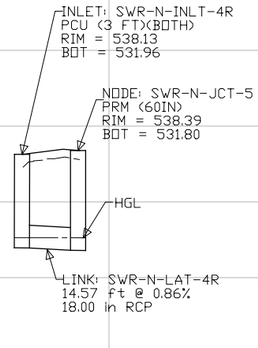


SWR-N-LAT-4L



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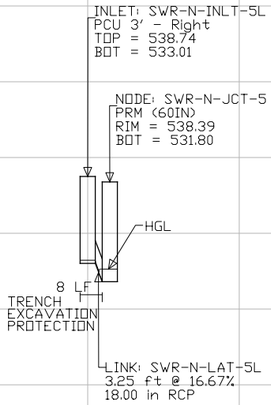

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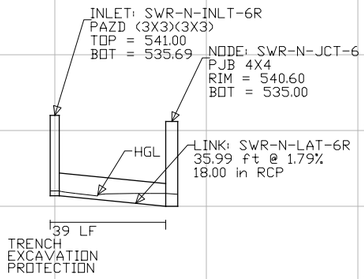

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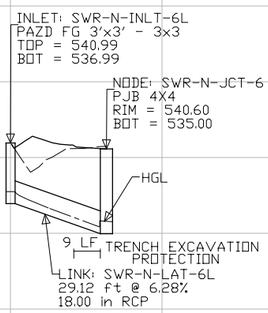

SWR-N-LAT-6L

LEGEND

PROPOSED GROUND

EXIST GROUND

10-YR HGL

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NOTE:

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STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED
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12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

STORM DRAIN SWR
LATERAL PROFILES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		150

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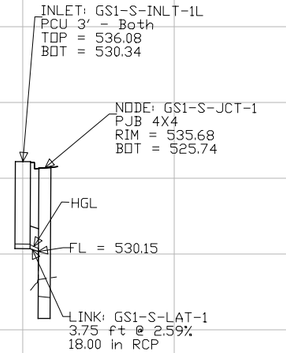
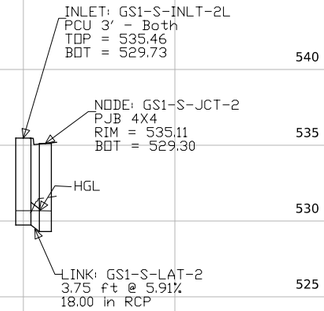
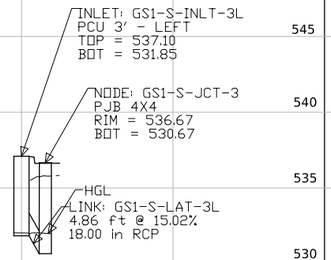


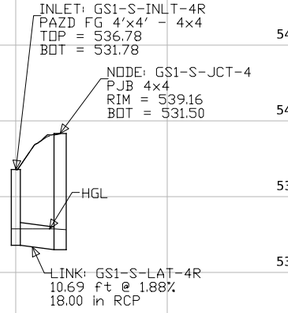
GS1-S-LAT-1L



GS1-S-LAT-2L



GS1-S-LAT-3L



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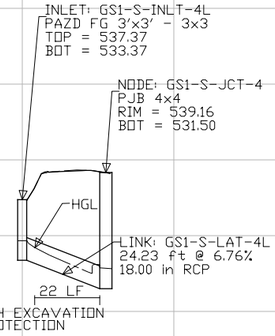

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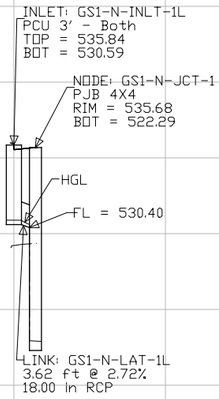

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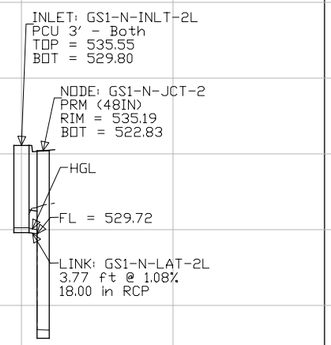

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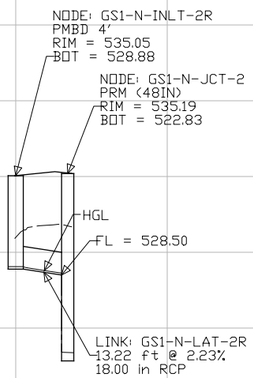

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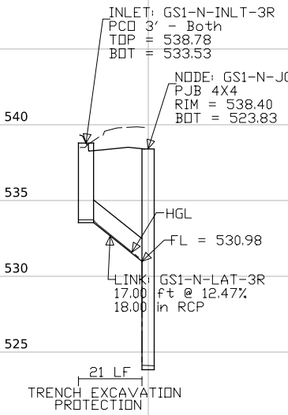

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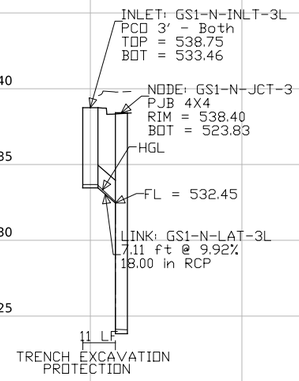
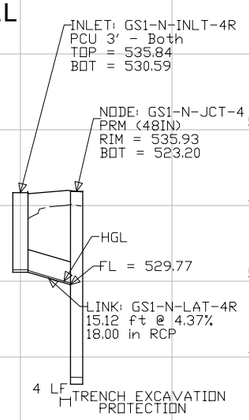


GS1-N-LAT-3L



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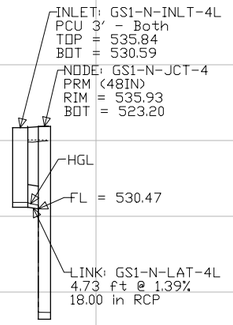

GS1-N-LAT-4L

LEGEND

PROPOSED GROUND

EXIST GROUND

10-YR HGL

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NOTE:

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12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

STORM DRAIN GS1
LATERAL PROFILES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		151

DATE: 11/25/2025 4:22:20 PM
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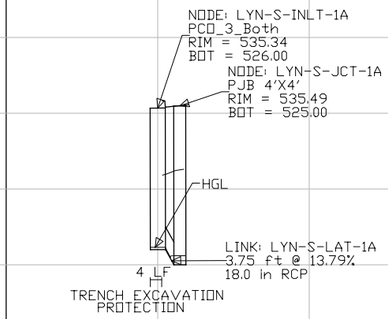

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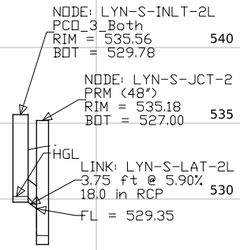

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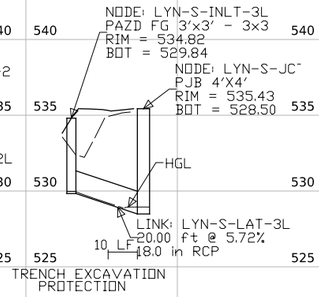

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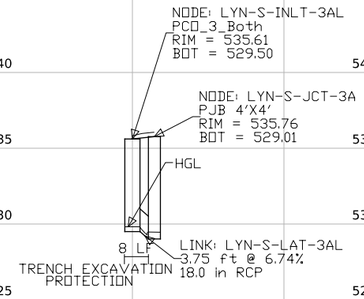

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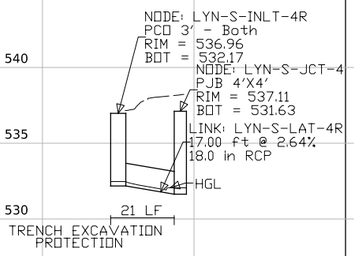

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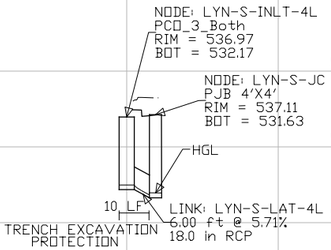

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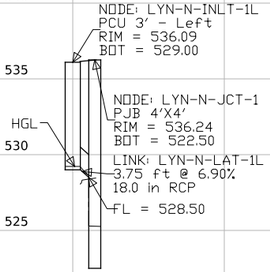

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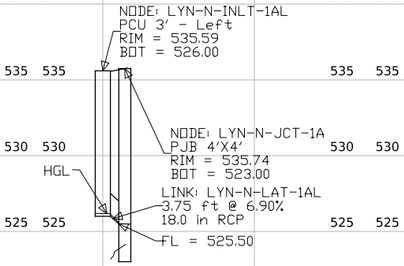

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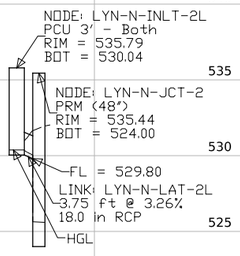

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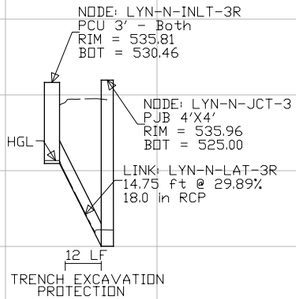

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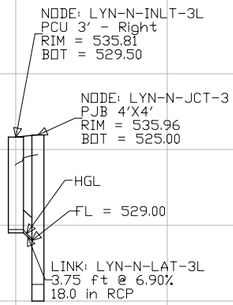
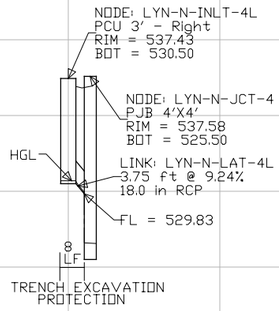


LYN-N-LAT-3L



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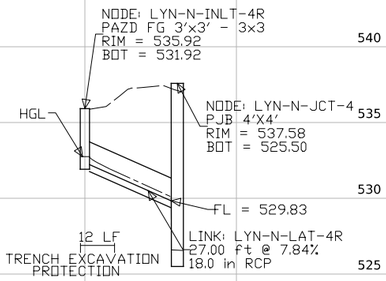
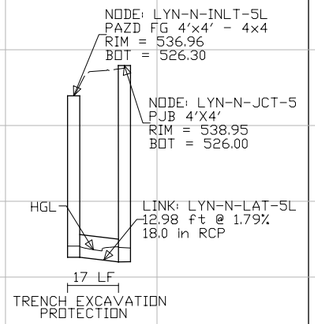


LYN-N-LAT-4R



LYN-N-LAT-5L

LEGEND

PROPOSED GROUND

EXIST GROUND

10-YR HGL

0 25 50
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NOTE:

1. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.

STATE OF TEXAS
ALEXYS GUERRERO
153408
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

STORM DRAIN LYN LATERAL PROFILES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		152

DATE:
FILE:

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DATE: 11/25/2025 3:06:48 PM
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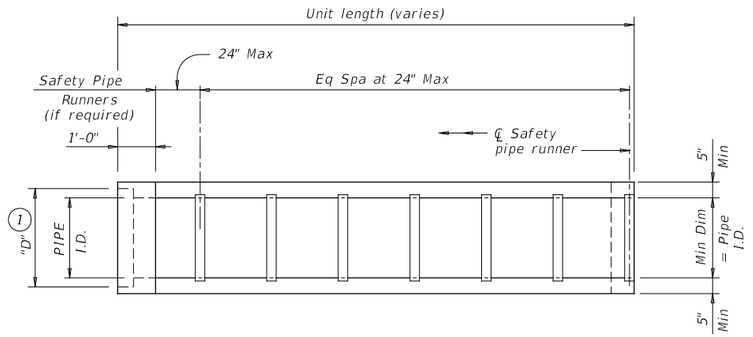
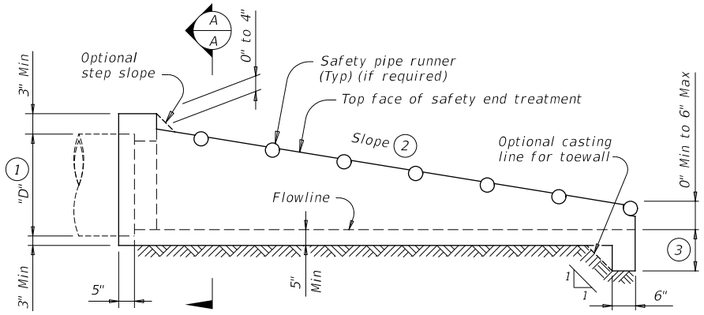


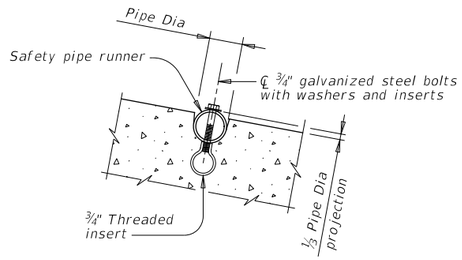
PLAN

(Showing bell end connection.)



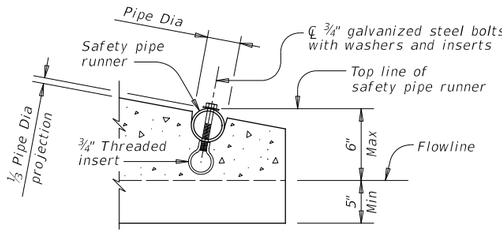
LONGITUDINAL ELEVATION

(Showing bell end connection.)

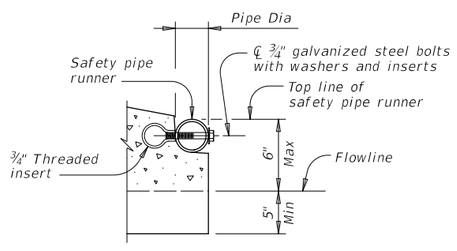


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



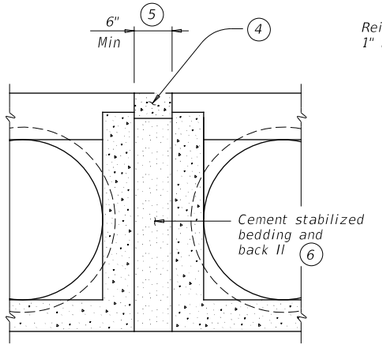
OPTION A



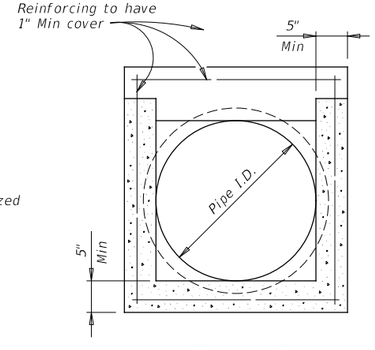
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

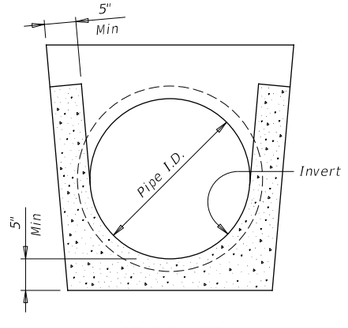
(If required)



MULTIPLE PIPE INSTALLATION

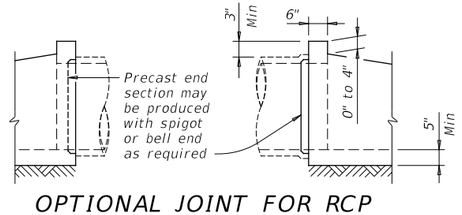


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (7)	"D" (1)	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' – 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	1.30"	20.50"	6:1	6' – 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	1.60"	24.00"	6:1	8' – 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' – 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	2.65"	38.50"	6:1	14' – 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' – 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	2.7"	52.50"	6:1	21' – 2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or atter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment."

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and back II in accordance with the Item 400, "Excavation and Back II for Structures." Bedding and back II is considered subsidiary to the Item 467, "Safety End Treatment." When concrete riprap is speci ed around the safety end treatment, back II as directed by Engineer.

(7) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as speci ed in Item "Safety End Treatment."

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" – D12 x D12 or 5"x5" – D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the speci cations.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe." Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

PSET-SP

FILE: CD-PSET-SP-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		153

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DATE: 11/25/2025 3:07:08 PM
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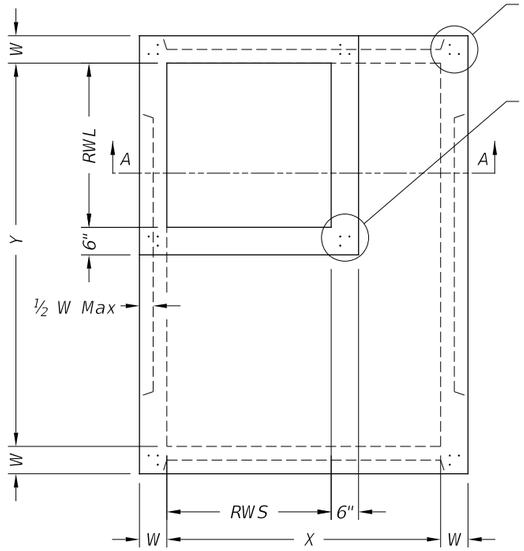
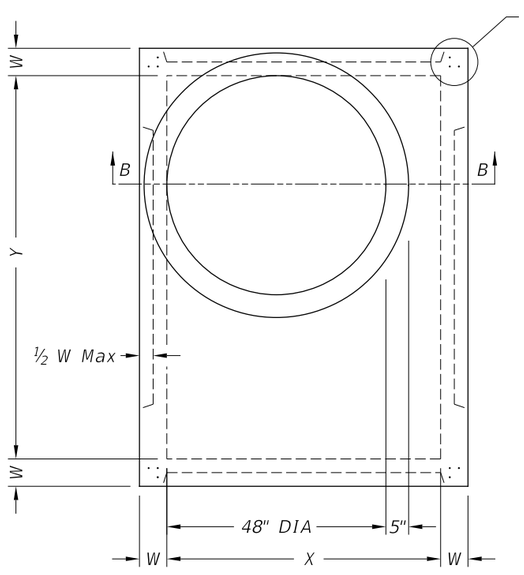


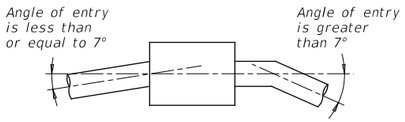
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



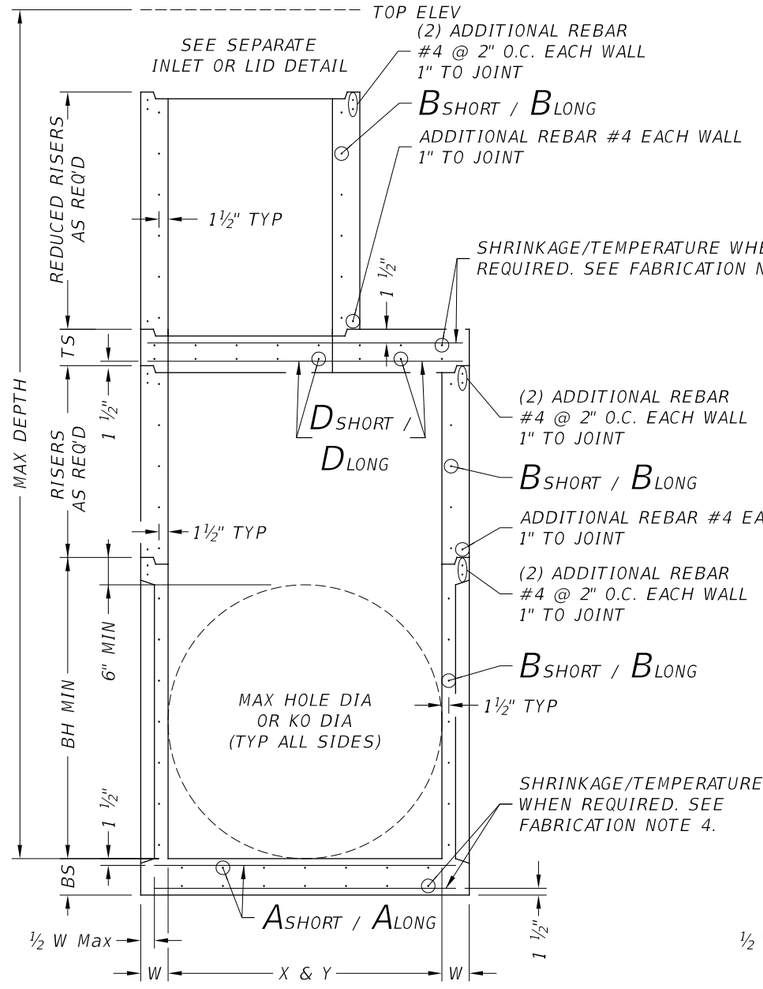
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



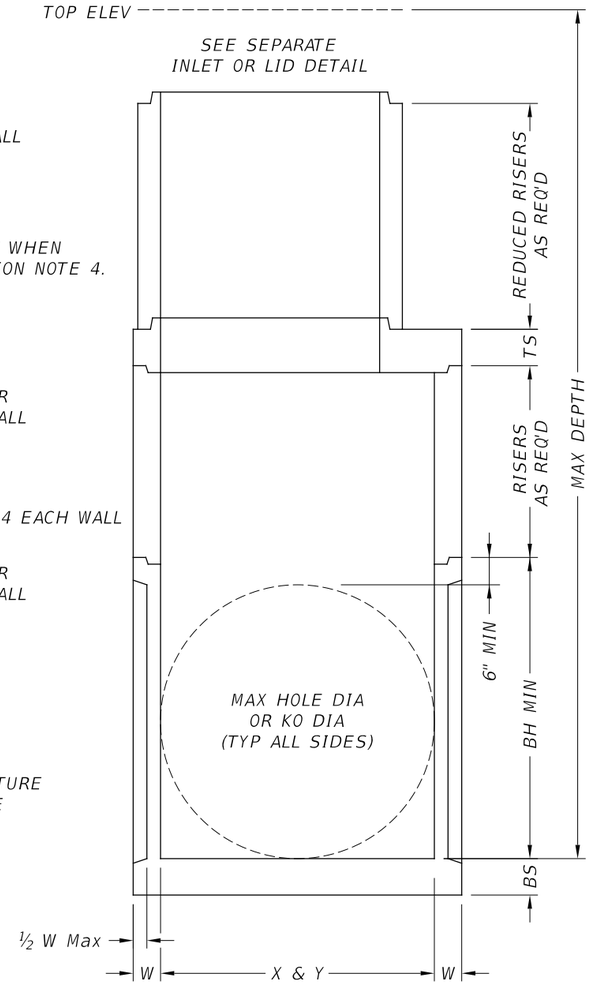
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall. If necessary, use pipe elbow or curved approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to speci ed inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For exible pipe, consult boot/seal Manufacturer's speci cation for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's speci cation.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the speci ed inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

PB

FILE: CD-PB-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		154

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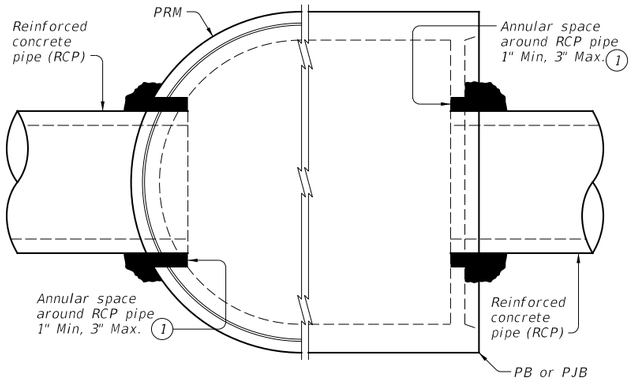
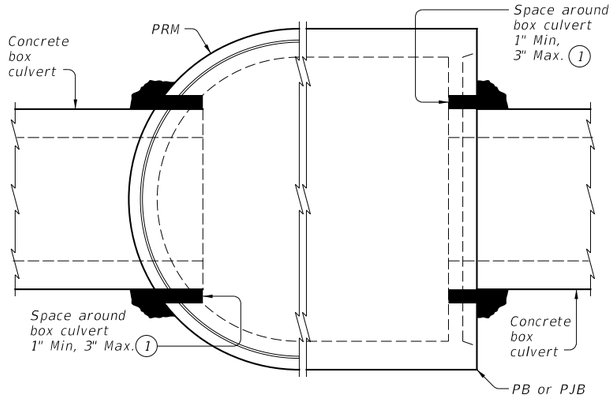


PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

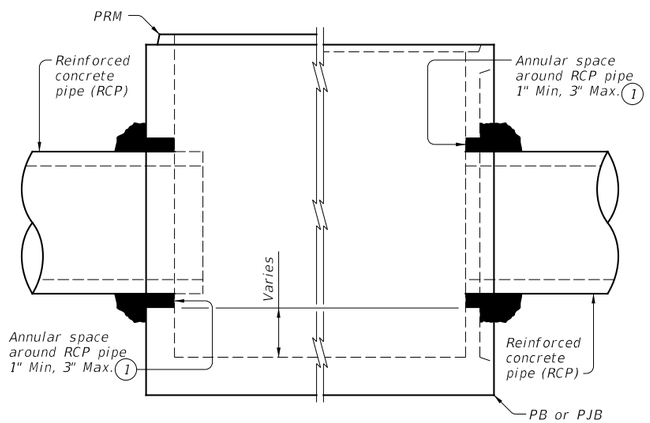
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

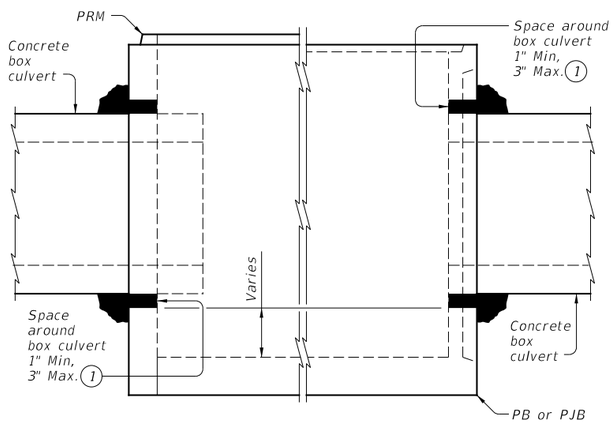
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

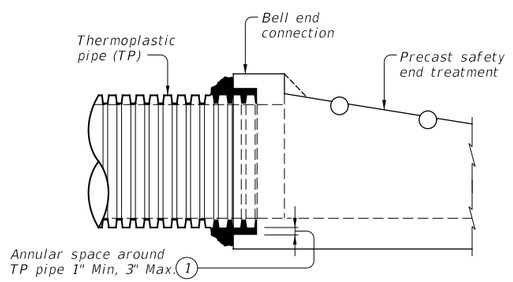
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application."

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application."

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains."

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe."

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

FILE: CD-PBGC-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		155

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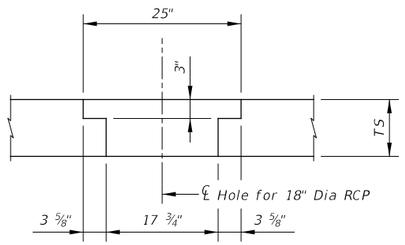
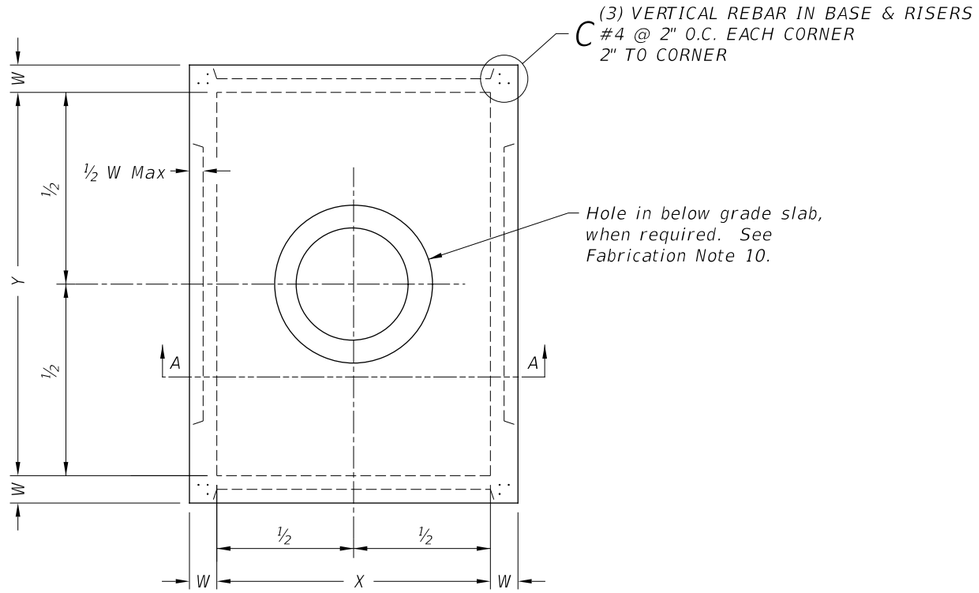
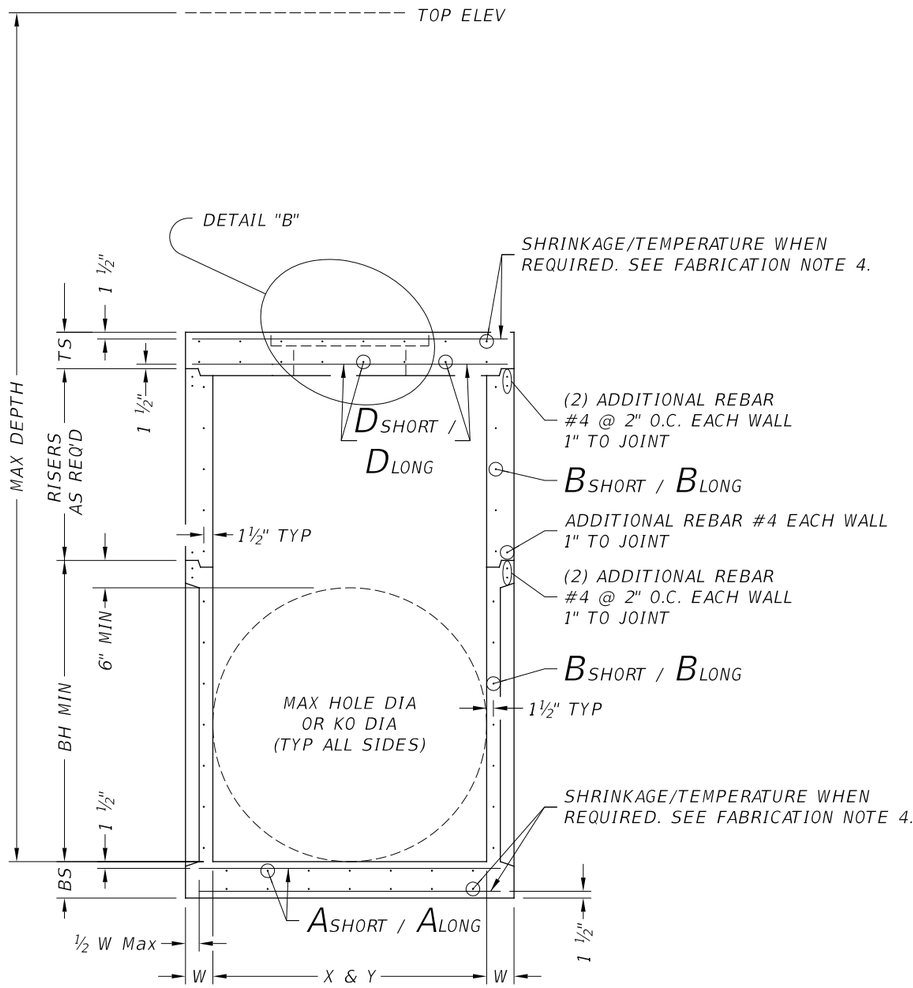


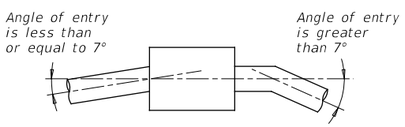
DETAIL "B"



PLAN VIEW



SECTION A-A



PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PJB wall.
If necessary, use pipe elbow or curved approach alignment to stay within this limit.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.
10. Provide hole in below grade slab only when PJB is installed with inlet type POD.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to junction box.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For exible pipe, consult boot/seal Manufacturer's speci cation for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's speci cation.

GENERAL NOTES:

1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for junction box is per Item 465 "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST JUNCTION BOX

PJB

FILE: CD-PJB-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		156

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

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DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: CD-PDD-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		157

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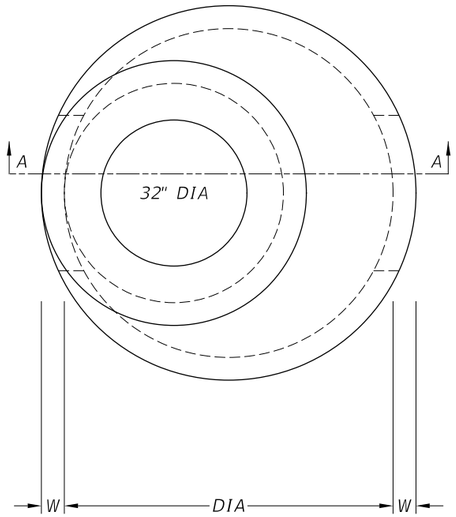
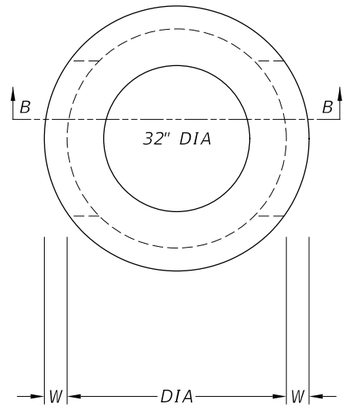
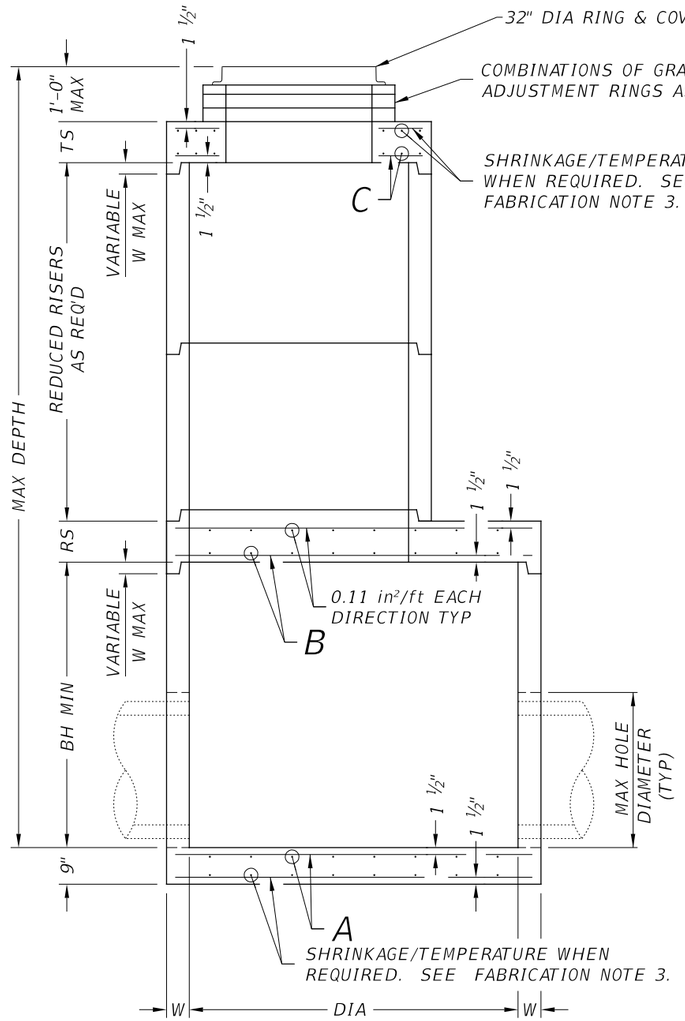
DATE: 11/25/2025 3:08:22 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CAD/4 - Design/Sheets/CD-PDD-20.dgn



PLAN VIEW "A"

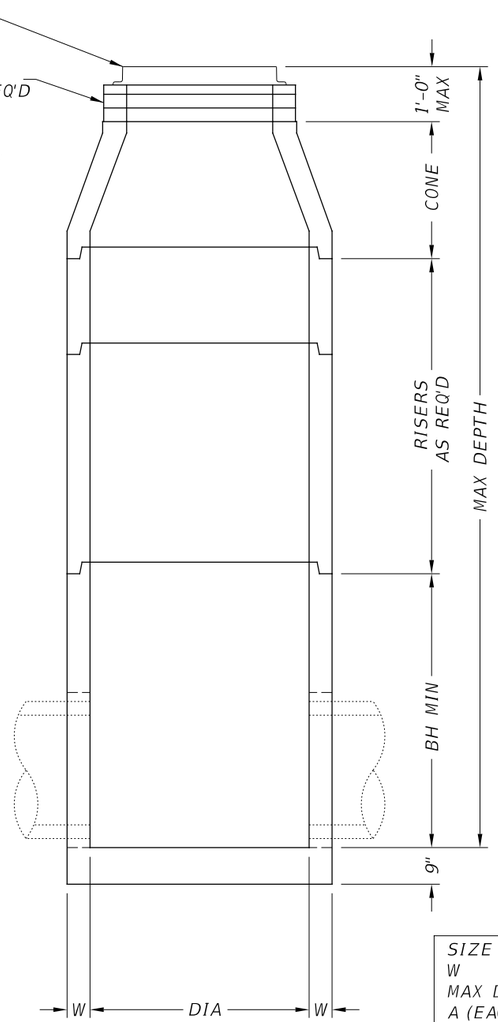


PLAN VIEW "B"



SECTION A-A

ROUND REDUCED RISER OPTION
SHOWING FLAT SLAB TOP



SECTION B-B

ROUND RISER OPTION
SHOWING CONE

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR. Provide circumferential reinforcing steel in vertical walls of base, riser and cone in accordance with ASTM C478.
3. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
4. Manufacture base and risers to nearest 3" increment.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.

INSTALLATION NOTES:

1. Cones may be concentric or eccentric. Reduction cones are acceptable. See Manufacturer for cone dimensions.
2. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to this item.
3. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
4. Do not grout rubber gasket joints without Manufacturer's recommendation.
5. Initial installation of grade adjustment rings is limited to 1'-0" Max as shown.
6. Grade adjustment rings may be increased to 2'-0" Max when future construction a ects nal grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments may be made up to the Max depth shown. Structure must be evaluated if Max depth will be exceeded.

GENERAL NOTES:

1. Designed according to ASTM C478.
2. Payment for manhole is per Item 465, "Junction Boxes, Manholes, and Inlets" by type and size.
3. Pipe OD + placement tolerance must be equal or less than Max hole diameter. For rigid pipe, placement tolerance is 4" Max, 2" Min. For exible pipe, consult boot/seal manufacturer's speci cation for placement tolerance.

Cover dimensions are clear dimensions, unless noted otherwise.

SIZE (DIA)	48 in	60 in	72 in
W	5 in	6 in	7 in
MAX DEPTH	25 ft	25 ft	25 ft
A (EACH WAY)	0.22 in²/ft	0.30 in²/ft	0.45 in²/ft
B (EACH WAY)	N/A	0.37 in²/ft	0.62 in²/ft
C (EACH WAY)	0.24 in²/ft	0.46 in²/ft	0.46 in²/ft
BH MIN	12 in	36 in	36 in
TS	9 in	9 in	9 in
RS	N/A	9 in	12 in
REDUCED RISER DIA	N/A	48 in	48/60 in
MAX HOLE DIA	32 in	40 in	54 in

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PRECAST ROUND MANHOLE

PRM

FILE: CD-PRM-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2023 – Corrected TS and RS callout	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		158

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FILE: pw:/halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/CD-PRM-23.dgn

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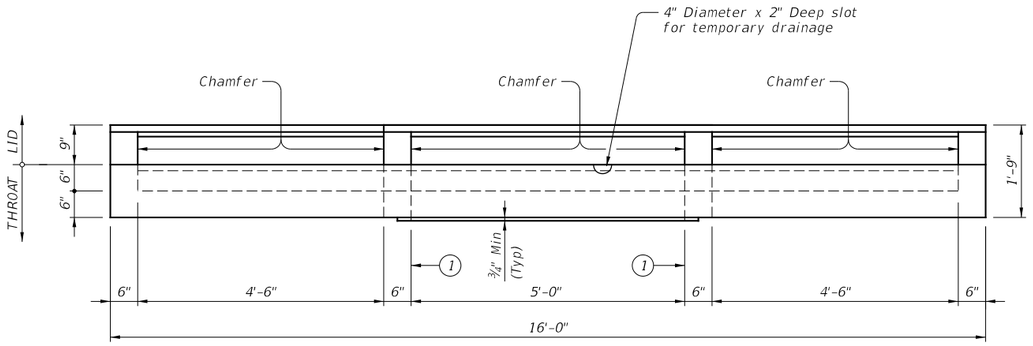
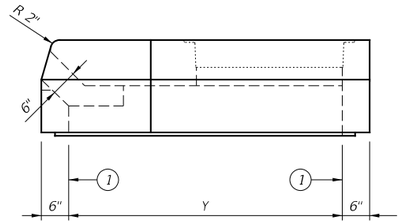


FRONT VIEW

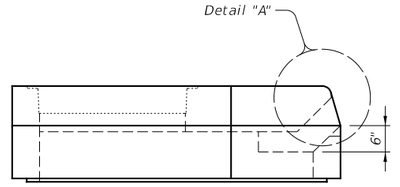
(Showning left and right extensions)



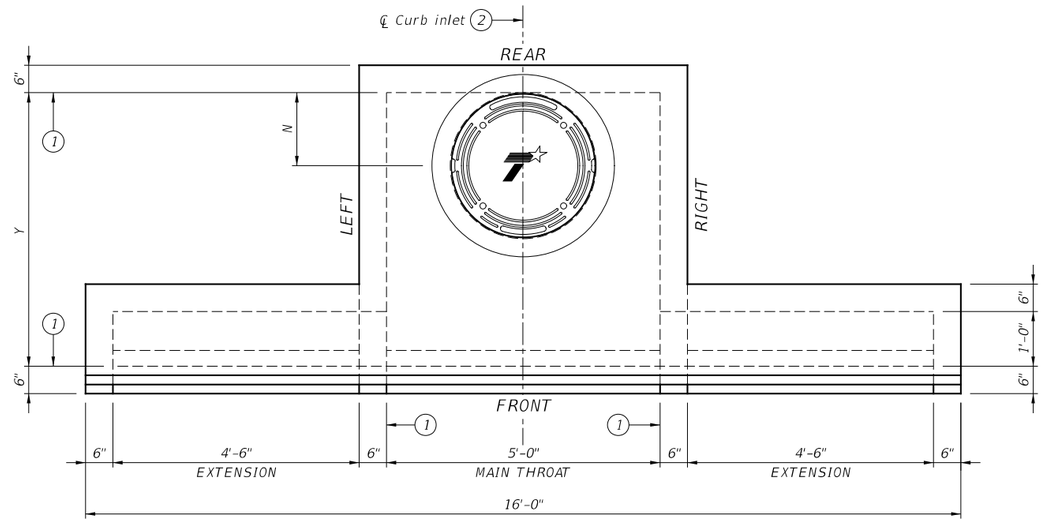
RIGHT VIEW

REAR VIEW

(Extensions not shown)



LEFT VIEW

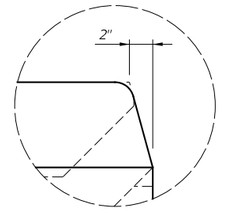


PLAN VIEW

(Showning left and right extensions)

(1) Matches inside face of wall of precast base or riser below inlet.

(2) Reference point is located where the ℄ of the main throat intersects the normal gutter line. See Curb and Gutter Transition Details for PCO Inlet (CGT-PCO) standard for more information.



DETAIL "A"

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: CD-PCO-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
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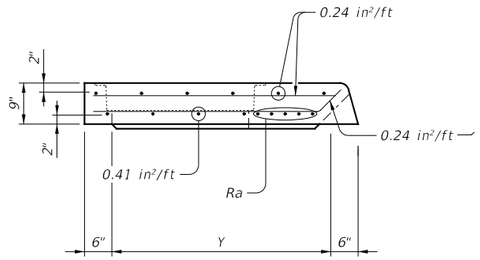
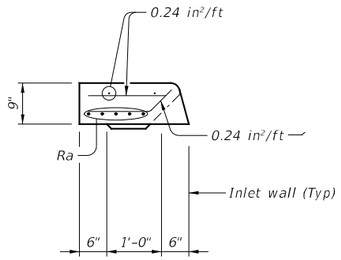
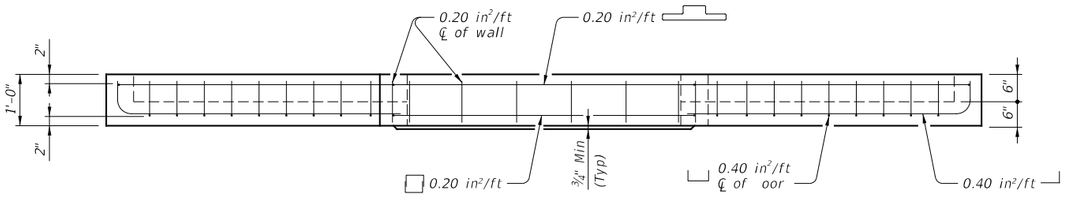


LID SECTION A-A

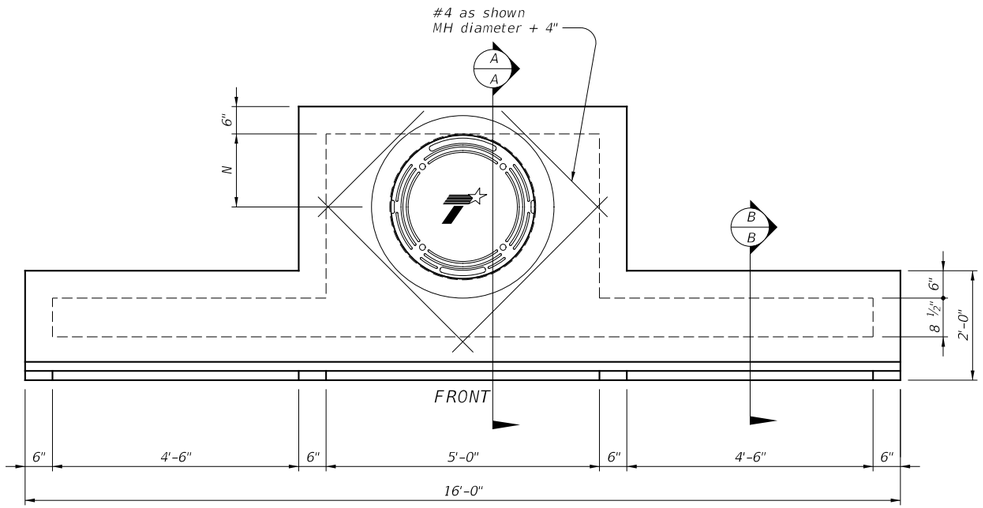


LID SECTION B-B



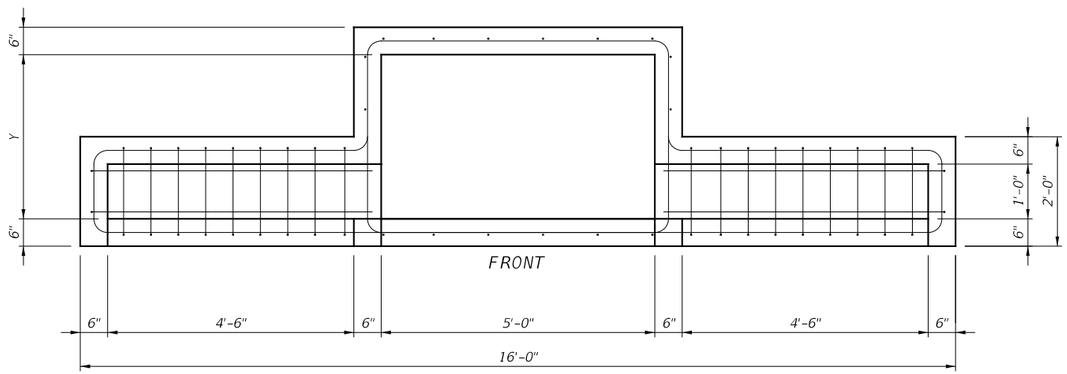
THROAT ELEVATION VIEW

(Showning left and right extensions)



LID PLAN VIEW

(Showning left and right extensions)



THROAT PLAN VIEW

(Showning left and right extensions)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Extensions may be right, left, both or none. Provide extensions as speci ed elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct tra c. Do not place in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

Size (Y)	N	MH Dia*	Ra
3'	9"	18"	(4) #5 Additional
4'	16"	32"	(4) #5 Additional
5'	16"	32"	(4) #5 Additional
6'	16"	32"	(4) #5 Additional

*Nominal ring and cover size.

HS20 LOADING SHEET 2 OF 2

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PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: CD-PCO-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0918	46	316	VA
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		160

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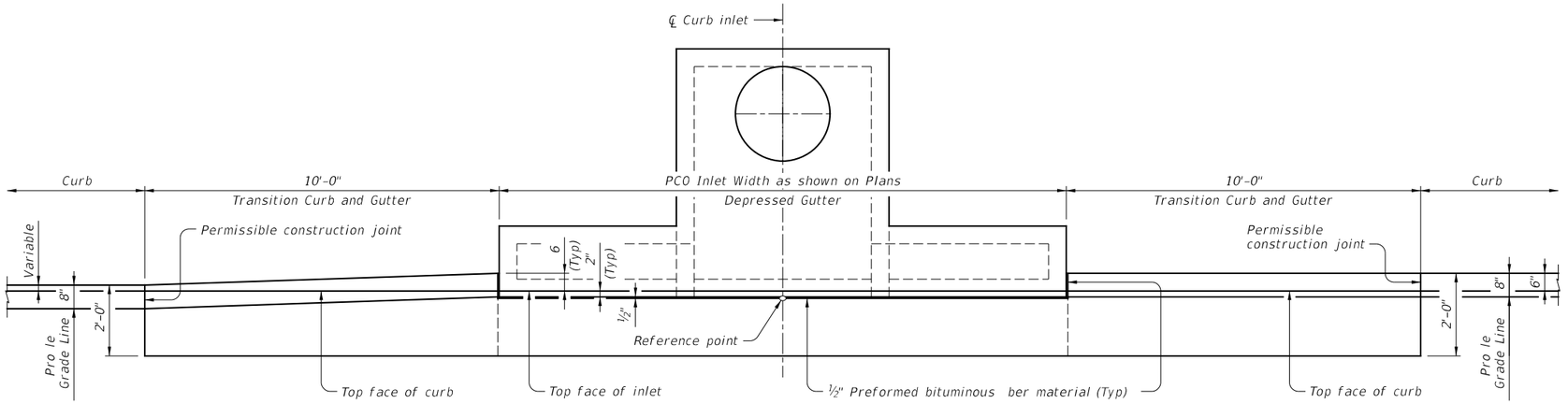
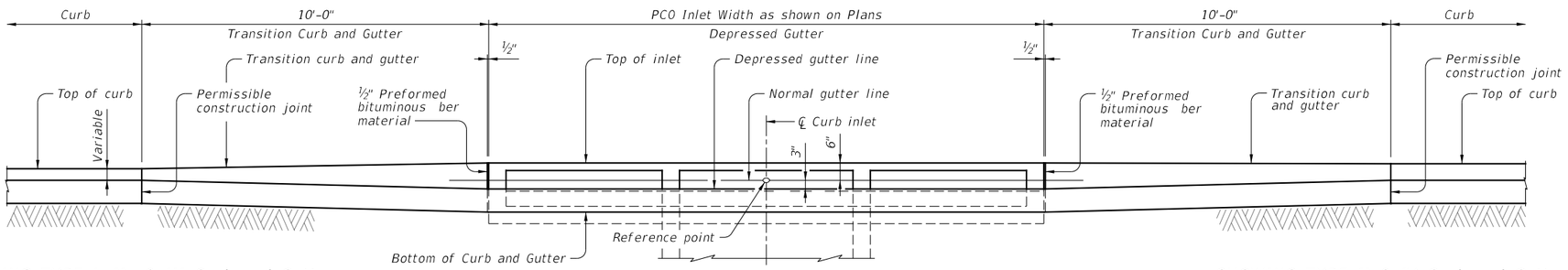
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CAD/4 - Design/Sheets/CD-CGT-PCO-23.dgn



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

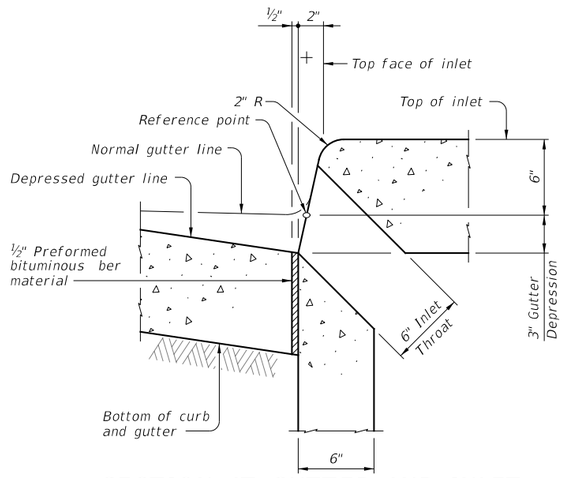
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

(Reinforcing steel not shown for clarity.)

CONSTRUCTION NOTES:

Align top face of curb with PCO Inlet as shown.

MATERIAL NOTES:

Provide ½" preformed bituminous ber material.

GENERAL NOTES:

Reference point is located where the ℄ of the main throat intersects the normal gutter line.

See Precast Curb Inlet Outside Roadway (PCO) standard for details and notes not shown.

See Concrete Curb and Curb and Gutter (CCCG-22) standard for details and notes not shown.

Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."

Preformed bituminous ber material is subsidiary to PCO Inlet.

Texas Department of Transportation

Bridge Division Standard

CURB AND GUTTER TRANSITION DETAILS FOR PCO INLET

CGT-PCO

FILE: CD-CGT-PCO-23.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
06-2023; Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		161

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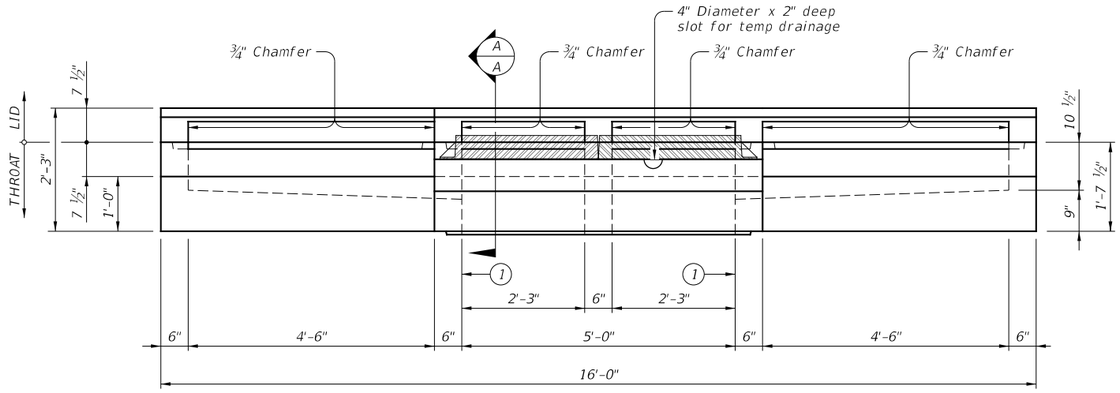
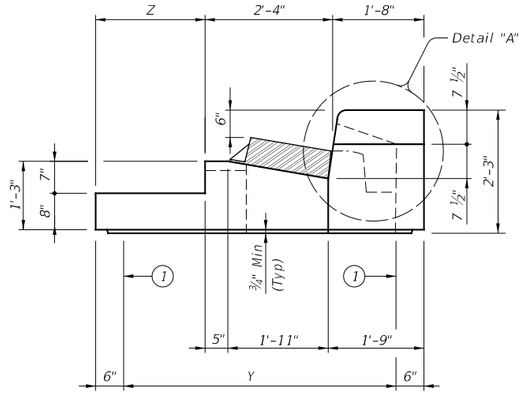
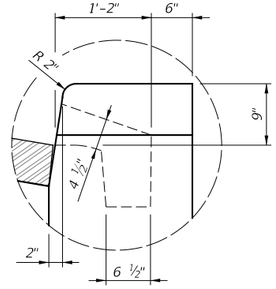


FRONT VIEW

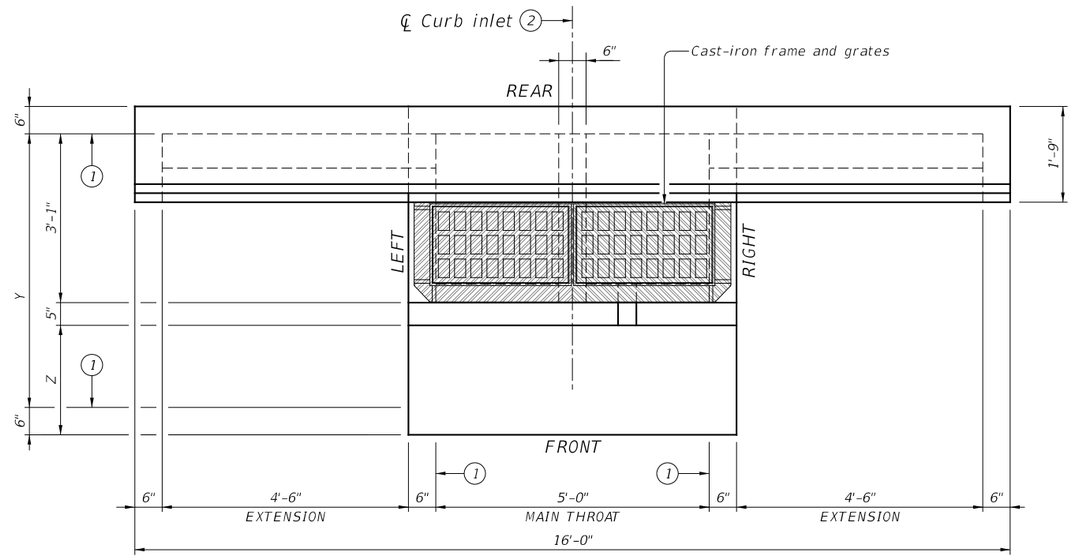
(Showing left and right extensions)



SECTION A-A



DETAIL "A"



PLAN VIEW

(Showing left and right extensions)

TABLE OF VARIABLE DIMENSIONS	
Size (Y)	Z
3'	0'
4'	1'
5'	2'
6'	3'

(1) Matches inside face of wall of precast base or riser below inlet.

(2) Reference point is located where the ℄ of the main throat intersects the normal gutter line. See Curb and Gutter Transition Details for PCO Inlet (CGT-PCO) standard for more information.

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

FILE: CD-PCU-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0918	46	316	VA
06-2023: Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		162

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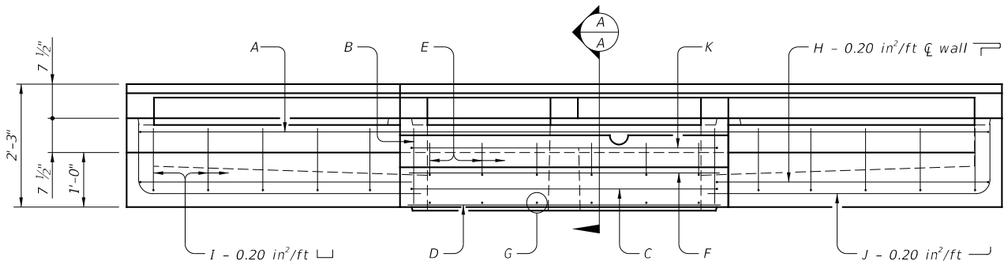
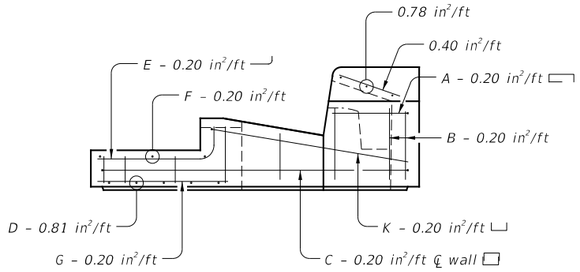
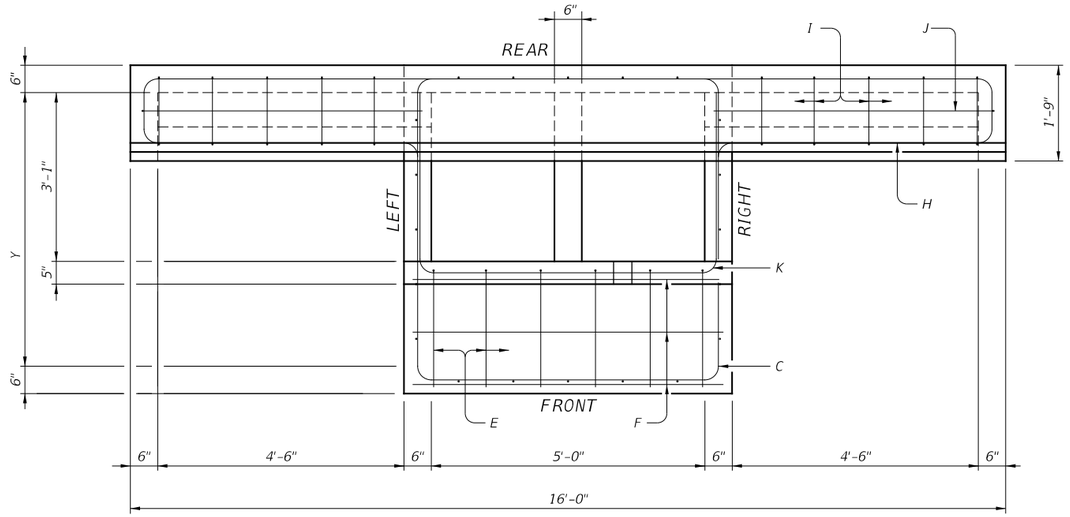


FRONT VIEW

(Showing left and right extensions)



SECTION A-A



PLAN VIEW

(Showing left and right extensions)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel from surface of concrete or lower outside shoulder.
4. Extensions may be right, left, both or none. Provide extensions as speci ed elsewhere in plans.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Top slab may employ a butt joint with dowels at the Contractor's option.
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Chamfer vertical edges on inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat is placed under roadway and intended for direct tra c. Inlet lid is not for direct tra c. Do not place Inlet lid in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 324 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes and Inlets" by type, size and extension placement. Extensions are subsidiary to inlet.

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

FILE: CD-PCU-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0918	46	316	VA
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	DAL	DENTON		163

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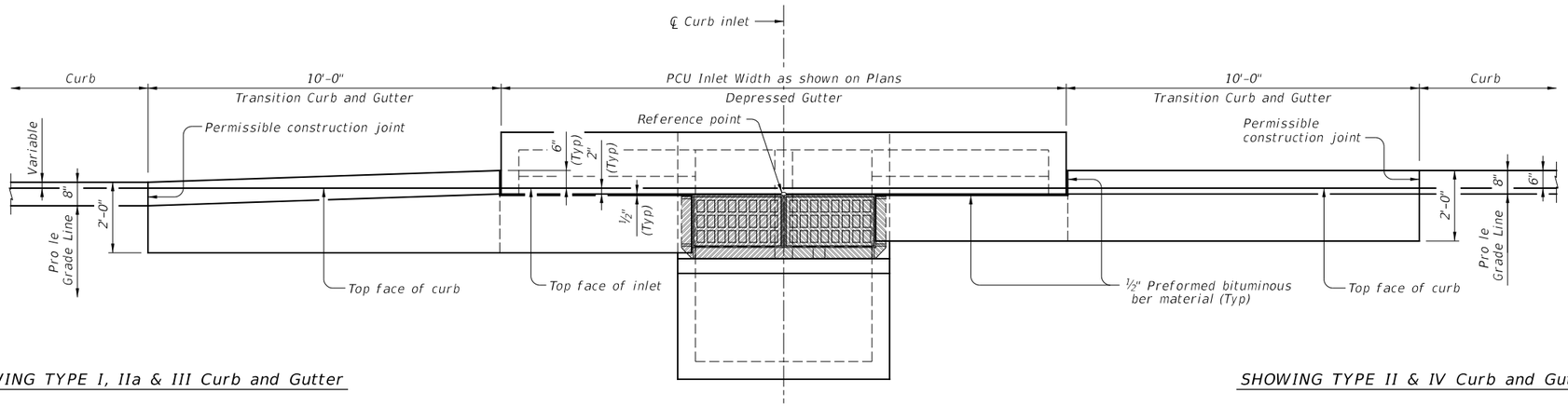
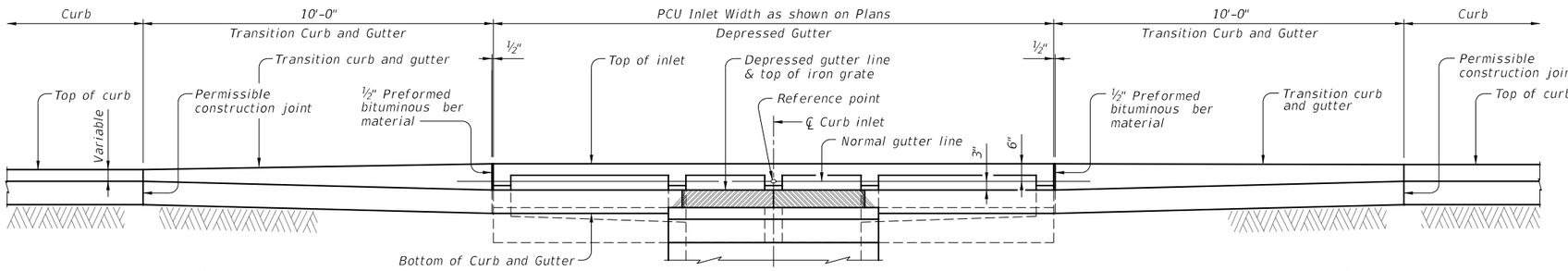


SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

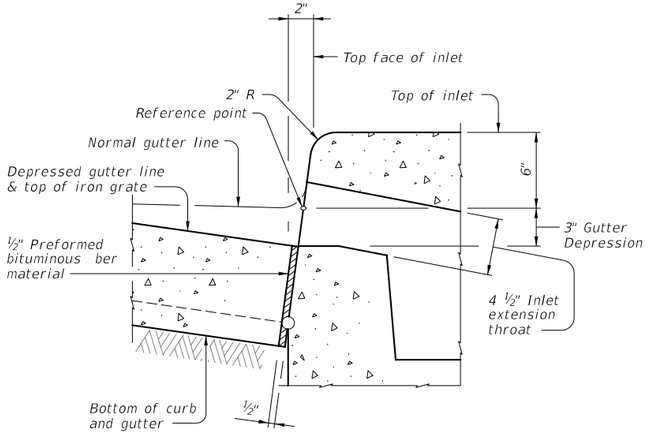
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

(Reinforcing steel not shown for clarity.)

CONSTRUCTION NOTES:
Align top face of curb with PCU Inlet as shown.

MATERIAL NOTES:
Provide ½" Preformed Bituminous Fiber Material.

GENERAL NOTES:
Reference point is located where the ℄ of the main throat intersects the normal gutter line.

See Precast Curb Inlet Under Roadway standard PCU for details and notes not shown.

See Concrete Curb and Curb and Gutter standard CCCG-22 for details and notes not shown.

Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."

Preformed Bituminous Fiber Material is subsidiary to PCU Inlet.

Texas Department of Transportation

Bridge Division Standard

CURB AND GUTTER TRANSITION DETAILS FOR PCU INLET

CGT-PCU

FILE: CD-CGT-PCU-23.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
06-2023; Added reference point.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		164

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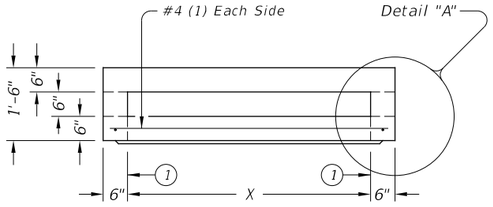
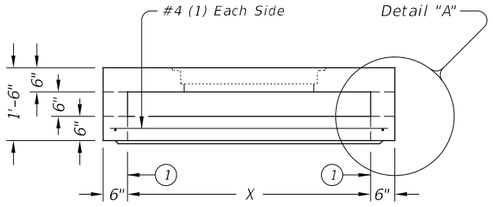
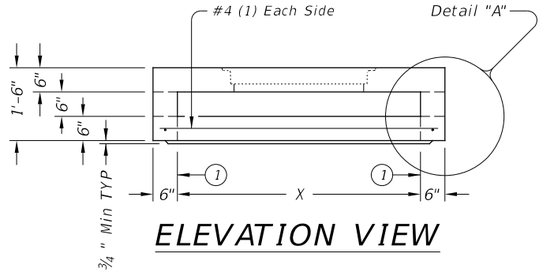
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CAD0/4 - Design/Sheets/CD-PAZD-20.dgn



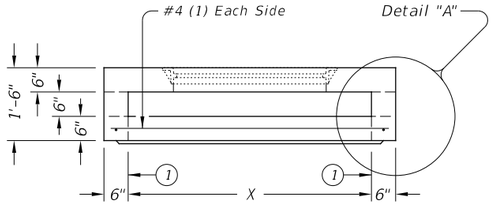
ELEVATION VIEW



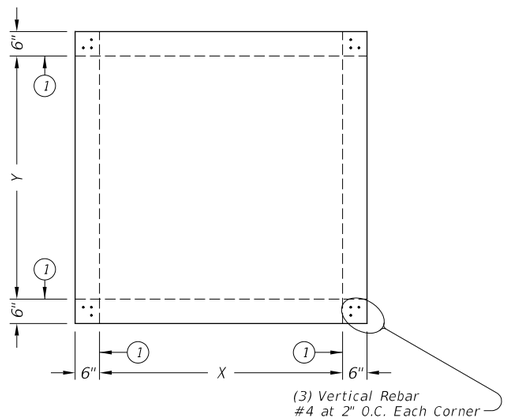
ELEVATION VIEW



ELEVATION VIEW



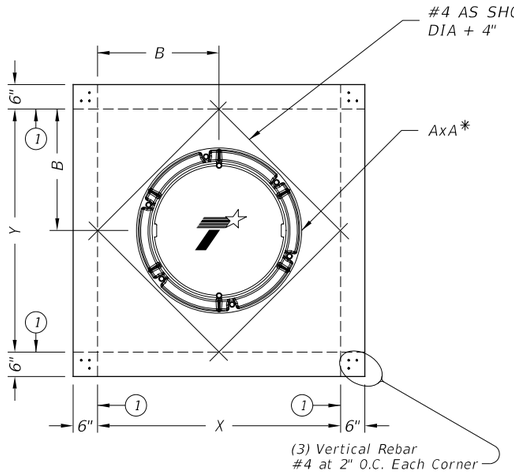
ELEVATION VIEW



PLAN VIEW

NO OPENINGS

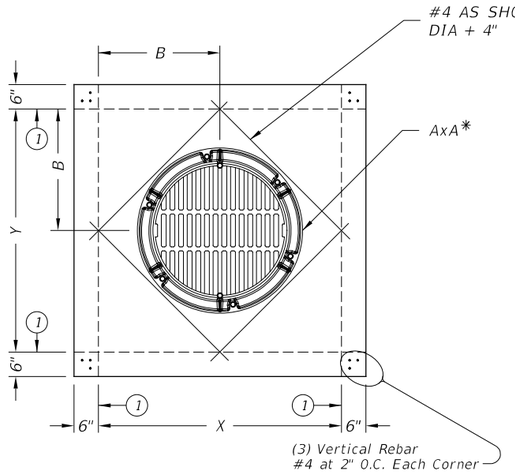
STYLE 'SL'



PLAN VIEW

32" DIA CAST-IN RING & COVER

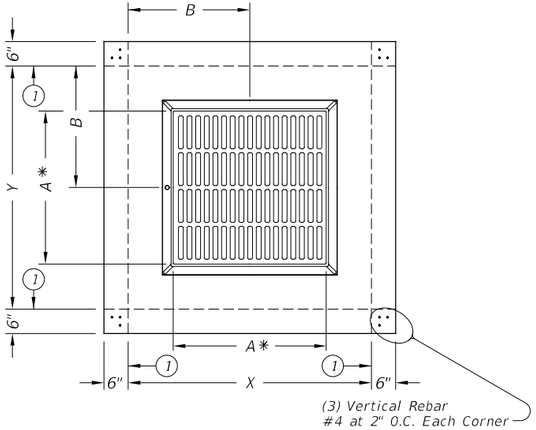
STYLE 'RC'



PLAN VIEW

32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW

CAST-IN FRAME & GRATE

STYLE 'FG'

(1) Matches inside face of wall of precast base or riser below inlet.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

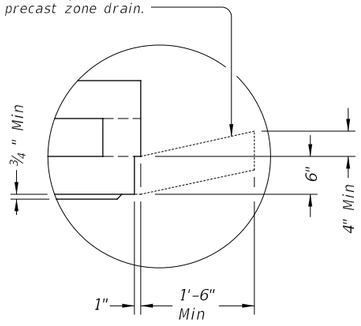
INSTALLATION NOTES:

1. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct tra c and may not be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

Style	Size (X x Y)	A x A *	B x B	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	n/a	n/a	0.37 in²/ft	0.37 in²/ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
SL	4'x4'	n/a	n/a	0.34 in²/ft	0.34 in²/ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	3'x3'	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	4'x4'	2'x2'	0.34 in²/ft	0.34 in²/ft
SL	5'x5'	n/a	n/a	0.43 in²/ft	0.43 in²/ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in²/ft	0.68 in²/ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft

* Nominal frame/grate or ring/cover size.

Texas Department of Transportation

Bridge Division Standard

PRECAST AREA ZONE DRAIN

PAZD

FILE: CD-PAZD-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0918	46	316	VA
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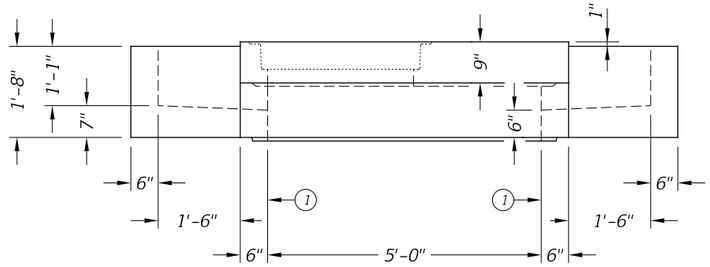
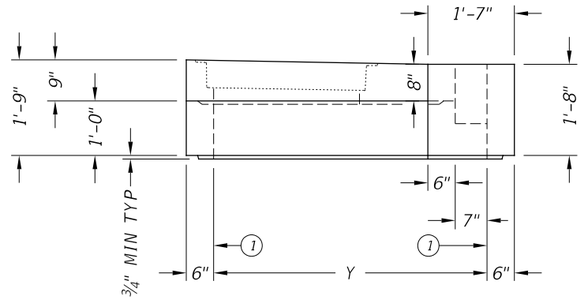
	DAL	DENTON		165

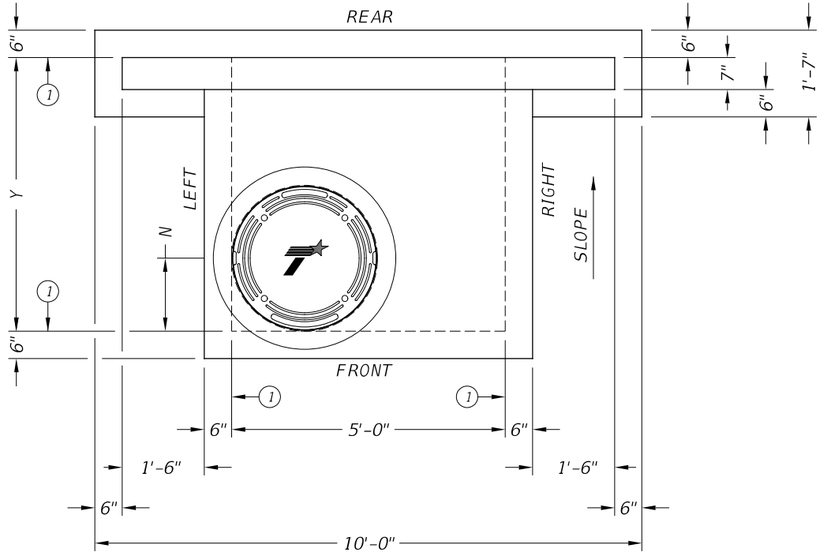


FRONT VIEW

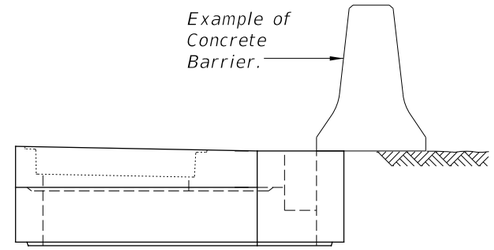


RIGHT VIEW

(1) Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW



BARRIER PLACEMENT DETAIL

(SHOWING EXAMPLE OF BARRIER AND BARRIER DRAIN)

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST MEDIAN BARRIER DRAIN

PMBD

FILE: CD-PMBD-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		166

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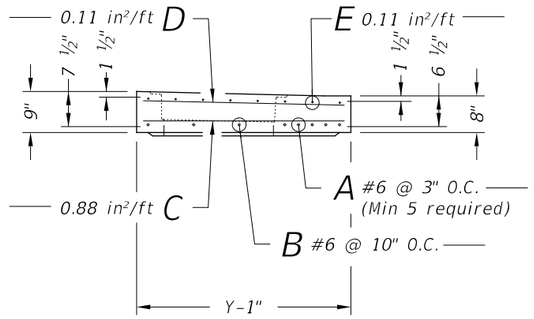
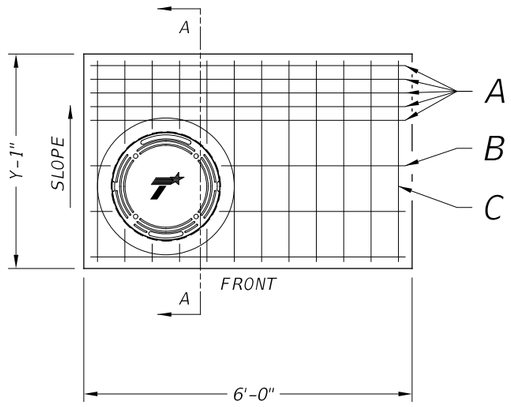
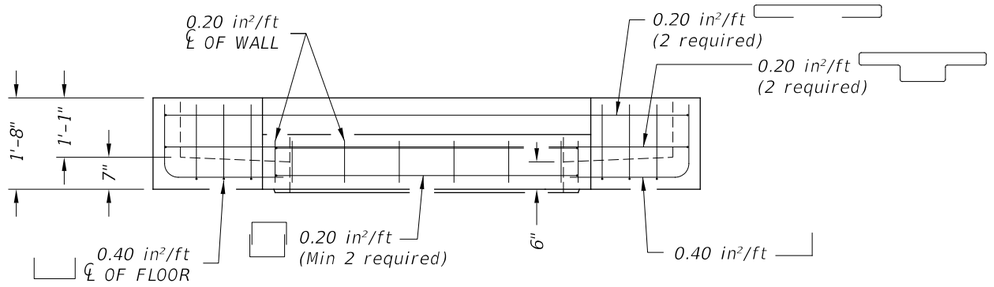


SECTION A-A

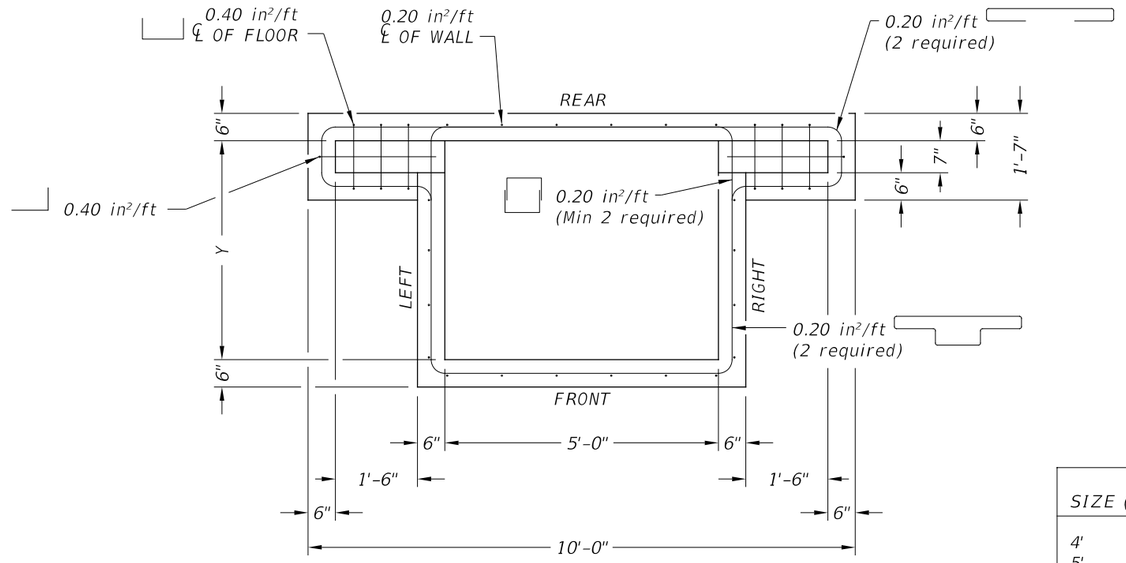


PLAN VIEW TOP SLAB

(BOTTOM MAT SHOWN)



FRONT VIEW



PLAN VIEW RISER

SIZE (Y)	MH DIA*	N
4'	24"	12"
5'	32"	16"
6'	32"	16"

*Nominal ring and cover size.

FABRICATION NOTES:
1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
4. Provide lifting devices in conformance with Manufacturer's recommendations.
5. Provide cast iron solid cover, unless noted otherwise elsewhere in plans.

INSTALLATION NOTES:
1. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
2. Do not grout rubber gasket joints without Manufacturer's recommendation.
3. When pinned precast median barrier is used, longitudinally adjust pin locations to avoid drilling into the PMBD inlet. When CIP median barrier is anchored to CRCP, transversely adjust anchorage bar to avoid con icting with the PMBD inlet.

GENERAL NOTES:
1. Designed according to ASTM C913.
2. Open area of throat = 756 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST MEDIAN BARRIER DRAIN

PMBD

FILE: CD-PMBD-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		167

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR1	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/29/23
	CSJ	0918-46-316	Station	39+82.62	Grnd. Elev.	534.41 ft
			Offset	11.68' LT	GW Elev.	504.41 ft

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
534.2			ASPHALT, 2 inches							
533.7			CONCRETE, 6 inches							
532.9			BASE, 10 inches							
532.4			FILL, CLAY; hard; brown, dark brown, gray; some gravel			12.0	28	15		P.P. = 4.5+, -#200=90.5
			SILT, hard; brown; with sand (ML)							P.P. = 4.5+
5		50 (4.75) 50 (4.25)				11.7				P.P. = 4.5+
						10.4	NP	NP		SPT MOD = 24, 37, 32 (69), -#200=84.9
524.4	10	50 (4) 50 (4.5)				16.4				Bag Sample
			SHALE, highly to completely weathered; soft; brown, gray							
519.4	15	50 (1.5) 50 (0.25)				14.9				Bag Sample
			SHALE, fresh; soft to very hard; gray, dark gray							
	20	50 (2) 50 (1)				16.8				Bag Sample
	25	37 (6) 50 (3)				21.2				Bag Sample
	30	50 (1.5) 50 (0.75)				13.9				P.P. = 4.5+; 30-35' %REC= 77; %RQD= 68
	35	50 (1.5) 50 (0.5)				415.4	17.9		130.0	Bag Sample

Remarks: -Northing/Easting: 7101210.8864, 2418818.5354
-seepage at 30 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR1	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/29/23
	CSJ	0918-46-316	Station	39+82.62	Grnd. Elev.	534.41 ft
			Offset	11.68' LT	GW Elev.	504.41 ft

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, fresh; soft to very hard; gray, dark gray							
	40	50 (4) 50 (1.5)								Bag Sample; 40-45' %REC= 99; %RQD= 43
	45	50 (0.25) 50 (0.25)			33.1	8.6			152.6	45-50' %REC= 15; %RQD= 0
	50	50 (0.25) 50 (0.25)								
	55	50 (0.25) 50 (0.25)								SPT MOD = 50=3" (50)
474.4	60	50 (0.25) 50 (0.25)	SANDSTONE, weakly to well cemented; soft to very hard; gray, dark gray; few to little shale seams			30.5				Bag Sample
	65	50 (0.25) 50 (0.25)								SPT MOD = 50=2" (50)
	70	50 (5) 50 (1.5)				16.3				Bag Sample

Remarks: -Northing/Easting: 7101210.8864, 2418818.5354
-seepage at 30 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 1 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		168

DATE: 12/1/2025 2:13:00 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-19.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR1	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/29/23
CSJ	0918-46-316	Station	39+82.62	Grnd. Elev.	534.41 ft
		Offset	11.68' LT	GW Elev.	504.41 ft

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
			SANDSTONE, weakly to well cemented; soft to very hard; gray, dark gray; few to little shale seams							
75		50 (0.25) 50 (0.25)								Bag Sample
454.4 80		50 (0.25) 50 (0.25)				26.0				Bag Sample
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7101210.8864, 2418818.5354
-seepage at 30 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR2	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/2/23
CSJ	0918-46-316	Station	42+22.56	Grnd. Elev.	528.02 ft
		Offset	0.31' LT	GW Elev.	525.02 ft

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
527.7			ASPHALT, 3.5 inches							
527.0			BASE, 8.5 inches; chemically treated							
			SAND, very loose; reddish brown, tan; silty (SM)			6.6				P.P. = 0.25, -#200=10.7
						8.5	NP	NP		SPT MOD = 29, 21, 12 (42), -#200=32.8
523.0 5		3 (6) 3 (6)				22.2				P.P. = 0.25
			SAND, very loose; reddish brown, tan; clayey (SC)							
						18.5	22	8		P.P. = 0.5, -#200=41.3
518.0 10		4 (6) 3 (6)				20.6				P.P. = 0.5, -#200=33.5
			SAND, loose; reddish brown, tan; silty (SM)							
15		5 (6) 5 (6)				14.9	NP	NP		P.P. = 2.0, -#200=23.2
509.0			SANDSTONE, weakly cemented; soft to very hard; gray, dark gray; occasional shale seams							
20		50 (0.25) 50 (0.5)				5.8				20-25' %REC= 21; %RQD= 0
25		21 (6) 46 (6)				7.0				25-30' %REC= 94; %RQD= 84
30		50 (2.75) 50 (0.5)				3.9				30-35' %REC= 88; %RQD= 9
35		50 (2.25) 50 (1.5)				15.5				35-40' %REC= 88; %RQD= 10

Remarks: -Northing/Easting: 7101451.0145, 2418824.8691
-seepage at 3 feet during drilling
-water measured at 10 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 2 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		169

DATE: 12/1/2025 1:39:52 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-20.dgn

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR2	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/2/23
	CSJ	0918-46-316	Station	42+22.56	Grnd. Elev.	528.02 ft
			Offset	0.31' LT	GW Elev.	525.02 ft

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
			SANDSTONE, weakly cemented; soft to very hard; gray, dark gray; occasional shale seams							
40		50 (2) 50 (2.25)								40-45' %REC= 72; %RQD= 62
487.0			SHALE, fresh; soft to very hard; gray, dark gray; occassional sandstone seams							
45		50 (5.25) 50 (4.75)				14.1				45-50' %REC= 94; %RQD= 91
50		50 (0.25) 50 (0.25)								50-55' %REC= 70; %RQD= 57
476.0			SANDSTONE, well cemented; hard to very hard; gray; trace shale seams							
55		50 (1.25) 50 (1.5)			66.6	13.8			140.6	55-60' %REC= 80; %RQD= 7
60		50 (0.75) 50 (0.25)				18.2				60-65' %REC= 80; %RQD= 5
65		50 (0.25) 50 (0.25)								65-70' %REC= 93; %RQD= 65
70		50 (1) 50 (0.25)			2593.3	11.5			144.6	70-75' %REC= 77; %RQD= 22

Remarks: -Northing/Easting: 7101451.0145, 2418824.8691
-seepage at 3 feet during drilling
-water measured at 10 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR2	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/2/23
	CSJ	0918-46-316	Station	42+22.56	Grnd. Elev.	528.02 ft
			Offset	0.31' LT	GW Elev.	525.02 ft

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
			SANDSTONE, well cemented; hard to very hard; gray; trace shale seams							
75		50 (0.5) 50 (0.5)								75-80' %REC= 5; %RQD= 0
448.0	80	50 (0.5) 50 (0.5)								
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7101451.0145, 2418824.8691
-seepage at 3 feet during drilling
-water measured at 10 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Kevin Kavadas Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 3 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		170

DATE: 12/1/2025 1:40:19 PM
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DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR3	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/28/23
	CSJ	0918-46-316	Station	74+47.80	Grnd. Elev.	527.25 ft
			Offset	3.65' RT	GW Elev.	517.25 ft

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
527.1			ASPHALT, 2 inches							
527.0			BASE, 1 inches; chemically treated							
			CLAY, soft; brown, reddish brown; trace ferrous nodules; with sand (CL)			13.8				P.P. = 4.5+
						17.3				P.P. = 2.75
5		9 (6) 8 (6)				20.1	27	12		P.P. = 0.75, -#200=75.8
521.3			SILT, stiff to very stiff; brown, light brown; trace ferrous nodules and oxide stains; with sand (ML)							
					30.5	15.8			133.3	P.P. = 2.0
10		10 (6) 10 (6)				15.3	NP	NP		P.P. = 2.75, -#200=59.3
15		23 (6) 22 (6)								P.P. = 1.75
507.3		17 (6) 13 (6)	SAND, slightly compact; brown; silty (SM)		15.2	16.2			130.5	P.P. = 0.5
25		17 (6) 15 (6)				29.2	NP	NP		SPT MOD = 14, 14, 18 (32), -#200=20.2
498.3			SHALE, slightly to moderately weathered; soft; brown, gray							
30		25 (6) 20 (6)				26.0				SPT MOD = 11, 21, 28 (49)
35		40 (6) 50 (3)				22.0				SPT MOD = 50=4" (50)

Remarks: -Northing/Easting: 7104675.8433, 2418808.2758
-seepage at 10 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR3	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/28/23
	CSJ	0918-46-316	Station	74+47.80	Grnd. Elev.	527.25 ft
			Offset	3.65' RT	GW Elev.	517.25 ft

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, slightly to moderately weathered; soft; brown, gray							
488.3			SANDSTONE, weakly cemented; very soft; light brown; trace shale seams							
40						40.6				40' Bag Sample
482.3		38 (6) 37 (6)	SHALE, fresh; very soft to soft; gray							
45										SPT MOD = 15, 25, 36 (61)
50		50 (6) 50 (5)				25.2				SPT MOD = 22, 43, 50=4" (93)
55		22 (6) 31 (6)								SPT MOD = 22, 41, 50=5.5"(91)
467.3		50 (1) 50 (0.25)	SHALE, fresh; soft to very hard; gray; trace sandstone seams		53.6	7.7			156.2	60-65' %REC= 100; %RQD= 72
65		50 (0.5) 50 (0.25)								65-70' %REC= 87; %RQD= 87
70		50 (5) 50 (5.5)			6.3	21.7			125.6	

Remarks: -Northing/Easting: 7104675.8433, 2418808.2758
-seepage at 10 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 4 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		171

DATE: 11/25/2025 3:14:24 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-22.dgn

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR3	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/28/23
	CSJ	0918-46-316	Station	74+47.80	Grnd. Elev.	527.25 ft
			Offset	3.65' RT	GW Elev.	517.25 ft

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, fresh; soft to very hard; gray; trace sandstone seams							
75		50 (1.5) 50 (3)				30.5				75' Bag Sample
447.2 80		50 (1) 50 (0.25)								80' Bag Sample
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7104675.8433, 2418808.2758
-seepage at 10 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR4	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/6/23
	CSJ	0918-46-316	Station	77+22.16	Grnd. Elev.	526.84 ft
			Offset	0.32' RT	GW Elev.	507.84 ft

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
526.6			CONCRETE, 2 inches							
526.5			BASE, 1 inches							
			CLAY, soft; brown, reddish brown, dark brown; trace oxide stains; sandy; silty (CL-ML) (CL)			6.5				P.P. = 4.5+
						14.9				P.P. = 2.5
5		7 (6) 5 (6)				14.7	17	5		P.P. = 1.75, -#200=53.5
						12.0				P.P. = 1.0
10		6 (6) 5 (6)				15.0	17	6		P.P. = 1.0, -#200=63.1
512.8			SAND, loose to slightly compact; brown, dark brown; trace cemented sand fragments; silty (SM)							
15		8 (6) 11 (6)				13.3				Bag Sample, -#200=53.3
20		7 (6) 6 (6)				18.3				SPT MOD = 7, 3, 5 (8)
						16.6	NP	NP		-#200=47.5
25		13 (6) 13 (6)								SPT MOD = 22, 22, 23 (45)
						17.6				
30		6 (6) 8 (6)								SPT MOD = 4, 6, 7 (13)
492.8			CLAY, soft; brown, dark brown; trace cemented sand fragments; sandy (CL)			23.4				
35		5 (6) 5 (6)								SPT MOD = 5, 4, 4 (8)

Remarks: -Northing/Easting:7104950.2204, 2418807.7487
-seepage at 19 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
PROFESSIONAL ENGINEER
LICENSED
TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 5 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		172

DATE: 11/25/2025 3:14:59 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-23.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR4	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/6/23
CSJ	0918-46-316	Station	77+22.16	Grnd. Elev.	526.84 ft
		Offset	0.32' RT	GW Elev.	507.84 ft

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
			CLAY, soft; brown, dark brown; trace cemented sand fragments; sandy (CL)			20.9	27	14		-#200=56.3
486.8	40	6 (6) 9 (6)	SHALE, fresh; soft to very hard; dark gray; trace sandstone seams							P.P. = 0.25
	45	50 (1) 50 (0.5)				33.6				P.P. = 0.5
	50	50 (0.25) 50 (0.25)								50-55' %REC= 83; %RQD= 58
	55	50 (3) 50 (2.25)				18.7				55-60' %REC= 48; %RQD= 48
	60	50 (0.5) 50 (1.5)								60-65' %REC= 100; %RQD= 89
	65	34 (6) 48 (6)		62.1	18.8				74.8	65-70' %REC= 92; %RQD= 92
	70	30 (6) 42 (6)							147.0	70-75' %REC= 93; %RQD= 90
455.8										

Remarks: -Northing/Easting:7104950.2204, 2418807.7487
-seepage at 19 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR4	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/6/23
CSJ	0918-46-316	Station	77+22.16	Grnd. Elev.	526.84 ft
		Offset	0.32' RT	GW Elev.	507.84 ft

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
			SANDSTONE, well cemented; very hard; gray, dark gray; trace shale seams							
	75	50 (0.25) 50 (0.5)			165.9	8.6			149.7	75-80' %REC= 27; %RQD= 11
446.8	80	50 (0.25) 50 (0.25)								
	85									
	90									
	95									
	100									
	105									

Remarks: -Northing/Easting:7104950.2204, 2418807.7487
-seepage at 19 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 6 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		173

DATE: 11/25/2025 3:15:26 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-24.dgn

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR5	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/27/23
	CSJ	0918-46-316	Station	79+25.55	Grnd. Elev.	527.54 ft
			Offset	3.38' RT	GW Elev.	517.54 ft

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
525.5			CLAY, medium to very stiff; reddish brown; trace ferrous nodules, sandy (CL)			14.7				P.P. = 2.0
			SILT, soft to stiff; brown, reddish brown; silty (ML)			12.3				P.P. = 2.5
5		8 (6) 10 (6)			11.8	12.4	NP	NP	132.7	P.P. = 3.5, -#200=51.3
										P.P. = 0.5
10		11 (6) 10 (6)				17.4	NP	NP		P.P. = 0.25, -#200=20.1
15		10 (6) 11 (6)				10.4				Bag Sample
20		13 (6) 11 (6)				17.1				P.P. = 0.25
506.5			SAND, slightly compact to compact; light brown, brown; poorly-graded with silt (SP-SM)							
25		16 (6) 14 (6)				19.5				SPT MOD = 5, 8, 14 (22) -#200=15.4
30		20 (6) 18 (6)				19.1	NP	NP		SPT MOD = 10, 27, 50=6" (77)
35		16 (6) 11 (6)				21.7				SPT MOD = 8, 22, 32 (54)

Remarks: -Northing/Easting: 7105153.5646, 2418812.8995
-seepage at 10 feet during drilling
-water measured at 10 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR5	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/27/23
	CSJ	0918-46-316	Station	79+25.55	Grnd. Elev.	527.54 ft
			Offset	3.38' RT	GW Elev.	517.54 ft

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
			SAND, slightly compact to compact; light brown, brown; poorly-graded with silt (SP-SM)							
40		16 (6) 14 (6)				20.2	NP	NP		SPT MOD = 6, 8, 13 (21), -#200=6.3
45		13 (6) 10 (6)				16.1				Bag Sample
50		31 (6) 34 (6)								SPT MOD = 13, 23, 35 (58)
472.5		50 (3) 50 (1)	SHALE, fresh; very soft to hard; gray			18.7				Bag Sample
60		41 (6) 50 (6)								SPT MOD = 20, 33, 37 (70)
65		37 (6) 37 (6)								SPT MOD = 14, 24, 24 (48)
70		50 (2.5) 50 (3.5)				35.8				SPT MOD = 50=5.75" (50)

Remarks: -Northing/Easting: 7105153.5646, 2418812.8995
-seepage at 10 feet during drilling
-water measured at 10 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS MARK G. THOMAS 103791 LICENSED PROFESSIONAL ENGINEER

Mark G. Thomas TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 7 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		174

DATE: 11/25/2025 3:15:53 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-25.dgn

DRILLING LOG

3 of 3

WinCore Version 3.1

County	Denton	Hole	BR5	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/27/23
CSJ	0918-46-316	Station	79+25.55	Grnd. Elev.	527.54 ft
		Offset	3.38' RT	GW Elev.	517.54 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
			SHALE, fresh; very soft to hard; gray							
75		50 (1) 50 (1)				16.4				SPT MOD = 38, 50=3" (50)
447.5 80		50 (2) 50 (1.25)								SPT MOD = 43, 50=3" (50)
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7105153.5646, 2418812.8995
-seepage at 10 feet during drilling
-water measured at 10 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrera (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

1 of 3

WinCore Version 3.1

County	Denton	Hole	BR6	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/7/23
CSJ	0918-46-316	Station	91+39.10	Grnd. Elev.	528.42 ft
		Offset	2.59' RT	GW Elev.	509.42 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
528.1			ASPHALT, 3 inches							
527.9			BASE, 2.5 inches; chemically treated							
			CLAY, soft to stiff; light brown; few to some calcareous nodules, trace to few ferrous nodules; sandy (CL)			13.1				P.P. = 4.5+
524.4					46.3	11.8	26	12	128.0	P.P. = 4.5+, -#200=58.4
5		6 (6) 4 (6)	SAND, loose to slightly compact; light brown; clayey (SC)		23.7	7.8			124.0	P.P. = 3.75, -#200=55.2
						14.8				P.P. = 1.0
10		15 (6) 16 (6)				14.1	22	9		P.P. = 1.0, -#200=43.0
515.4			SAND, loose to dense; brown; trace to few gravel; poorly-graded (SP)							
15		50 (5) 50 (1.5)				24.1				Bag Sample, -#200=9.3
20		19 (6) 26 (6)				16.5	NP	NP		SPT MOD = 3, 11, 15 (26), -#200=8.3
25		23 (6) 26 (6)				25.0				SPT MOD = 2, 3, 10 (13)
30		27 (6) 23 (6)				23.0				SPT MOD = 3, 12, 23 (35)
35		5 (6) 6 (6)				21.7				SPT MOD = 18, 11, 12 (23)

Remarks: -Northing/Easting: 7106345.4360, 2418945.0837
-seepage at 19 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrera (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 4, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 8 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		175

DATE: 11/25/2025 3:16:21 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-26.dgn

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR6	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/7/23
	CSJ	0918-46-316	Station	91+39.10	Grnd. Elev.	528.42 ft
			Offset	2.59' RT	GW Elev.	509.42 ft

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
			SAND, loose to dense; brown; trace to few gravel; poorly-graded (SP)							
40		14 (6) 16 (6)				23.4	NP	NP		SPT MOD = 5, 12, 23 (35), -#200=8.0
483.4 45		50 (5) 50 (2.5)	SHALE, fresh; soft to hard; gray, dark gray; trace to few sandstone seams			12.0				Bag Sample
50		50 (3.25) 50 (3)				14.4				SPT MOD = 15, 27, 42 (69)
55		50 (4.5) 50 (3.25)				14.6				Bag Sample
60		50 (1.25) 50 (1)				135.0				60-65' %REC= 75; %RQD= 53
467.4			SANDSTONE, weakly to well cemented; hard to very hard; gray; trace shale seams							
65		50 (2) 50 (1)			67.9	11.2			140.0	65-70' %REC= 80; %RQD= 52
70		50 (0.5) 50 (0.25)			92.8	10.2			142.4	70-75' %REC= 0; %RQD= 0

Remarks: -Northing/Easting: 7106345.4360, 2418945.0837
-seepage at 19 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR6	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/7/23
	CSJ	0918-46-316	Station	91+39.10	Grnd. Elev.	528.42 ft
			Offset	2.59' RT	GW Elev.	509.42 ft

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
			SANDSTONE, weakly to well cemented; hard to very hard; gray; trace shale seams							
75		50 (0.25) 50 (0.25)								75-80' %REC=0; %RQD=0
448.4 80		50 (0.25) 50 (0.25)								
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7106345.4360, 2418945.0837
-seepage at 19 feet during drilling
-water measured at 19 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED PROFESSIONAL ENGINEER
SURVEYOR
TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 9 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		176

DATE: 11/25/2025 3:16:47 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-27.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR7	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/16/23
CSJ	0918-46-316	Station	94+21.77	Grnd. Elev.	527.90 ft
		Offset	5.49' LT	GW Elev.	514.90 ft

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
527.6			ASPHALT, 3 inches							
526.9			BASE, 9 inches; chemically treated							
			SILT, stiff; brown, reddish brown; sandy (ML)			10.6				
						12.5				P.P. = 3.75
5		11 (6) 9 (6)				14.6				P.P. = 1.5, -#200=15.3
519.9			SAND, loose to compact; brown, reddish brown, gray; silty (SM)			13.7	17	2		P.P. = 0.75, -#200=50.4
10		20 (6) 17 (6)				15.5				P.P. = 2.25
15		11 (6) 12 (6)				20.6				P.P. = 3.0, -#200=52.0
20		9 (6) 9 (6)				16.2				Bag sample
25		28 (6) 30 (6)				20.6	NP	NP		SPT MOD = 4, 3, 5 (8), -#200=40.7
30		15 (6) 16 (6)				22.9				SPT MOD = 11, 12, 11 (23)
35		20 (6) 28 (6)				18.9				SPT MOD = 7, 6, 7 (13)

Remarks: -Northing/Easting: 7106628.0755, 2418935.1176
-seepage at 13 feet during drilling
-water measured at 13 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR7	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/16/23
CSJ	0918-46-316	Station	94+21.77	Grnd. Elev.	527.90 ft
		Offset	5.49' LT	GW Elev.	514.90 ft

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
			SAND, loose to compact; brown, reddish brown, gray; silty (SM)							
40		28 (6) 24 (6)				15.5	NP	NP		SPT MOD = 18, 10, 24 (34), -#200=26.6
45		20 (6) 14 (6)								SPT MOD = 3, 2, 6 (8)
478.9			SAND, very loose; brown, reddish brown; poorly-graded (SP)							
50		3 (6) 4 (6)				20.2	NP	NP		SPT MOD = 6, 5, 9 (14), -#200=2.9
472.9		50 (1) 50 (0.25)	SHALE, fresh; hard to very hard; trace sandstone seams			57.5				SPT MOD = 50=4" (50)
60		50 (0.5) 50 (0.5)								60-65' %REC= 4; %RQD= 0
462.9		50 (2) 50 (0.25)	SANDSTONE, weakly to well cemented; very hard; reddish tan; trace shale			52.3				65-70' %REC=0; %RQD= 0
70		50 (0.25) 50 (0.25)								70-75' %REC=0; %RQD= 0

Remarks: -Northing/Easting: 7106628.0755, 2418935.1176
-seepage at 13 feet during drilling
-water measured at 13 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
PROFESSIONAL ENGINEER
TBPELS FIRM #12796

Mark G. Thomas

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 10 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		177

DATE: 11/25/2025 3:17:15 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-28.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR7	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/16/23
CSJ	0918-46-316	Station	94+21.77	Grnd. Elev.	527.90 ft
		Offset	5.49' LT	GW Elev.	514.90 ft

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
			SANDSTONE, weakly to well cemented; very hard; reddish tan; trace shale							
452.9		50 (0.25) 50 (0.25)								

Remarks: -Northing/Easting: 7106628.0755, 2418935.1176
-seepage at 13 feet during drilling
-water measured at 13 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR8	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/10/23
CSJ	0918-46-316	Station	97+42.08	Grnd. Elev.	527.27 ft
		Offset	0.63' RT	GW Elev.	512.27 ft

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
527.0			ASPHALT, 3 inches							
			BASE, 18 inches; chemically treated							
525.5			CLAY, soft to stiff; dark brown; with sand (CL)			17.5			126.0	P.P. = 4.5+
					23.9	18.3			127.4	P.P. = 2.75
5		4 (6) 5 (6)				17.9				P.P. = 1.5, -#200=69.1
					15.1	18.2	21	8	127.0	P.P. = 2.25, -#200=73.7
517.3		5 (6) 5 (6)				15.3				P.P. = 2.25
10			SAND, loose ; brown; clayey (SC)							
15		7 (6) 8 (6)				17.9				P.P. = 0.25, -#200=46.3
508.3			CLAY, soft; brown; sandy (CL)							
20		10 (6) 13 (6)				19.9	23	11		P.P. = 0.25, -#200=62.8
25		17 (6) 18 (6)				21.2				P.P. = 0.25
498.3			SAND, dense; dark brown; silty; clayey (SC-SM)							
30		37 (6) 45 (6)				16.7	18	5		P.P. = 1.0, -#200=36.0
495.3			SAND, compact; reddish brown, tan; poorly-graded with silt (SP-SM)							
35		23 (6) 22 (6)				19.6				SPT MOD = 6, 12, 9 (21)

Remarks: -Northing/Easting: 7106948.4022, 2418941.2348
-seepage at 15 feet during drilling
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 11 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		178

DATE: 11/25/2025 3:17:42 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-29.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR8	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/10/23
CSJ	0918-46-316	Station	97+42.08	Grnd. Elev.	527.27 ft
		Offset	0.63' RT	GW Elev.	512.27 ft

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
			SAND, compact; reddish brown, tan; poorly-graded with silt (SP-SM)							
40		23 (6) 40 (6)				15.8	NP	NP		SPT MOD = 13, 24, 17 (41), -#200=9.1
45		28 (6) 23 (6)				19.7				SPT MOD = 16, 26, 46 (72)
478.3										
50		50 (3) 50 (1)	SHALE, fresh; soft to very hard; dark gray; occassional sandstone seams			20.4				50' Bag Sample
55		50 (0.25) 50 (0.25)								55' Bag Sample
467.3		50 (1) 50 (0.5)	SANDSTONE, weakly cemented; hard to very hard; gray							60-65' %RED= 0; %RQD= 0
65		50 (0.25) 50 (0.25)								65-70' %RED= 0; %RQD= 0
70		50 (0.25) 50 (0.25)								70-75' %RED= 0; %RQD= 0

Remarks: -Northing/Easting: 7106948.4022, 2418941.2348
-seepage at 15 feet during drilling
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR8	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/10/23
CSJ	0918-46-316	Station	97+42.08	Grnd. Elev.	527.27 ft
		Offset	0.63' RT	GW Elev.	512.27 ft

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
			SANDSTONE, weakly cemented; hard to very hard; gray							
75		50 (0.25) 50 (0.25)								
447.3										
80		50 (0.25) 50 (0.25)								SPT MOD = 50=1.0" (50)
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7106948.4022, 2418941.2348
-seepage at 15 feet during drilling
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER

Mark G. Thomas

TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 12 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		179

DATE: 11/25/2025 3:18:08 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-30.dgn

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR9	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/15/23
	CSJ	0918-46-316	Station	99+51.94	Grnd. Elev.	527.68 ft
			Offset	1.14' RT	GW Elev.	507.68 ft

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
527.4			ASPHALT, 4 inches							
526.7			BASE, 8 inches; chemically treated							
			SAND, slightly compact; tan, brown; clayey (SC)			12.4				P.P. = 4.5+
						11.6	24	11		P.P. = 4.5+, -#200=43.0
522.7	5	14 (6) 13 (6)				9.5				P.P. = 3.5, -#200=30.7
			CLAY, soft to very stiff; reddish brown; trace to few calcareous nodules; sandy (CL)		69.0	13.0			120.0	P.P. = 4.5+
	10	8 (6) 10 (6)				16.1	29	13		P.P. = 4.5+, -#200=59.7
	15	10 (6) 12 (6)			13.8	15.9			135.0	P.P. = 1.0, -#200=58.7
507.7	20	36 (6) 50 (6)				16.6				P.P. = 1.0
			SAND, compact to dense; reddish tan, brown; some gravel; poorly-graded with silt (SP-SM)							
	25	24 (6) 29 (6)				22.5				SPT MOD = 2, 2, 7 (9), -#200=6.4
	30	36 (6) 22 (6)				23.7				SPT MOD = 5, 6, 9 (15)
492.7	35	22 (6) 18 (6)				16.5				SPT MOD = 5, 5, 7 (13)

Remarks: -Northing/Easting: 7107158.2626, 2418941.0905
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

DRILLING LOG

WinCore Version 3.1	County	Denton	Hole	BR9	District	Dallas
	Highway	Shady Shores Road	Structure	Bridge	Date	11/15/23
	CSJ	0918-46-316	Station	99+51.94	Grnd. Elev.	527.68 ft
			Offset	1.14' RT	GW Elev.	507.68 ft

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
			SAND, loose to compact; reddish tan, brown; some gravel; silty (SM)							
	40	28 (6) 23 (6)				21.2				SPT MOD = 14, 15, 43 (58)
	45	8 (6) 10 (6)				14.8	NP	NP		SPT MOD = 10, 50=5.5" (50), -#200=16.2
477.7	50		SHALE, fresh; very hard; dark gray; with sandstone seams			18.0				50' Bag Sample
	55	50 (0.25) 50 (0.25)				31.4				55' Bag Sample; 55-60' %REC= 0; %RQD= 0
	60	50 (0.25) 50 (0.25)								
466.7			SANDSTONE, weakly cemented; very hard; gray							
	65	50 (0.25) 50 (0.25)								SPT MOD = 50=1.5" (50)
	70	50 (0.25) 50 (0.25)								SPT MOD = 50=3.0" (50)

Remarks: -Northing/Easting: 7107158.2626, 2418941.0905
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025
STATE OF TEXAS
MARK G. THOMAS
103791
LICENSED
PROFESSIONAL ENGINEER
Mark G. Thomas
TBPELS FIRM #12796

GEOTEX ENGINEERING

Texas Department of Transportation

SHADY SHORES

BORING LOGS
BRIDGE

SHEET 13 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		180

DATE: 11/25/2025 3:18:35 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-31.dgn

DRILLING LOG

WinCore Version 3.1

County	Denton	Hole	BR9	District	Dallas
Highway	Shady Shores Road	Structure	Bridge	Date	11/15/23
CSJ	0918-46-316	Station	99+51.94	Grnd. Elev.	527.68 ft
		Offset	1.14' RT	GW Elev.	507.68 ft

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
			SANDSTONE, weakly cemented; very hard; gray							
75		50 (0.25) 50 (0.25)								SPT MOD = 50=2.75" (50)
447.7 80		50 (0.25) 50 (0.25)								SPT MOD = 50= 3.0" (50)
85										
90										
95										
100										
105										

Remarks: -Northing/Easting: 7107158.2626, 2418941.0905
-seepage at 20 feet during drilling
-water measured at 20 feet after 15 minutes
-SPT Modified with 170 lb hammer and 24 inch drop height

Driller: Octavio Herrerra (Geotex) Logger: Dylan McAden (Geotex) Organization: Geotex Engineering, LLC

December 1, 2025

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GEOTEX ENGINEERING

Texas Department of Transportation

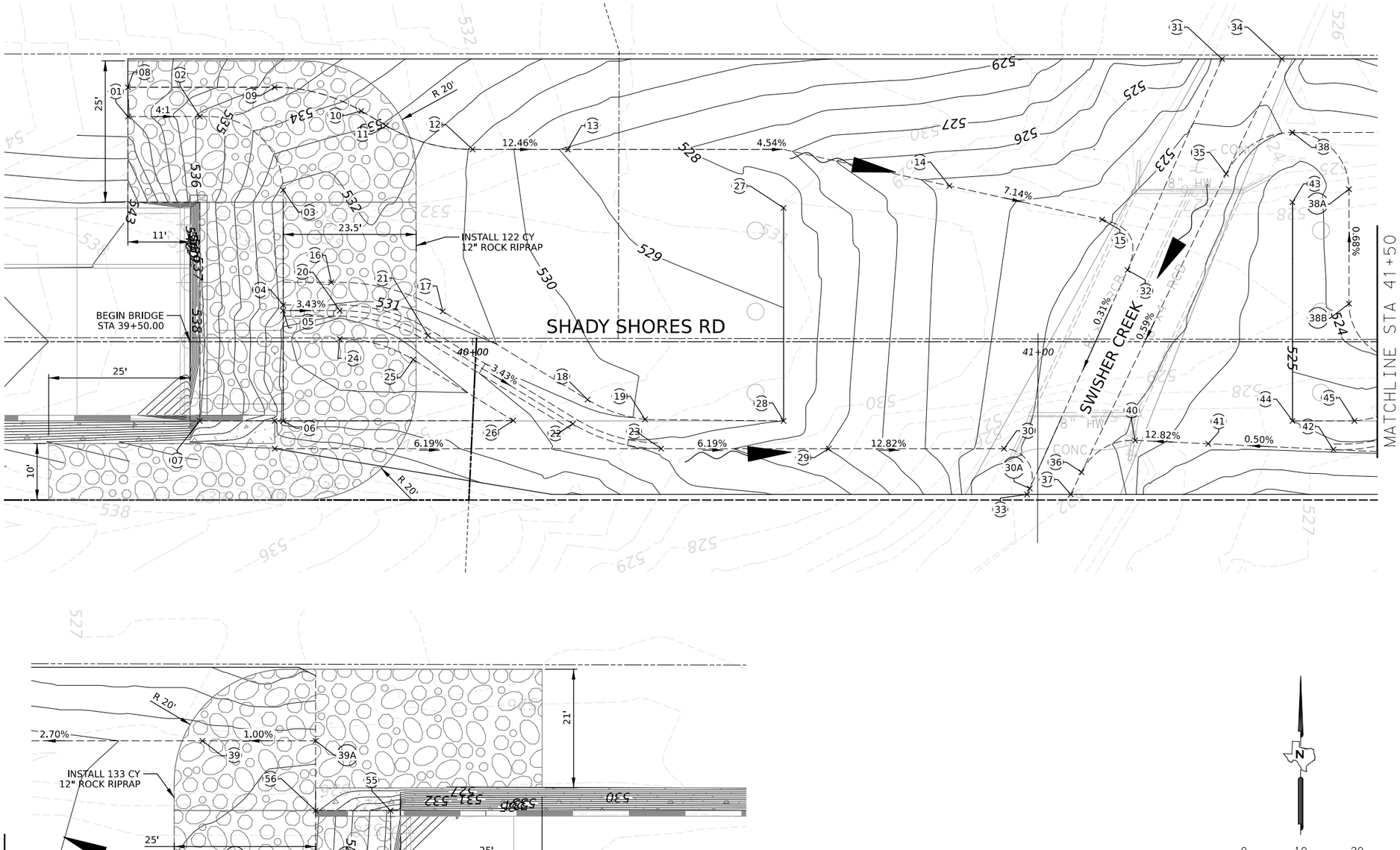
SHADY SHORES

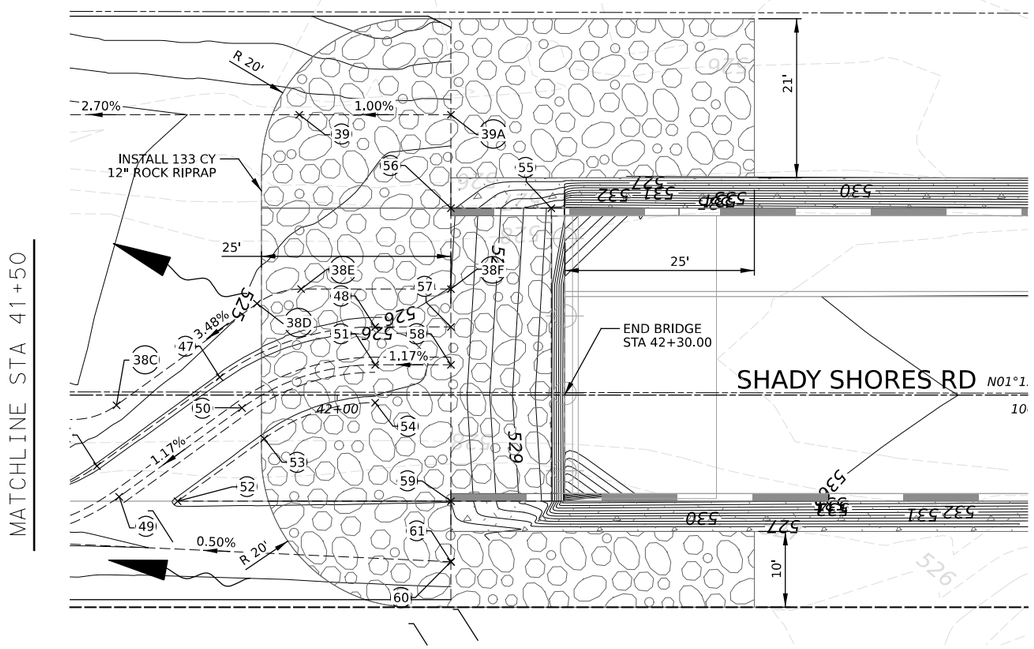
BORING LOGS
BRIDGE

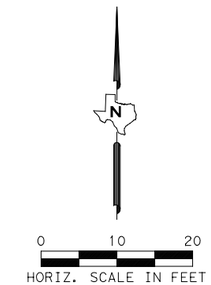
SHEET 14 OF 14

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO
DAL	DENTON		181

DATE: 11/25/2025 3:19:02 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GT-BLOG-32.dgn







* REFER TO GRADING POINT DATA SHEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

GRADING PLAN
SWISHER CREEK

SHEET 1 OF 1

CONT.	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		182

DATE: 11/25/2025 3:19:24 PM
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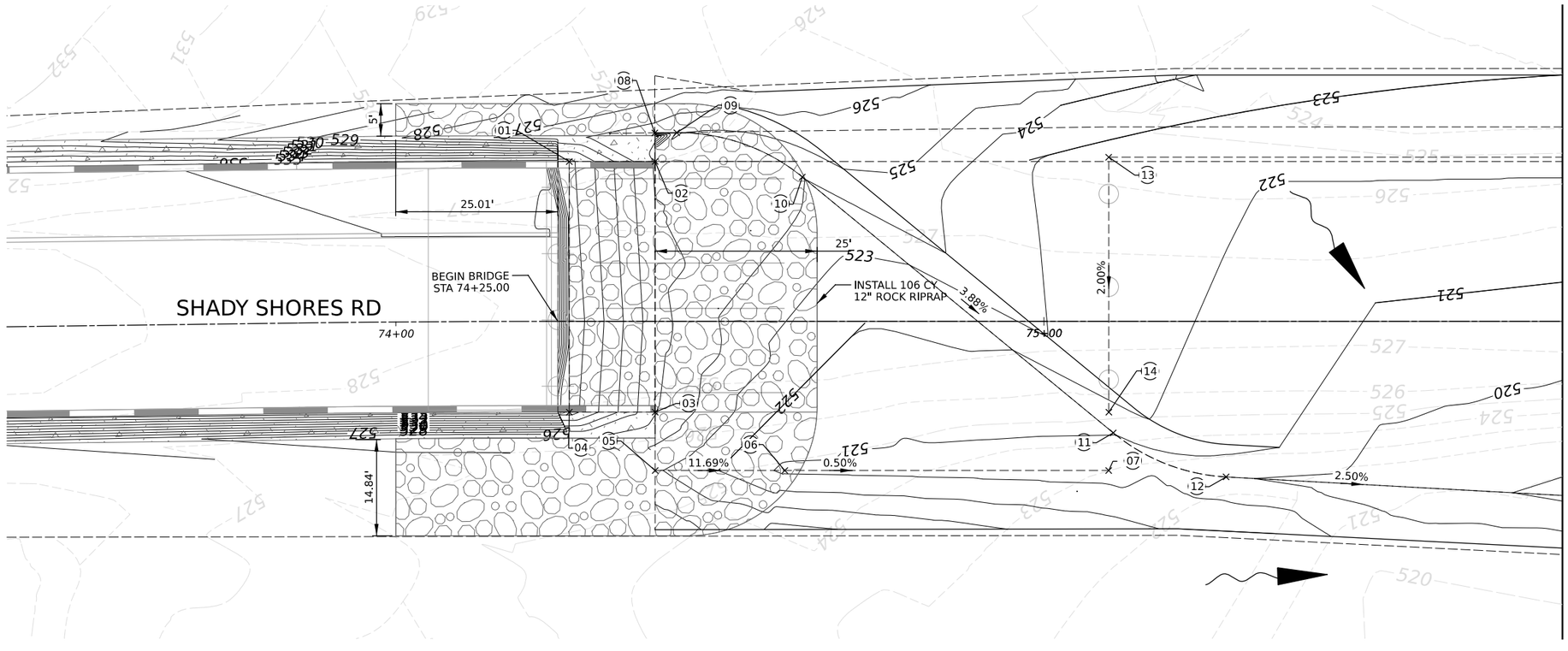

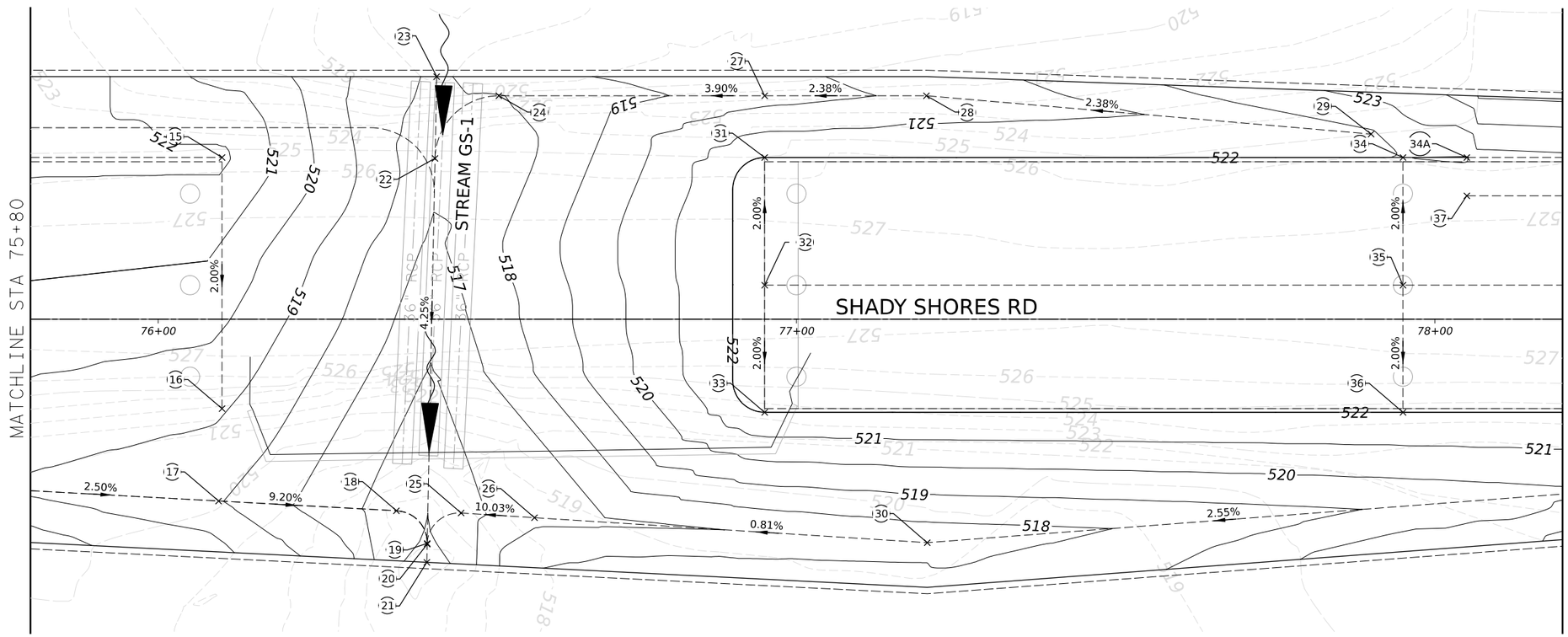

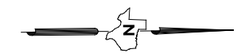

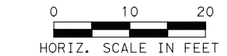

* REFER TO GRADING POINT DATA SHEET

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

GRADING PLAN
STREAM GS-1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		183

DATE: 11/25/2025 3:19:43 PM
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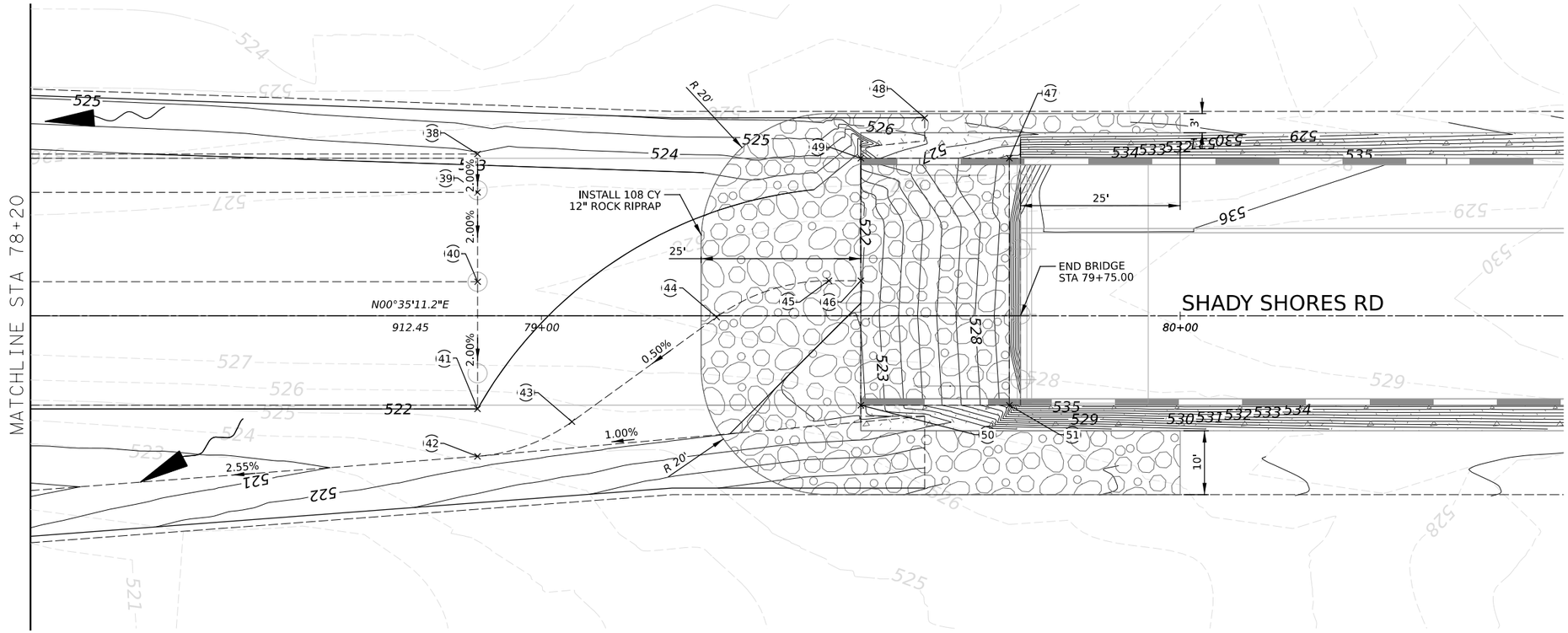
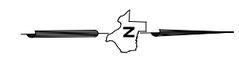




* REFER TO GRADING POINT DATA SHEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

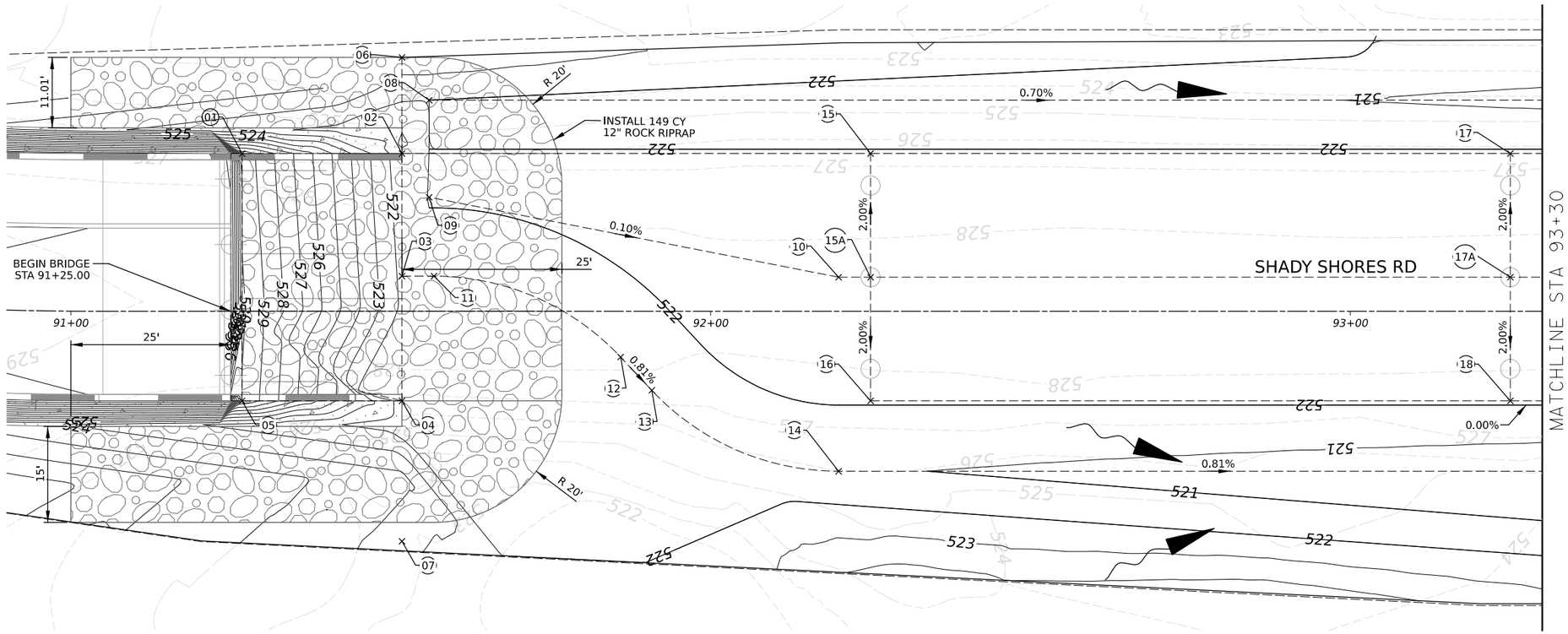
SHADY SHORES

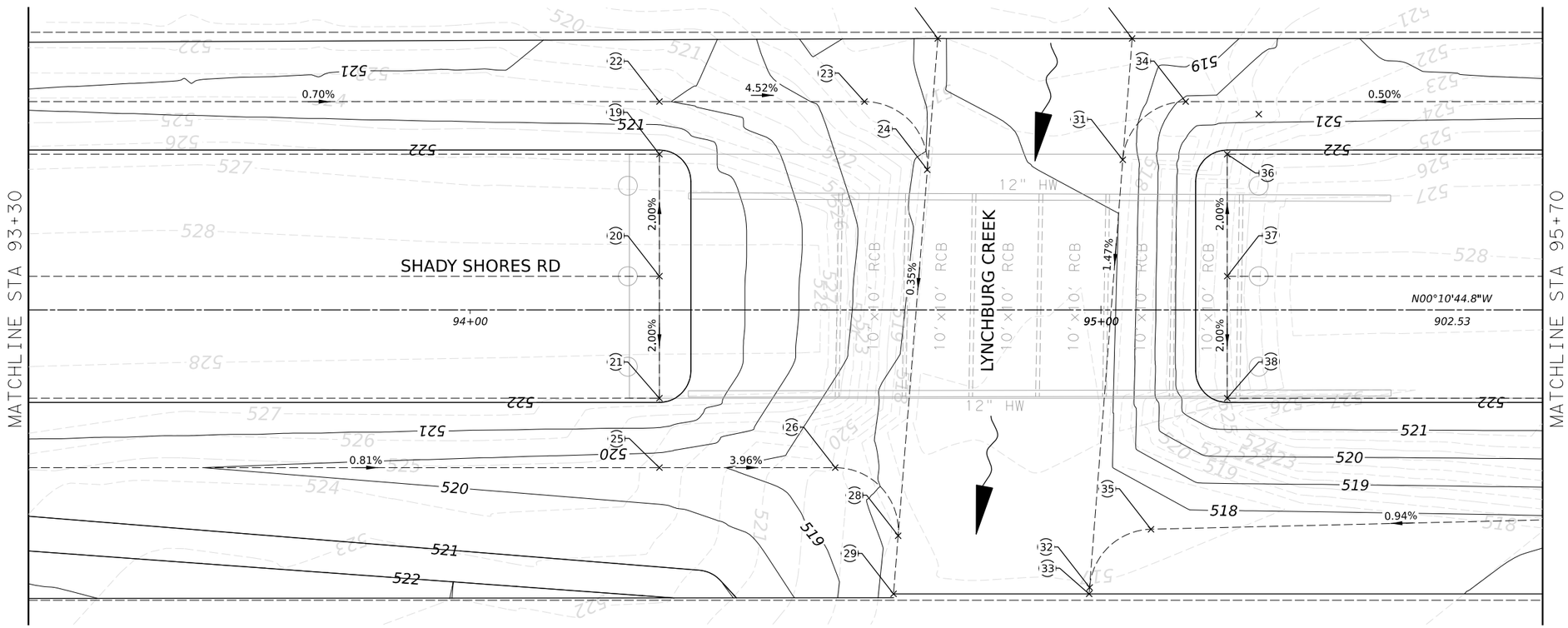
GRADING PLAN
STREAM GS-1

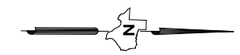
SHEET 2 OF 2

CONT.	SECT.	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		184

DATE: 11/25/2025 3:20:02 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GRAD-GS1-02







* REFER TO GRADING POINT DATA SHEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

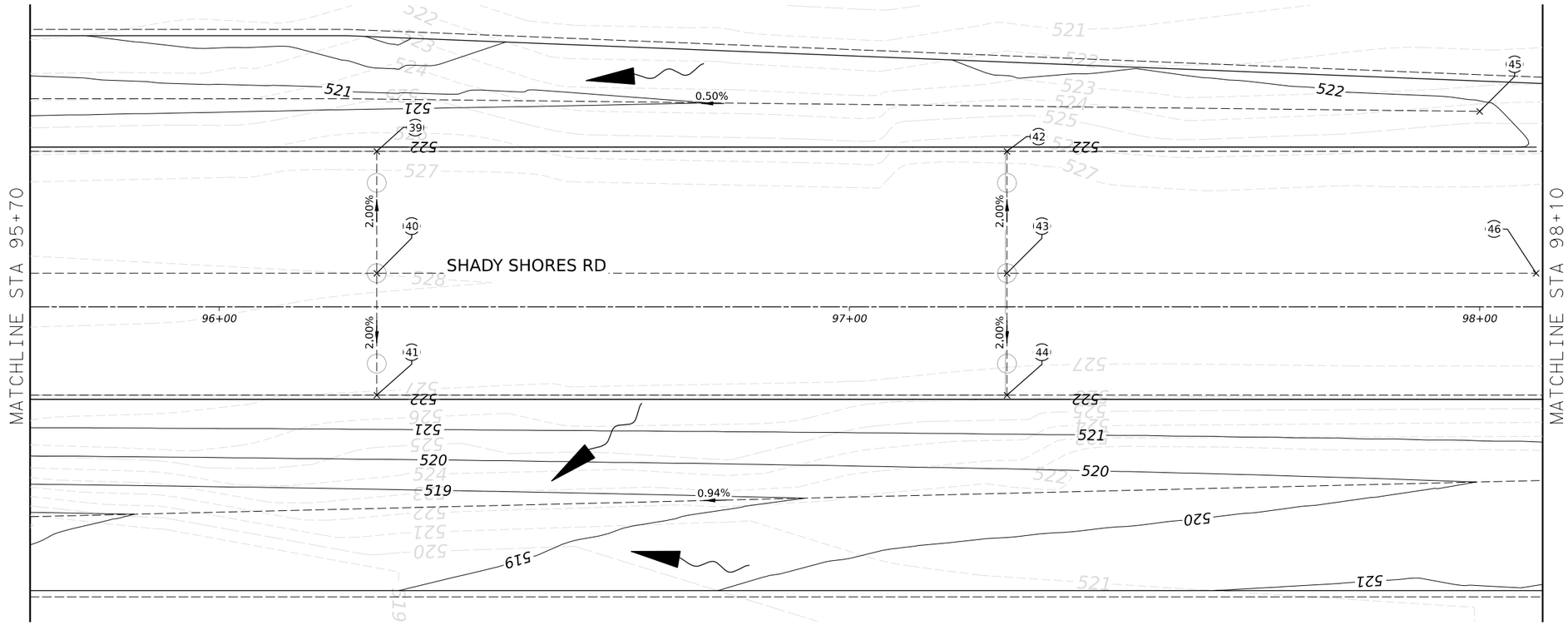
SHADY SHORES

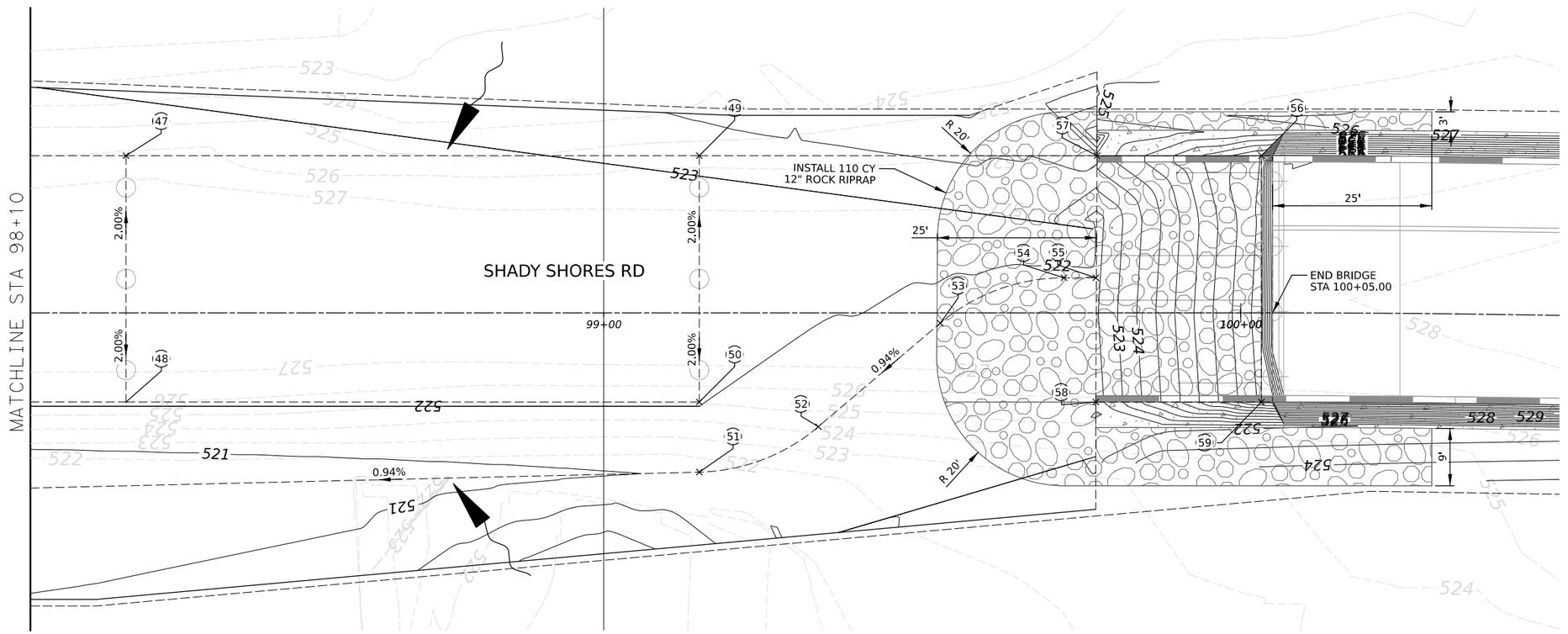
GRADING PLAN
LYNCHBURG CREEK

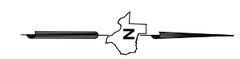
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		185

DATE: 11/25/2025 3:20:20 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GRAD-LYNCH-01







0 10 20
HORIZ. SCALE IN FEET

* REFER TO GRADING POINT DATA SHEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

GRADING PLAN
LYNCHBURG CREEK

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		186

DATE: 11/25/2025 3:20:38 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-GRAD-LYNCH-02

GRADING POINT TABLE - SWISHER CREEK GRADING LAYOUT SHEET 1 OF 1				
ID	DESCRIPTION	STATION	OFFSET	ELEV
01	RIPRAP TOE	39+39.05	39.82' LT	539.06
02	RIPRAP TOE	39+51.75	39.82' LT	535.82
03	RIPRAP TOE	39+66.50	26.82' LT	531.79
04	STORM DRAIN OUTFALL/DITCH BEGIN	39+66.50	6.50' LT	531.76
05	STORM DRAIN OUTFALL/DITCH BEGIN	39+66.50	5.50' LT	531.78
06	END OF RETAINING WALL	39+66.50	14.00' RT	530.61
07	RIPRAP TOE	39+51.75	14.00' RT	536.03
08	BEGIN DITCH	39+39.05	45.00' LT	538.97
09	DITCH PC	39+65.00	45.00' LT	535.73
10	DITCH PT	39+80.31	40.80' LT	533.55
11	DITCH PC	39+84.69	38.20' LT	532.91
12	DITCH PT	40+00.00	34.00' LT	530.90
13	DITCH VPI	40+16.82	34.00' LT	528.93
14	DITCH VPI	40+84.32	27.56' LT	524.64
15	DITCH PC	41+11.34	21.62' LT	522.67
16	DITCH PC	39+75.00	10.50' LT	531.64
17	DITCH PT	39+94.73	5.38' LT	531.38
18	DITCH PC	40+20.34	10.24' RT	530.36
19	DITCH PT	40+30.50	13.74' RT	529.91
20	DITCH PC	39+76.50	5.50' LT	530.95
21	DITCH PT	39+92.12	1.11' LT	530.38
22	DITCH PC	40+17.73	14.51' RT	529.36
23	DITCH PT	40+33.36	18.90' RT	528.79
24	DITCH PC	39+76.50	0.50' LT	531.63
25	DITCH PT	39+89.52	3.16' RT	531.38
26	DITCH VPI	40+07.18	13.93' RT	530.68
27	BERM	40+55.00	23.67' LT	529.00
28	BERM	40+55.00	14.00' RT	529.00
29	DITCH VPI	40+63.00	18.90' RT	526.96
30	DITCH PC	40+94.04	18.90' RT	523.39
30A	DITCH PT	40+98.55	25.95' RT	522.22
31	MATCH EXIST CREEK	41+32.55	50.00' LT	523.49
32	DITCH PT	41+15.84	12.68' LT	522.40
33	MATCH EXIST CREEK	40+98.08	27.00' RT	522.00
34	MATCH EXIST CREEK	41+43.13	50.00' LT	523.10
35	DITCH PC	41+33.27	29.67' LT	522.58
36	DITCH PC	41+07.70	23.07' RT	522.35
37	MATCH EXIST CREEK	41+05.79	27.00' RT	522.30
38	DITCH PCC	41+44.97	37.00' LT	523.05
38A	DITCH PT	41+55.00	26.96' LT	523.41
38B	DITCH PC	41+55.00	6.74' LT	523.35
38C	DITCH PT	41+70.86	1.33' RT	524.31
38D	DITCH PC	41+89.40	12.08' LT	525.11
38E	DITCH PT	41+95.24	14.00' LT	525.33
38F	STORM DRAIN OUTFALL/DITCH END	42+15.00	14.00' LT	526.01
39	DITCH VPI	41+94.99	37.00' LT	524.40
39A	DITCH END	42+15.00	37.00' LT	524.60
40	DITCH PT	41+17.16	17.44' RT	523.12
41	DITCH VPI	41+30.09	18.04' RT	524.77
42	DITCH PC	41+52.23	19.08' RT	524.89
43	BERM	41+45.00	24.67' LT	525.00
44	BERM	41+45.00	14.00' RT	525.00
45	DITCH PC	41+55.95	14.00' RT	525.93
46	DITCH PT	41+68.28	9.36' RT	526.11
47	DITCH PC	41+84.49	2.36' LT	526.11
48	DITCH PT	42+05.00	9.00' LT	526.11
49	DITCH PT	41+71.21	13.42' RT	525.12
50	DITCH PC	41+87.42	1.69' RT	525.35
51	DITCH PT	42+05.00	4.00' LT	525.57
52	DITCH VPI	41+78.93	14.00' RT	526.11
53	DITCH PC	41+90.35	5.74' RT	526.11
54	DITCH PT	42+05.00	1.00' RT	526.11
55	RIPRAP TOE	42+28.25	24.67' LT	530.22
56	BEGIN OF RETAINING WALL	42+15.00	24.67' LT	525.80
57	STORM DRAIN OUTFALL/DITCH END	42+15.00	9.00' LT	526.11
58	STORM DRAIN OUTFALL/DITCH END	42+15.00	4.00' LT	526.21
59	BEGIN OF RETAINING WALL	42+15.00	14.00' RT	526.01
60	RIPRAP TOE	42+28.25	14.00' RT	530.43
61	DITCH END	42+15.00	22.00' RT	525.20

GRADING POINT TABLE - STREAM GS-1 GRADING LAYOUT SHEET 1 OF 2				
ID	DESCRIPTION	STATION	OFFSET	ELEV
01	RIPRAP TOE	74+26.75	24.67' LT	529.30
02	END OF RETAINING WALL	74+40.00	24.67' LT	524.90
03	END OF RETAINING WALL	74+40.00	14.00' RT	252.09
04	RIPRAP TOE	74+26.75	14.00' RT	529.50
05	BEGIN DITCH	74+40.00	23.00' RT	523.14
06	DITCH VPI	74+60.00	23.00' RT	520.81
07	END DITCH	75+09.98	23.00' RT	520.56
08	BEGIN DITCH	74+39.95	29.07' LT	525.48
09	DITCH PC	74+43.34	29.11' LT	525.04
10	DITCH PT	74+62.72	22.27' LT	524.25
11	DITCH PC	75+10.68	17.20' RT	521.02
12	DITCH PT	75+28.10	24.00' RT	520.11
13	BERM	75+09.98	25.34' LT	522.20
14	BERM	75+10.00	14.00' RT	521.48
15	BERM	76+10.00	25.34' LT	522.20
16	BERM	76+10.00	14.00' RT	519.09
17	DITCH VPI	76+09.47	28.47' RT	518.07
18	DITCH PC	76+37.33	30.00' RT	515.50
19	DITCH PT	76+42.14	35.10' RT	514.80
20	DITCH PC	76+42.14	35.23' RT	514.79
21	MATCH EXIST CREEK	76+42.08	38.07' RT	514.67
22	DITCH PC	76+43.37	25.20' LT	517.36
23	MATCH EXIST CREEK	76+43.63	38.00' LT	517.90
24	DITCH PT	76+53.37	35.00' LT	517.96
25	DITCH PT	76+47.46	30.34' RT	515.60
26	DITCH VPI	76+58.95	31.08' RT	516.76
27	DITCH VPI	76+95.00	35.00' LT	519.58
28	DITCH PI/VPI	77+20.35	35.00' LT	520.19
29	END DITCH	77+90.00	29.00' LT	521.85
30	DITCH PI/VPI	77+20.48	35.00' RT	517.26
31	BERM	76+95.00	25.34' LT	522.00
32	BERM	76+95.00	5.34' LT	522.10
33	BERM	76+95.00	14.58' RT	522.00
34	BERM	77+95.00	25.34' LT	522.00
34A	BEGIN DITCH	78+05.00	25.34' LT	521.97
35	BERM	77+95.00	5.34' LT	522.10
36	BERM	77+95.00	14.58' RT	522.00
37	BEGIN DITCH	78+05.00	19.34' LT	522.17

GRADING POINT TABLE - STREAM GS-1 GRADING LAYOUT SHEET 2 OF 2				
ID	DESCRIPTION	STATION	OFFSET	ELEV
38	END DITCH	78+89.98	25.34' LT	523.92
39	BERM	78+89.98	19.34' LT	522.17
40	BERM	78+90.00	5.34' LT	522.10
41	BERM	78+89.98	14.58' RT	522.00
42	DITCH PC	78+89.98	22.00' RT	521.59
43	DITCH PT	79+04.76	16.58' RT	521.67
44	DITCH PC	79+27.42	0.19' RT	521.81
45	DITCH PT	79+45.00	5.50' LT	521.90
46	STORM DRAIN OUTFALL/DITCH END	79+50.00	5.50' LT	521.93
47	RIPRAP TOE	79+73.25	24.67' LT	529.30
48	DITCH END	79+60.00	31.00' LT	526.76
49	BEGIN OF RETAINING WALL	79+50.00	24.67' LT	521.55
50	BEGIN OF RETAINING WALL	79+50.00	14.00' RT	521.76
51	RIPRAP TOE	79+73.25	14.00' RT	529.51

GRADING POINT TABLE - LYNCHBURG CREEK GRADING LAYOUT SHEET 1 OF 2				
ID	DESCRIPTION	STATION	OFFSET	ELEV
01	RIPRAP TOE	91+26.75	24.67' LT	529.69
02	END OF RETAINING WALL	91+51.75	24.67' LT	521.35
03	STORM DRAIN OUTFALL/DITCH BEGIN	91+51.75	5.50' LT	521.74
04	END OF RETAINING WALL	91+51.75	14.00' RT	521.57
05	RIPRAP TOE	91+26.75	14.00' RT	529.90
06	DITCH BEGIN	91+51.75	39.69' LT	523.67
07	DITCH BEGIN	91+51.75	35.94' RT	523.20
08	DITCH BEGIN	91+56.00	33.00' LT	522.00
09	DITCH BEGIN	91+56.00	17.84' LT	522.04
10	DITCH PI/VPI	92+20.00	5.34' LT	522.10
11	DITCH PC	91+56.75	5.50' LT	521.70
12	DITCH PT	91+85.94	7.15' RT	521.43
13	DITCH PC	91+90.81	12.35' RT	521.38
14	DITCH PT	92+20.00	25.00' RT	521.11
15	BERM	92+25.00	24.67' LT	523.02
15A	BERM	92+25.00	5.34' LT	522.10
16	BERM	92+25.00	14.00' RT	522.25
17	BERM	93+25.00	24.67' LT	522.52
17A	BERM	93+25.00	5.34' LT	522.10
18	BERM	93+25.00	14.00' RT	522.00
19	BERM	94+30.00	24.67' LT	522.00
20	BERM	94+30.00	5.34' LT	522.10
21	BERM	94+30.00	14.00' RT	521.23
22	DITCH VPI	94+30.00	33.00' LT	520.08
23	DITCH PC	94+62.50	33.00' LT	518.61
24	DITCH PT	94+72.47	22.21' LT	517.87
25	DITCH VPI	94+30.00	25.00' RT	519.42
26	DITCH PC	94+57.88	25.00' RT	518.31
27	MATCH EXIST CREEK	94+74.12	43.00' LT	517.94
28	DITCH PT	94+67.85	35.79' RT	517.66
29	MATCH EXIST CREEK	94+67.12	45.00' RT	517.63
30	MATCH EXIST CREEK	95+04.93	43.00' LT	518.41
31	DITCH PC	95+03.44	23.77' LT	518.13
32	DITCH PC	94+98.19	43.99' RT	517.12
33	MATCH EXIST CREEK	94+98.11	45.00' RT	517.11
34	DITCH PT	95+13.41	33.00' LT	520.18
35	DITCH PT	95+07.92	34.77' RT	517.26
36	BERM	95+20.00	24.67' LT	522.00
37	BERM	95+20.00	5.34' LT	522.10
38	BERM	95+20.00	14.00' RT	521.22

GRADING POINT TABLE - LYNCHBURG CREEK GRADING LAYOUT SHEET 2 OF 2				
ID	DESCRIPTION	STATION	OFFSET	ELEV
39	BERM	96+25.00	24.67' LT	522.52
40	BERM	96+25.00	5.34' LT	522.10
41	BERM	96+25.00	14.00' RT	522.00
42	BERM	97+25.00	24.67' LT	522.02
43	BERM	97+25.00	5.34' LT	522.10
44	BERM	97+25.00	14.00' RT	522.25
45	DITCH END	98+00.00	31.00' LT	521.61
46	BERM	98+08.97	5.34' LT	522.10
47	BERM	98+25.00	24.67' LT	522.52
48	BERM	98+25.00	14.00' RT	522.00
49	BERM	99+15.00	24.67' LT	522.07
50	BERM	99+15.00	14.00' RT	521.30
51	DITCH PC	99+15.00	25.00' RT	521.09
52	DITCH PT	99+33.69	17.88' RT	521.28
53	DITCH PC	99+52.84	1.63' RT	521.51
54	DITCH PT	99+72.25	5.50' LT	521.71
55	STORM DRAIN OUTFALL/DITCH END	99+77.25	5.50' LT	521.76
56	RIPRAP TOE	100+03.25	24.67' LT	530.04
57	BEGIN OF RETAINING WALL	99+77.45	24.67' LT	521.44
58	BEGIN OF RETAINING WALL	99+77.25	14.00' RT	521.59
59	RIPRAP TOE	100+03.25	14.00' RT	530.25

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

GRADING POINT DATA

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		187

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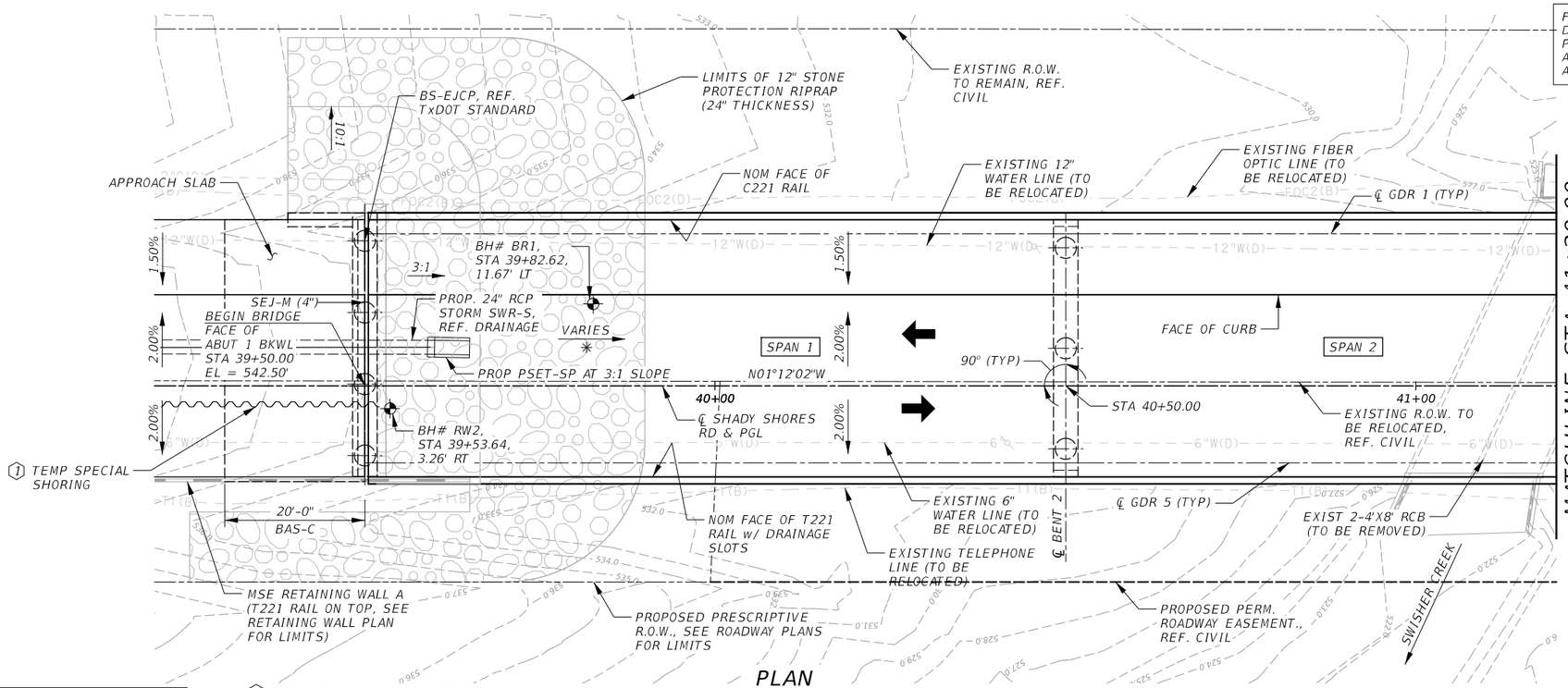
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SC-SWISH-BL01-02

FUNCTIONAL CLASS: URBAN MAJOR COLLECTOR
DESIGN SPEED: 35 MPH
PROP BRIDGE NBI NO: 18-061-0-KK00-05-002
ADT (2024): 7,200
ADT (2044): 13,000

N

0 10 20 30 40

SCALE: 1"=20'



PLAN
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING N88°47'58"E

1 SEE RETAINING WALL SHEETS FOR DETAILS AND QUANTITIES.

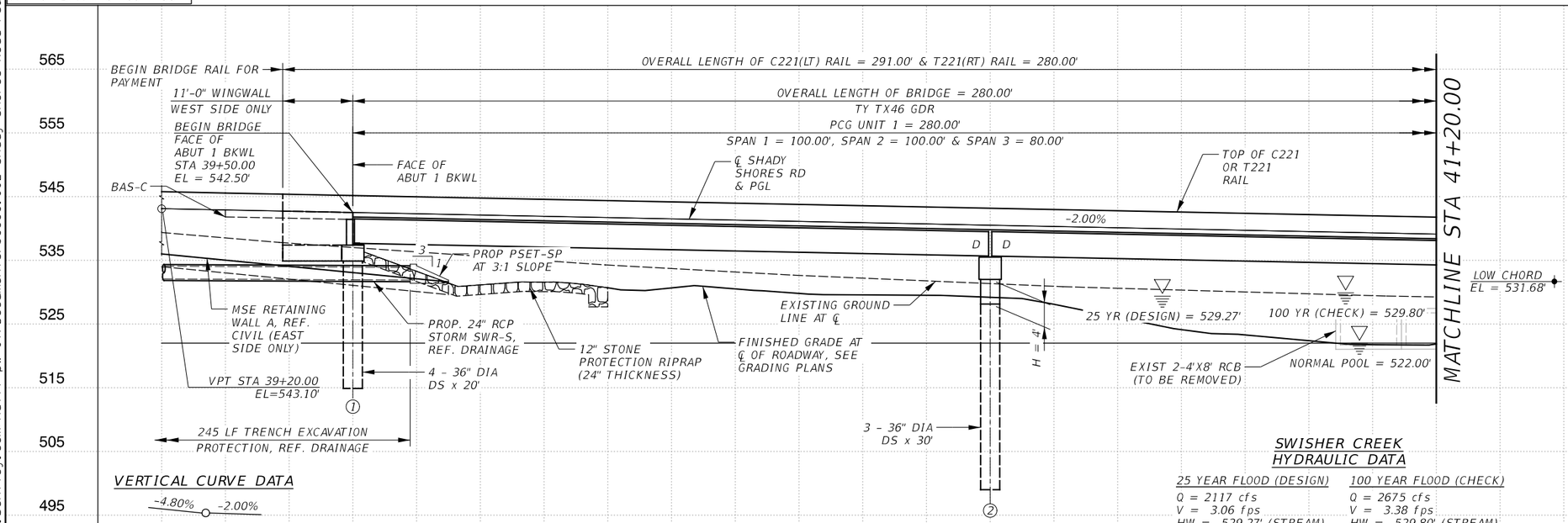
GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. TEST HOLE DATA PROVIDED BY GEOTEX ENGINEERING PROJECT NO. #G22-4003-1-B DATED MARCH 25, 2024
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM THE ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
4. SEE BORING LOGS SHEET FOR DRILLING LOG INFORMATION.
5. SEE ROADWAY PLANS FOR GRADING PLANS.
6. SAW-CUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS NOT REQUIRED.
7. "D" DENOTES BENTS WITH D BARS AND SLOTTED HOLES AT EXTERIOR GIRDERS.
8. "H" HEIGHTS SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
9. SEE TXDOT IGSK STANDARD FOR SHEAR KEYS WHICH ARE TO BE INSTALLED AT ABUTMENTS AND BENTS IN THE UPSTREAM GIRDER BAY.

FOUNDATION NOTES:

1. FOUND DRILLED SHAFTS AT THE LENGTH SHOWN OR DEEPER AS NECESSARY TO PENETRATE THE SHALE OR SANDSTONE TO THE FOLLOWING MINIMUM DEPTHS:
   ABUTMENTS - 5.0 FT
   BENT - 5.0 FT

✳ SEE GRADING PLAN SHEETS FOR BRIDGE END GRADING DETAIL.



VERTICAL CURVE DATA

-4.80% -2.00%

VPI = 38+50.00
ELEV = 544.50'
ex = 0.49'
K = 50
L = 140.00'

ELEVATION
SCALE: 1" = 20'-0"

SWISHER CREEK HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 2117 cfs	Q = 2675 cfs
V = 3.06 fps	V = 3.38 fps
HW = 529.27' (STREAM)	HW = 529.80' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 1 of 2 Sheets

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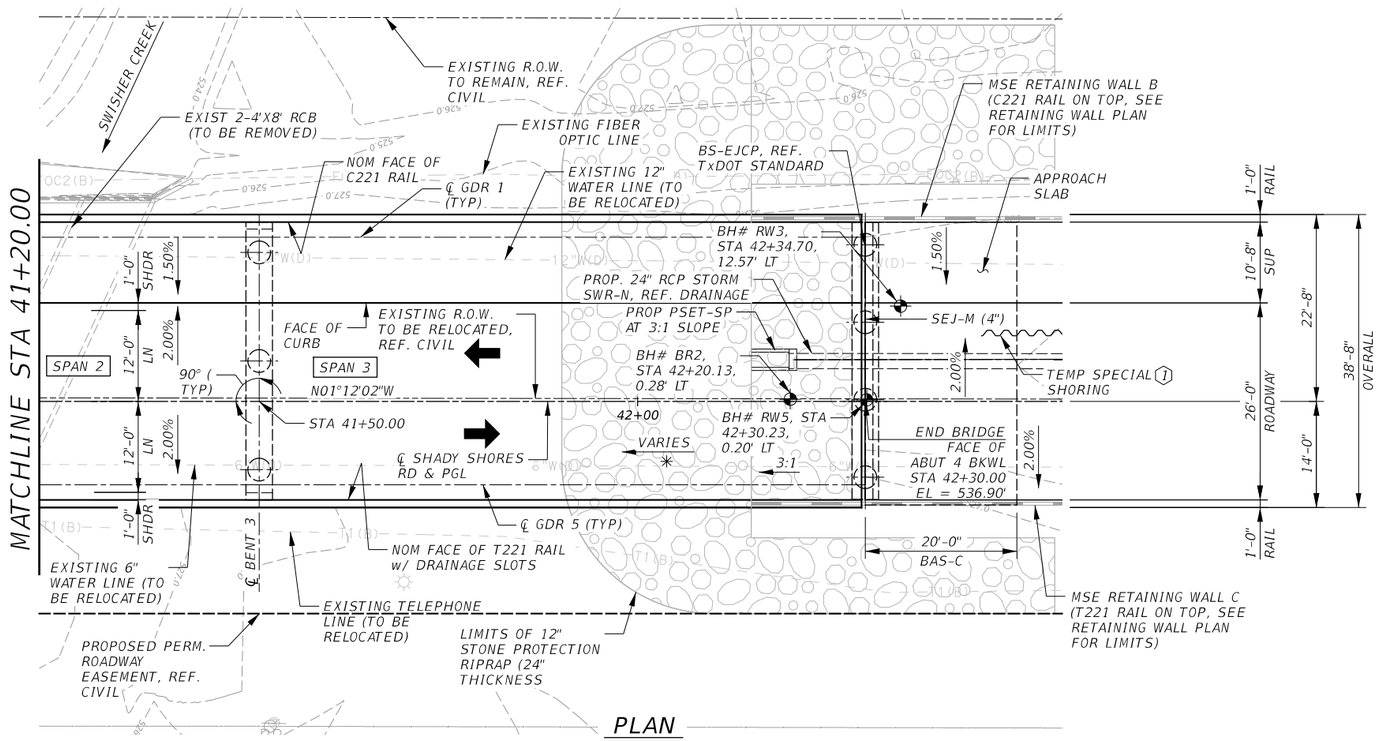
Texas Department of Transportation

Dallas District Bridge

BRIDGE LAYOUT
SWISHER CREEK
STA 39+20 - 41+20
NBI: 18-061-0-KK00-05-002

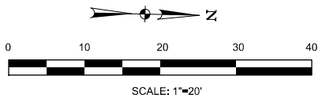
FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		188



PLAN

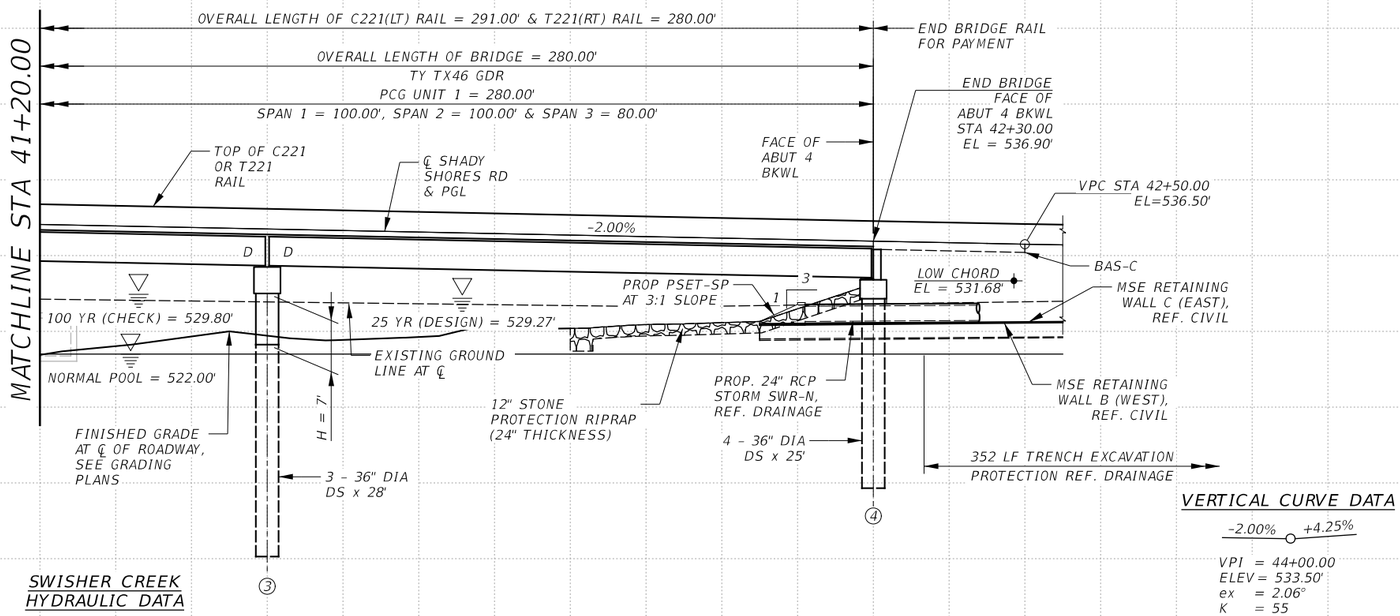
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING N88°47'58"E



(1) SEE RETAINING WALL SHEETS FOR DETAILS AND QUANTITIES.

✳ SEE GRADING PLAN SHEETS FOR BRIDGE END GRADING DETAIL.



ELEVATION

SCALE: 1" = 20'-0"

VERTICAL CURVE DATA

-2.00% +4.25%

VPI = 44+00.00
ELEV = 533.50'
ex = 2.06'
K = 55
L = 300.00'

SWISHER CREEK HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 2117 cfs	Q = 2675 cfs
V = 3.06 fps	V = 3.38 fps
HW = 529.27' (STREAM)	HW = 529.80' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

Sheet 2 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

BRIDGE LAYOUT
SWISHER CREEK
STA 41+20 - 42+55
NBI: 18-061-0-KK00-05-002

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		189

DATE: 11/25/2025 TIME: 3:21:58 PM
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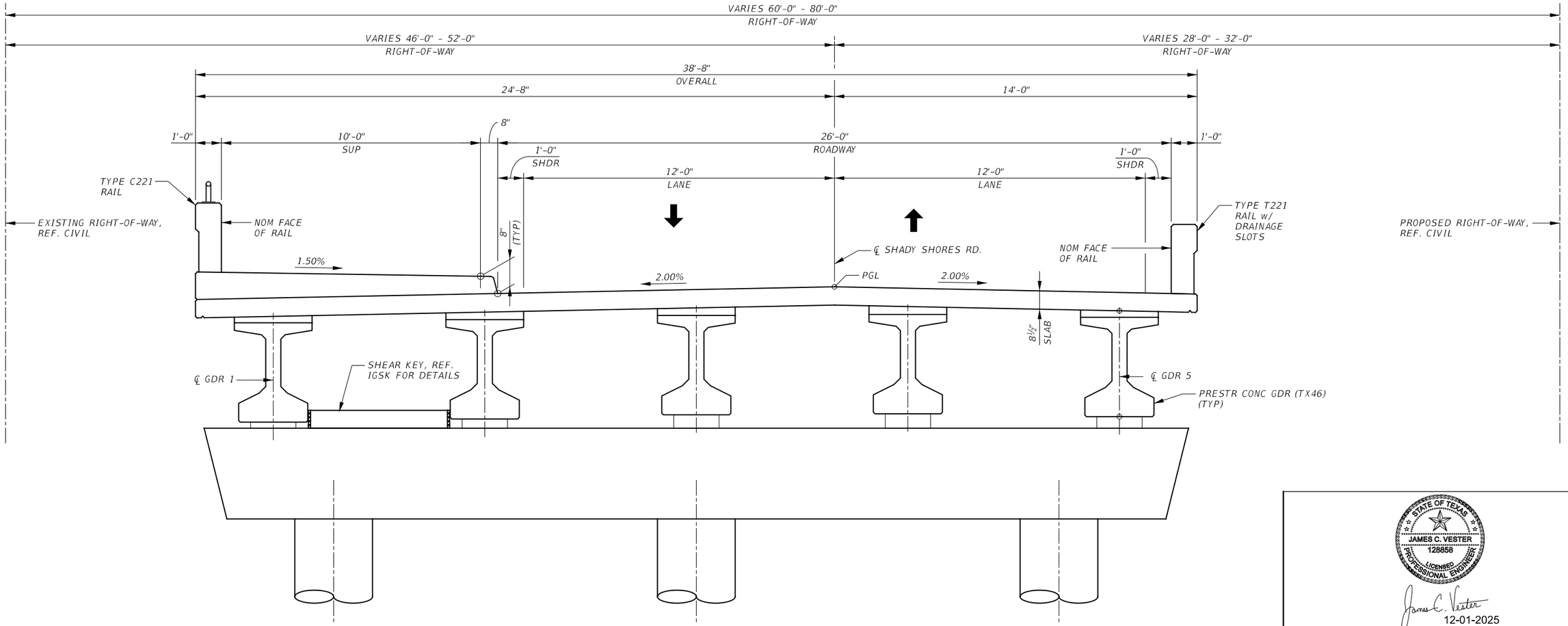

TYPICAL SECTION

SCALE: ¼" = 1'-0"

STA 39+50.00 TO 42+30.00

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED
PROFESSIONAL ENGINEER
12-01-2025

Sheet 1 of 1 Sheets

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Texas Department of Transportation

Dallas
District
Bridge

BRIDGE
TYPICAL SECTION
SWISHER CREEK

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		190

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SUMMARY OF ESTIMATED QUANTITIES

BRIDGE ELEMENT \ BID ITEM DESCRIPTION	416	420	420	420	422	422	422	425	432	442	450	450	454
	7006	7013	7023	7039	7002	7014	7022	7004	7041	7008	7005	7033	7004
	DRILL SHAFTS (1) (36 IN)	CL "C" CONC (HPC) (ABUT)	CL "C" CONC (HPC) (CAP)	CL "C" CONC (HPC) (COLUMN)	REINF CONC SLAB (HPC)	APPROACH SLAB (HPC)	BRIDGE SIDEWALK (HPC)	PRESTR CONC GIRDER (TX46)	RIPRAP (STONE PROTECTION) (12 IN)	STR STL (MISC) (BS-EJCP)	RAIL (HPC) (TY T221)	RAIL (HPC) (TY C221)	SEALED EXPANSION JOINT (4 IN) (SEJ-M)
	LF	CY	CY	CY	SF	CY	SF	LF	CY	LB	LF	LF	LF
2 - ABUTMENTS	180	41.0											
2 - INTERIOR BENTS	174		34.0	8.5									
1 - 280.00' PCG UNIT					10,827	59	3,268	1,392.78	6,315	299	280.0	291.0	54
TOTAL	354	41.0	34.0	8.5	10,827	59	3,268	1,392.78	6,315	299	280.0	291.0	54

(1) PROVIDE SULFATE RESISTANT CONCRETE FOR DRILLED SHAFTS.

BEARING SEAT ELEVATIONS

			GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5
ABUT	1	(FWD)	536.984	537.148	537.311	537.361	537.198
BENT	2	(BK)	535.024	535.188	535.351	535.401	535.238
		(FWD)	534.984	535.148	535.311	535.361	535.198
BENT	3	(BK)	533.024	533.188	533.351	533.401	533.238
		(FWD)	532.984	533.148	533.311	533.361	533.198
ABUT	4	(BK)	531.424	531.588	531.751	531.801	531.638

STATE OF TEXAS
JAMES C. VESTER
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LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet I of I Sheets

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Texas Department of Transportation

Dallas District Bridge

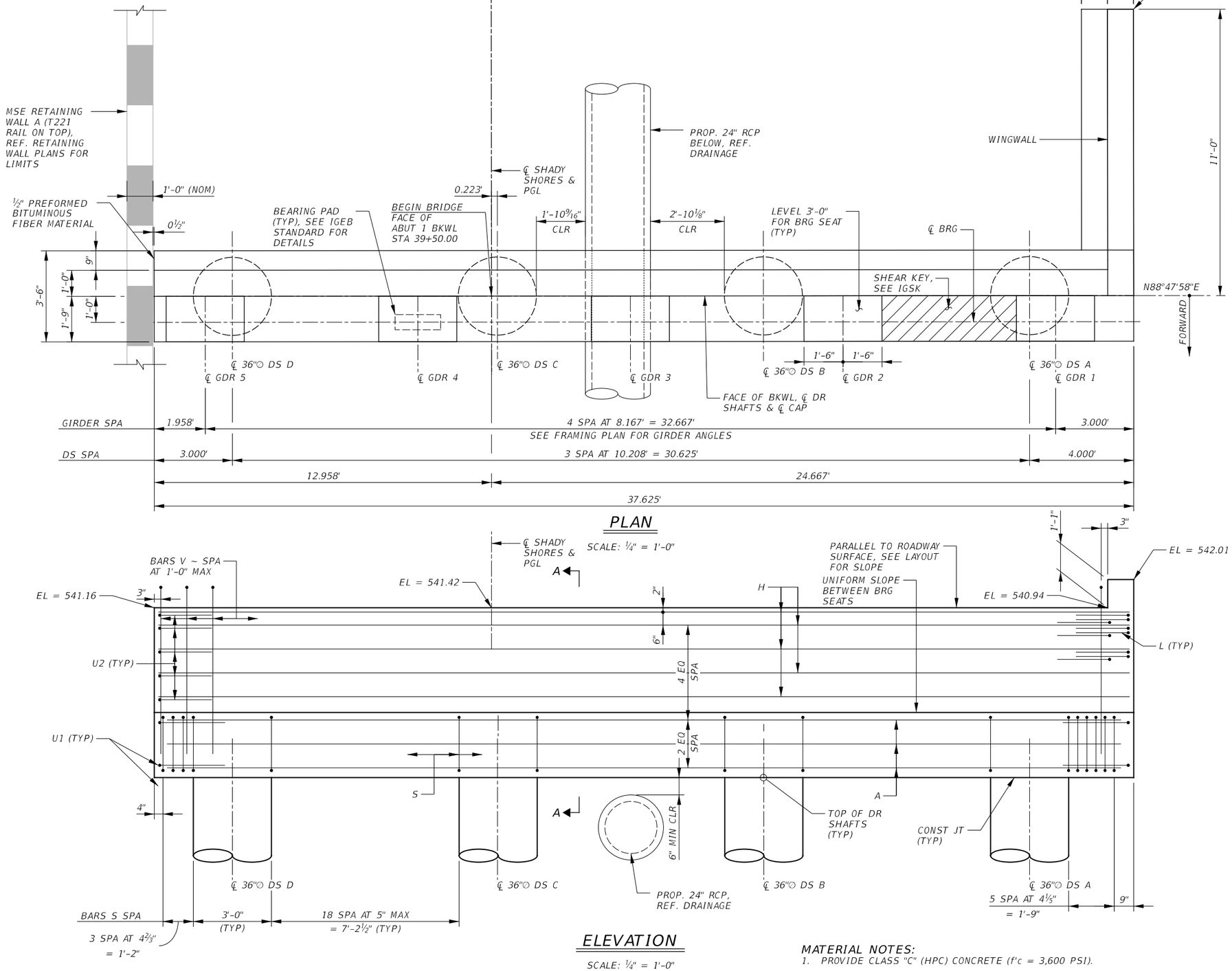
SHADY SHORES ROAD
SWISHER CREEK
EST. QUANTITIES AND BEARING SEAT ELEVATIONS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		191

User:
DATE: 12/4/2025 TIME: 9:20:43 AM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SC-SWISH-EQ01

CONTROL ELEVATIONS

ABUTMENT	STATION	TOP OF DRILLED SHAFTS			
		DS A	DS B	DS C	DS D
1	39+50.00	534.38	534.58	534.79	534.59



PLAN

SCALE: ¼" = 1'-0"

ELEVATION

SCALE: ¼" = 1'-0"

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI).
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.

BAR SCHEDULE ~ ONE CAP

BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
A	St	12	#11	36'-8"	2,274
H	St	10	#6	37'-4"	561
L	Bt	9	#6	4'-0"	55
S	Bt	67	#5	11'-6"	804
U1	Bt	4	#6	8'-1"	49
U2	Bt	5	#6	5'-6½"	42
V	Bt	37	#5	14'-5"	556
wH1	St	7	#6	12'-5"	131
wH2	St	12	#6	10'-9"	194
wS	Bt	11	#4	8'-0"	59
wV	Bt	11	#5	14'-5"	166
(1) TOTAL REINFORCING STEEL				LB	4,891
CL C CONC (HPC) (ABUT)				CY	23.0

ESTIMATED QUANTITIES

ITEM	UNIT	ABUT
DRILL SHAFT (36IN)	LF	80
CL C CONC (HPC) (ABUT)	CY	23.0
(1) REINF STEEL	LB	4,891

(1) FOR CONTRACTOR'S INFORMATION ONLY.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. CHAMFER ALL EXPOSED EDGES ¾" UNLESS NOTED OTHERWISE.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE CAP.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD = 126 TONS/SHAFT.
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN WINGWALLS.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS" SHEET.
8. SEE FD STANDARD FOR FOUNDATION DETAILS AND NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 1 of 3 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD SWISHER CREEK ABUTMENT 1 DETAILS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		192

User:
DATE: 12/2/2025 TIME: 11:10:29 AM
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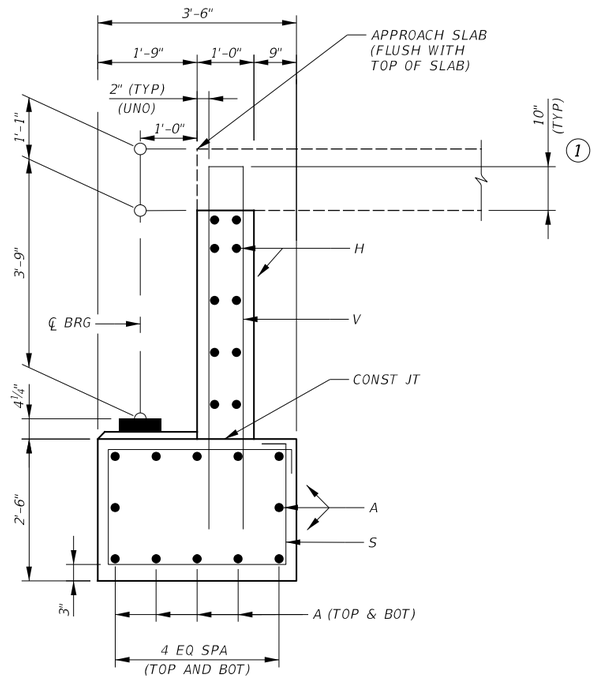
User:

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.



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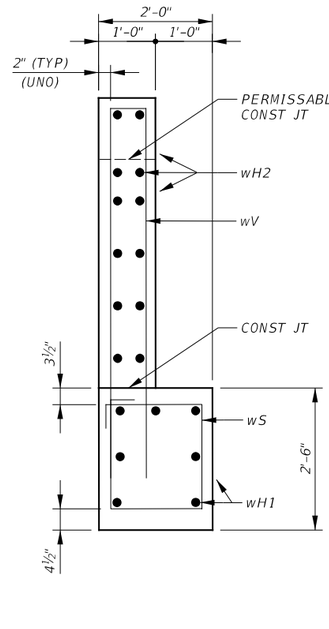

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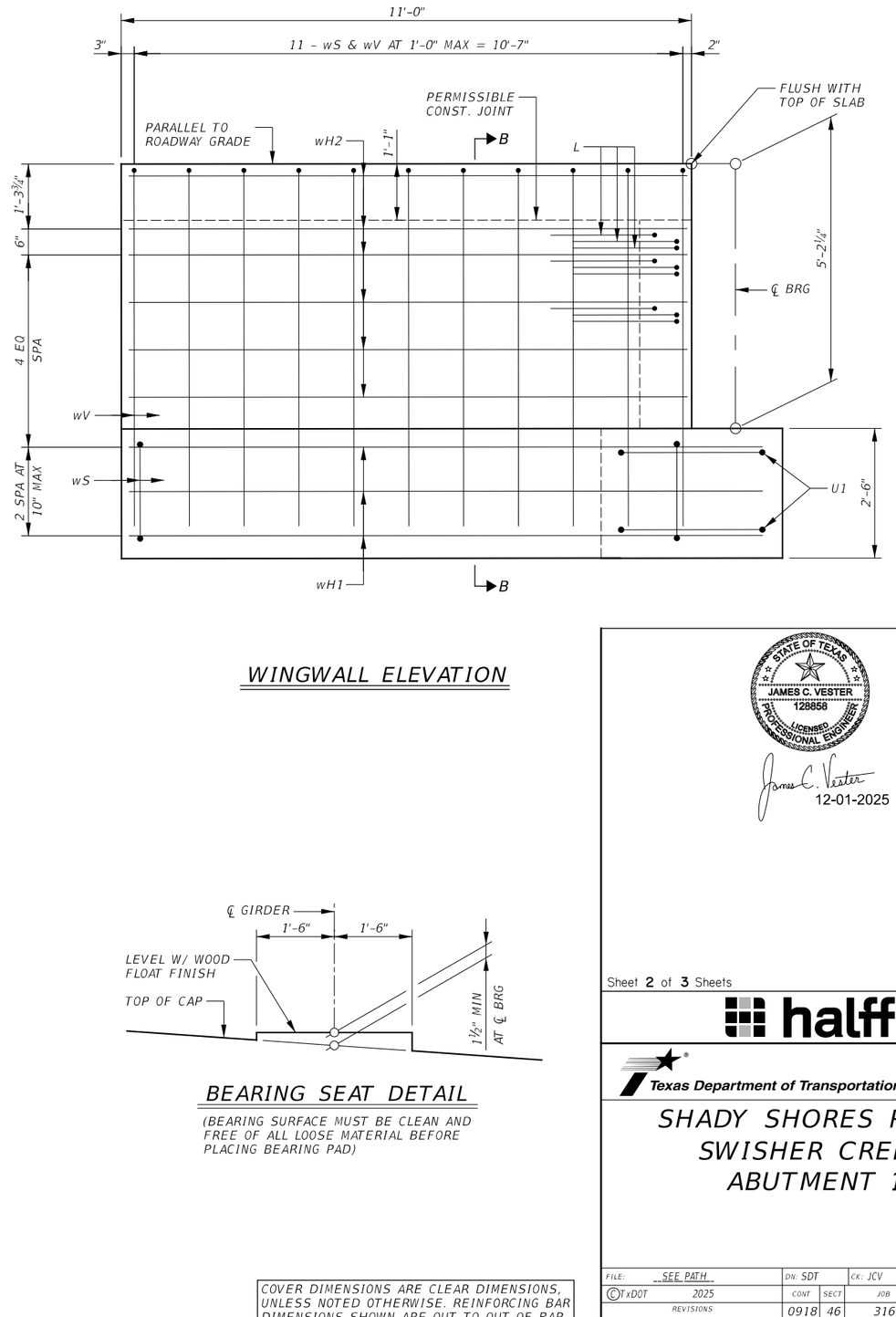
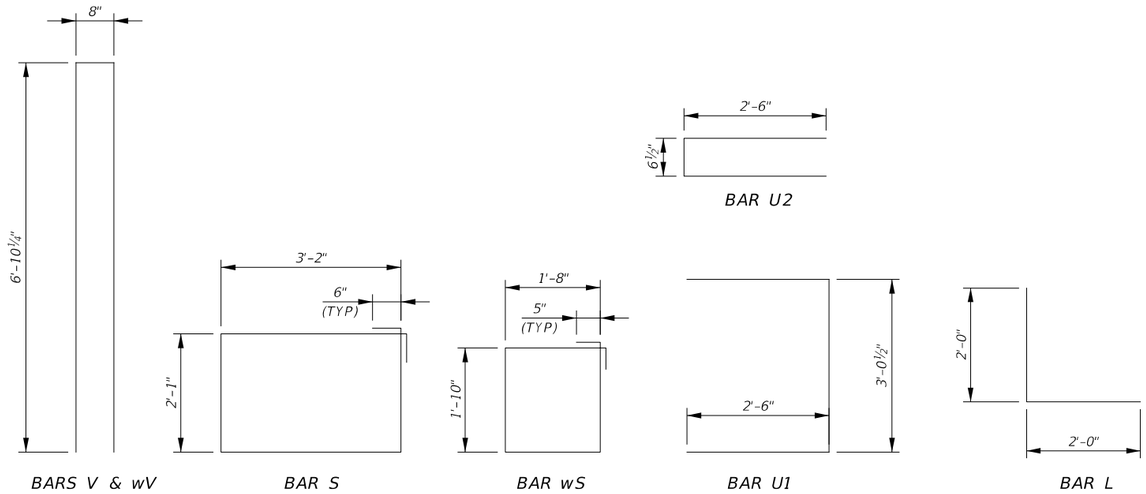


WINGWALL ELEVATION



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

Sheet 2 of 3 Sheets

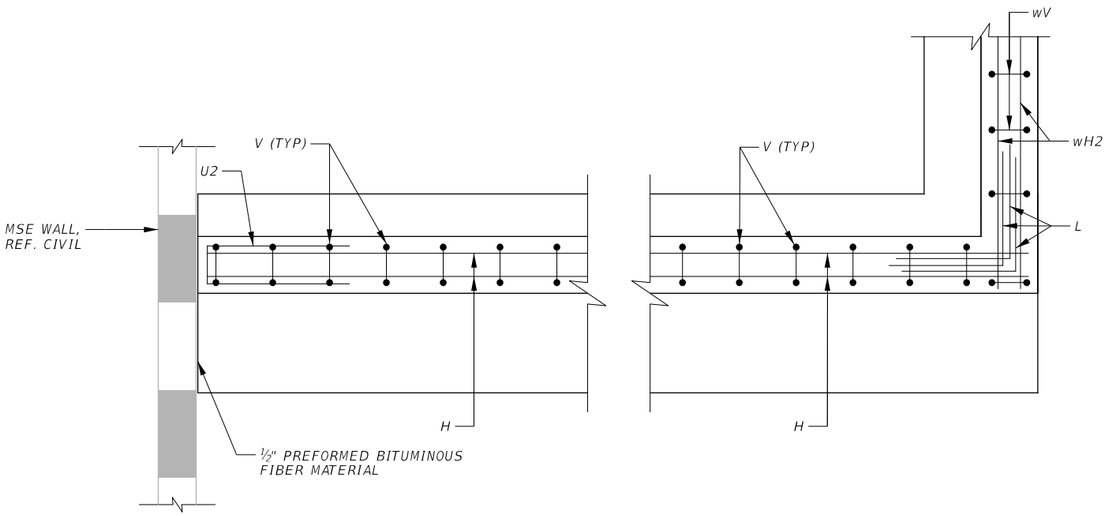
halff

Texas Department of Transportation

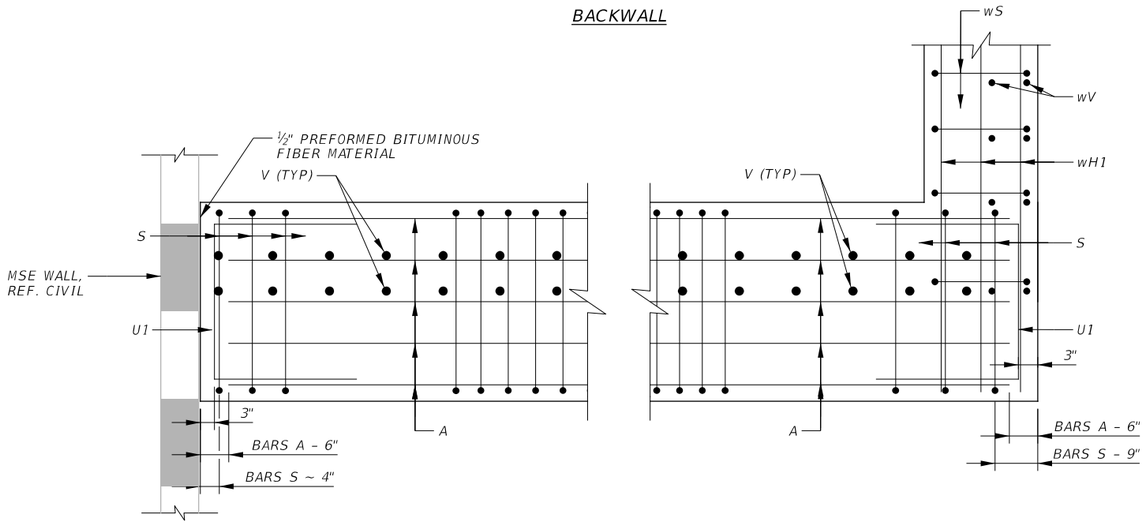
Dallas District Bridge

SHADY SHORES ROAD SWISHER CREEK ABUTMENT 1

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		193



BACKWALL



CAP

CORNER DETAILS

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER

12-01-2025

Sheet 3 of 3 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD
SWISHER CREEK
ABUTMENT 1

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		194

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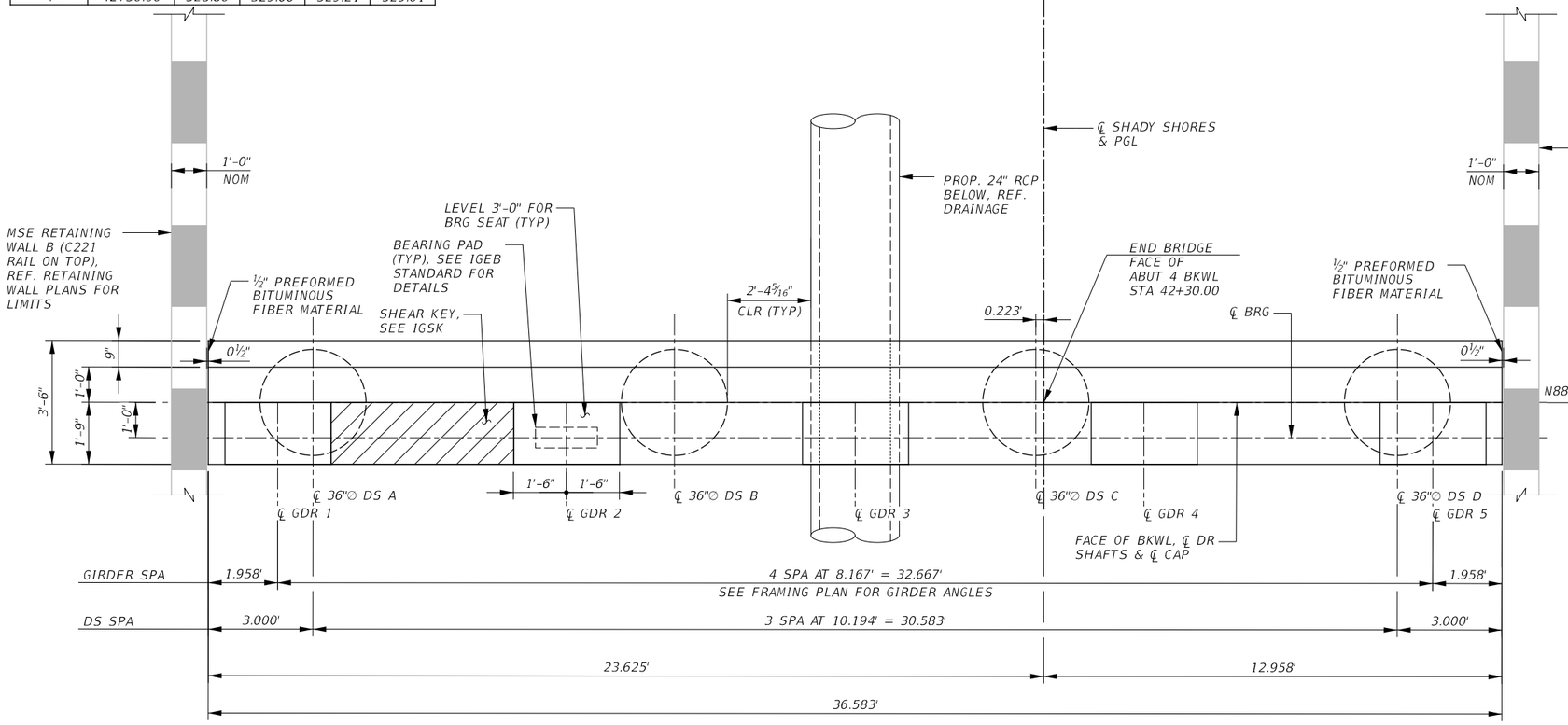
User:

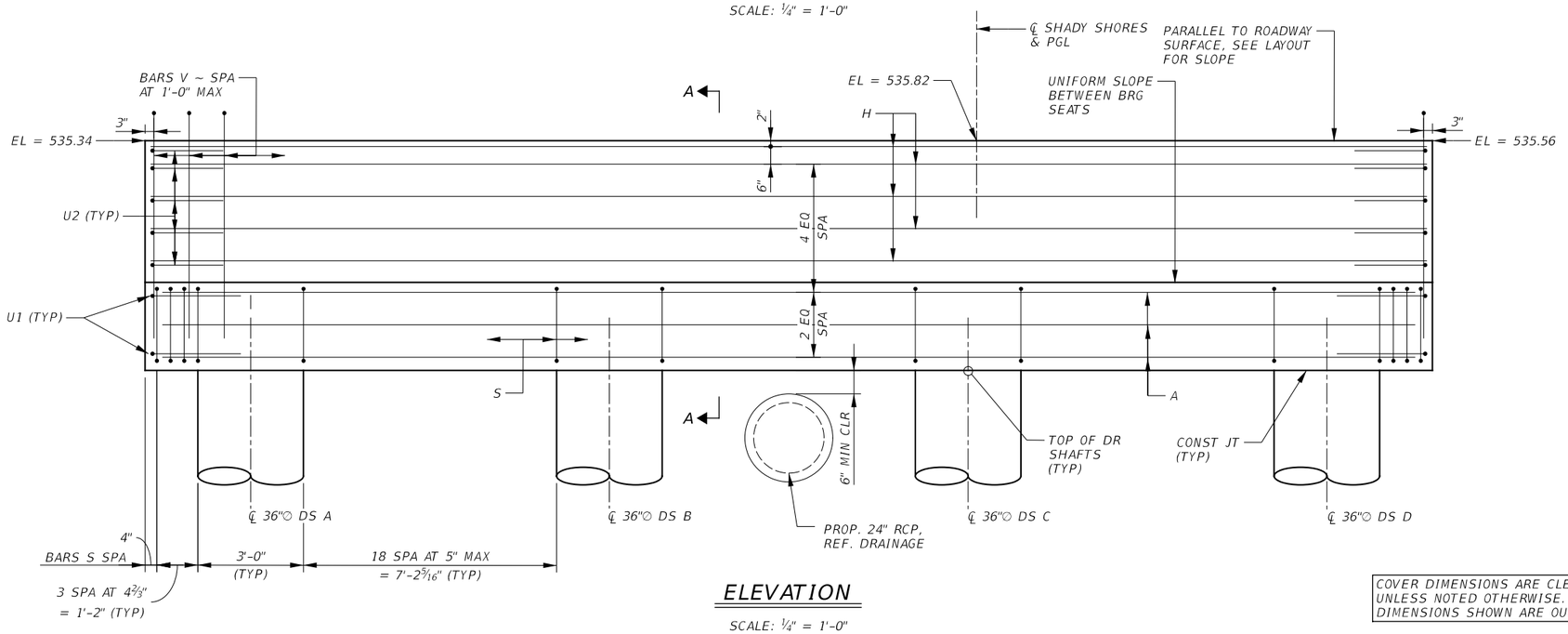
CONTROL ELEVATIONS

ABUTMENT	STATION	TOP OF DRILLED SHAFTS			
		DS A	DS B	DS C	DS D
4	42+30.00	528.80	529.00	529.21	529.01



PLAN

SCALE: ¼" = 1'-0"



ELEVATION

SCALE: ¼" = 1'-0"

BAR SCHEDULE ~ ONE CAP

BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
A	St	12	#11	35'-8"	2,274
H	St	10	#6	36'-4"	546
S	Bt	65	#5	11'-6"	780
U1	Bt	4	#6	8'-1"	49
U2	Bt	10	#6	5'-6½"	84
V	Bt	36	#5	14'-5"	541
(1) TOTAL REINFORCING STEEL				LB	4,274
CL C CONC (HPC) (ABUT)				CY	18.0

ESTIMATED QUANTITIES

ITEM	UNIT	ABUT
DRILL SHAFT (36 IN)	LF	100
CL C CONC (HPC) (ABUT)	CY	18.0
(1) REINF STEEL	LB	4,274

(1) FOR CONTRACTOR'S INFORMATION ONLY.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. CHAMFER ALL EXPOSED EDGES ¾" UNLESS NOTED OTHERWISE.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE CAP.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD = 107 TONS/SHAFT.
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN WINGWALLS.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS" SHEET.
8. SEE FD STANDARD FOR FOUNDATION DETAILS AND NOTES.

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI).
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

Sheet 1 of 2 Sheets

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Dallas District Bridge

SHADY SHORES ROAD SWISHER CREEK ABUTMENT 4 DETAILS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		195

User:
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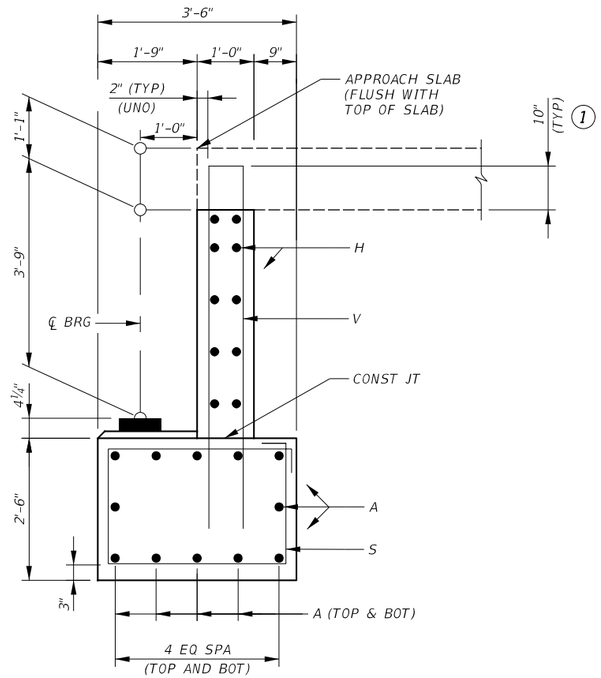
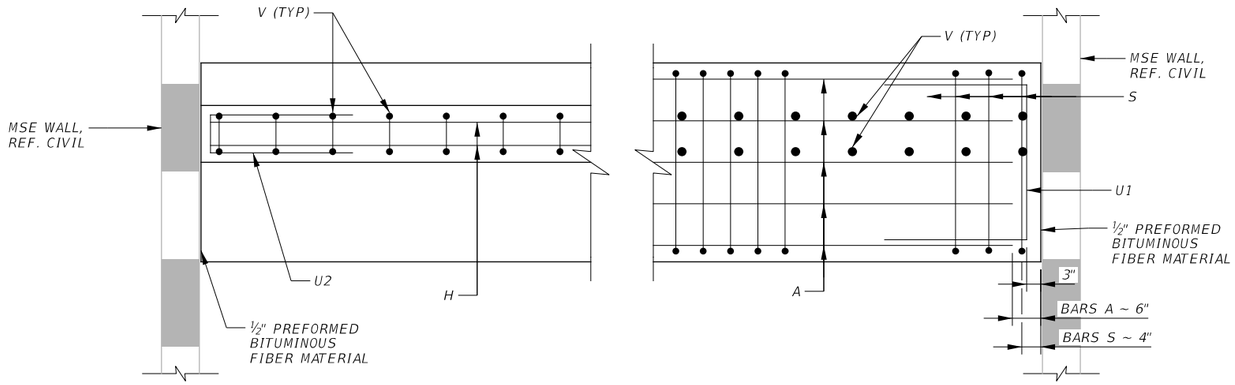


SECTION A-A

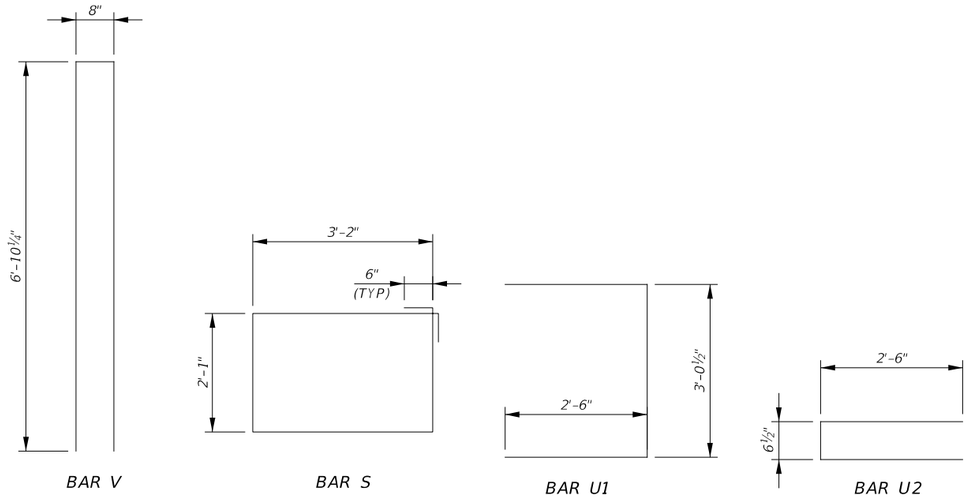
1 INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

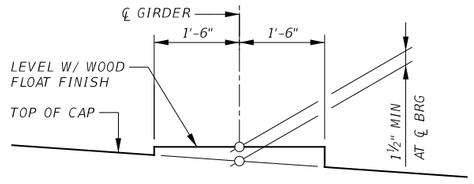


BACKWALL CAP

CORNER DETAILS

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.





BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

STATE OF TEXAS
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PROFESSIONAL ENGINEER
12-01-2025

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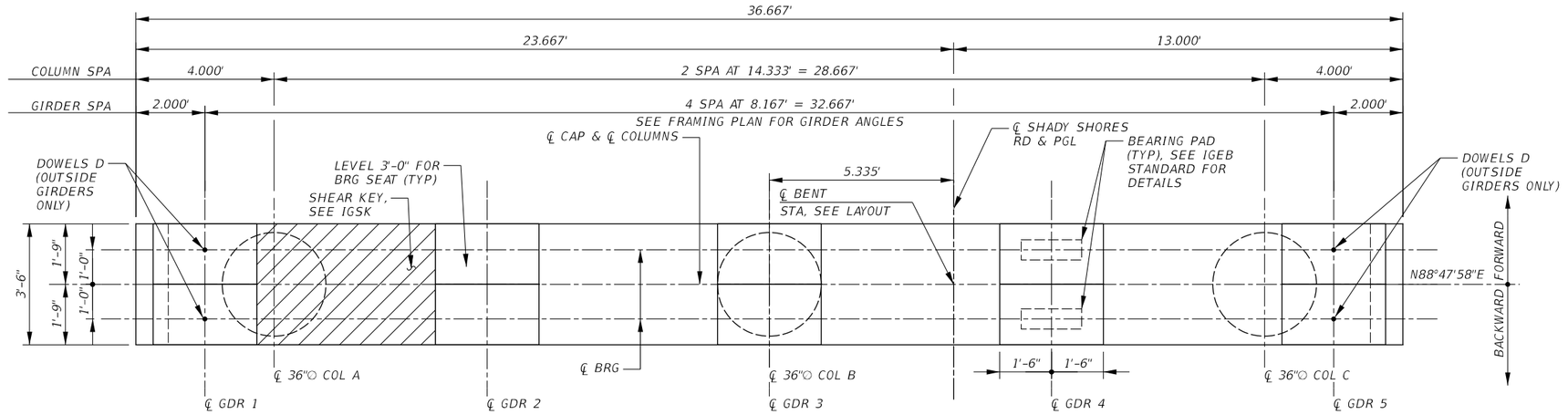
Dallas District Bridge

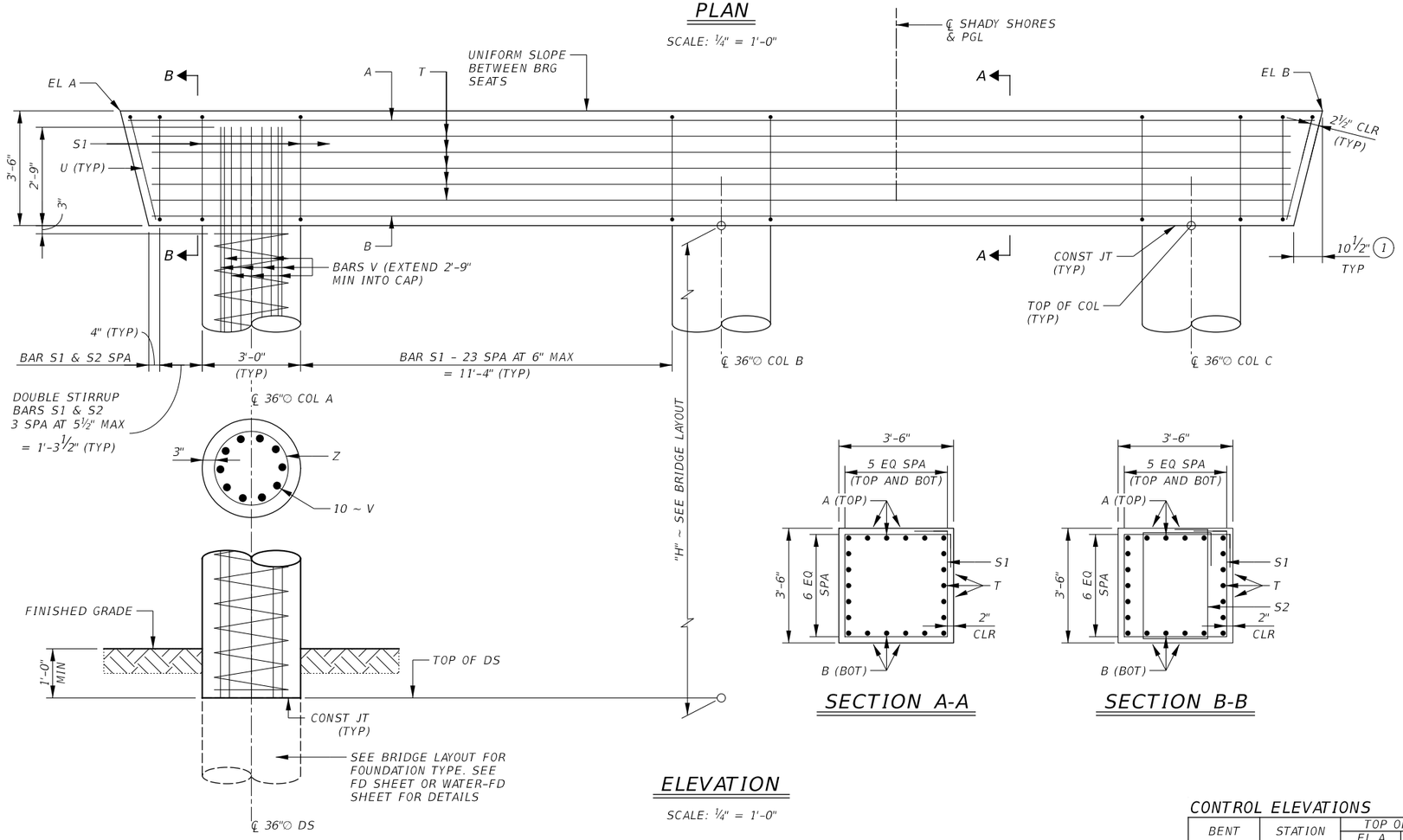
SHADY SHORES ROAD SWISHER CREEK ABUTMENT 4

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		196



PLAN

SCALE: ¼" = 1'-0"



ELEVATION

SCALE: ¼" = 1'-0"

SECTION A-A

SECTION B-B

N

(1) MEASURED PARALLEL TO TOP OF CAP CROSS SLOPE.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. THE PRICE BID PER FOOT OF COLUMN SHALL INCLUDE THE REINFORCING EXTENDING FROM THE COLUMN INTO THE CAP.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE COLUMN.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD:
   BENT 2 = 270 TONS/SHAFT
   BENT 3 = 250 TONS/SHAFT
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET AND WATER-FD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS" SHEET.

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI) FOR BENT CAP AND COLUMN.
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.
4. GALVANIZE DOWELS D.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CONTROL ELEVATIONS

BENT	STATION	TOP OF CAP		TOP OF COLUMNS		
		EL A	EL B	COL A	COL B	COL C
2	40+50.00	534.84	535.08	531.37	531.47	531.56
3	41+50.00	532.84	533.08	529.37	529.47	529.56

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
12-01-2025

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Texas Department of Transportation
Dallas District Bridge

SHADY SHORES ROAD
SWISHER CREEK
TYPICAL INTERIOR BENT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		197

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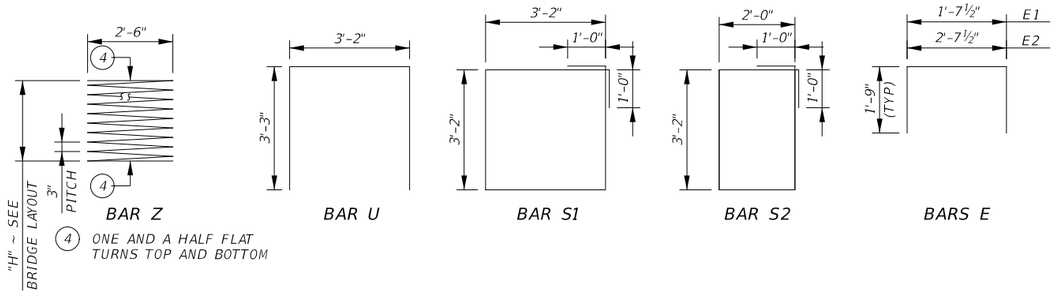
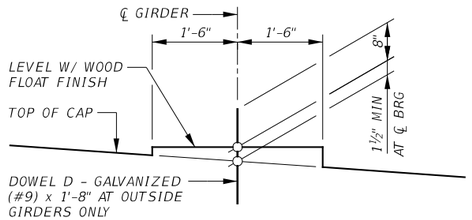


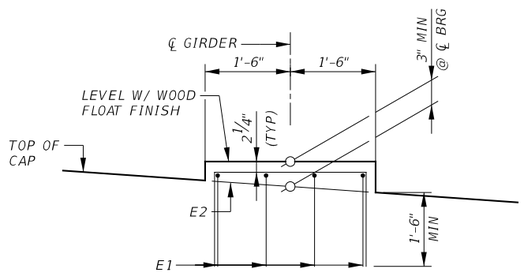
(4) ONE AND A HALF FLAT TURNS TOP AND BOTTOM



WITH DOWEL

BEARING SEAT DETAIL

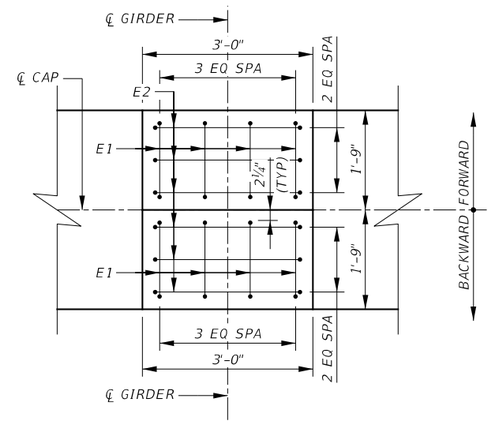
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



PEDESTAL BEARING SEAT ELEVATION (2)

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

* PEDESTAL REINF. REQUIRED PER SECTION 420.4.9 WHEN HEIGHT >3".



PEDESTAL BEARING SEAT PLAN (2)

BAR SCHEDULE ~ ONE CAP

	BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
	A	St	6	#11	36'-2"	1,153
	B	St	6	#11	34'-8"	1,105
	D	St	4	#9	1'-8"	23
(2)	E1	Bt	24	#5	5'-2"	128
(2)	E2	Bt	18	#5	6'-2"	115
	S1	Bt	56	#6	14'-8"	1,233
	S2	Bt	8	#6	12'-4"	148
	T	St	10	#5	34'-8"	362
	U	Bt	2	#5	9'-8"	20
(1)	TOTAL REINFORCING STEEL				LB	4,287
	CL C CONC (HPC) (CAP)				CY	17.0

COLUMN SCHEDULE ~ ONE COLUMN

	BARS V~10-#9		BARS Z~#4 SPIRAL		EST QUANT~3 COL	
"H"					REINF STEEL	CLASS C CONC
FT	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
4	6'-9"	230	74'	50	840	3.1
5	7'-9"	264	90'	61	975	3.9
6	8'-9"	298	105'	71	1,107	4.7
7	9'-9"	332	121'	81	1,239	5.4

ADJUST SPIRAL Z LENGTH BY 7.9 FT AND BAR V LENGTH BY 0.5 FT FOR EACH 0.5 FT VARIATION IN "H" VALUE.
ADJUST REINFORCING STEEL TOTAL BY 22.3 LBS AND CONCRETE BY 0.13 CY PER COLUMN FOR EACH 0.5 FT VARIATION IN "H" VALUE PER COLUMN.

(1) FOR CONTRACTOR'S INFORMATION ONLY.

(2) PEDESTAL BEARING OCCURS FOR ALL INTERIOR GIRDERS. ADDITIONAL 0.3CY AND "E" BARS INCLUDED FOR PEDESTAL BEARING SEATS IN QUANTITY TABLE.

ESTIMATED QUANTITIES

	ITEM	UNIT	BENT 2	BENT 3
	DRILL SHAFT (36 IN)	LF	90	84
	CL C CONC (HPC) (CAP)	CY	17.0	17.0
	CL C CONC (HPC) (COL)	CY	3.1	5.4
(1)	REINF STEEL	LB	4,287	4,287

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

James C. Vester
12-01-2025

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD SWISHER CREEK TYPICAL INTERIOR BENT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		198

DATE: 12/2/2025 TIME: 11:12:15 AM
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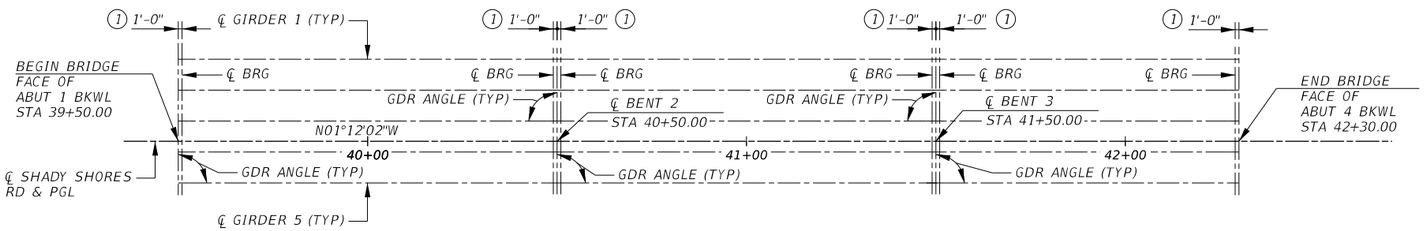


SPAN 1
(TY TX46 GDR)

SPAN 2
(TY TX46 GDR)

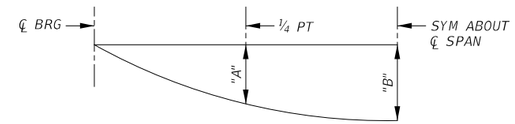
SPAN 3
(TY TX46 GDR)

PLAN

SCALE: 1" = 40'-0"

(1) *SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION.*

(2) *GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.*



DEAD LOAD DEFLECTION DIAGRAM

DEFLECTIONS SHOWN ARE DUE TO CIP CONCRETE SLAB ONLY (EC = 5,000 KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DEFLECTIONS MAY BE LESS. DEFLECTIONS SHALL BE ADJUSTED BASED ON FIELD OBSERVATIONS.
(FOR DEAD LOAD DEFLECTIONS SEE FRAMING PLANS.)

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.519	-0.020	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.519	-0.020	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.519	-0.020	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.519	-0.020	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.519	-0.020	0.093	0.131
	TOTAL	497.500					

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.519	-0.020	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.519	-0.020	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.519	-0.020	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.519	-0.020	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.519	-0.020	0.093	0.131
	TOTAL	497.500					

GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	80.000	79.500	78.000	79.516	-0.020	0.038	0.053
GIRDER 2	80.000	79.500	78.000	79.516	-0.020	0.043	0.061
GIRDER 3	80.000	79.500	78.000	79.516	-0.020	0.043	0.061
GIRDER 4	80.000	79.500	78.000	79.516	-0.020	0.043	0.061
GIRDER 5	80.000	79.500	78.000	79.516	-0.020	0.038	0.053
	TOTAL	397.500					

BENT REPORT

ABUT NO. 1 (N 88°47'58" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (ABUT BKWL)	GIRDER ANGLE D	M	S
SPAN 1 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 2 (N 88°47'58" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 2 (N 88°47'58" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 3 (N 88°47'58" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 3 (N 88°47'58" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

ABUT NO. 4 (N 88°47'58" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (ABUT BKWL)	GIRDER ANGLE D	M	S
SPAN 3 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

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JAMES C. VESTER
128858
LICENSED
PROFESSIONAL ENGINEER
12-01-2025

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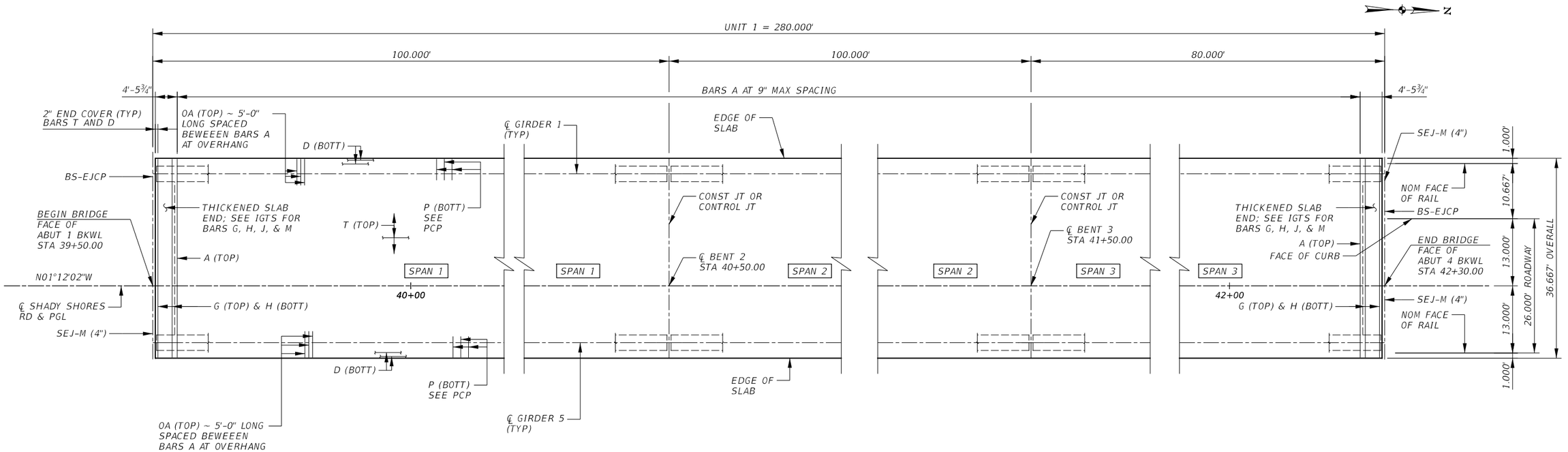
Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD SWISHER CREEK FRAMING PLAN

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		199

DATE: 11/25/2025 TIME: 3:25:06 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SC-SWISH-FP01-01.dgn
User:



COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

PLAN

SCALE: 1" = 20'-0"

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS S, CONCRETE STRENGTH f'c = 4000 PSI
2. FOR GIRDER BEARING PAD, MISC. SLAB, SIDEWALK EXPANSION JOINT COVER PLATE AND THICKENED SLAB END DETAILS NOT SHOWN SEE IGD, IGEB, IGMS, IGND, BS-EJCP AND IGTS STANDARDS.
3. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
4. FOR SEALED EXPANSION JOINT DETAILS NOT SHOWN, SEE SEJ-M STANDARD. FOR SEJ-M QUANTITIES NOT SHOWN SEE ESTIMATED QUANTITIES SHEET.
5. DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, 0A, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.
6. FOR RAIL DETAILS NOT SHOWN SEE TRAFFIC RAIL TYPE C221 & T221.
7. FOR GIRDER LAYOUTS SEE FRAMING PLAN SHEETS.
8. ALL REINFORCING SHALL BE GRADE 60 STEEL.
9. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   EPOXY COATED ~ #4 = 2'-5"

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SHADY SHORES ROAD SWISHER CREEK DECK DETAILS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
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REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		200

DATE: 11/25/2025 TIME: 3:25:24 PM
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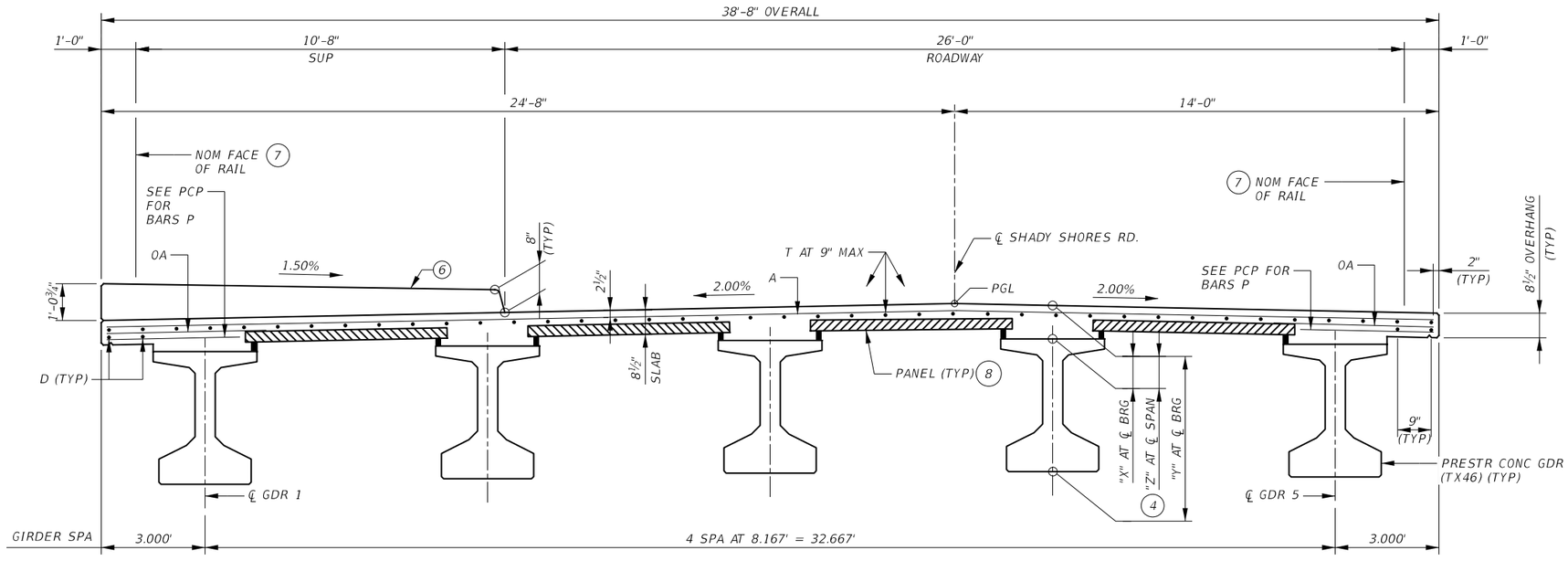

TYPICAL TRANSVERSE SECTION

SCALE: ¼" = 1'-0"

STA 39+20.00 TO 42+30.00

1. SEE DECK DETAILS FOR GENERAL AND MATERIAL NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

TABLE OF SECTION DEPTHS - UNIT 1 (5)

SPAN NO.	GIRDER NO.	"X" AT C.L. BRG	"Y" AT C.L. BRG	"Z" AT C.L. SPAN (4)
1	1-5	1'-0"	4'-10"	10½"
2	1-5	1'-0"	4'-10"	10½"
3	1-5	1'-0"	4'-10"	10½"

BAR TABLE

BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

ESTIMATED QUANTITIES

	ITEM	UNIT	SPAN 1	SPAN 2	SPAN 3	TOTAL
(1)	REINF CONC SLAB (HPC) (CL S)	SF	3,867	3,867	3,093	10,827
	PRESTR CONC GIRDER (Tx46)	LF	497.60	497.60	397.58	1,392.78
(3)	CL S CONC (HPC) (SDWLK)	CY	37.0	37.0	30.0	104.0
(2)	REINF STEEL	LB	8,895	8,895	7,114	24,904

(1) LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEETS FOR GIRDER LENGTHS.

(2) CONTRACTOR'S INFORMATION ONLY.

(3) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF FOR SLAB.

(4) THEORETICAL DIMENSION.

(5) SEE PCP STANDARD FOR HAUNCH REINFORCING DETAIL AND SPECIAL GRADING DETAIL FOR ALL AREAS WHERE MEASURED HAUNCH EXCEEDS 3½".

(6) FOR REINFORCEMENTS, SEE TxDOT STANDARD, BRSM.

(7) EPOXY COAT ALL REINFORCEMENT IN C221 AND T221 RAILING.

(8) SEE PRESTRESSED CONCRETE PANELS (PCP) STANDARD AND PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) STANDARD FOR PANEL DETAILS NOT SHOWN.

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BRIDGE DECK SECTION SWISHER CREEK

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		201

DATE: 11/25/2025 TIME: 3:25:42 PM
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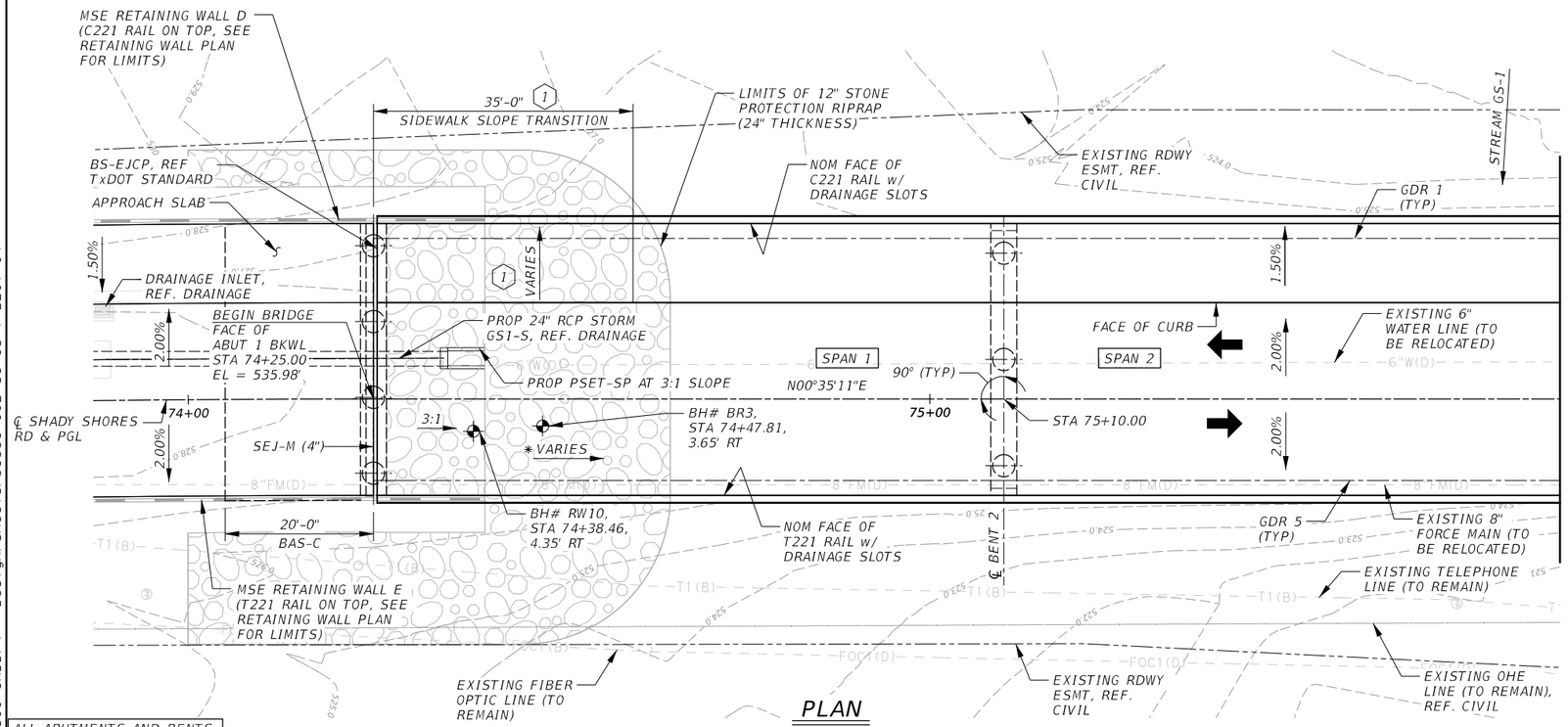
User:

FUNCTIONAL CLASS: URBAN MAJOR COLLECTOR
DESIGN SPEED: 35 MPH
PROP BRIDGE NBI NO: 18-061-0-KK00-05-003
ADT (2024): 7,200
ADT (2044): 13,000

N

0 10 20 30 40

SCALE: 1"=20'



ALL ABUTMENTS AND BENTS ARE ON BEARING S89°24'49"E

PLAN

SCALE: 1" = 20'-0"

GENERAL NOTES:

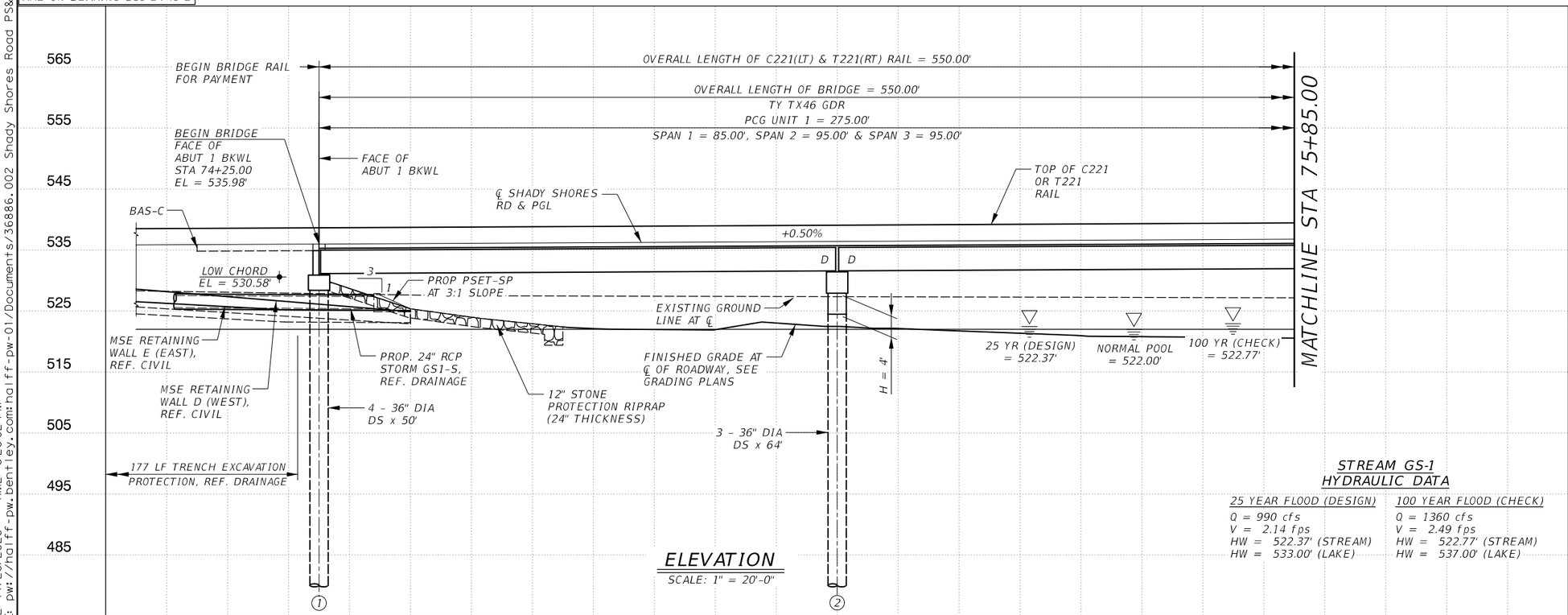
1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. TEST HOLE DATA PROVIDED BY GEOTEX ENGINEERING PROJECT NO. #G22-4003-1-B DATED MARCH 25, 2024
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM THE ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
4. SEE BORING LOGS SHEET FOR DRILLING LOG INFORMATION.
5. SEE ROADWAY PLANS FOR GRADING PLANS.
6. SAW-CUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS NOT REQUIRED.
7. "D" DENOTES BENTS WITH D BARS AND SLOTTED HOLES AT EXTERIOR GIRDERS.
8. "H" HEIGHTS SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.

FOUNDATION NOTES:

1. FOUND DRILLED SHAFTS AT THE LENGTH SHOWN OR DEEPER AS NECESSARY TO PENETRATE THE SHALE TO THE FOLLOWING MINIMUM DEPTHS:
   ABUTMENTS - 5.0 FT
   BENT - 5.0 FT

(1) SEE BRIDGE TYPICAL SECTION SHEET FOR SUP SLOPE TRANSITION SKETCH FOR DETAILS.

* SEE GRADING PLAN SHEETS FOR BRIDGE END GRADING DETAIL.



ELEVATION

SCALE: 1" = 20'-0"

STREAM GS-1 HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 990 cfs	Q = 1360 cfs
V = 2.14 fps	V = 2.49 fps
HW = 522.37' (STREAM)	HW = 522.77' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

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Dallas District Bridge

BRIDGE LAYOUT
STREAM GS-1
STA 73+95 - 75+85
NBI: 18-061-0-KK00-05-003

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		202

DATE: 11/25/2025 TIME: 3:26:02 PM
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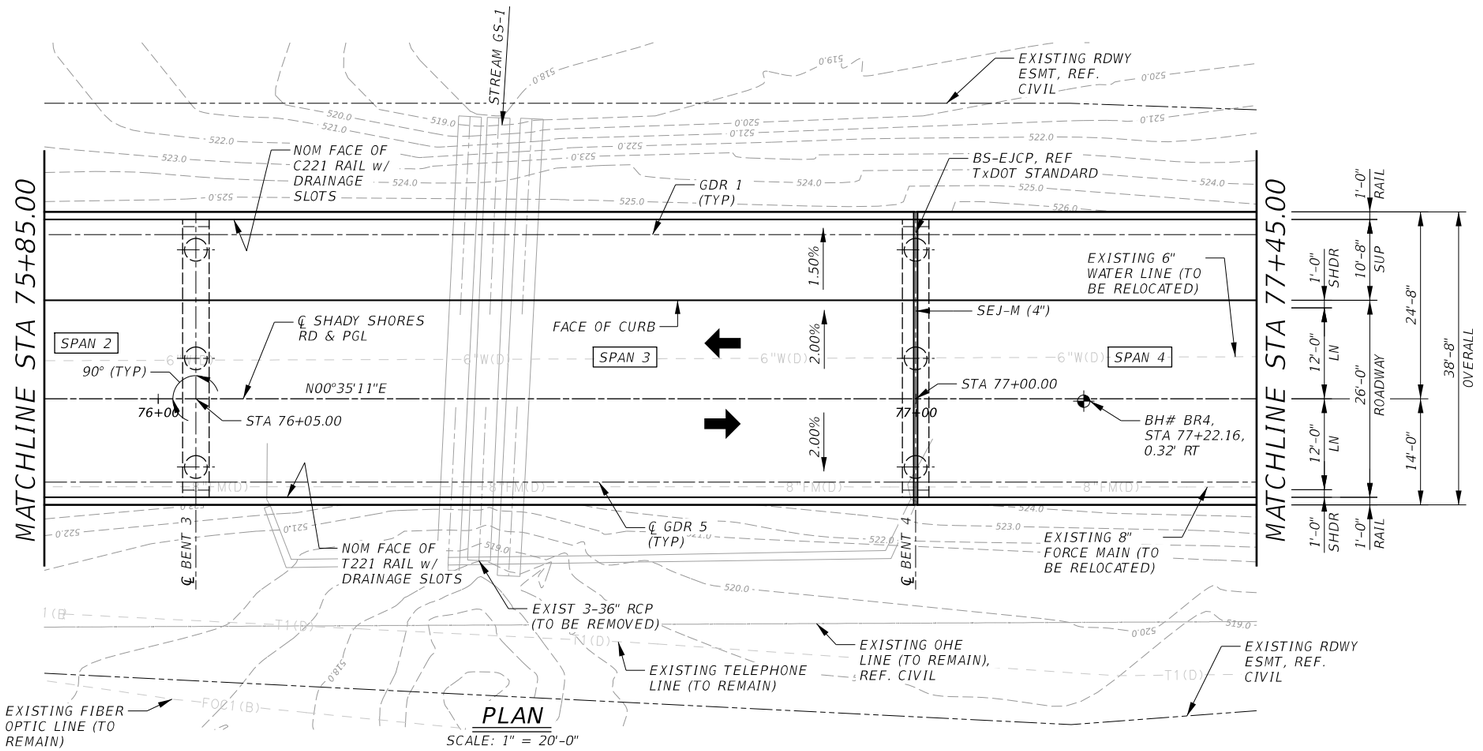
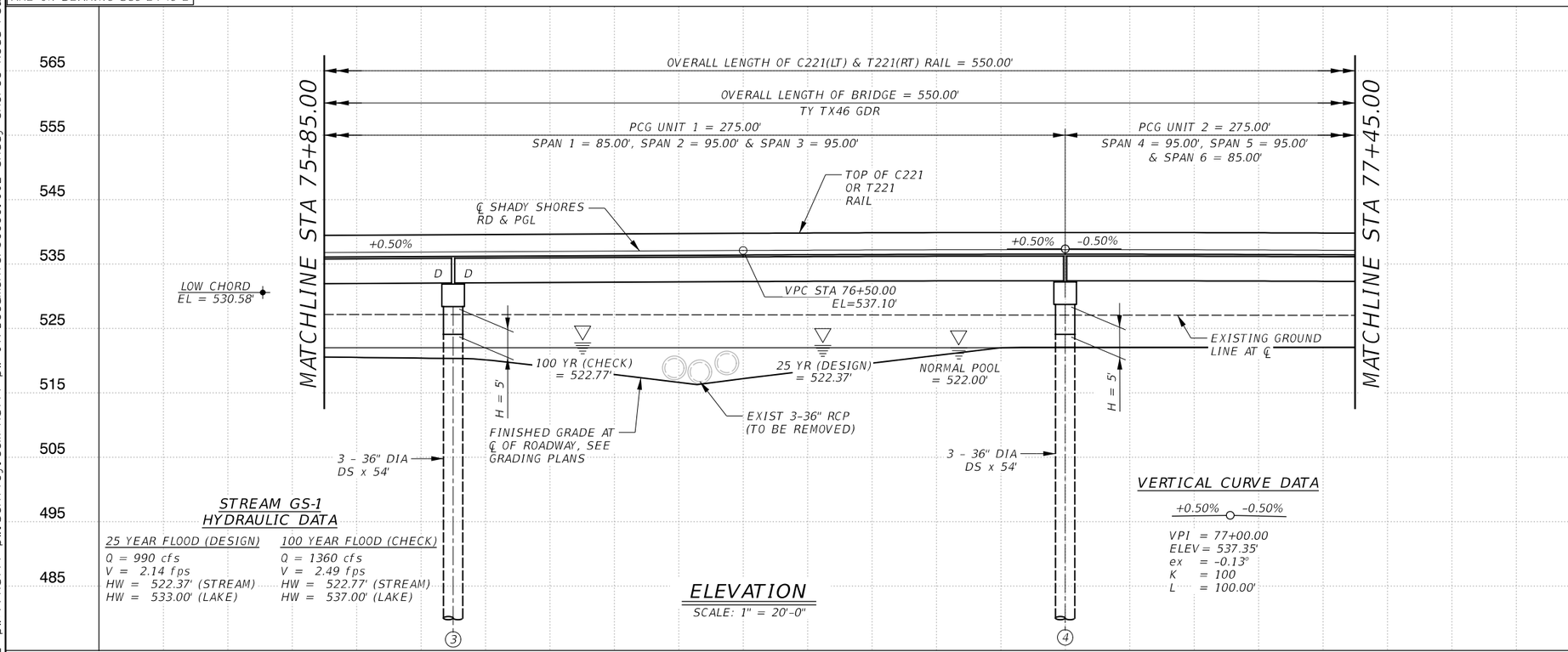


PLAN
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING S89°24'49"E



ELEVATION
SCALE: 1" = 20'-0"

STREAM GS-1
HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 990 cfs	Q = 1360 cfs
V = 2.14 fps	V = 2.49 fps
HW = 522.37' (STREAM)	HW = 522.77' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

VERTICAL CURVE DATA

+0.50% -0.50%

VPI = 77+00.00
ELEV = 537.35'
ex = -0.13'
K = 100
L = 100.00'

0 10 20 30 40
SCALE: 1"=20'

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Dallas District Bridge

BRIDGE LAYOUT
STREAM GS-1
STA 75+85 - 77+45
NBI: 18-061-0-KK00-05-003

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		203

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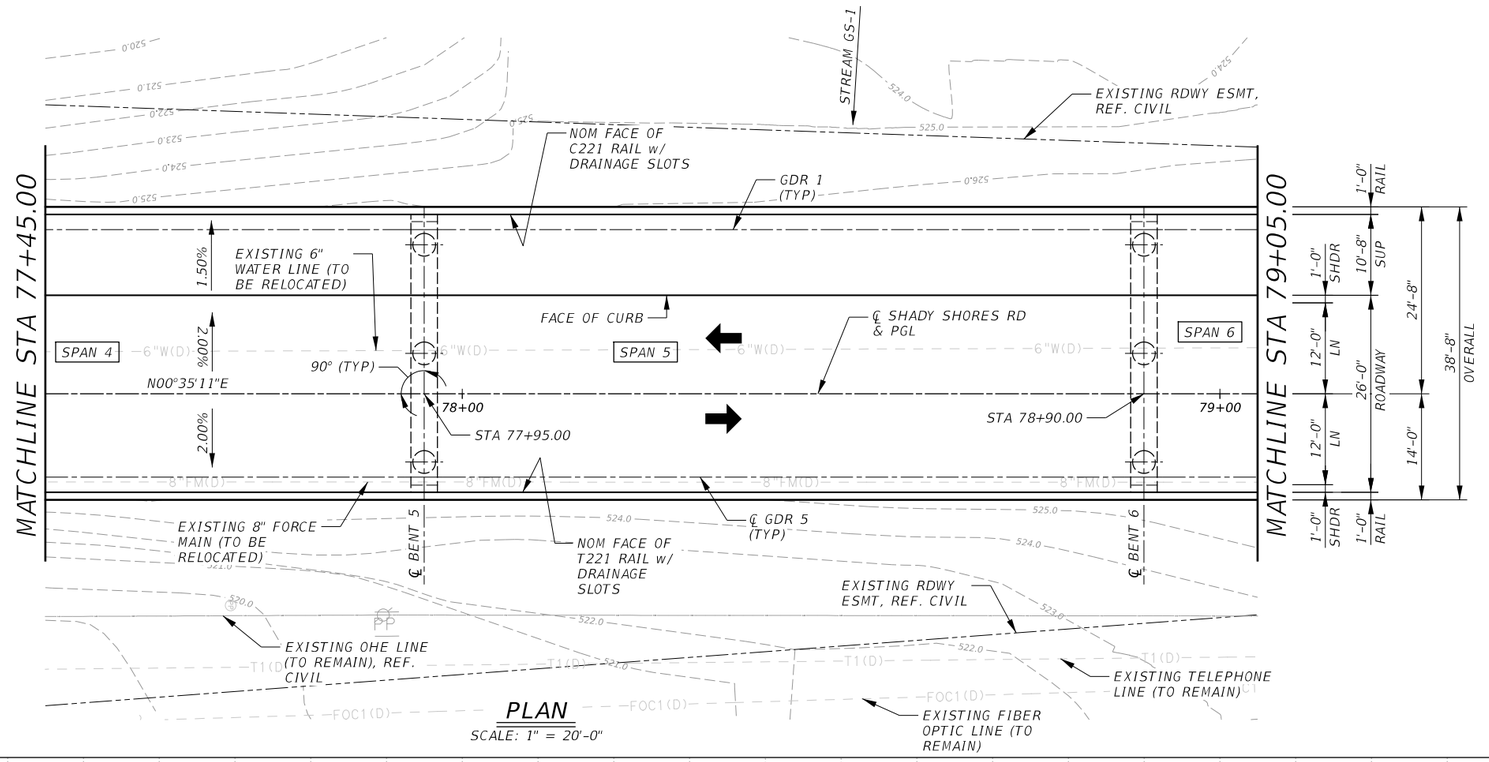


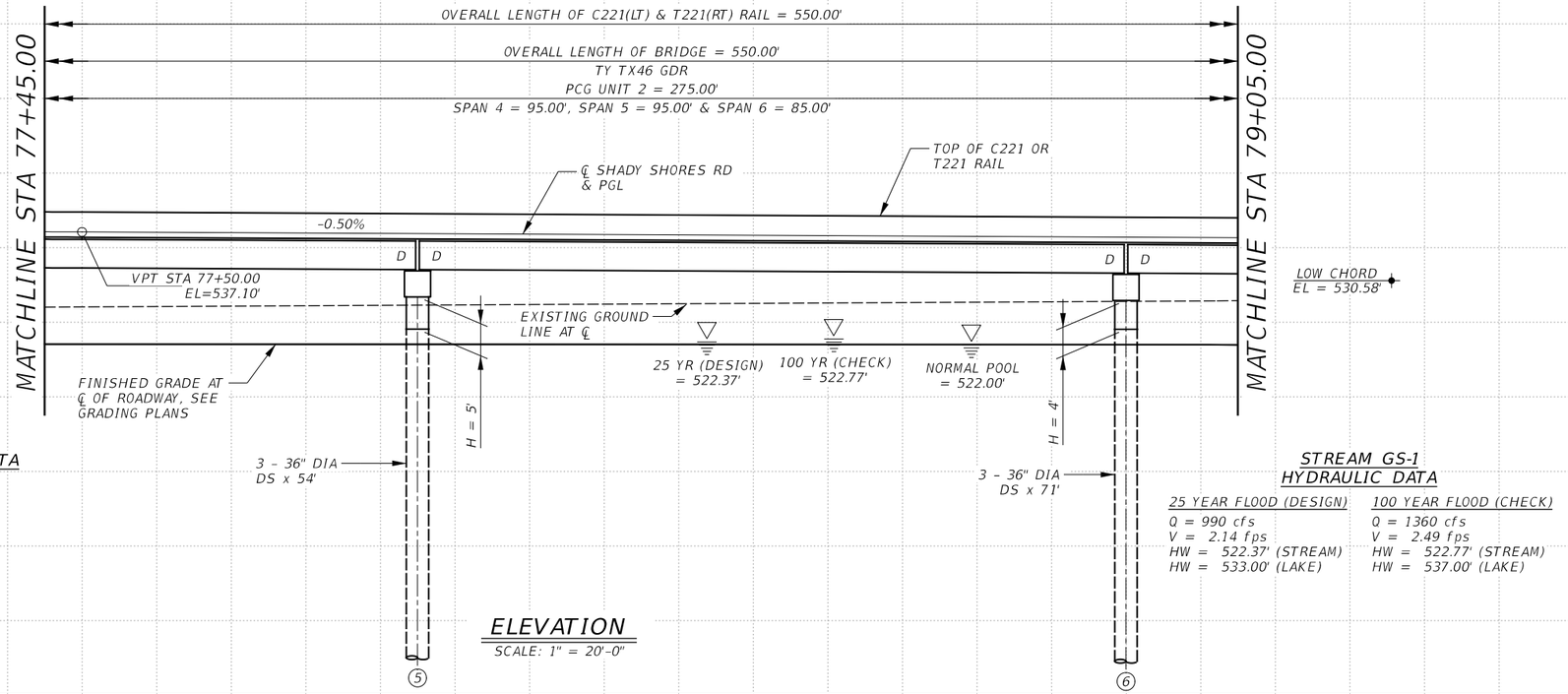
PLAN
SCALE: 1" = 20'-0"

N

0 10 20 30 40

SCALE: 1"=20'

ALL ABUTMENTS AND BENTS ARE ON BEARING S89°24'49"E



ELEVATION
SCALE: 1" = 20'-0"

VERTICAL CURVE DATA

+0.50% -0.50%

VPI = 77+00.00
ELEV = 537.35'
ex = -0.13'
K = 100
L = 100.00'

STREAM GS-1
HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 990 cfs	Q = 1360 cfs
V = 2.14 fps	V = 2.49 fps
HW = 522.37' (STREAM)	HW = 522.77' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

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Dallas District Bridge

BRIDGE LAYOUT
STREAM GS-1
STA 77+45 - 79+05
NBI: 18-061-0-KK00-05-003

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		204

User:
DATE: 11/25/2025 TIME: 3:26:40 PM
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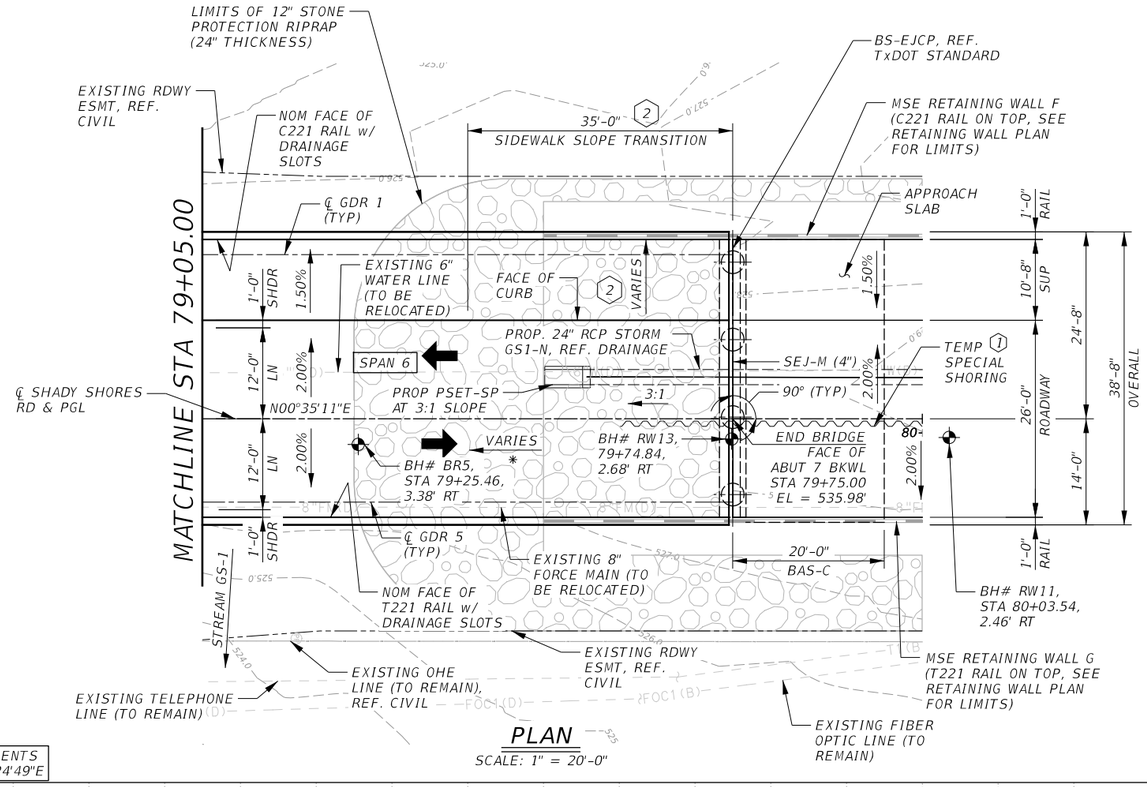
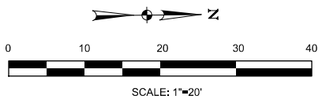


PLAN

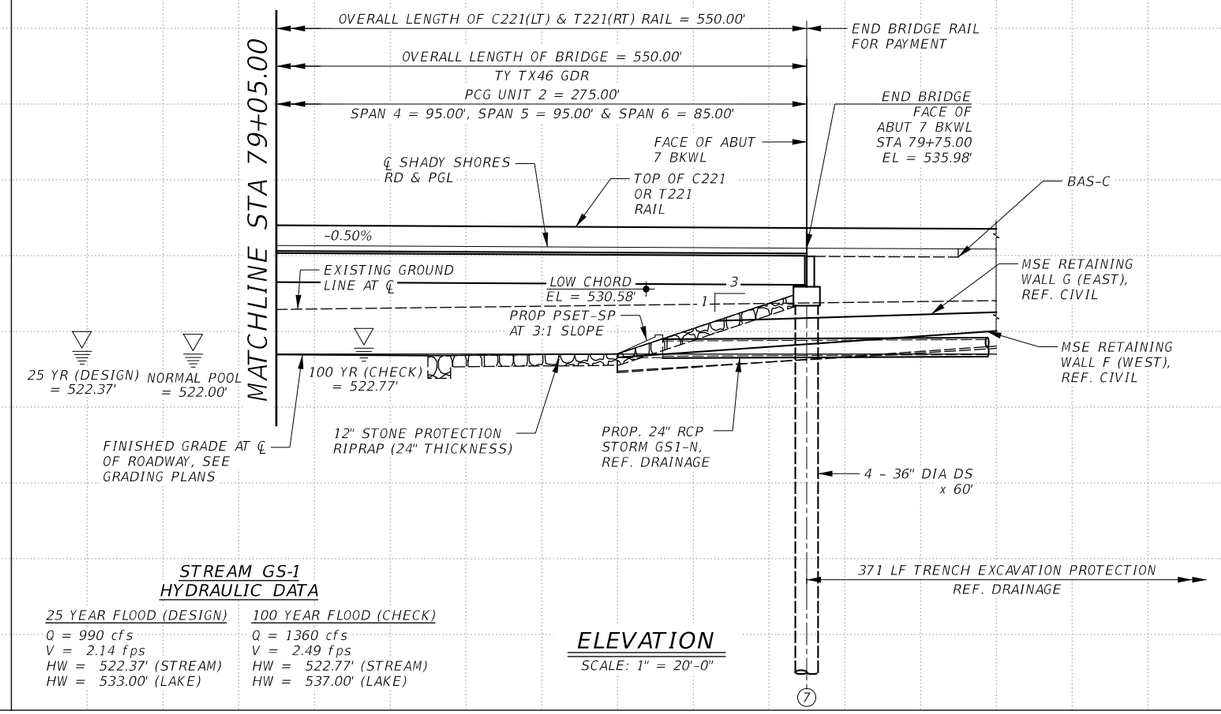
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING S89°24'49"E



1. SEE RETAINING WALL SHEETS FOR DETAILS AND QUANTITIES.
2. SEE BRIDGE TYPICAL SECTION SHEET FOR SUP SLOPE TRANSITION SKETCH FOR DETAILS.

✳ SEE GRADING PLAN SHEETS FOR BRIDGE END GRADING DETAIL.



ELEVATION

SCALE: 1" = 20'-0"

STREAM GS-1
HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 990 cfs	Q = 1360 cfs
V = 2.14 fps	V = 2.49 fps
HW = 522.37' (STREAM)	HW = 522.77' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

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Dallas District Bridge

BRIDGE LAYOUT
STREAM GS-1
STA 79+05 - 80+00
NBI: 18-061-0-KK00-05-003

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		205

DATE: 11/25/2025 TIME: 3:27:00 PM
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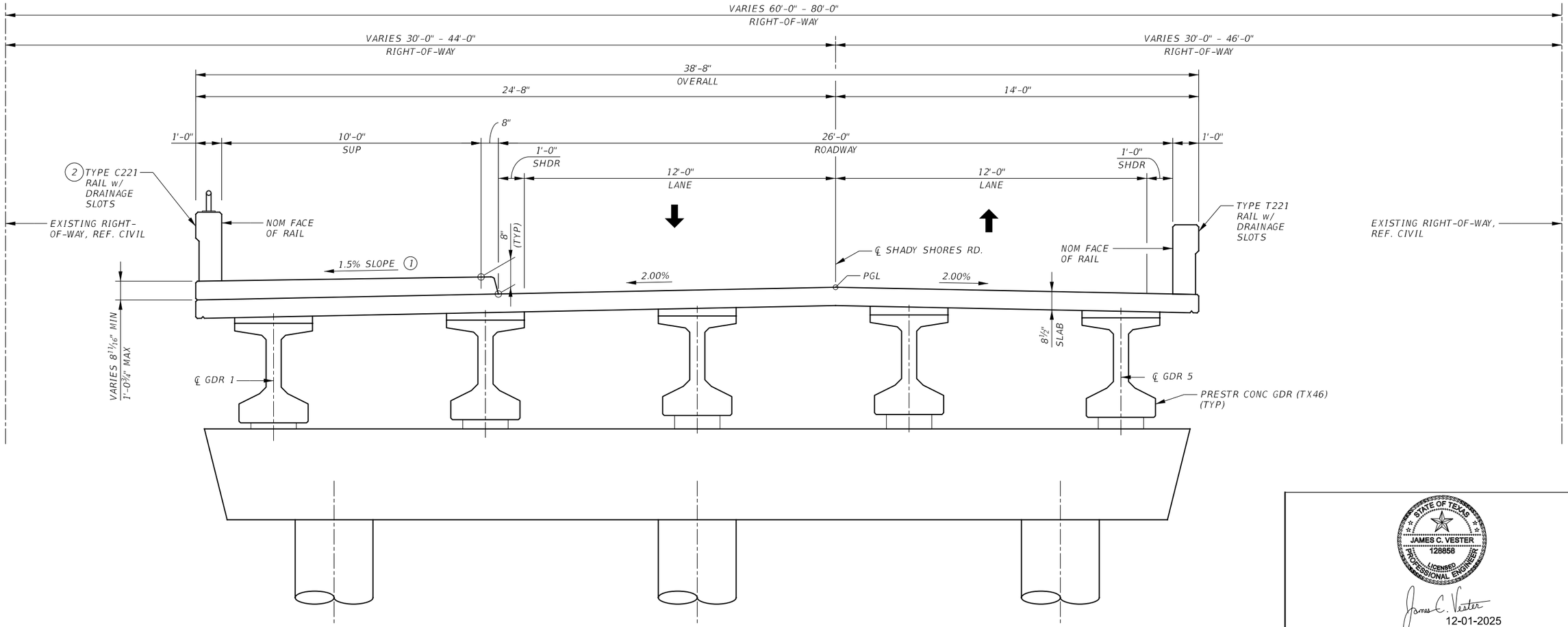


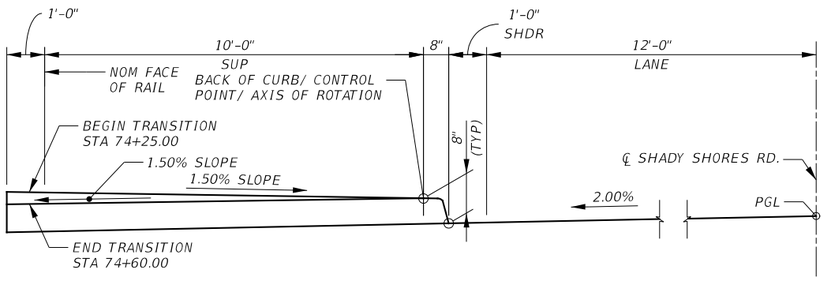
1 SUP CROSS SLOPE FROM STA 74+60.00 TO 79+40.00. SEE SUP CROSS SLOPE TRANSITION SKETCH FOR 74+25.00 TO 74+60.00 AND STA 79+40.00 TO 79+75.00.

2 RAIL DRAINAGE SLOTS ARE NOT REQUIRED WITHIN THE FIRST 17' OF SUP SLOPE TRANSITION AT THE BEGINNING OF BRIDGE AND THE LAST 17' OF SLOPE TRANSITION AT THE END OF BRIDGE.

TYPICAL SECTION

SCALE: 1/4" = 1'-0"

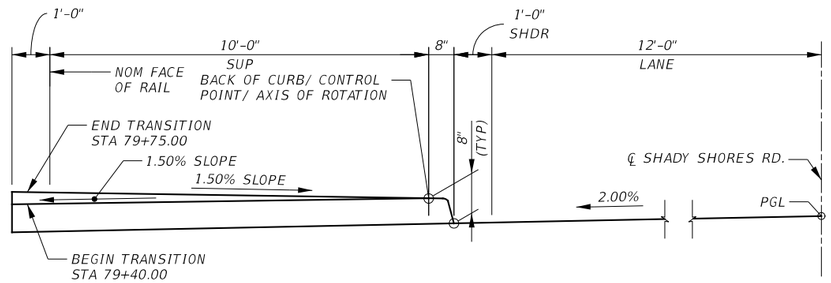
STA 74+25.00 TO 79+75.00



SUP CROSS SLOPE TRANSITION SKETCH

SCALE: 1/4" = 1'-0"

STA 74+25.00 TO 74+60.00



SUP CROSS SLOPE TRANSITION SKETCH

SCALE: 1/4" = 1'-0"

STA 79+40.00 TO 79+75.00

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BRIDGE TYPICAL SECTION STREAM GS-1

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		206

DATE: 11/25/2025 TIME: 3:27:19 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SC-GS-1-BS01
User:

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE ELEMENT \ BID ITEM DESCRIPTION	416 7006 DRILL SHAFTS (1) (36 IN)	420 7013 CL "C" CONC (HPC) (ABUT)	420 7023 CL "C" CONC (HPC) (CAP)	420 7039 CL "C" CONC (HPC) (COLUMN)	422 7002 REINF CONC SLAB (HPC)	422 7014 APPROACH SLAB (HPC)	422 7022 BRIDGE SIDEWALK (HPC)	425 7004 PRESTR CONC GIRDER (TX46)	432 7041 RIPRAP (STONE PROTECTION) (12 IN)	442 7008 STR STL (MISC) (BS-EJCP)	450 7005 RAIL (HPC) (TY T221)	450 7033 RAIL (HPC) (TY C221)	454 7004 SEALED EXPANSION JOINT (4 IN) (SEJ-M)
	LF	CY	CY	CY	SF	CY	SF	LF	CY	LB	LF	LF	LF
2 - ABUTMENTS	440	36											
4 - INTERIOR BENTS	891		85.0	18									
2 - 275.00' PCG UNITS					21,230	59	6,419	2,735.06	5,280	448	550.0	550.0	81
TOTAL	1,331	36	85.0	18	21,230	59	6,419	2,735.06	5,280	448	550.0	550.0	81

(1) PROVIDE SULFATE RESISTANT CONCRETE FOR DRILLED SHAFTS.

BEARING SEAT ELEVATIONS

			GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5
ABUT	1	(FWD)	530.510	530.673	530.837	530.887	530.723
BENT	2	(BK)	530.925	531.088	531.252	531.302	531.138
		(FWD)	530.935	531.098	531.262	531.312	531.148
BENT	3	(BK)	531.400	531.563	531.727	531.777	531.613
		(FWD)	531.410	531.573	531.737	531.787	531.623
BENT	4	(BK)	531.750	531.913	532.077	532.127	531.963
		(FWD)	531.750	531.913	532.077	532.127	531.963
BENT	5	(BK)	531.410	531.573	531.737	531.787	531.623
		(FWD)	531.400	531.563	531.727	531.777	531.613
BENT	6	(BK)	530.935	531.098	531.262	531.312	531.148
		(FWD)	530.925	531.088	531.252	531.302	531.138
ABUT	7	(BK)	530.510	530.673	530.837	530.887	530.723

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12-01-2025

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SHADY SHORES ROAD STREAM GS-1 EST. QUANTITIES AND BEARING SEAT ELEVATIONS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		207

DATE: 12/4/2025 TIME: 9:21:01 AM
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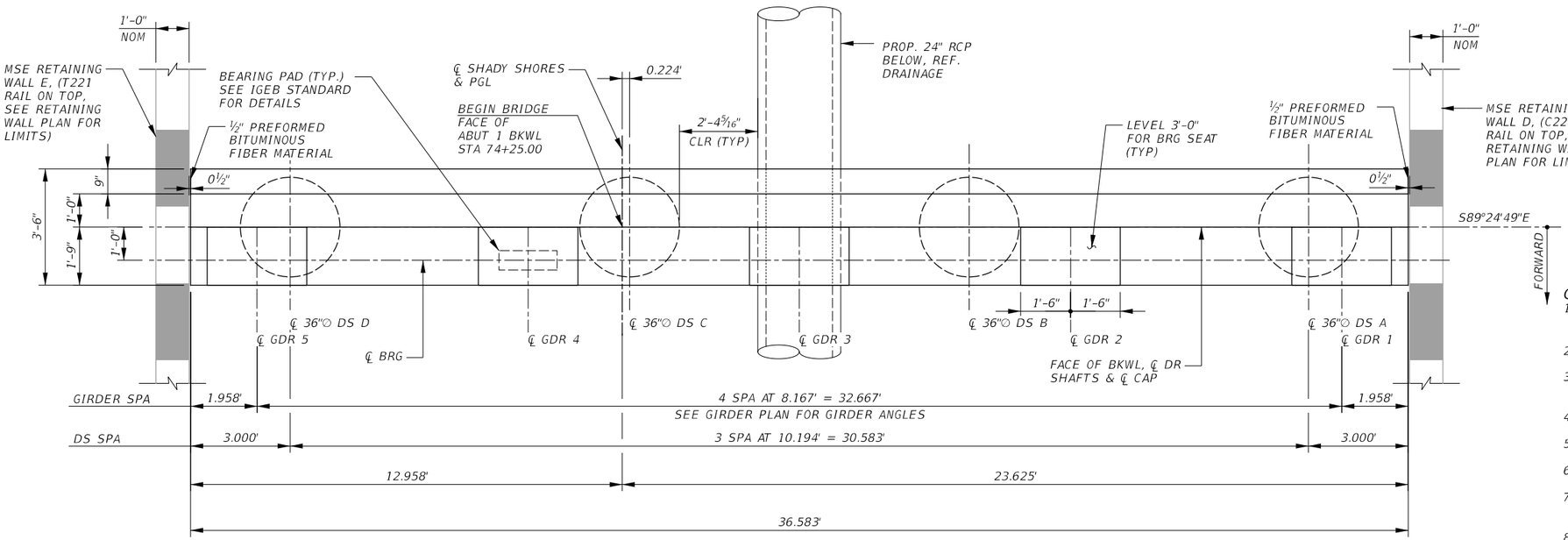
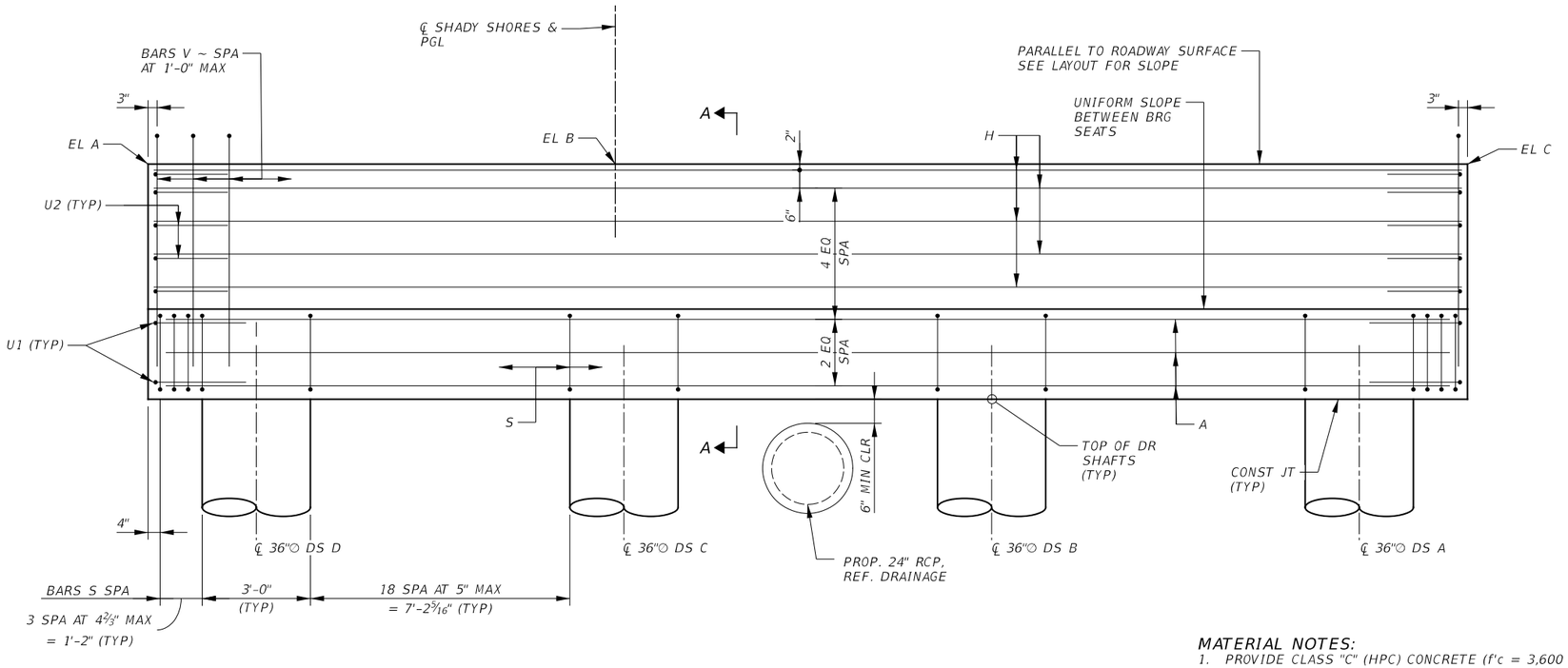
User:



PLAN

SCALE: ¼" = 1'-0"
ABUTMENT 1 SHOWN, ABUTMENT 7 SIMILAR



ELEVATION

SCALE: ¼" = 1'-0"

CONTROL ELEVATIONS

ABUTMENT	STATION	TOP OF ABUTMENT			TOP OF DRILLED SHAFTS			
		EL A	EL B	EL C	DS A	DS B	DS C	DS D
1	74+25.00	534.64	534.90	534.42	527.91	528.11	528.31	258.12
7	79+75.00	534.42	534.90	534.64	528.12	528.31	528.11	527.91

BAR SCHEDULE ~ ONE CAP

BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
A	St	12	#11	35'-8"	2,274
H	St	10	#6	36'-4"	546
S	Bt	65	#5	11'-6"	780
U1	Bt	4	#6	8'-1"	49
U2	Bt	10	#6	5'-6½"	84
V	Bt	36	#5	14'-5"	541
(1) TOTAL REINFORCING STEEL				LB	4,274
CL C CONC (HPC) (ABUT)				CY	18.0

ESTIMATED QUANTITIES

ITEM	UNIT	ABUT 1	ABUT 7
DRILL SHAFT (36IN)	LF	200	240
CL C CONC (HPC) (ABUT)	CY	18.0	18.0
(1) REINF STEEL	LB	4,274	4,274

(1) FOR CONTRACTOR'S INFORMATION ONLY.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. CHAMFER ALL EXPOSED EDGES ¾" UNLESS NOTED OTHERWISE.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE CAP.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD = 112 TONS/SHAFT.
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN MSE WALLS.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIY AND BEARING SEAT ELEVATIONS" SHEET
8. SEE FD STANDARD FOR FOUNDATION DETAILS AND NOTES.

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI).
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

Sheet 1 of 2 Sheets

halff

Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 ABUTMENT 1 OR 7

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		208

DATE: 11/25/2025 TIME: 3:27:56 PM
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User:

User:
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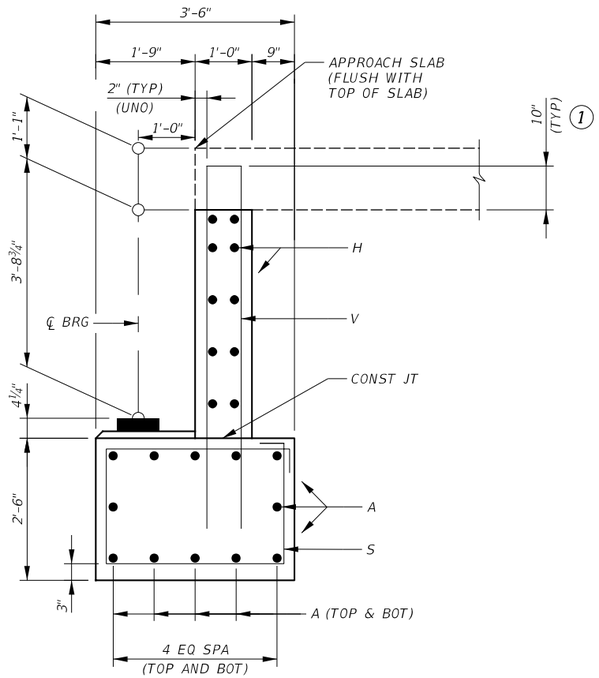
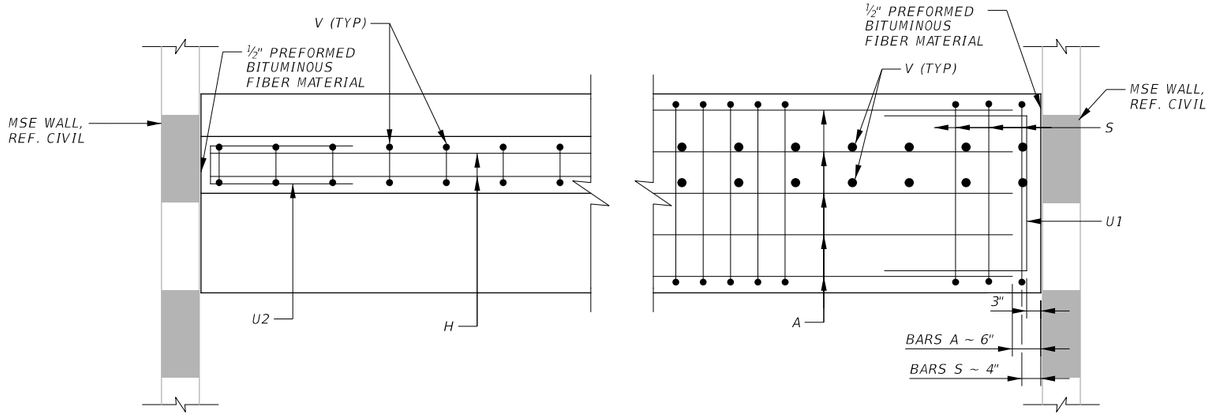
(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.



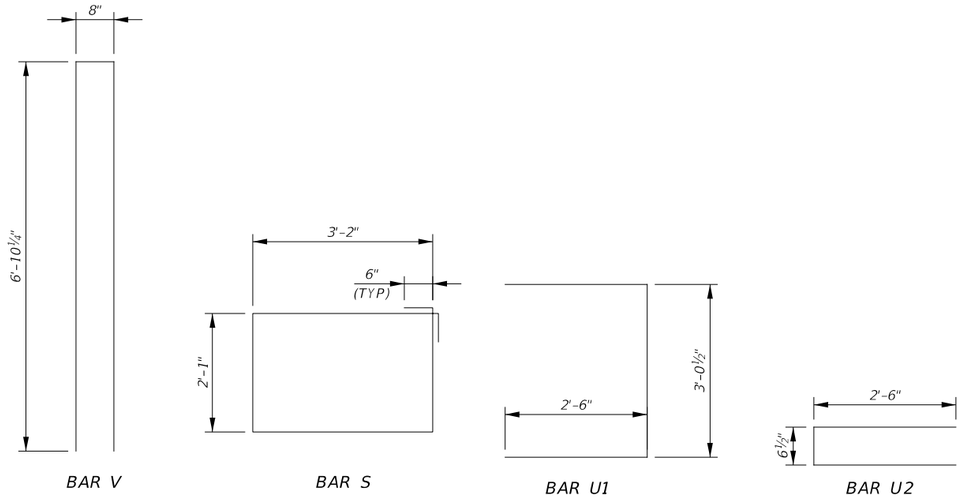
SECTION A-A

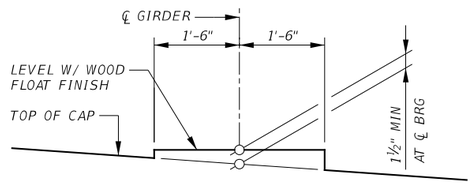


BACKWALL CAP

CORNER DETAILS

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.





BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 2 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 ABUTMENT 1 OR 7

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		209

User:
DATE: 11/25/2025 TIME: 3:28:35 PM
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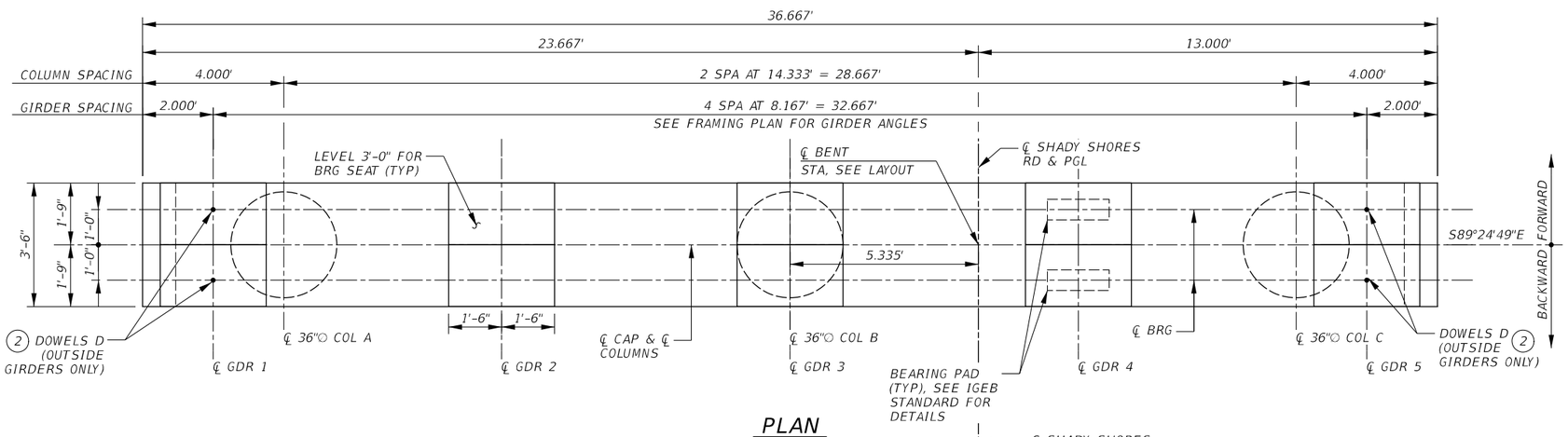
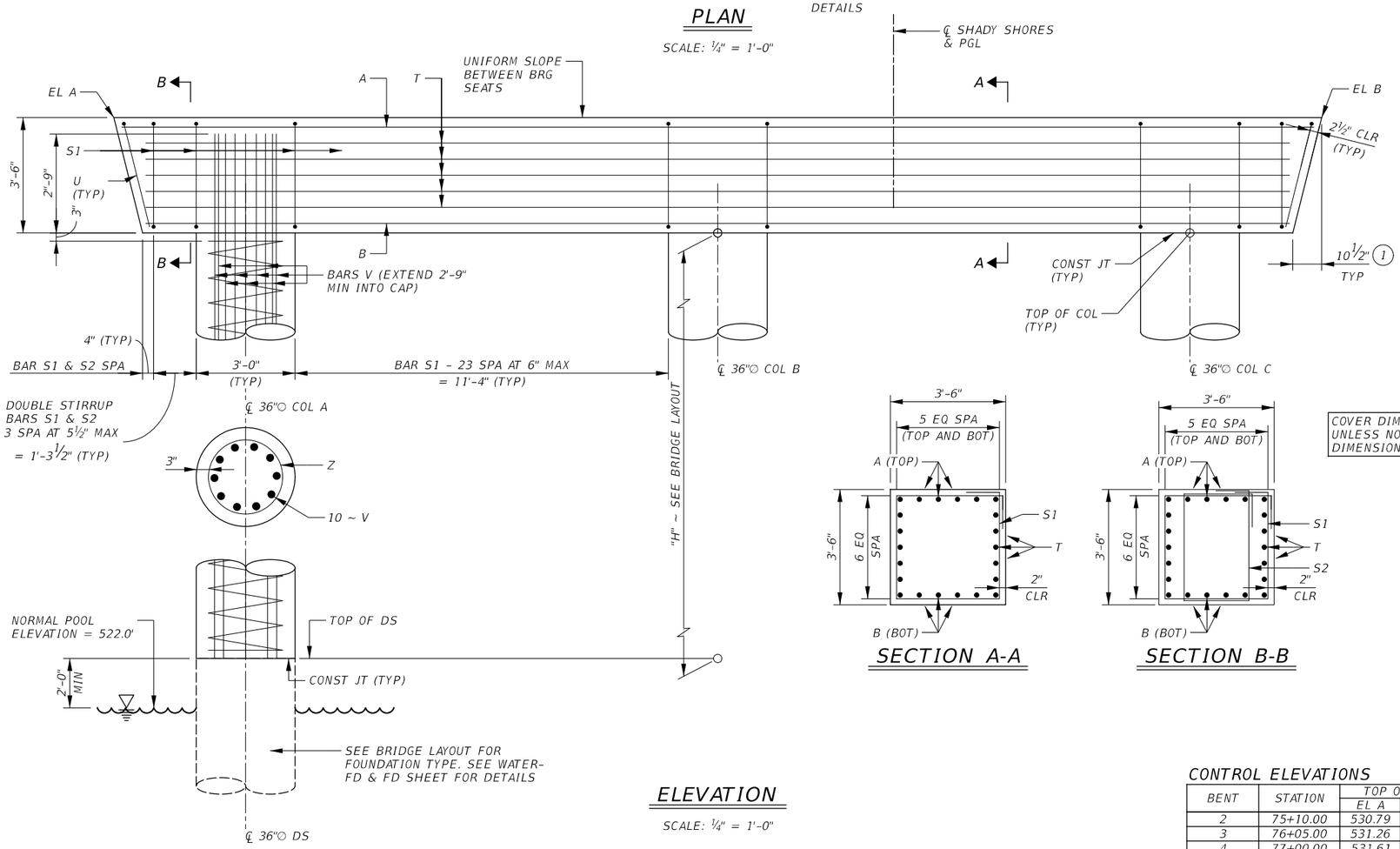


PLAN

SCALE: ¼" = 1'-0"



ELEVATION

SCALE: ¼" = 1'-0"

SECTION A-A

SECTION B-B

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

(2) DOWEL TABLE

BENT	
2	DOWEL
3	DOWEL
4	-
5	DOWEL
6	DOWEL

CONTROL ELEVATIONS

BENT	STATION	TOP OF CAP		TOP OF COLUMNS		
		EL A	EL B	COL A	COL B	COL C
2	75+10.00	530.79	531.03	527.31	527.41	527.50
3	76+05.00	531.26	531.50	527.79	527.88	527.98
4	77+00.00	531.61	531.85	528.14	528.23	528.33
5	77+95.00	531.26	531.50	527.79	527.88	527.98
6	78+90.00	530.79	531.03	527.31	527.41	527.50

(1) MEASURED PARALLEL TO TOP OF CAP CROSS SLOPE.

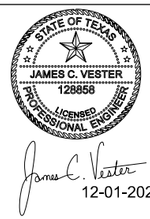
(2) SEE DOWEL TABLE FOR DOWEL LOCATIONS.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. THE PRICE BID PER FOOT OF COLUMN SHALL INCLUDE THE REINFORCING EXTENDING FROM THE COLUMN INTO THE CAP.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE COLUMN.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD:
   BENT 2 & 6 = 252 TONS/SHAFT
   BENT 3, 4, & 5 = 265 TONS/SHAFT
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET AND WATER-FD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS" SHEET.

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI) FOR BENT CAP AND COLUMN.
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.
4. GALVANIZE DOWELS D.



Sheet 1 of 2 Sheets

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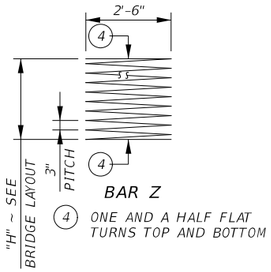
Texas Department of Transportation

Dallas District Bridge

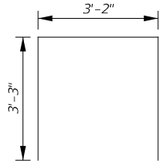
SHADY SHORES ROAD STREAM GS-1 TYPICAL INTERIOR BENT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		210

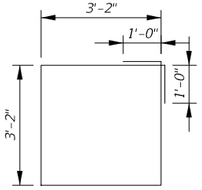


BAR Z

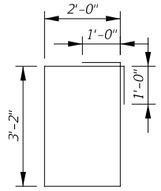
(4) ONE AND A HALF FLAT TURNS TOP AND BOTTOM



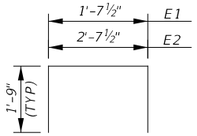
BAR U



BAR S1



BAR S2



BARS E

BAR SCHEDULE ~ ONE CAP

	BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
	A	St	6	#11	36'-2"	1,153
	B	St	6	#11	34'-8"	1,105
	D	St	4	#9	1'-8"	23
(3)	E1	Bt	24	#5	5'-2"	128
(3)	E2	Bt	18	#5	6'-2"	115
	S1	Bt	56	#6	14'-8"	1,233
	S2	Bt	8	#6	12'-4"	148
	T	St	10	#5	34'-8"	362
	U	Bt	2	#5	9'-8"	20
(1)	TOTAL REINFORCING STEEL				LB	4,287
	CL C CONC (HPC) (CAP)				CY	17.0

COLUMN SCHEDULE ~ ONE COLUMN

					EST QUANT~3 COL	
"H"	BARS V~10-#9		BARS Z~#4 SPIRAL		REINF STEEL	CLASS C CONC
FT	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
3	5'-9"	196	58'	39	705	2.3
4	6'-9"	230	74'	50	840	3.1
5	7'-9"	264	90'	61	975	3.9
6	8'-9"	298	105'	71	1,107	4.7
7	9'-9"	332	121'	81	1,239	5.4

ADJUST SPIRAL Z LENGTH BY 7.9 FT AND BAR V LENGTH BY 0.5 FT FOR EACH 0.5 FT VARIATION IN "H" VALUE.
ADJUST REINFORCING STEEL TOTAL BY 22.3 LBS AND CONCRETE BY 0.13 CY PER COLUMN FOR EACH 0.5 FT VARIATION IN "H" VALUE PER COLUMN.

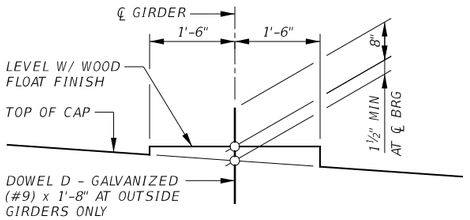
(1) FOR CONTRACTOR'S INFORMATION ONLY.

(2) SEE DOWEL TABLE ON SHEET 1 OF 2.

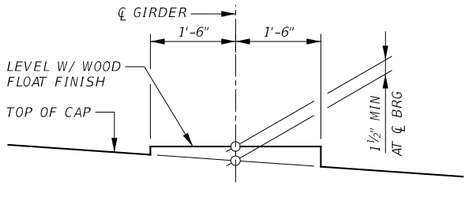
(3) PEDESTAL BEARING OCCURS FOR ALL INTERIOR GIRDERS. ADDITIONAL 0.3CY AND "E" BARS INCLUDED FOR PEDESTAL BEARING SEATS IN QUANTITY TABLE.

ESTIMATED QUANTITIES

	ITEM	UNIT	BENT 2	BENT 3	BENT 4	BENT 5	BENT 6
	DRILL SHAFT (36IN)	LF	192	162	162	162	213
	CL C CONC (HPC) (CAP)	CY	17.0	17.0	17.0	17.0	17.0
	CL C CONC (HPC) (COL)	CY	3.1	3.9	3.9	3.9	3.1
(1)	REINF STEEL	LB	4,287	4,287	4,287	4,287	4,287



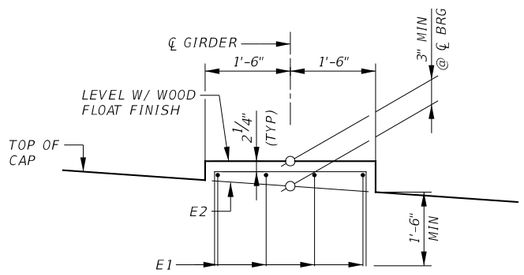
WITH DOWEL



WITHOUT DOWEL

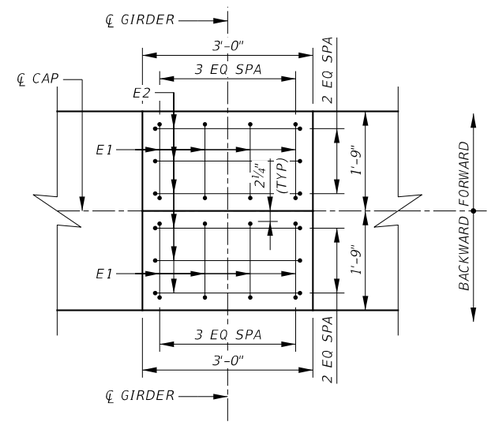
BEARING SEAT DETAIL (2)

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



PEDESTAL BEARING SEAT ELEVATION (3)

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



PEDESTAL BEARING SEAT PLAN (3)

* PEDESTAL REINF. REQUIRED PER SECTION 420.4.9 WHEN HEIGHT >3".

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

Sheet 2 of 2 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 TYPICAL INTERIOR BENT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		211

DATE: 11/25/2025 TIME: 3:28:53 PM
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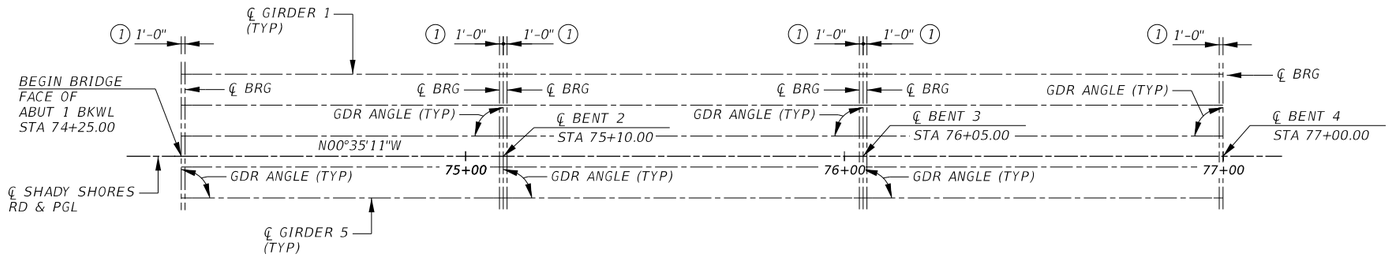


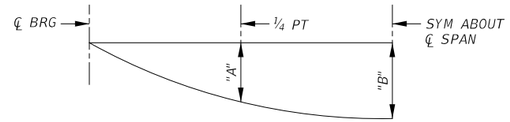
SPAN 1 (TY TX46 GDR) | SPAN 2 (TY TX46 GDR) | SPAN 3 (TY TX46 GDR)

PLAN

SCALE: 1" = 40'-0"

(1) SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION.

(2) GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.



DEAD LOAD DEFLECTION DIAGRAM

DEFLECTIONS SHOWN ARE DUE TO CIP CONCRETE SLAB ONLY (EC = 5,000 KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DEFLECTIONS MAY BE LESS. DEFLECTIONS SHALL BE ADJUSTED BASED ON FIELD OBSERVATIONS.
(FOR DEAD LOAD DEFLECTIONS SEE FRAMING PLANS.)

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	85.000	84.500	83.000	84.501	0.005	0.048	0.068
GIRDER 2	85.000	84.500	83.000	84.501	0.005	0.056	0.078
GIRDER 3	85.000	84.500	83.000	84.501	0.005	0.056	0.078
GIRDER 4	85.000	84.500	83.000	84.501	0.005	0.056	0.078
GIRDER 5	85.000	84.500	83.000	84.501	0.005	0.048	0.068
	TOTAL	422.500					

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	95.000	94.500	93.000	94.501	0.005	0.076	0.107
GIRDER 2	95.000	94.500	93.000	94.501	0.005	0.088	0.123
GIRDER 3	95.000	94.500	93.000	94.501	0.005	0.088	0.123
GIRDER 4	95.000	94.500	93.000	94.501	0.005	0.088	0.123
GIRDER 5	95.000	94.500	93.000	94.501	0.005	0.076	0.107
	TOTAL	472.500					

GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	95.000	94.500	93.000	94.501	0.004	0.076	0.107
GIRDER 2	95.000	94.500	93.000	94.501	0.004	0.088	0.123
GIRDER 3	95.000	94.500	93.000	94.501	0.004	0.088	0.123
GIRDER 4	95.000	94.500	93.000	94.501	0.004	0.088	0.123
GIRDER 5	95.000	94.500	93.000	94.501	0.004	0.076	0.107
	TOTAL	472.500					

BENT REPORT

ABUT NO. 1 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (ABUT BKWL)	GIRDER ANGLE (C.L. BENT) D	M	S
SPAN 1 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 2 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 2 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 3 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 3 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 4 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 1 of 2 Sheets

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Texas Department of Transportation
Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 FRAMING PLAN

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		212

DATE: 11/25/2025 TIME: 3:29:11 PM
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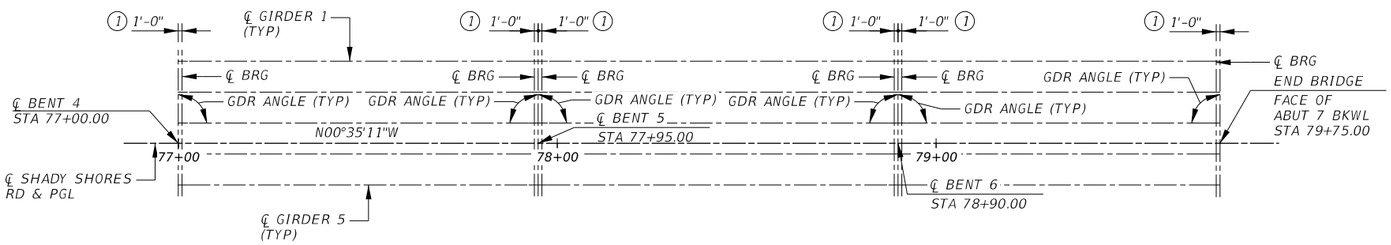

SPAN 4
(TY TX46 GDR)

SPAN 5
(TY TX46 GDR)

SPAN 6
(TY TX46 GDR)

PLAN

SCALE: 1" = 40'-0"

N

(1) SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION.

(2) GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

GIRDER REPORT

GIRDER REPORT, SPAN 4

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	95.000	94.500	93.000	94.501	-0.004	0.076	0.107
GIRDER 2	95.000	94.500	93.000	94.501	-0.004	0.088	0.123
GIRDER 3	95.000	94.500	93.000	94.501	-0.004	0.088	0.123
GIRDER 4	95.000	94.500	93.000	94.501	-0.004	0.088	0.123
GIRDER 5	95.000	94.500	93.000	94.501	-0.004	0.076	0.107
	TOTAL	472.500					

GIRDER REPORT, SPAN 5

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	95.000	94.500	93.000	94.501	-0.005	0.076	0.107
GIRDER 2	95.000	94.500	93.000	94.501	-0.005	0.088	0.123
GIRDER 3	95.000	94.500	93.000	94.501	-0.005	0.088	0.123
GIRDER 4	95.000	94.500	93.000	94.501	-0.005	0.088	0.123
GIRDER 5	95.000	94.500	93.000	94.501	-0.005	0.076	0.107
	TOTAL	472.500					

GIRDER REPORT, SPAN 6

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	85.000	84.500	83.000	84.501	-0.005	0.048	0.068
GIRDER 2	85.000	84.500	83.000	84.501	-0.005	0.056	0.078
GIRDER 3	85.000	84.500	83.000	84.501	-0.005	0.056	0.078
GIRDER 4	85.000	84.500	83.000	84.501	-0.005	0.056	0.078
GIRDER 5	85.000	84.500	83.000	84.501	-0.005	0.048	0.068
	TOTAL	422.500					

BENT REPORT

BENT NO. 4 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 4	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 5 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 4	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 5 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 5	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 6 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 5	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 6 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 6	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

ABUT NO. 7 (N 89°24'49" W)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(ABUT BKWL)	GIRDER ANGLE D	M	S
SPAN 6	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER

James C. Vester
12-01-2025

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 FRAMING PLAN

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		213

User:
DATE: 11/25/2025 TIME: 3:29:30 PM
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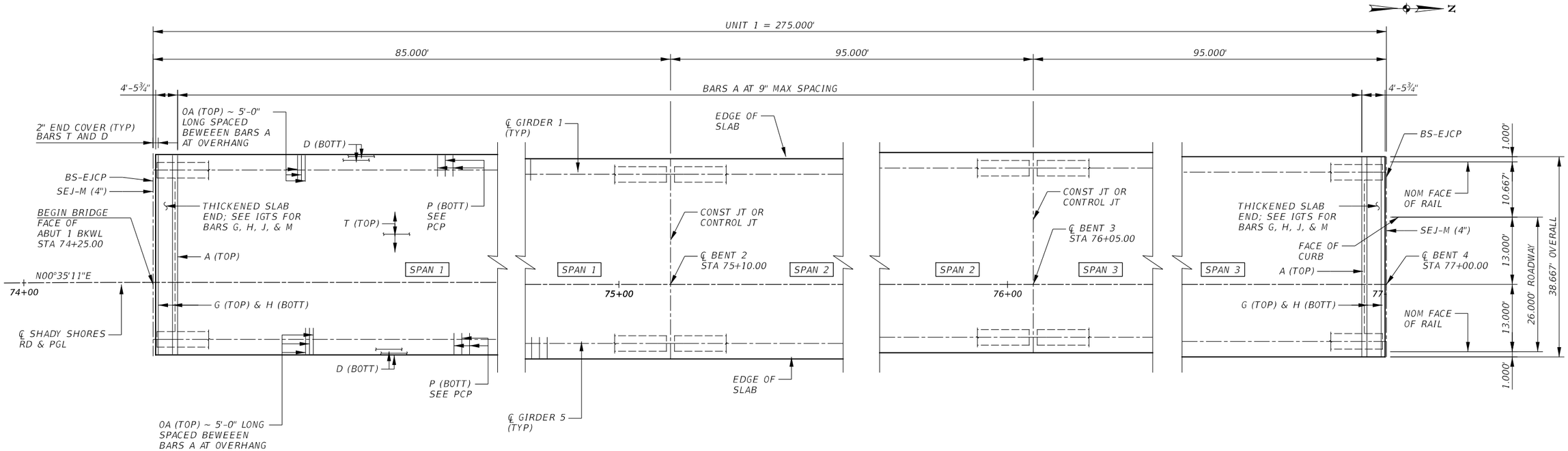

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

PLAN

SCALE: 1" = 20'-0"

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS S, CONCRETE STRENGTH f'c = 4000 PSI
2. FOR GIRDER BEARING PAD, MISC. SLAB, SIDEWALK EXPANSION JOINT COVER PLATE AND THICKENED SLAB END DETAILS NOT SHOWN SEE IGD, IGEB, IGMS, IGND, BS-EJCP AND IGTS STANDARDS.
3. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
4. FOR SEALED EXPANSION JOINT DETAILS NOT SHOWN, SEE SEJ-M STANDARD. FOR SEJ-M QUANTITIES NOT SHOWN SEE ESTIMATED QUANTITIES SHEET.
5. DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, 0A, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.
6. FOR RAIL DETAILS NOT SHOWN SEE TRAFFIC RAIL TYPE C221 & T221.
7. FOR GIRDER LAYOUTS SEE FRAMING PLAN SHEETS.
8. ALL REINFORCING SHALL BE GRADE 60 STEEL.
9. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   EPOXY COATED ~ #4 = 2'-5"

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Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 DECK DETAILS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		214

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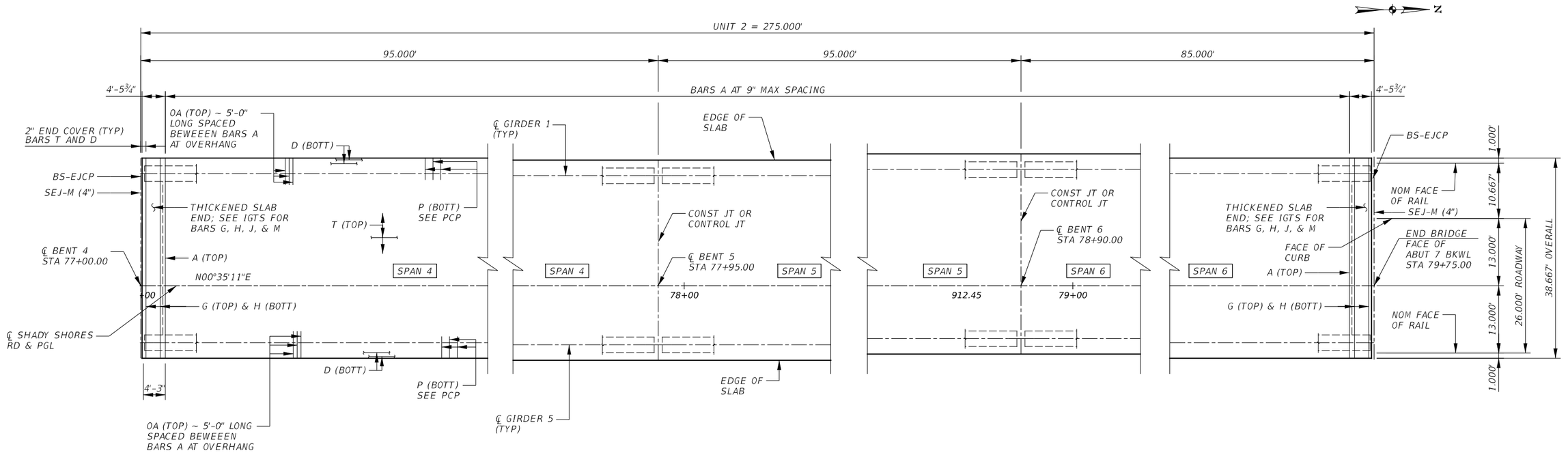

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

PLAN

SCALE: 1" = 20'-0"

STATE OF TEXAS
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12-01-2025

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Dallas District Bridge

SHADY SHORES ROAD STREAM GS-1 DECK DETAILS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		215

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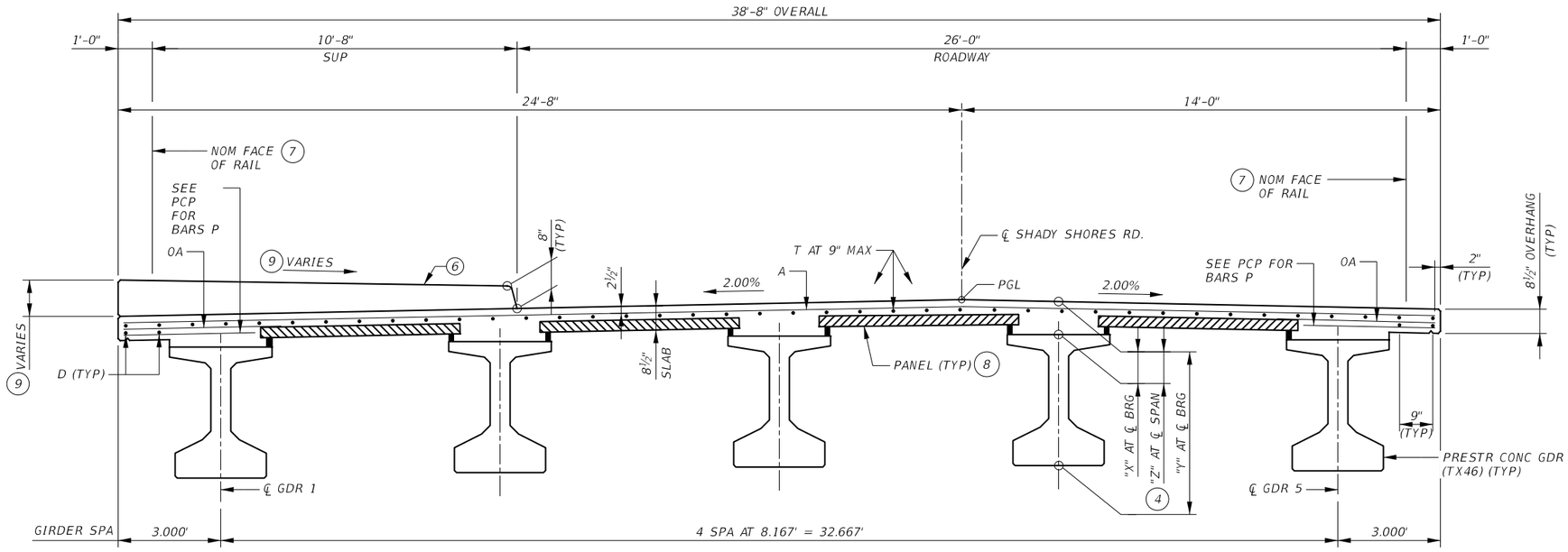

TYPICAL TRANSVERSE SECTION

SCALE: ¼" = 1'-0"

STA 73+95.00 TO 80+00.00

1. SEE DECK DETAILS FOR GENERAL AND MATERIAL NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

BAR TABLE

BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF SECTION DEPTHS (5)

SPAN NO.	BEAM NO.	"X" AT C.L. BRG	"Y" AT C.L. BRG	"Z" AT C.L. SPAN (4)
ALL	1-5	11¾"	4'-9 ¾"	10¼"

ESTIMATED QUANTITIES

	ITEM	UNIT	SPAN 1	SPAN 2	SPAN 3	SPAN 4	SPAN 5	SPAN 6	TOTAL
(1)	REINF CONC SLAB (HPC) (CL S)	SF	3,287	3,674	3,674	3,674	3,674	3,287	21,270
	PRESTR CONC GIRDER (Tx46)	LF	422.51	472.51	472.51	472.51	472.51	422.51	2,735.06
	CL S CONC (HPC) (SDWLK)	CY	31.5	35.1	35.1	35.1	35.1	31.5	203.4
(3) (2)	REINF STEEL	LB	7,561	8,451	8,451	8,451	8,451	7,561	48,926

(1) LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEETS FOR GIRDER LENGTHS.

(2) CONTRACTOR'S INFORMATION ONLY.

(3) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF FOR SLAB.

(4) THEORETICAL DIMENSION.

(5) SEE PCP STANDARD FOR HAUNCH REINFORCING DETAIL AND SPECIAL GRADING DETAIL FOR ALL AREAS WHERE MEASURED HAUNCH EXCEEDS 3½".

(6) FOR REINFORCEMENTS, SEE TxDOT STANDARD, BRSM.

(7) EPOXY COAT ALL REINFORCEMENT IN C221 AND T221 RAILING.

(8) SEE PRESTRESSED CONCRETE PANELS (PCP) STANDARD AND PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) STANDARD FOR PANEL DETAILS NOT SHOWN.

(9) SEE BRIDGE TYPICAL SECTION SHEET FOR SUP SLOPE AND SLOPE TRANSITION DETAILS.

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12-01-2025

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Dallas District Bridge

BRIDGE DECK SECTION STREAM GS-1

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		216

DATE: 11/25/2025 TIME: 3:30:29 PM
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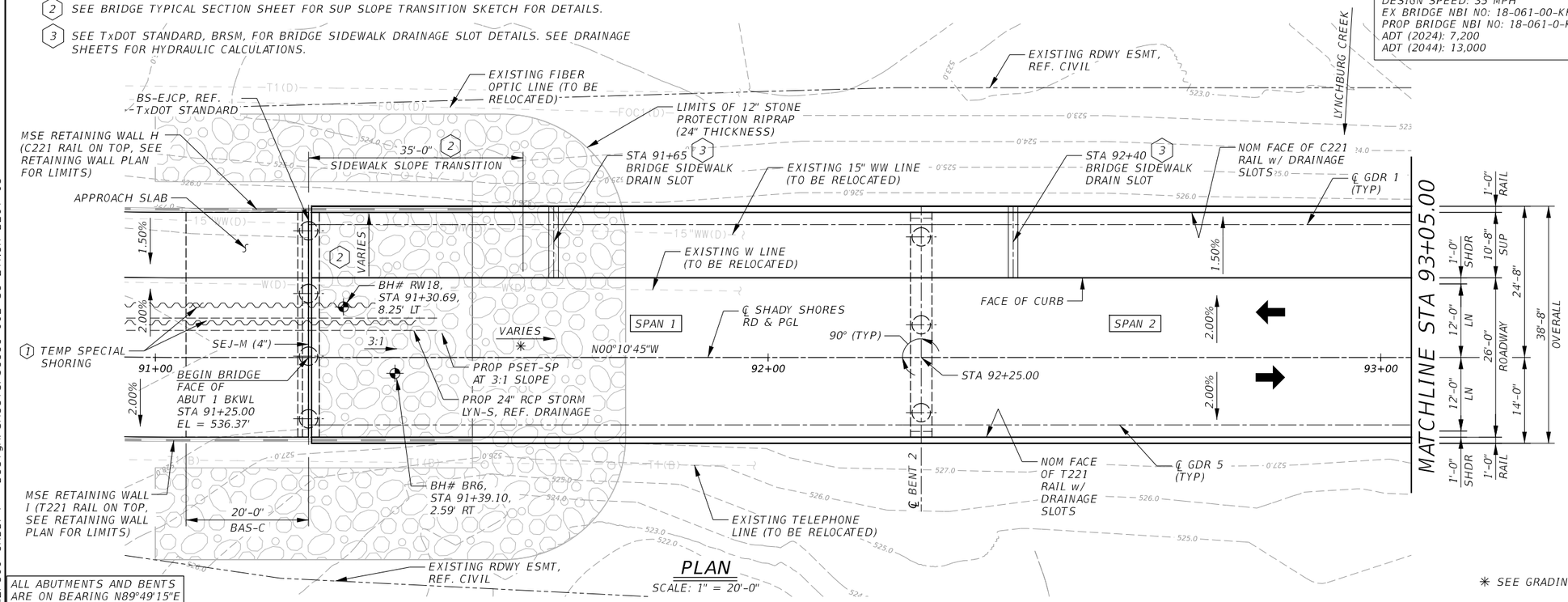
User:

1. SEE RETAINING WALL SHEETS FOR DETAILS AND QUANTITIES.
2. SEE BRIDGE TYPICAL SECTION SHEET FOR SUP SLOPE TRANSITION SKETCH FOR DETAILS.
3. SEE TxDOT STANDARD, BRSM, FOR BRIDGE SIDEWALK DRAINAGE SLOT DETAILS. SEE DRAINAGE SHEETS FOR HYDRAULIC CALCULATIONS.

FUNCTIONAL CLASS: URBAN MAJOR COLLECTOR
DESIGN SPEED: 35 MPH
EX BRIDGE NBI NO: 18-061-00-KK00-05-001
PROP BRIDGE NBI NO: 18-061-0-KK00-05-004
ADT (2024): 7,200
ADT (2044): 13,000

N

0 10 20 30 40
SCALE: 1"=20'



PLAN
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING N89°49'15"E

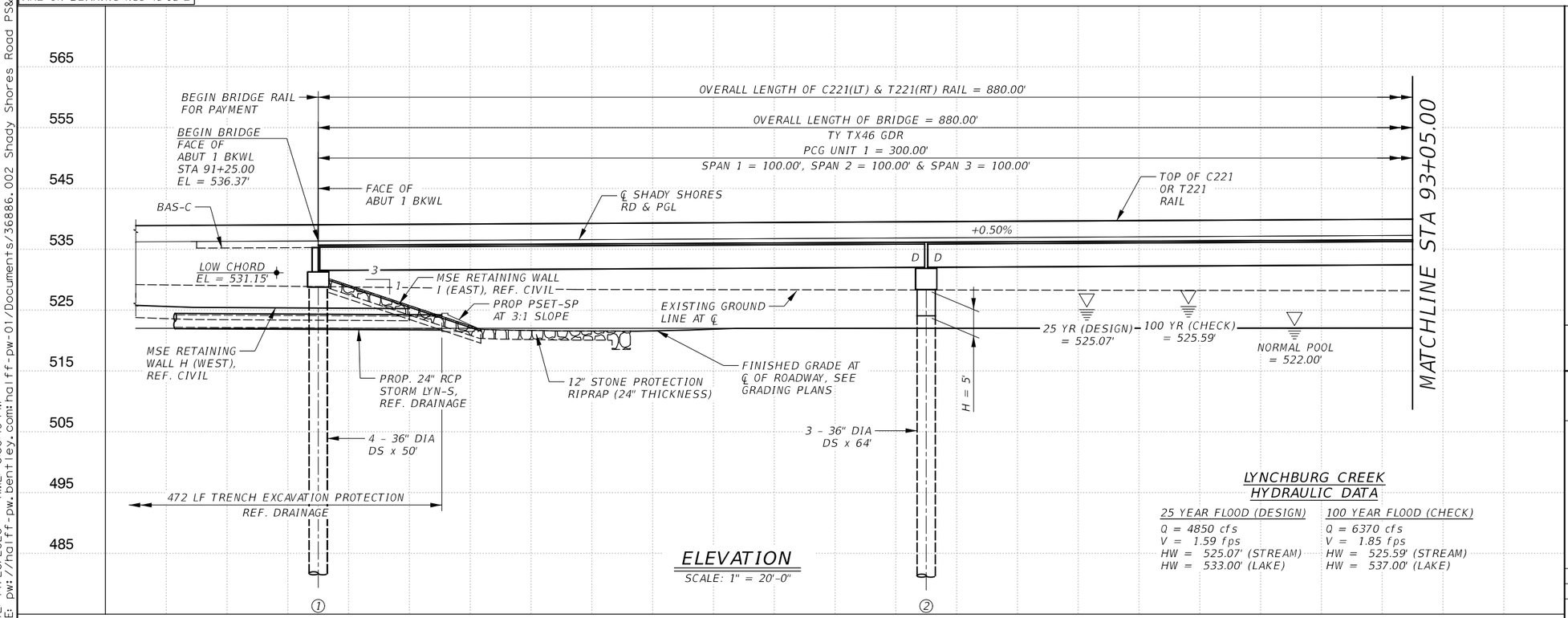
✳ SEE GRADING PLAN SHEETS FOR BRIDGE END GRADING DETAIL.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. TEST HOLE DATA PROVIDED BY GEOTEX ENGINEERING PROJECT NO. #G22-4003-1-B DATED MARCH 25, 2024
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND INFORM THE ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION.
4. SEE BORING LOGS SHEET FOR DRILLING LOG INFORMATION.
5. SEE ROADWAY PLANS FOR GRADING PLANS.
6. SAW-CUT GROOVING OF THE BRIDGE DECK AND APPROACH SLAB IS NOT REQUIRED.
7. "D" DENOTES BENTS WITH D BARS AND SLOTTED HOLES AT EXTERIOR GIRDERS.
8. "H" HEIGHTS SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.

FOUNDATION NOTES:

1. FOUND DRILLED SHAFTS AT THE LENGTH SHOWN OR DEEPER AS NECESSARY TO PENETRATE THE SHALE TO THE FOLLOWING MINIMUM DEPTHS:
   ABUTMENTS - 5.0 FT
   BENT - 5.0 FT



ELEVATION
SCALE: 1" = 20'-0"

LYNCHBURG CREEK HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 4850 cfs	Q = 6370 cfs
V = 1.59 fps	V = 1.85 fps
HW = 525.07' (STREAM)	HW = 525.59' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

STATE OF TEXAS
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12-01-2025

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Dallas District Bridge

BRIDGE LAYOUT
LYNCHBURG CREEK
STA 90+95 - 93+05
NBI: 18-061-0-KK00-05-004

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		217

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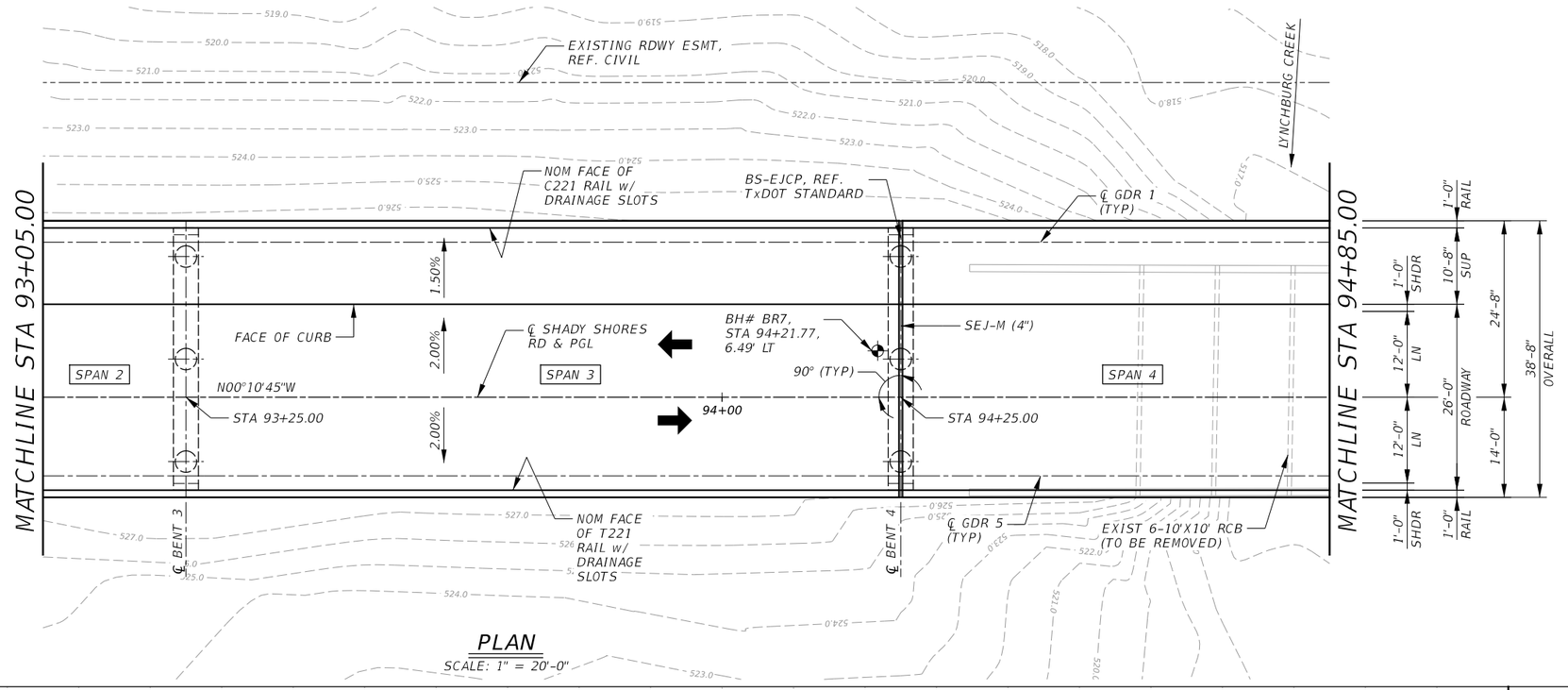
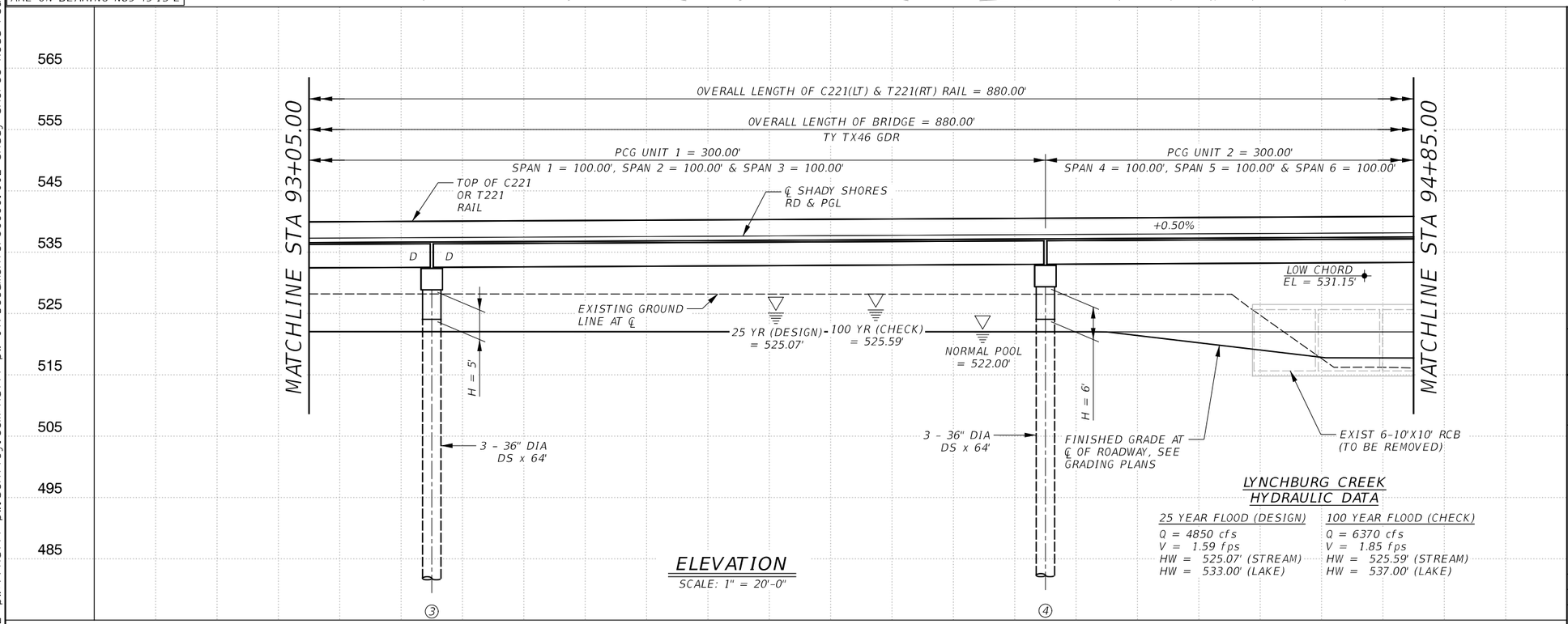
ALL ABUTMENTS AND BENTS ARE ON BEARING N89°49'15"E



PLAN
SCALE: 1" = 20'-0"



ELEVATION
SCALE: 1" = 20'-0"

LYNCHBURG CREEK
HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 4850 cfs	Q = 6370 cfs
V = 1.59 fps	V = 1.85 fps
HW = 525.07' (STREAM)	HW = 525.59' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

STATE OF TEXAS
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12-01-2025

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Texas Department of Transportation

Dallas District Bridge

BRIDGE LAYOUT
LYNCHBURG CREEK
STA 93+05 - 94+85
NBI: 18-061-0-KK00-05-004

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		218

User:
DATE: 11/25/2025 TIME: 3:31:26 PM
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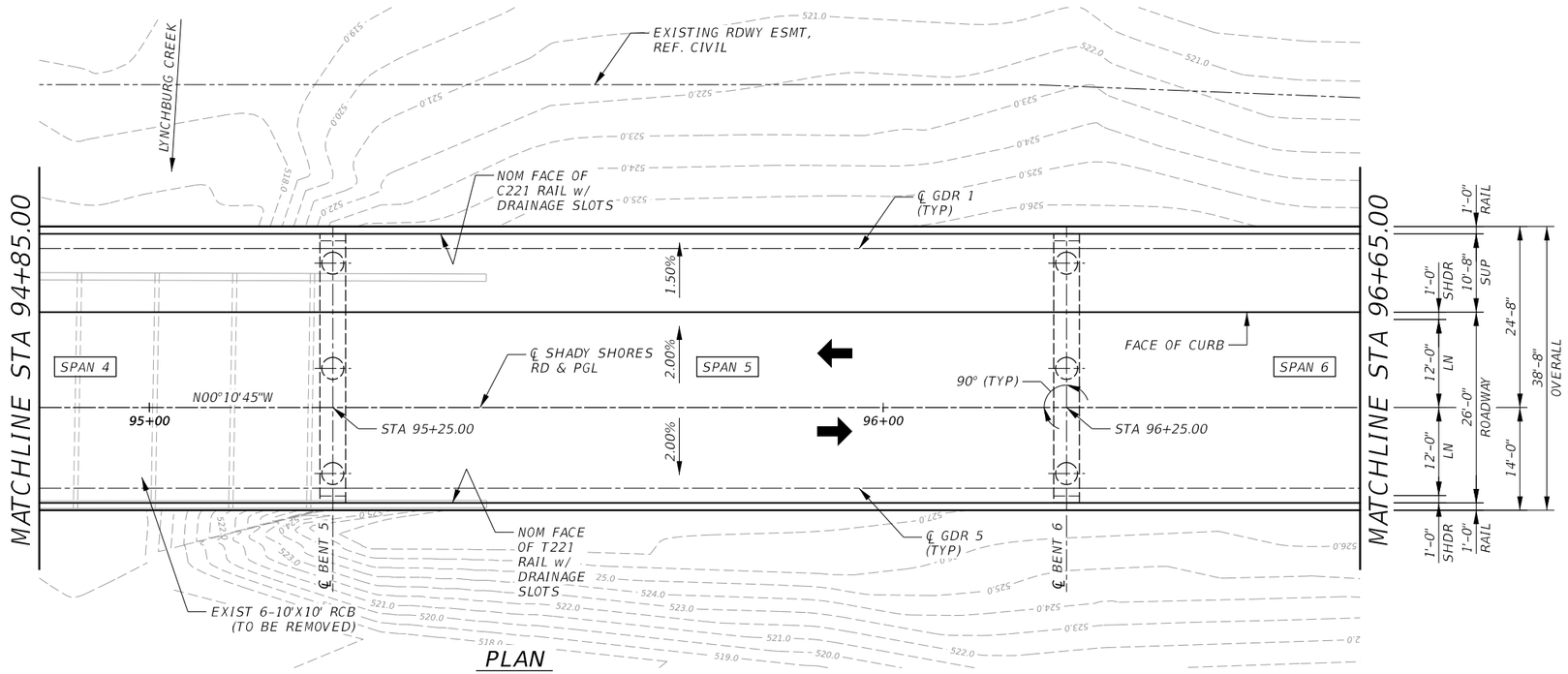
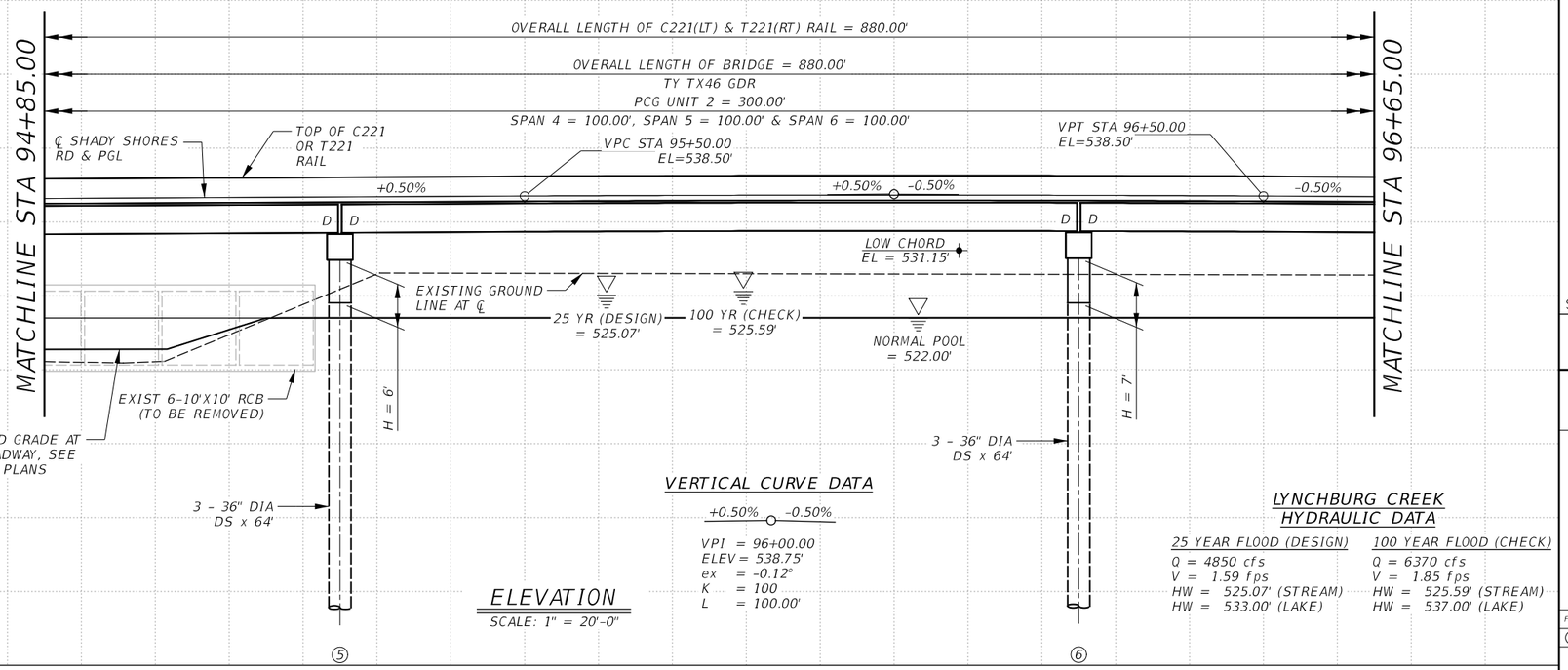


PLAN
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING N89°49'15"E



ELEVATION
SCALE: 1" = 20'-0"

VERTICAL CURVE DATA

+0.50% -0.50%

VPI = 96+00.00
ELEV = 538.75'
ex = -0.12°
K = 100
L = 100.00'

LYNCHBURG CREEK HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 4850 cfs	Q = 6370 cfs
V = 1.59 fps	V = 1.85 fps
HW = 525.07' (STREAM)	HW = 525.59' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 3 of 5 Sheets

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Texas Department of Transportation

Dallas District Bridge

BRIDGE LAYOUT
LYNCHBURG CREEK
STA 94+85 - 96+65
NBI: 18-061-0-KK00-05-004

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		219

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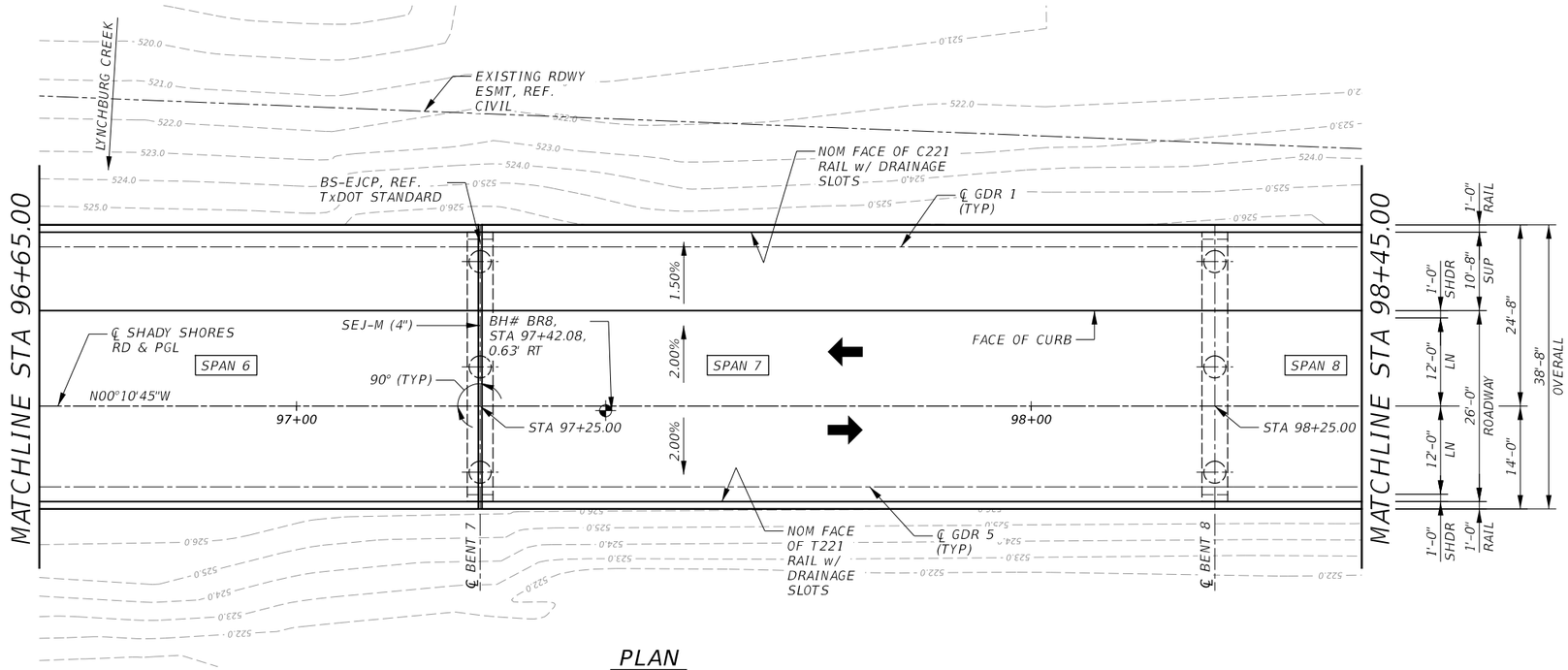
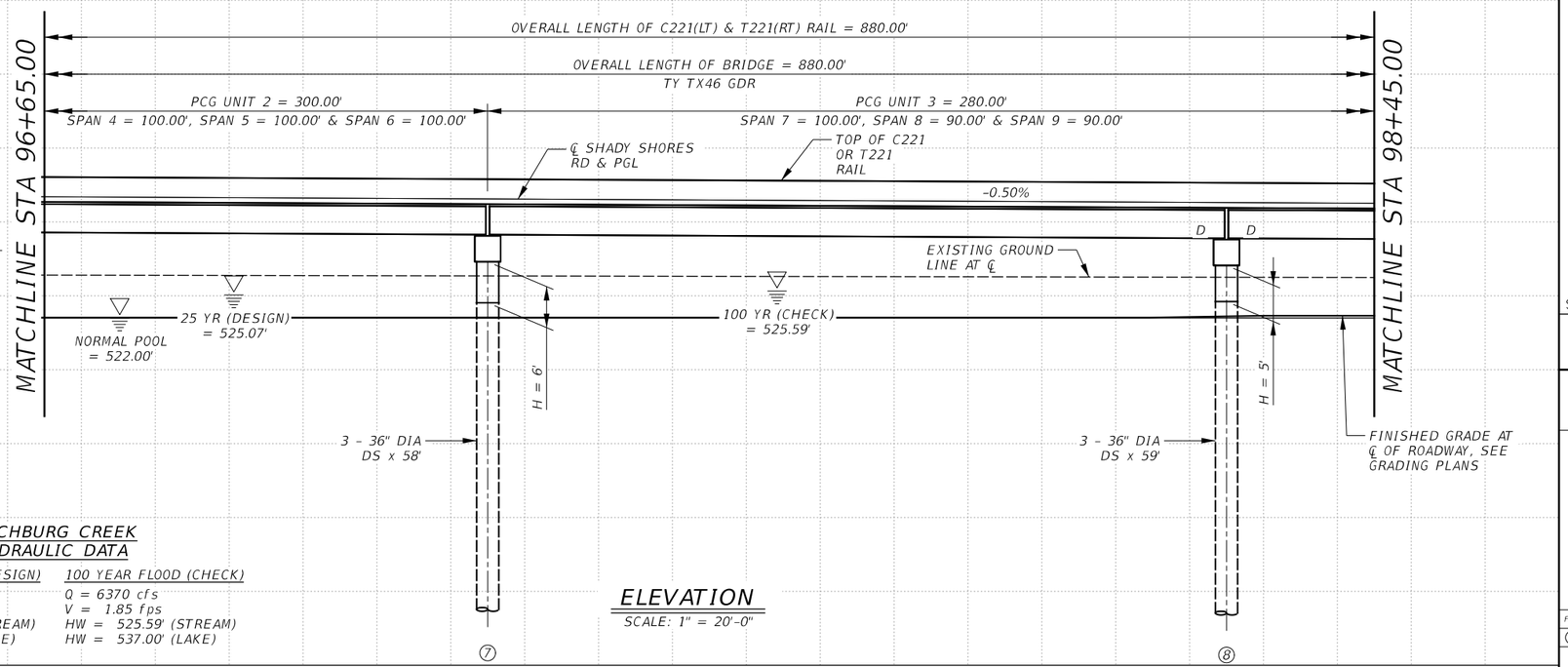


PLAN
SCALE: 1" = 20'-0"

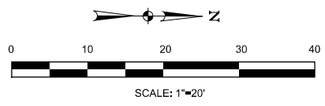
ALL ABUTMENTS AND BENTS ARE ON BEARING N89°49'15"E

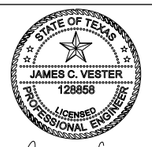


LYNCHBURG CREEK
HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 4850 cfs	Q = 6370 cfs
V = 1.59 fps	V = 1.85 fps
HW = 525.07' (STREAM)	HW = 525.59' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

ELEVATION
SCALE: 1" = 20'-0"





12-01-2025

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Texas Department of Transportation

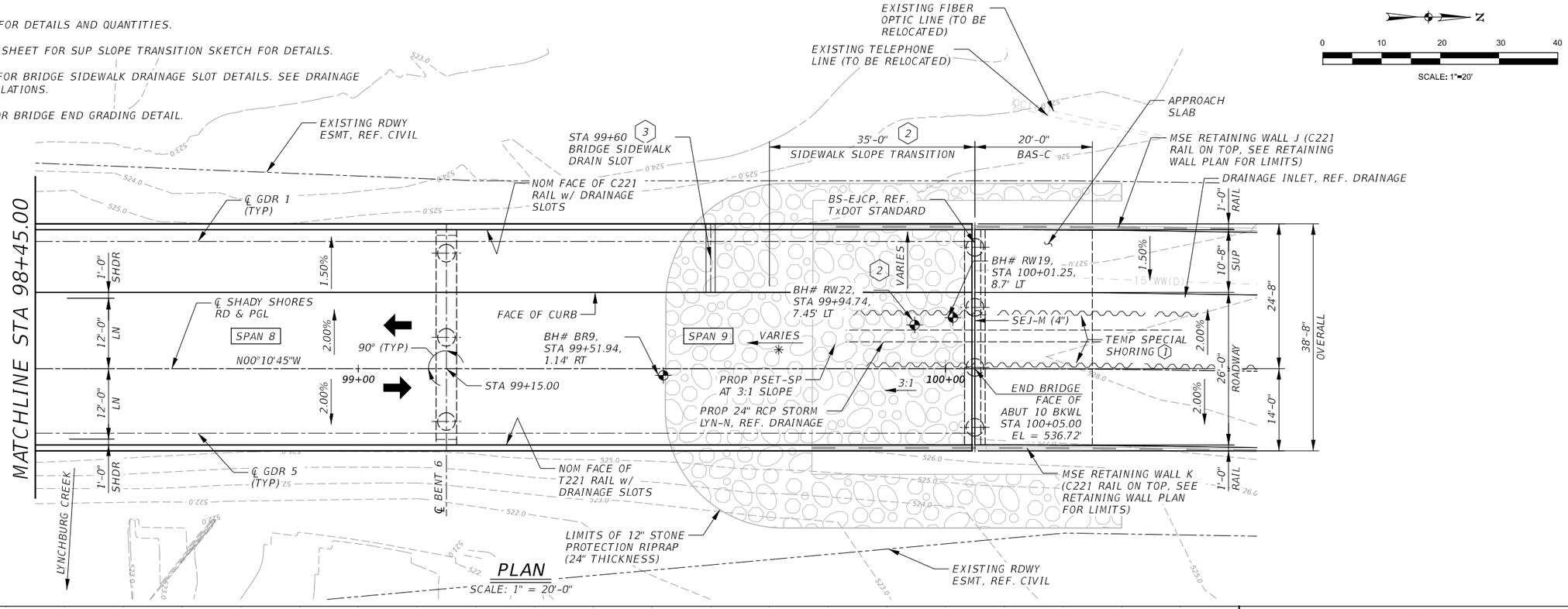
Dallas District Bridge

BRIDGE LAYOUT
LYNCHBURG CREEK
STA 96+65 - 98+45
NBI: 18-061-0-KK00-05-004

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		220

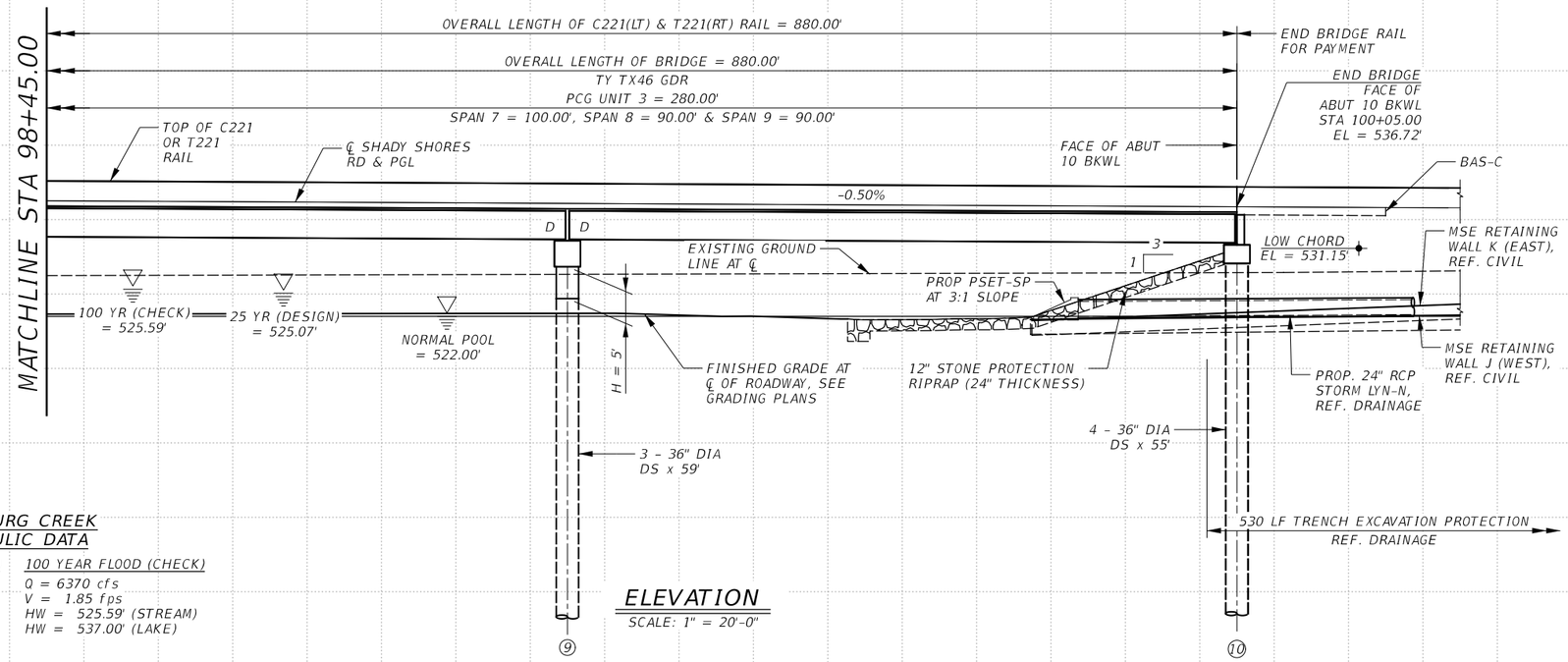
1. SEE RETAINING WALL SHEETS FOR DETAILS AND QUANTITIES.
2. SEE BRIDGE TYPICAL SECTION SHEET FOR SUP SLOPE TRANSITION SKETCH FOR DETAILS.
3. SEE TxDOT STANDARD, BRSM, FOR BRIDGE SIDEWALK DRAINAGE SLOT DETAILS. SEE DRAINAGE SHEETS FOR HYDRAULIC CALCULATIONS.

✳ SEE GRADING PLAN SHEETS FOR BRIDGE END GRADING DETAIL.



PLAN
SCALE: 1" = 20'-0"

ALL ABUTMENTS AND BENTS ARE ON BEARING N89°49'15"E



ELEVATION
SCALE: 1" = 20'-0"

LYNCHBURG CREEK
HYDRAULIC DATA

25 YEAR FLOOD (DESIGN)	100 YEAR FLOOD (CHECK)
Q = 4850 cfs	Q = 6370 cfs
V = 1.59 fps	V = 1.85 fps
HW = 525.07' (STREAM)	HW = 525.59' (STREAM)
HW = 533.00' (LAKE)	HW = 537.00' (LAKE)

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128858
LICENSED PROFESSIONAL ENGINEER
James C. Vester
12-01-2025

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Texas Department of Transportation

Dallas District Bridge

BRIDGE LAYOUT
LYNCHBURG CREEK
STA 98+45 - 100+35
NBI: 18-061-0-KK00-05-004

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		221

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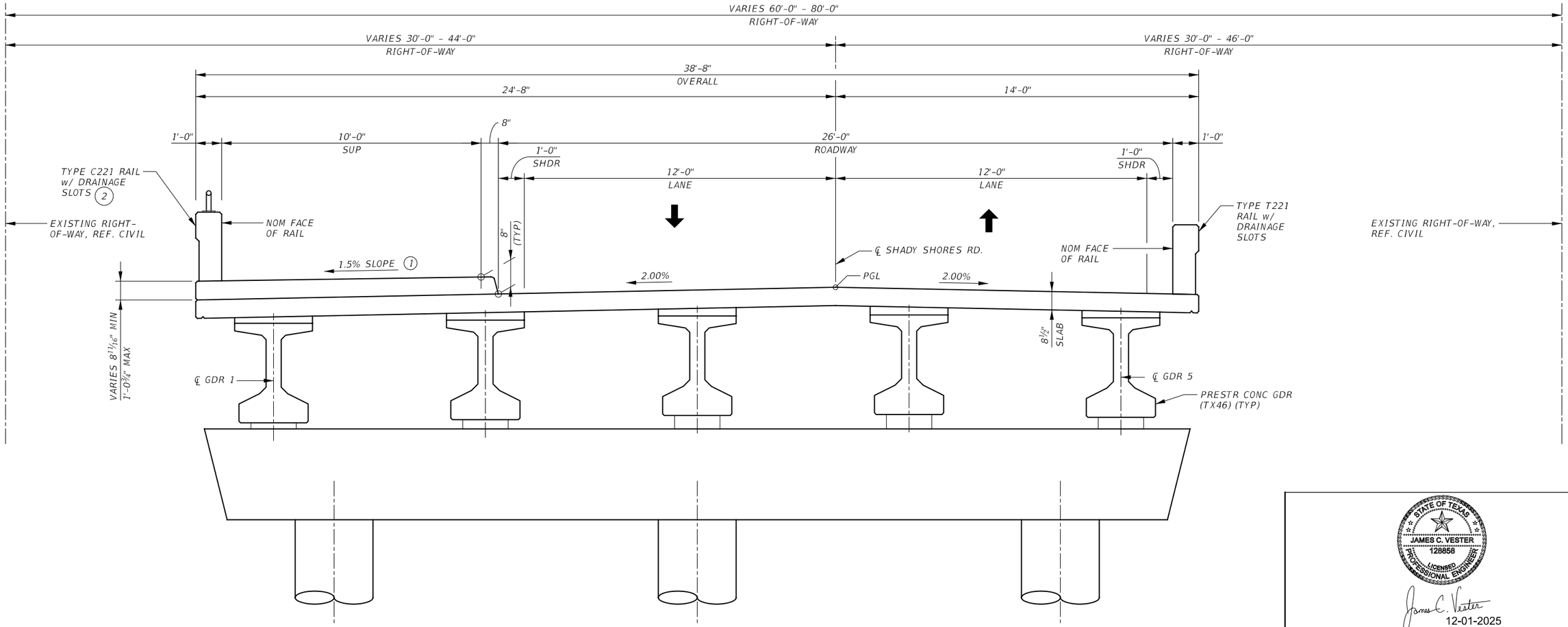


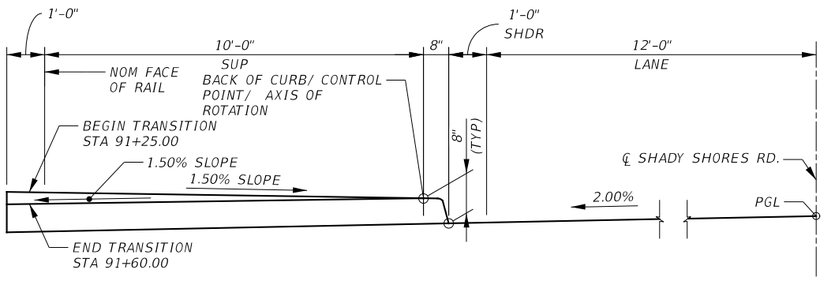
TYPICAL SECTION

SCALE: 1/4" = 1'-0"

STA 91+25.00 TO 100+05.00

(1) SUP CROSS SLOPE FROM STA 91+60.00 TO 99+70.00. SEE SUP CROSS SLOPE TRANSITION SKETCH FOR 91+25.00 TO 91+60.00 AND STA 99+70.00 TO 100+05.00.

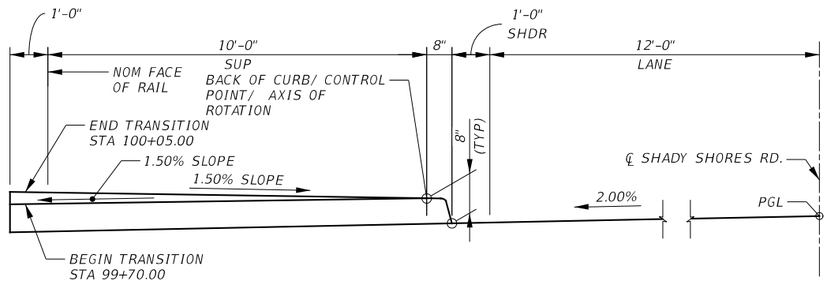
(2) RAIL DRAINAGE SLOTS ARE NOT REQUIRED WITHIN THE FIRST 17' OF SUP SLOPE TRANSITION AT THE BEGINNING OF BRIDGE AND THE LAST 17' OF SLOPE TRANSITION AT THE END OF BRIDGE.



SUP CROSS SLOPE TRANSITION SKETCH

SCALE: 1/4" = 1'-0"

STA 91+25.00 TO 91+60.00



SUP CROSS SLOPE TRANSITION SKETCH

SCALE: 1/4" = 1'-0"

STA 99+70.00 TO 100+05.00

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STATE OF TEXAS

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Dallas District Bridge

BRIDGE TYPICAL SECTION LYNCHBURG CREEK

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		222

DATE: 11/25/2025 TIME: 3:32:24 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SC-LYNCH-BS01
User:

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE ELEMENT \ BID ITEM DESCRIPTION	416 7006 DRILL SHAFTS (1) (36 IN)	420 7013 CL "C" CONC (HPC) (ABUT)	420 7023 CL "C" CONC (HPC) (CAP)	420 7039 CL "C" CONC (HPC) (COLUMN)	422 7002 REINF CONC SLAB (HPC)	422 7014 APPROACH SLAB (HPC)	422 7022 BRIDGE SIDEWALK (HPC)	425 7004 PRESTR CONC GIRDER (TX46)	432 7041 RIPRAP (STONE PROTECTION) (12 IN)	442 7008 STR STL (MISC) (BS-EJCP)	442 7008 STR STL (MISC) (BRSM)	450 7005 RAIL (HPC) (TY T221)	450 7033 RAIL (HPC) (TY C221)	454 7004 SEALED EXPANSION JOINT (4 IN) (SEJ-M)
	LF	CY	CY	CY	SF	CY	SF	LF	CY	LB	LB	LF	LF	LF
2 - ABUTMENTS	420	36												
8 - INTERIOR BENTS	1395		136.0	36										
2 - 300.00' PCG UNITS & 1 - 280.00' PCG UNIT					33,991	59	10,270	4,377.58	6,375	598	1,537	880.0	880.0	108
TOTAL	1908	36	136.0	36	33,991	59	10,270	4,377.58	6,375	598	1,537	880.0	880.0	108

(1) PROVIDE SULFATE RESISTANT CONCRETE FOR DRILLED SHAFTS.

BEARING SEAT ELEVATIONS

			GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5
ABUT	1	(FWD)	530.879	531.043	531.206	531.256	531.093
BENT	2	(BK)	531.369	531.533	531.696	531.746	531.583
		(FWD)	531.379	531.543	531.706	531.756	531.593
BENT	3	(BK)	531.879	532.043	532.206	532.256	532.083
		(FWD)	531.869	532.033	532.196	532.246	532.093
BENT	4	(BK)	532.379	532.543	532.706	532.756	532.583
		(FWD)	532.369	532.533	532.696	532.746	532.593
BENT	5	(BK)	532.879	533.043	533.206	533.256	533.083
		(FWD)	532.869	533.033	533.196	533.246	533.093
BENT	6	(BK)	533.100	533.264	533.427	533.477	533.314
		(FWD)	533.095	533.259	533.422	533.472	533.309
BENT	7	(BK)	532.619	532.783	532.946	532.996	532.843
		(FWD)	532.629	532.793	532.956	533.006	532.833
BENT	8	(BK)	532.119	532.283	532.446	532.496	532.343
		(FWD)	532.129	532.293	532.456	532.506	532.333
BENT	9	(BK)	531.669	531.833	531.996	532.046	531.893
		(FWD)	531.679	531.843	532.006	532.056	531.883
ABUT	10	(BK)	531.229	531.393	531.556	531.606	531.443

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12-01-2025

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD
LYNCHBURG CREEK
EST. QUANTITIES AND BEARING SEAT ELEVATIONS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		223

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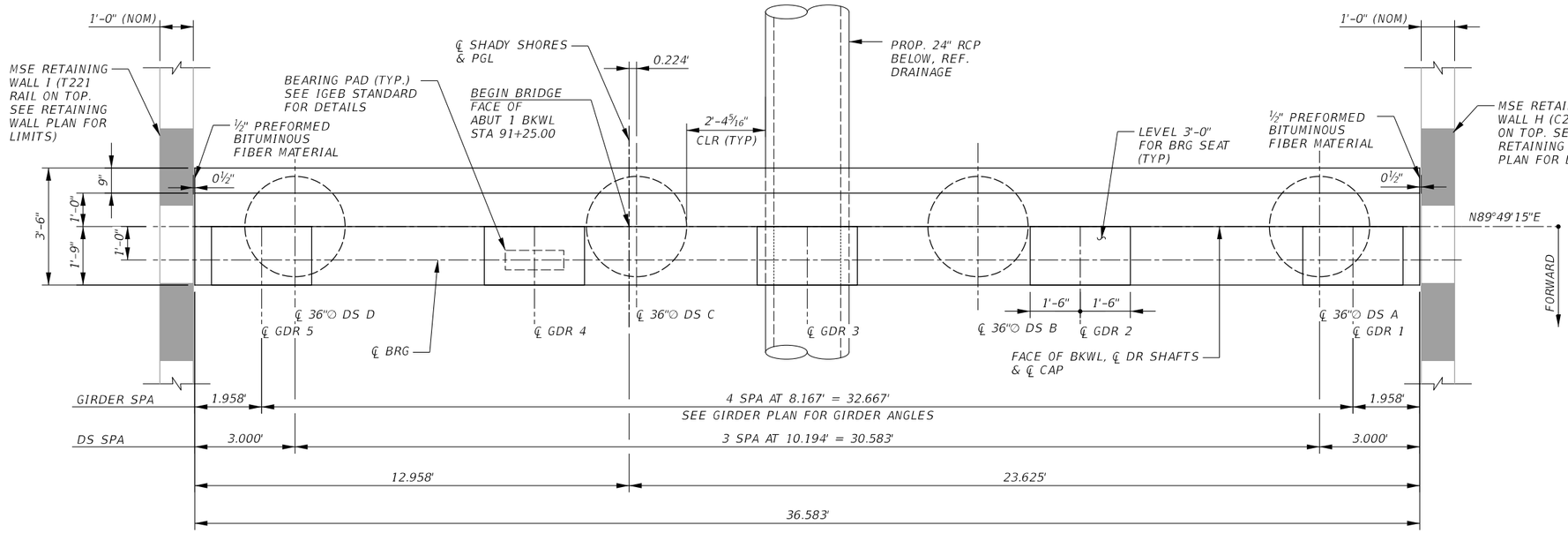
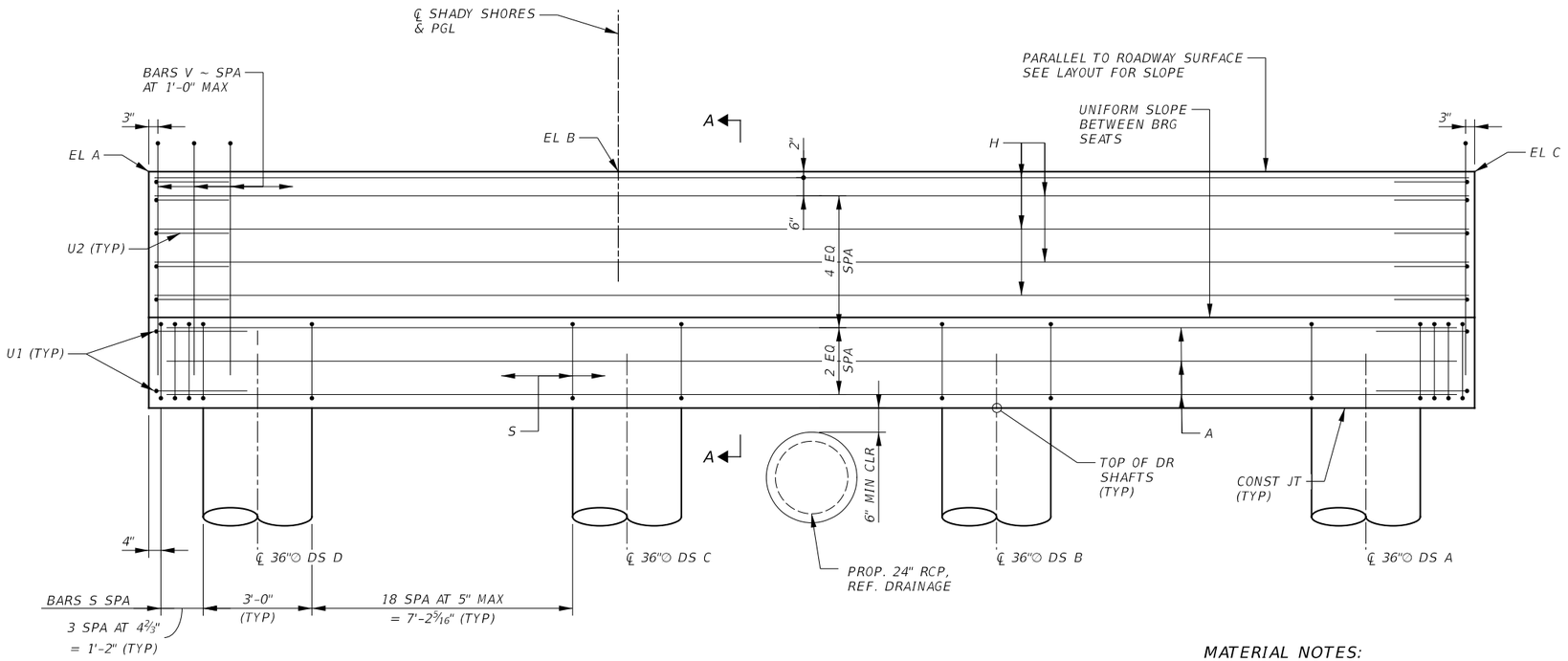


PLAN

SCALE: ¼" = 1'-0"
ABUTMENT 1 SHOWN, ABUTMENT 10 SIMILAR



ELEVATION

SCALE: ¼" = 1'-0"

CONTROL ELEVATIONS

ABUTMENT	STATION	TOP OF ABUTMENT			TOP OF DRILLED SHAFTS			
		EL A	EL B	EL C	DS A	DS B	DS C	DS D
1	91+25.00	535.03	535.29	534.81	528.28	528.48	528.68	528.49
10	100+05.00	535.16	535.64	535.38	528.84	529.03	528.83	528.63

BAR SCHEDULE ~ ONE CAP

BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
A	St	12	#11	35'-8"	2,274
H	St	10	#6	36'-4"	546
S	Bt	65	#5	11'-6"	780
U1	Bt	4	#6	8'-1"	49
U2	Bt	10	#6	5'-6½"	84
V	Bt	36	#5	14'-5"	541
① TOTAL REINFORCING STEEL				LB	4,274
CL C CONC (HPC) (ABUT)				CY	18.0

ESTIMATED QUANTITIES

ITEM	UNIT	ABUT 1	ABUT 10
DRILL SHAFT (36IN)	LF	200	220
① CL C CONC (HPC) (ABUT)	CY	18.0	18.0
REINF STEEL	LB	4,274	4,274

① FOR CONTRACTOR'S INFORMATION ONLY.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. CHAMFER ALL EXPOSED EDGES ¾" UNLESS NOTED OTHERWISE.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE CAP.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD FOR EACH ABUTMENT
   ABUTMENT 1 = 125 TONS/SHAFT.
   ABUTMENT 10 = 116 TONS/SHAFT.
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN MSE WALLS.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIY AND BEARING SEAT ELEVATIONS" SHEET
8. SEE FD STANDARD FOR FOUNDATION DETAILS AND NOTES.

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI).
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

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Dallas District Bridge

SHADY SHORES ROAD LYNCHBURG CREEK ABUTMENT 1 OR 10

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		224

User:
DATE: 11/25/2025 TIME: 3:33:19 PM
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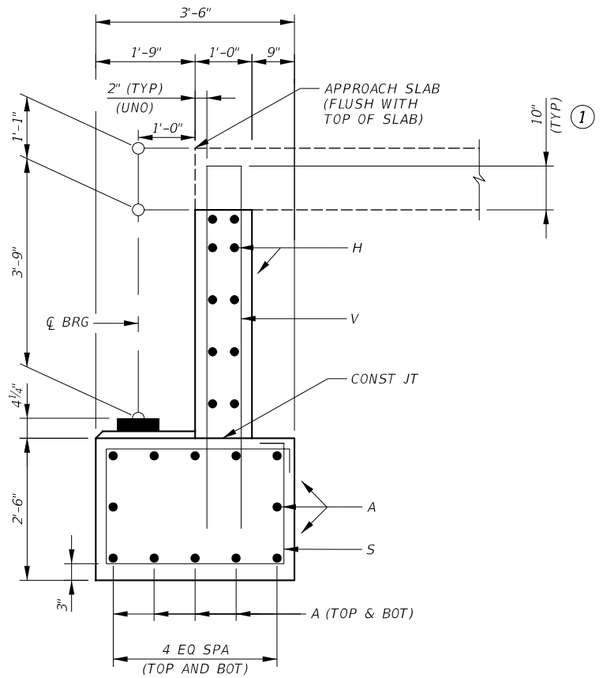
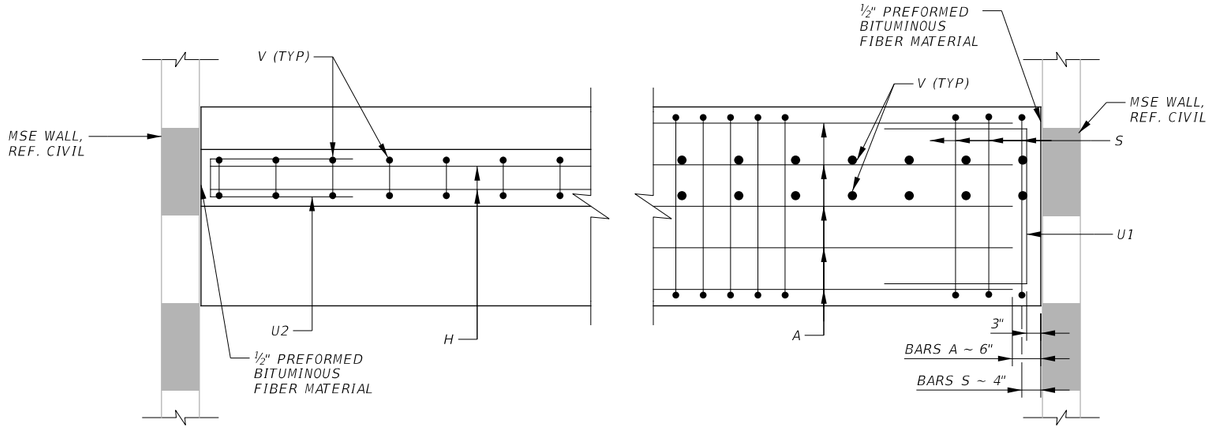


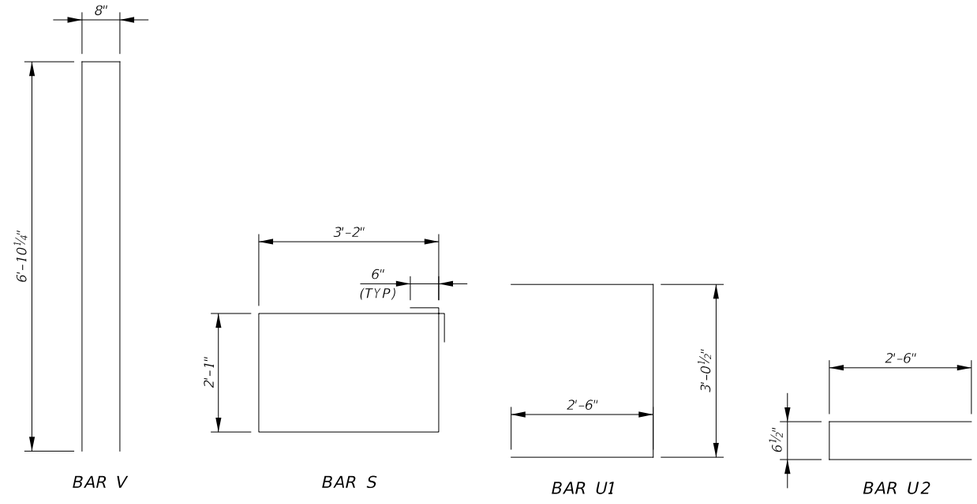
SECTION A-A

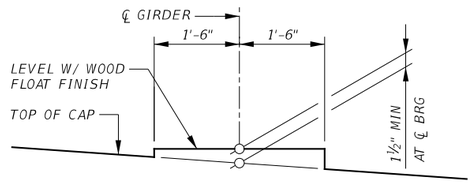
1 INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.



BACKWALL CAP

CORNER DETAILS





BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

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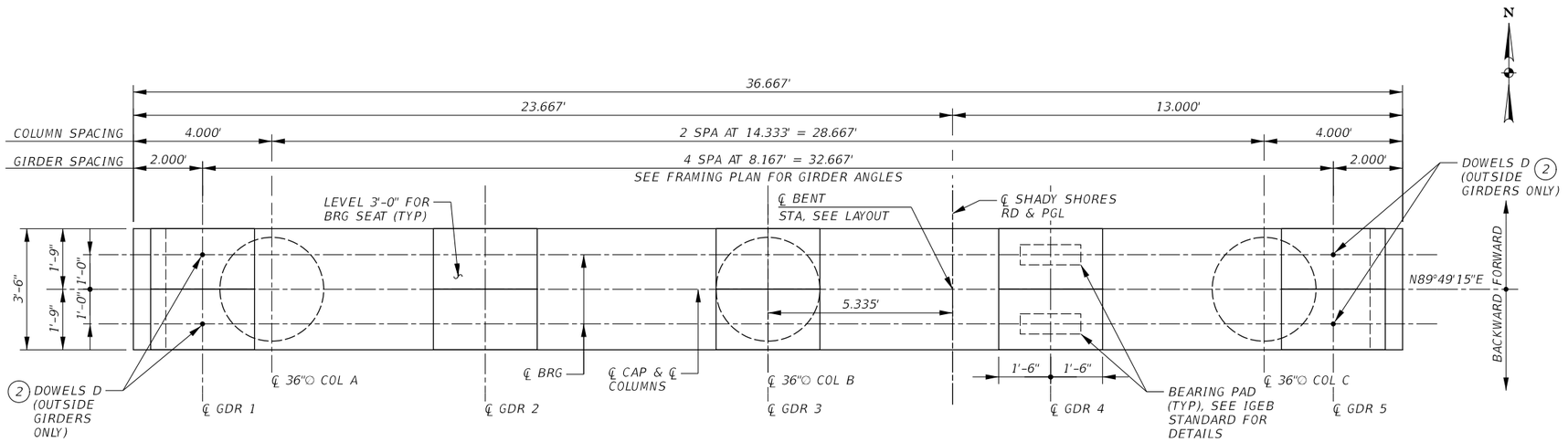
Dallas District Bridge

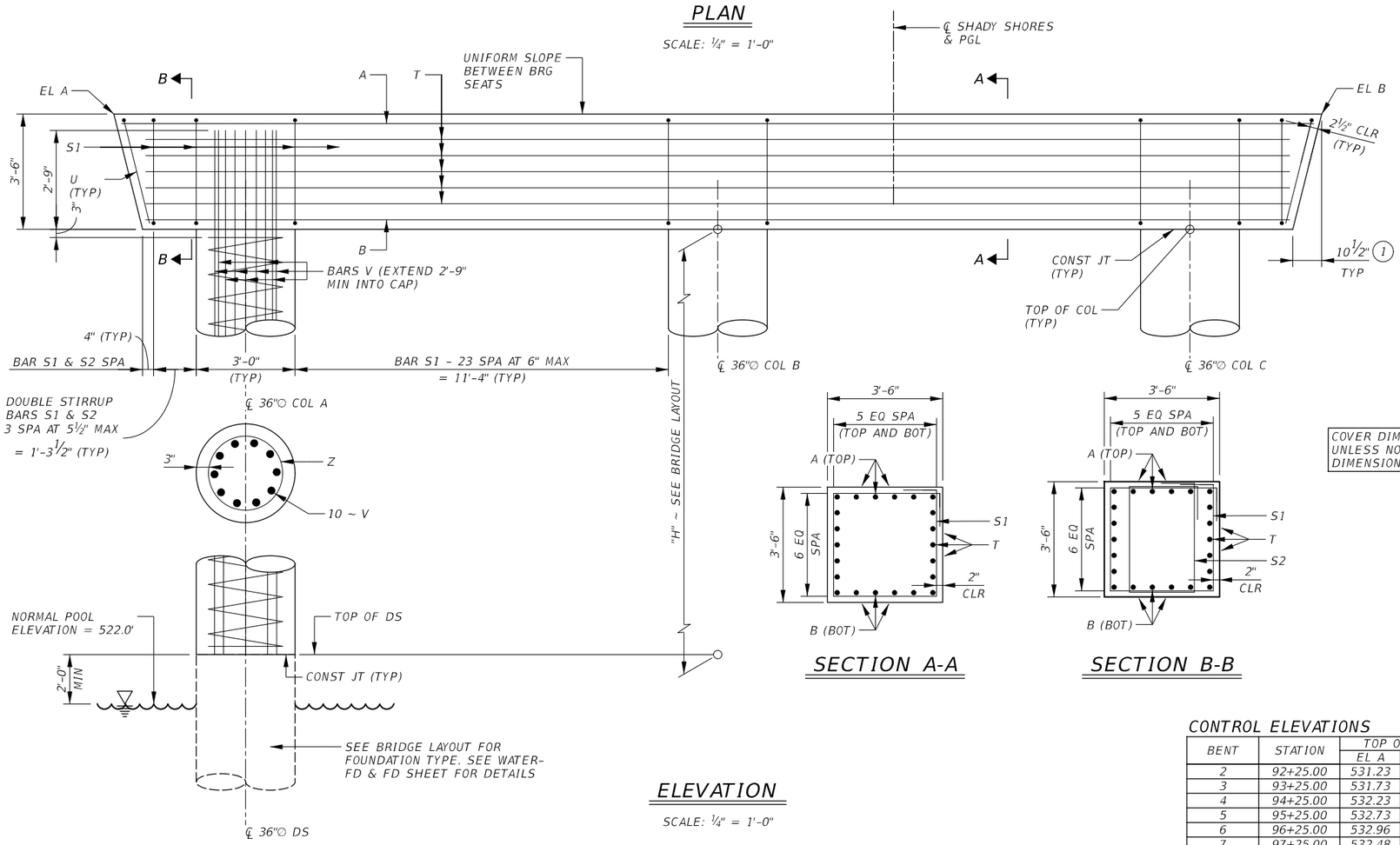
SHADY SHORES ROAD
LYNCHBURG CREEK
ABUTMENT 1 OR 10

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		225



PLAN

SCALE: ¼" = 1'-0"



ELEVATION

SCALE: ¼" = 1'-0"

SECTION A-A

SECTION B-B

(1) MEASURED PARALLEL TO TOP OF CAP CROSS SLOPE.

(2) SEE DOWEL TABLE FOR DOWEL LOCATIONS.

GENERAL NOTES:

1. DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TXDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. THE PRICE BID PER FOOT OF COLUMN SHALL INCLUDE THE REINFORCING EXTENDING FROM THE COLUMN INTO THE CAP.
3. THE PRICE BID PER FOOT OF DRILLED SHAFT SHALL INCLUDE THE REINFORCING EXTENDING FROM THE SHAFT INTO THE COLUMN.
4. CALCULATED DRILLED SHAFT FOUNDATION LOAD:
   BENT 2-7 = 270 TONS/SHAFT
   BENT 8 = 260 TONS/SHAFT
   BENT 9 = 250 TONS/SHAFT
5. THE BEARING SEATS SHALL RECEIVE A WOOD FLOAT FINISH.
6. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET AND WATER-FD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.
7. FOR BEARING SEAT ELEVATIONS AND ESTIMATED QUANTITIES, SEE "ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS" SHEET.

MATERIAL NOTES:

1. PROVIDE CLASS "C" (HPC) CONCRETE (f'c = 3,600 PSI) FOR BENT CAP AND COLUMN.
2. FOR DRILLED SHAFTS, PROVIDE SULFATE RESISTANT CONCRETE OF THE FOLLOWING CLASSES:
   FOR DRY PLACEMENT, CLASS C (f'c=3,600 PSI)
   FOR WET/SLURRY PLACEMENT, CLASS SS (f'c=3,600 PSI)
3. ALL CAP AND DRILLED SHAFTS REINFORCING SHALL BE GRADE 60 STEEL.
4. GALVANIZE DOWELS D.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

(2) DOWEL TABLE

BENT	
2	DOWEL
3	DOWEL
4	-
5	DOWEL
6	DOWEL
7	-
8	DOWEL
9	DOWEL

CONTROL ELEVATIONS

BENT	STATION	TOP OF CAP		TOP OF COLUMNS		
		EL A	EL B	COL A	COL B	COL C
2	92+25.00	531.23	531.47	527.76	527.85	527.94
3	93+25.00	531.73	531.97	528.26	528.35	528.44
4	94+25.00	532.23	532.47	528.76	528.85	528.94
5	95+25.00	532.73	532.97	529.26	529.35	529.44
6	96+25.00	532.96	533.20	529.48	528.58	529.67
7	97+25.00	532.48	532.72	529.01	529.10	529.19
8	98+25.00	531.98	532.22	528.51	528.60	528.69
9	99+15.00	531.53	531.77	528.06	528.15	528.24

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LICENSED PROFESSIONAL ENGINEER
12-01-2025

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Dallas District Bridge

SHADY SHORES ROAD LYNCHBURG CREEK TYPICAL INTERIOR BENT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		226

DATE: 11/25/2025 TIME: 3:33:39 PM
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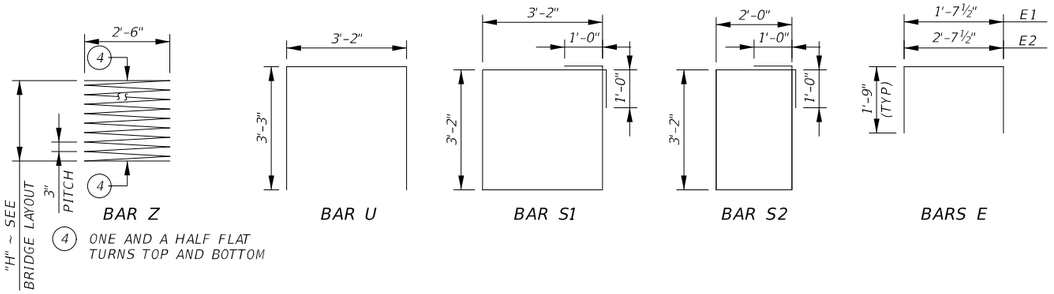


(4) ONE AND A HALF FLAT TURNS TOP AND BOTTOM

BAR SCHEDULE ~ ONE CAP

	BAR	TYPE	NO.	SIZE	LENGTH	WEIGHT
	A	St	6	#11	36'-2"	1,153
	B	St	6	#11	34'-8"	1,105
	D	St	4	#9	1'-8"	23
(3)	E1	Bt	24	#5	5'-2"	128
(3)	E2	Bt	18	#5	6'-2"	115
	S1	Bt	56	#6	14'-8"	1,233
	S2	Bt	8	#6	12'-4"	148
	T	St	10	#5	34'-8"	362
	U	Bt	2	#5	9'-8"	20
(1)	TOTAL REINFORCING STEEL				LB	4,287
	CL C CONC (HPC) (CAP)				CY	17.0

COLUMN SCHEDULE ~ ONE COLUMN

	BARS V~10-#9		BARS Z~#4 SPIRAL		EST QUANT~3 COL REINF STEEL	EST QUANT~3 COL CLASS C CONC
"H"	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
FT						
4	6'-9"	230	74'	50	840	3.1
5	7'-9"	264	90'	61	975	3.9
6	8'-9"	298	105'	71	1,107	4.7
7	9'-9"	332	121'	81	1,239	5.4
8	10'-9"	366	137'	92	1,374	6.2

ADJUST SPIRAL Z LENGTH BY 7.9 FT AND BAR V LENGTH BY 0.5 FT FOR EACH 0.5 FT VARIATION IN "H" VALUE.
ADJUST REINFORCING STEEL TOTAL BY 22.3 LBS AND CONCRETE BY 0.13 CY PER COLUMN FOR EACH 0.5 FT VARIATION IN "H" VALUE PER COLUMN.

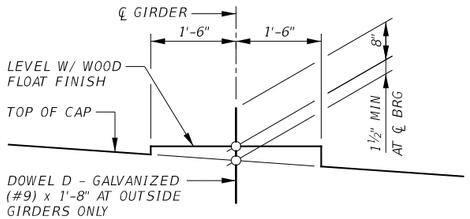
(1) FOR CONTRACTOR'S INFORMATION ONLY.

(2) SEE DOWEL TABLE ON SHEET 1 OF 2.

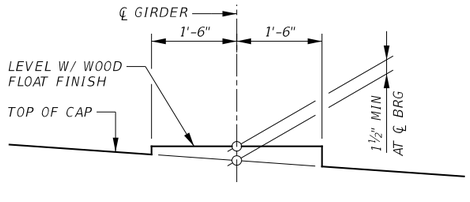
(3) PEDESTAL BEARING OCCURS FOR ALL INTERIOR GIRDERS. ADDITIONAL 0.3CY AND "E" BARS INCLUDED FOR PEDESTAL BEARING SEATS IN QUANTITY TABLE.

ESTIMATED QUANTITIES

	ITEM	UNIT	BENT 2	BENT 3	BENT 4	BENT 5	BENT 6	BENT 7	BENT 8	BENT 9
	DRILL SHAFT (36IN)	LF	192	192	192	192	192	174	177	177
	CL C CONC (HPC) (CAP)	CY	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
	CL C CONC (HPC) (COL)	CY	3.9	3.9	4.7	4.7	5.4	4.7	3.9	3.9
(1)	REINF STEEL	LB	4,287	4,287	4,287	4,287	4,287	4,287	4,287	4,287



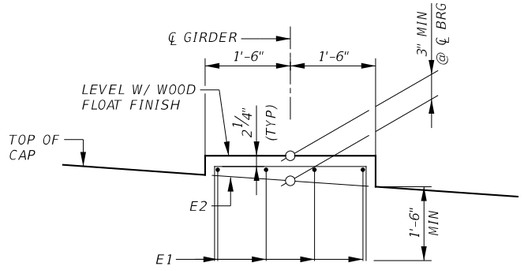
WITH DOWEL



WITHOUT DOWEL

BEARING SEAT DETAIL (2)

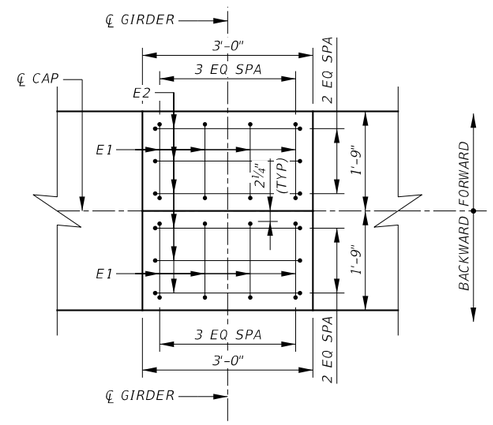
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)



PEDESTAL BEARING SEAT ELEVATION (3)

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

* PEDESTAL REINF. REQUIRED PER SECTION 420.4.9 WHEN HEIGHT >3".



PEDESTAL BEARING SEAT PLAN (3)

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 2 of 2 Sheets

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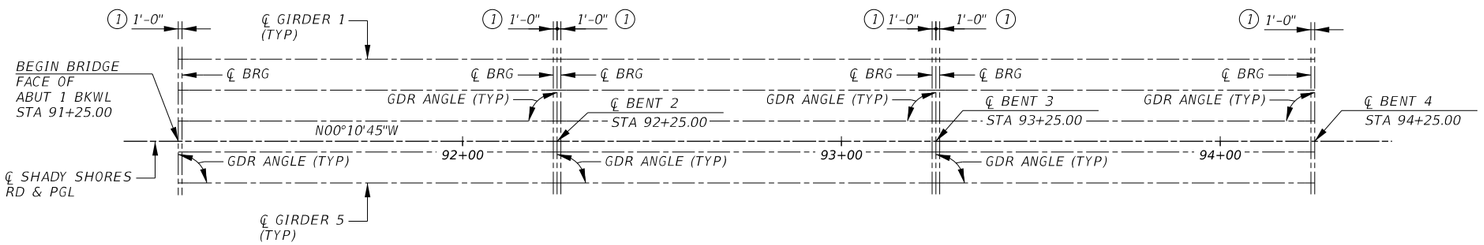
Texas Department of Transportation | Dallas District Bridge

SHADY SHORES ROAD LYNCHBURG CREEK TYPICAL INTERIOR BENT

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		227



SPAN 1 (TY TX46 GDR)

SPAN 2 (TY TX46 GDR)

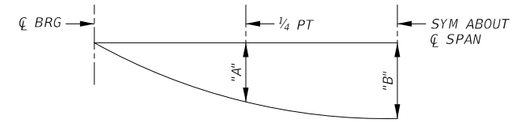
SPAN 3 (TY TX46 GDR)

PLAN

SCALE: 1" = 40'-0"

(1) SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION.

(2) GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.



DEAD LOAD DEFLECTION DIAGRAM

DEFLECTIONS SHOWN ARE DUE TO CIP CONCRETE SLAB ONLY (EC = 5,000 KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DEFLECTIONS MAY BE LESS. DEFLECTIONS SHALL BE ADJUSTED BASED ON FIELD OBSERVATIONS.
(FOR DEAD LOAD DEFLECTIONS SEE FRAMING PLANS.)

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.501	0.005	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.501	0.005	0.093	0.131
TOTAL		497.500					

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.501	0.005	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.501	0.005	0.093	0.131
TOTAL		497.500					

GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.501	0.005	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.501	0.005	0.093	0.131
TOTAL		497.500					

BENT REPORT

ABUT NO. 1 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (ABUT BKWL)	GIRDER ANGLE D	M	S
SPAN 1 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 2 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 2 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 3 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 3 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 4 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 1 of 3 Sheets

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Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD LYNCHBURG CREEK FRAMING PLAN

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		228

User:
DATE: 11/25/2025 TIME: 3:34:15 PM
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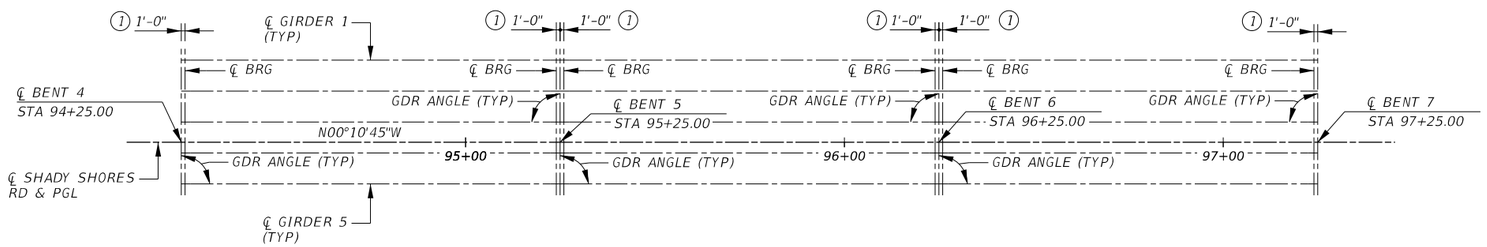

SPAN 4 (TY TX46 GDR)

SPAN 5 (TY TX46 GDR)

SPAN 6 (TY TX46 GDR)

PLAN

SCALE: 1" = 40'-0"

(1) SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION.

(2) GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

GIRDER REPORT

GIRDER REPORT, SPAN 4

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG.(2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.501	0.005	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.501	0.005	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.501	0.005	0.093	0.131
	TOTAL	497.500					

GIRDER REPORT, SPAN 5

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG.(2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.500	0.002	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.500	0.002	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.500	0.002	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.500	0.002	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.500	0.002	0.093	0.131
	TOTAL	497.500					

GIRDER REPORT, SPAN 6

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG.(2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.501	-0.005	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.501	-0.005	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.501	-0.005	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.501	-0.005	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.501	-0.005	0.093	0.131
	TOTAL	497.500					

BENT REPORT

BENT NO. 4 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 4 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 5 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 4 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 5 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 5 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 6 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 5 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 6 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 6 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

BENT NO. 7 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 6 GIRDER 1	0.000	90	00	00
GIRDER 2	8.167	90	00	00
GIRDER 3	8.167	90	00	00
GIRDER 4	8.167	90	00	00
GIRDER 5	8.167	90	00	00
TOTAL	32.667			

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER
12-01-2025

Sheet 2 of 3 Sheets

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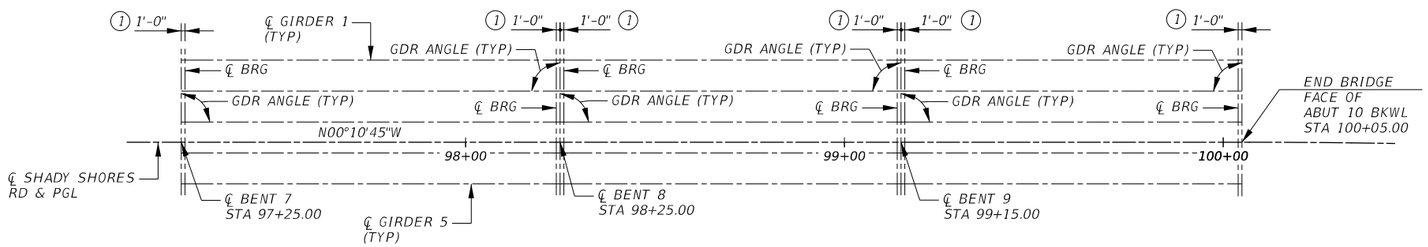
Texas Department of Transportation

Dallas District Bridge

SHADY SHORES ROAD LYNCHBURG CREEK FRAMING PLAN

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
©TxDOT 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		229

DATE: 11/25/2025 TIME: 3:34:34 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SC-LYNCH-FP02-03.dgn
User:



SPAN 7
(TY TX46 GDR)

SPAN 8
(TY TX46 GDR)

SPAN 9
(TY TX46 GDR)

PLAN

SCALE: 1" = 40'-0"

(1) SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION.

(2) GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

GIRDER REPORT

GIRDER REPORT, SPAN 7

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	100.000	99.500	98.000	99.501	-0.005	0.093	0.131
GIRDER 2	100.000	99.500	98.000	99.501	-0.005	0.108	0.152
GIRDER 3	100.000	99.500	98.000	99.501	-0.005	0.108	0.152
GIRDER 4	100.000	99.500	98.000	99.501	-0.005	0.108	0.152
GIRDER 5	100.000	99.500	98.000	99.501	-0.005	0.093	0.131
	TOTAL	497.500					

GIRDER REPORT, SPAN 8

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	90.000	89.500	88.000	89.501	-0.005	0.061	0.085
GIRDER 2	90.000	89.500	88.000	89.501	-0.005	0.071	0.099
GIRDER 3	90.000	89.500	88.000	89.501	-0.005	0.071	0.099
GIRDER 4	90.000	89.500	88.000	89.501	-0.005	0.071	0.099
GIRDER 5	90.000	89.500	88.000	89.501	-0.005	0.061	0.085
	TOTAL	447.500					

GIRDER REPORT, SPAN 9

	HORIZONTAL DISTANCE C-C BENT	E-E GDR.	C-C BRG.	TRUE LENGTH BOT. GDR. FLG. (2)	GIRDER SLOPE	DEFLECTIONS A	B
GIRDER 1	90.000	89.500	88.000	89.501	-0.005	0.061	0.085
GIRDER 2	90.000	89.500	88.000	89.501	-0.005	0.071	0.099
GIRDER 3	90.000	89.500	88.000	89.501	-0.005	0.071	0.099
GIRDER 4	90.000	89.500	88.000	89.501	-0.005	0.071	0.099
GIRDER 5	90.000	89.500	88.000	89.501	-0.005	0.061	0.085
	TOTAL	447.500					

BENT REPORT

BENT NO. 7 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 7	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 8 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 7	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 8 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 8	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 9 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 8	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

BENT NO. 9 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 9	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

ABUT NO. 10 (N 89°49'15" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1 21.667 L

	GIRDER SPACE	(ABUT BKWL)	GIRDER ANGLE D	M	S
SPAN 9	GIRDER 1	0.000	90	00	00
	GIRDER 2	8.167	90	00	00
	GIRDER 3	8.167	90	00	00
	GIRDER 4	8.167	90	00	00
	GIRDER 5	8.167	90	00	00
	TOTAL	32.667			

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128858
LICENSED
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SHADY SHORES ROAD LYNCHBURG CREEK FRAMING PLAN

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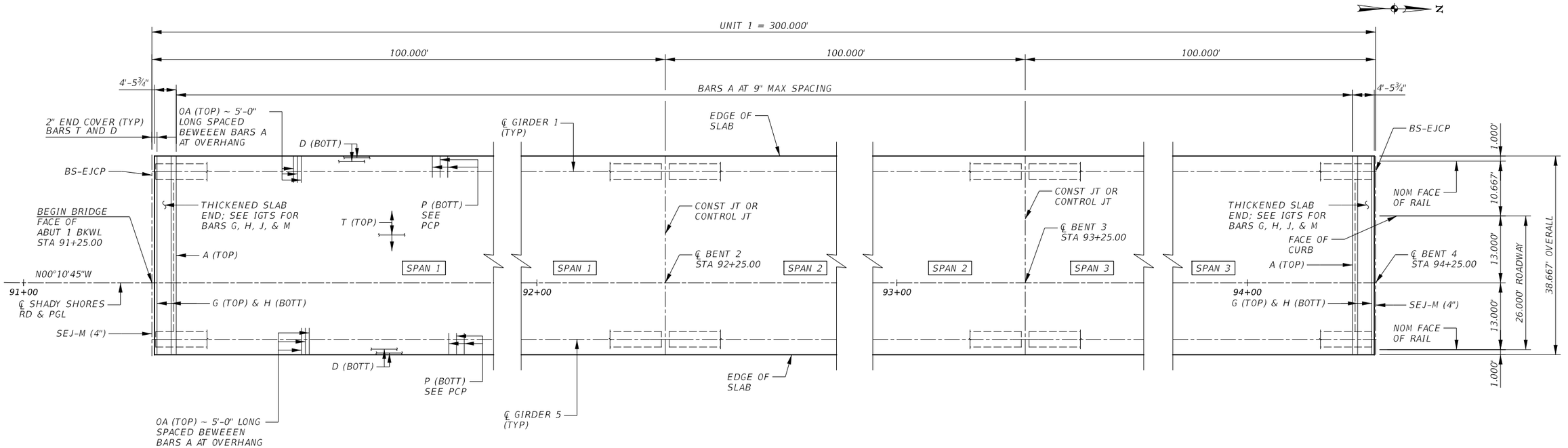

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

PLAN

SCALE: 1" = 20'-0"

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS S, CONCRETE STRENGTH f'c = 4000 PSI
2. FOR GIRDER BEARING PAD, MISC. SLAB, SIDEWALK EXPANSION JOINT COVER PLATE AND THICKENED SLAB END DETAILS NOT SHOWN SEE IGD, IGEB, IGMS, IGND, BS-EJCP AND IGTS STANDARDS.
3. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
4. FOR SEALED EXPANSION JOINT DETAILS NOT SHOWN, SEE SEJ-M STANDARD. FOR SEJ-M QUANTITIES NOT SHOWN SEE ESTIMATED QUANTITIES SHEET.
5. DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, 0A, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.
6. FOR RAIL DETAILS NOT SHOWN SEE TRAFFIC RAIL TYPE C221 & T221.
7. FOR GIRDER LAYOUTS SEE FRAMING PLAN SHEETS.
8. ALL REINFORCING SHALL BE GRADE 60 STEEL.
9. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:
   EPOXY COATED ~ #4 = 2'-5"

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SHADY SHORES ROAD LYNCHBURG CREEK DECK DETAILS

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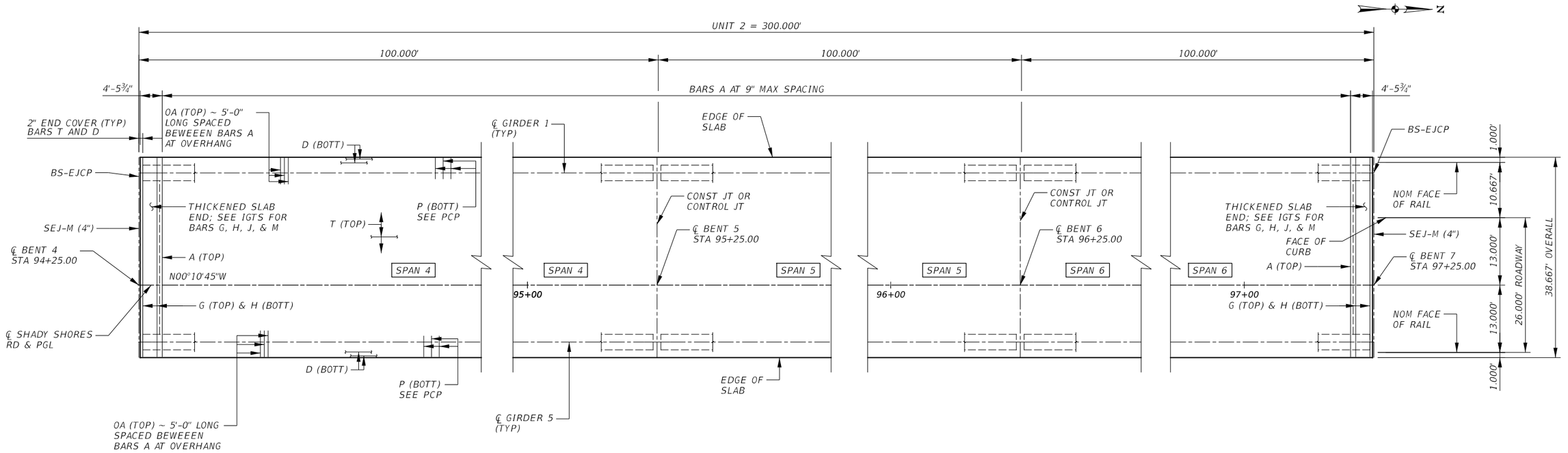

PLAN

SCALE: 1" = 20'-0"

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

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SHADY SHORES ROAD LYNCHBURG CREEK DECK DETAILS

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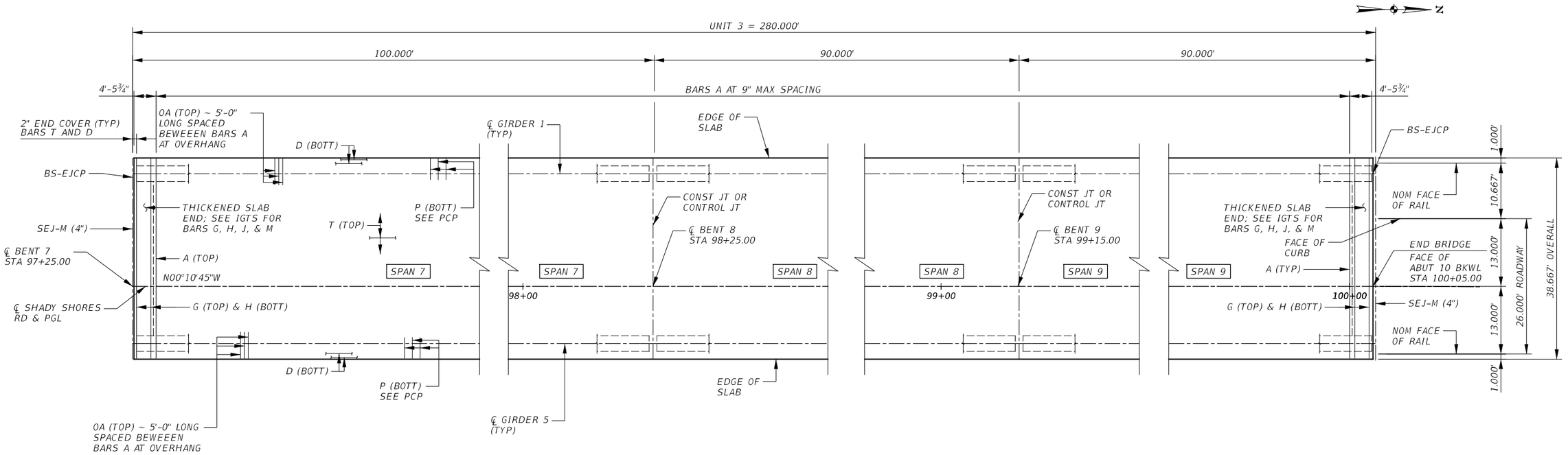

PLAN

SCALE: 1" = 20'-0"

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

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SHADY SHORES ROAD LYNCHBURG CREEK DECK DETAILS

FILE: SEE PATH	DN: SDT	CK: JCV	DW: SDT	CK: JCV
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REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		233

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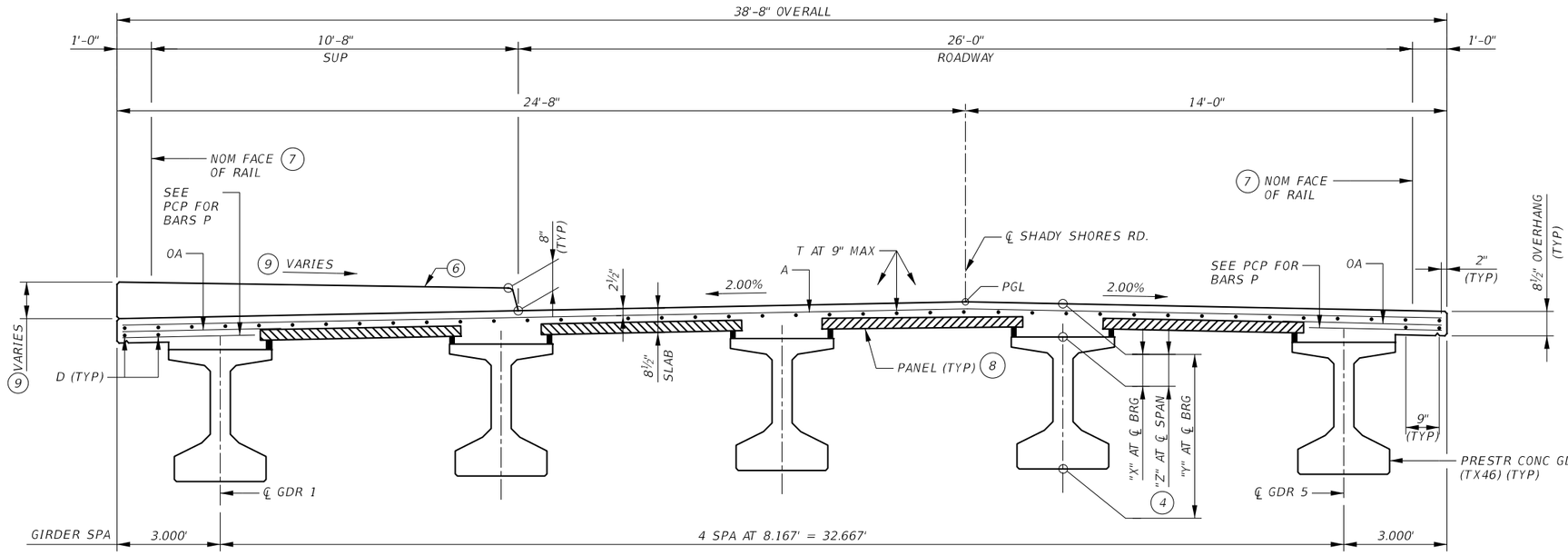

TYPICAL TRANSVERSE SECTION

SCALE: ¼" = 1'-0"

STA 91+25.00 TO 100+05.00

1. SEE DECK DETAILS FOR GENERAL AND MATERIAL NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

BAR TABLE

BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF SECTION DEPTHS (5)

SPAN NO.	BEAM NO.	"X" AT C.L. BRG	"Y" AT C.L. BRG	"Z" AT C.L. SPAN (4)
ALL	1-5	1'-0"	4'-10"	10½"

ESTIMATED QUANTITIES

	ITEM	UNIT	SPAN 1	SPAN 2	SPAN 3	SPAN 4	SPAN 5	SPAN 6	SPAN 7	SPAN 8	SPAN 9	TOTAL
(1)	REINF CONC SLAB (HPC) (CL S)	SF	3,867	3,867	3,867	3,867	3,867	3,867	3,867	3,480	3,480	34,029
(1)	PRESTR CONC GIRDER (Tx46)	LF	497.51	497.51	497.51	497.51	497.50	497.51	497.51	447.51	447.51	4,377.58
	CL S CONC (HPC) (SDWLK)	CY	37.0	37.0	37.0	37.0	37.0	37.0	37.0	33.3	33.3	325.6
(3) (2)	REINF STEEL	LB	8,895	8,895	8,895	8,895	8,895	8,895	8,895	8,004	8,004	78,273

1. LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE. SEE FRAMING PLAN SHEETS FOR GIRDER LENGTHS.
2. CONTRACTOR'S INFORMATION ONLY.
3. REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF FOR SLAB.
4. THEORETICAL DIMENSION.
5. SEE PCP STANDARD FOR HAUNCH REINFORCING DETAIL AND SPECIAL GRADING DETAIL FOR ALL AREAS WHERE MEASURED HAUNCH EXCEEDS 3½".
6. FOR REINFORCEMENTS, SEE TxDOT STANDARD, BRSM.
7. EPOXY COAT ALL REINFORCEMENT IN C221 AND T221 RAILING.
8. SEE PRESTRESSED CONCRETE PANELS (PCP) STANDARD AND PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) STANDARD FOR PANEL DETAILS NOT SHOWN.
9. SEE BRIDGE TYPICAL SECTION SHEET FOR SUP SLOPE AND SLOPE TRANSITION DETAILS.

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BRIDGE DECK SECTION LYNCHBURG CREEK

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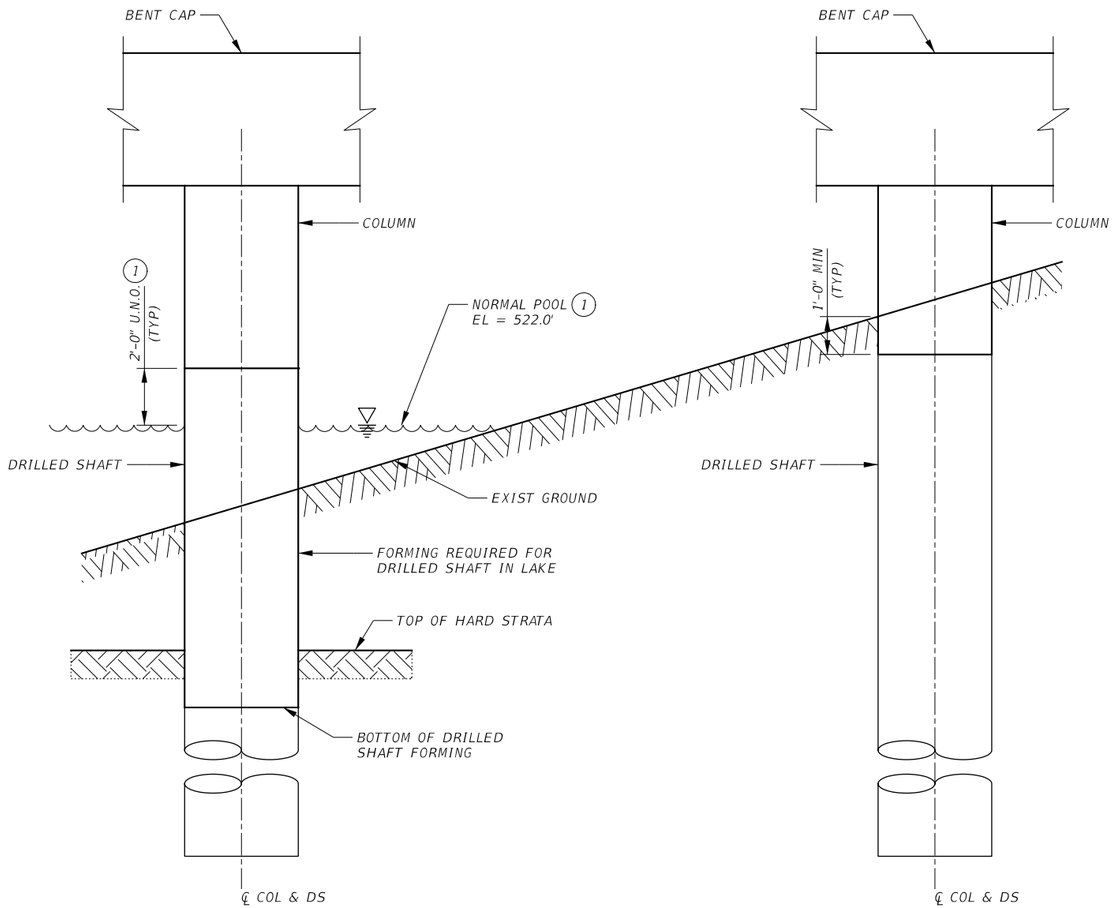

DRILLED SHAFT IN WATER (2)

N.T.S.

DRILLED SHAFT ON LAND (3)

N.T.S.

FORMING REQUIRED TO STABILIZE THE EXCAVATION AND FORM DS CONSTRUCTED IN AND NEAR THE LAKE SURFACE. TO PROVIDE STABLE CONSTRUCTION, STOP BOTTOM OF DRILLED SHAFT FORMING ONE (1) SHAFT DIAMETER BELOW THE TOP OF HARD STRATA. IF DRILLED SHAFT FORMING IS TIPPED MORE THAN 1 DIA DEEPER INTO HARD STRATA, LOWER THE TIPPING ELEVATION ACCORDINGLY WITH THE OVERRUN IN SHAFT LENGTH AT NO ADDITIONAL COST TO TXDOT.

AT CONTRACTOR'S OPTION, PERMANENT CASING MAY BE USED FOR THE REQUIRED FORMING OF DRILLED SHAFTS CONSTRUCTED IN WATER. THIS CASING WOULD NEED TO EXTEND A MINIMUM OF 2 FOOT ABOVE THE NORMAL POOL ELEVATION. COMPENSATION FOR PERMANENT CASING SHALL BE INCLUDED IN THE BID UNIT PRICE FOR DRILLED SHAFT.

(1) *SHAFT PROJECTION LENGTH ABOVE THE WATER AND ELEVATIONS FOR CONST JT/TOP OF DS AND TOP OF DRILLED SHAFT FORMING SHOWN ARE BASED UPON ASSUMPTION THAT LAKE LEVEL IS AT OR BELOW NORMAL POOL ELEVATION DURING CONSTRUCTION. IF OTHERWISE, CONTRACTOR MAY PROPOSE, SUBJECT TO APPROVAL BY THE ENGINEER, A UNIFORM UPWARD EXTENSION OF ALL DRILLED SHAFT FORMING WITH CORRESPONDING REDUCTIONS IN COLUMN HEIGHTS.*

(2) *USE WHEN THE DRILLED SHAFT IS IN WATER, OR BOTTOM OF COLUMN IS LESS THAN 2'-0" ABOVE THE WATER LEVEL.*

(3) *USE WHEN TOP OF SHAFT IS SURROUNDED BY SOIL THAT IS MORE THAN 2'-0" ABOVE WATER LEVEL.*

STATE OF TEXAS
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James C. Vester
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Texas Department of Transportation | Dallas District Bridge

SHADY SHORES ROAD
LAKE COL TO DS CONN
FOUNDATION DETAILS

WATER-FD

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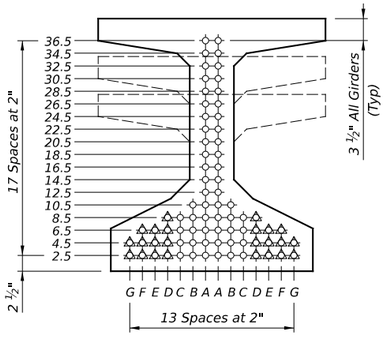
STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS		
				PRESTRESSING STRANDS															STRENGTH I		SERVICE III
	SPAN NO.	GIRDER NO.	GIRDER TYPE	NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)	NO.	TO END (in)	RELEASE STRENGTH ① f'ci (ksi)	MINIMUM 28 DAY COMP STRENGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTTOM ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR ② Moment	LIVE LOAD DISTRIBUTION FACTOR ② Shear	Inv	Opr	Inv
LYNCHBURG CREEK	1,2,3,4, 5,6,7	1,2,4,5	Tx46		40	0.6	270	15.70	10.30	6	42.5	5.900	6.500	3.920	–4.344	6873	0.642	0.826	1.53	2.06	1.01
	1,2,3,4, 5,6,7	3	Tx46		42	0.6	270	15.60	10.46	6	42.5	5.900	6.800	3.948	–4.441	7066	0.642	0.826	1.52	2.05	1.05
	8,9	1,2,4,5	Tx46		32	0.6	270	16.23	9.85	6	40.5	4.700	5.700	3.155	–3.558	5752	0.661	0.826	1.63	2.12	1.08
	8,9	3	Tx46		32	0.6	270	16.23	9.85	6	40.5	4.700	5.700	3.177	–3.637	5907	0.661	0.826	1.50	2.04	1.01
STREAM GS–1	ALL	1	Tx46		34	0.6	270	16.07	9.72	6	42.5	4.800	6.000	2.718	–3.079	5056	0.671	0.826	2.02	2.66	1.69
	1 & 6	2	Tx46		28	0.6	270	16.60	11.46	4	40.5	4.200	5.000	2.815	–3.218	5258	0.671	0.826	1.58	2.05	1.10
	2,3,4,5	2	Tx46		36	0.6	270	15.94	10.27	6	40.5	5.100	5.900	3.535	–3.968	6338	0.651	0.826	1.64	2.19	1.05
	1 & 6	3	Tx46		30	0.6	270	16.40	9.60	6	40.5	4.200	5.100	2.839	–3.304	5426	0.671	0.826	1.74	2.26	1.25
	2,3,4,5	3	Tx46		38	0.6	270	15.81	10.13	6	42.5	5.300	6.100	3.566	–4.075	6549	0.651	0.826	1.67	2.24	1.20
	1 & 6	4	Tx46		26	0.6	270	16.68	12.07	4	34.5	4.000	5.000	2.737	–2.942	4832	0.671	0.826	1.64	2.13	1.29
	2,3,4,5	4	Tx46		32	0.6	270	16.23	9.85	6	40.5	4.500	5.900	3.437	–3.621	5804	0.651	0.826	1.68	2.18	1.16
	1 & 6	5	Tx46		24	0.6	270	16.77	14.10	4	20.5	4.000	5.000	2.630	–2.806	4645	0.671	0.826	1.50	1.94	1.24
	2,3,4,5	5	Tx46		30	0.6	270	16.40	9.60	6	40.5	4.200	5.800	3.297	–3.448	5569	0.651	0.826	1.57	2.03	1.12
SWISHER CREEK	ALL	1	Tx46		38	0.6	270	15.81	10.45	6	40.5	5.500	6.200	3.726	–4.131	6586	0.682	0.826	1.50	2.07	1.03
	ALL	2	Tx46		40	0.6	270	15.70	10.60	6	40.5	5.800	6.600	3.870	–4.327	6867	0.642	0.826	1.57	2.11	1.07
	1 & 2	3	Tx46		42	0.6	270	15.60	10.46	6	42.5	5.900	6.800	3.904	–4.447	7102	0.642	0.826	1.60	2.16	1.21
	3	3	Tx46		40	0.6	270	15.70	10.30	6	42.5	5.900	6.800	2.524	–2.961	5822	0.682	0.826	2.29	3.04	2.60
	ALL	4	Tx46		36	0.6	270	15.94	10.27	6	40.5	5.200	5.900	3.761	–3.942	6274	0.642	0.826	1.69	2.27	1.19
	ALL	5	Tx46		34	0.6	270	16.07	9.72	6	42.5	5.000	5.500	3.603	–3.750	6014	0.642	0.826	1.64	2.13	1.17



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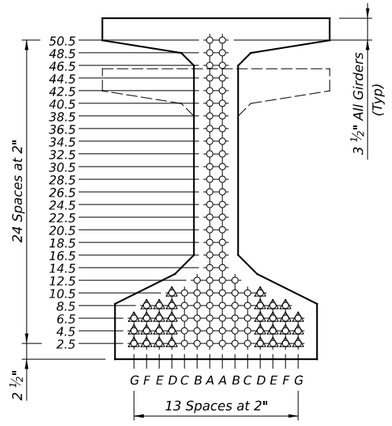

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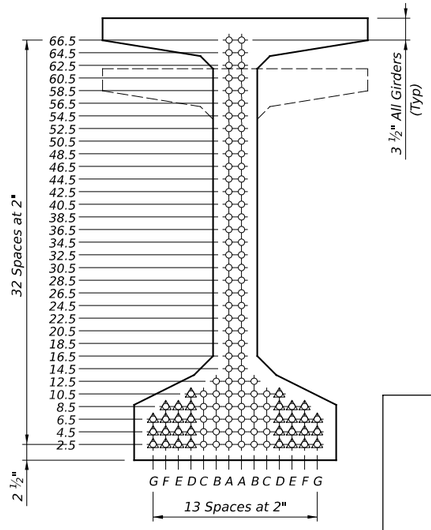

TYPE Tx62 & Tx70

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

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. Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of __ percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The Fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The Fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

Locate strands for the designed girder 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", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

To complete this sheet input the girder designs in the table and the relative humidity under Design Notes. In all cases, remove this block. This sheet must be signed, sealed, and dated by a registered Professional Engineer.

HL93 LOADING

STATE OF TEXAS
JAMES C. VESTER
128858
LICENSED PROFESSIONAL ENGINEER

12-01-2025

JAMES C. VESTER	128858
NAME	P.E. NO.
DATE	11/25/2025
TBPELS FIRM #312	

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

FILE: IG-IGND-22 (1).dgn	DN: TxDOT	CK: TxDOT	DW: EFC	CK: TAR
©TxDOT August 2017	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
10-19: Modified for depressed strands only 03-22: Added load rating	DIST	COUNTY		SHEET NO.
	DAL	DENTON		236

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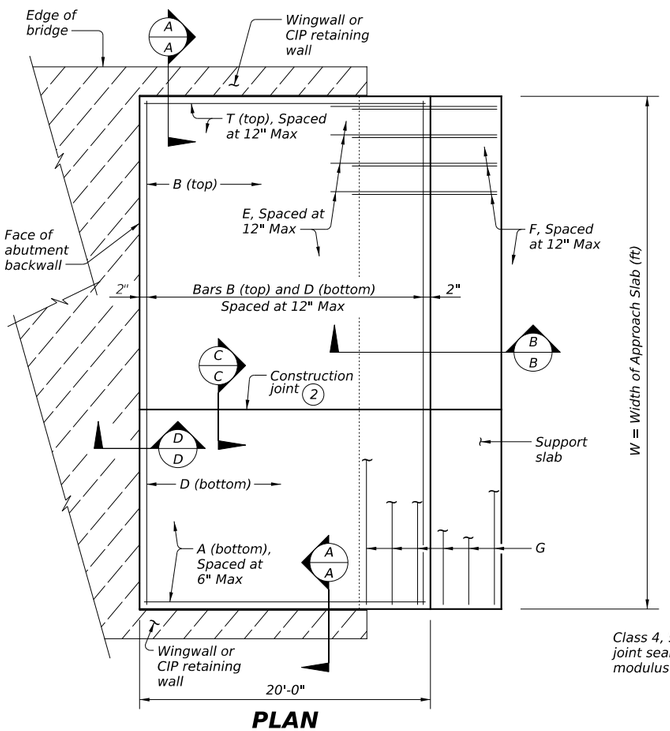
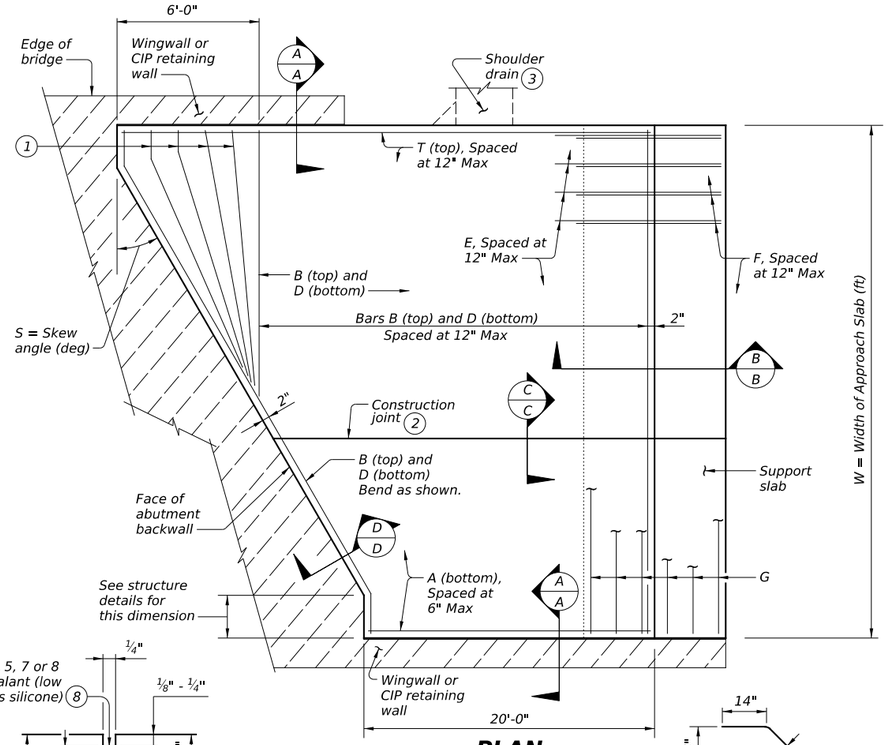


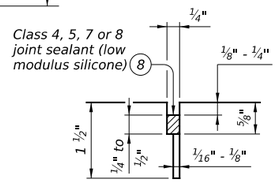
PLAN

(Showing non-skewed approach slab.)

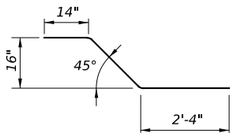


PLAN

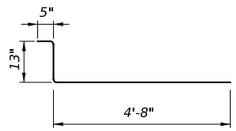
(Showing skewed approach slab.)



LONGITUDINAL SAW CUT JOINT DETAIL



BARS E (#5)



BARS F (#5)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab
= 18.4 Lbs/LF of Support Slab

Vol of Appr Slab Conc (CY) = 1.057W - 0.008W x T + 0.02W² Tan S
(Includes Support Slab)

W = Width of Approach Slab (ft)

T = Conc Pavement Thickness (in)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max spacing, 3" Min spacing). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab only.

(5) On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Place two layers of 30# roofing felt.

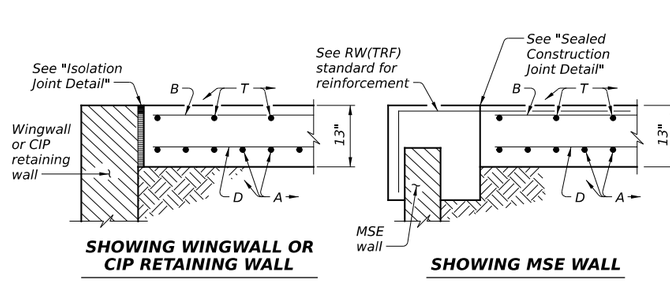
(6) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(7) See details elsewhere in plans for required cross-slope.

(8) Place in accordance with Item 438.

(9) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

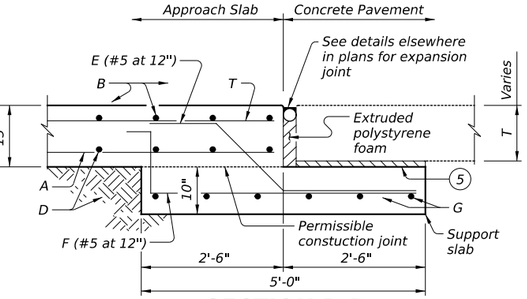
(10) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.



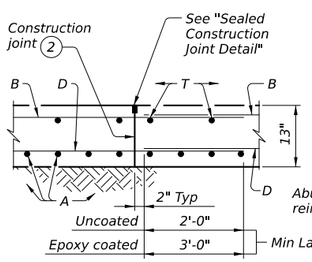
SHOWING WINGWALL OR CIP RETAINING WALL

SHOWING MSE WALL

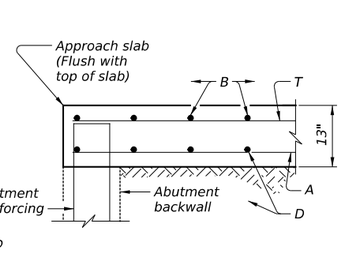
SECTION A-A



SECTION B-B



SECTION C-C (6)

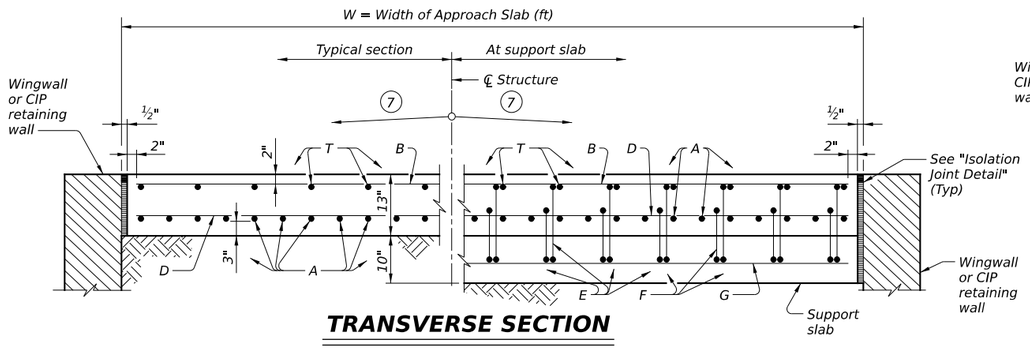


SECTION D-D

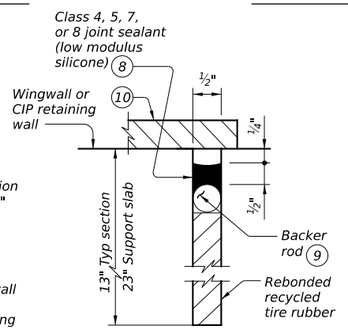
GENERAL NOTES:

Construct approach slab in accordance with Item 422.
Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
Provide Grade 60 reinforcing steel.
Provide longitudinal joints as shown on the "Longitudinal Saw Cut Joint Detail" at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."
Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
Cure for 4 days using water or membrane curing per Item 422.
All details shown herein are subsidiary to bridge approach slab.

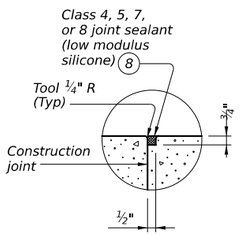
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

Bridge Division Standard

BRIDGE APPROACH SLAB
CONCRETE PAVEMENT

BAS-C

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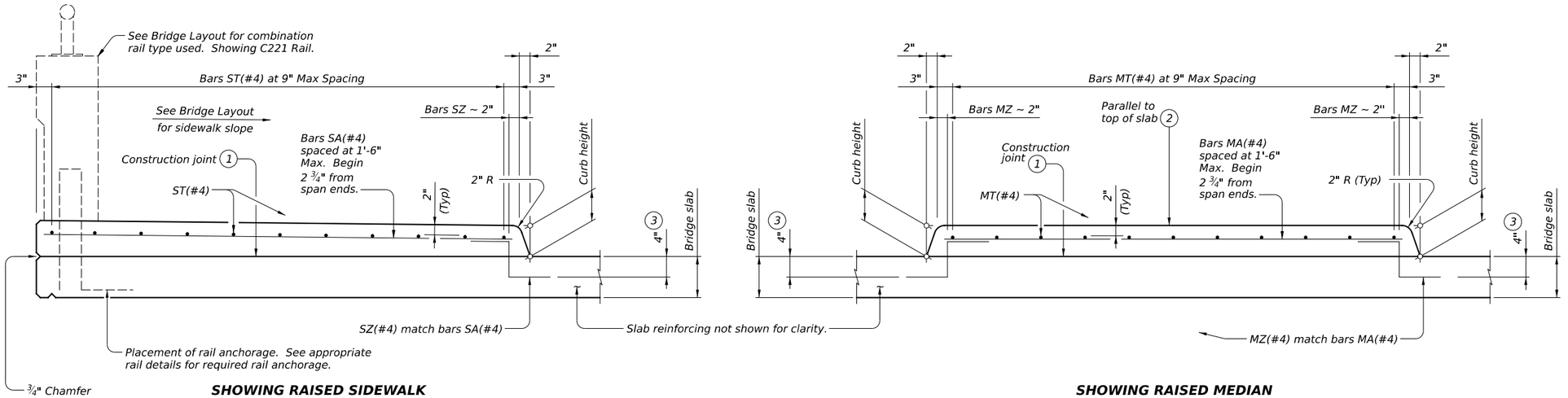


SHOWING RAISED SIDEWALK ***SHOWING RAISED MEDIAN***

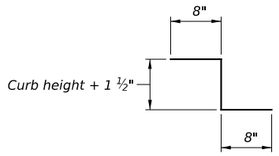
TYPICAL TRANSVERSE SECTIONS

See Span Details for dimensions not shown.

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

(2) *Unless noted otherwise on the span details.*

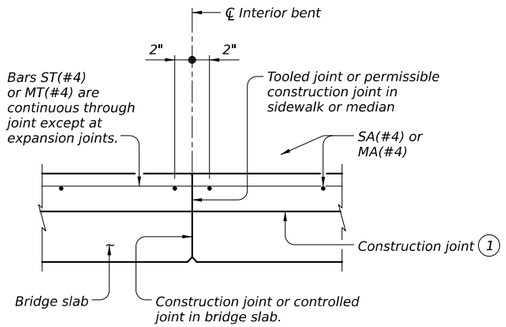
(3) *Bars may rest on top of PCPs.*



BARS SZ(#4) AND MZ(#4)

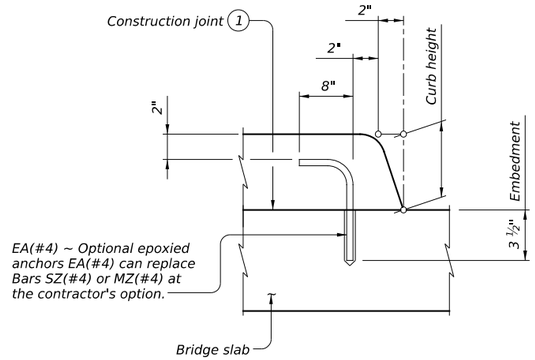
APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

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



LONGITUDINAL SECTION AT INTERIOR BENT

At bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIMAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C, D, E, or F) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives." Follow manufacturer's directions for installing the epoxied anchor bars.

MATERIAL NOTES:

Provide the same concrete required for the bridge deck, Class S or Class S (HPC) concrete.

Provide Grade 60 reinforcing steel. Deformed welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for Bars SA, ST, MA, and MT.

Provide epoxy coat or galvanize reinforcement if bridge deck reinforcement is required to be epoxy coated or galvanized.

Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing." Chamfer or round edges approximately 1/16" prior to galvanizing.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Provide the following bar or wire lap lengths when required:
Uncoated, 1'-7" Min
Coated, 2'-5" Min

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

Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).

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

DESIGNER NOTES:

These details do not apply for longitudinal grades exceeding 5 percent.

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

Texas Department of Transportation

Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

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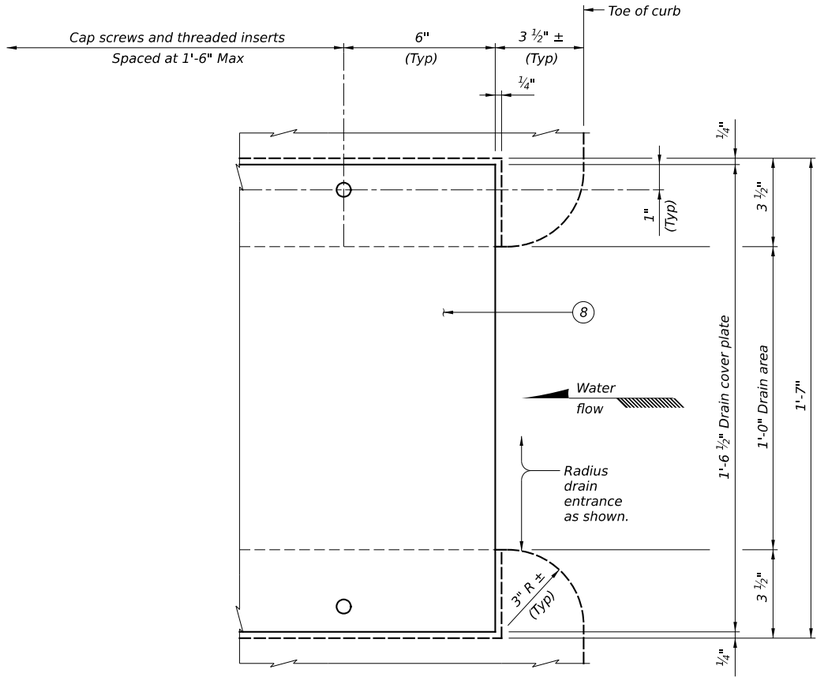
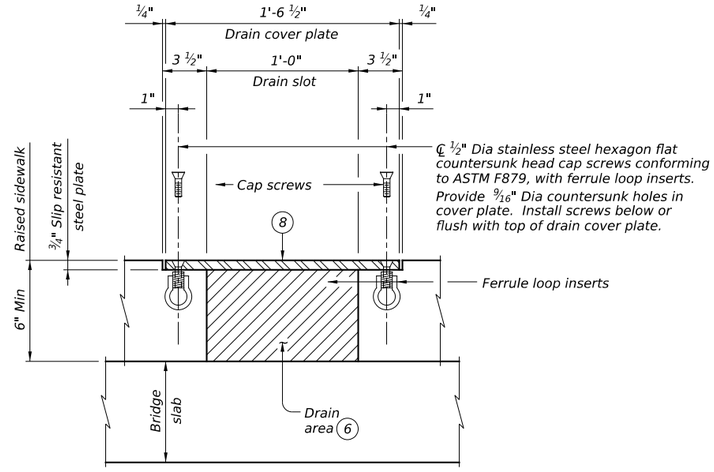
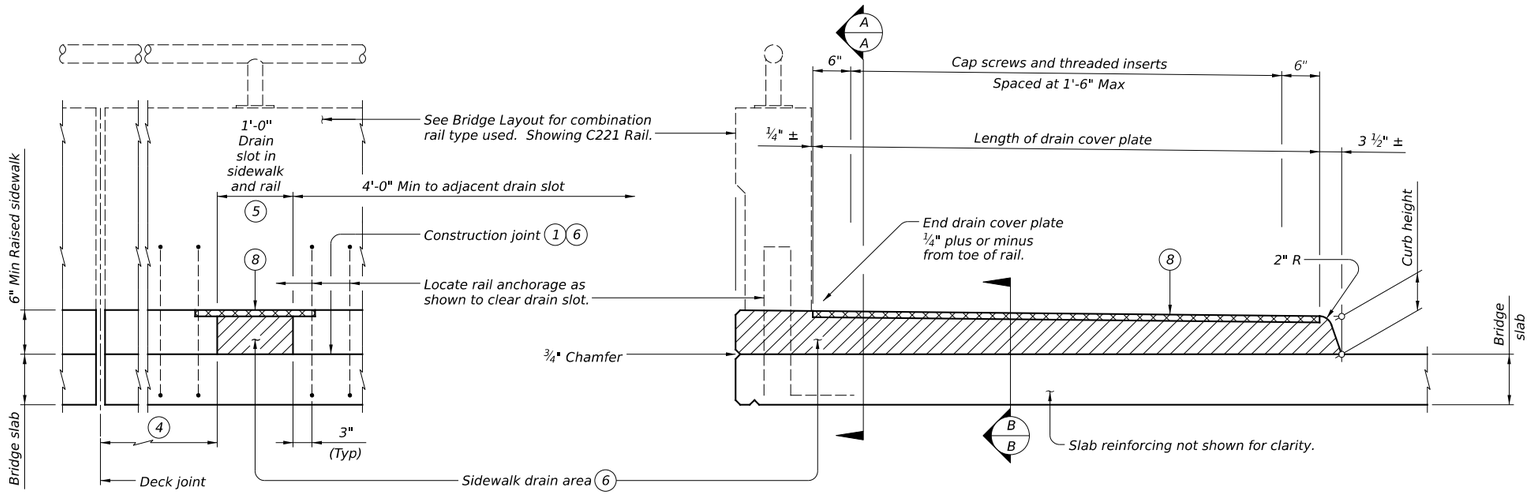


PARTIAL PLAN CURB DRAIN



SECTION B-B

Reinforcing not shown for clarity.



SECTION A-A

SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS (7)

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

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

(5) *For rail Type C1W, center drain slots between posts.*

(6) *Steel trowel top surface of bridge deck in drain locations.*

(7) *Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place drain and cover plate perpendicular to toe of rail.*

(8) *Drain cover plate (PL ¾ x 18 ½ slip resistant steel plate). Install flush with top of sidewalk.*

Texas Department of Transportation

Bridge Division Standard

BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

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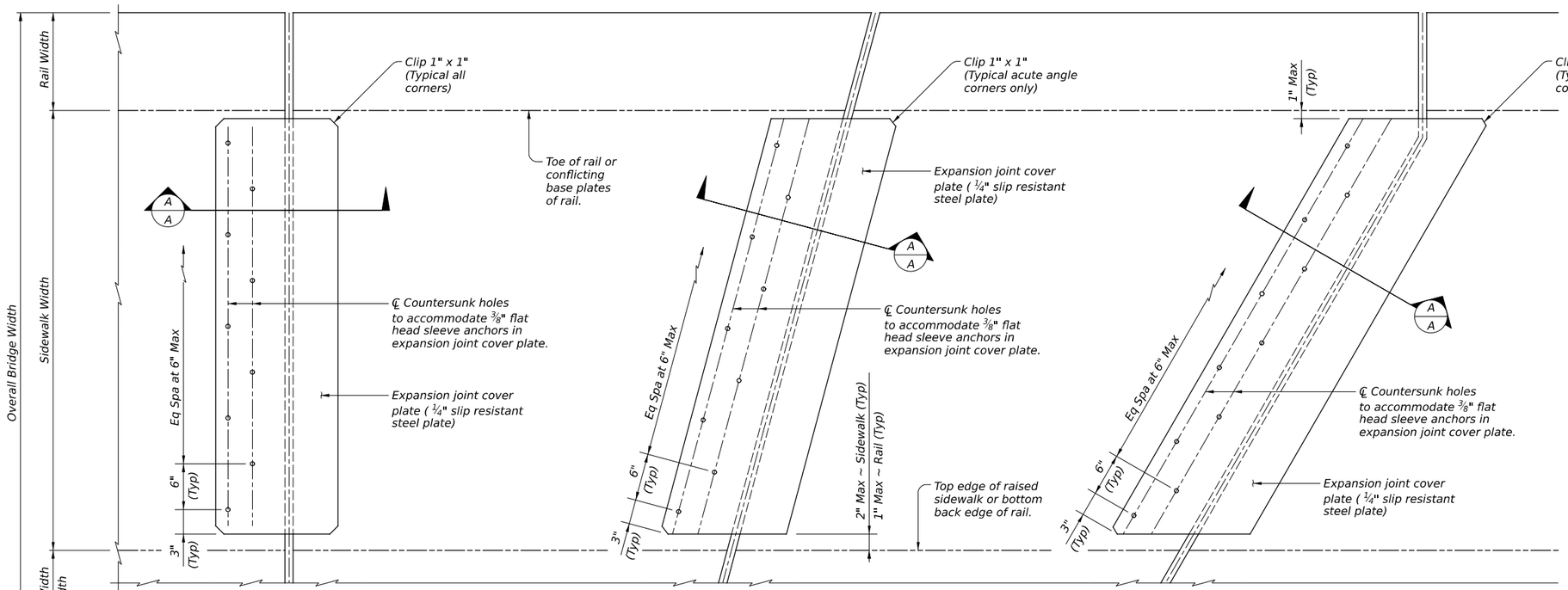
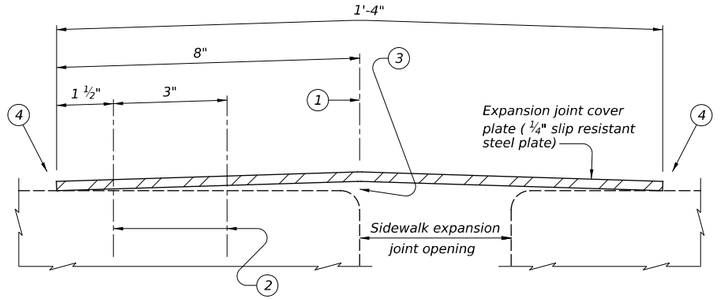
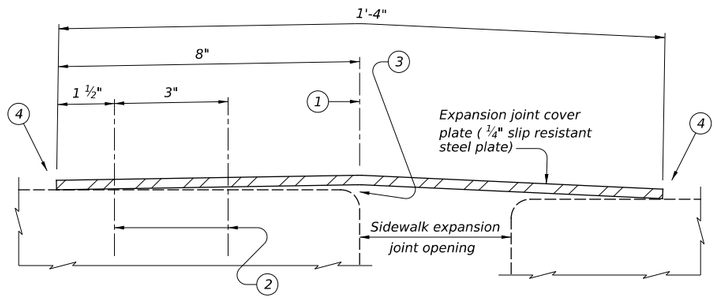


NO SKEW | **SKEW WITHOUT SLAB BREAKBACK** | **SKEW WITH SLAB BREAKBACK**

PLAN



SHOWING LEVEL EXPANSION JOINT

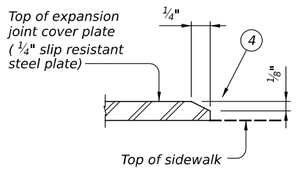


SHOWING UNLEVEL EXPANSION JOINT

(Install sleeve anchors on high side of expansion joint.)

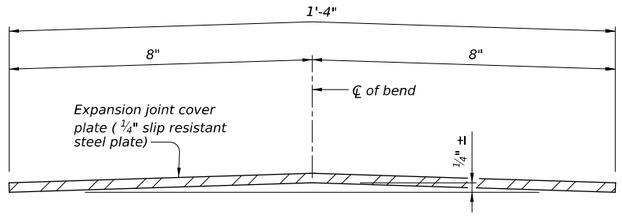
SECTION A-A

1. ℄ Expansion joint cover plate and edge of expansion joint.
2. ℄ ⅜" x 2 ½" Min, flat head sleeve anchors, stainless steel. Countersink flat head sleeve anchors in ¼" slip resistant steel plate.
3. It is not necessary to remove plate crown provided the plate is firmly secured to the sidewalk.
4. Transverse edges must be in contact with sidewalk surface after installation.



EXPANSION JOINT COVER PLATE BEVEL DETAIL

Bevel all plate edges as shown.



BENDING DIAGRAM OF EXPANSION JOINT COVER PLATE

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

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

FABRICATION NOTES:

Shop drawings for the fabrication of bridge sidewalk expansion joint cover plate will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A Bridge Sidewalk Expansion Joint Cover Plate Layout which Identifies location side of sleeve anchors and orientation of all cover plate sections must be developed by the fabricator. Mark each steel section in accordance with the Bridge Sidewalk Expansion Joint Cover Plate Layout. A copy of the Bridge Sidewalk Expansion Joint Cover Plate Layout is to be provided to the Engineer.

Sidewalk expansion joint cover plates must be hot-dipped galvanized ¼" slip resistant steel plate. Checker plate or diamond plate is not allowed nor are slip resistant tapes, films and non-metallic coatings.

Minimum required yield strength of steel plate is 36 ksi.

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

Provide stainless steel flat head sleeve anchors meeting the requirements of ASTM F 593, Group I, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

GENERAL NOTES:

Sidewalk expansion joint cover plates can only accommodate up to a 7" maximum expansion joint opening.

Details provided are applicable to concrete walkway surfaces only.

Payment for sidewalk expansion joint cover plates are by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures."

Estimated weight of one sidewalk expansion joint cover plate is 14 plf.

Texas Department of Transportation

Bridge Division Standard

BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (ALL SKEWS)

BS-EJCP

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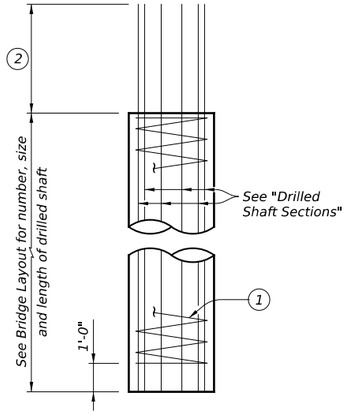
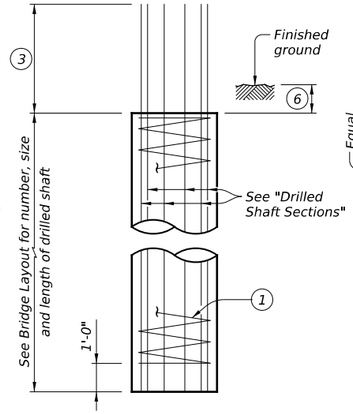
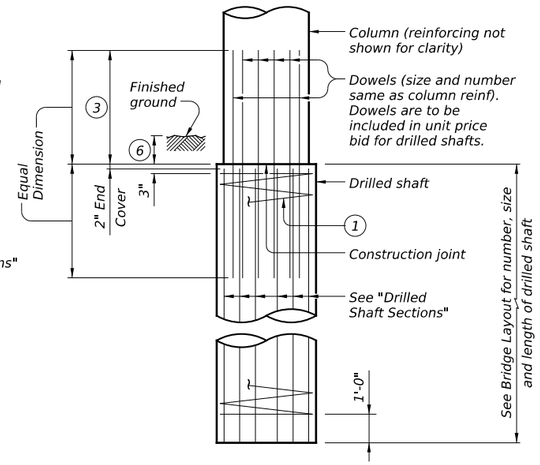


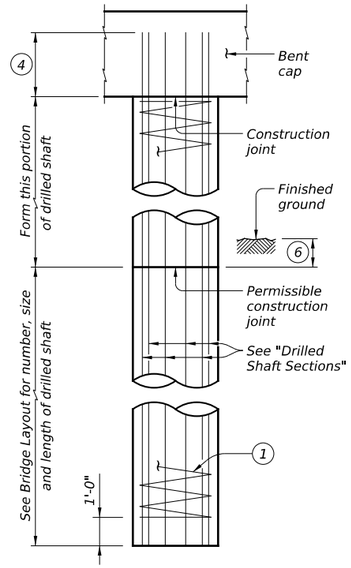
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



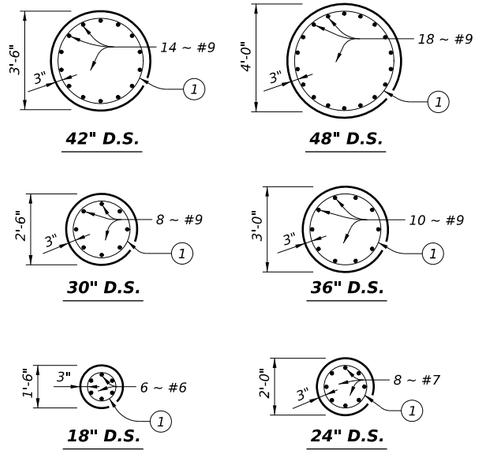
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

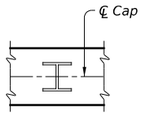


DRILLED SHAFT SECTIONS

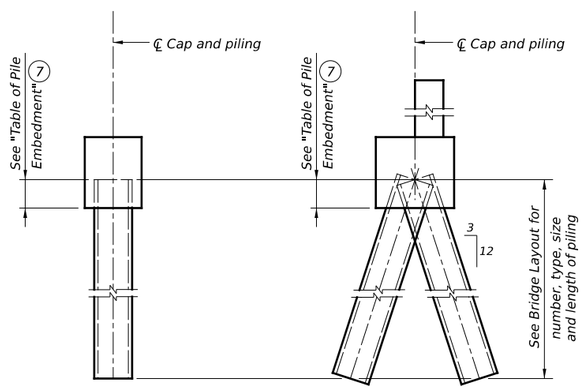
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

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



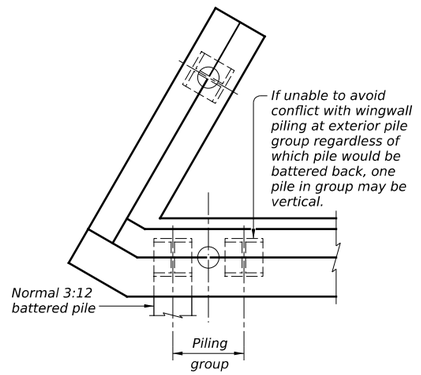
ORIENTATION OF STEEL H-PILING



VERTICAL PILE **BATTERED PILE**

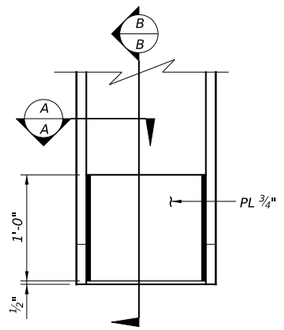
PILING DETAILS

(Concrete or steel H)

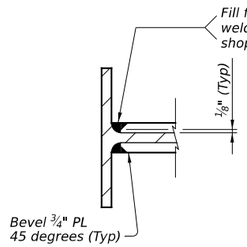


DETAIL A

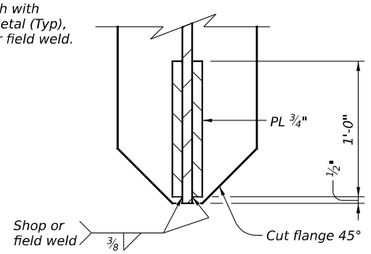
(Showing plan view of a 30° skewed abutment)



ELEVATION



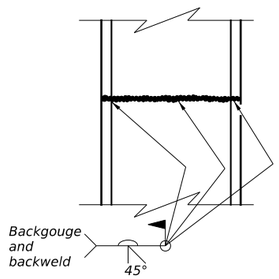
SECTION A-A

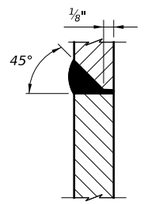


SECTION B-B

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.*

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: MS-FD-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		241

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DATE: 11/25/2025 3:38:07 PM
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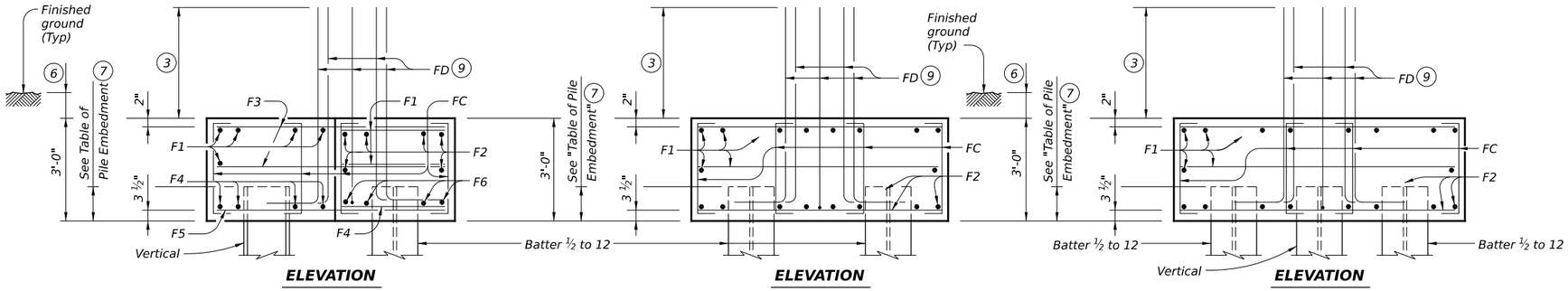
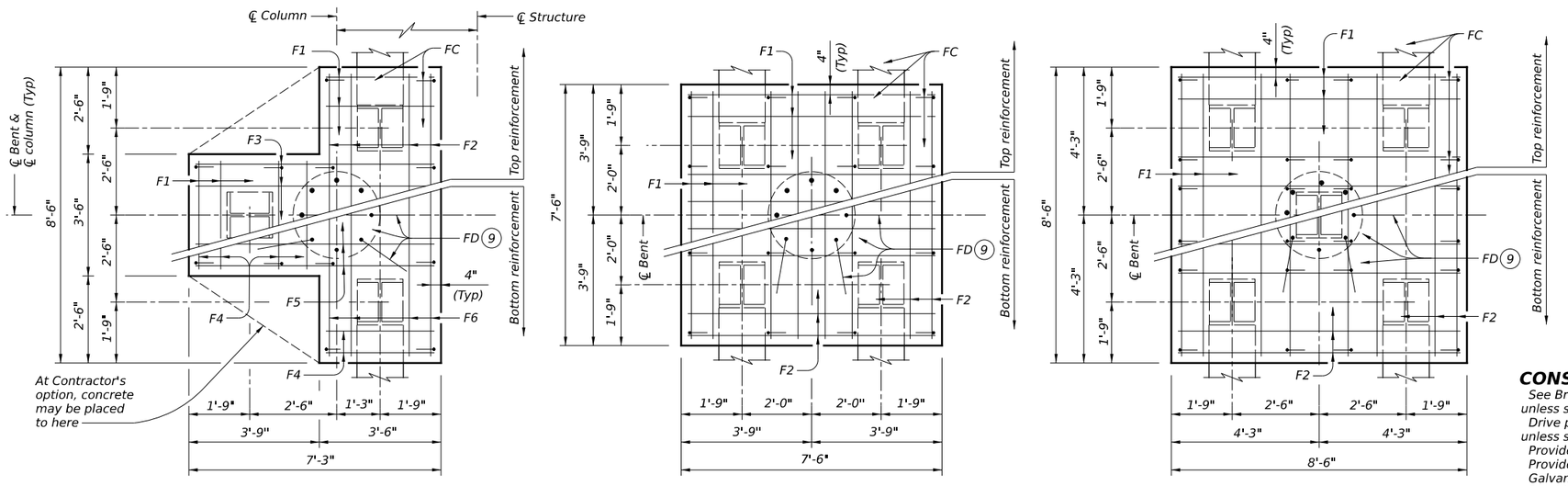


ELEVATION **ELEVATION** **ELEVATION**



PLAN **PLAN** **PLAN**

THREE PILE FOOTING (8)

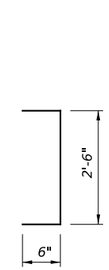
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

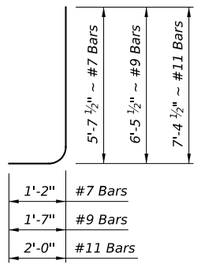
For 42" Dia and smaller columns.

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: MS-FD-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		242

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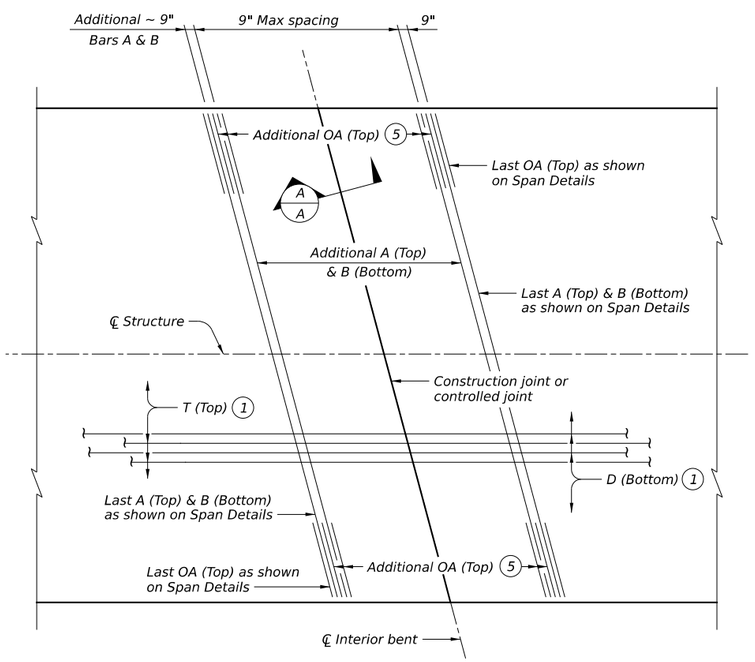
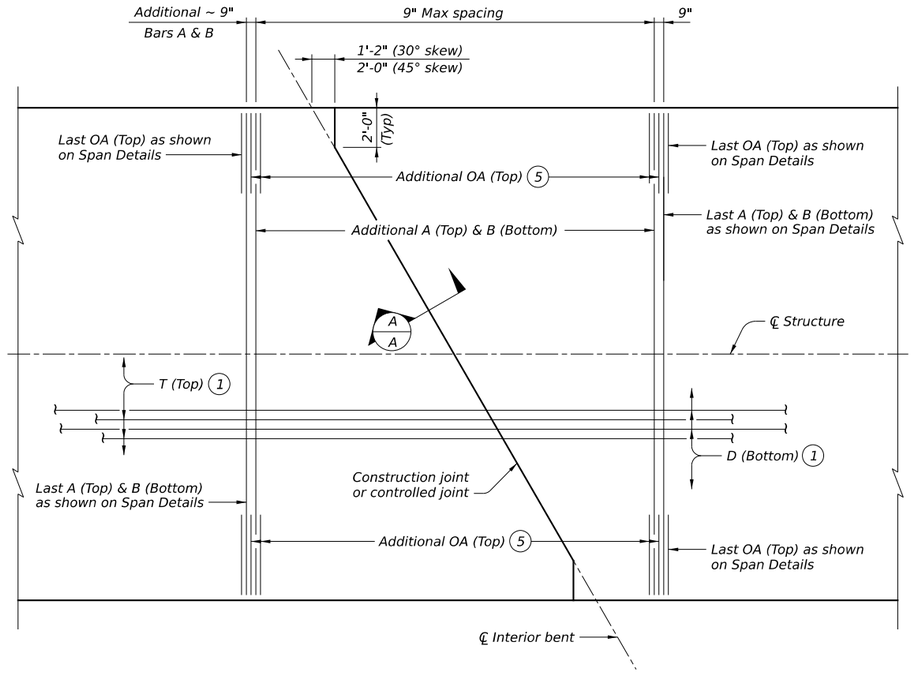


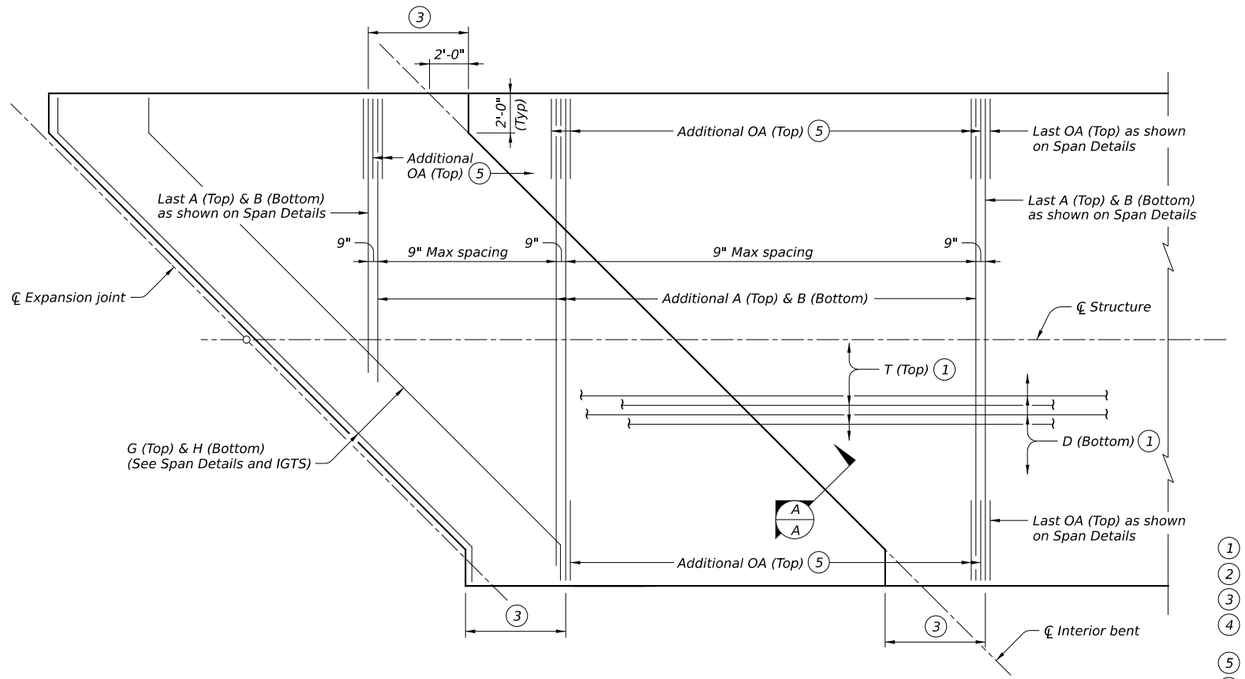
PLAN FOR 0° OR 15° SKEW

(Showing 15° skew)



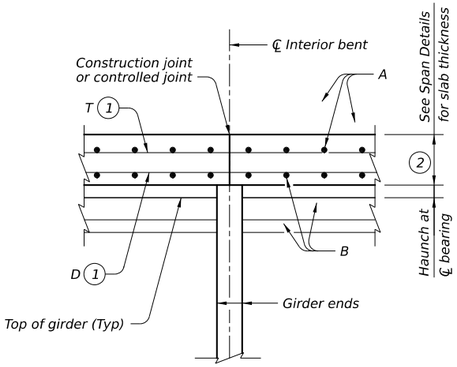
PLAN FOR 30° OR 45° SKEW

(Showing 30° skew)



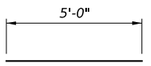
PLAN FOR 45° SKEW 4

(Showing short span condition.)



SECTION A-A

Bars OA (Top) not shown for clarity.



BARS OA (#5)

1. Top and bottom mats must be continuous through joint.
2. Maintain a constant slab thickness over the bent.
3. 5'-4" as shown on Span Details.
4. Use these details when no full slab width bars A and B are shown on Span Details.
5. Bars OA (Top) at 9" Max spacing between Bars A (Top).
6. Values in table assume a temperature change of 70° F after erection when calculating thermal movement in one direction (not total).

TABLE OF ALLOWABLE UNIT LENGTH 6

Max Rdwy Grade, Percent	Unit Length Factor
0.00	4.1
1.00	3.9
2.00	3.7
3.00	3.5
4.00	3.3
5.00	3.1

Unit length must not exceed the length of the shortest end span times the Unit Length Factor shown in table or 400', whichever is less.

BAR TABLE

BAR	SIZE
A	#4
B	#4
D	#4
T	#4
OA	#5

The details shown on this sheet are applicable for two and three span units comprised of the same girder type. Units may be comprised of different span lengths. See "Table of Allowable Unit Length."

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.

CONSTRUCTION NOTES:

Where multi-span units are indicated on the Bridge Layout, the thickened slab end details and reinforcement shown on IGTS standard (Bars AA, G, H, J, K, and M) and on the Span Details will be omitted where slabs are continuous over interior bents. At these locations, the slab details and reinforcement will be as shown on this sheet or on PCP standard (if using this option).

Thickened slab end reinforcement and details still apply at expansion joint locations (ends of units).

See Span Details for remainder of slab reinforcement and details.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide Class "S" concrete (f'_c = 4,000 psi).
Provide Class "S" (HPC) if shown elsewhere on the plans.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

The details shown on this sheet are applicable for use only with the Prestressed Concrete I-Girder Standard Designs shown on standards IGSD-24, IGSD-28, IGSD-30, IGSD-32, IGSD-34, IGSD-38, IGSD-40 and IGSD-44.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

CONTINUOUS SLAB DETAILS
PRESTR CONC I-GIRDER SPANS

IGCS

FILE: IG-IGCS-24.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
10-19: Added Bubble note 6 01-23: Added 34 ft. Roadway 11-24: Flipped top mat	DIST	COUNTY		SHEET NO.
	DAL	DENTON		243

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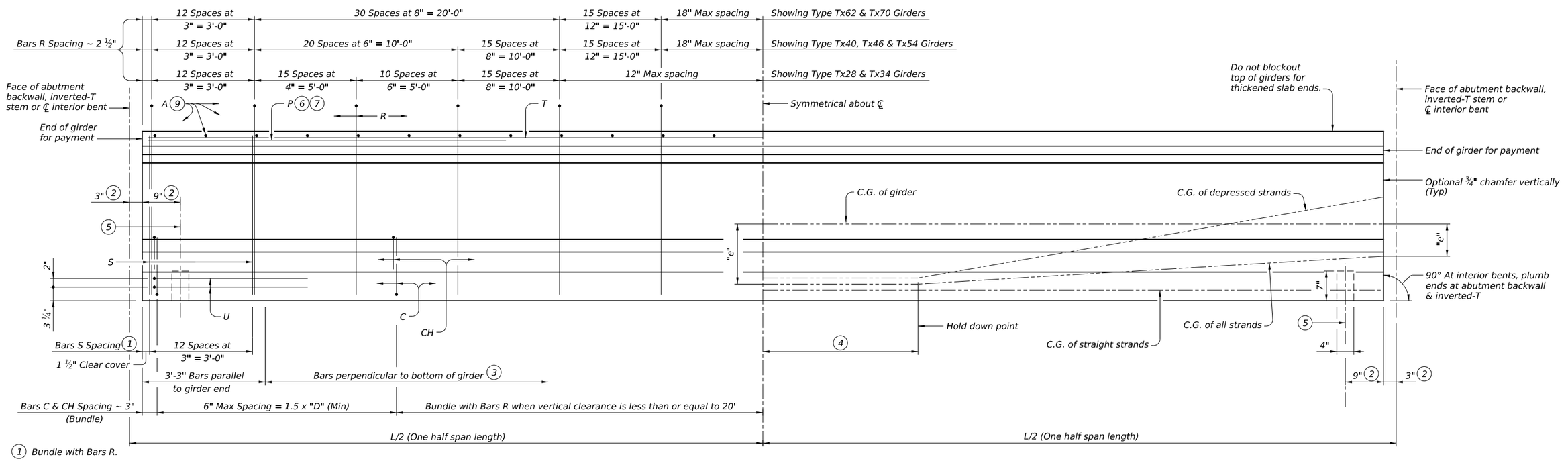


(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment backwall or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅝") at base. If holes are formed with sheet metal, forms may be left in place.

GIRDER ELEVATION

(6) Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the Fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the Fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes."

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

(11) Smooth trowel finish on the slab overhang side of exterior girder.

GIRDER DIMENSIONS AND SECTION PROPERTIES

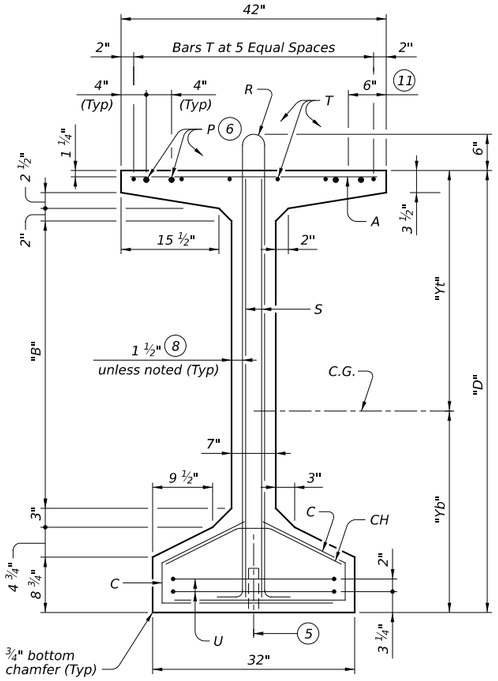
Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:

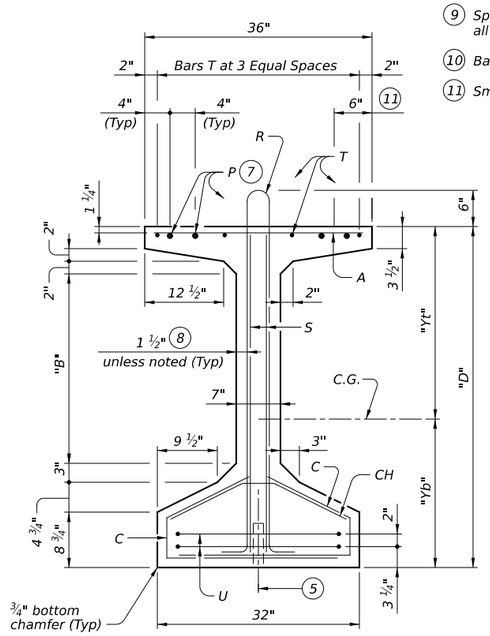
Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.
When vertical clearance of the span is less than or equal to 20', provide additional Bars C and CH in every girder of that span.

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

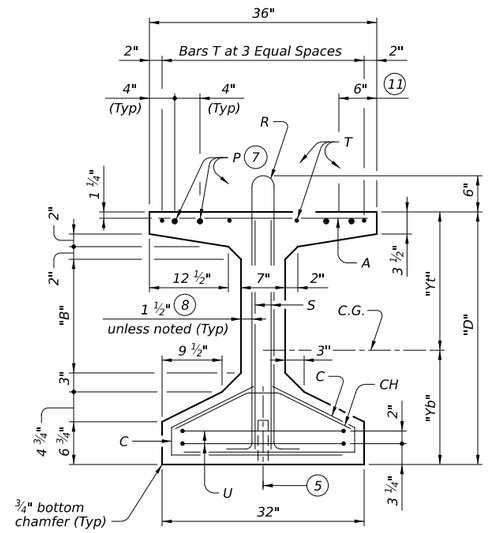
HL93 LOADING **SHEET 1 OF 2**



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

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Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23 (1).dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	DIST	COUNTY		SHEET NO.
	DAL	DENTON		244

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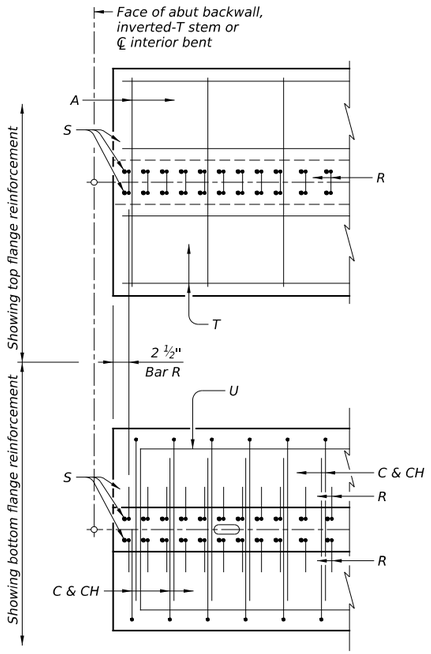
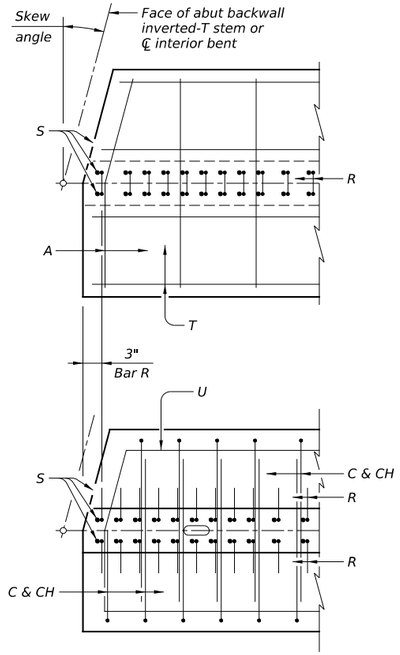
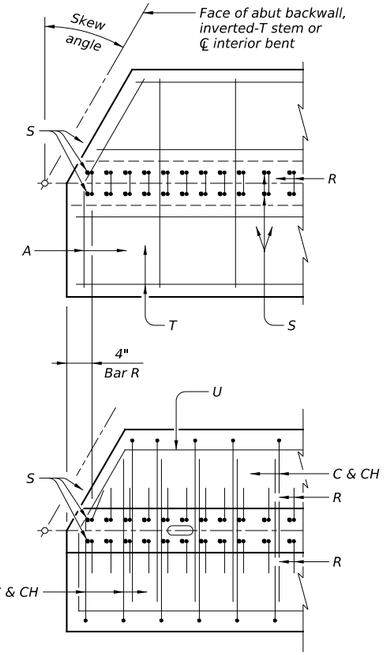


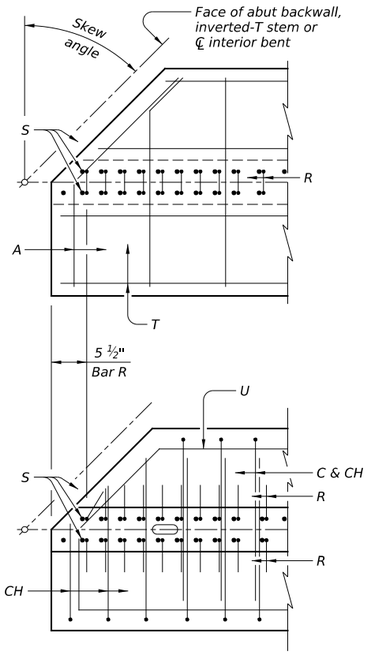
0° SKEW



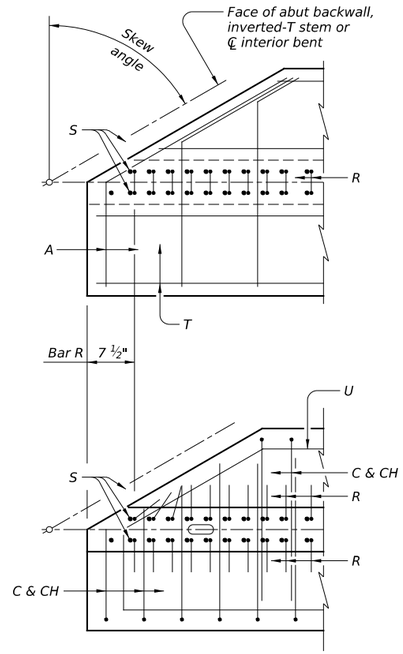
15° SKEW



30° SKEW



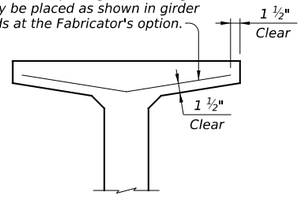
45° SKEW



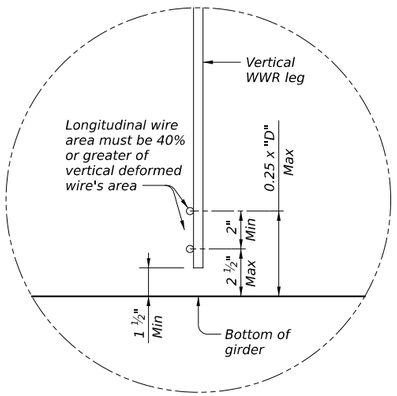
60° SKEW

PLAN OF GIRDER ENDS (12)

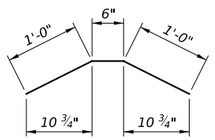
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



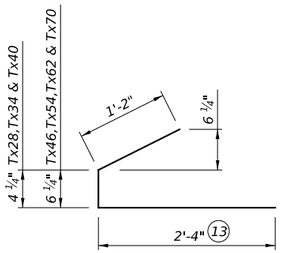
OPTIONAL TOP FLANGE REINFORCING DETAIL



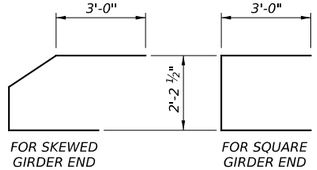
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



BARS CH (#4)



BARS C (#4)



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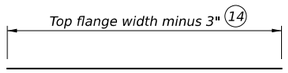
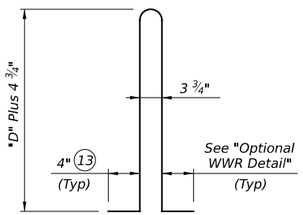
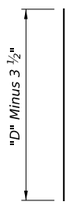


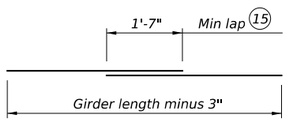
BARS A (#3)



BARS R (#4) (16)



BARS S (#6)



BARS T (#4)

(12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(13) Bars may be cut or bent at skewed end as required.

(14) Increase as necessary for bars at skewed end.

(15) No portion of bar less than 10 ft.

(16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING **SHEET 2 OF 2**

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23 (1).dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
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REVISIONS	0918	46	316	VA
10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	DIST	COUNTY		SHEET NO.
	DAL	DENTON		245

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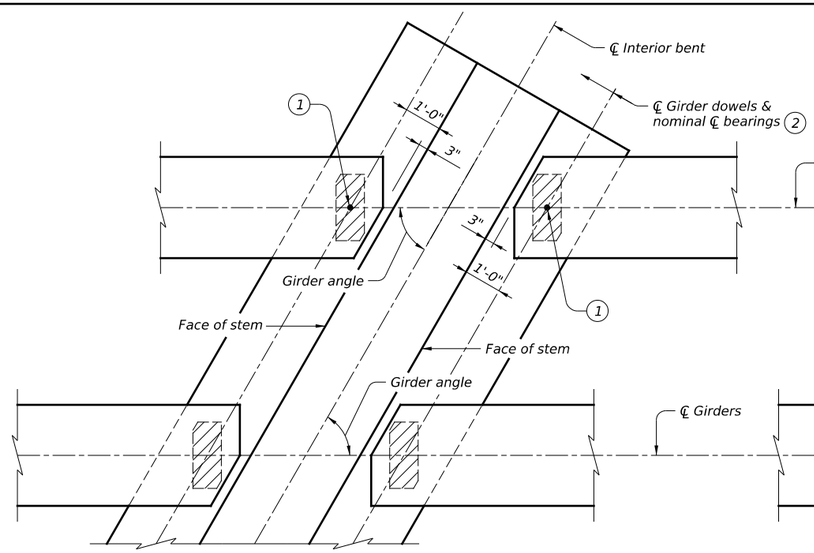
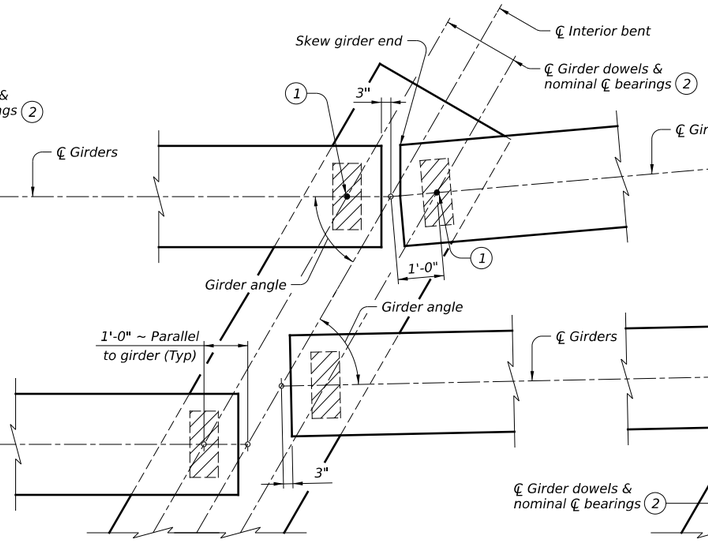
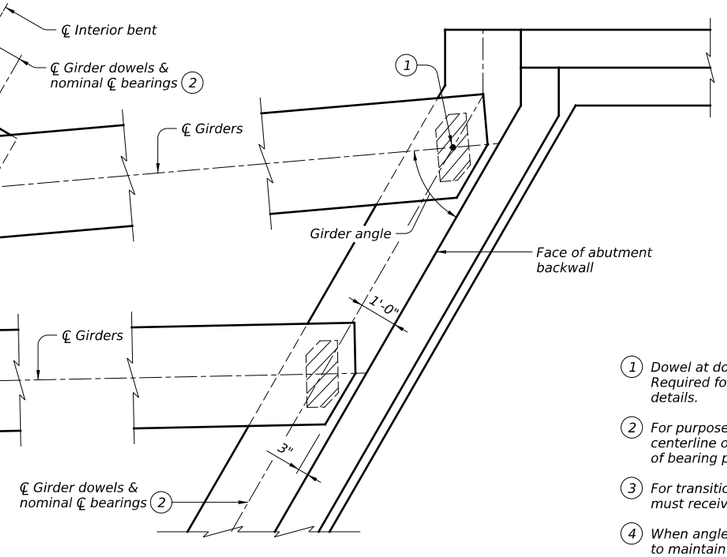
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/IG-IGEB-17 (1).dgn



INVERTED-T BENT WITH SKEW



CONVENTIONAL INTERIOR BENT WITH SKEW



ABUTMENT WITH SKEW (3)

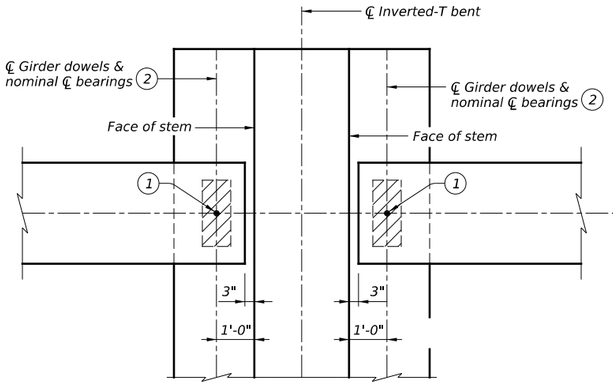
(1) *Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.*

(2) *For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.*

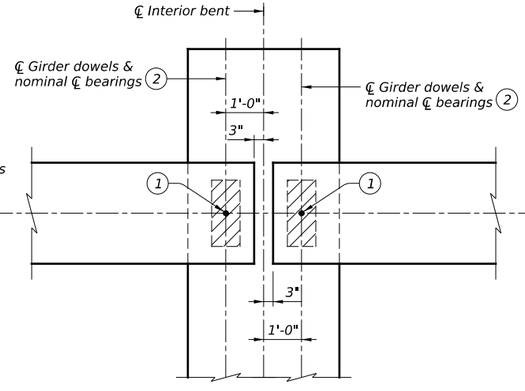
(3) *For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.*

(4) *When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.*

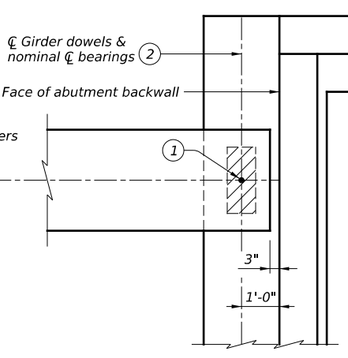
(5) *See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.*



INVERTED-T BENT

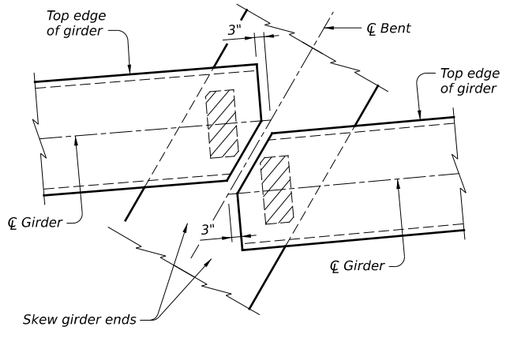


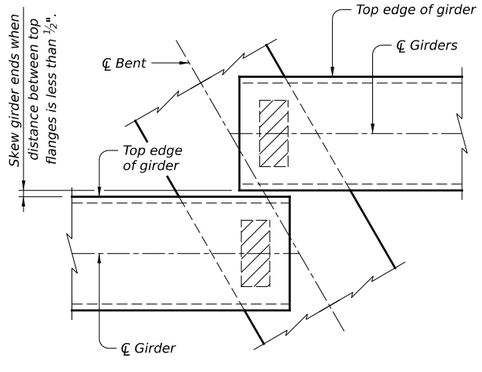
CONVENTIONAL INTERIOR BENT

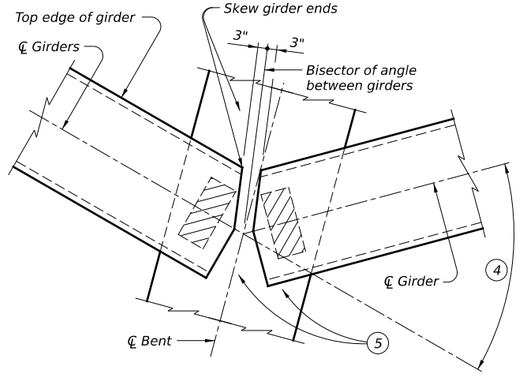


ABUTMENT (3)

GIRDER END DETAILS







GIRDER CONFLICT DETAILS

GENERAL NOTES:

These details accommodate skew angles up to 60°.
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, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders."

HL93 LOADING **SHEET 1 OF 3**

Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

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REVISIONS	0918	46	316	VA
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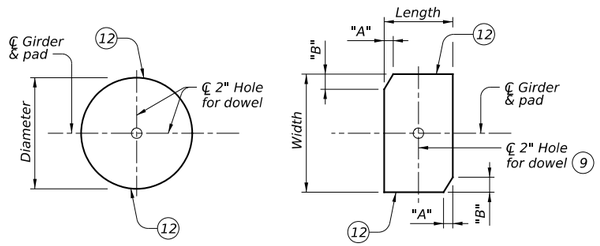
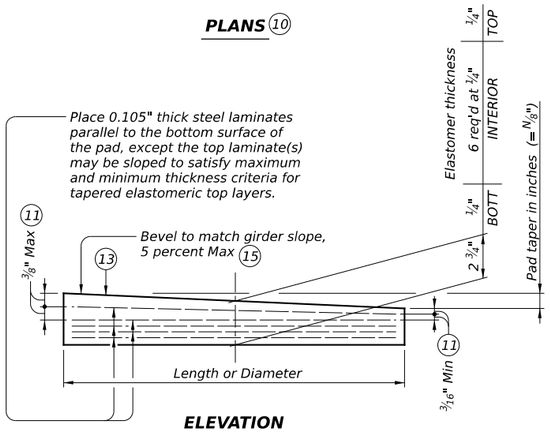


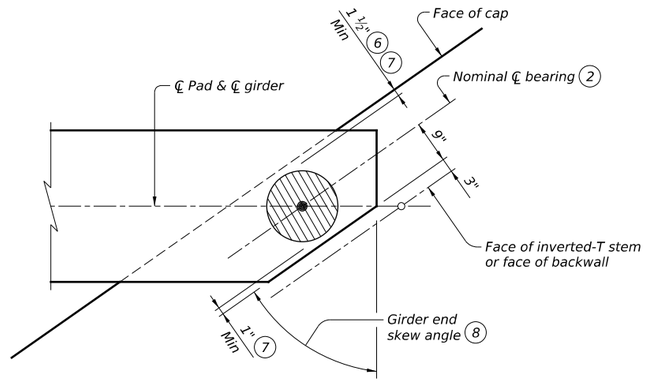
PLANS (10)



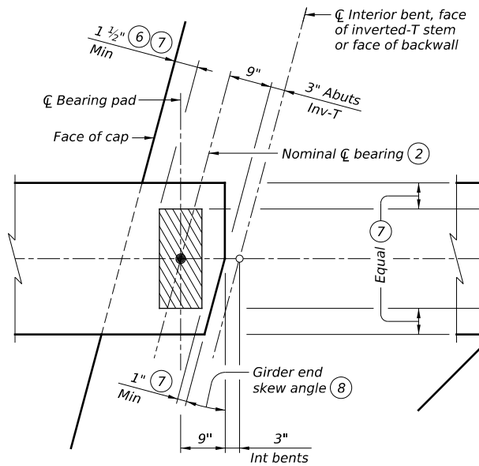
ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

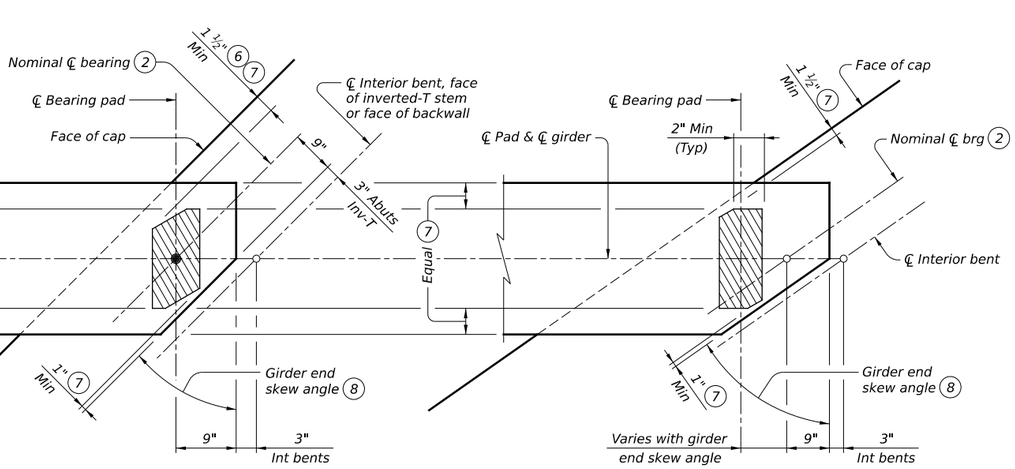
(50 DUROMETER)



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BACKWALL



SKEWED GIRDER ENDS AT INTERIOR BENTS, FACE OF INVERTED-T STEM OR FACE OF BACKWALL



SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (16)

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

Girder Type	Abutments	Interior Bents	Inv-T Bents
	Face of Backwall to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Length x Width	Pad Clip Dimensions	
					"A"	"B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) 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 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING **SHEET 2 OF 3**

Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

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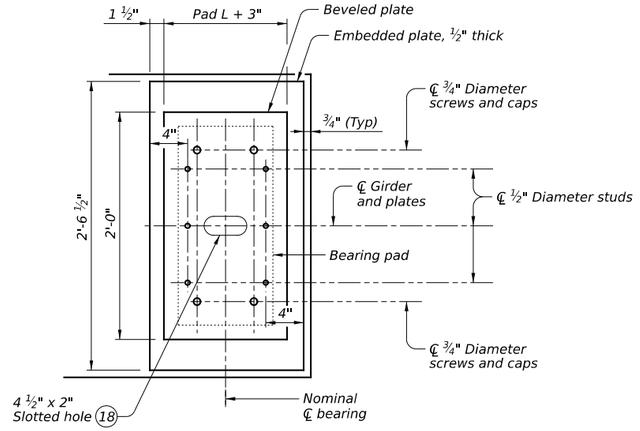
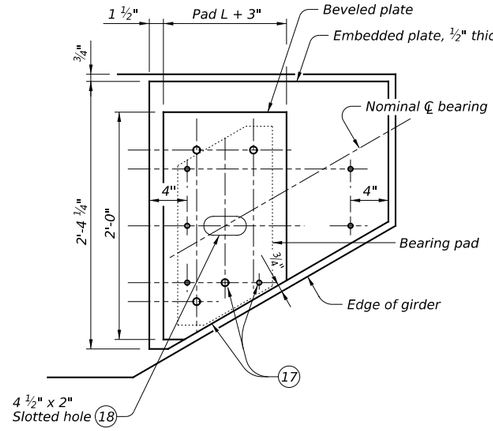


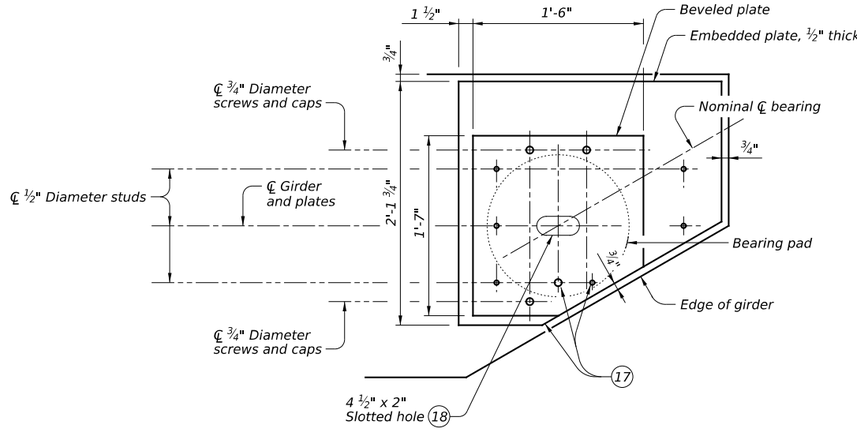
NORMAL GIRDER END

RECTANGULAR BEARING PAD



SKEWED GIRDER END

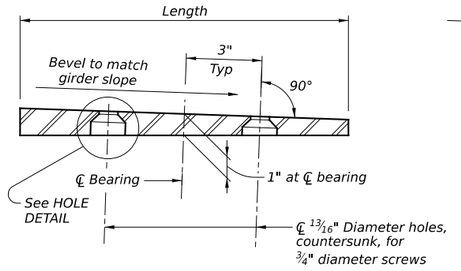
CLIPPED RECTANGULAR BEARING PAD



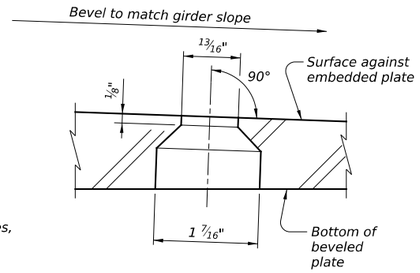
SKEWED GIRDER END

15" DIAMETER BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS

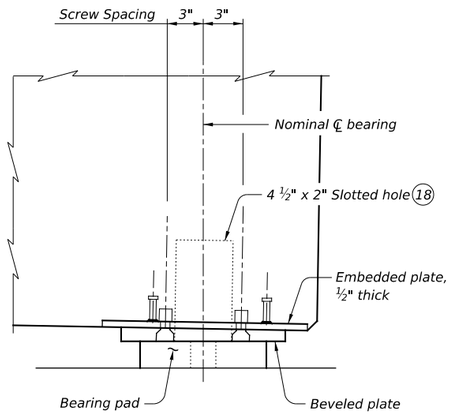


SECTION

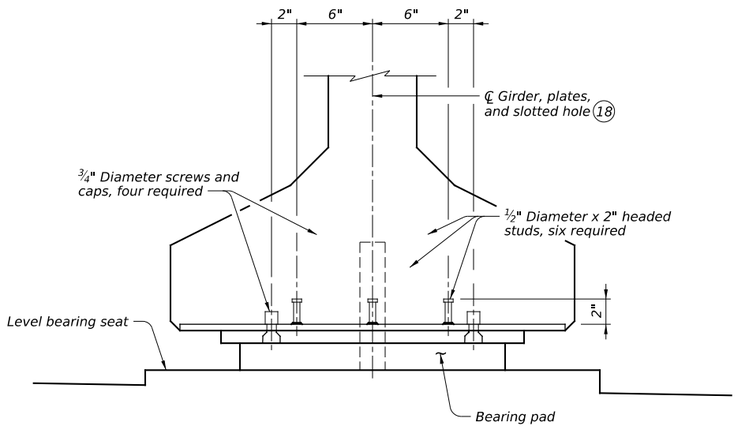


HOLE DETAIL

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION

Showing normal girder end.

GIRDER DETAILS

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16"+/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424, "Precast Concrete Structural Members (Fabrication)" apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

¾" Diameter screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.

HL93 LOADING **SHEET 3 OF 3**

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

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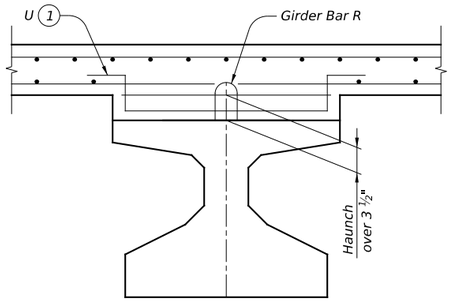
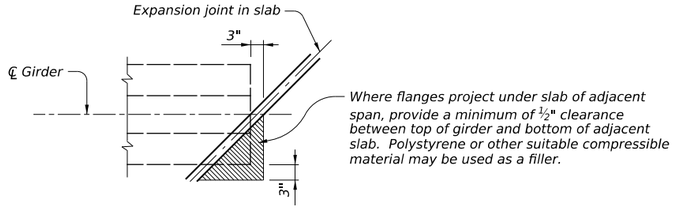
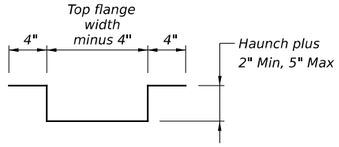


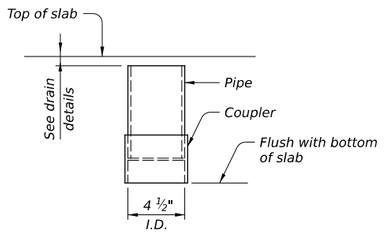
HAUNCH REINFORCING DETAIL



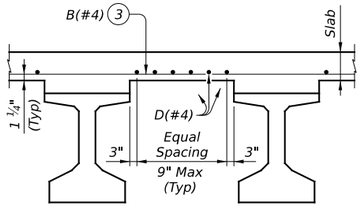
TREATMENT AT GIRDER END FOR SKEWED SPANS



BARS U (#4)

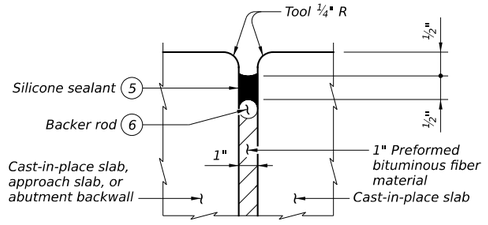


C-I-P DRAIN DETAIL (2)

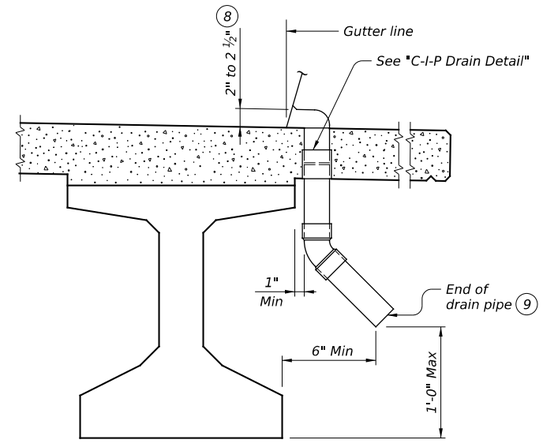


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



TYPE A JOINT DETAIL (7)



DRAIN DETAIL (10)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."

All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.

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

DECK FORMWORK NOTES:

Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

1. Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".
2. Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
3. Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor may end alternating bars B(#4) at centerline of outside girder.
4. Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
   Uncoated ~ #4 = 1'-7"
   Epoxy coated ~ #4 = 2'-5"
5. Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
6. 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
7. The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.
8. Drain entrance formed in rail or sidewalk.
9. Water may not be discharged onto girders.
10. All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

IGMS

FILE: IG-IGMS-24.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
10-19: Modified Note 7. Type A now a pay item. 11-24: Flipped top mat.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		249

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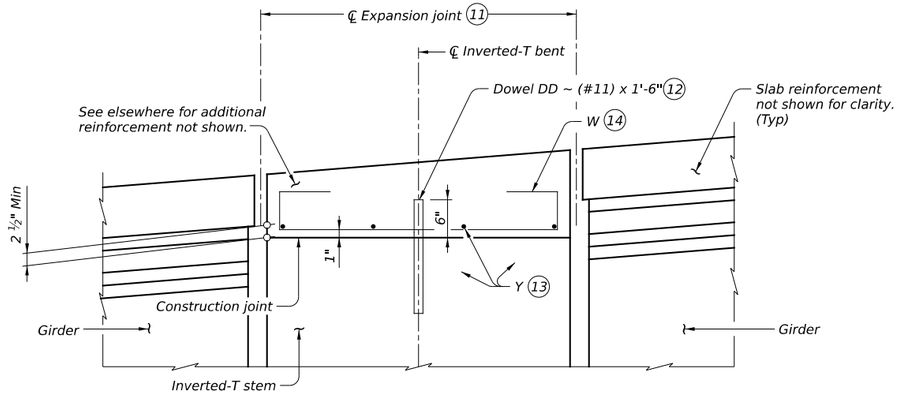
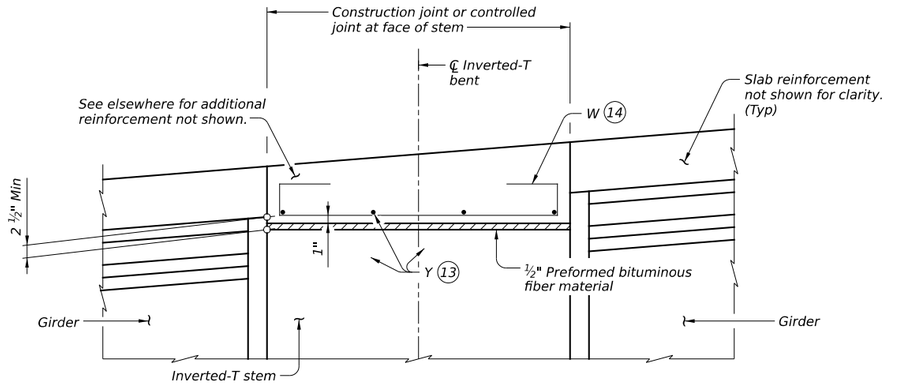
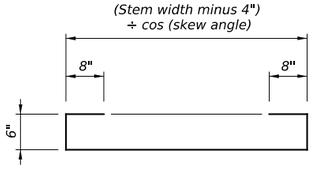


SHOWING EXPANSION JOINTS

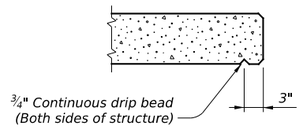


SHOWING CONSTRUCTION JOINTS OR CONTROLLED JOINTS

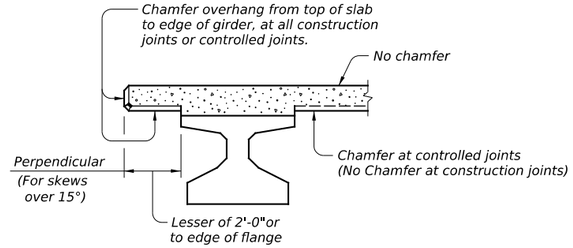
REINFORCEMENT OVER INV-T BENTS



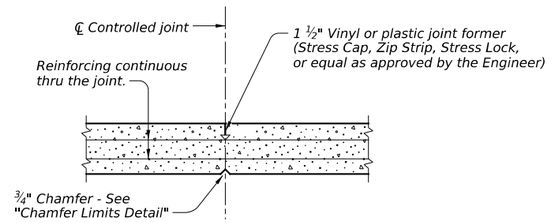
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) *See Layout for joint type.*

(12) *Dowels DD (#11) spaced at 5 ft Max. See Inverted-T bents for quantity and location.*

(13) *Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.*

(14) *Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.*

(15) *See Span Details for type of joint and joint locations.*

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

IGMS

FILE: IG-IGMS-24.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
10-19: Modified Note 7. Type A now a pay item. 11-24: Flipped top mat.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		250

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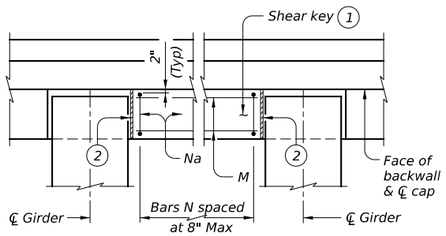
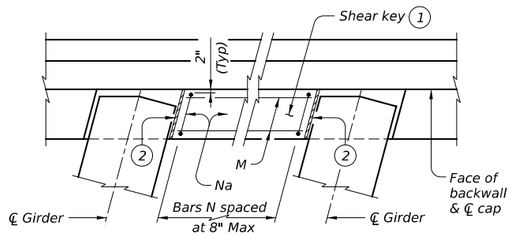


ABUTMENT



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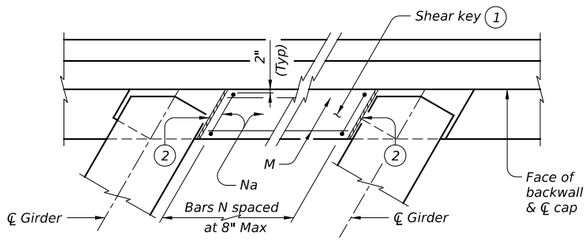

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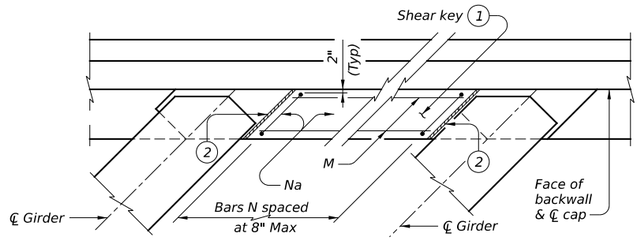

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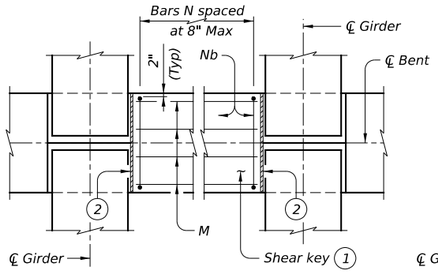
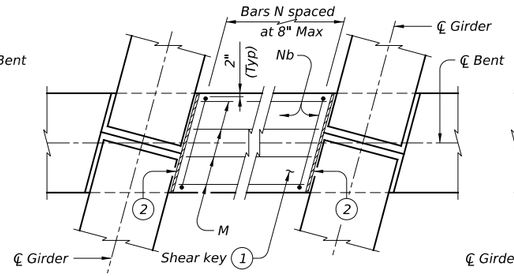


INTERIOR BENT

PARTIAL PLANS WITH NO SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.



INTERIOR BENT

PARTIAL PLANS WITH 15° SKEW

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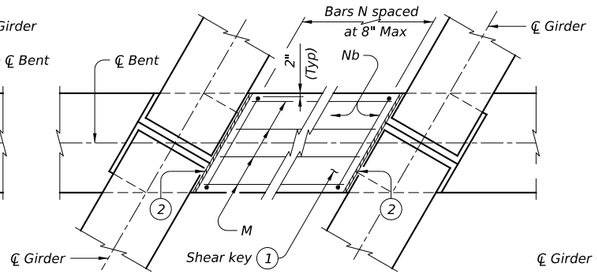
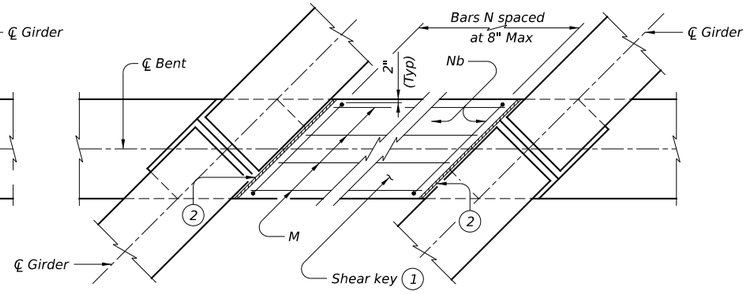


INTERIOR BENT

PARTIAL PLANS WITH 30° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

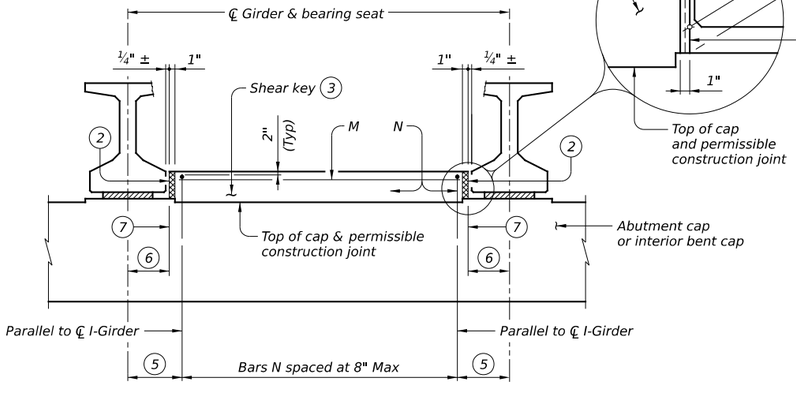


INTERIOR BENT

PARTIAL PLANS WITH 45° SKEW

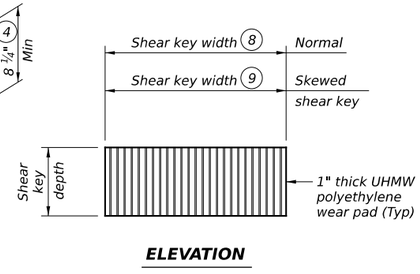
Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

1. Place shear keys on the upstream side of structure between outside girder and next adjacent girder, unless shown otherwise on plans.
2. UHMW polyethylene wear pad. (Typ)
3. Leave a ¼" gap plus or minus between girder and face of wear pad. Cast wear pad with shear key, smooth side facing girder. Care must be taken to keep concrete from flowing under girder. Slope top of shear keys in accordance with Item 420.4.9, "Treatment and Finishing of Horizontal Surfaces."
4. Measure at higher bearing seat elevation forward or back. Dimension based on typical bearing pad and bearing seat. Increase as necessary to maintain 5" overlap.
5. With No Skew = 1'-8 ¼", measured along ℄ cap.
   With Skew = 1'-8 ¼" ÷ Cos Skew, measured along ℄ cap.
6. With No Skew = 1'-4 ¼", measured along ℄ cap.
   With Skew = 1'-4 ¼" ÷ Cos Skew, measured along ℄ cap.
7. Face of UHMW polyethylene wear pad. Smooth side of pad facing girder.
8. Abutments = ½ Cap width.
   Interior bents = Cap width.
9. Abutments = ½ Cap width ÷ Cos Skew.
   Interior bents = Cap width ÷ Cos Skew.

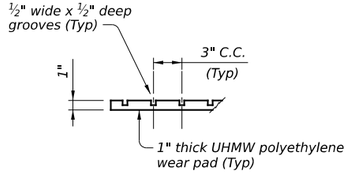


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP (1)

Showing shear key with girder Type Tx46.
Other I-Girder types similar.

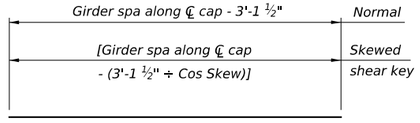


ELEVATION

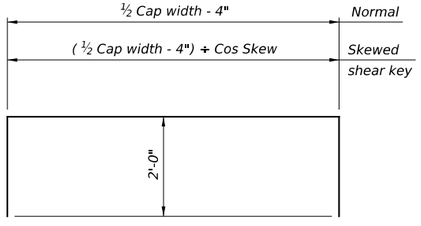


PART SECTION

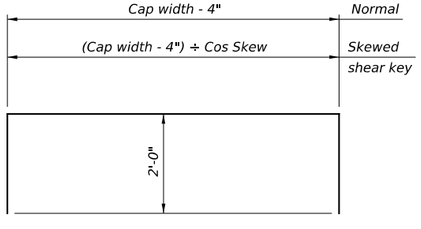
ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



BARS M (#5)



BARS Na (#5)
(For abutments)



BARS Nb (#5)
(For interior bents)

MATERIAL NOTES:

Provide Class "C" concrete ($f'c$ = 3,600 psi). Provide Class "C" (HPC) if shown elsewhere on the plans.
Provide Grade 60 reinforcing steel.
Provide epoxy coated reinforcing steel for shear key if abutment or interior bent reinforcing steel is epoxy coated.
Provide Ultra High Molecular Weight (UHMW) polyethylene wear pads in accordance with ASTM D6712.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Details showing skew are drawn showing right forward skew. See Bridge Layout for actual skew direction.
These details are limited to bridges skewed 45 degrees and less.
This standard is only applicable for I-Girders.
Modify details for bearing conditions, and girder spacing not shown on this standard. Details do not account for sole plate or pedestal bearing seat.
Include shear key concrete in abutment or bent concrete for payment.
UHMW polyethylene wear pads are subsidiary to Class "C" concrete.

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

Texas Department of Transportation

Bridge Division Standard

SHEAR KEY DETAILS
PRESTRESSED CONCRETE I-GIRDERS

IGSK

FILE: IG-IGSK-17 (1).dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
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REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		251

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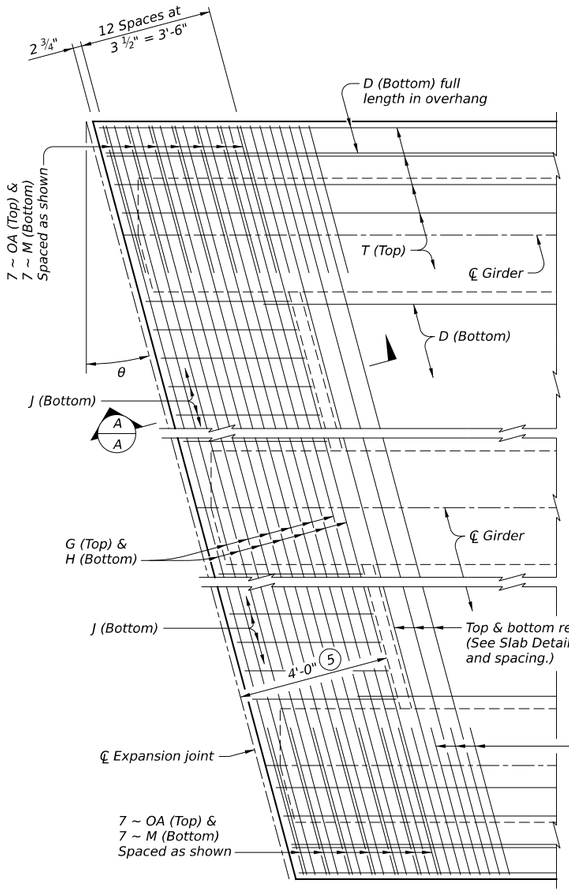
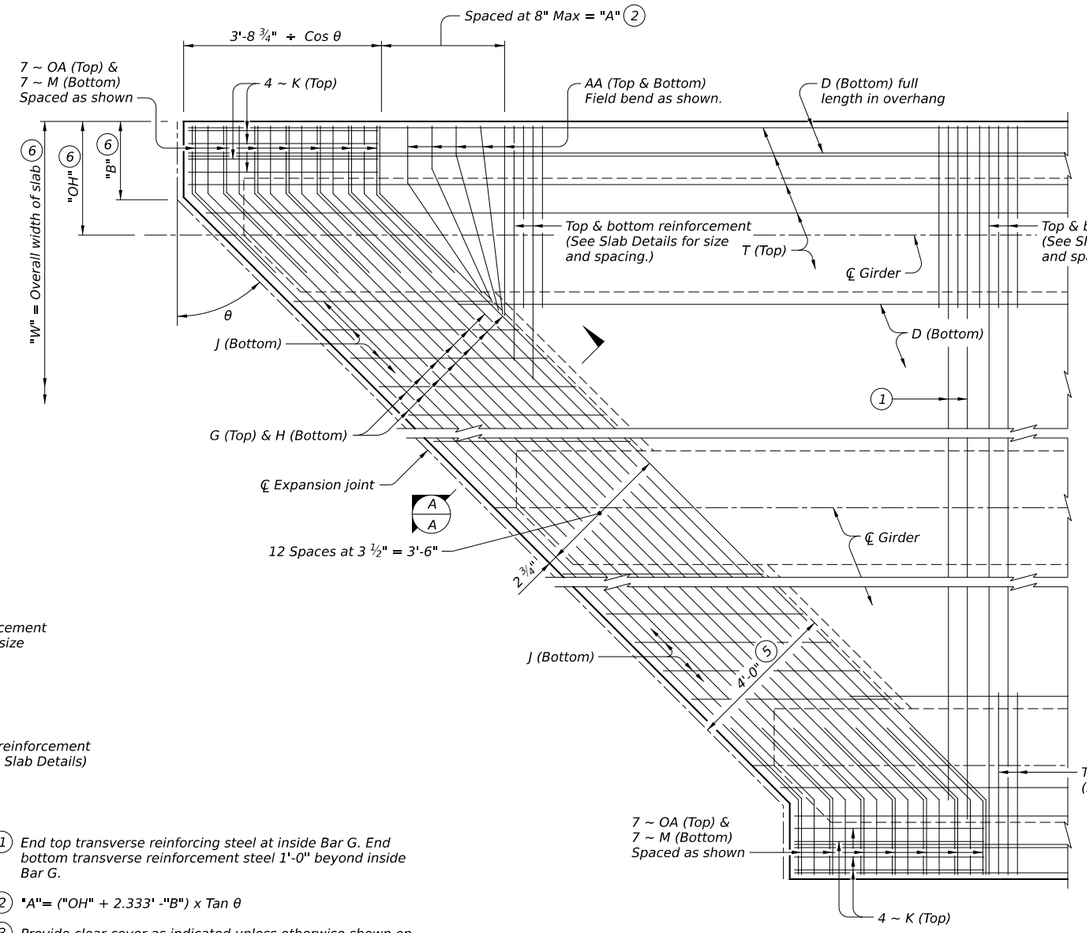
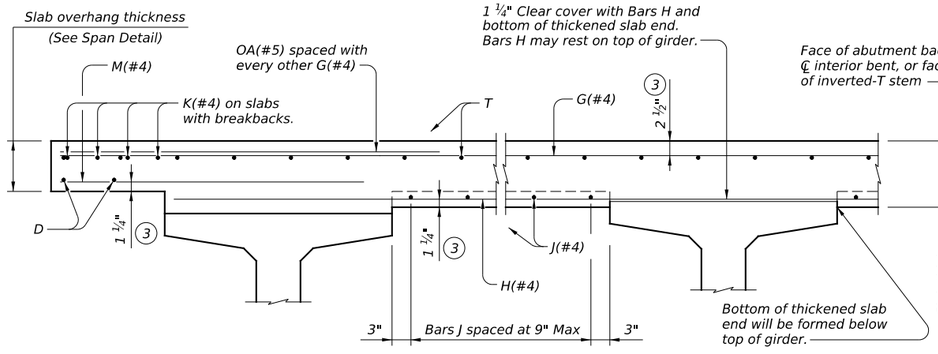


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

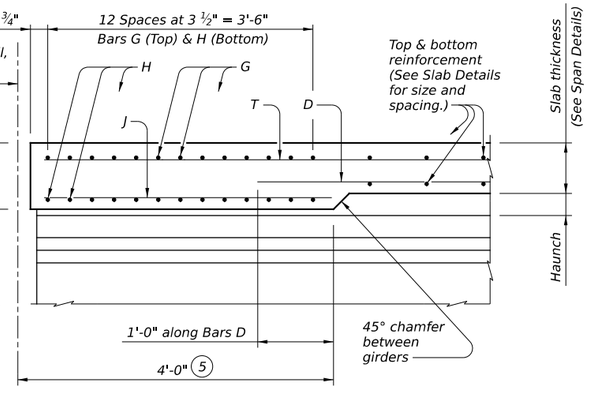
1. End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
2. "A" = ("OH" + 2.333' -"B") x Tan θ
3. Provide clear cover as indicated unless otherwise shown on Span Details.
4. Only required on slabs with breakbacks.
5. Thickened slab end dimensioned perpendicular to face of backwall, centerline interior bent or face of inverted-T stem.
6. See Slab Details for dimensions.



2" AND MORE OF HAUNCH **LESS THAN 2" OF HAUNCH**

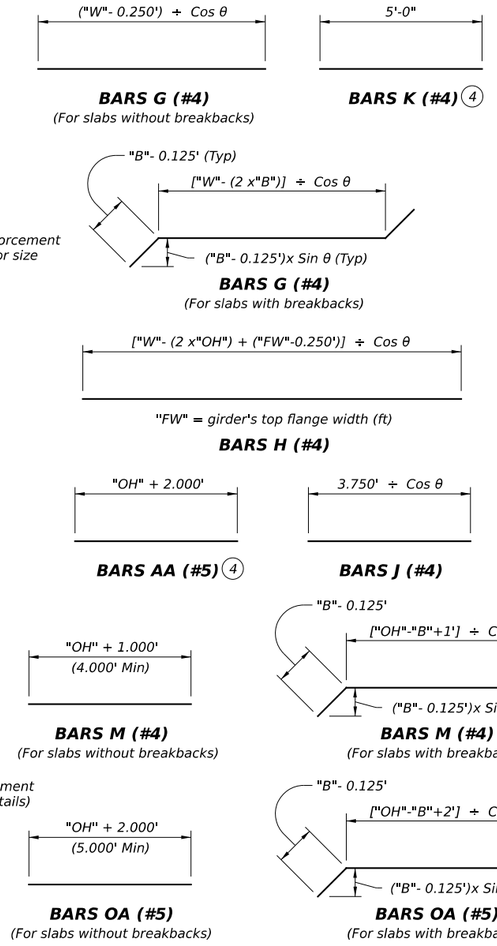
TYPICAL TRANSVERSE SECTION

(Showing prestressed concrete I-Girders at ℄ bearing)



SECTION A-A

(Showing with 2" and more of haunch)



GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

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

THICKENED SLAB END DETAILS
PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS

FILE: IG-IGTS-24.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
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REVISIONS	0918	46	316	VA
11-24: Flipped top mat.	DIST	COUNTY		SHEET NO.
	DAL	DENTON		252

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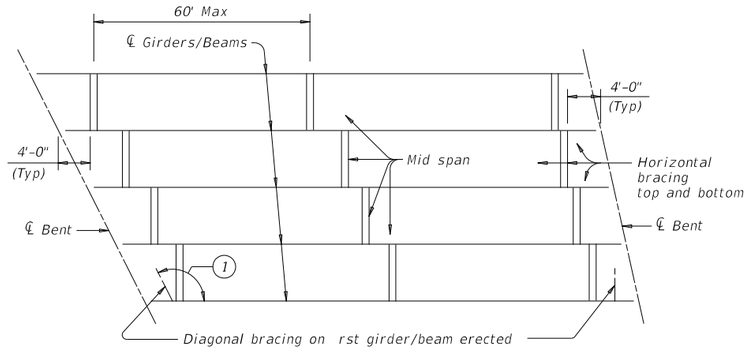
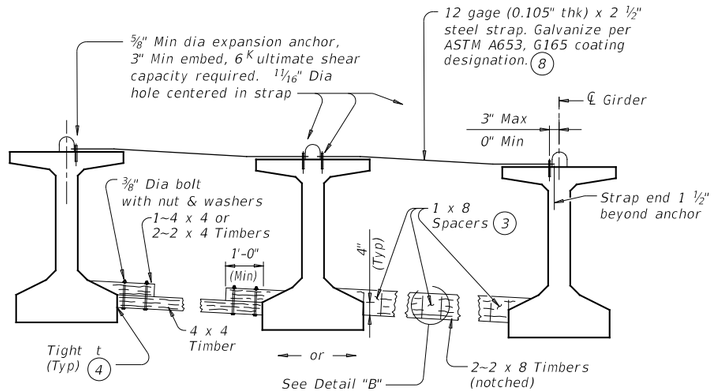
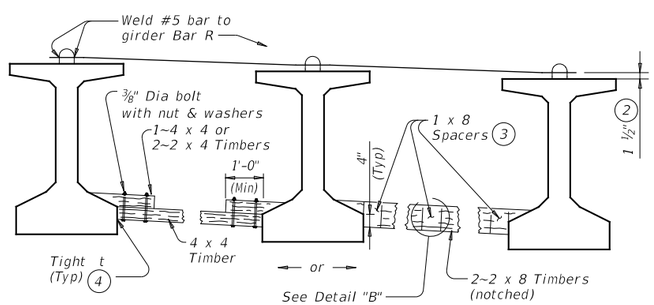


ERECTION BRACING



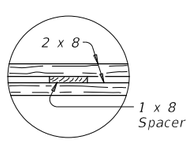
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



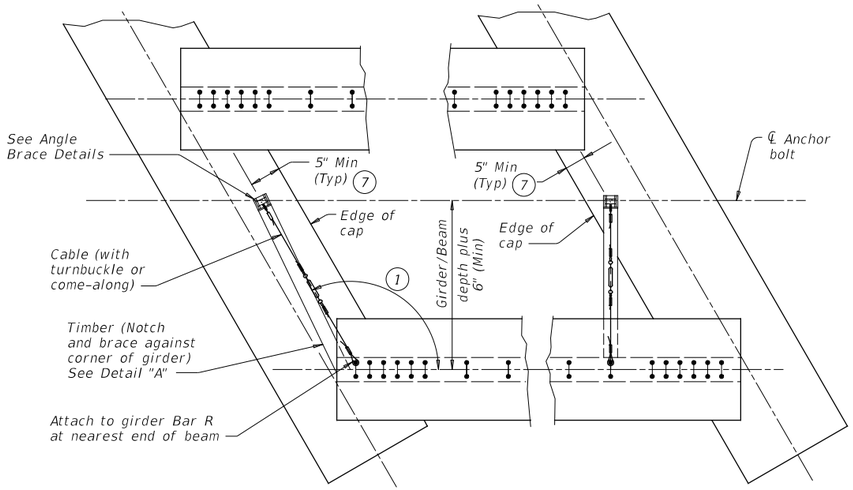
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS 5

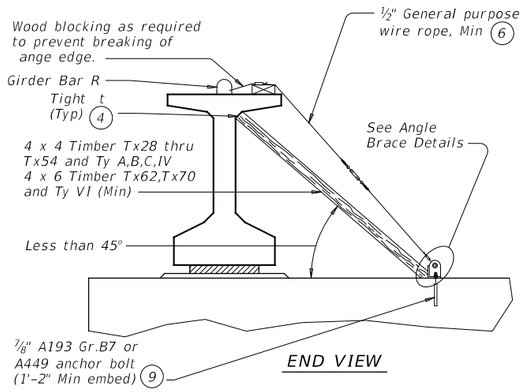


PLAN

DETAIL "B"



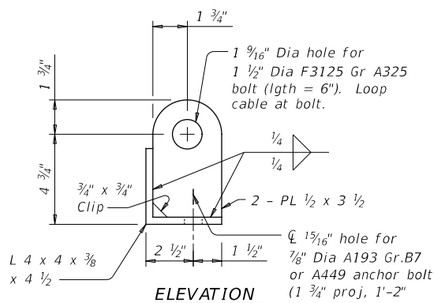
PLAN



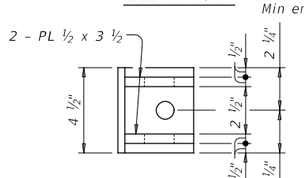
END VIEW

DIAGONAL BRACING DETAILS 5

(To be used on both ends of the rst girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral sti ening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

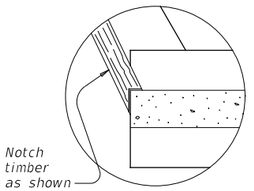
ERECTION BRACING:

Erection bracing details shown are considered the minimum for ful lling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after rst, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

(1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected rst.

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight t. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(6) All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.

(7) It is acceptable to tie anchor bolts to cap reinforcement.

(8) Prior to installing, eld bend strap to lay ush on both girders' top ange and slope between ange tips.

(9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: IG-MEBR(C)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		253

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DATE: 11/25/2025 3:40:22 PM
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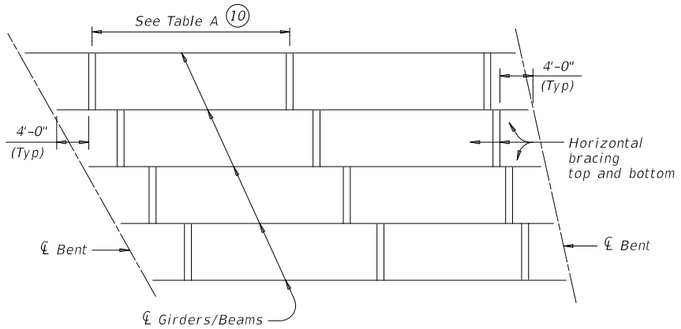


SLAB PLACEMENT BRACING

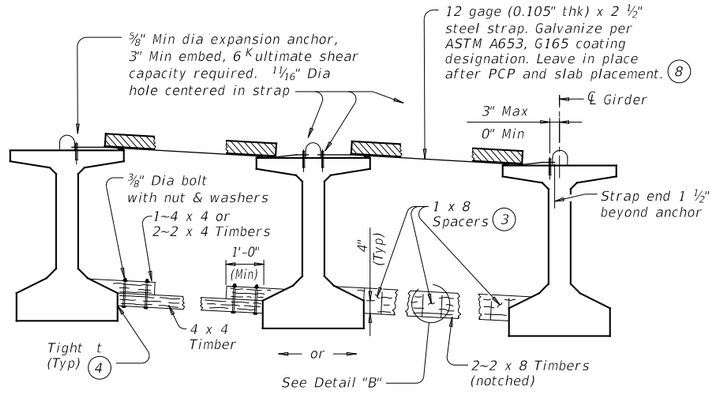
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	¼ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

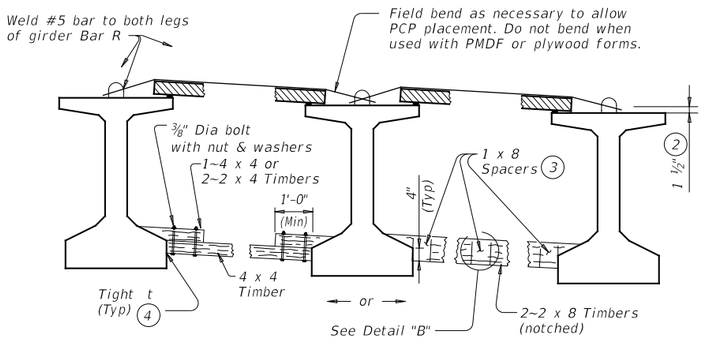
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

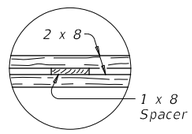
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



PLAN

DETAIL "B"

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight t. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, eld bend strap to lay ush on both girders' top ange and slope between ange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between rst and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for ful lling the requirements of Speci cation Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: IG-MEBR(C)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		254

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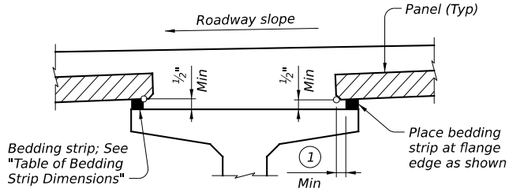
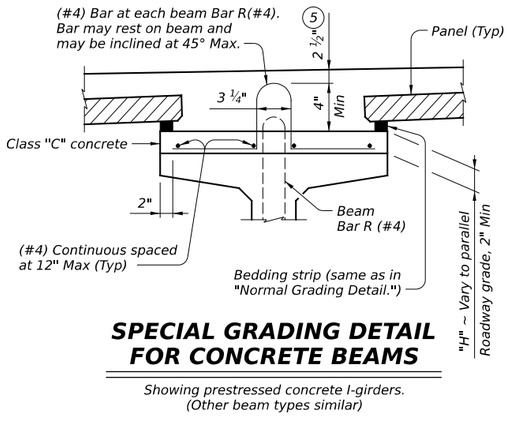


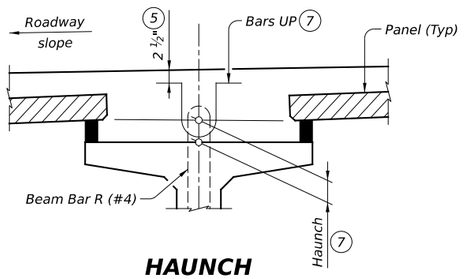
NORMAL GRADING DETAIL (3)

Showing prestressed concrete I-girders.
(Other beam types similar)



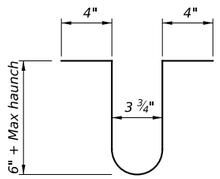
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders.
(Other beam types similar)

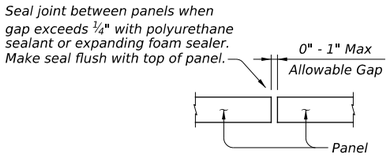


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)

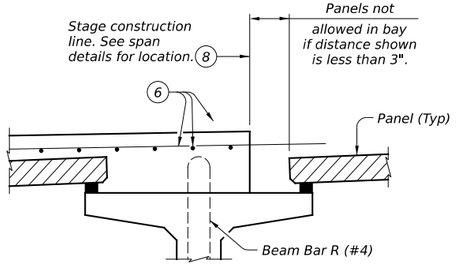


BARS UP (#4) (7)

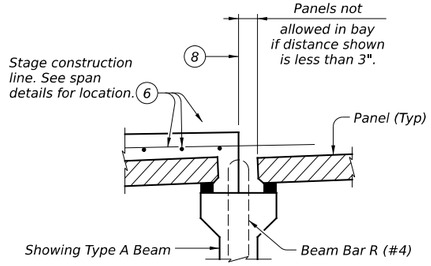


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



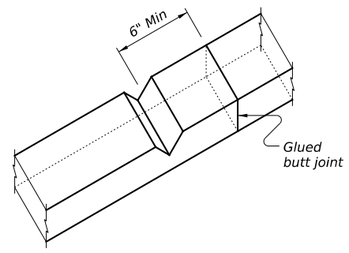
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)



BEDDING STRIP DETAIL (9)

TABLE OF BEDDING STRIP DIMENSIONS

WIDTH	HEIGHT (4)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2"	½"	4"
2 ¼"	½"	4 ½" (2)
2 ½"	½"	5" (2)
2 ¾"	½"	5 ½" (2)
3" (Max)	½"	6" (2)

(1) 2" Min for I-girders, 1 ½" Min for all other beam types.

(2) Allowed for prestressed concrete I-girders, not allowed on other beam types.

(3) To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ¼". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use "Special Grading Detail for Concrete Beams" or submit an alternate method to the Bridge Division for approval.

(4) Height must not exceed twice the width.

(5) Provide clear cover as indicated unless otherwise shown on span details.

(6) See span details and thickened slab end details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(7) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 ½" with I-girders, and 3" for all other beam types. Incline Bars UP as needed to maintain clear cover (45° Max). Epoxy coating for Bars UP is not required.

(8) Do not locate construction joints on top of a panel.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approximately ¼" deep, in the top of the bedding strips at 8' o.c..

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

Placing panels to minimize joint openings is recommended.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail (UBMS) standard sheet.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See "Table of Reinforcing Steel" for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the span details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:

Uncoated	~ #4 = 1'-7"
Epoxy Coated	~ #4 = 2'-5"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of prestressed concrete panels is not permitted for horizontally curved steel plate or tub girders. See span details for other possible restrictions on their use.

These details are to be used in conjunction with the span details, Prestressed Concrete Panel Fabrication Details (PCP-FAB) standard and other applicable standard drawings.

When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab."

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

HL93 LOADING **SHEET 1 OF 4**

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

FILE: MS-PCP-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
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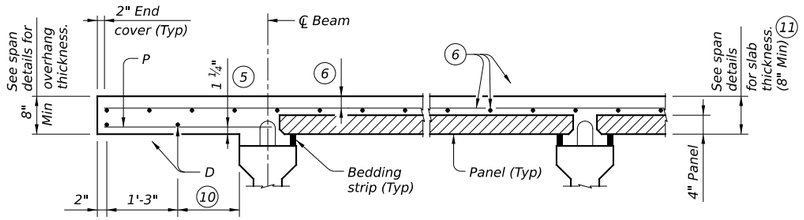
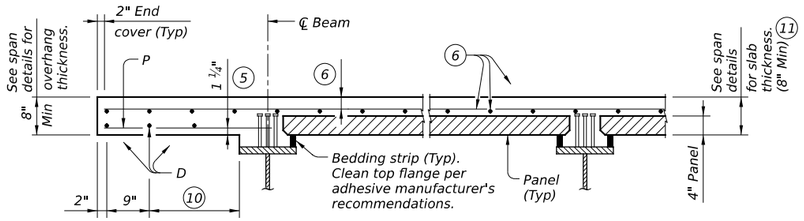
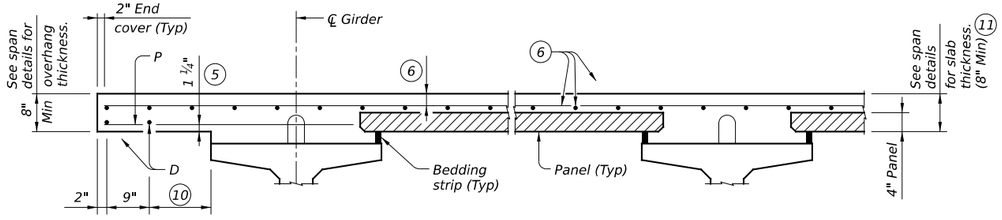


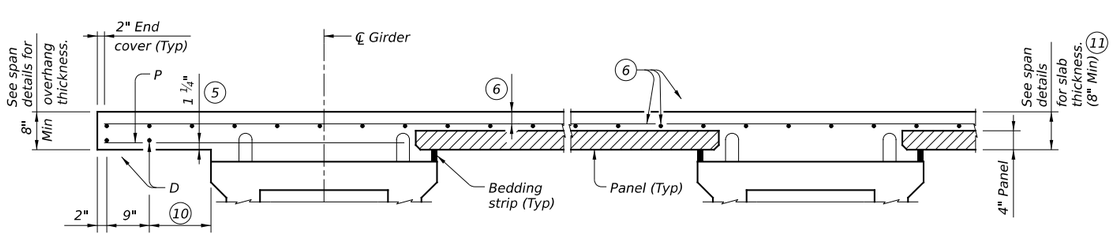
PRESTRESSED CONCRETE I-BEAMS



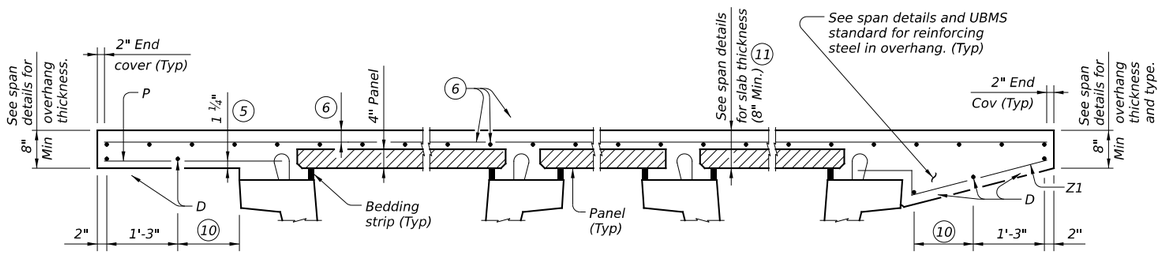
STEEL BEAMS 13



PRESTRESSED CONCRETE I-GIRDERS



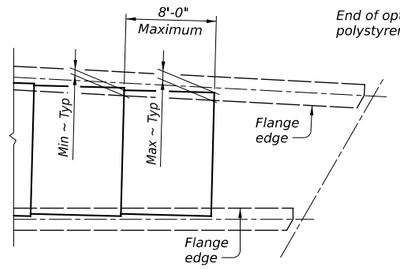
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

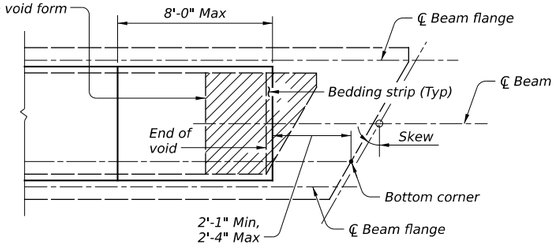
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS



FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on beam/girder type.



OVER CONCRETE U-BEAMS

PART PLANS OF PANEL PLACEMENT

(5) *Provide clear cover as indicated unless otherwise shown on span details.*

(6) *See span details and thickened slab end details for top slab einforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.*

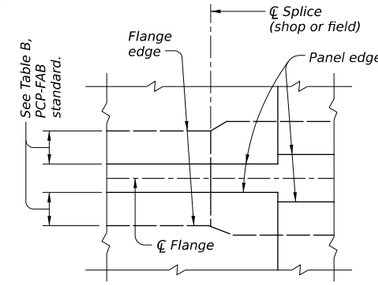
(9) *Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..*

(10) *Equally space additional bar if more than 1'-3" Max.*

(11) *The actual thickness constructed may exceed the slab thickness shown on the span details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.*

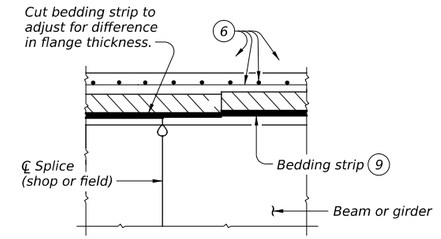
(12) *Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.*

(13) *Panels are allowed over top tension flanges, as approved by the Engineer. See Span Details for additional top mat reinforcement required in tension zones. Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.*



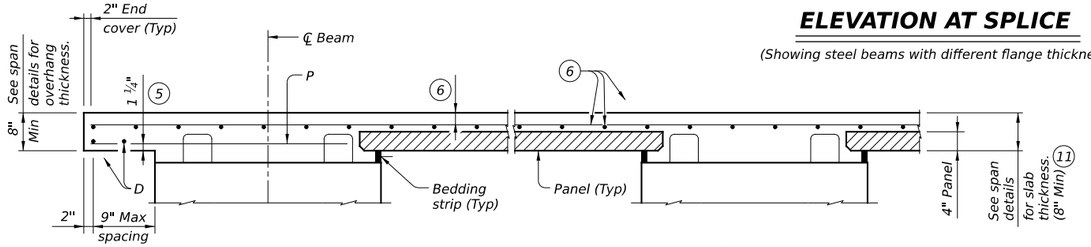
PLAN AT SPLICE

(Showing steel beams with flange width transition.)



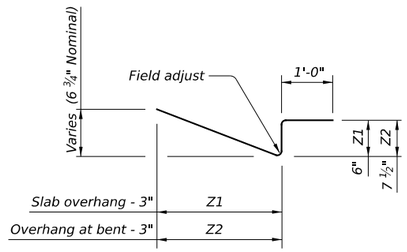
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness.)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) 12

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PRESTRESSED CONCRETE PANELS
DECK DETAILS

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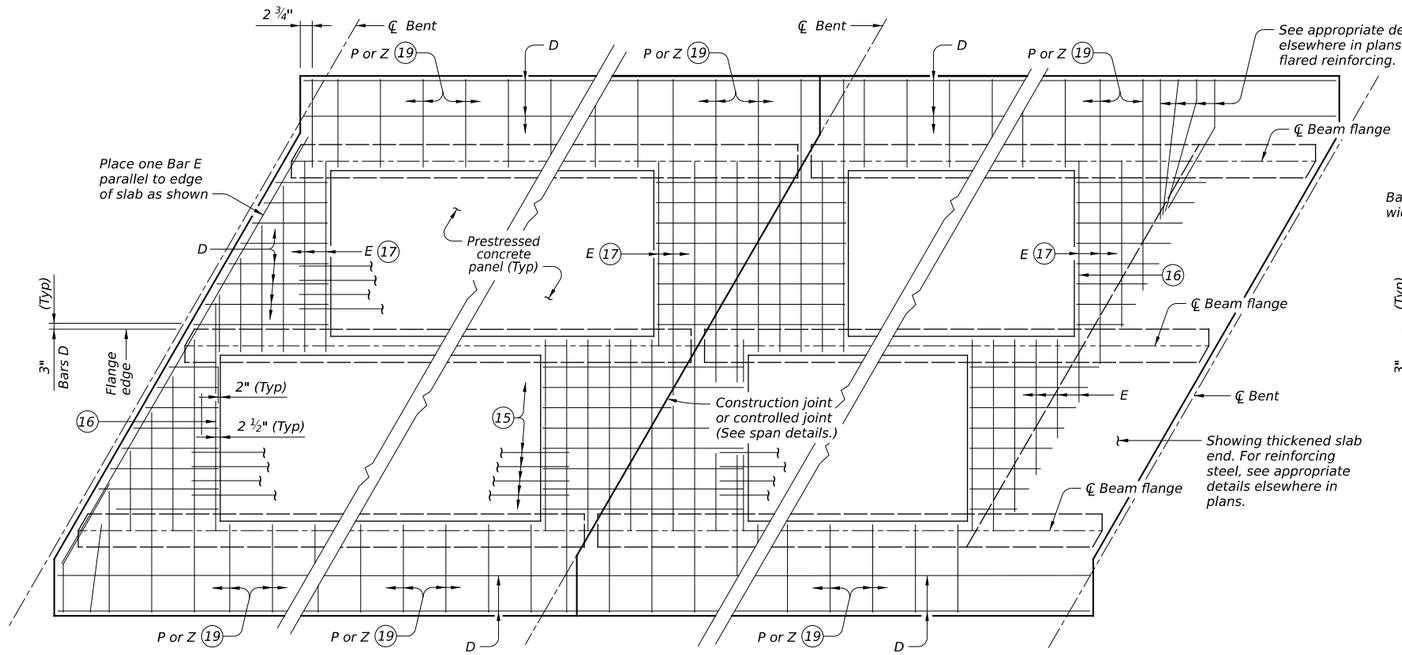
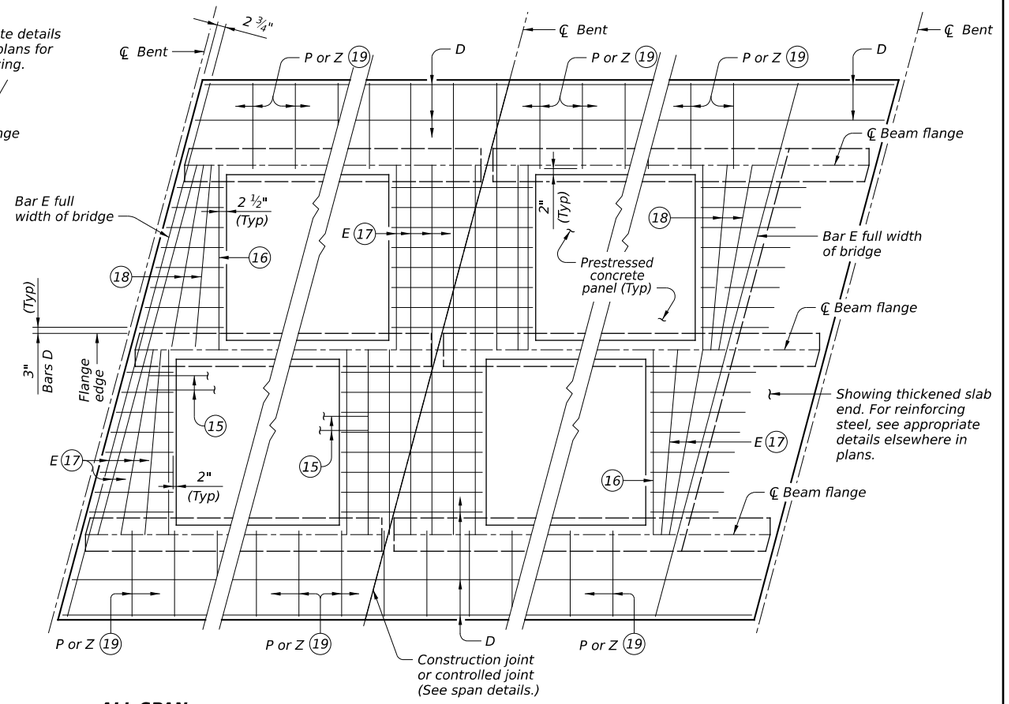


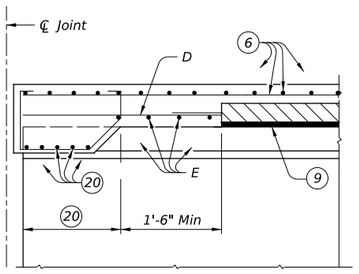
ALL SPAN ENDS UNLESS NOTED OTHERWISE | **INTERIOR BENTS** | **THICKENED END SLABS**

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

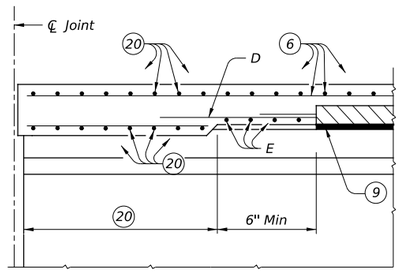


ALL SPAN ENDS UNLESS NOTED OTHERWISE | **INTERIOR BENTS** | **THICKENED END SLABS**

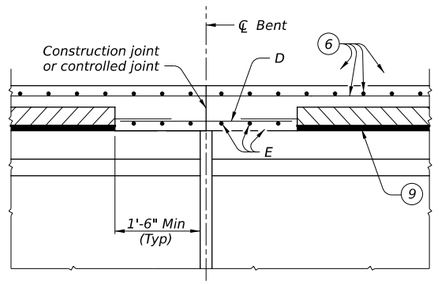
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



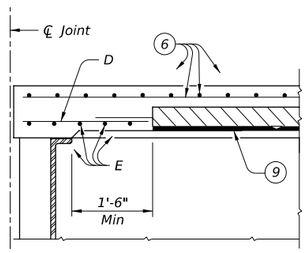
THICKENED SLAB ENDS FOR PRESTR CONCRETE U-BEAMS



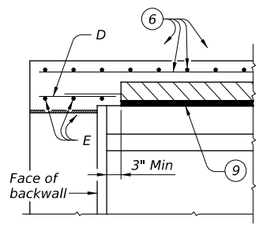
THICKENED SLAB ENDS FOR PRESTR CONCRETE I-BEAMS AND STEEL BEAMS



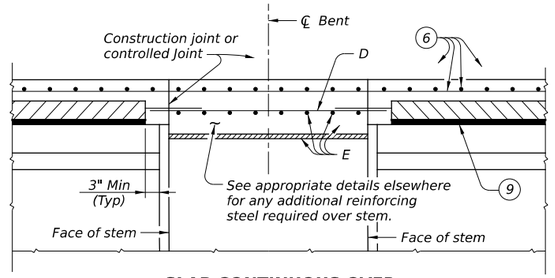
SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BEAMS



CONVENTIONAL END DIAPHRAGMS FOR STEEL BEAMS



SLAB OVER ABUTMENT BACKWALL FOR ALL BEAMS



SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BEAMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(6) See span details and thickened slab end details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.

(14) Max spacing as listed unless otherwise shown.

(15) At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.

(16) Maintain one Bar E(#4) parallel to panel ends (Typ).

(17) Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.

(18) Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.

(19) Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.

(20) See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

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PRESTRESSED CONCRETE PANELS
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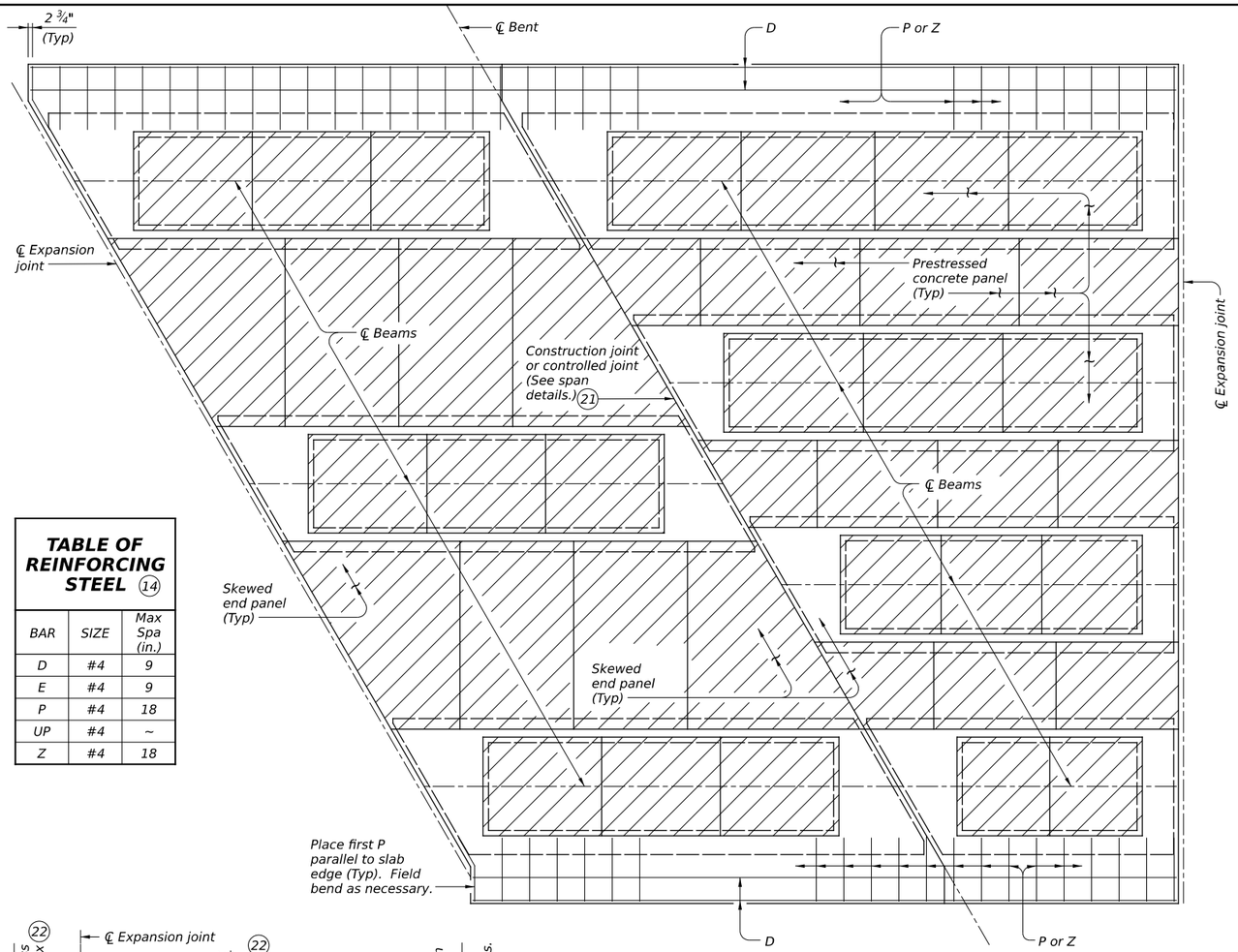
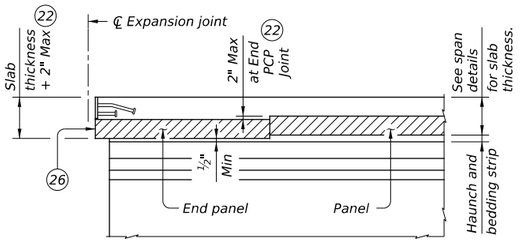


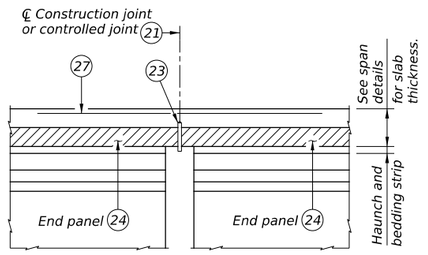
OPTION 2 ~ PLAN OF SLAB

(Showing U-beams; other beams similar)



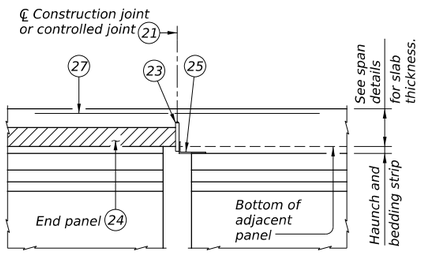
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-B, SEJ-M, SEJ-S(O), AJ, and Type A expansion joints only.



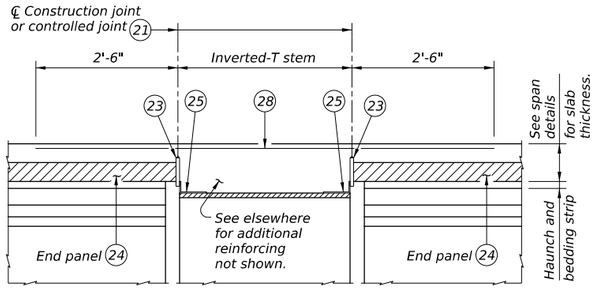
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

Panel against beam/girder end in adjacent span.

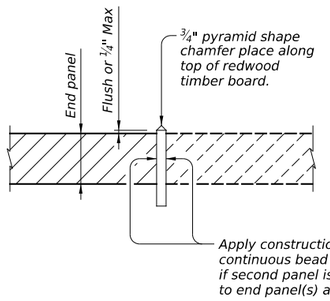


INVERTED-T BENT

Panels against inverted-T stem

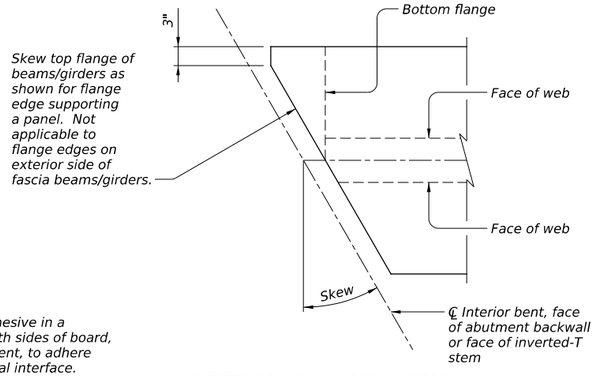
OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends."



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-beam/I-girder; U-beams and steel beams similar.

(6) *See span details and thickened slab end details for top slab reinforcement and clear cover. Longitudinal top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.*

(14) *Max spacing as listed unless otherwise shown.*

(21) *1 ½" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)*

(22) *End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.*

(23) *¾" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within ¼" Max above panel. Place ¾" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board." Place straight, within ¼" of centerline of bent or face of inverted-T, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.*

(24) *Place panel within ½" of ¾" thick board.*

(25) *Permanent galvanized steel sheet form. Removable formwork is acceptable.*

(26) *Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.*

(27) *Place additional (#4) bar 5'-0" in length between every slab Bars T. Center (#4) bar on Joint.*

(28) *Place additional (#4) bar continuous 2'-6" beyond each side of inverted-T stem between every slab Bars T.*

SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the thickened slab end details sheet.

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on shown on Armor Joint Details (AJ) and Sealed Expansion Joint Type B (SEJ-B), Type M (SEJ-M), and Type S (SEJ-S(O)) standards is permissible if necessary to clear top of end panels The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G, K and OA from Thickened Slab End Details Predtressed Concrete I-Girder Spans (IGTS) standard in the slab.

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PRESTRESSED CONCRETE PANELS

DECK DETAILS

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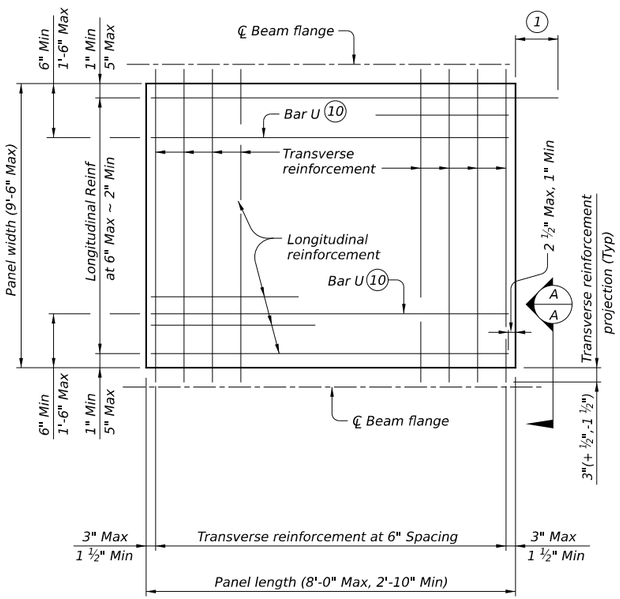
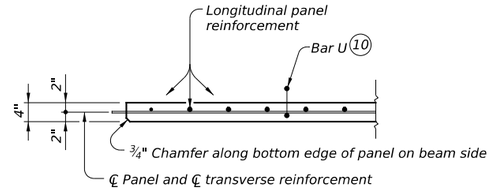
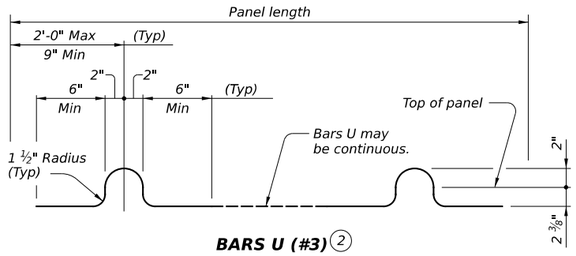


TYPICAL NON-SKEWED PANEL PLAN

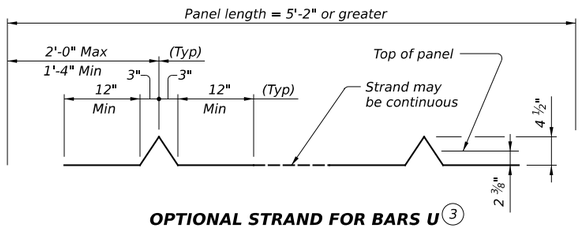


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels)



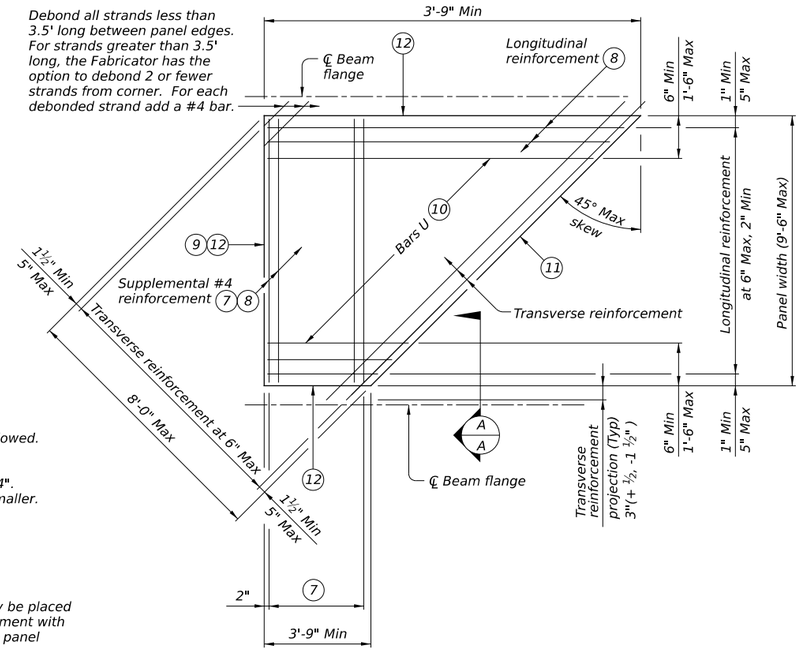
BARS U (#3) (2)



OPTIONAL STRAND FOR BARS U (3)

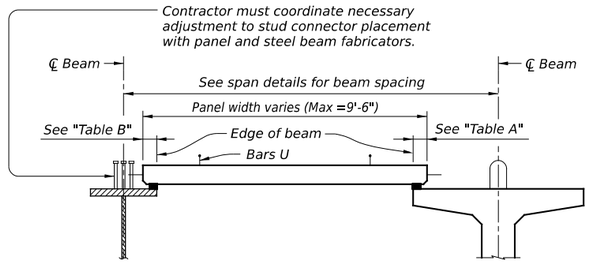
1. *At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.*
2. *Four loops required per panel.*
3. *Four loops required per panel. ⅜" or ½" strands may be used.*
4. *Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.*
5. *See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.*
6. *One Splice allowed per panel. No more than two sheets of WWR are allowed.*
7. *Provide (#4) bars under transverse reinforcement, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.*
8. *End Cover 2 ½" Max, 1" Min.*
9. *Recess strands on indicated panel edge in accordance with Item 424.*
10. *At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcement with horizontal legs in plane of transverse panel reinforcement.*
11. *Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcement.*
12. *Timber form work permissible this edge.*

Debond all strands less than 3.5' long between panel edges. For strands greater than 3.5' long, the Fabricator has the option to debond 2 or fewer strands from corner. For each debonded strand add a #4 bar.



TYPICAL SKEWED END PANEL PLAN

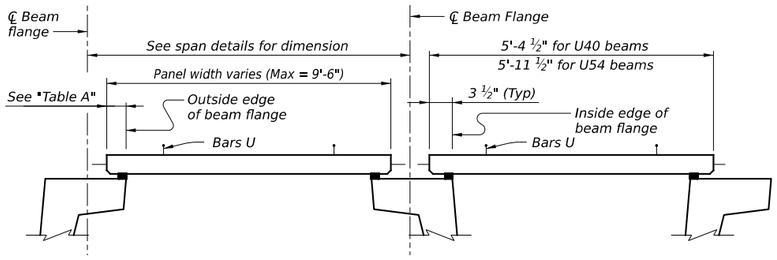
(Only to be used with details shown elsewhere in the plans.)



STEEL BEAMS

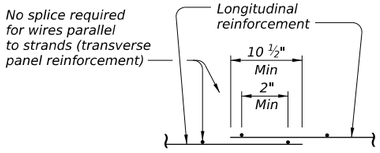
PRESTRESSED CONCRETE BEAMS OR GIRDERS

Typ unless noted otherwise



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH



WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)

TABLE A (4) (5)

Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½	8 ½
U40 - 54	5 ½	5 ½	7
Tx28-70	6	5	7 ½
XB20 - 40	4	3	4 ½
XSB12 - 15	4	3	4 ½

TABLE B (4) (5)

Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3,500 psi. Minimum 28 day strength f'c=5,000 psi.

Provide ¾" chamfer along bottom edge of panel on beam side.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

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

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed). Place reinforcing bars at least two bar diameters away from each prestressed strand.

Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" or 0.6" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcement. One splice per panel is allowed. See WWR Splice Detail.

No combination of longitudinal reinforcement options in a panel is allowed.

Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

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PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

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	DIST	COUNTY		SHEET NO.
	DAL	DENTON		259

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DATE: 11/25/2025 3:41:22 PM
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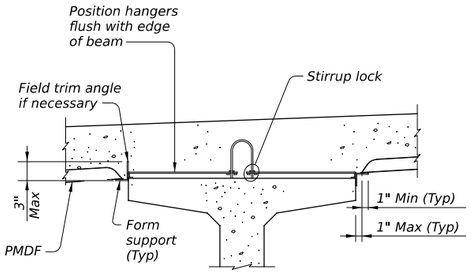
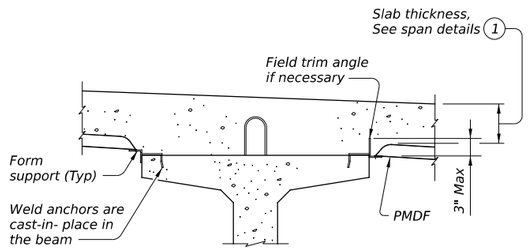
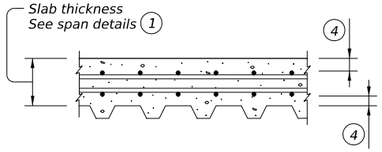


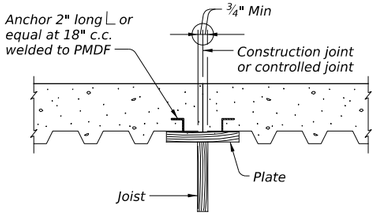
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

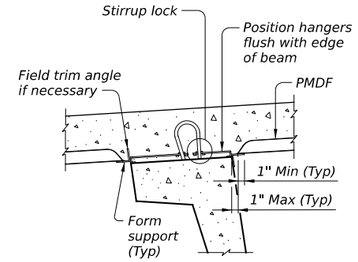


TYPICAL LONGITUDINAL SLAB SECTION

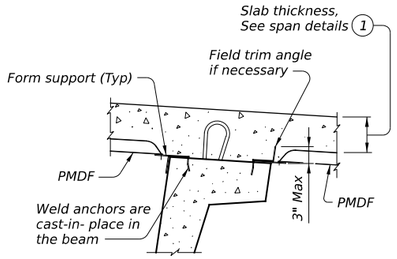


Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT



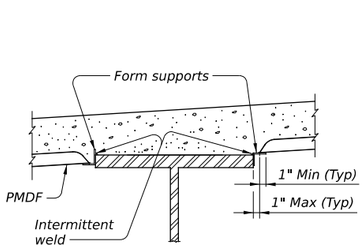
U-BEAMS WITH STIRRUP LOCKS



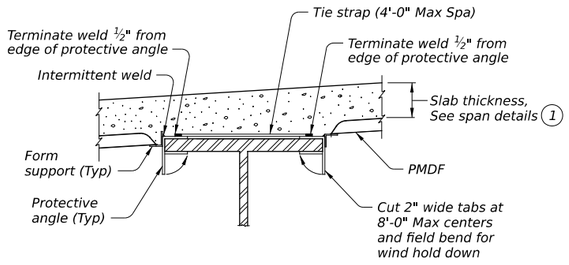
U-BEAMS WITH WELD ANCHORS

FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422, "Concrete Superstructures."

FOR PRESTR CONC TX-GIRDER BRIDGES:
See Miscellaneous Slab Details, Prestressed Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.

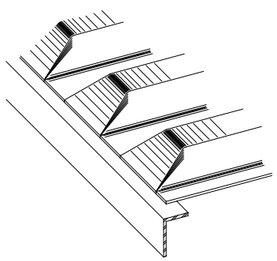


STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES (2)

TYPICAL TRANSVERSE SECTIONS



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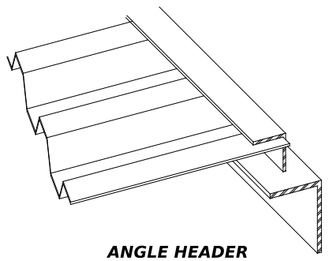
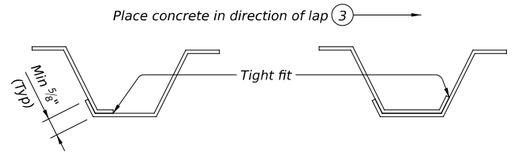


ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES



SIDE LAP DETAILS

(1) *Slab thickness minus 5/8" if corrugations match reinforcing bars.*

(2) *Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.*

(3) *The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.*

(4) *See span details for cover requirements.*

GENERAL NOTES:
Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gauge and that of support angles and protective angles is 12 gauge.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures."

DESIGN NOTES:
As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.

Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

1/240 of the form design span, but not more than 0.75", for all design spans of railroad overpass bridge spans fully or partially over railroad right-of-way, and for all bridge spans of railroad underpass structures.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:
Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding," pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing." Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

FILE: MS-PMDF-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0918	46	316	VA
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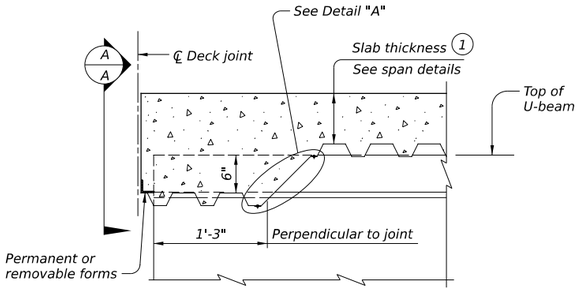
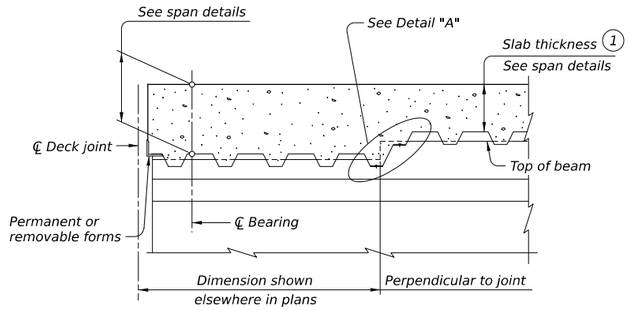
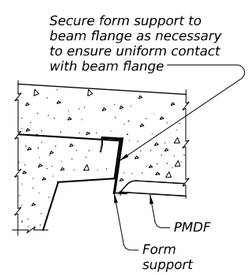


THICKENED SLAB END FOR U-BEAMS

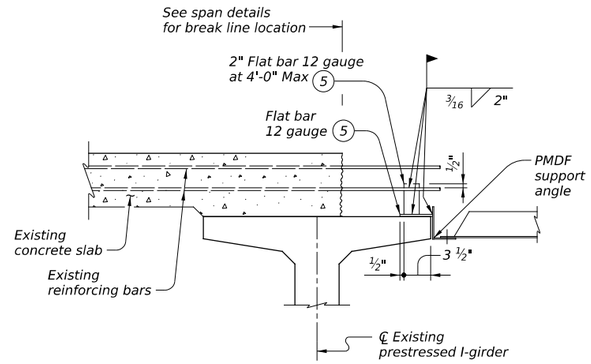


THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

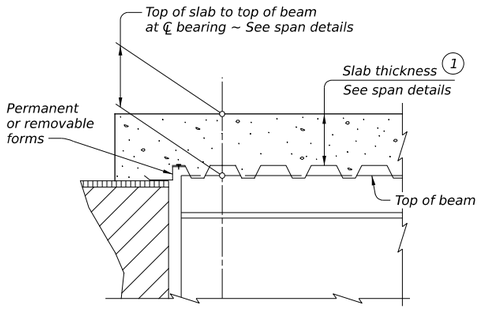
Showing I-beam block-out. No block-out for I-girders or steel beams.



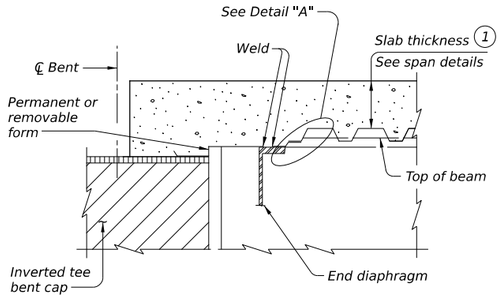
SECTION A-A



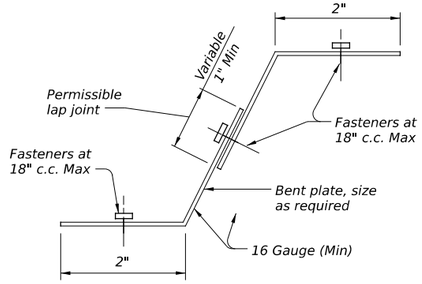
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



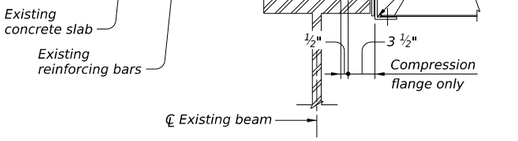
SLAB OVER ABUTMENT BACKWALL OR INVERTED-T STEM FOR CONCRETE BEAMS WITHOUT THICKENED SLAB END



SLAB OVER INVERTED-T STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END

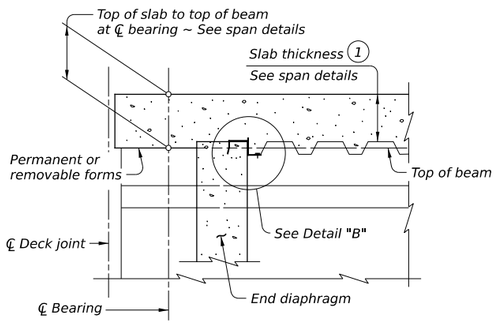


DETAIL A

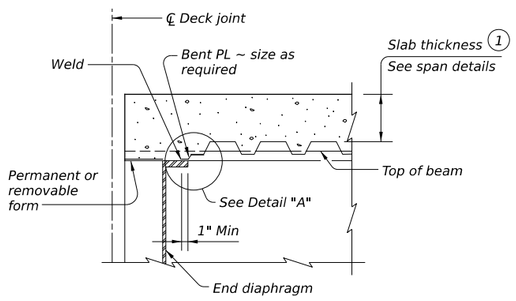


SHOWING STEEL BEAMS

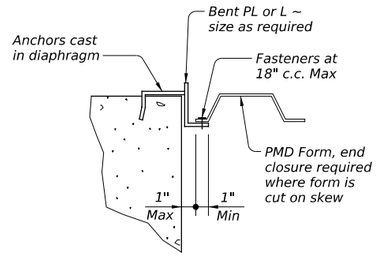
WIDENING DETAILS



CONCRETE END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL B

(1) Slab thickness minus 5/8" if corrugations match reinforcing bars.

(5) Provide 12 gauge bars with a minimum yield stress of 40 ksi.

DETAILS AT ENDS OF BEAMS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

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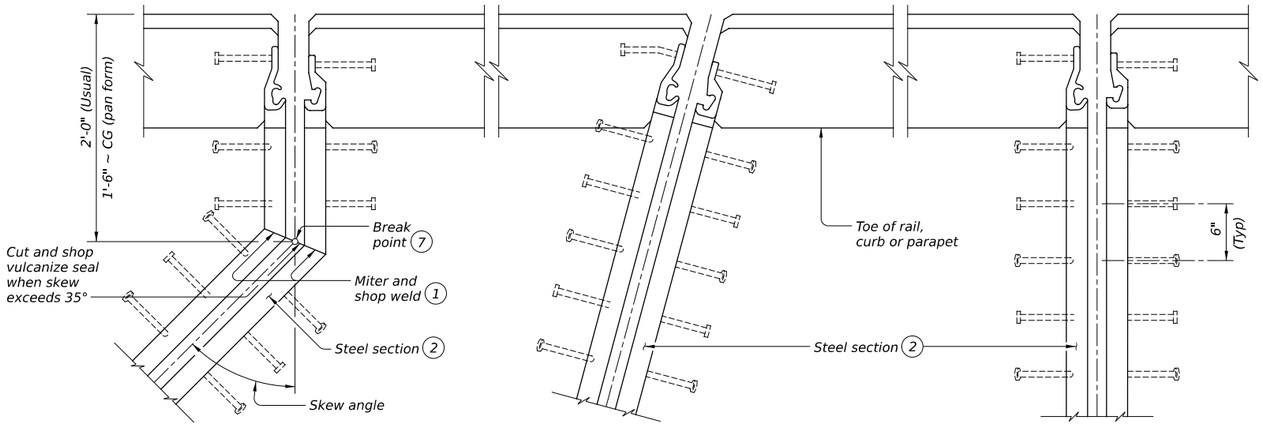
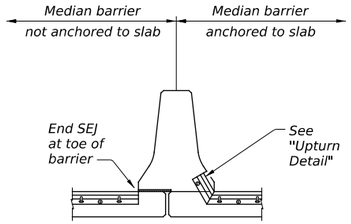
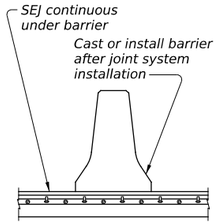


SHOWING SKEWS WITH SLAB BREAKBACKS | **SHOWING SKEWS WITHOUT SLAB BREAKBACKS** | **SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS**

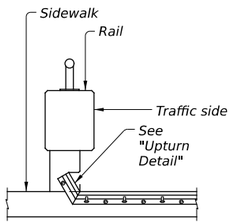
PLANS OF END CONDITIONS



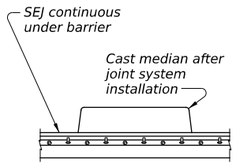
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



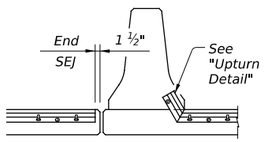
AT MEDIAN BARRIER



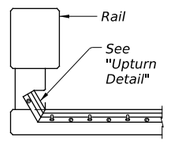
AT SIDEWALK BEHIND BRIDGE RAIL



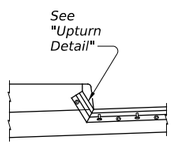
AT RAISED MEDIAN



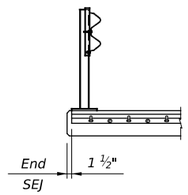
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

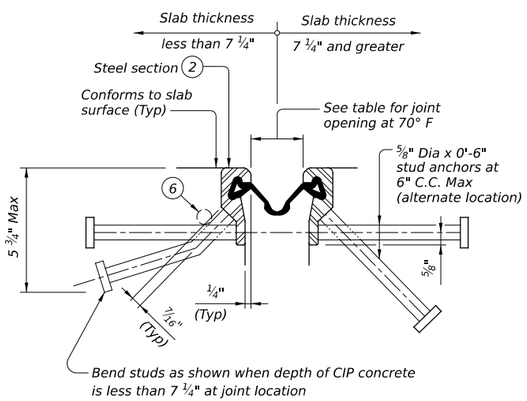


AT SIDEWALK

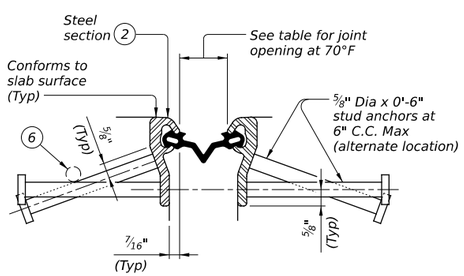


AT STEEL POST BRIDGE RAIL

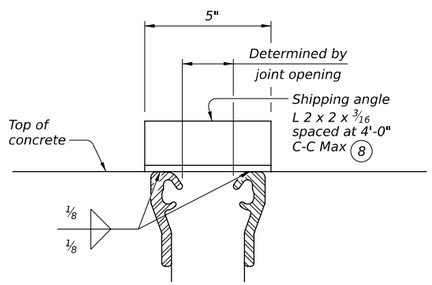
TYPICAL SECTIONS 5



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)

(All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

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

TABLE OF SEALED EXPANSION JOINT INFORMATION

Manufacturer	Steel Section (2)	Strip Seal			
		4" Joint		5" Joint	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

Skew (deg)	Joint Size	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

(1) Remove all burrs which will be in contact with seal prior to making splice.

(2) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(3) These openings are also the recommended minimum installation openings.

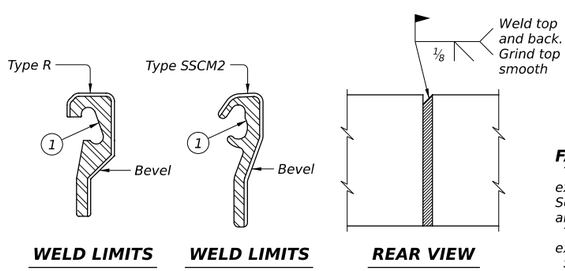
(4) Reduce for sidewalk or parapet heights less than 6".

(5) Other conditions affecting the joint profile should be noted elsewhere.

(6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.

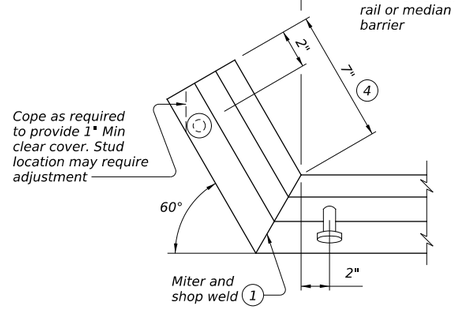
(7) See Span details for location of break point.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS | **WELD LIMITS** | **REAR VIEW**

FIELD SPLICE DETAIL



UPTURN DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged 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.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Galvanize the entire steel section in accordance with Item 445, "Galvanizing" unless required to paint elsewhere in the plans. If required, paint the entire steel section 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 Item 446.4.6.3 and 446.4.6.4.

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

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the 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 sealed expansion joint.

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

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 ½".

Texas Department of Transportation

Bridge Division Standard

SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY

SEJ-M

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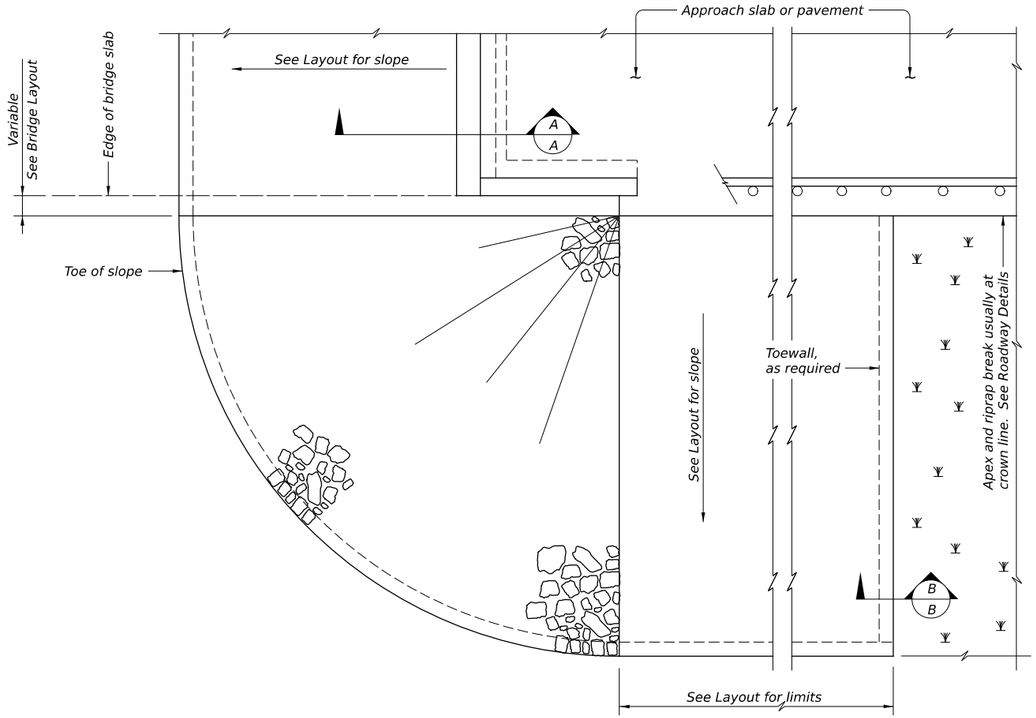
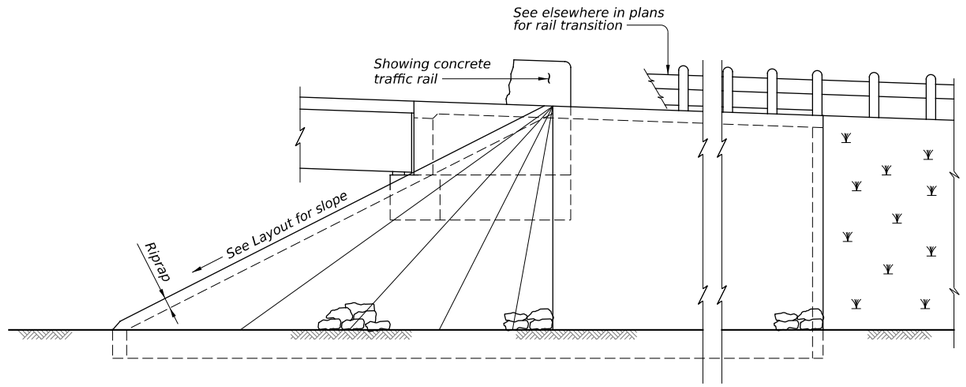
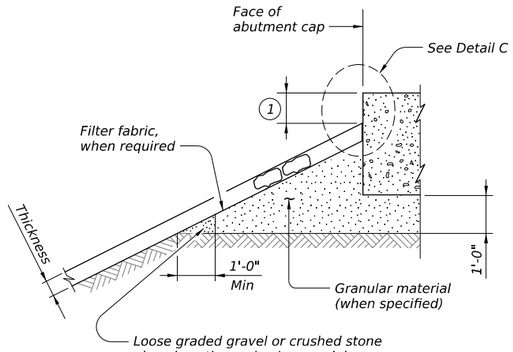


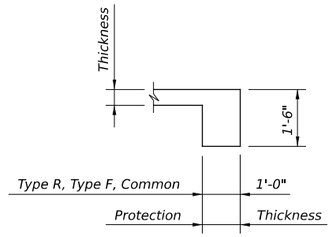
PLAN



ELEVATION



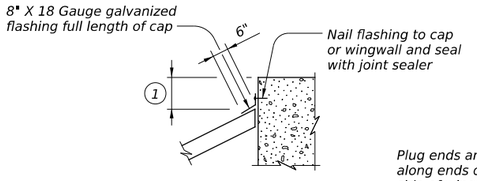
SECTION A-A AT CAP



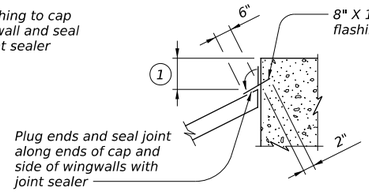
SECTION B-B

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

(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.*



CAP OPTION A



CAP OPTION B

DETAIL C

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

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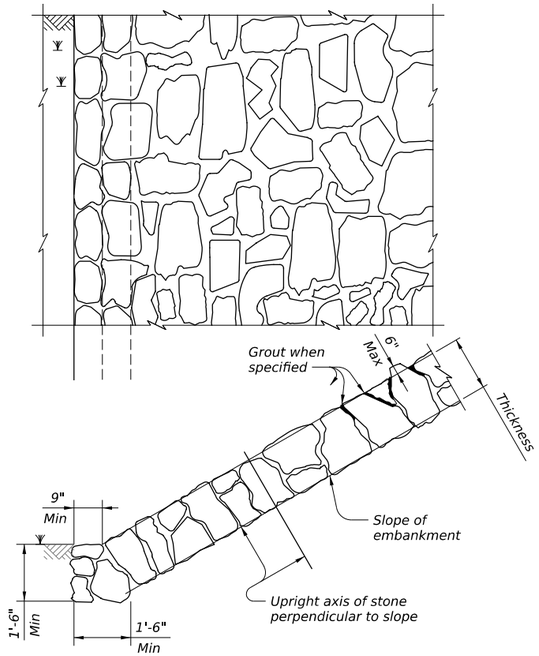


FIGURE 1 ~ TYPE R STONE RIPRAP

Dry or grouted

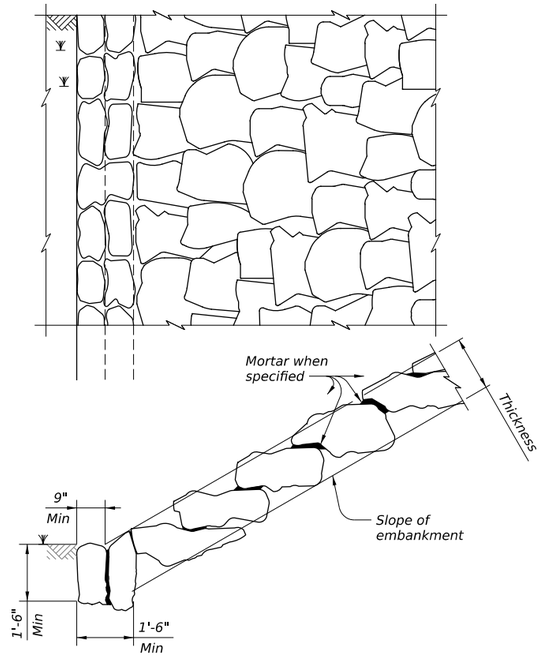


FIGURE 2 ~ TYPE F STONE RIPRAP

Dry or mortared

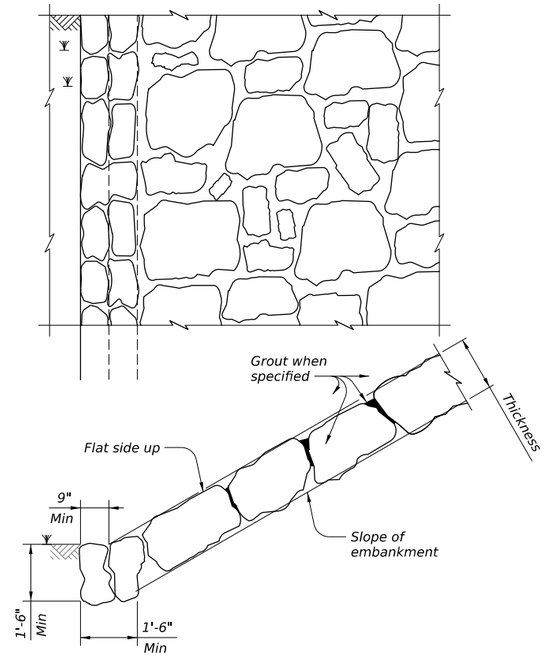


FIGURE 3 ~ TYPE F STONE RIPRAP

Grouted

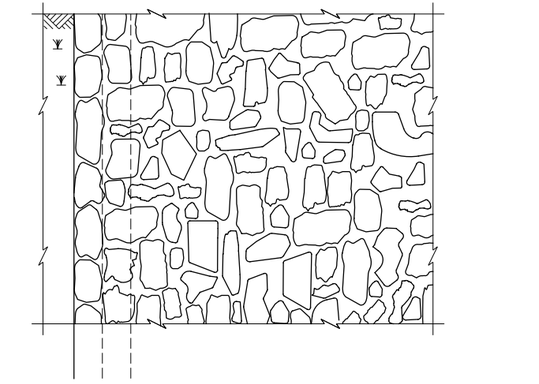


FIGURE 4 ~ COMMON STONE RIPRAP

Dry or grouted

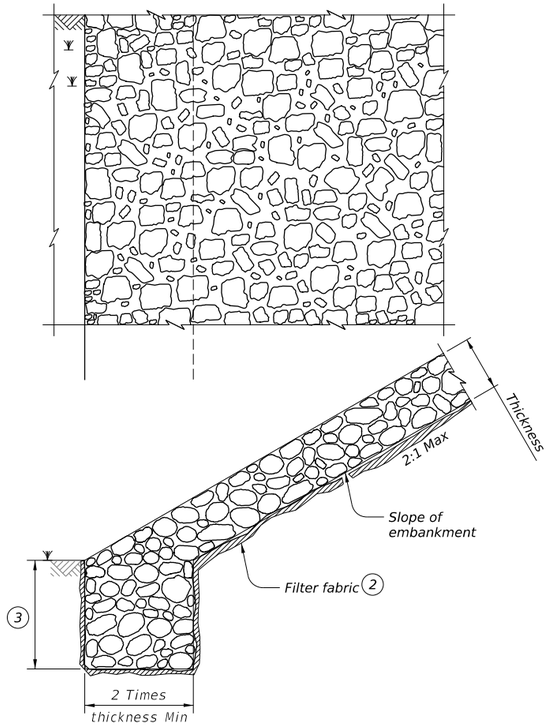


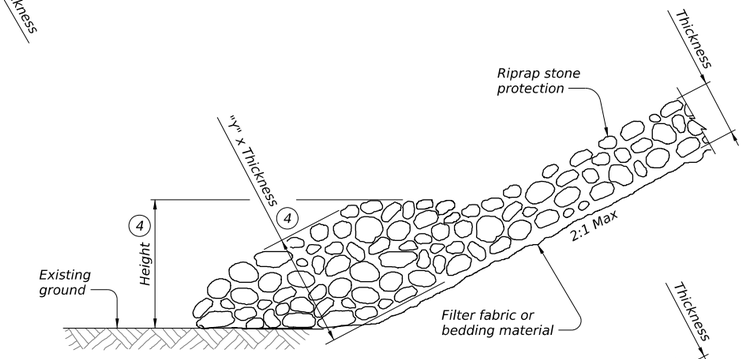
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

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

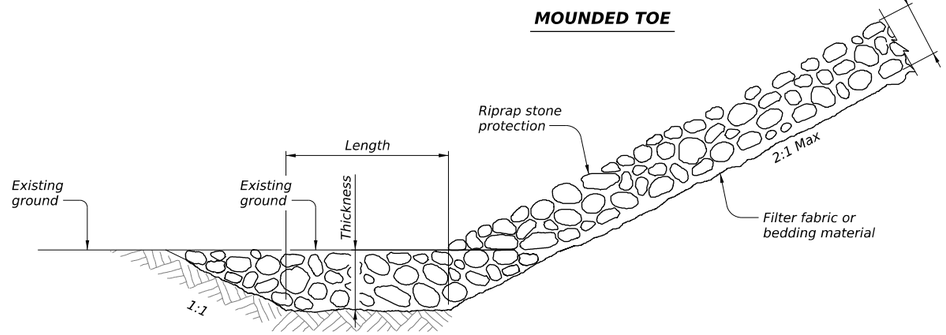
(3) *Minimum toe depth is 2 times the riprap thickness (typical) or as shown elsewhere in the plans.*

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

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



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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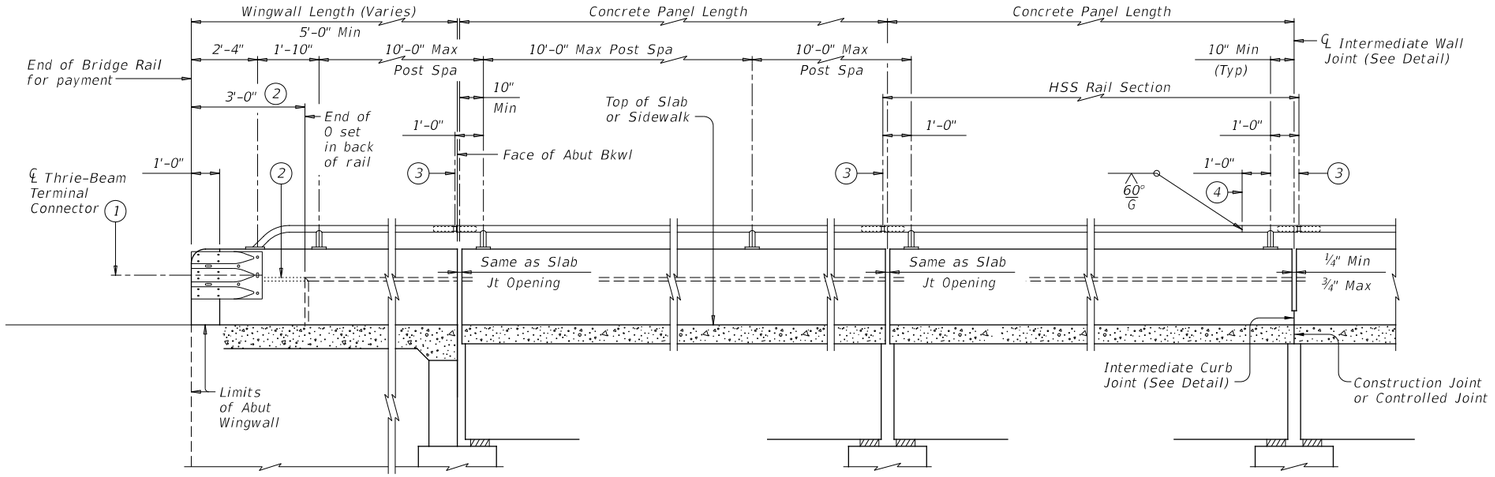
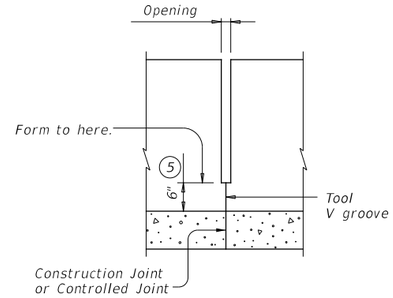


AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

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

(2) Back of rail o set may, with Engineer's approval, be continued to the end of the railing.

(3) ℄ Expansion joint or splice joint as required.

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

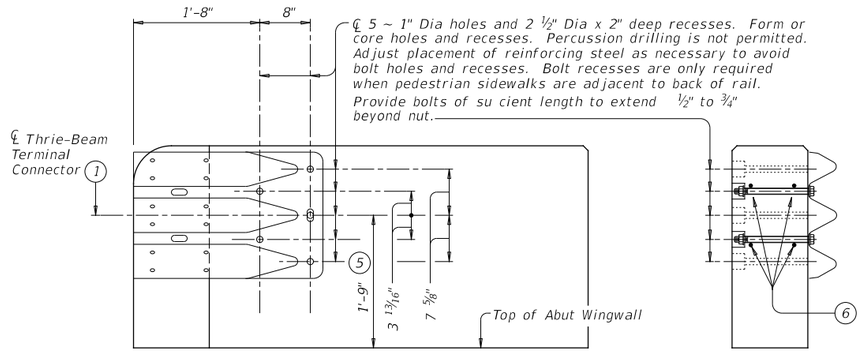
(5) Increase 2" for structures with overlay.

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

(7) HSS 2.875 x 0.203

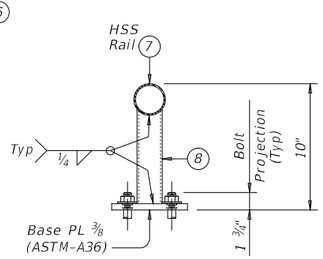
(8) HSS 2.375 x 0.154

(9) ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

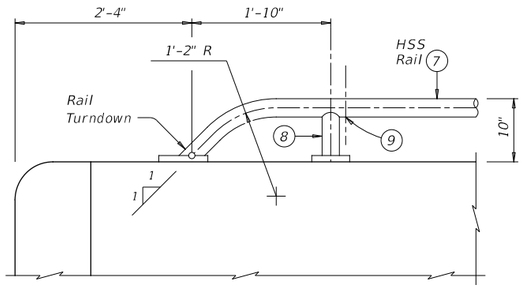


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS

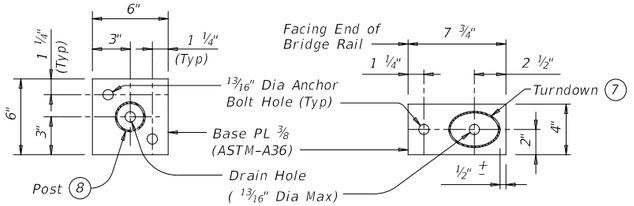


TRANSVERSE SECTION



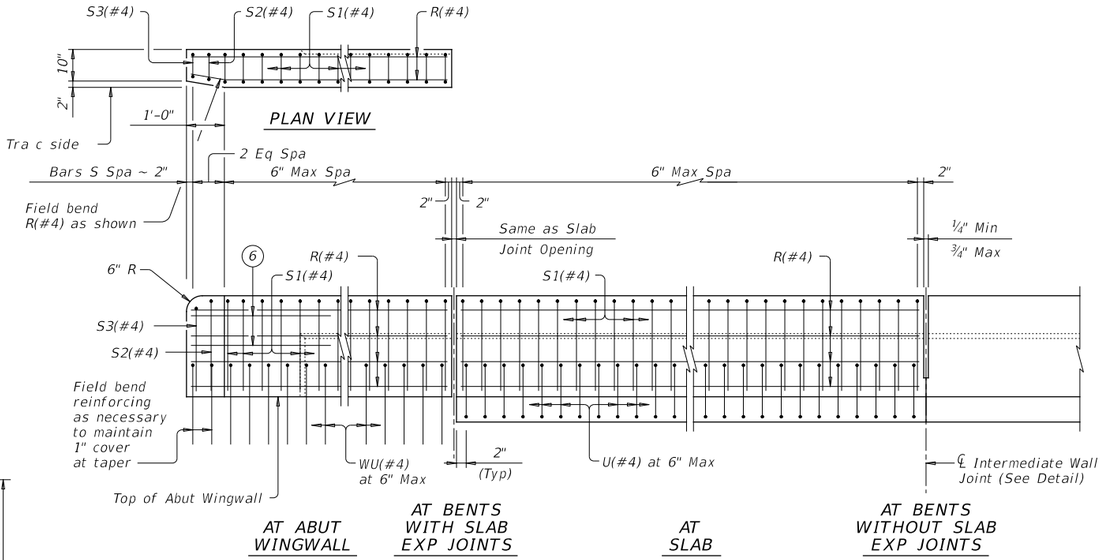
Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

HSS RAIL TERMINAL DETAIL



POST BASE PLATE PLAN | RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



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

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

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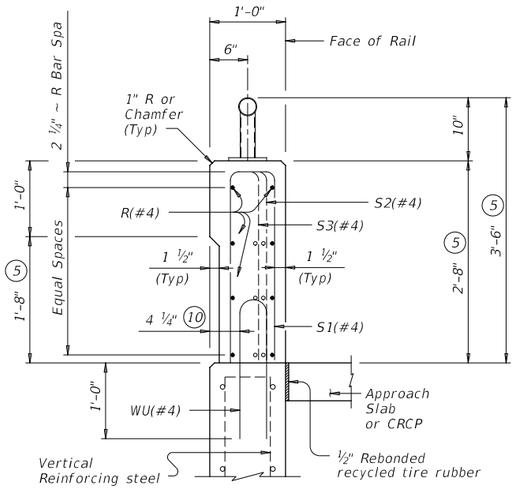
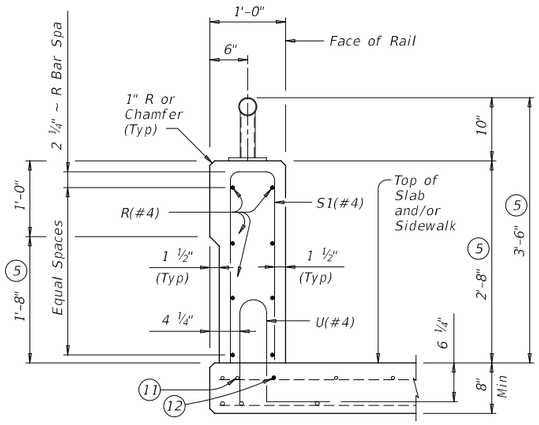
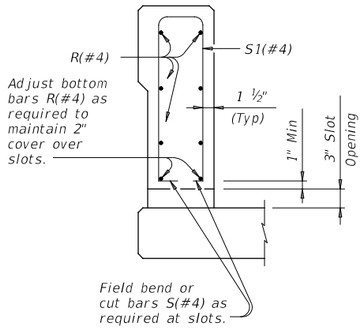


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

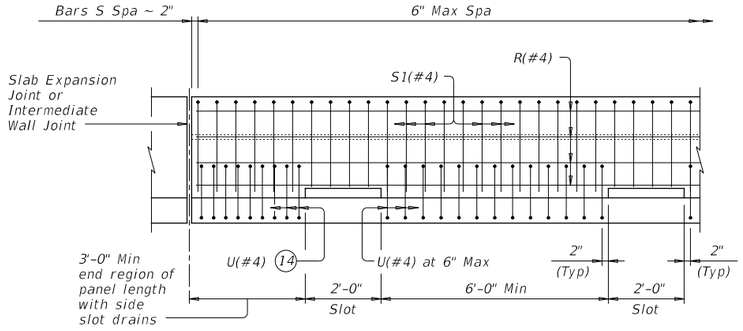


ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

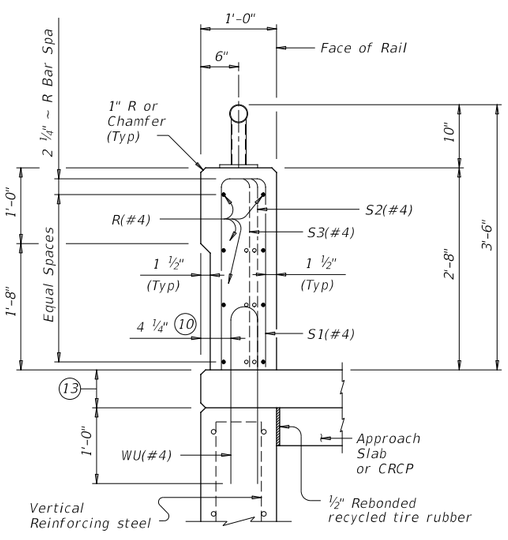


SECTION THRU OPTIONAL SIDE SLOT DRAIN

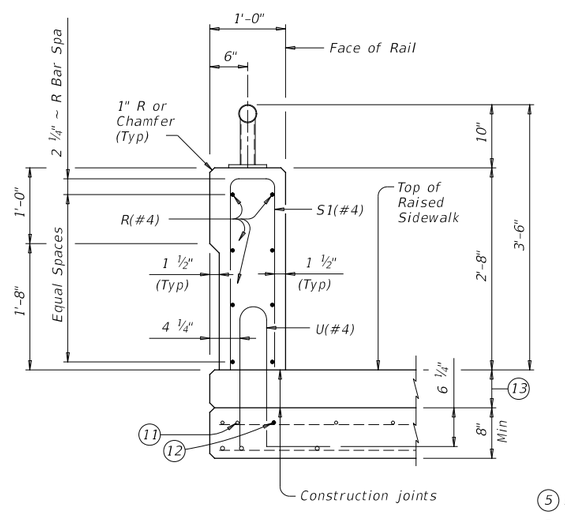


OPTIONAL SIDE SLOT DRAIN DETAIL

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



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK

(5) Increase 2" for structures with overlay.

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

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

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

(13) Raised Sidewalk

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

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

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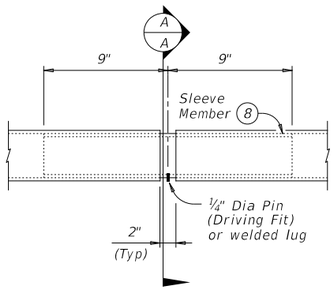
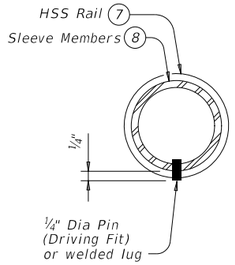
RAIL DATA FOR HORIZONTAL CURVES

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

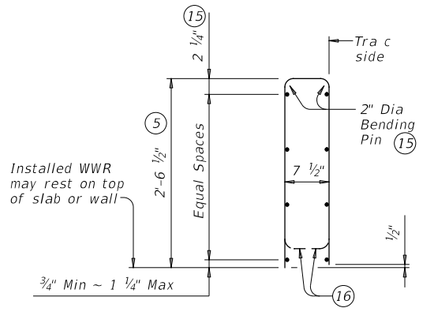


AT SPLICE OR EXP JTS



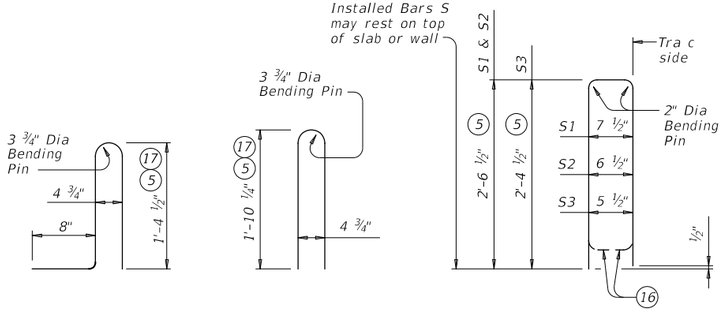
SECTION A-A

PIPE SPLICE DETAILS

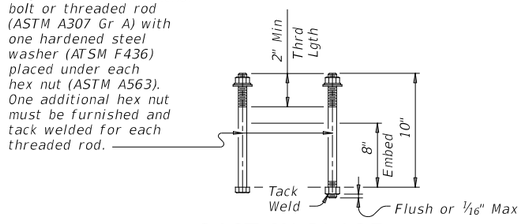


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

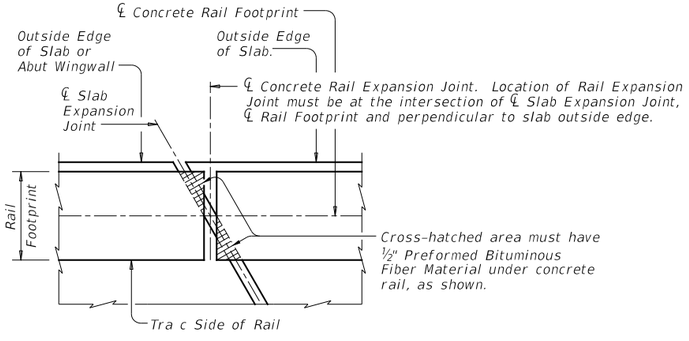
DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Di erential	The smaller wire must have an area of 40% or more of the larger wire.	



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



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.

(7) HSS 2.875 x 0.203

(8) HSS 2.375 x 0.154

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

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

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

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

CONSTRUCTION NOTES:

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

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

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

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

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

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

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

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. 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.

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

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

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

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

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

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

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

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

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

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

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

Texas Department of Transportation

Bridge Division Standard

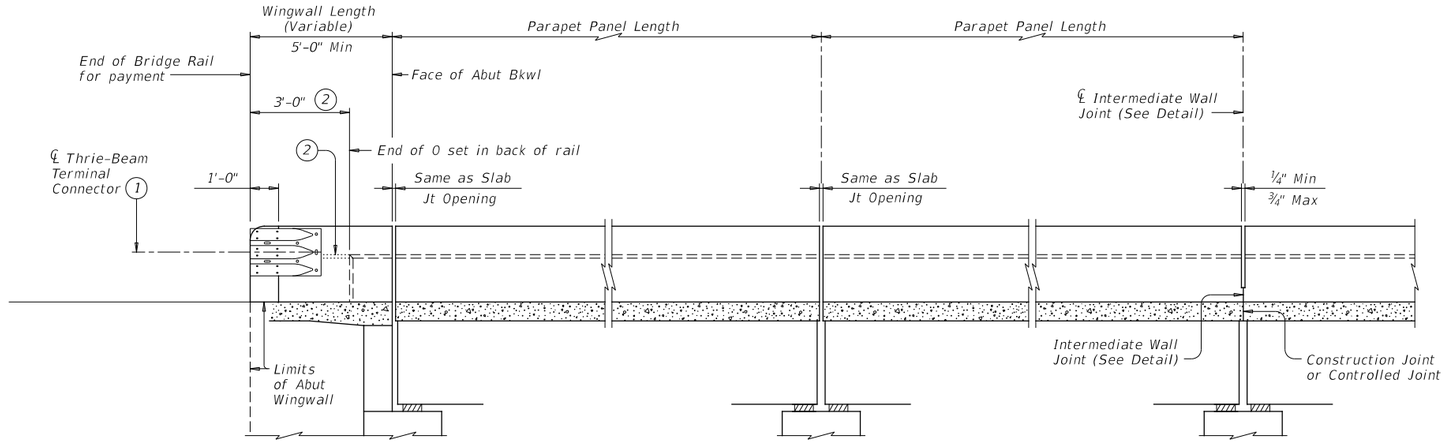
COMBINATION RAIL

TYPE C221

FILE: RL-C221-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		267

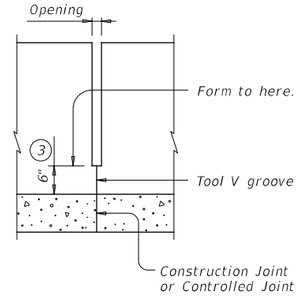
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 11/25/2025 3:42:41 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/RL-T221-19.dgn



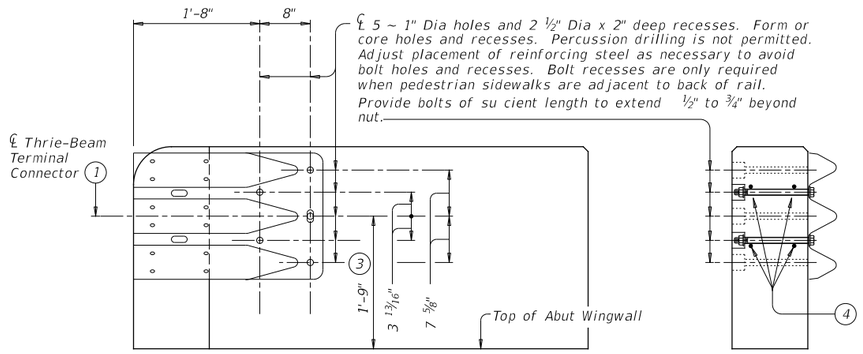
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

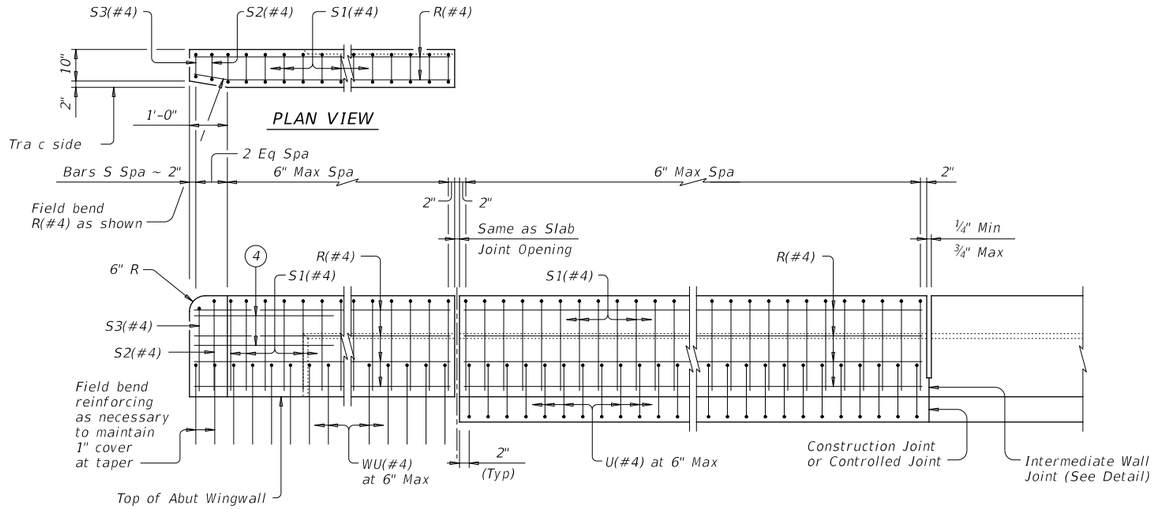
Provide at all interior bents without slab expansion joints.



ELEVATION | SECTION

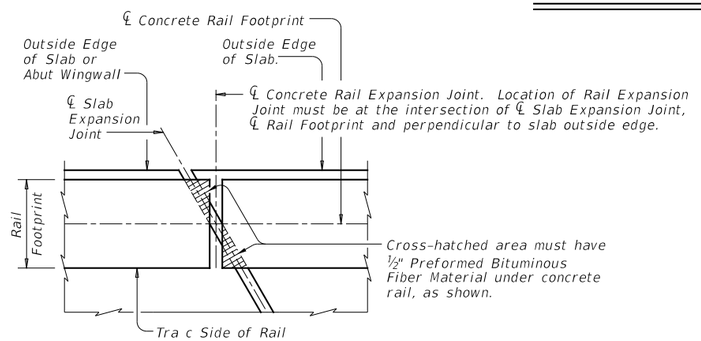
TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Back of rail o set may, with Engineer's approval, be continued to the end of the railing.
3. Increase 2" for structures with overlay.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.



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

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL

TYPE T221

FILE: RL-T221-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		268

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DATE: 11/25/2025 3:42:42 PM
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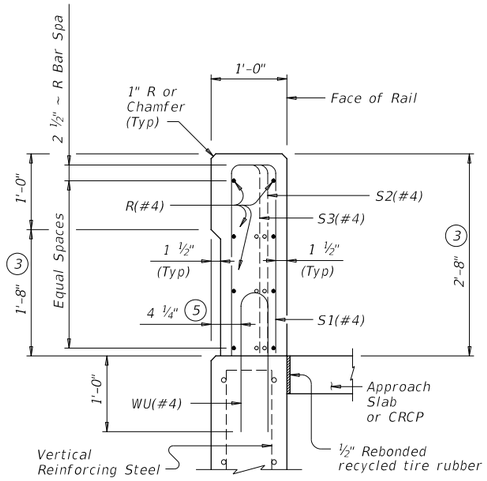
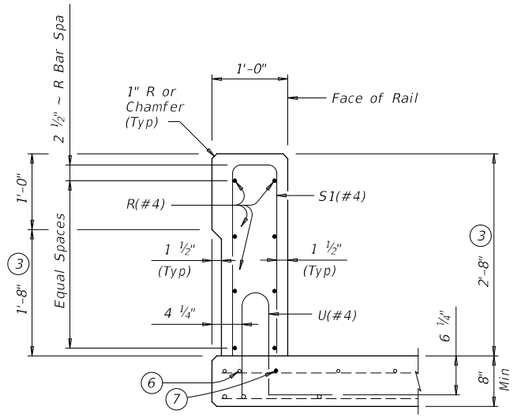


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(3) Increase 2" for structures with overlay.

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

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

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

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

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

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

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

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

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Chamfer all exposed concrete 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 Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or con gurations of WWR other that shown are permitted if conditions in the table are satis ed. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

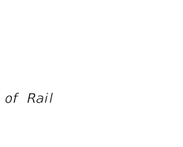
Rail anchorage details shown on this standard may require modi cation for select structure types. See appropriate details elsewhere in plans for these modi cations.

Shop drawings are not required for this rail.

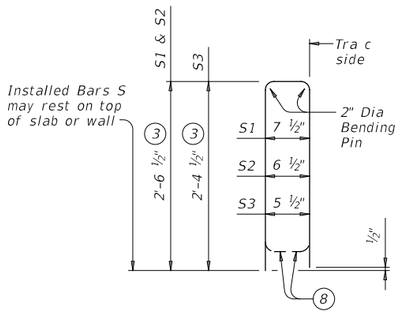
Average weight of railing with no overlay is 370 plf.

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

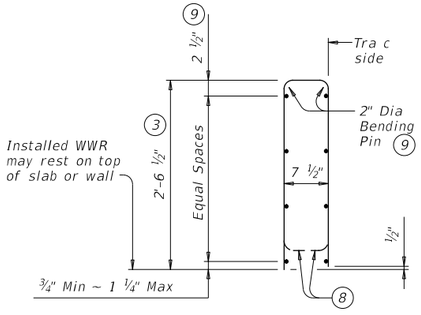
BARS U (#4)



BARS WU (#4)

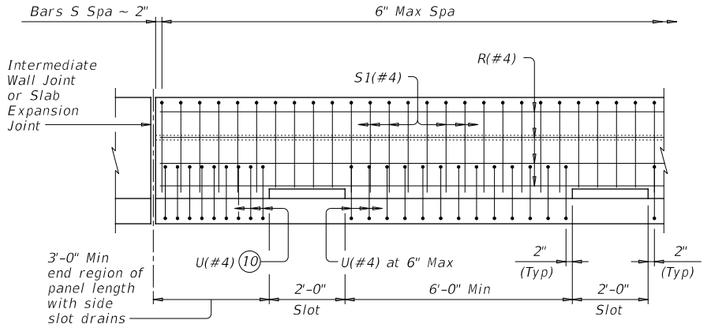


BARS S (#4)



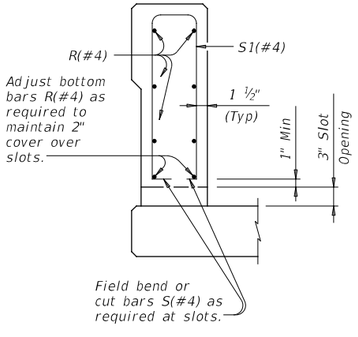
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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



OPTIONAL SIDE SLOT DRAIN DETAIL

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



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T221

FILE: RL-T221-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		269

BEGIN B
℄ SHADYSHORES STA 36+40.00
12.64' LT
MATCH EXISTING MARKINGS

1
Silktree Ct
Shady Shores Rd
D3-1
VARIESx12"

STOP
R1-1
30"x30"

END B
℄ SHADYSHORES STA 37+55.13 =
℄ SILKTREE STA 10+39.00
12.00' RT

℄ SILKTREE

BEGIN B
℄ SHADYSHORES STA 37+78.65 =
℄ SILKTREE STA 10+39.00
12.00' LT

2
CEMETERY ENTRANCE AHEAD
CUSTOM WARNING SIGN
30"x30"

LOT 13, BLOCK J
THOUSAND OAKS ADDITION PHASE II
CAB. K, PG. 383
P.R.D.C.T.

GENERAL WARRANTY DEED
DARRYL L. DARNELL, A MARRIED PERSON
VOL. 4329, PG. 1991
D.R.D.C.T.
FILED: APRIL 30, 1999

BEGIN A
℄ SHADYSHORES STA 36+40.00
1.77' LT

EXIST ROW

SILKTREE CT

℄ SHADYSHORES

10' SUP

LOT 1, BLOCK J
THOUSAND OAKS ADDITION PHASE II
CAB. K, PG. 383
P.R.D.C.T.

GENERAL WARRANTY DEED WITH VENDOR'S LIEN
HOLLY BLACKMON
DOC. NO. 2014-77260
O.P.R.D.C.T.
FILED: AUGUST 4, 2014

PARK AND DRAINAGE EASEMENT
THOUSAND OAKS ADDITION PHASE I
CAB. I, PG. 308
P.R.D.C.T.

SPECIAL WARRANTY DEED
ONE THOUSAND OAKS LIMITED PARTNERSHIP
VOL. 3459, PG. 508
D.R.D.C.T.
FILED: MARCH 2, 1993

TYPE D-SW DELINEATORS
SPACED @ 86'

EXIST ROW

SHADY SHORES RD

36+00 37+00 38+00 39+00 40+00 41+00 42+00

MATCHLINE STA 42+00

EXIST RDWY ESMT

PRESCRIPTIVE ROW

TYPE D-SW DELINEATORS
SPACED @ 72'

REFLECTIVE PAVEMENT
MARKERS TYPE II-A-A
SPACED @ 40'

10:1 TRANSITIONAL PAVEMENT

CORRECTION DEED
UNITED STATES OF AMERICA
TRACT NO. M-1101-2
GARZA-LITTLE ELM RESERVOIR
CALLED 14,709.96 ACRES
VOL. 411, PG. 194
D.R.D.C.T.

WARRANTY DEED WITH VENDOR'S LIEN
THOMAS B. PRALLE AND WIFE, MYRA K. PRALLE
VOL. 1923, PG. 318
D.R.D.C.T.
FILED: JULY 7, 1986

WARRANTY DEED WITH VENDOR'S LIEN
MONTSERRAT RETREAT HOUSE
VOL. 847, PG. 126
D.R.D.C.T.
REMAINDER OF SECOND TRACT
FILED: AUGUST 3, 1977

3
DO NOT PASS
R4-1
24"x30"

4
Keep Lake Dallas Beautiful
Adopt-A-Street
CUSTOM SIGN
24"x24"
Montserrat Retreat House
CUSTOM SIGN
24"x12"

5
WATERSHED
LEWISVILLE LAKE
KEEP IT CLEAN
CUSTOM SIGN
24"x30"

6
BRIDGE MAY ICE IN COLD WEATHER
W8-13aT
30"x30"

BEGIN A
℄ SHADYSHORES STA 36+40.00
1.09' LT

BEGIN B
℄ SHADYSHORES STA 36+40.00
10.57' RT

LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)

N

0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
CONTRACTOR TO UTILIZE EXISTING PECIAL SIGNS FOR REFERENCE OF NEW SIGNS. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ENGINEER OF RECORD TO REVIEW AND APPROVED PRIOR TO FABRICATION.

FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

David A. Burkett
12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
BEGIN TO STA 42+00

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		270

DATE: 11/25/2025 3:43:02 PM
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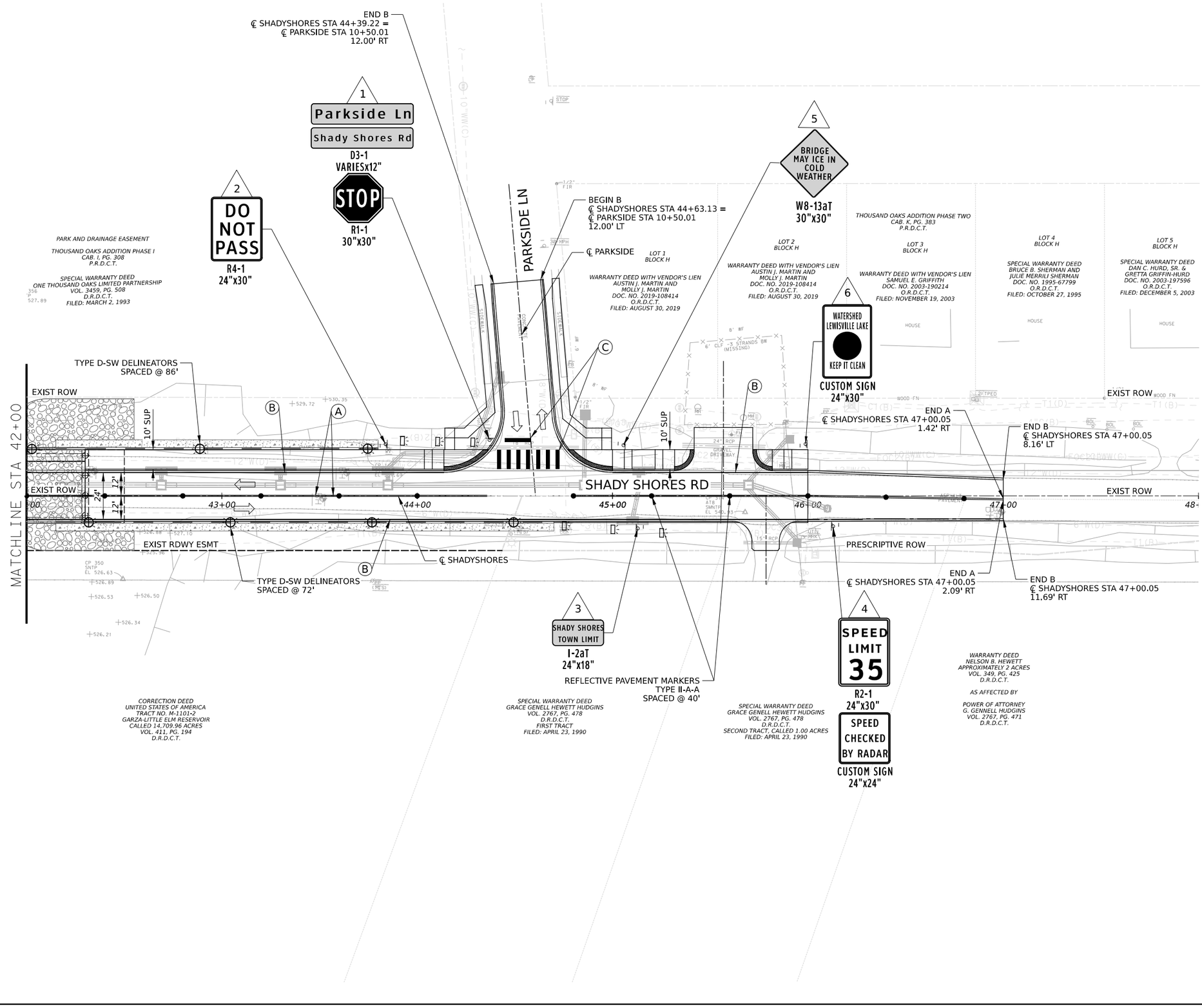

LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)

0 25 50
HORIZ. SCALE IN FEET

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FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100008
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
STA 42+00 TO END

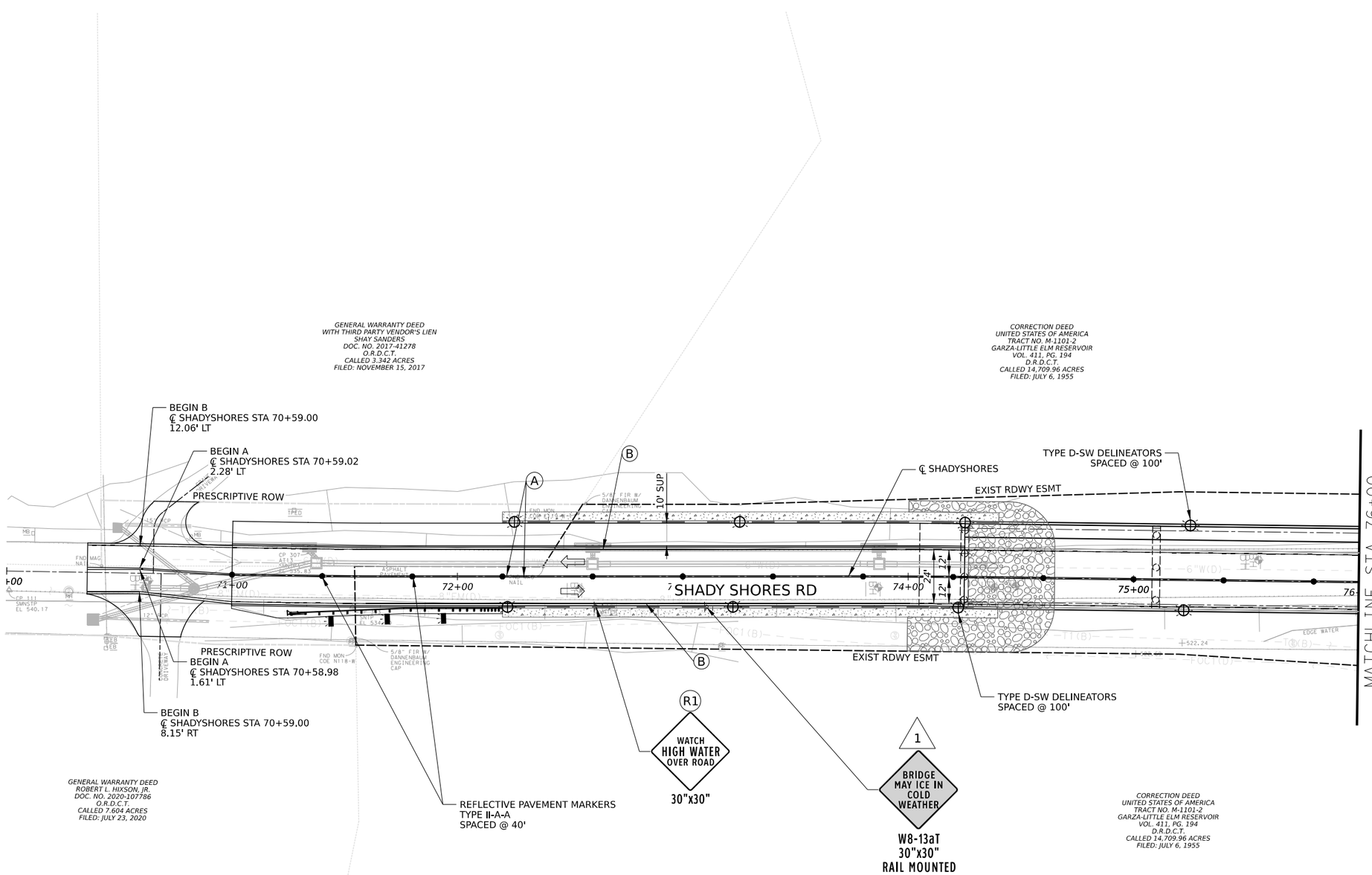
SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		271

DATE: 11/25/2025 3:43:21 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-02.dgn

LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)



0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
CONTRACTOR TO UTILIZE EXISTING PECIAL SIGNS FOR REFERENCE OF NEW SIGNS. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ENGINEER OF RECORD TO REVIEW AND APPROVED PRIOR TO FABRICATION.

FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
BEGIN TO STA 76+00

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA

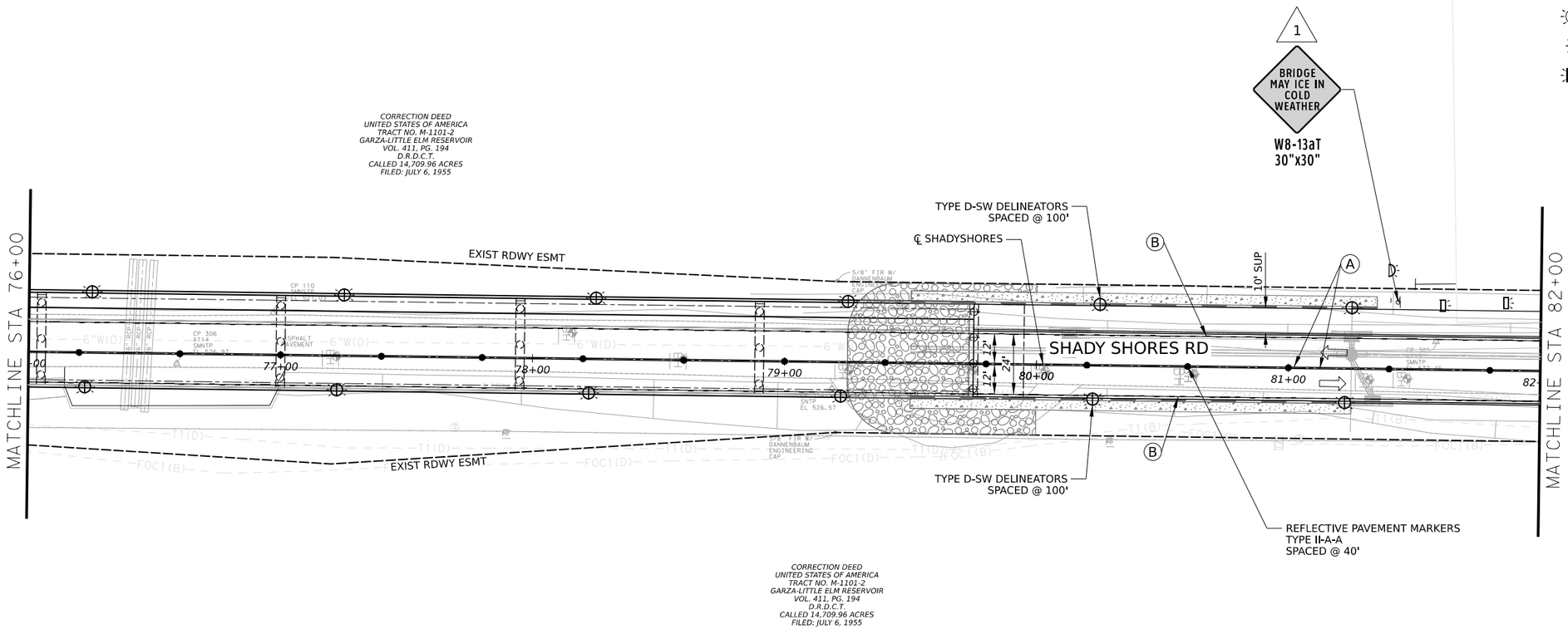
DIST	COUNTY	SHEET NO.
DAL	DENTON	272

DATE: 11/25/2025 3:43:43 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-03.dgn

CK: DW: CK: DW:

LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)



0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
CONTRACTOR TO UTILIZE EXISTING PECIAL SIGNS FOR REFERENCE OF NEW SIGNS. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ENGINEER OF RECORD TO REVIEW AND APPROVED PRIOR TO FABRICATION.

FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

David A. Burkett
12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
STA 76+00 TO STA 82+00

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		273

DATE: 11/25/2025 3:44:02 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-04.dgn

CK:
DW:
CK:
DW:

END B
℄ SHADYSHORES STA 82+77.42 =
℄ OAKWOOD STA 10+26.00
11.00' RT

BEGIN B
℄ SHADYSHORES STA 82+99.42 =
℄ OAKWOOD STA 10+26.00
11.00' LT

OAKWOOD CIR

EXIST RDWY ESMT

EXIST RDWY ESMT

GENERAL WARRANTY DEED
THE UNITED STATES OF AMERICA
TRACT NO. N-1265, CALLED 0.34 ACRES
VOL. 440, PG. 531
D.R.D.C.T.

FILED OCT. 8, 1958

GENERAL WARRANTY DEED
UNITED STATES OF AMERICA
CALLED 3.30 ACRES
VOL. 415, PG. 569
D.R.D.C.T.

FILED MARCH 11, 1957
MISCLOSE 8.03'

CORRECTION DEED
UNITED STATES OF AMERICA
TRACT NO. M-1101-2
GARZA-LITTLE ELM RESERVOIR
CALLED 14,709.96 ACRES
VOL. 411, PG. 194
D.R.D.C.T.

℄ OAKWOOD

℄ SHADYSHORES

SHADY SHORES RD

MATCHLINE STA 82+00

MATCHLINE STA 88+00

82+00 83+00 84+00 85+00 86+00 87+00

NO FENCING SHOWN

5/8" FIR W/ DANNENBAUM ENGINEERING CAP

REFLECTIVE PAVEMENT MARKERS
TYPE II-A-A
SPACED @ 40'

TYPE D-SW DELINEATORS
SPACED @ 130'

1
Oakwood Cir
Shady Shores Rd
D3-1
VARIESx12"

STOP
R1-1
30"x30"

2
W1-4R
30"x30"

3
SPEED LIMIT 35
R2-1
30"x36"

CORRECTION DEED
UNITED STATES OF AMERICA
TRACT NO. M-1101-2
GARZA-LITTLE ELM RESERVOIR
VOL. 411, PG. 194
D.R.D.C.T.
CALLED 14,709.96 ACRES
FILED: JULY 6, 1955

LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)

0 25 50
HORIZ. SCALE IN FEET

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FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100088
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

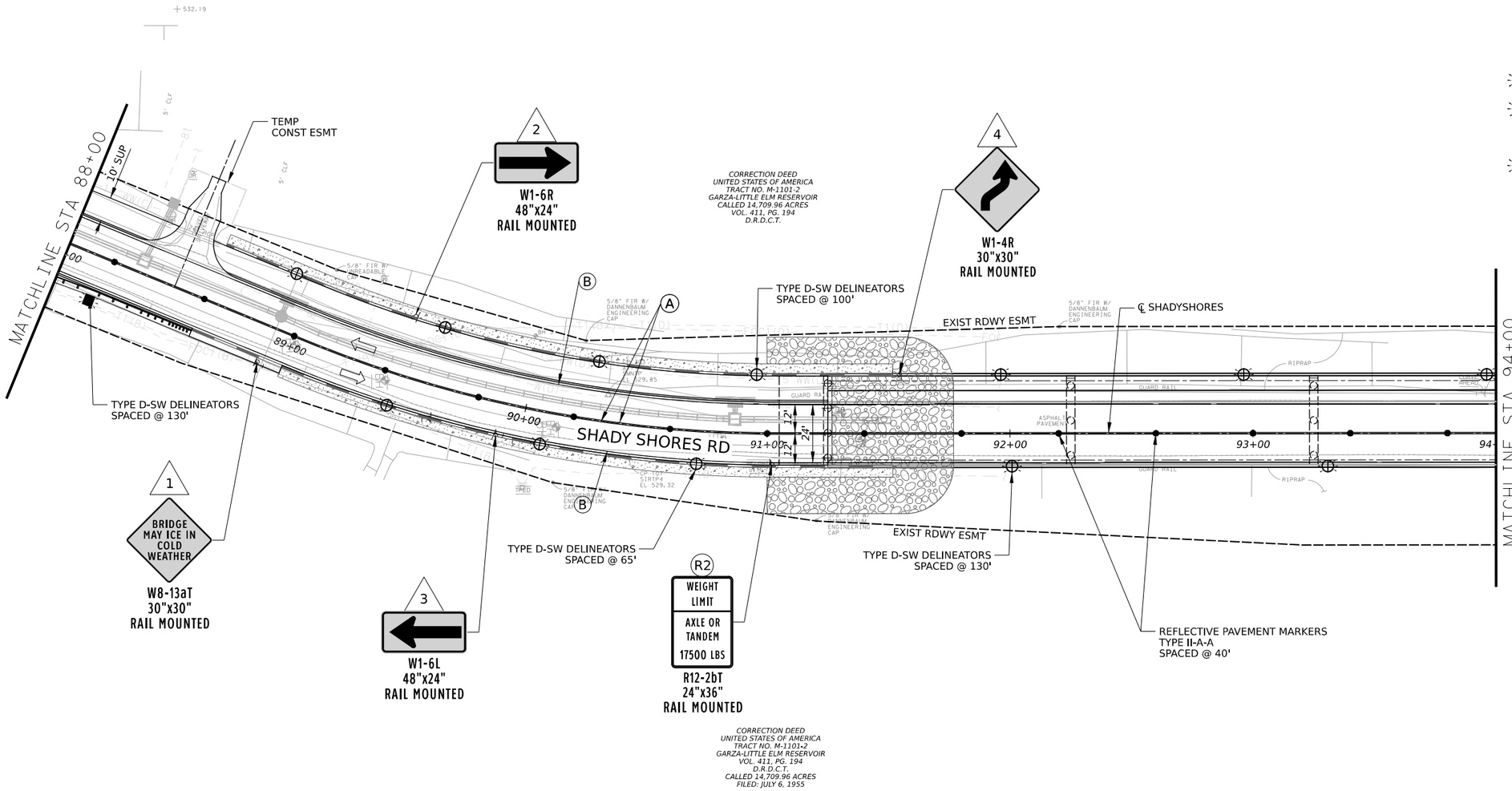
SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
STA 82+00 TO 88+00

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		274

DATE: 11/25/2025 3:44:21 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-05.dgn



LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)

0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
CONTRACTOR TO UTILIZE EXISTING PECIAL SIGNS FOR REFERENCE OF NEW SIGNS. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ENGINEER OF RECORD TO REVIEW AND APPROVED PRIOR TO FABRICATION.

FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
STA 88+00 TO STA 94+00

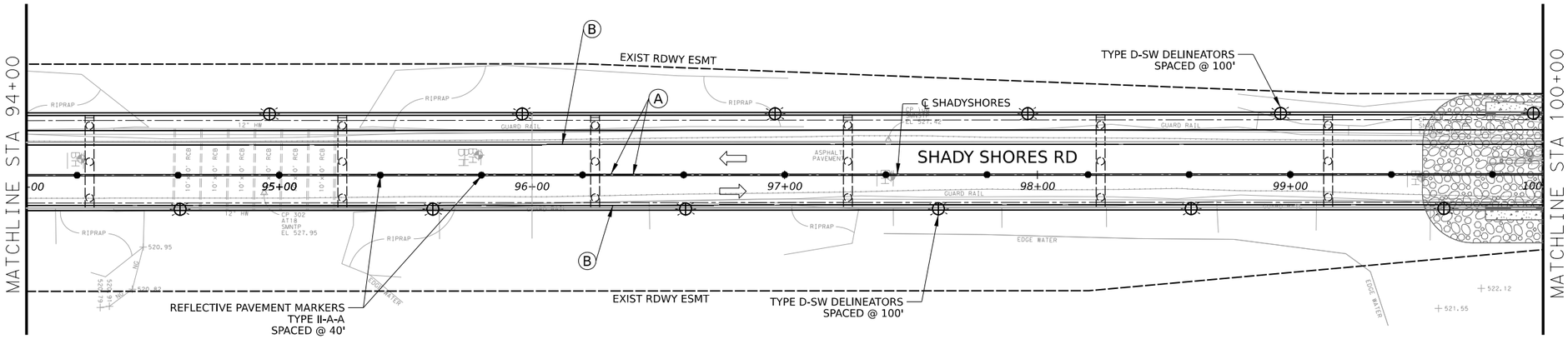
SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		275

DATE: 11/25/2025 3:44:39 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-06.dgn

LEGEND

- A — REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- B — REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- C — REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- R# — SIGN TO BE REMOVED
- # — PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)



0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
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FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
STA 94+00 TO STA 100+00

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		276

DATE: 11/25/2025 3:45:00 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-07.dgn

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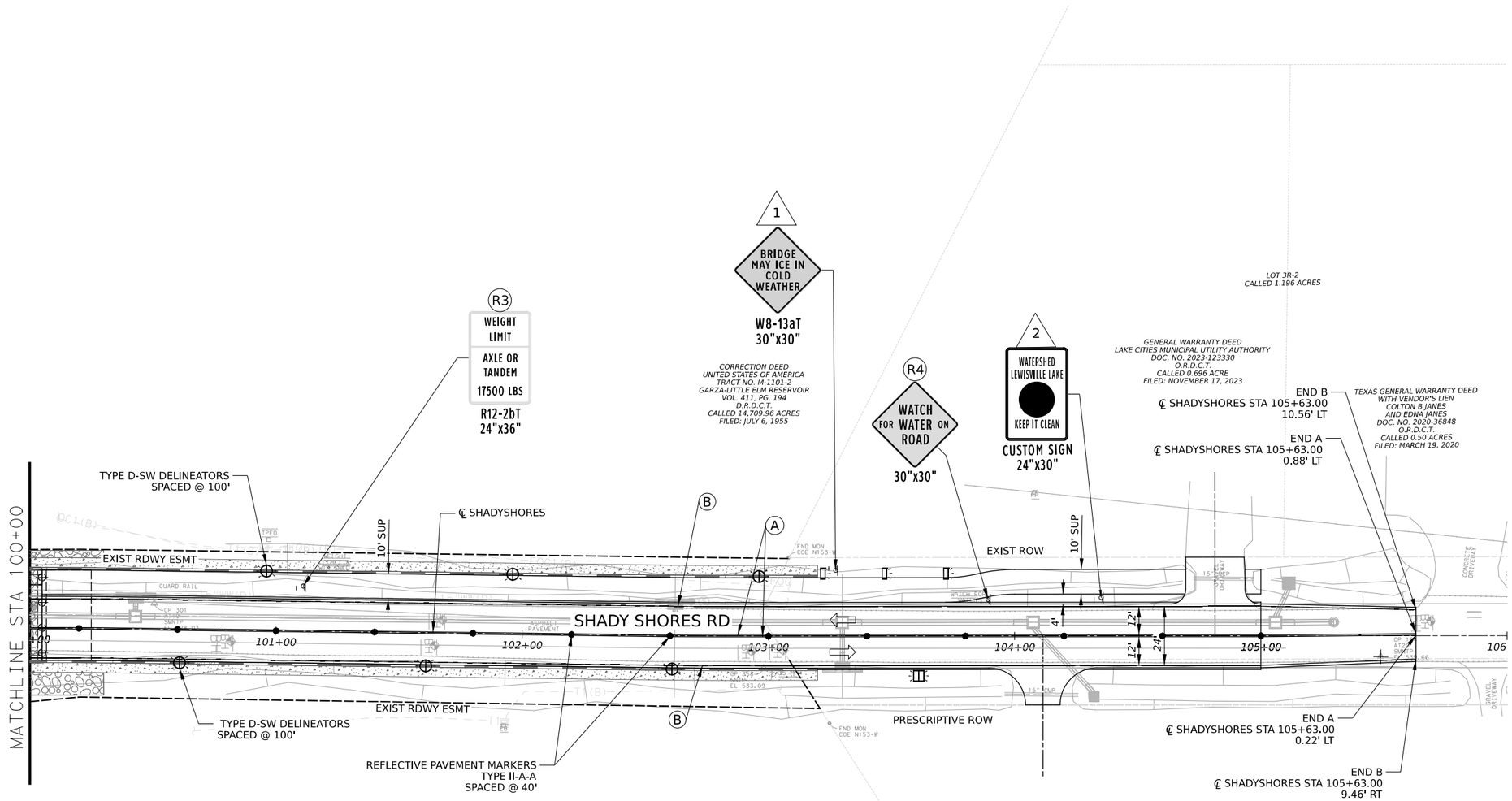

LEGEND

- (A) REFL PAV MRK TY I (Y) 6" (SLD) (100MIL)
- (B) REFL PAV MRK TY I (W) 6" (SLD) (100MIL)
- (C) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (R#) SIGN TO BE REMOVED
- (#) PROPOSED SIGN
- TRAFFIC FLOW ARROWS
- YELLOW REFLECTIVE MARKING
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL
- INSTL DEL ASSM (D-SW) SZ1 (WFLX) GNDLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) CTBLL (BI)
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL
- INSTL DEL ASSM (D-SW) SZ1 (BRF) GF2LL (BI)

0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
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FOR DETAILS ON CROSSWALK INSTALLATION, SEE SHEET 288

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SIGNING AND PAVEMENT MARKING PLAN

SHADY SHORES
STA 100+00 TO END

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		277

DATE: 11/25/2025 3:45:20 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-TR-PVMK-08.dgn

DW: CK: DW: CK:

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: 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
		D3-1	Silktree Ct	VARIESx12								
270	1	D3-1	Shady Shores Rd	VARIESx12			10BWG	1	SA	P		
		R1-1	STOP	30x30								
270	2		CEMETERY ENTRANCE AHEAD	30x30			10BWG	1	SA	P		
270	3	R4-1 #	DO NOT PASS	24x30			10BWG	1	SA	P		
270	4		Keep Lake Dallas Beautiful / Adopt-A-Street	24x24			10BWG	1	SA	P		
			Montserrat Retreat House	24x12								
270	5	#	WATERSHED LEWISVILLE LAKE / KEEP IT CLEAN	24X30			10BWG	1	SA	P		
270	6	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	30x30			10BWG	1	SA	P		
		D3-1	Parkside Ln	VARIESx12								
271	1	D3-1	Shady Shores Rd	VARIESx12			10BWG	1	SA	P		
		R1-1	STOP	30x30								

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).

- ATTACHED TO BRIDGE RAIL

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	DENTON		278

18

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DATE: 11/26/2025 10:18:26 AM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SIGN-SUM-01.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: 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
271	2	R4-1 #	DO NOT PASS	24x30			10BWG	1	SA	P		
271	3	I-2aT	SHADY SHORES TOWN LIMIT	24x18			10BWG	1	SA	P		
271	4	R2-1	SPEED LIMIT 35	24x30			10BWG	1	SA	P		
			SPEED CHECKED BY RADAR	24x24								
271	5	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	30x30			10BWG	1	SA	P		
271	6	#	WATERSHED LEWISVILLE LAKE / KEEP IT CLEAN	24x30			10BWG	1	SA	P		
272	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	30x30			RAIL MOUNTED			P		
273	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	30x30			10BWG	1	SA	P		
274	1	D3-1	Oakwood Cir	VARIESx12								
			Shady Shores Rd				10BWG	1	SA	P		
		R1-1	STOP	30x30								
274	2	W1-4R		30x30			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"

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

- ATTACHED TO BRIDGE RAIL

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	DENTON		279

18

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DATE: 11/26/2025 10:18:43 AM
FILE: pw:/halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SIGN-SUM-02.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: 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
274	3	R2-1		24x30			10BWG	1	SA	P		
275	1	W8-13aT		30x30			RAIL MOUNTED			P		
275	2	W1-6R		48x24			RAIL MOUNTED			T		
275	3	W1-6L		48x24			RAIL MOUNTED			T		
275	4	W1-4R #		30x30			RAIL MOUNTED			P		
277	1	W8-13aT		30x30			10BWG	1	SA	P		
277	2			24x30			10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

- ATTACHED TO BRIDGE RAIL

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	DENTON		280

18

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DATE: 11/26/2025 10:19:00 AM
FILE: pw:/halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/36886-002-SIGN-SUM-03.dgn

DISCLAIMER:
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DATE: 11/25/2025 3:46:34 PM
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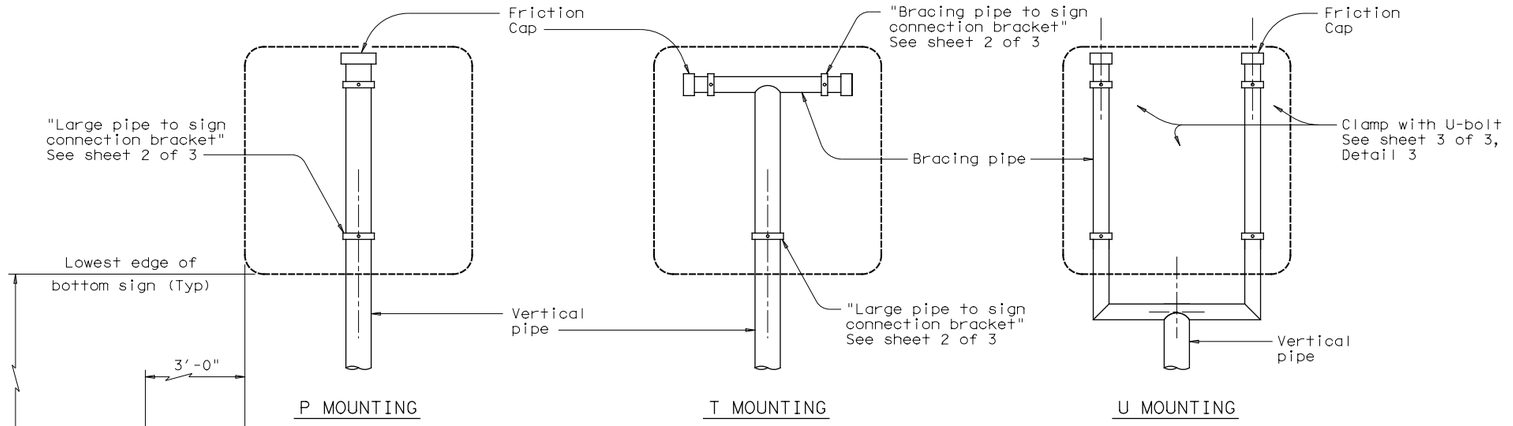
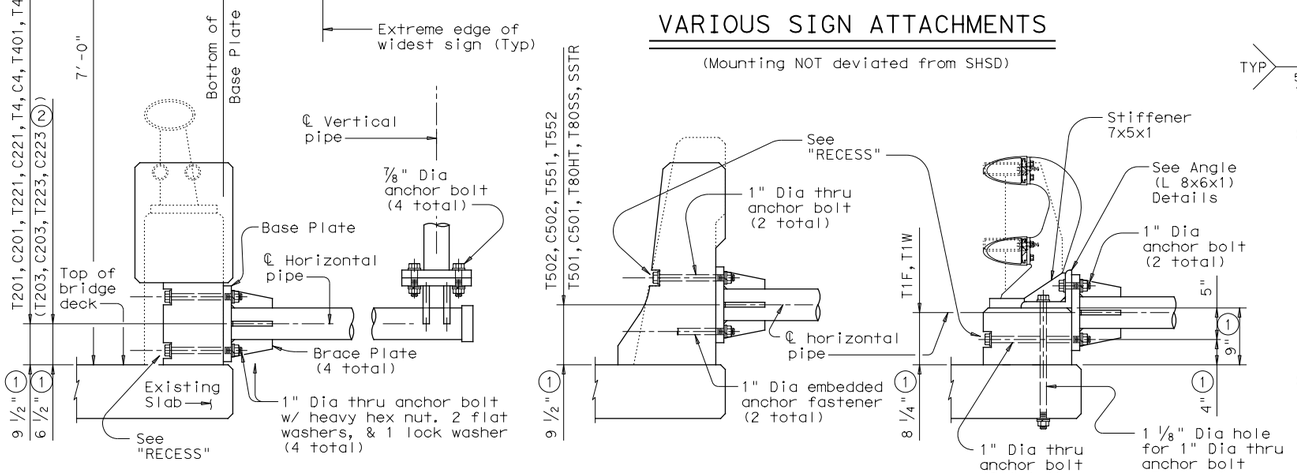


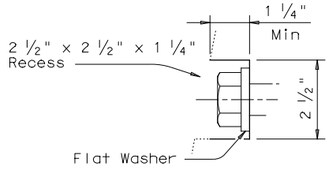
VARIOUS SIGN ATTACHMENTS

(Mounting NOT deviated from SHSD)



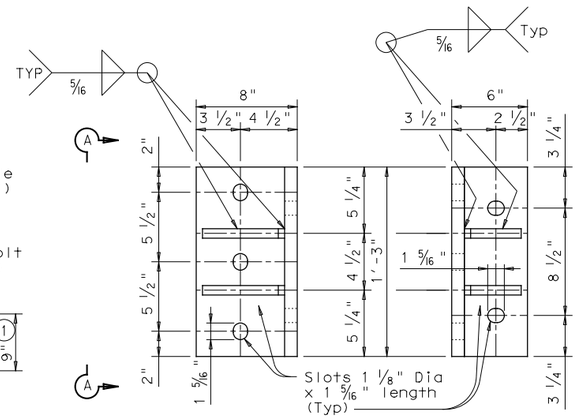
LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT

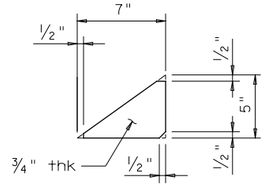
(1) Increase 2" for structure with overlay.
(2) Attached at ℄ post.



RECESS

PIPE SIZE AND THICKNESS			
Pipe Placement / Design Wind Speed	Horizontal	Vertical	Bracing
90 mph	5" X-Strong (.375")	4" X-Strong (.337")	2 ½" Standard (.203")
130 mph	6" X-Strong (.432")	5" X-Strong (.375")	3" X-Strong (.300")





STIFFENER

ANGLE (L 8x6x1) DETAILS

GENERAL NOTES:

Design conforms to 2013 AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design 3-second gust wind speeds of 90 mph and 130 mph with a 1.14 gust factor, and a wind importance factor of 1.0 (50-year mean recurrence interval) for the supporting structures. For mounting connection between sign panel and pipe, wind importance factors of 0.71 and 0.54, for 90 mph and 130 mph winds, respectively, are applied to adjust the wind speeds to a 10-year mean recurrence interval.

See standard sheet WV & IZ(LTS2013) for the boundaries of each design wind zone. All mounting shall be based on 130 mph wind speed design except when located in 90 mph wind zone. Maximum panel area is 30 sq. ft. Maximum design height is 50 ft, with design height defined as the distance between natural ground (average elevation of surrounding terrain) and the center of sign(s) at the mounting location.

Material for pipe shall be ASTM A53 Grade B, or A501. Structural steel plates shall be ASTM A36, A572 Grade 50, or A588. Bolts used to connect pipe and mounting bracket, and wind beam to sign panel shall be ASTM A307. Anchor bolts shall be ASTM A325 or A193 B7. Each anchor bolt shall be provided with 2 flat washers, 1 lock washer, and 1 heavy hex nut. All parts shall be galvanized in accordance with Standard Specifications Item 445, "Galvanizing".

Attach horizontal pipe at least 2'-0" from the edge of any nearby drain slot.

Contractor shall verify applicable field dimensions before fabrication. Holes drilled through the railing parapet wall shall be drilled with rotary (coring or masonry drill) type equipment. Percussion (star) drilling shall not be allowed. Anchorage for pipe attached to rail shall be placed using an anchoring system approved by the engineer. Installation of anchor fasteners including hole depth, diameter and material shall be in accordance with the manufacturers' recommendation.

Each embedded anchor fastener shall resist an allowable design loading (after applying the reduction factors of bolt spacing and bolt edge distance) of:

	130 mph	90 mph
Tension	12.5 kips	7.5 kips
Shear	9.0 kips	5.0 kips

Each anchoring system shall provide a capacity to resist the required tension and shear acting simultaneously.

For sign connection to mounting, shop drill holes on sign blank in accordance with the current Standard Highway Sign Designs for Texas (SHSD). Additional hole(s) needed to meet a stipulated-type mounting may be field drilled. For multi-sign or back-to-back signs mounting, the engineer shall determine the proper type which ensures each individual mounting meets requirements.

Refer to Standard sheets SMD(GEN), SMD(SLIP-2 and SMD(2-1) for details not covered here.

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-1)-14

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©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		281

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DATE: 11/25/2025 3:46:34 PM
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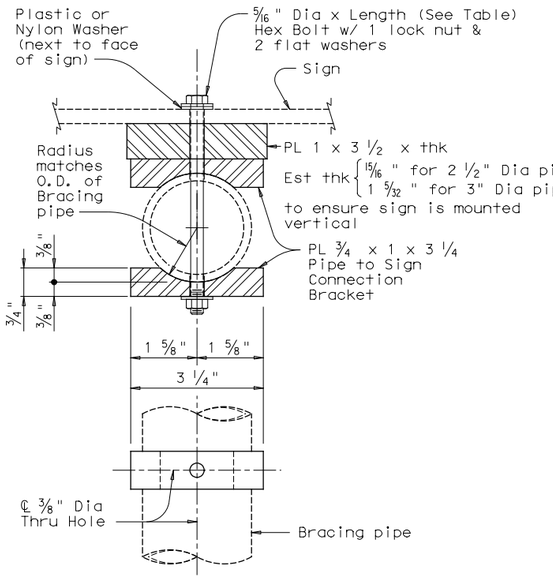
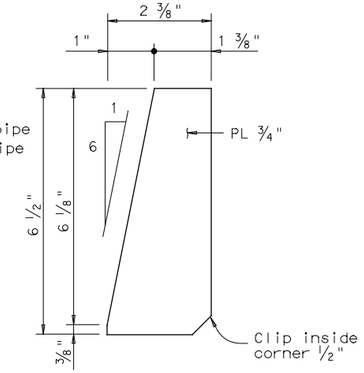
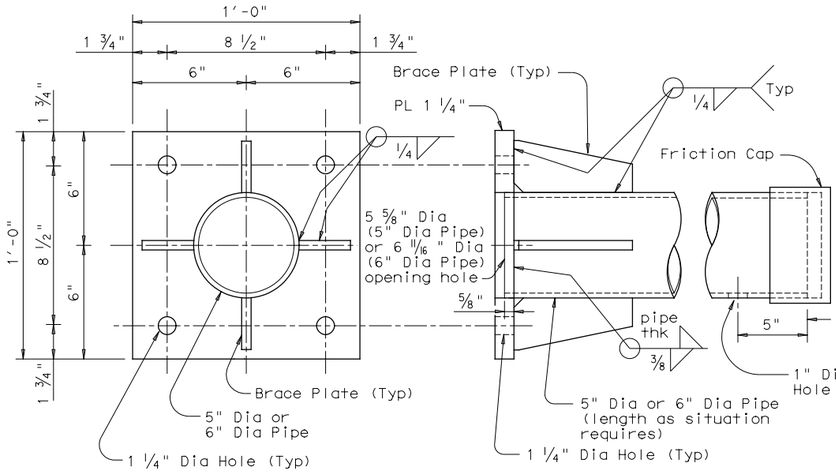


BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

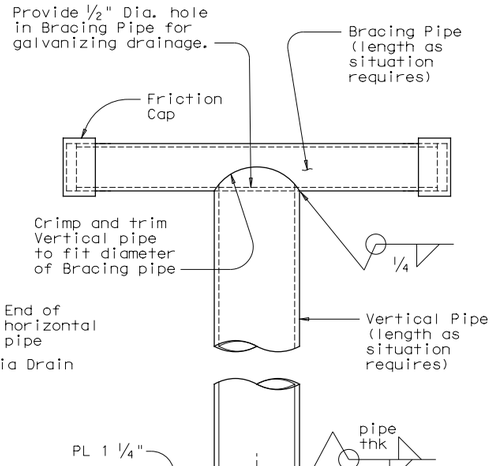
(Showing T Mounting)



BRACE PLATE DETAILS

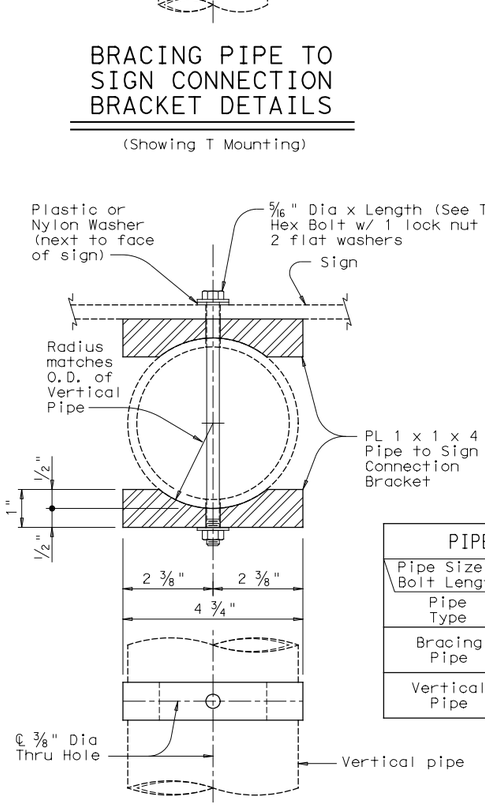


BASE PLATE DETAILS



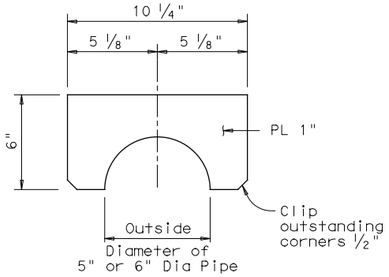
SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)



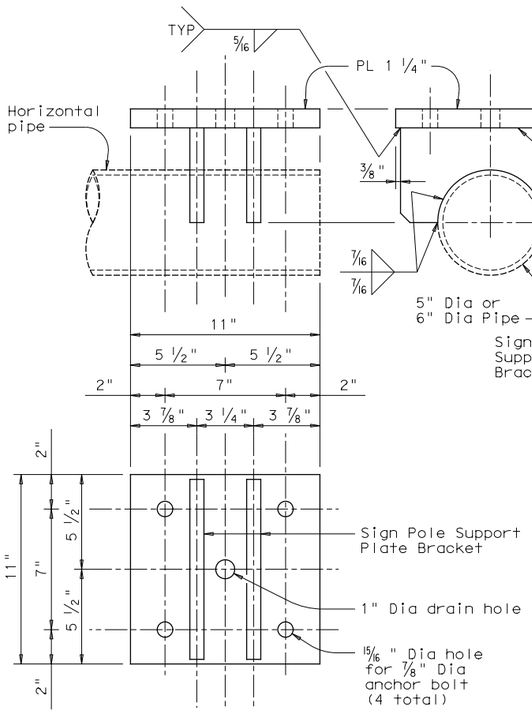
LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)



SIGN POLE SUPPORT PLATE BRACKET DETAILS

PIPE AND BOLT SPECIFICATIONS		
Pipe Size & Bolt Length / Pipe Type	Nominal Pipe Dia (in.)	Bolt Length (in.)
Bracing Pipe	2 1/2	6
	3	7
Vertical Pipe	4	7
	5	8



SIGN POLE SUPPORT PLATE DETAILS

SHEET 2 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-2)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DAL	DENTON		282

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DATE: 11/25/2025 3:46:35 PM
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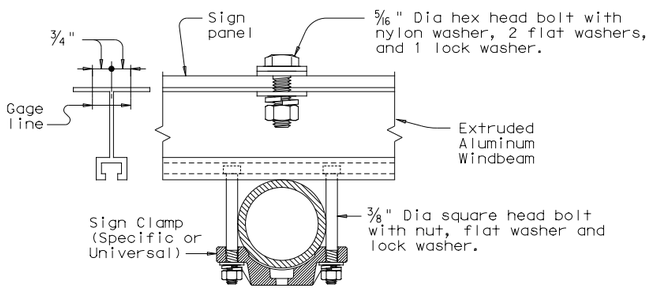
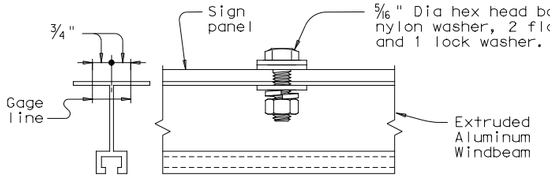
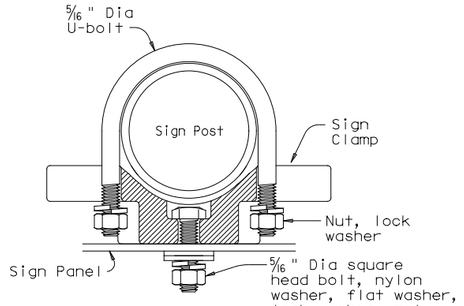


DETAIL 1



DETAIL 2

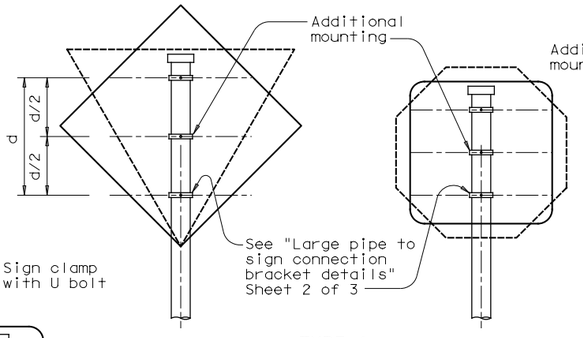


DETAIL 3

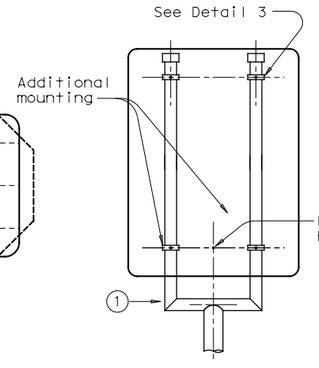
SIGN SHAPE	SQUARE			HORIZONTAL RECTANGLE			VERTICAL RECTANGLE			DIAMOND			OCTAGON			EQUILATERAL TRIANGLE			INTERSTATE SHIELD	PENTAGON (SCHOOL)	
Type of Sign Mounting on SHSD / Design Wind Speed	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	P	T
90 mph					(Type 23) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"		(Type 2) 36"x48" (Type 32) 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" 48"x72" (Type 3) 48"x84"			(Type 3) 60"x60"									(Type Special) 45"x36"		
130 mph	(Type 1) 30"x30" 36"x36"	(Type 3) 48"x48"		(Type 1) 36"x24" 36"x30"	(Type 23) 48"x42" 54"x42" 60"x30" 66"x36" 84"x24" (Type 3) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"	(Type 1) 30"x36" 30"x42"	(Type 3) 36"x48" 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" (Type 4) 48"x72" 48"x84"	(Type 3) 48"x60"	(Type 1) 36"x36"	(Type 3) 48"x48" 60"x60"					(Type 1) 48"x48"			(Type Special) 36"x36" 45"x36"		

Notes:
1. Drill holes in addition to the hole pattern of the Standard Highway Sign Designs for Texas (SHSD) at specified locations to meet a stipulated-type mounting indicated in the parenthesis ( ).
2. "Blank" in the above table indicates all other signs excluded from stipulated mounting shall be mounted in accordance with SHSD.

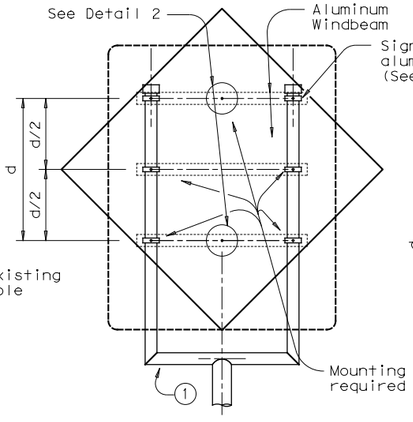
(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.

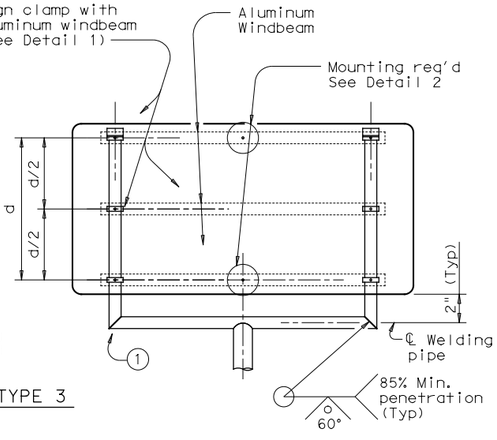


TYPE 1

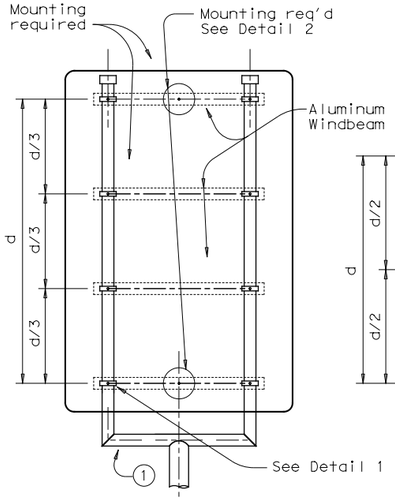


TYPE 2





TYPE 3



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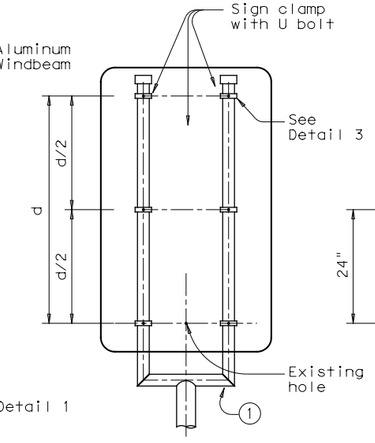
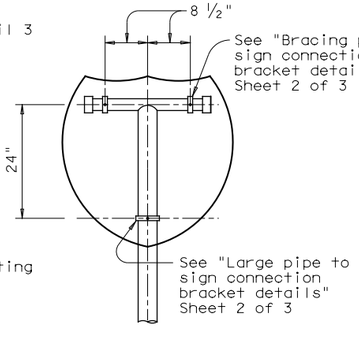


TYPE 32



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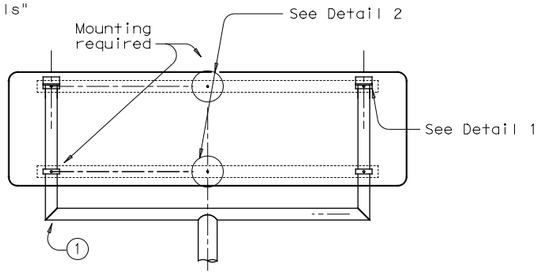

TYPE 23

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-3)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DAL	DENTON		283

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FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design Sheets/dom1-25.dgn

DELINEATOR - BID ITEM DESCRIPTIONS

XXXXX DEL ASSM (D-XX)SZ X (XXXX)XXXXX(XX)

PAYMENT
INSTL = Installation
REPLC = Replacement

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
SZ 1 or SZ 2 or SZ 5 or SZ 6

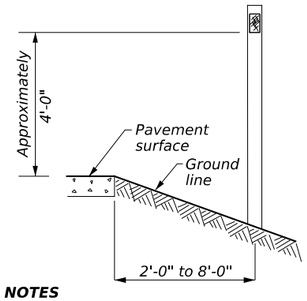
TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Ground Embedded (drivable or set in concrete)
CAB1 or CAB2 or CAB3 = Cable Barrier
CTB = Concrete Traffic Barrier
GF1 or GF2 = Guard Fence
SRF = Surface Mount

IDENTIFICATION
LL= Low Speed, Low Impact
HH = High Speed, High Impact

DIRECTION [if required]
BI = Bi-Directional
BR = Bi-Directional with red on back

DELINEATOR - TYPICAL INSTALLATION



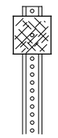
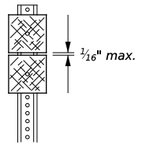
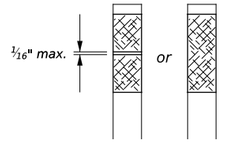
GENERAL NOTES

1. *Place delineators on a section of roadway at a consistent distance from the edge of pavement.*
2. *When 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 delineator as close to the desired height as possible.*
3. *Install all delineators and barrier reflectors in accordance with the manufacturer's recommendation.*
4. *GF1, GF2, and CTB barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.*
5. *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.*
6. *Delineator substrates and sign substrates shall be 0.080" aluminum sign blank and confrom to ASTM B-209 Alloy 6061-T6 or an approved alternative.*

DELINEATOR DEFINITION

Retroreflective devices mounted on the roadway surface or at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather. (See TMUTCD - Part 3, DELINEATORS.)

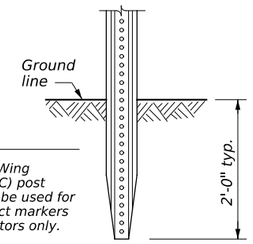
SINGLE AND DOUBLE MOUNTED DELINEATORS

	SINGLE		DOUBLE	
DEVICE	 1-Size 2 reflector unit	1-Size 1 reflector unit	 2-Size 2 reflector units	 2-Size 1 reflector units or 1-Size 5 reflector unit
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GNDLL	GNDLL, GNDHH, SRFLL, SRFHH	GNDLL	GNDLL, GNDHH, SRFLL, SRFHH

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

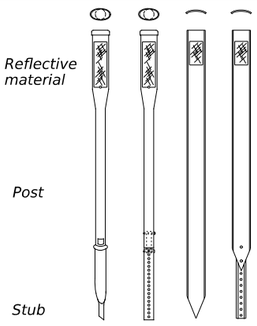
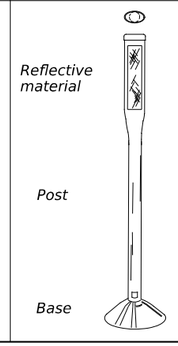
GND



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	SRF
	

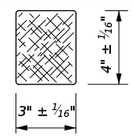
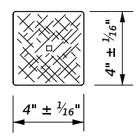
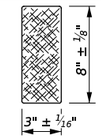
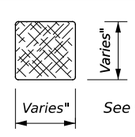
NOTES

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.*

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*

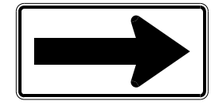
REFLECTOR UNIT DIMENSIONS FOR DELINEATORS

	SIZE 1	SIZE 2	SIZE 5	SIZE 6
DEVICE				 See Note 3
SHEETING	Yellow, White, or Red Type B or C reflective sheeting			
NOTES	1. Size 1 and 5 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 - For use on wing channel (wc) post only. Use approved metal, plastic, or fiberglass backplate with 17/64" mounting holes. 3. Size 6 - For use on cable barrier systems only. Direct applied reflective sheeting. Various dimensions as specified elsewhere in the plans or as defined by the manufacturer.			

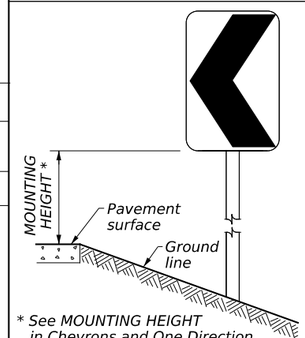
CHEVRONS

DEVICE				
	W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" to 4'-6" or 7'-0" to 7'-6"		7'-0" to 7'-6"	

ONE DIRECTION LARGE ARROW

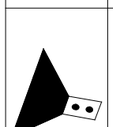
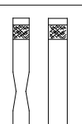
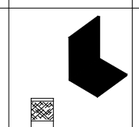
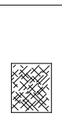
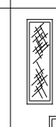
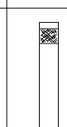
DEVICE	 **W1-6**
SIZE (W x L)	48"x 24" (Conventional) / 60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0" to 7'-6"
NOTES	1. Chevron Alignment (W1-8) signs and One-Direction Large Arrow (W1-6) signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, a larger One-Direction Large Arrow (W1-9T) sign may be used in lieu of the typical W1-6 sign.

CHEVRONS AND ONE DIRECTION LARGE ARROW SIGNS TYPICAL INSTALLATION



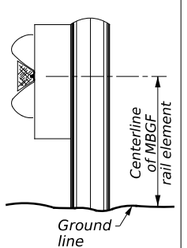
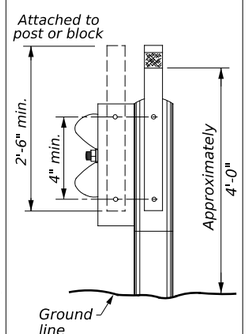
* See MOUNTING HEIGHT in Chevrons and One Direction Large Arrow tables.

BARRIER REFLECTORS (BRF)

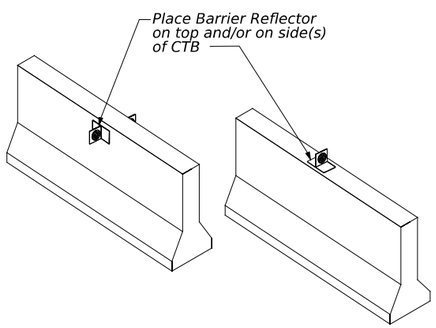
	GF1	GF2	CTB	CAB1	CAB2	CAB3
DEVICE						
	1. Barrier reflectors shall meet the requirements of DMS-8600. 2. Approved barrier reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov. 3. GF2 and CAB3 are coded as "YFLX" or "WFLX" instead of "BRF". 4. CAB1, CAB2, and CAB3 are only to be used as replacements. Per Item 543, original installation is to be considered subsidiary to the Cable Barrier System.					
SHEETING	Yellow, White, Red					
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches by 3 inches and minimum surface area of 9 square inches.					

BARRIER MOUNT TYPES

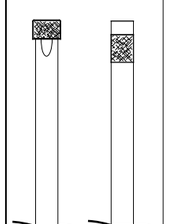
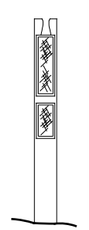
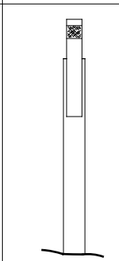
GUARD FENCE

GF1	GF2
	

CONCRETE TRAFFIC BARRIER (CTB)



CABLE BARRIER

CAB1	CAB2	CAB3
		

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR MATERIAL DESCRIPTION & INSTALLATION

D & OM(1)-25

FILE: dom1-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
8-04 3-15 10-09 7-20 4-10 5-25	DIST	COUNTY		SHEET NO.
	DAL	DENTON		284

20A

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DATE: 11/25/2025 3:47:11 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/dom225.dgn

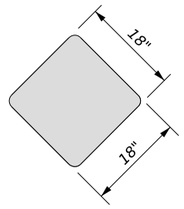
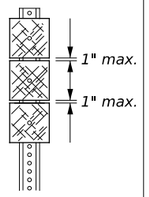
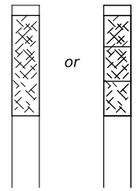
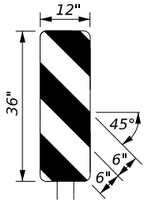
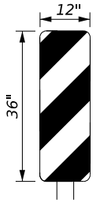
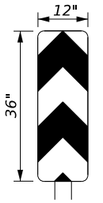
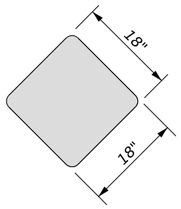
OBJECT MARKER - BID ITEM DESCRIPTIONS

XXXXX OM ASSM (OM-XX)(XXXX)XXXXX(XX)

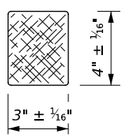
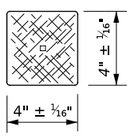
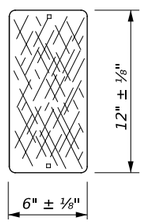
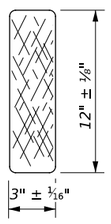
- **PAYMENT**
  - INSTL = Installation
  - REPLC = Replacement
- **TYPE OF OBJECT MARKER**
  - 1, 2, 3, or 4
- **NUMBER OF REFLECTORS OR DIRECTION**
  - X = 3-Size 2 reflector units (Type 2 only)
  - Y = 1-Size 3 reflector unit (Type 2 only)
  - Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
  - 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
  - YFLX = Yellow Flexible Post
  - TWT = Thin Walled Tubing
- **TYPE OF MOUNT**
  - GND = Ground Embedded (drivable or set in concrete)
  - SRF = Surface Mount
  - WAS = Wedge Anchor Steel
  - WAP = Wedge Anchor Plastic
- **IDENTIFICATION**
  - LL = Low Speed, Low Impact
  - HH = High Speed, High Impact
- **DIRECTION [if required]**
  - BI = Bi-Directional

OBJECT MARKER DEFINITION

Devices used to mark obstructions within or adjacent to the roadway. (See TMUTCD - Chapter 2C, WARNING SIGNS AND 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	 1-Size 4 reflector unit or 3-Size 1 reflector units				
SHEETING	Yellow - Type B_{FL} or C_{FL} sheeting	White and 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, YFLX	TWT, WFLX			TWT
MOUNT TYPE	WAS, WAP	GNDLL	GNDLL	GNDLL, GNDHH, SRFLL, SRFHH	WAS, WAP, GNDLL, GNDHH, SRFLL, SRFHH			WAS, WAP

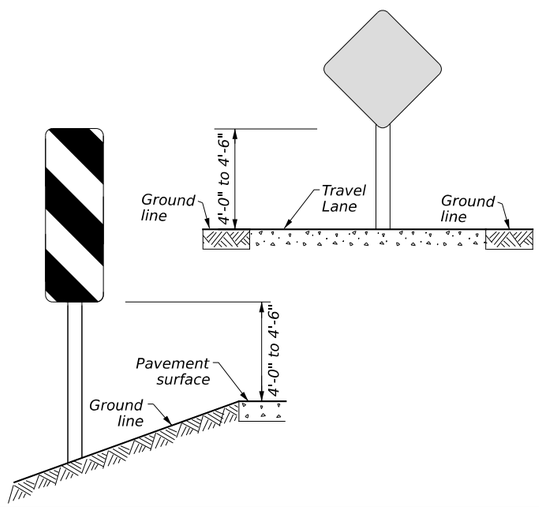
REFLECTOR UNIT DIMENSIONS FOR OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				

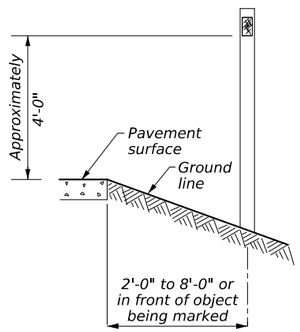
NOTE

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.

TYPES 1, 3, AND 4 OBJECT MARKERS TYPICAL INSTALLATION



TYPE 2 OBJECT MARKERS TYPICAL INSTALLATION

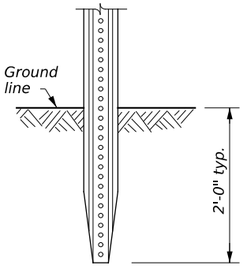


See General Notes 1, 2, and 3

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

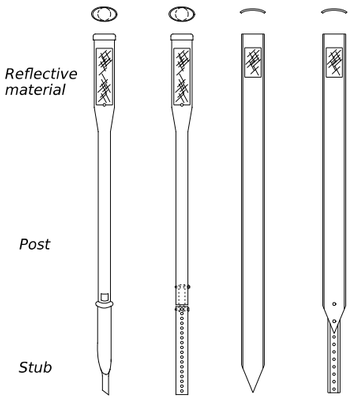


NOTES

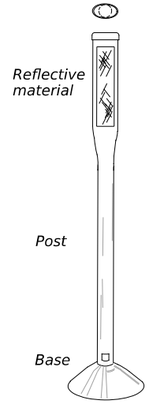
1. Embedded Wing Channel (WC) post option may be used for Type 2 object markers and delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF

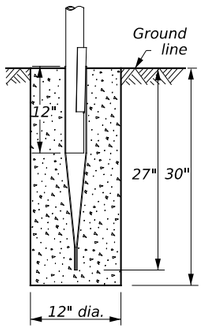


NOTES

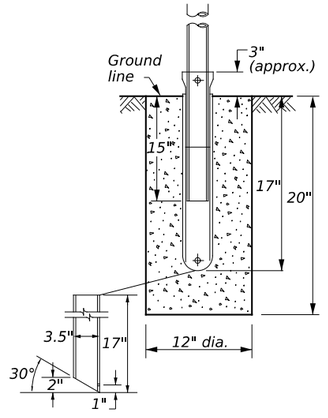
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.

WEDGE ANCHOR SYSTEMS

WAS



WAP



NOTE

1. Install per manufacturer's recommendations.

GENERAL NOTES

1. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
2. When Type 2 object markers 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 as close to the recommended height as possible.
3. Install all object markers in accordance with the manufacturer's recommendation.
4. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.
5. Object marker substrates shall be 0.080" aluminum sign blank and conform to ASTM B-209 Alloy 6061-T6 or an approved alternative.

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

Texas Department of Transportation

Traffic Safety Division Standard

OBJECT MARKER MATERIAL DESCRIPTION & INSTALLATION

D & OM(2)-25

FILE: dom2-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-04 5-25 3-15 7-20	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		285

20B

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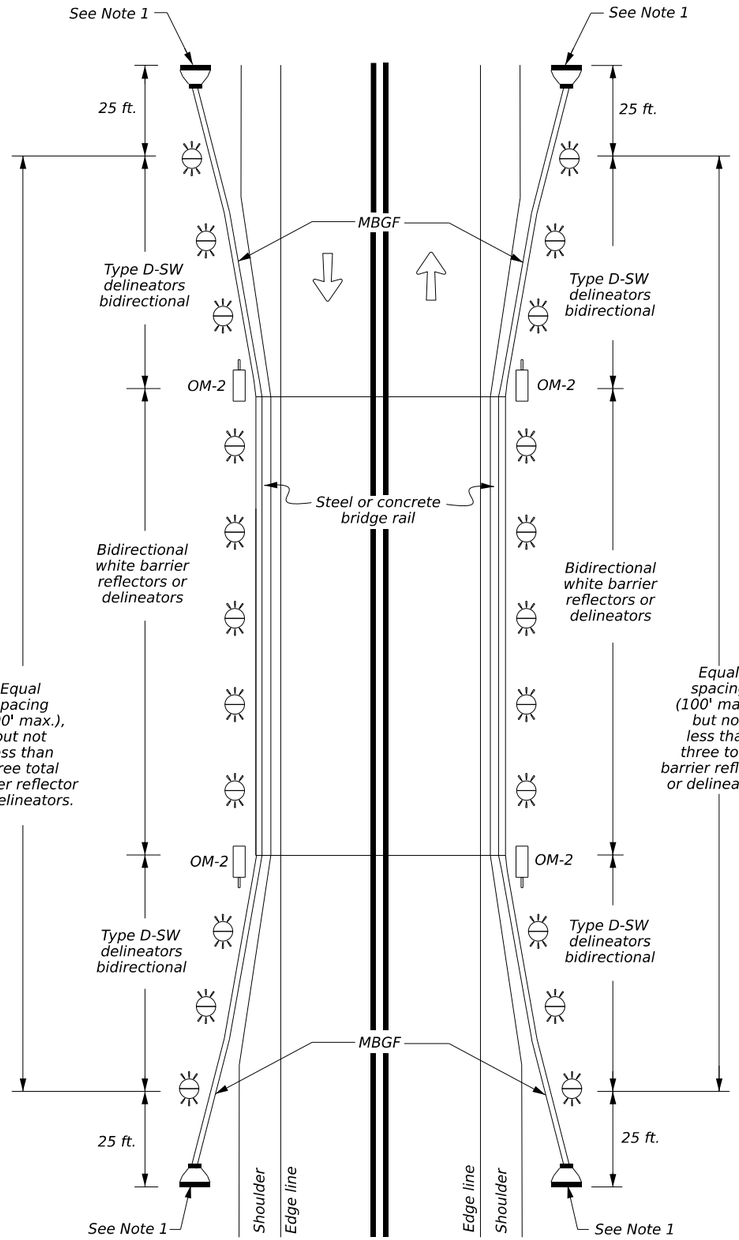
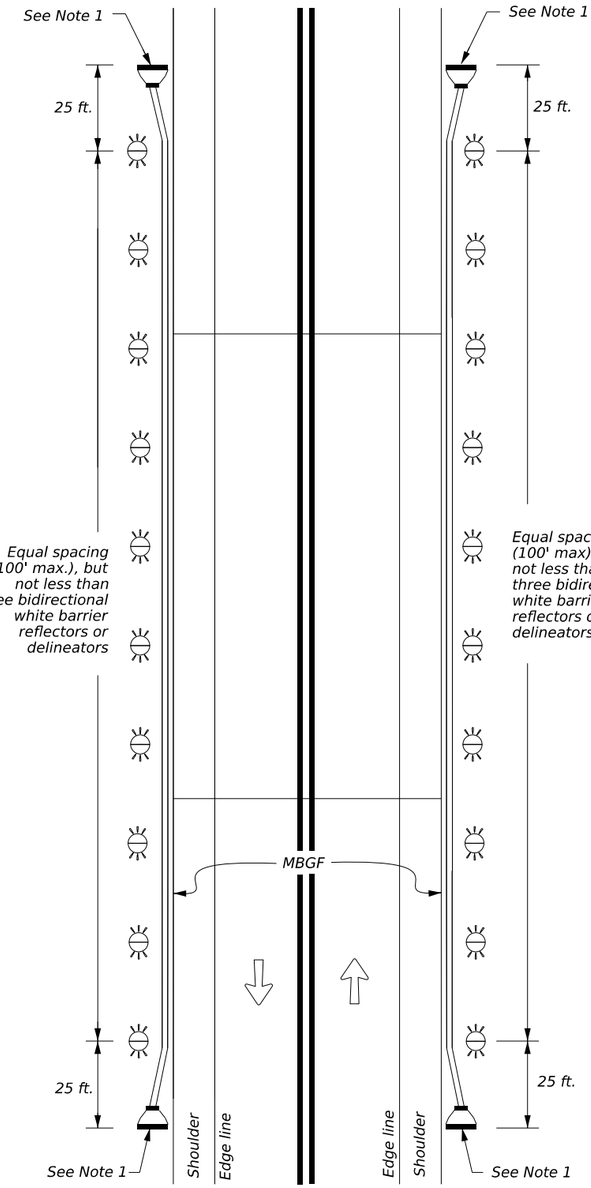
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



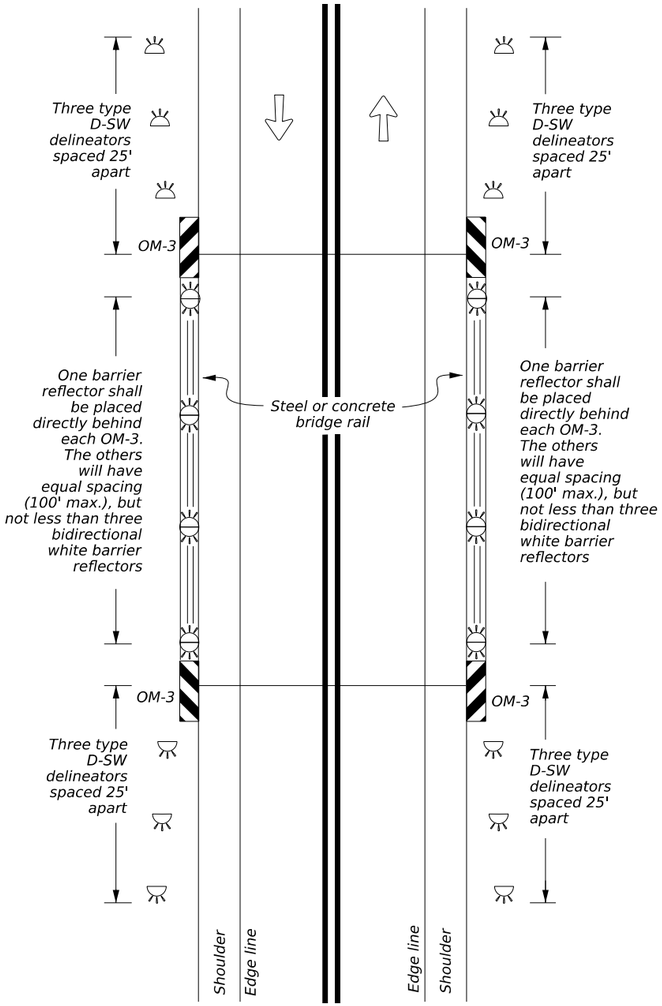
DETAIL 5a

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



DETAIL 5b

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



DETAIL 5c

NOTES

1. Terminal ends require reflective sheeting provided by manufacturer per D&OM(VIA) or a Type 3 object marker (OM-3) in front of the terminal end.
2. Bridge-class culverts may require OMs on or in advance of culvert headwalls. Refer to the TxDOT Roadway Design Manual and the TMUTCD.

GENERAL NOTE

Delineators (D) indicate roadway alignment. Object Markers (OM) identify obstructions. See D and OM definitions on D&OM(1) and D&OM(2), respectively.

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS (BRIDGE & BRIDGE-CLASS CULVERTS)

D & OM(5)-25

FILE: dom5-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
8-15 7-20 5-25	DIST	COUNTY		SHEET NO.
	DAL	DENTON		286
20E				

DATE:
FILE:

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DATE: 11/25/2025 3:47:48 PM
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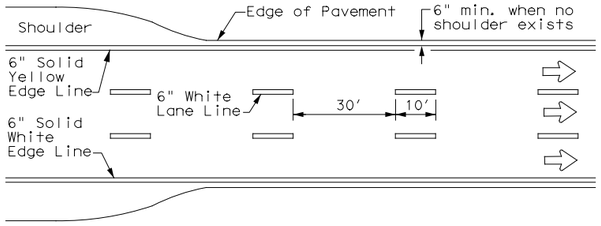
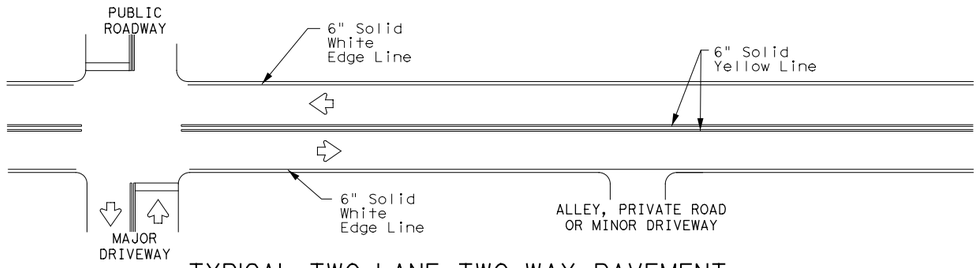
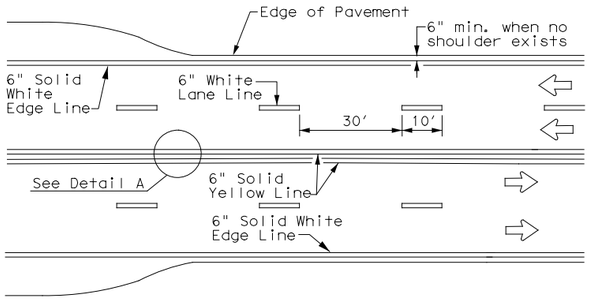
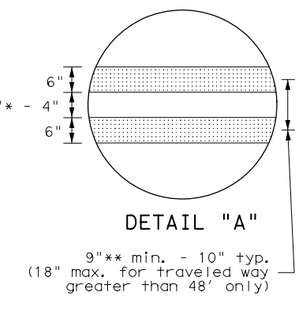


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





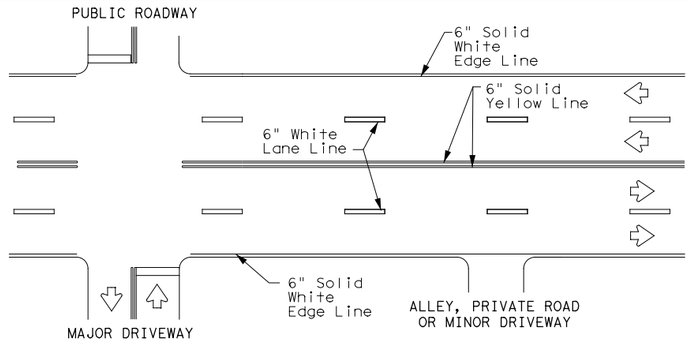
DETAIL "A"

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

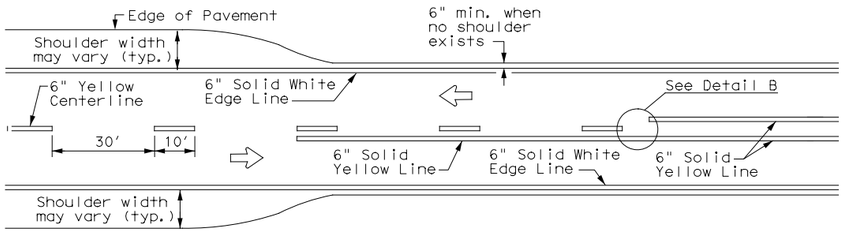
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

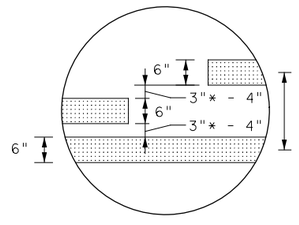
** 8" minimum for restripe projects when approved by the Engineer.



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



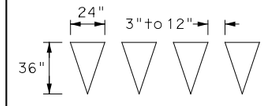
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

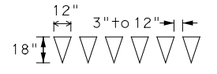
DETAIL "B"

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

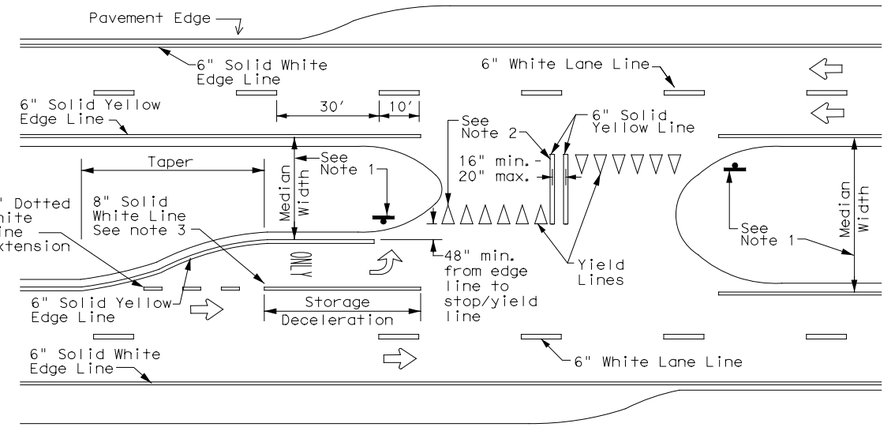


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

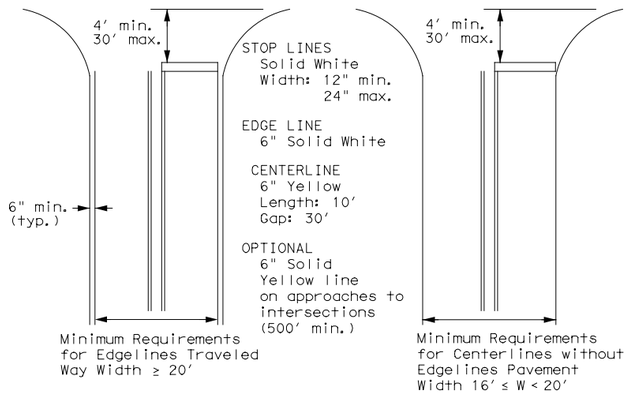
GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		287

22A

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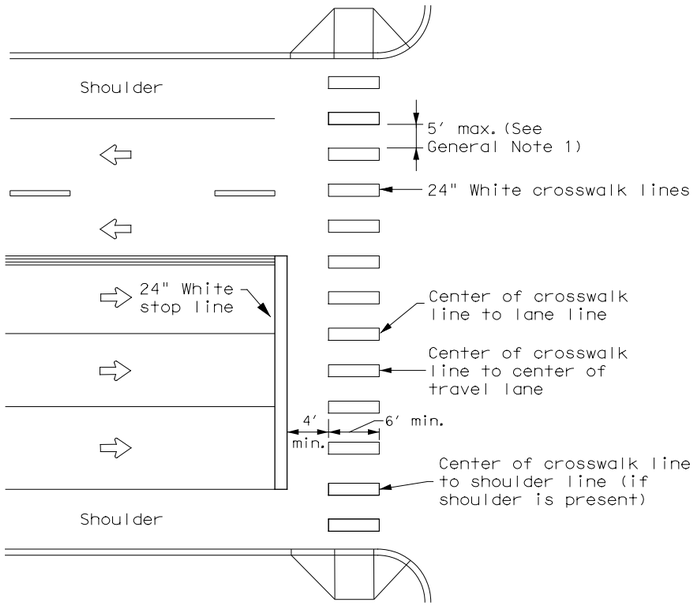
DATE: 11/25/2025 3:48:07 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Rd Sidewalk/Traffic Engineering/Sheets/pm4-22a.dgn



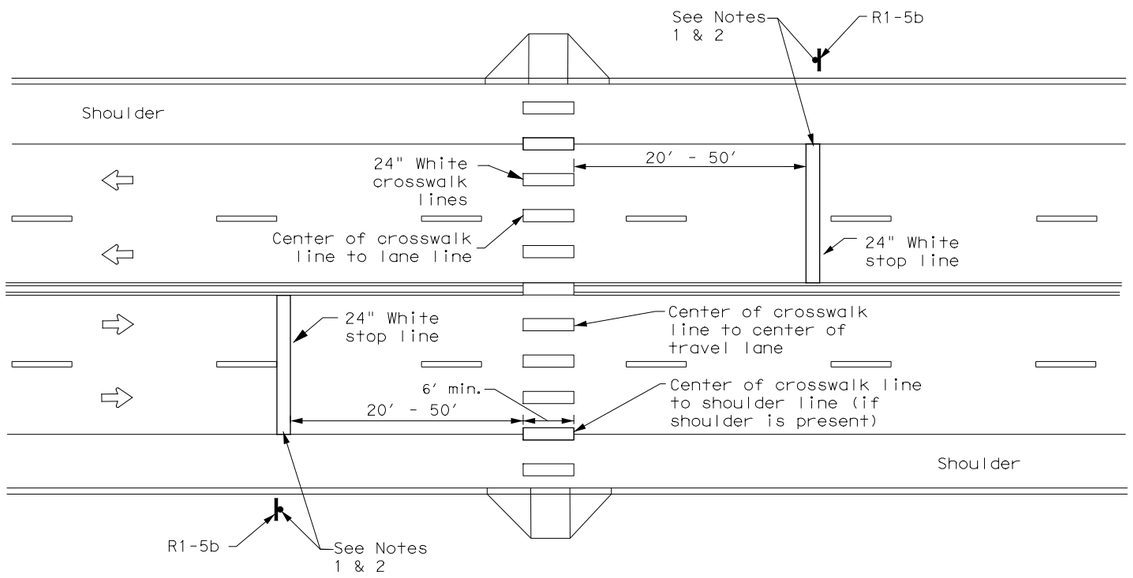
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

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

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

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



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

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

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
6-20	DIST	COUNTY		SHEET NO.
6-22	DAL	DENTON		288
12-22				
22D				

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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)

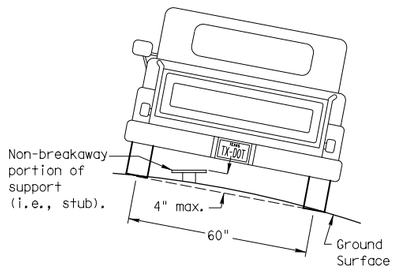
Anchor Type

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-1))

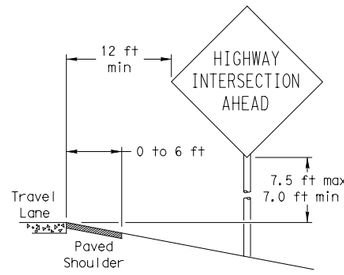
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

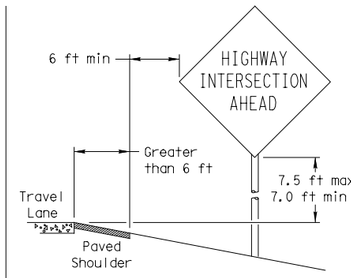
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

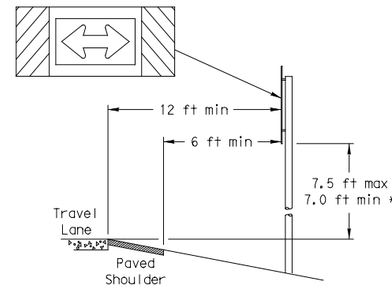
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



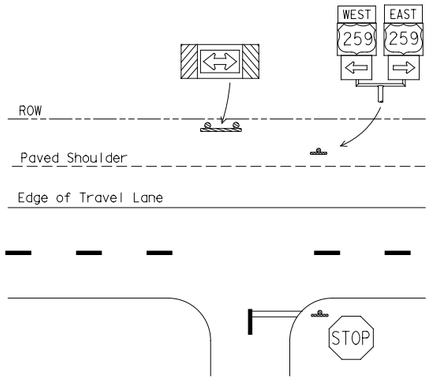
GREATER THAN 6 FT. WIDE

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.

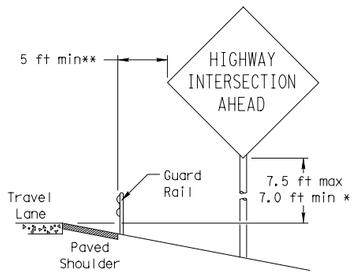
T-INTERSECTION



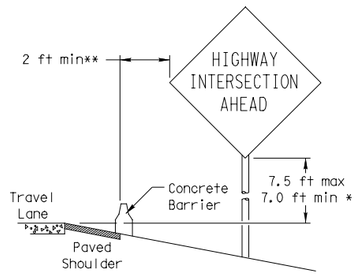
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* 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

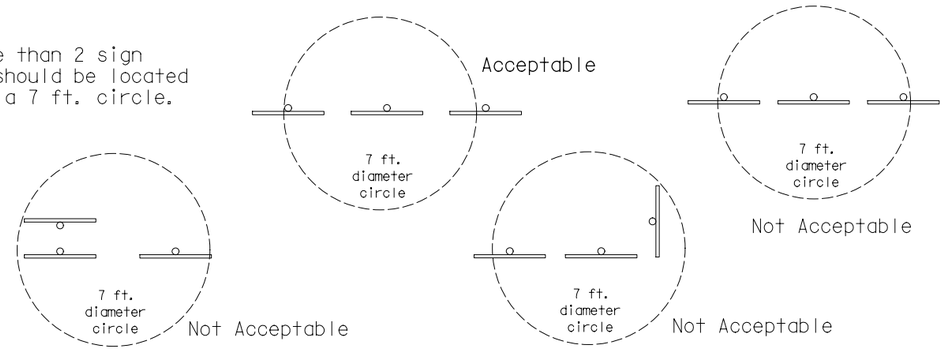
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

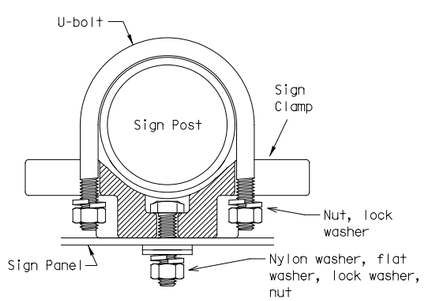
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

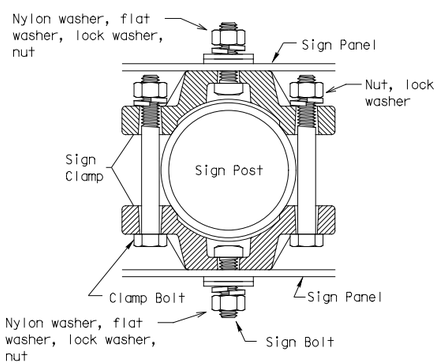


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

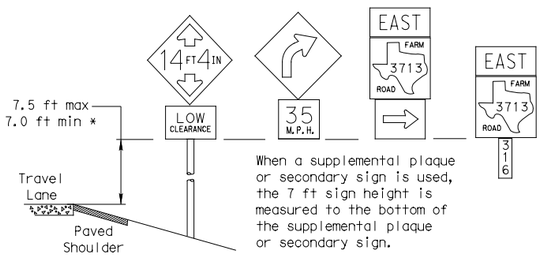
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



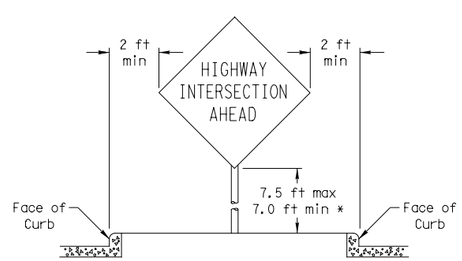
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



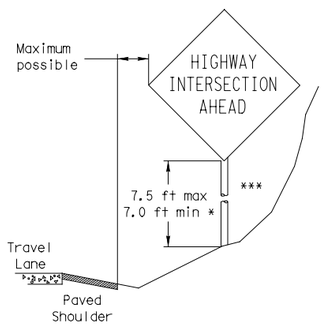
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		289

26A

DATE:
FILE:

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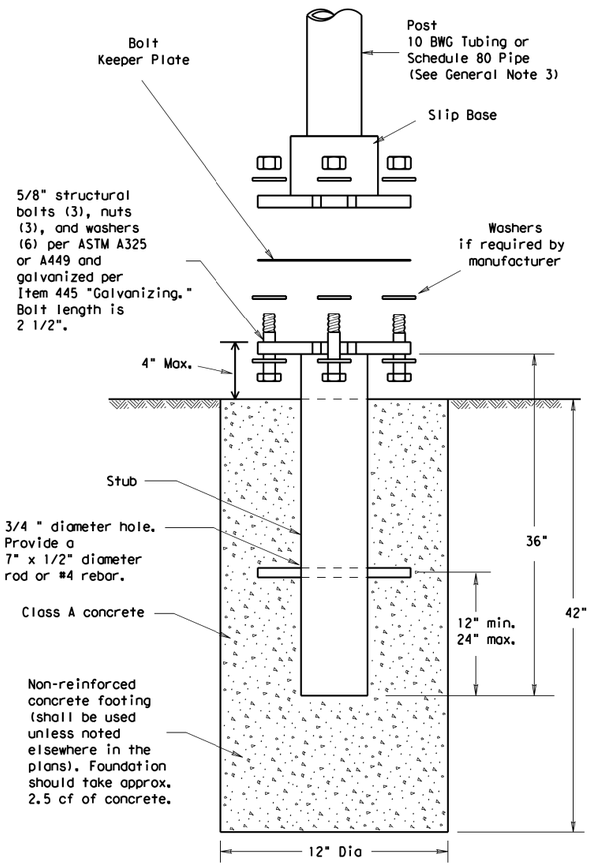
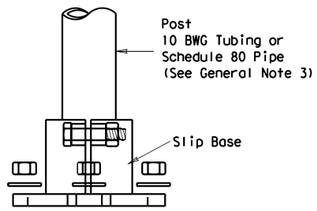
DATE: 11/25/2025 3:48:45 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/SMD(SLIP-1)DAL

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

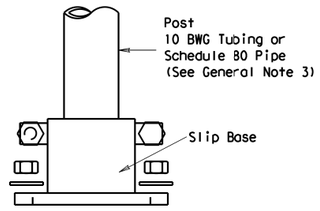


SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

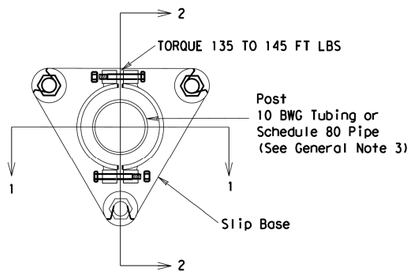
NOTE
The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.



SIDE VIEW 1-1



SIDE VIEW 2-2



TOP VIEW

DETAIL A

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

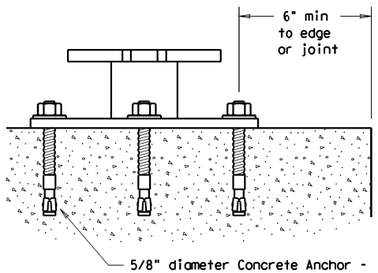
Foundation

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.

ADDED DETAIL A FOR CLAMP BASE
10-2010

Texas Department of Transportation
Dallas District Standard

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08(DAL)

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
12-10 (DISTRICT) ADDED CLAMP BASE DETAIL FOR SLIP BASE INSTALLATION	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		290

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DATE: 11/25/2025 3:49:24 PM
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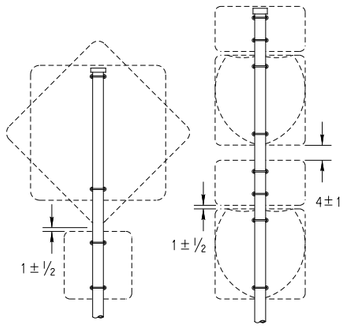

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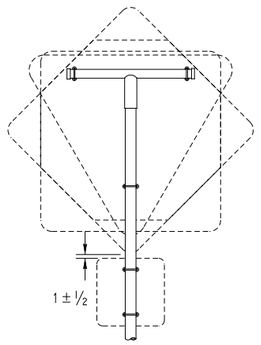

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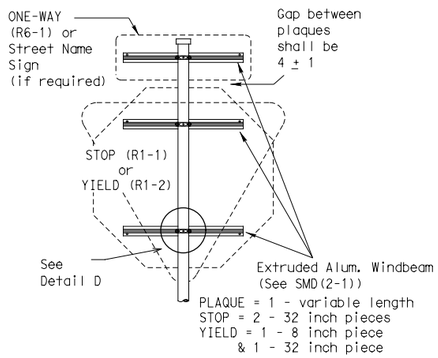

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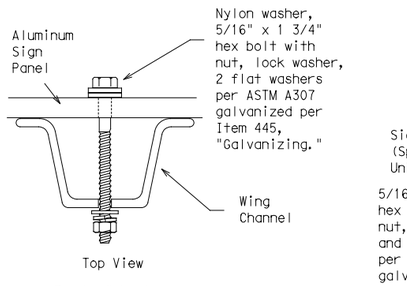
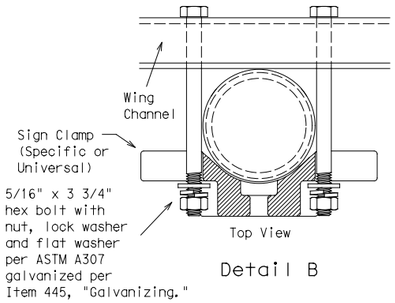
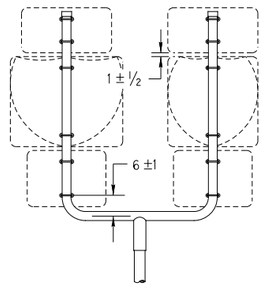


Detail A



Detail B



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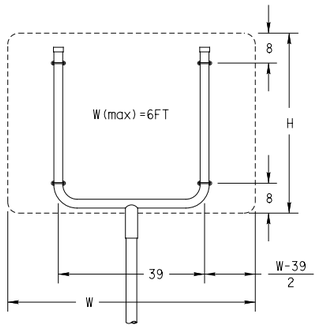

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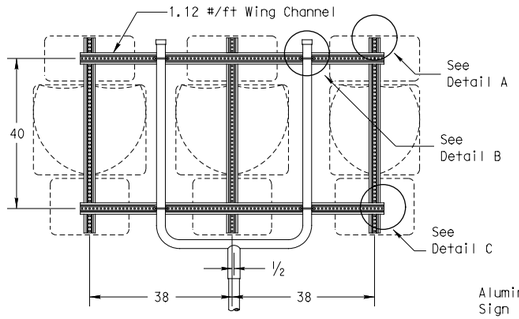
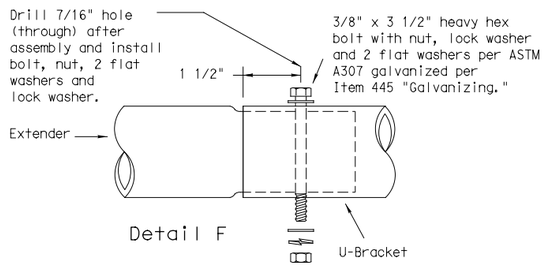
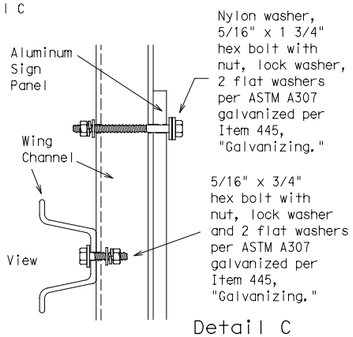


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

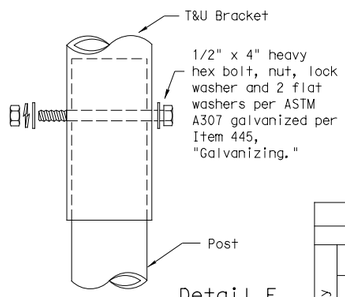


Detail F

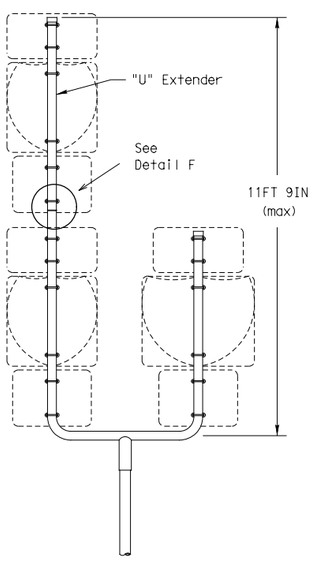
Splices shall only be allowed behind the sign substrate.



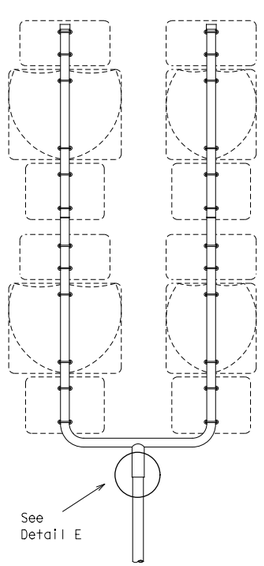
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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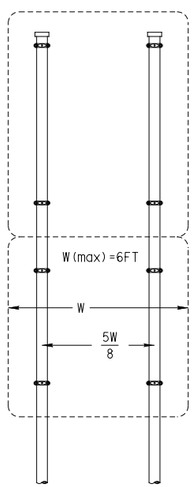
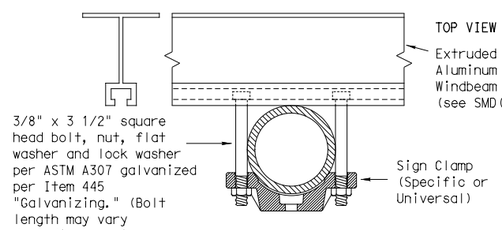
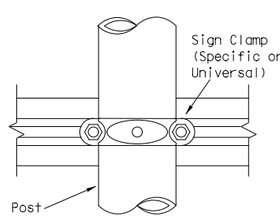


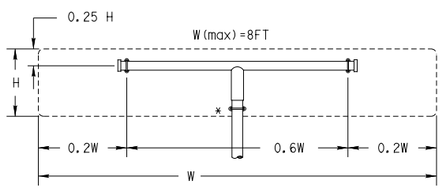
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

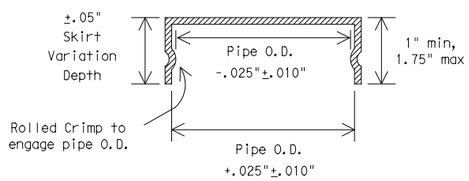




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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 shall 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.

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)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		291

26C

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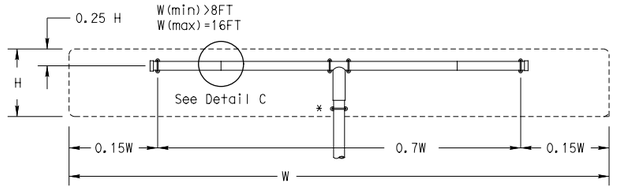
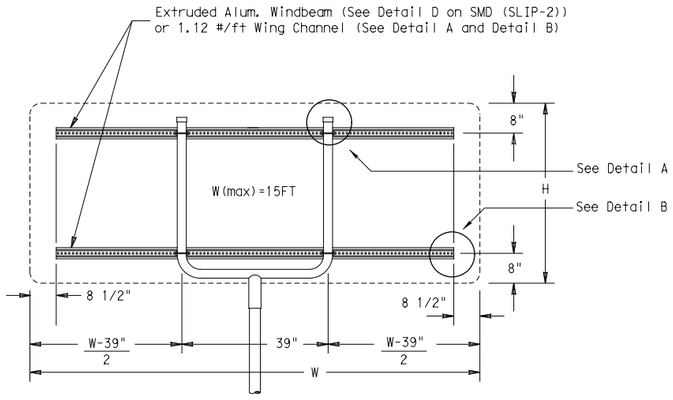
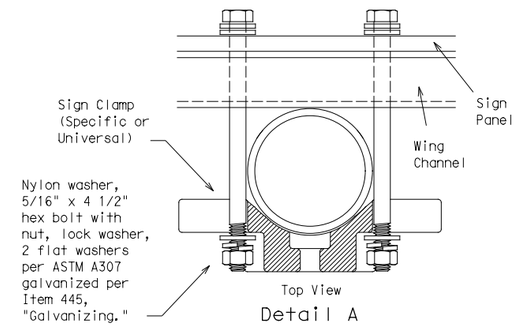


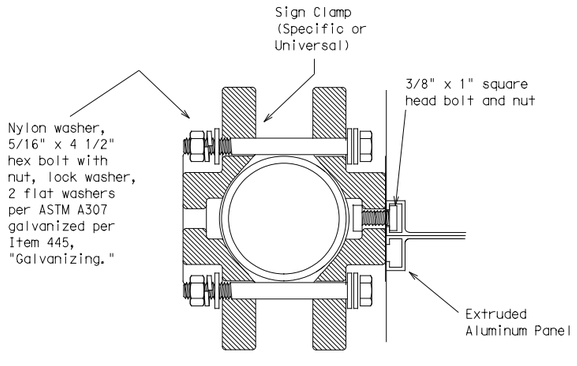
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



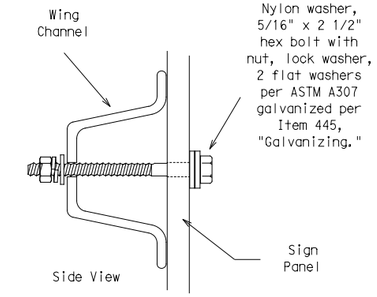
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



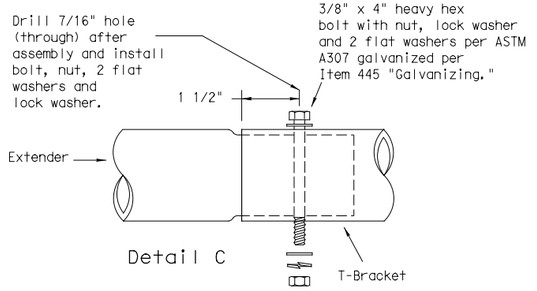
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

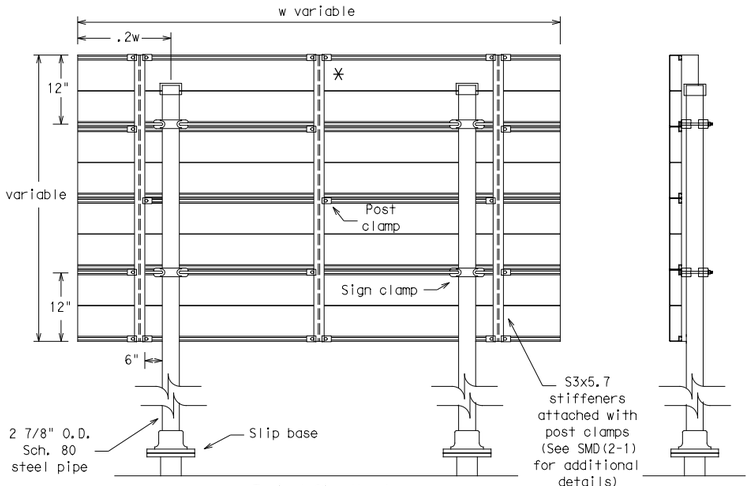


Detail B



Detail C

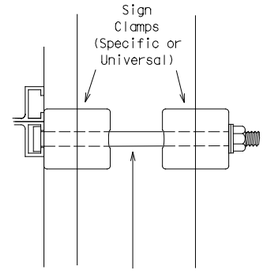
Splices shall only be allowed behind the sign substrate.



Typical Sign Mount

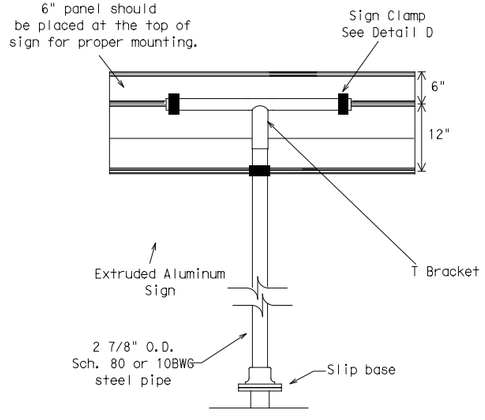
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

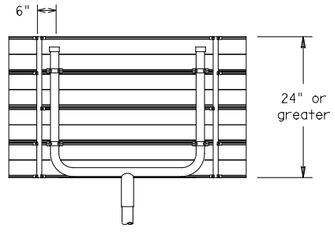


Detail E

See Detail E
for clamp installation



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

GENERAL NOTES:

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.

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

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REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		292

26D

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DATE: 11/25/2025 3:50:02 PM
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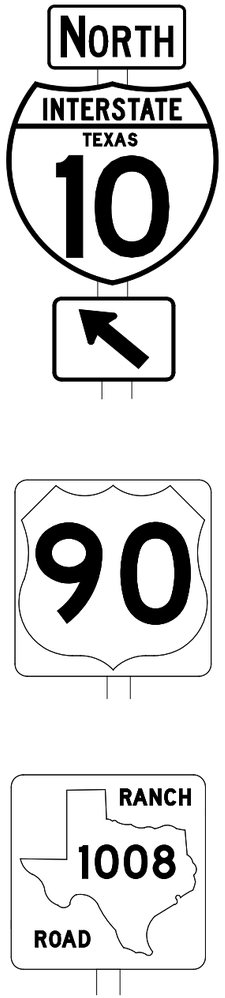
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

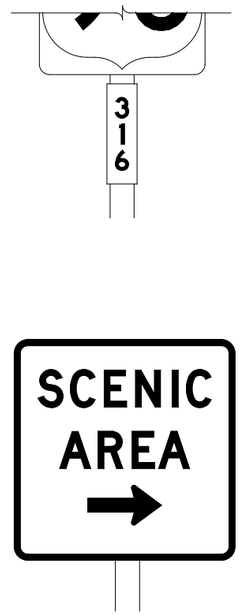
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

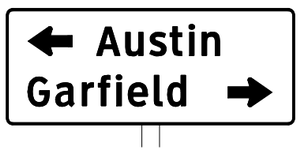


TYPICAL EXAMPLES

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	0918	46	316	VA
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	DENTON		293

3

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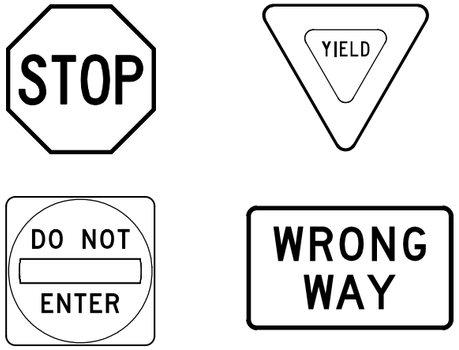
DATE: 11/25/2025 3:50:22 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road #5960/CADD/Sheets/tsr4-13.dgn

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

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.

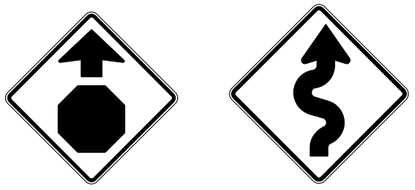
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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/

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

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	0918	46	316	VA
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	DAL	DENTON		294

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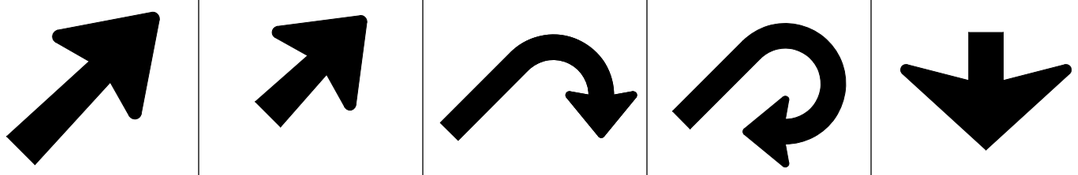
DATE: 11/25/2025 3:50:40 PM
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PSMP/950/CAD/04 Comp Sheets/tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

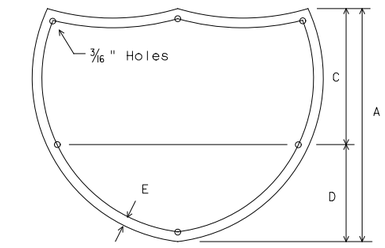
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

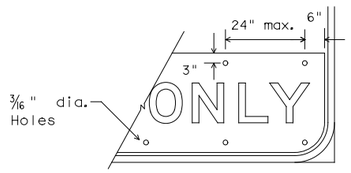
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

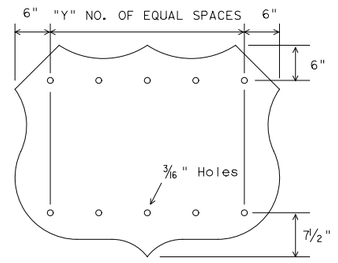


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

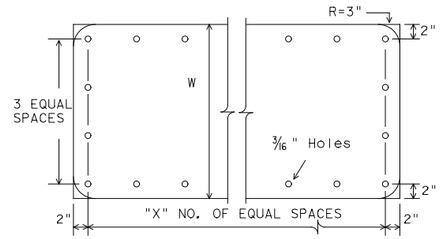


EXIT ONLY PANEL



U.S. ROUTE MARKERS

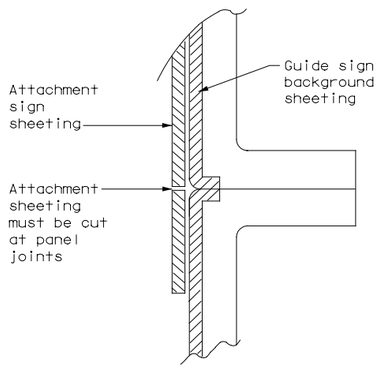
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



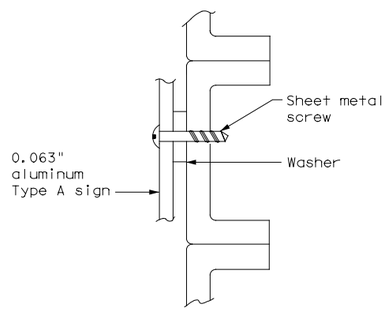
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

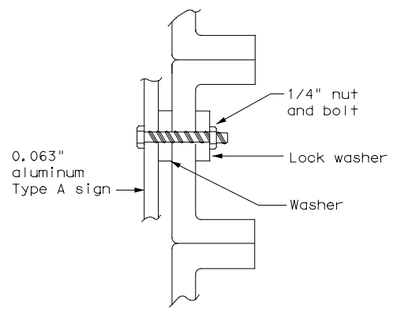
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

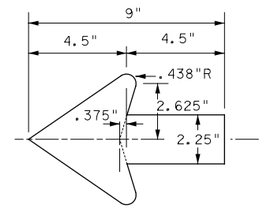
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

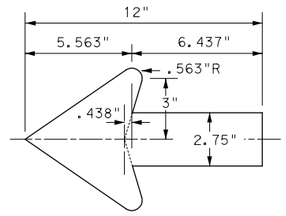
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	DENTON		295

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

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

1. Town of Shady Shores Phase II MS 4 - contact Wendy Withers

☐ No Action Required ☒ Required Action

Action Number:

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

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

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

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

☐ No Permit Required

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

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

☐ Individual 404 Permit Required

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

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

1. Road Station 41+05 to 41+25 PS-1 (Swisher Creek) Perennial Stream Impacts
2. Road Station 74+55 to 75+25 (east) FW-1 (Forested Wetland) Wetland Impacts
3. Road Station 75+25 to 75+85 (east) SSW-1 (Scrub Shrub Wetland) Wetland Impacts
4. Road Station 76+00 to 76+60 (west) SSW-2 (Scrub Shrub Wetland) Wetland Impacts
5. Road Station 75+75 to 78+20 (east) LL-1 (Lake Lewisville at Stream GS-1) Open Water Impacts
6. Road Station 78+20 to 78+55 (east) FW-2 (Forested Wetland) Wetland Impacts
7. Road Station 91+00 to 92+80 (west) FW-4 (Forested Wetland) Wetland Impacts
8. Road Station 91+60 to 92+70 (east) SSW-3.1 (Scrub Shrub Wetland) Wetland Impacts
9. Road Station 93+25 to 94+35 (east) SSW-3.0 (Scrub Shrub Wetland) Wetland Impacts
10. Road Station 94+25 to 95+30 LL-2 (Lake Lewisville at Lynchburg Creek) Open Water Impacts
11. Road Station 95+25 to 100+00 (east) FW-3 (Forested Wetland) Wetland Impacts

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

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

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

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

☐ No Action Required ☒ Required Action

Action Number:

1. The following species could occur in the project area: Monarch butterfly, Louisiana pigtoe, sandbank pocketbook, Texas fawnsfoot, Texas heelsplitter, tricolored bat, Strecker's chorus frog, Woodhouse's toad, eastern spotted skunk, long-tailed weasel, muskrat, swamp rabbit, western hog-nosed skunk, eastern box turtle, smooth softshell, Texas garter snake, timber (canebrake) rattlesnake, western box turtle, and western chicken turtle. Follow the special note on the EPIC sheet and the BMPs listed below to protect these species.

2. Freshwater mussel survey is required for Louisiana pigtoe, sandbank pocketbook, Texas fawnsfoot, and Texas heelsplitter at Swisher Creek (approx. Station 41+10), Stream GS-1 (approx.. Station 76+80), and Lynchburg Creek (approx. Station 95:90). Denton County is to complete the survey during the months of April to October prior to the start of construction.

3. Contractor to implement the following BMPs from "Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources"(Dec. 2024) available at the following website https://www.txdot.gov/content/dam/docs/environmental/toolkit/300-01-bmp.pdf
   a. Section 2.4.3 Freshwater Mussel BMP
   b. Section 2.6.1 Aquatic Amphibian and Reptile BMP (barrier fencing not required)
   c. Section 2.6.2 Terrestrial Amphibian and Reptile BMP
   d. Section 1.4 Water Quality BMP
   e. Section 1.2 Vegetation BMP

Special Notes:

1. Avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.
2. If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.
3. The Migratory Bird Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade or transport any migratory bird, nest, young, feather or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

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

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

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

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

☐ Yes ☒ No

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

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

☐ Yes ☐ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action Number:

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

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

LAST REVISION: 1/15/15

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Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		VA
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	Denton	
CONTROL	SECTION	JOB	SHEET NO.
0918	46	316	296

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

Filled Out: XX/XX/XXXX
Prepared by: Name/Section

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
CSJ 0918-46-316 (ROADWAY)

1.2 PROJECT LIMITS:

From: WEST SHADY SHORES ROAD

To: SILKTREE COURT

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 33.137169° (N) ,(Long) 97.029836° (W)

END:(Lat) 33.157876° (N), (Long) 97.029256° (W)

1.4 TOTAL PROJECT AREA (Acres): 12.8

1.5 TOTAL AREA TO BE DISTURBED (Acres): 7.8

1.6 NATURE OF CONSTRUCTION ACTIVITY:

RECONSTRUCT LOCAL ROAD FROM 2 TO 2 LANES TO ELEVATE OUT OF FLOODPLAIN WITH DRAINAGE IMPROVEMENTS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
2 - Altoga silty clay, 3 to 5% slopes	From Sta 74+80 to Sta 75+30 and Sta 87+30 to Sta 90+80. 1. Soil composition: sand 7%, silt 48%, clay 45%. 2. Soil drainage: well drained. 3. Rate of runoff: high runoff potential. 4. Erosion potential: K = 0.32 (low).
12 - Birome fine sandy loam, 3 to 5% slopes	From Sta 41+00 to Sta 47+00, Sta 70+50 to Sta 72+00. 1. Soil composition: sand 70%, silt 16%, clay 14%. 2. Soil drainage: well drained. 3. Rate of runoff: medium runoff potential. 4. Erosion potential: K = 0.28 (low).
13 - Birome-Rayex-Aubrey Complex (stony fine sandy loam), 2 to 15 % slopes	From Sta 36+40 to Sta 41+00. This complex is comprised of nearly equal amounts of the three named soils, which have similar physical characteristics and generally occur on ridgetops/slopes. 1. Soil composition: typically sand 69%, silt 19%, clay 12%. 2. Soil drainage: well drained. 3. Rate of runoff: high to very high runoff potential. 4. Erosion potential: K = 0.28 to 0.37 (low to medium).
24 - Callisburg fine sandy loam, 3 to 5% slopes; and 25 - Callisburg soils, 2 to 5% slopes, severely eroded	From Sta 77+90 to Sta 87+30. 1. Soil composition: sand 70%, silt 16%, clay 14%. 2. Soil drainage: well drained. 3. Rate of runoff: medium runoff potential. 4. Erosion potential: K = 0.24 (low).
40 - Gowen clay loam, frequently flooded	From Sta 75+30 to Sta 77+90 and Sta 90+80 to Sta 100+10. 1. Soil composition: sand 34%, silt 37%, clay 29%. 2. Soil drainage: well drained. 3. Rate of runoff: negligible runoff potential. 4. Erosion potential: K = 0.24 (low).
51 - Konsil fine sandy loam, 3 to 8% slopes	From Sta 72+00 to Sta 74+80. 1. Soil composition: sand 70%, silt 16%, clay 14%. 2. Soil drainage: well drained. 3. Rate of runoff: medium runoff potential. 4. Erosion potential: K = 0.20 (very low).
60 - Navo clay loam, 1 to 3% slopes	From Sta 100+10 to Sta 105+70. 1. Soil composition: sand 33%, silt 37%, clay 30%. 2. Soil drainage: moderately well drained. 3. Rate of runoff: very high runoff potential. 4. Erosion potential: K = 0.37 (medium).

NOTE: A variety of plant communities occur over soils within the study area, including floodplain hardwood forests (dominated by riparian woody vegetation with 20-30% herbaceous ground cover), upland hardwood forests (dominated by upland woody vegetation and 5-10% herbaceous ground cover), open water bodies (lake and streams), forested and scrub shrub wetlands (0-5% herbaceous ground cover), and maintained urban landscapes (consisting of native and introduced grass varieties with nearly 100% ground cover where lawns are established).

Sources: NRCS Web Soil Survey's Soil Data Explorer re Soil Properties and Qualities (https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx); and Soil Survey of Denton County, Texas (USDA,1980).

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

X PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

X Mobilization
X Install sediment and erosion controls
X Blade existing topsoil into windrows, prep ROW, clear and grub
X Remove existing pavement
X Grading operations, excavation, and embankment
X Excavate and prepare subgrade for proposed pavement widening
X Remove existing culverts, safety end treatments (SETs)
X Remove existing metal beam guard fence (MBGF), bridge rail
X Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
X Install mow strip, MBGF, bridge rail
X Place flex base
X Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
X Revegetation of unpaved areas
X Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

X Sediment laden stormwater from stormwater conveyance over disturbed area
X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
X Solvents, paints, adhesives, etc. from various construction activities
X Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
X Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
X Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
X Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities.
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

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

Tributaries*	Classified Waterbody
PS-1 (Swisher Creek)	Lewisville Lake (0823)
FW-1 (forested wetland near Stream GS-1)	
FW-2 (forested wetland near Stream GS-1)	
FW-3 (forested wetland near Lynchburg Creek)	
FW-4 (forested wetland near Lynchburg Creek)	
SSW-1 (scrub shrub wetland near Stream GS-1)	
SSW-2 (scrub shrub wetland near Stream GS-1)	
SSW-3.0 (scrub shrub wetland near Lynchburg Creek)	
SSW-3.1 (scrub shrub wetland near Lynchburg Creek)	
LL-1 (Lewisville Lake at Stream GS-1)	
LL-2 (Lewisville Lake at Lynchburg Creek)	

NO IMPAIRMENTS, TMDLS OR I-PLANS WERE IDENTIFIED FOR LEWISVILLE LAKE

***NOTE:** All receiving water features are depicted on the SWP3 layout sheets that follow the summary sheets.

Sources: USACE-verified Waters of the U.S. Delineation included within Denton County's Section 404 *Nationwide Permit 14 Pre-Construction Notification* that was approved in September 2023; *Surface Water Quality Viewer* (TCEQ, 2025).

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

1.12 ROLES AND RESPONSIBILITIES: Denton County

X Development of plans and specifications
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
X Other: See EPIC sheet Section V.2. The Contractor must ensure that before any work may be performed in any of the three streams crossing the project and/or Lake Lewisville, a mussel survey must be completed and any mussels found are to be relocated offsite.
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
TOWN OF SHADY SHORES (PHASE II MS4 SYSTEM)

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

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July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		297
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	DENTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0918	46	316	VA

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- X ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ X Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - X Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
Riprap	Sta 39+20	Sta 39+90
	Sta 41+90	Sta 42+50
	Sta 74+00	Sta 74+60
	Sta 79+20	Sta 80+00
	Sta 91+00	Sta 91+80
	Sta 99+50	Sta 100+30

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- X Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED PROFESSIONAL ENGINEER

12-01-2025

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2.5 POLLUTION PREVENTION MEASURES:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To
PS-1 (Swisher Creek) no buffer; TY2 and TY3 RFDs; blanket seeding	Sta 41 + 05	Sta 41 + 25
FW-1 Forested Wetland no buffer; silt fence; blanket seeding	Sta 74+55	Sta 75+25
SSW-1 Scrub Shrub Wetland no buffer; silt fence; blanket seeding	Sta 75+25	Sta 75+85
SSW-2 Scrub Shrub Wetland no buffer; silt fence; blanket seeding	Sta 76+00	Sta 76+60
LL-1 (Lewisville Lake at Stream GS-1) no buffer; blanket seeding directly adjacent; ECLs, and riprap on both sides of bridge; silt fences along the length of the bridge; TY2 and TY3 RFDs	Sta 75+75	Sta 78+20
FW-2 Forested Wetland no buffer;silt fence; blanket seeding	Sta 78+20	Sta 78+55
FW-4 Forested Wetland no buffer; riprap; silt fence; blanket seeding	Sta 91+00	Sta 92+80
SSW-3.1 Scrub Shrub Wetland no buffer; silt fence; riprap; blanket seeding	Sta 91+60	Sta 92+70
SSW-3.0 Scrub Shrub Wetland no buffer; silt fence; blanket seeding	Sta 93+25	Sta 94+35
LL-2 (Lewisville Lake at Lynchburg Creek) no buffer; blanket seeding directly adjacent; ECLs, and riprap on both sides of bridge; silt fences along the length of the bridge; TY2 and TY3 RFDs	Sta 94+25	Sta 95+30
FW-3 Forested Wetland no buffer; silt fence, blanket seeding	Sta 95+25	Sta 100+00

NOTES:

1. All waters listed in this table are subject to Section 404 permitting. In September 2023 the U.S. Corps of Engineers (USACE) approved specified project-related impacts to the water features in the above table subject to general an project-specific conditions that accompany the approved Nationwide Permit 14 with Pre-Construction Notification. Contractors must adhere to the permit's requirements and commitments and ensure minimal disturbance to soil, waters, and vegetation/habitat to the greatest extent possible.
2. The project's purpose is to mitigate flooding of Shady Shores Road by replacing bridge structures at stream crossings; therefore, disturbance to all water features listed in the table is unavoidable, as the proposed project limits are restricted to the existing roadway footprint.
3. Refer to the SWP3 Plan Sheets attached to this SWP3.

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 DEWATERING:

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

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SW3P.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

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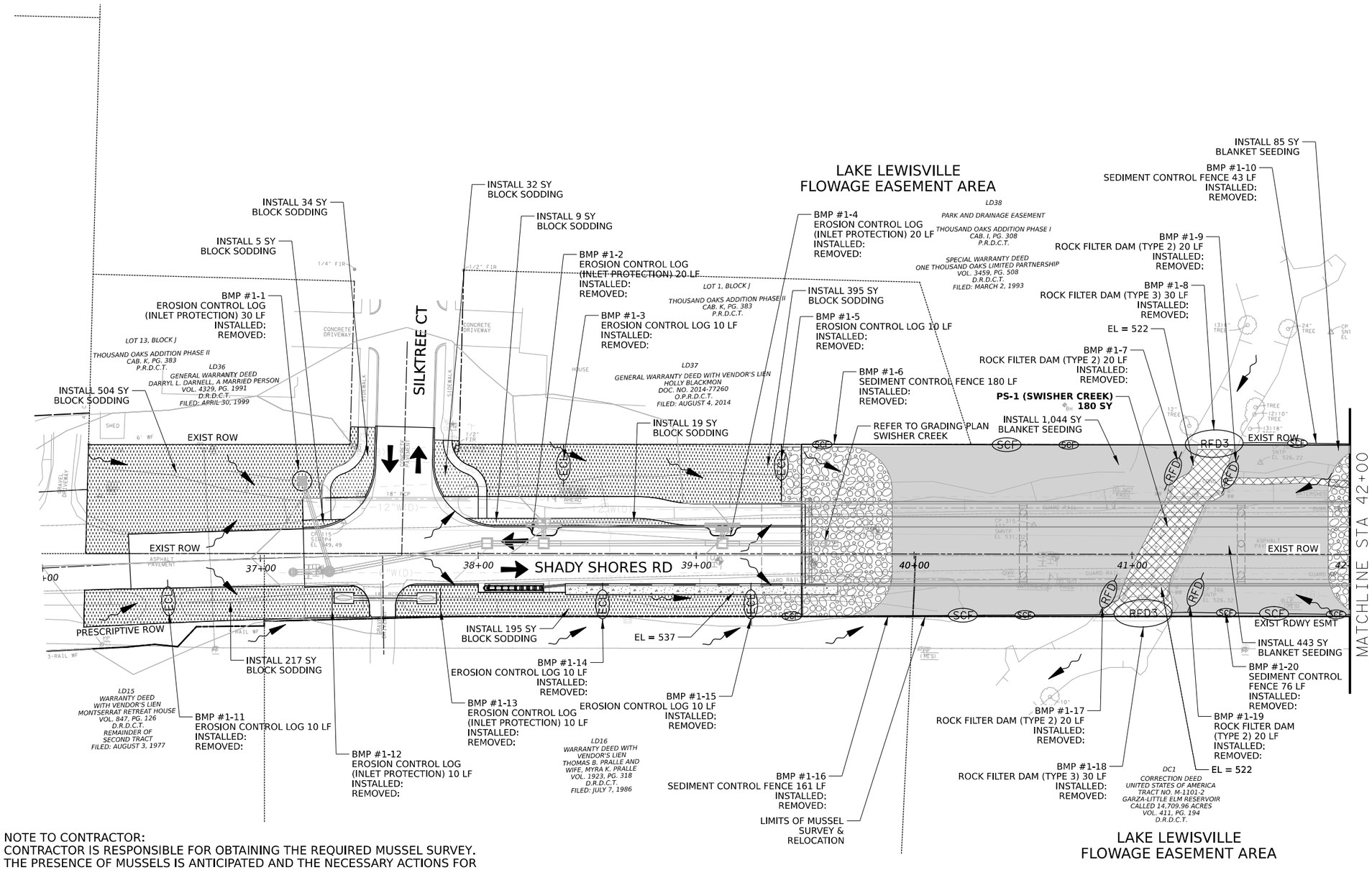
July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		298
STATE	STATE DIST.	COUNTY	
TEXAS	DAL	DENTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0918	46	316	VA



LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
- SSW (SCRUB SHRUB WETLAND)
- LL (LAKE LEWISVILLE)
- DRAINAGE FLOW ARROW
- DIRECTION OF TRAFFIC
- (RFD) ROCK FILTER DAM (TYPE 2)
- (RFD3) ROCK FILTER DAM (TYPE 3)
- (ECL) EROSION CONTROL LOG
- EROSION CONTROL LOG (INLET PROTECTION)
- (SCF) SEDIMENT CONTROL FENCE
- ROCK RIPRAP
- LL FLOWAGE EASEMENT BOUNDARY
- PROPERTY PARCEL BOUNDARY

NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

0 25 50
HORIZ. SCALE IN FEET

NOTE TO CONTRACTOR:
CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE REQUIRED MUSSEL SURVEY. THE PRESENCE OF MUSSELS IS ANTICIPATED AND THE NECESSARY ACTIONS FOR RELOCATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTRACTING WITH A BIOLOGIST OR FISHERY CAPABLE OF PREPARING OF AN AQUATIC RESOURCES RELOCATION PLAN (ARRP) FOR SUBMISSION TO THE TEXAS PARKS AND WILDLIFE DEPARTMENT (TPWD) AND THE EXECUTION OF THE ACTIVITIES IDENTIFIED IN THE ARRP PRIOR TO THE COMMENCEMENT OF INITIAL DEWATERING OR DIVERSION ACTIVITIES. PLEASE SEE TECHNICAL MEMORANDUM FOR ARRP REQUIREMENT SPECIFICS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INITIAL DEWATERING AND/OR DIVERSION OF WATERS AS SHOWN ON THE PLANS UPON THE COMPLETION OF THE ACTIVITIES IDENTIFIED IN THE ARRP AND THE SUBSEQUENT MANAGEMENT OF SURFACE WATER, BOTH NORMAL AND WEATHER RELATED, THROUGHOUT THE COMPLETION OF THE PROJECT. ALL COSTS ASSOCIATED WITH THE ENVIRONMENTAL PROCESS DESCRIBED ABOVE, ARE TO BE INCLUDED IN THE BID FOR THIS PROJECT.

IN COORDINATION WITH AN ENVIROMENTAL COMPLIANCE FIRM, WE HAVE ESTIMATED THAT 20 DAYS OF MUSSEL RELOCATION MAY BE NEEDED FOR TIME OF CONSTRUCTION WITHIN WATER AREAS. CONTRACTOR IS REQUIRED TO COORDINATE WITH AN ENVIROMENTAL COMPLIANCE FIRM TO COMPLETE THIS WORK.

1. DATE INSTALLED: _____
DATE REMOVED: _____

SOILS ON THIS PAGE:
STA 36+40 TO STA 41+00: 13 - BIROME-RAYEX-AUBREY COMPLEX (STONY FINE SANDY LOAM, 2 TO 15% SLOPES)
STA 41+00 TO STA 42+00: 12 - BIROME FINE SANDY LOAM (3 TO 5% SLOPES)

STATE OF TEXAS
DAVID A. BURKETT
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LICENSED
PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT

BEGIN TO STA 42+00

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		299

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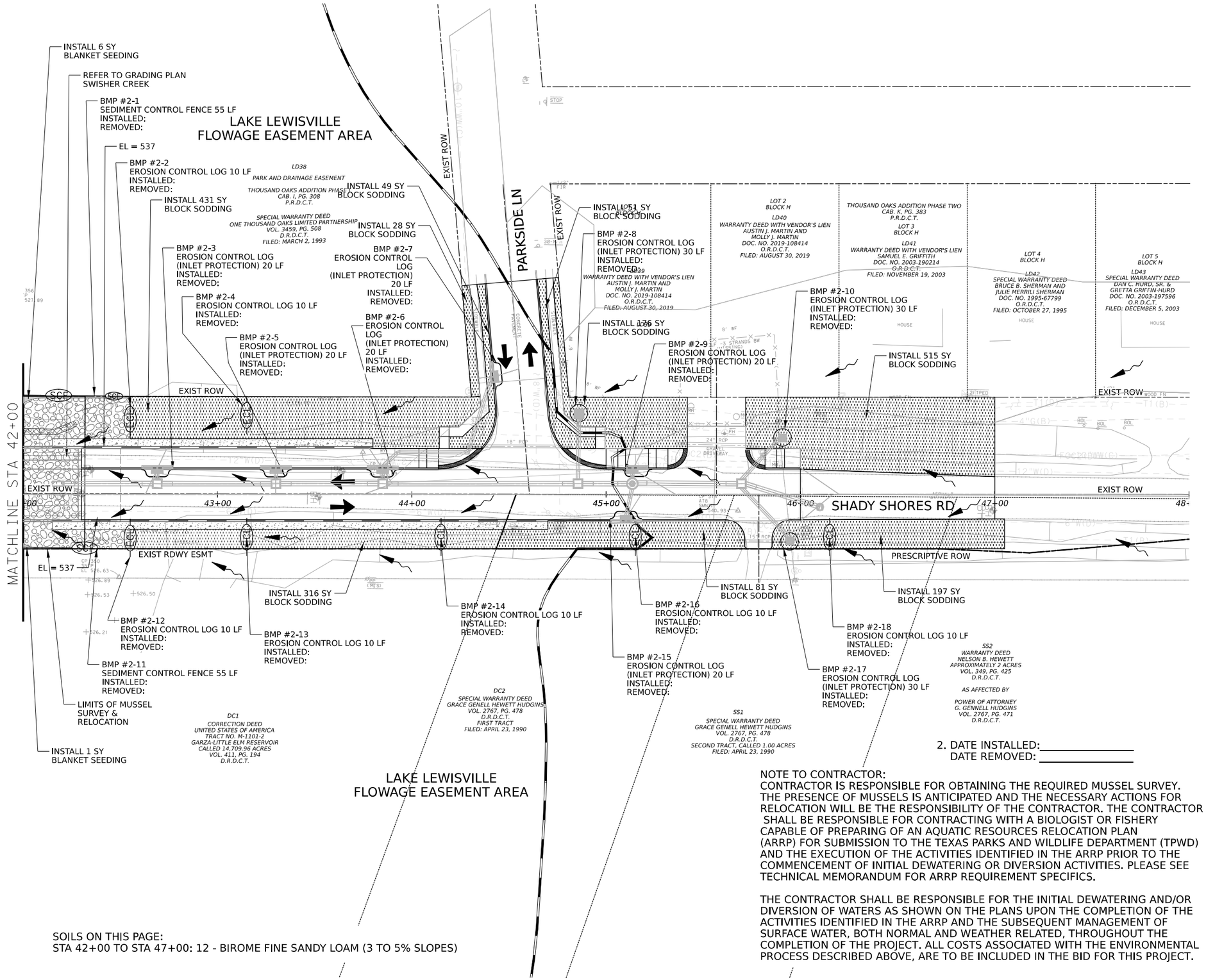

LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
- SSW (SCRUB SHRUB WETLAND)
- LL (LAKE LEWISVILLE)
- DRAINAGE FLOW ARROW
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- (SCF) SEDIMENT CONTROL FENCE
- ROCK RIPRAP
- LL FLOWAGE EASEMENT BOUNDARY
- PROPERTY PARCEL BOUNDARY

NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

0 25 50
HORIZ. SCALE IN FEET

SOILS ON THIS PAGE:
STA 42+00 TO STA 47+00: 12 - BIROME FINE SANDY LOAM (3 TO 5% SLOPES)

2. DATE INSTALLED:_____
DATE REMOVED: _____

NOTE TO CONTRACTOR:
CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE REQUIRED MUSSEL SURVEY. THE PRESENCE OF MUSSELS IS ANTICIPATED AND THE NECESSARY ACTIONS FOR RELOCATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTRACTING WITH A BIOLOGIST OR FISHERY CAPABLE OF PREPARING OF AN AQUATIC RESOURCES RELOCATION PLAN (ARRP) FOR SUBMISSION TO THE TEXAS PARKS AND WILDLIFE DEPARTMENT (TPWD) AND THE EXECUTION OF THE ACTIVITIES IDENTIFIED IN THE ARRP PRIOR TO THE COMMENCEMENT OF INITIAL DEWATERING OR DIVERSION ACTIVITIES. PLEASE SEE TECHNICAL MEMORANDUM FOR ARRP REQUIREMENT SPECIFICS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INITIAL DEWATERING AND/OR DIVERSION OF WATERS AS SHOWN ON THE PLANS UPON THE COMPLETION OF THE ACTIVITIES IDENTIFIED IN THE ARRP AND THE SUBSEQUENT MANAGEMENT OF SURFACE WATER, BOTH NORMAL AND WEATHER RELATED, THROUGHOUT THE COMPLETION OF THE PROJECT. ALL COSTS ASSOCIATED WITH THE ENVIRONMENTAL PROCESS DESCRIBED ABOVE, ARE TO BE INCLUDED IN THE BID FOR THIS PROJECT.

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

David A. Burkett
12-01-2025

TBPELS FIRM #312

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Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT

STA 42+00 TO STA 47+00

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		300

DATE: 11/25/2025 3:52:01 PM
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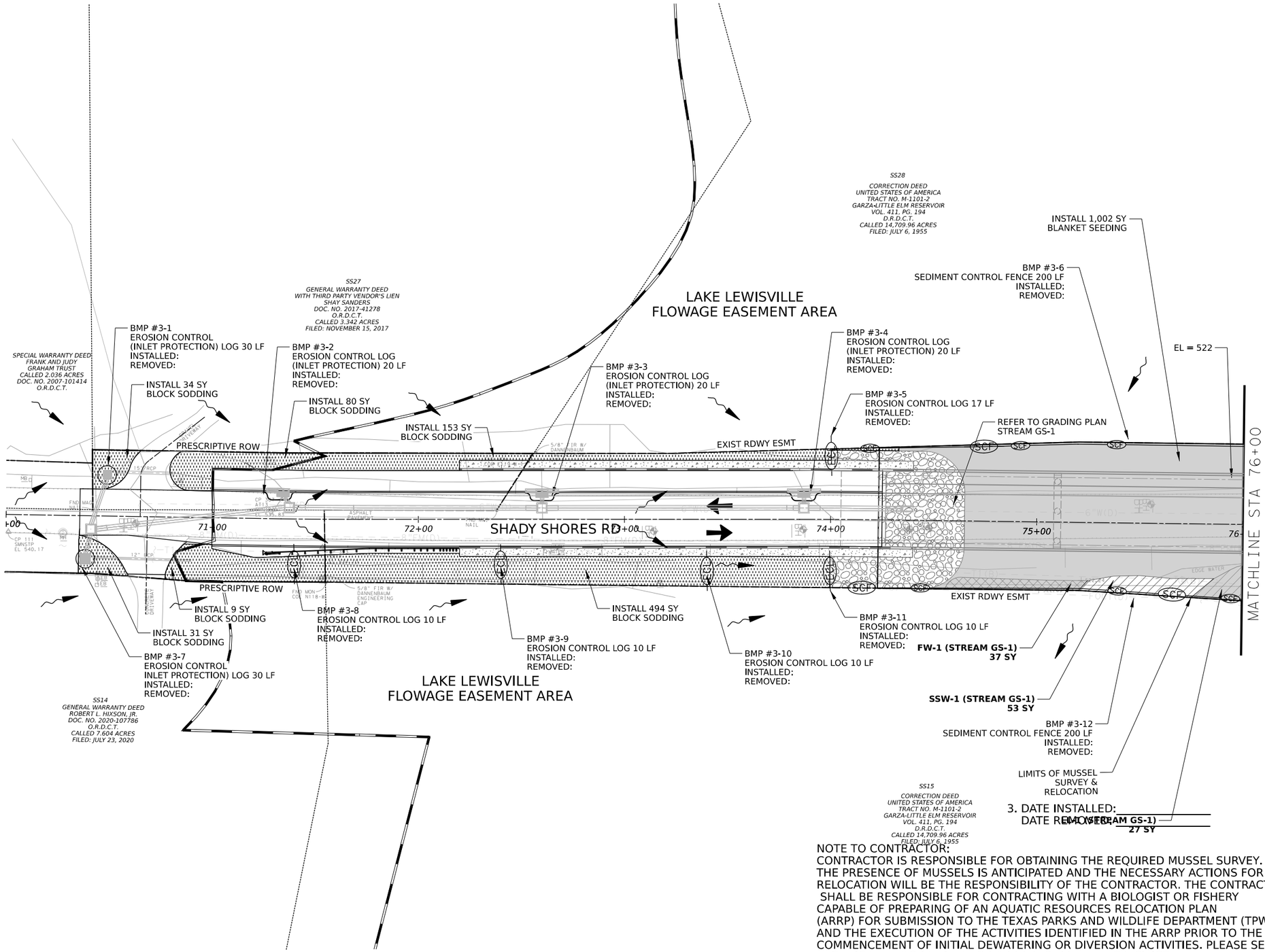
DW: CK: DW: CK:



SOILS ON THIS PAGE:
STA 70+50 TO STA 72+00: 12 - BIROME FINE SANDY LOAM (3 TO 5% SLOPES)
STA 72+00 TO STA 74+80: 51 - KONSIL FINE SANDY LOAM (3 TO 8% SLOPES)
STA 74+80 TO STA 75+30: 2 - ALTOGA SILTY CLAY (3 TO 5% SLOPES)
STA 75+30 TO STA 76+00: 40 - GOWEN CLAY LOAM (FREQUENTLY FLOODED)

NOTE TO CONTRACTOR:
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LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
- SSW (SCRUB SHRUB WETLAND)
- LL (LAKE LEWISVILLE)
- DRAINAGE FLOW ARROW
- DIRECTION OF TRAFFIC
- RFD — ROCK FILTER DAM (TYPE 2)
- RFD3 — ROCK FILTER DAM (TYPE 3)
- ECL — EROSION CONTROL LOG
- EROSION CONTROL LOG (INLET PROTECTION)
- SCF — SEDIMENT CONTROL FENCE
- ROCK RIPRAP
- LL FLOWAGE EASEMENT BOUNDARY
- PROPERTY PARCEL BOUNDARY

NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

N

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT

STA 70+00 TO STA 76+00

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		301

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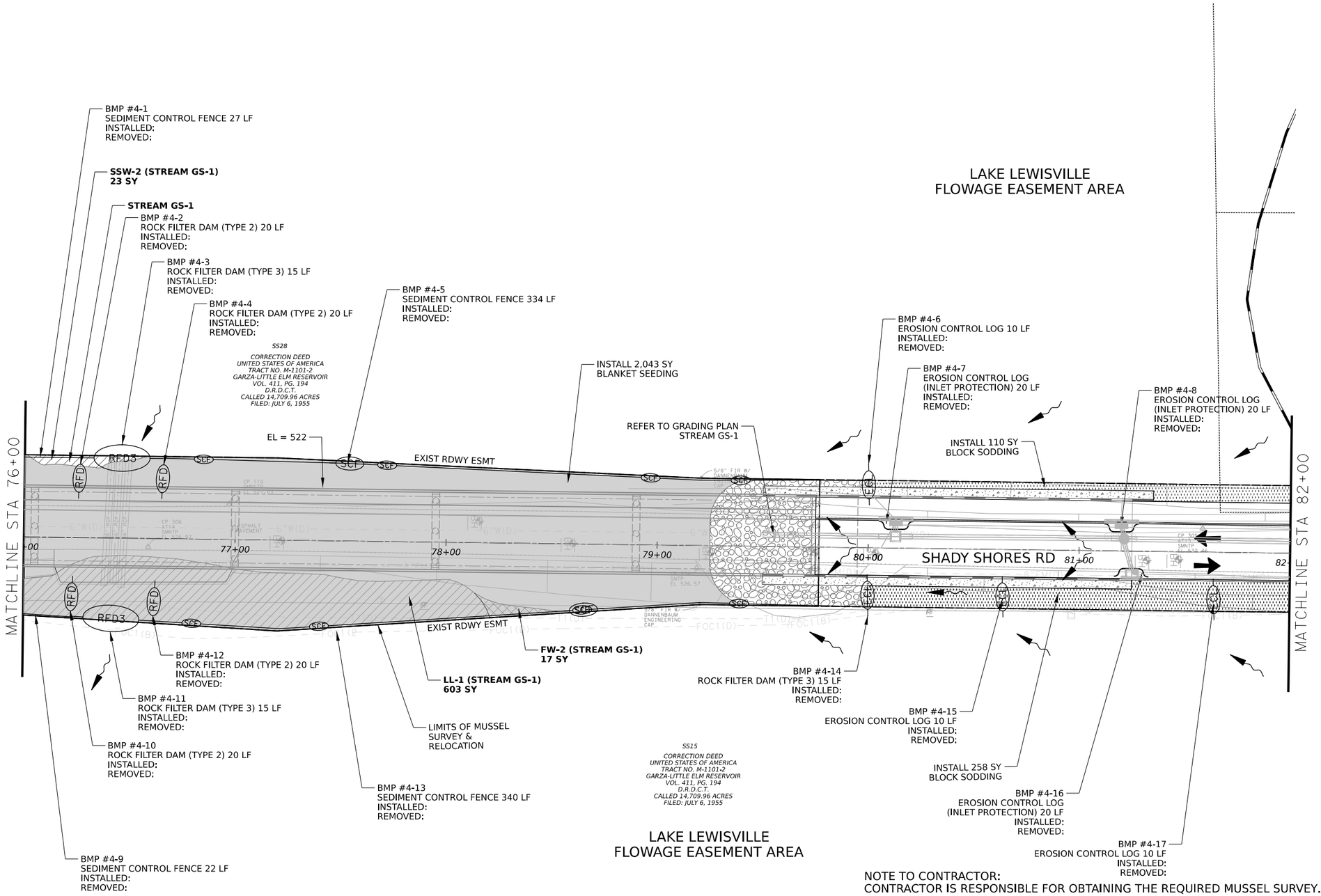

NOTE:
EXCEPTION TO BLANKET SEEDING IN CONSTRUCTION AREAS WITHIN THE LL FLOWAGE EASEMENT AREA: DO NOT APPLY BLANKET SEEDING WITHIN ACTIVE STREAM CHANNEL AREAS FOR STREAM GS-1.

SOILS ON THIS PAGE:
STA 76+00 TO STA 77+90: 40 - GOWEN CLAY FOAM (FREQUENTLY FLOODED)
STA 77+90 TO STA 82+00: 24 - CALLISBURG FINE SANDY LOAM (3 TO 5% SLOPES)
AND 25 - CALLISBURG SOILS (2 TO 5% SLOPES, SEVERELY ERODED)

4. DATE INSTALLED: _____
DATE REMOVED: _____

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LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
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- LL (LAKE LEWISVILLE)
- DRAINAGE FLOW ARROW
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- EROSION CONTROL LOG (INLET PROTECTION)
- SCF — SEDIMENT CONTROL FENCE
- ROCK RIPRAP
- LL FLOWAGE EASEMENT BOUNDARY
- PROPERTY PARCEL BOUNDARY

NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P

LAYOUT

STA 76+00 TO STA 82+00

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		302

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DW
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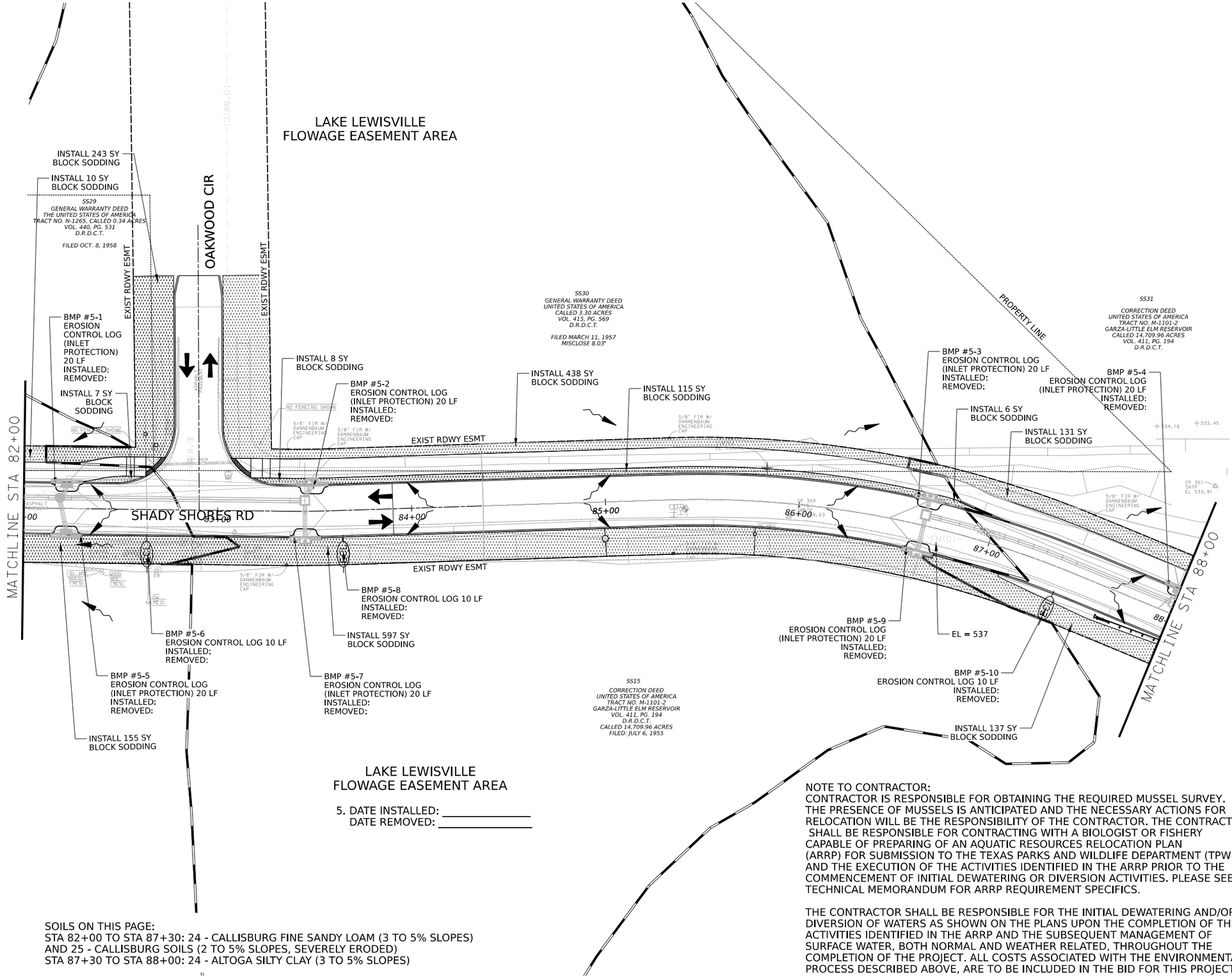
DW



LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
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- LL (LAKE LEWISVILLE)
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NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

N

0 25 50
HORIZ. SCALE IN FEET

LAKE LEWISVILLE
FLOWAGE EASEMENT AREA

5. DATE INSTALLED: _____
DATE REMOVED: _____

SOILS ON THIS PAGE:
STA 82+00 TO STA 87+30: 24 - CALLISBURG FINE SANDY LOAM (3 TO 5% SLOPES)
AND 25 - CALLISBURG SOILS (2 TO 5% SLOPES, SEVERELY ERODED)
STA 87+30 TO STA 88+00: 24 - ALTOGA SILTY CLAY (3 TO 5% SLOPES)

NOTE TO CONTRACTOR:
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STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

David A. Burkett
12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT

STA 82+00 TO 88+00

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		303

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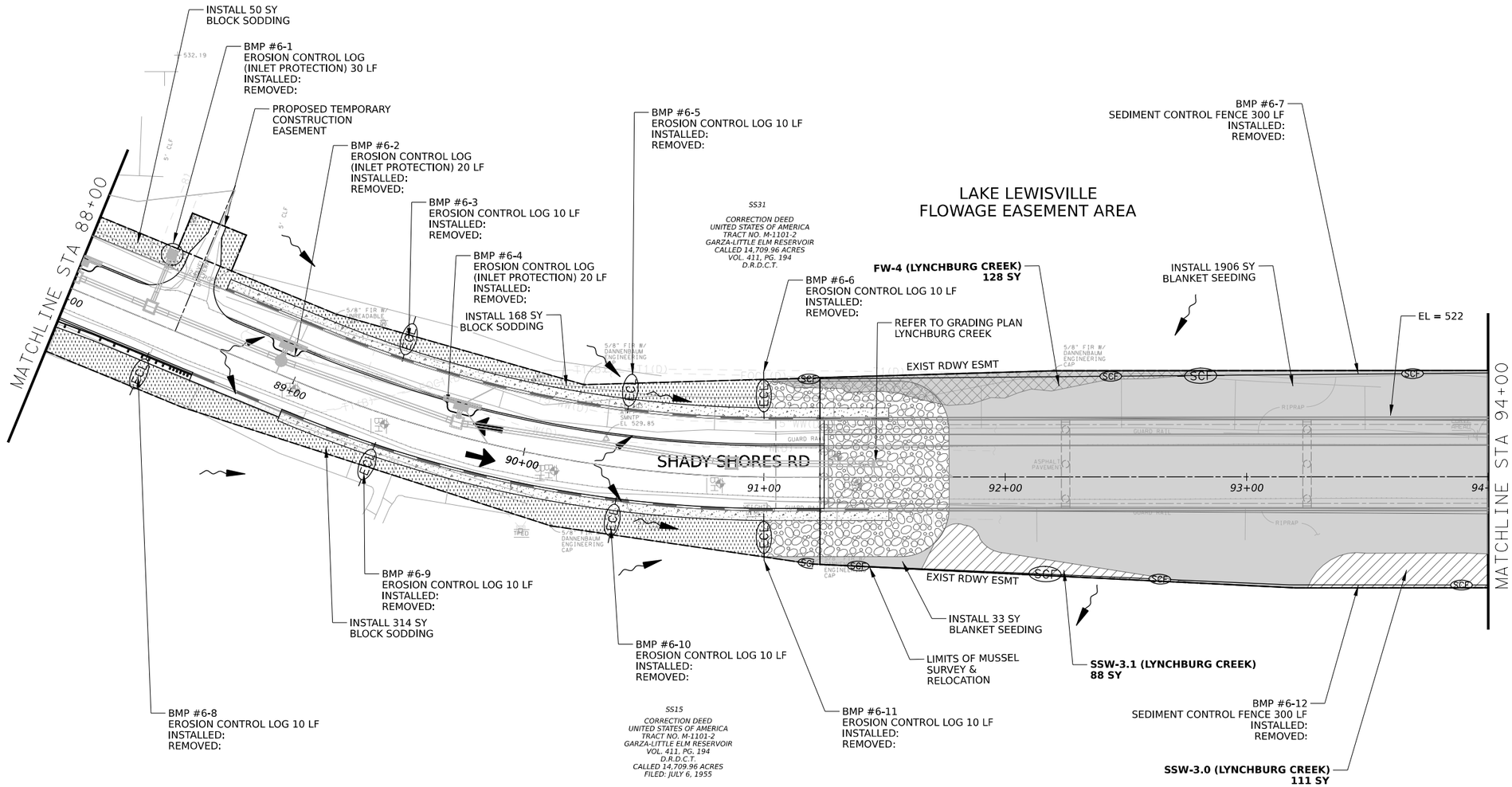

LAKE LEWISVILLE
FLOWAGE EASEMENT AREA

SOILS ON THIS PAGE:
STA 88+00 TO STA 90+80: 2 - ALTOGA SILTY CLAY (3 TO 5% SLOPES)
STA 90+80 TO STA 94+00: 40 - GOWEN CLAY LOAM (FREQUENTLY FLOODED)

6. DATE INSTALLED: _____
DATE REMOVED: _____

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- SSW (SCRUB SHRUB WETLAND)
- LL (LAKE LEWISVILLE)
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- EROSION CONTROL LOG (INLET PROTECTION)
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- ROCK RIPRAP
- LL FLOWAGE EASEMENT BOUNDARY
- PROPERTY PARCEL BOUNDARY

NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

N

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT
STA 88+00 TO STA 94+00

SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		304

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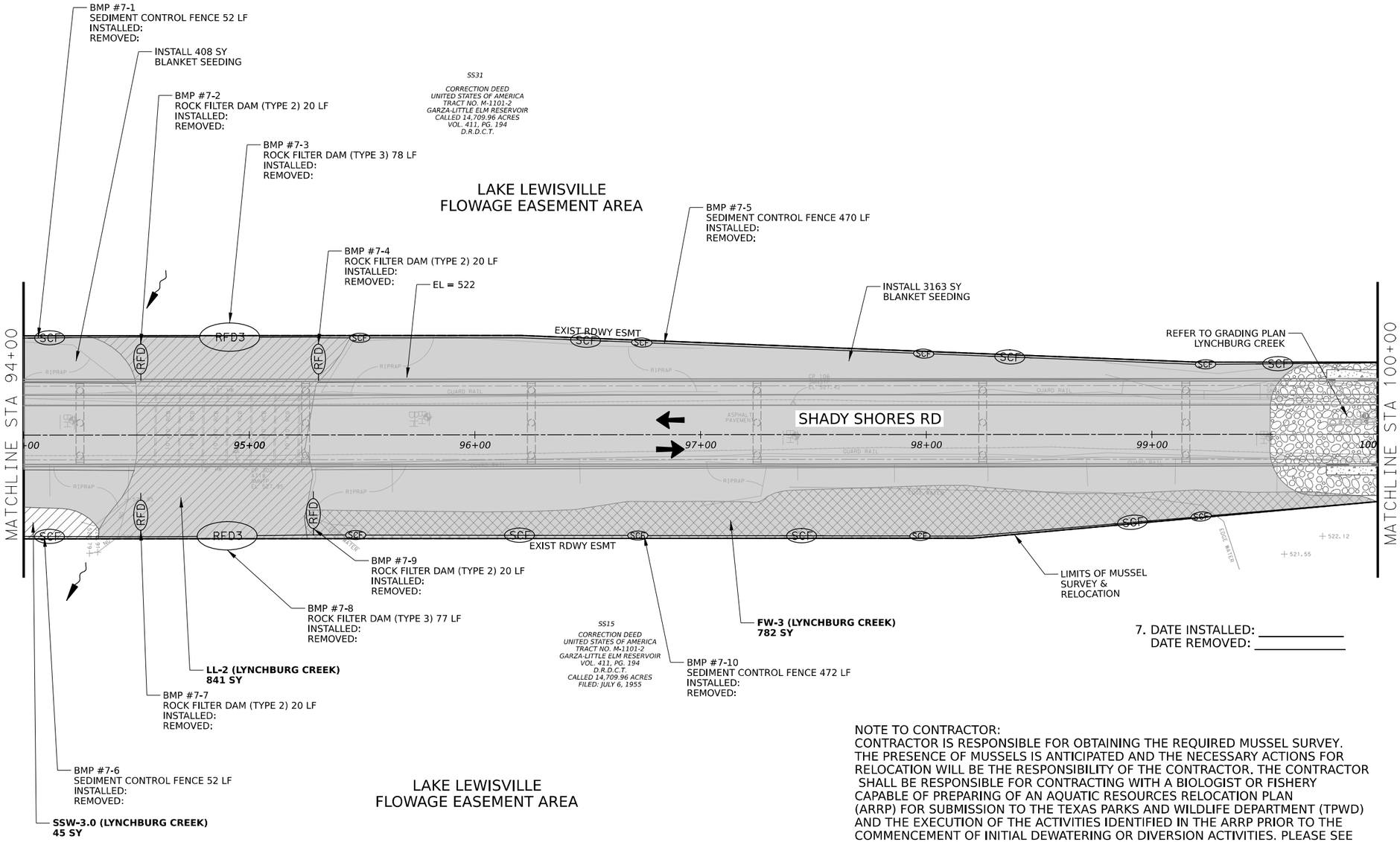

NOTE:
EXCEPTION TO BLANKET SEEDING IN CONSTRUCTION AREAS WITHIN THE LL FLOWAGE EASEMENT AREA: DO NOT APPLY BLANKET SEEDING WITHIN ACTIVE STREAM CHANNEL AREAS FOR LYNCHBURG CREEK.

SOILS ON THIS PAGE:
STA 94+00 TO STA 100+00: 40 - GOWEN CLAY LOAM (FREQUENTLY FLOODED)

NOTE TO CONTRACTOR:
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7. DATE INSTALLED: _____
DATE REMOVED: _____

LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
- SSW (SCRUB SHRUB WETLAND)
- LL (LAKE LEWISVILLE)
- DRAINAGE FLOW ARROW
- DIRECTION OF TRAFFIC
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- RFD3 — ROCK FILTER DAM (TYPE 3)
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- EROSION CONTROL LOG (INLET PROTECTION)
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- LL FLOWAGE EASEMENT BOUNDARY
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NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

0 25 50
HORIZ. SCALE IN FEET

STATE OF TEXAS
DAVID A. BURKETT
100068
LICENSED
PROFESSIONAL ENGINEER

12-01-2025

TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT

STA 94+00 TO STA 100+00

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		305

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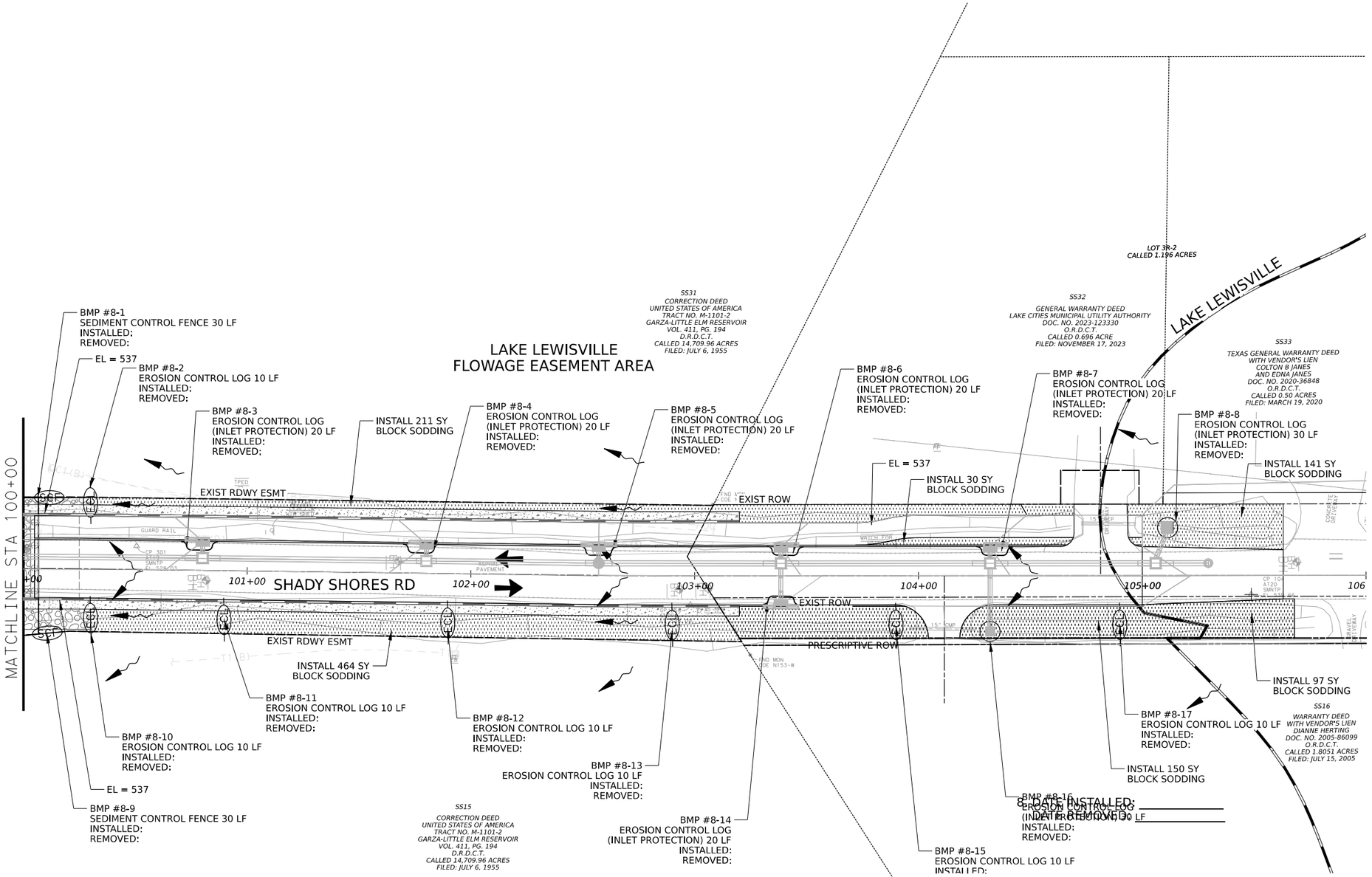

LEGEND

- BLANKET SEEDING
- BLOCK SODDING
- PS (PERENNIAL STREAM)
- FW (FORESTED WETLAND)
- SSW (SCRUB SHRUB WETLAND)
- LL (LAKE LEWISVILLE)
- DRAINAGE FLOW ARROW
- DIRECTION OF TRAFFIC
- (RFD) ROCK FILTER DAM (TYPE 2)
- (RFD3) ROCK FILTER DAM (TYPE 3)
- (ECL) EROSION CONTROL LOG
- EROSION CONTROL LOG (INLET PROTECTION)
- (SCF) SEDIMENT CONTROL FENCE
- ROCK RIPRAP
- LL FLOWAGE EASEMENT BOUNDARY
- PROPERTY PARCEL BOUNDARY

NOTE: CONTRACTOR TO MATCH EXISTING GRASS SPECIES FOR REPLACEMENT.

0 25 50
HORIZ. SCALE IN FEET

SOILS ON THIS PAGE:
STA 100+00 TO STA 100+10: 40 - GOWEN CLAY LOAM (FREQUENTLY FLOODED)
STA 100+10 TO STA 105+70: 60 - NAVO CLAY LOAM (1 TO 3% SLOPES)

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100068
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PROFESSIONAL ENGINEER
12-01-2025
TBPELS FIRM #312

halff

Texas Department of Transportation

SHADY SHORES

SW3P
LAYOUT

STA 100+00 TO END

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0918	46	316	VA
DIST	COUNTY		SHEET NO.
DAL	DENTON		306

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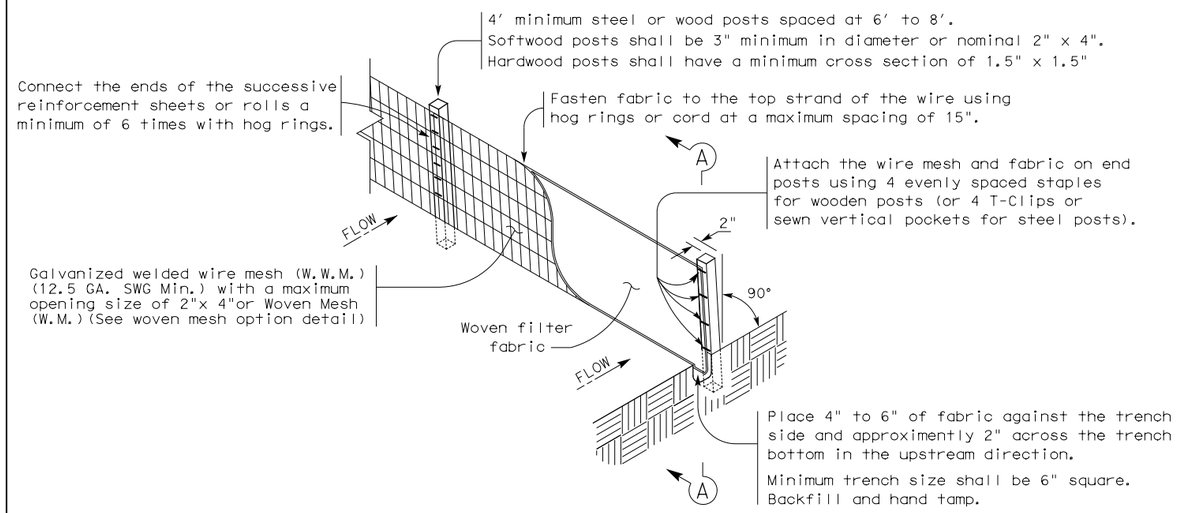
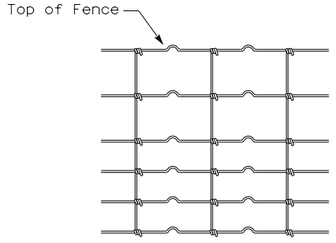
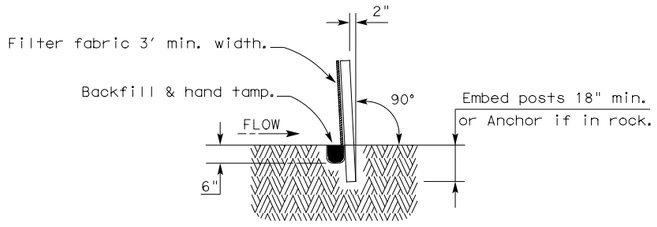


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

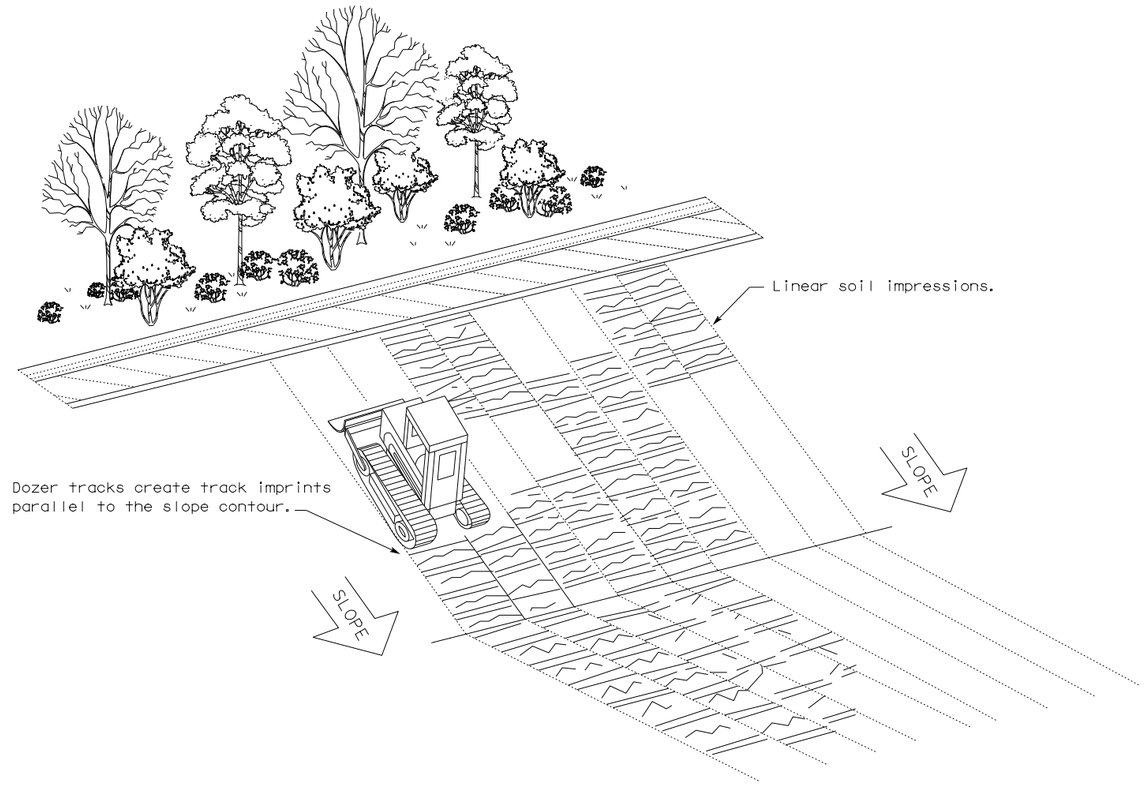
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

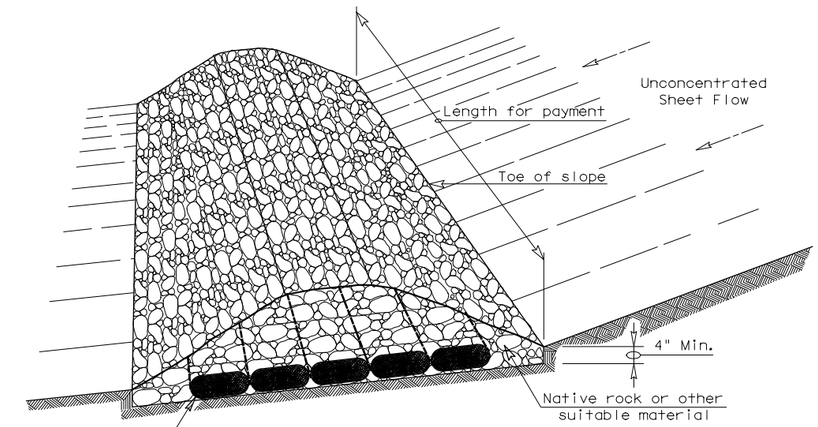
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

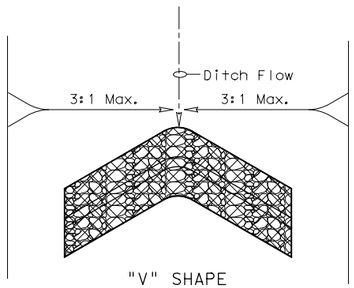
EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		307



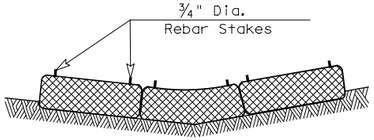
FILTER DAM AT TOE OF SLOPE

RFD1



"V" SHAPE
PLAN VIEW

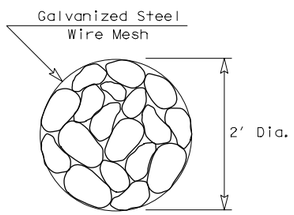
PLAN VIEW



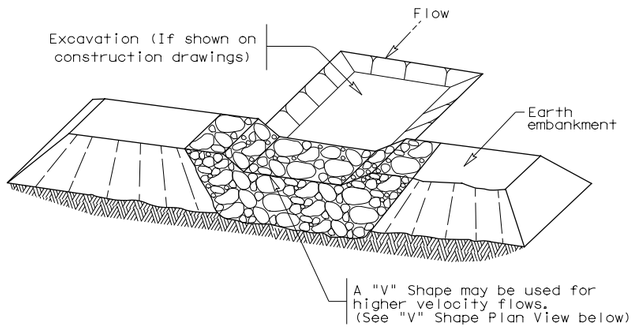
SECTION B-B

TYPE 4 (SACK GABIONS)

RFD4

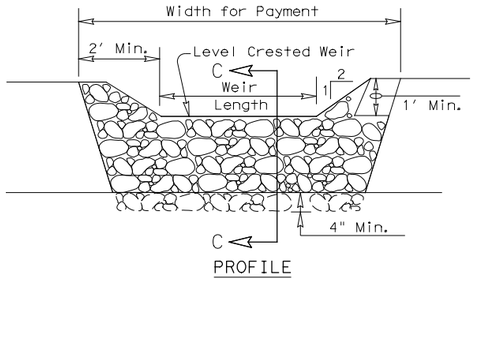


SECTION A-A

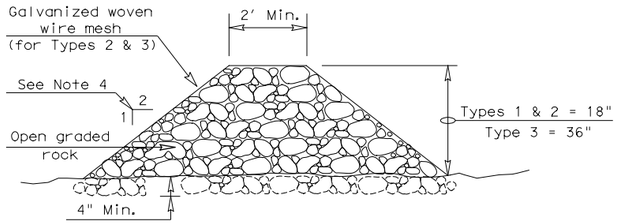


FILTER DAM AT SEDIMENT TRAP

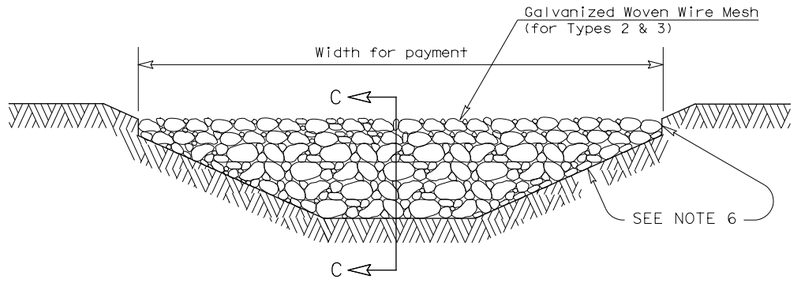
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		308

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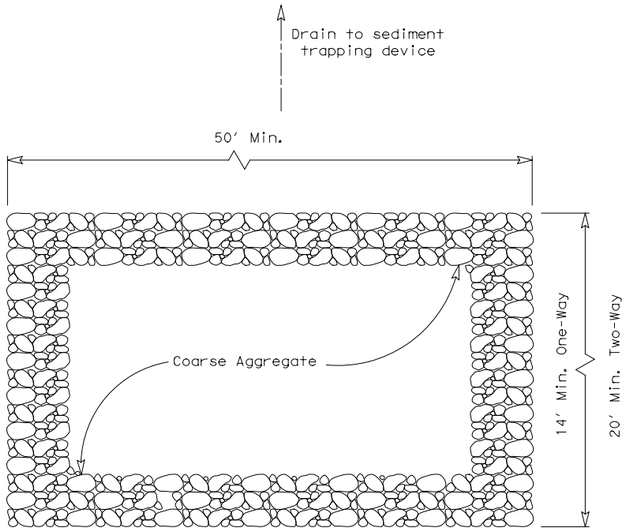
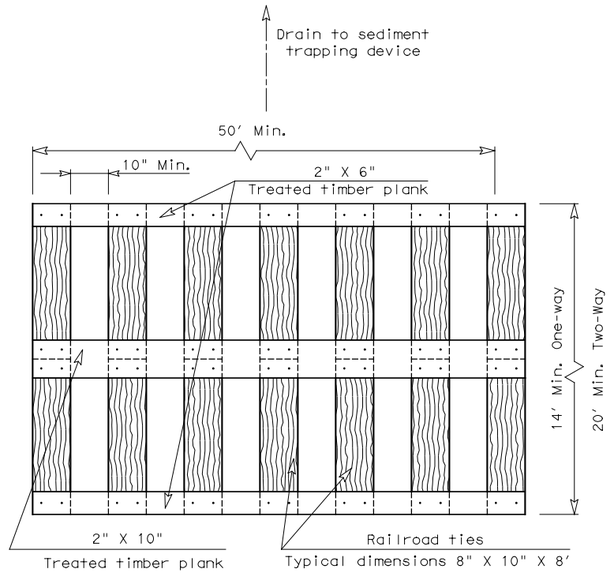


PLAN VIEW



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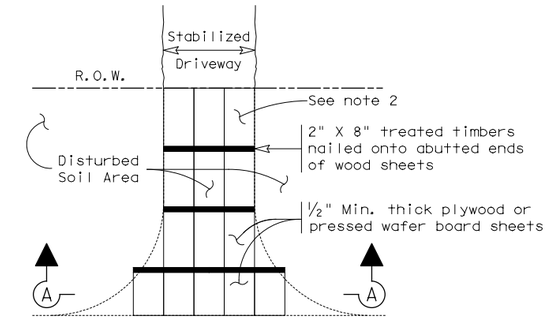
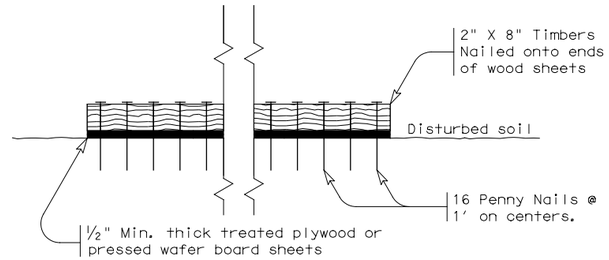


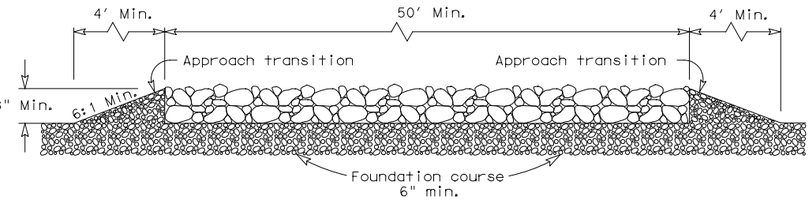
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

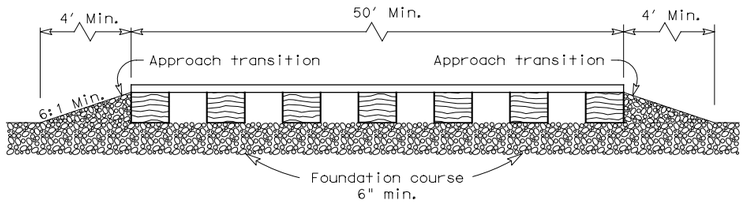
SHORT TERM



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	0918	46	316	VA
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		309

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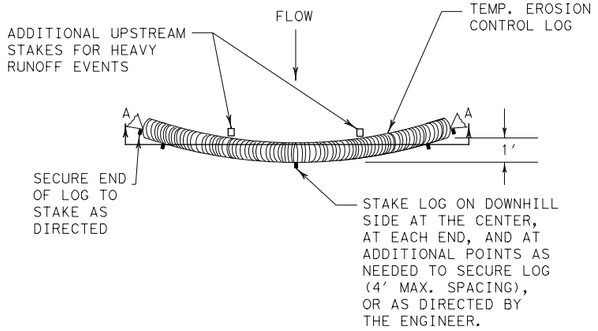
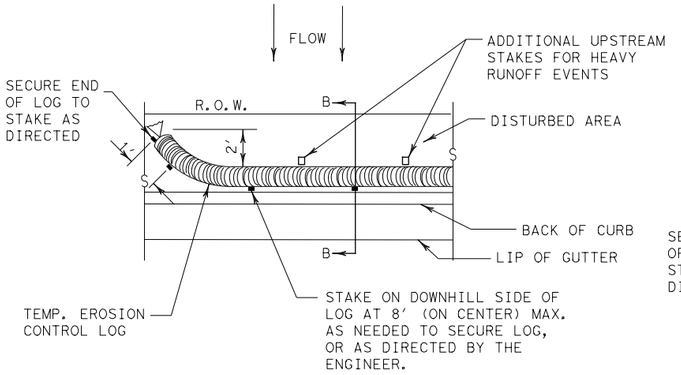
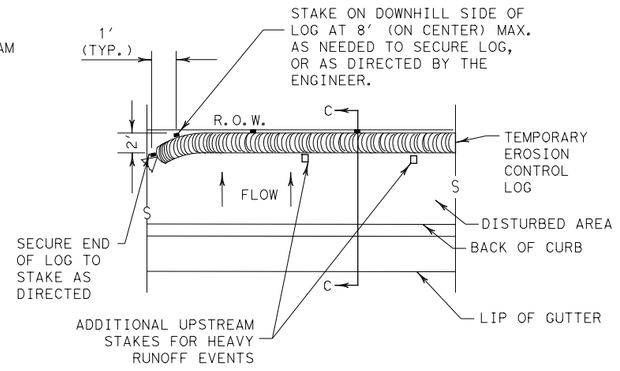


PLAN VIEW



PLAN VIEW



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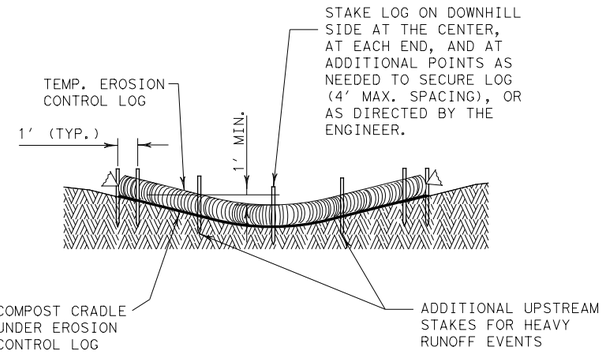
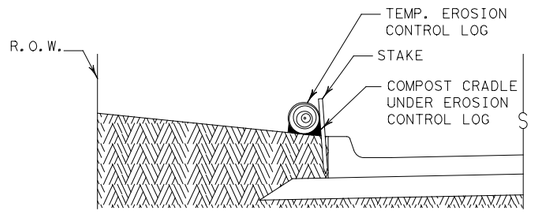


SECTION A-A

EROSION CONTROL LOG DAM

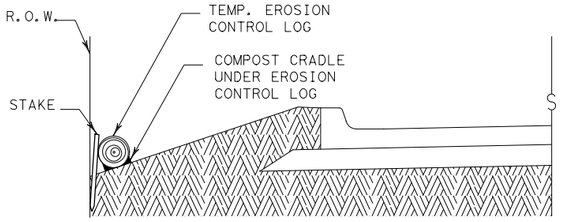
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

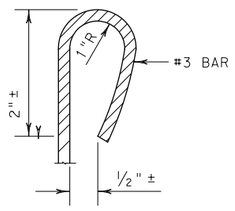
CL-BOC



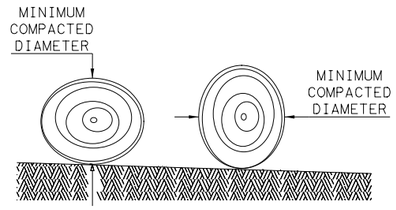
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

GENERAL NOTES:

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

LEGEND

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

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
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REVISIONS	0918	46	316		VA		
	DIST	COUNTY			SHEET NO.		
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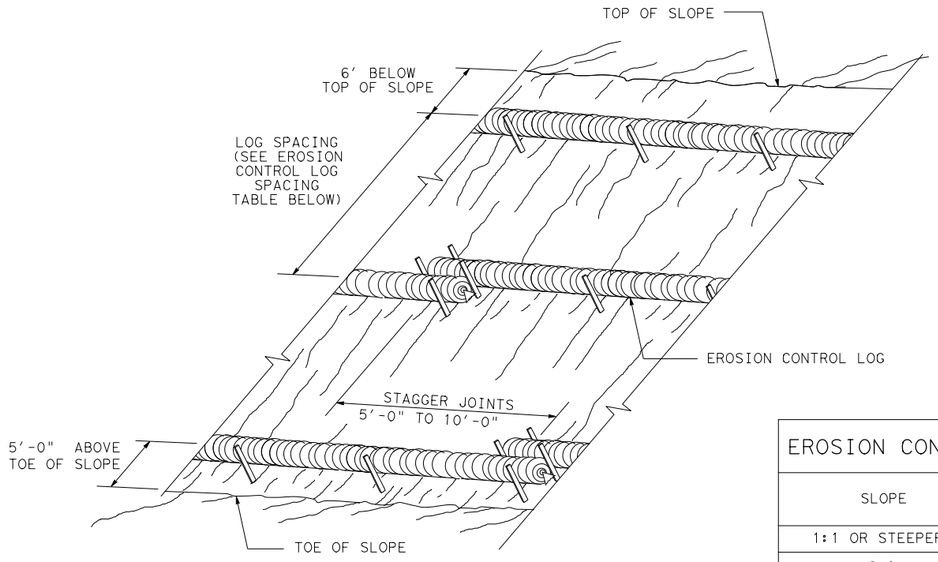
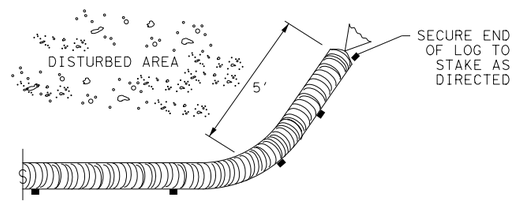


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

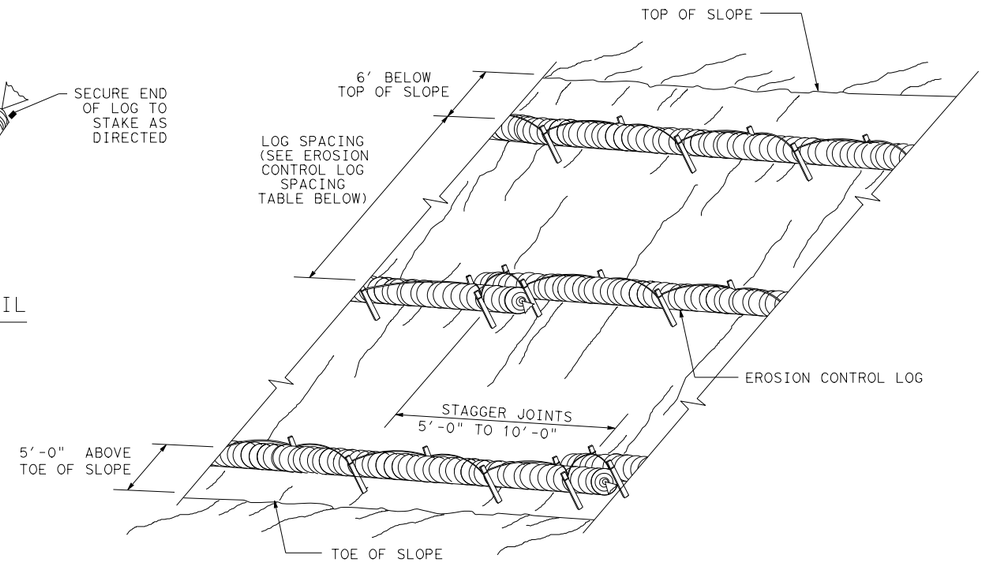
CL-SST



END SECTION RAP DETAIL

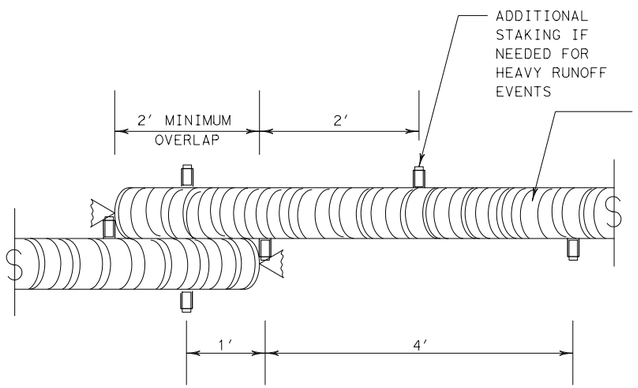
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

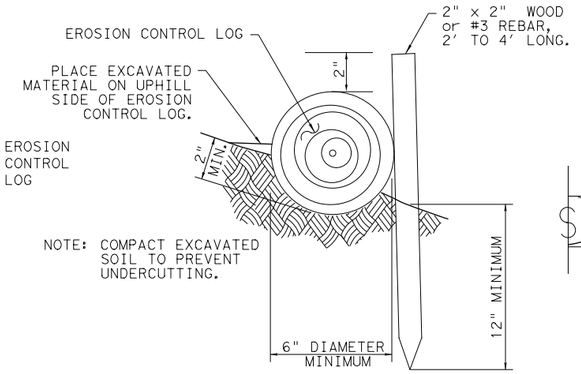
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

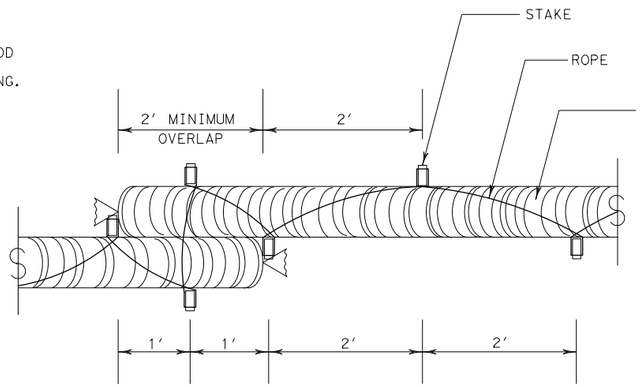


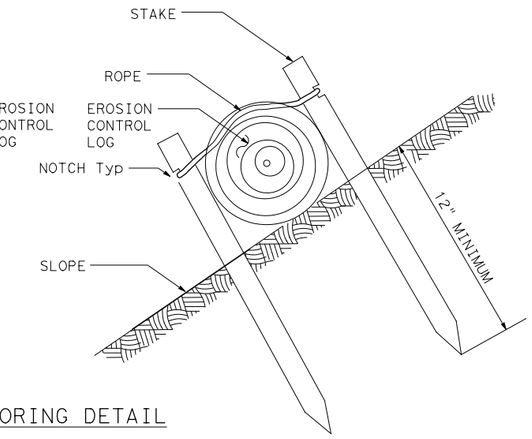


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

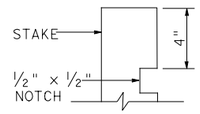
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

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	
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	DIST	COUNTY			SHEET NO.	
	DAL	DENTON			311	

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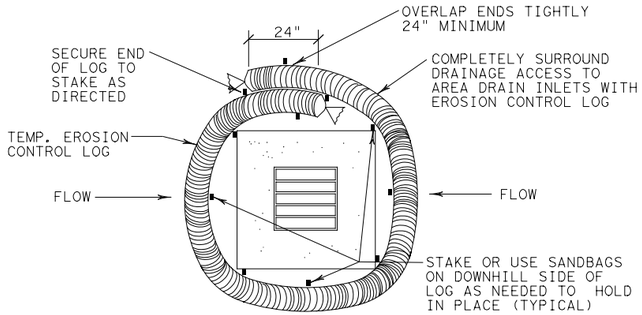
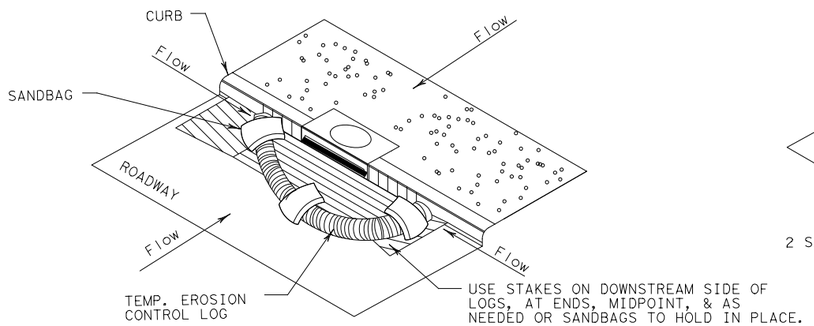


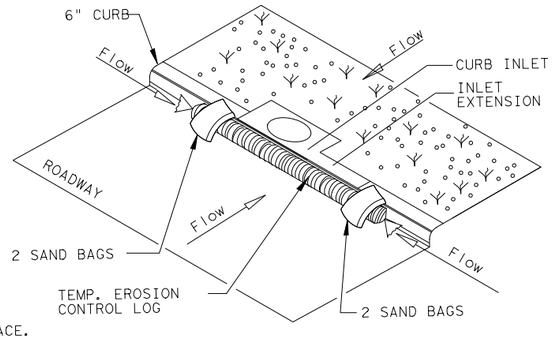
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

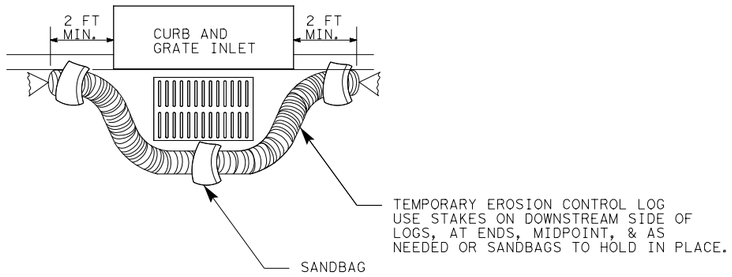
CL-CI



EROSION CONTROL LOG AT CURB INLET

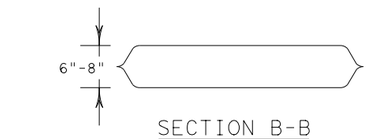
CL-CI

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.

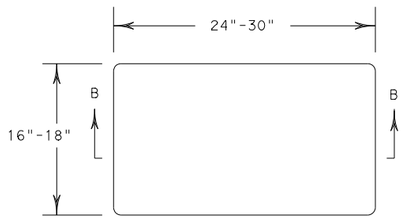


EROSION CONTROL LOG AT CURB & GRADE INLET

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
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0918	46	316		VA		
	DIST	COUNTY			SHEET NO.		
	DAL	DENTON			312		

USER ID

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

SURFACE PREPARATION

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

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

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

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

APPLICATION OF COMPOST MANUFACTURED TOPSOIL (4")

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

FERTILIZER ITEM 166* FERTILIZER TON

SOIL ANALYSIS FOR FERTILIZER APPLICATION RATE

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

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

SEEDING FOR EROSION CONTROL ITEM 164* DRILL SEED SY

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

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

			Pure Live Seed Rate **
RURAL SANDY SOILS (PERM_RURAL_SAND)	Shortspike Windmillgrass (Welder)	10%	0.2 lbs PLS per acre
	Hairy Grama (Chaparral)	15%	0.6 lbs PLS per acre
	Sand Dropseed (Taylor)	10%	0.2 lbs PLS per acre
	Little Bluestem (OK Select)	15%	1.05 lbs PLS per acre
	Sideoats Grama (Haskell)	10%	1.0 lbs PLS per acre
	Green Sprangletop (Van Horn)	10%	0.4 lbs PLS per acre
	Hooded Windmillgrass (Burnet)	10%	0.2 lbs PLS per acre
	Sand Lovegrass (Mason)	10%	0.4 lbs PLS per acre
	Silver Bluestem (Santiago)	10%	0.4 lbs PLS per acre
URBAN SANDY SOILS (PERM_URBAN_SAND)	Green Sprangletop		0.3 lbs PLS per acre
	Buffalograss (Texoka)***		1.6 lbs PLS per acre
	Bermudagrass		3.6 lbs PLS per acre
	Sand Dropseed (Borden Co.)		0.4 lbs PLS per acre

SEEDING NOTES:
1. When seeding is specified under Item 164, refer to TxDOT 2024 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown. Materials and construction shall meet all specifications.
2. Conduct seeding upon completion of each applicable construction stage (dependent upon planting season requirements), without compensation for additional move-ins.
3. Place seed AFTER preparing planting area surface. Refer to Surface Preparation detail this sheet, as well as Topsoil Item 160 and Compost Manufactured Topsoil Item 161 when specified. Apply fertilizer per Item 166 BEFORE seeding, per specifications and this sheet, to help drill the fertilizer into the soil.
4. When temporary grasses are well-established and more than 2-inches tall, mow planting area before seeding permanent grasses; mowing for this purpose will be subsidiary. When vegetation is not already well-established, scarify planting area to a depth as described in Item 164.3, before temporary seeding and before permanent seeding.
5. Seed material must be appropriate to the location, soil type and season. Use the seed mix species and pure live seed rates designated in Tables 1-5 of the TxDOT 2024 Standard Specifications* for Item 164, unless otherwise specified.
6. All seed shall meet labeling, delivery, analysis, and testing requirements described in Item 164.2.1. Deliver seed in labeled, unopened bags or containers to Engineer prior to planting.
7. Uniformly plant seed over the designated planting area, along the contour of slopes, and drill seed to a depth as described in Item 164.3.5.
8. Hydroseeding per Item 164.2.5.2 and 164.3.4 may be allowed, when specified or Engineer concurs. For hydroseeding, increase PLS rate by 25% and avoid microplastics.
9. Implement and continue Vegetative Watering per the schedule, rate and volume specified under Item 168.

TXDOT REFERENCE MATERIALS:

* "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES" 2024
- "A GUIDANCE TO ROADSIDE VEGETATION ESTABLISHMENT" 2004
- ONLINE TRAINING COURSE: MNT415 REVEGETATION DURING CONSTRUCTION
- DALLAS DISTRICT "VEGETATION ESTABLISHMENT GUIDELINES"

SODDING FOR EROSION CONTROL ITEM 162* BLOCK SODDING SY

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

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

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

WATERING SCHEDULE

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

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

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

TEMPORARY SEEDING MIX DRILL SEED (TEMP_WARM_COOL) REV.1

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

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

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

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

ROADSIDE MOWING ITEM 730* AC

MOWING NOTES:
1. During project construction, once seed is established, use mowing to promote permanent grasses by mowing any remaining temporary grasses.
2. Also mow established turf and ROW grasses in designated areas of project limits as specified or directed by Engineer.
3. Remove litter and debris prior to mowing.
4. Do not mow on wet ground when soil rutting can occur.
5. Hand-trim around obstructions and stormwater control devices as needed.
6. Maintain paved surfaces free of tracked soils and clipped vegetation.

SEQUENCE OF WORK:

- SCARIFY SURFACE SOIL.
- PREPARE / PLACE TOPSOIL, OR
- PREPARE / PLACE COMPOST MANUFACTURED TOPSOIL.
- APPLY FERTILIZER AND THEN PLACE SEEDING, OR
- PLACE SOD AND THEN APPLY FERTILIZER.
- CONDUCT VEGETATIVE WATERING.
- CONDUCT ROADSIDE MOWING, AS DIRECTED.

Texas Department of Transportation
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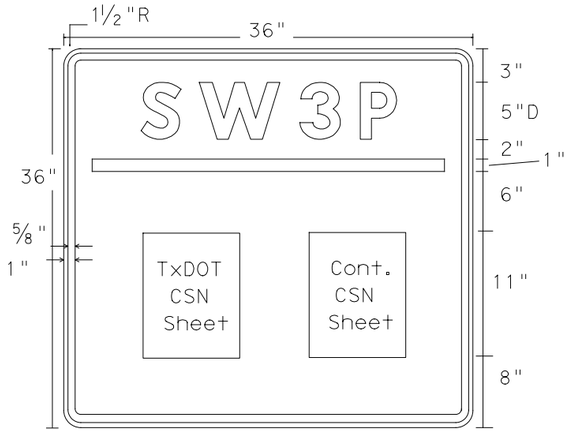
VEGETATION ESTABLISHMENT SHEET

(DALLAS DISTRICT)

TEMPLATE REVISION DATE: 11/19/25

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
RAD	6	(See Title Sheet)		VA
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
XXX	TEXAS	DALLAS	DENTON	312A
CHECK	CONTROL	SECTION	JOB	
XXX	0918	46	316	
CHECK				
XXX				

DATE: 3/30/2026
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/DallasDistrict_VegetationEstablishment.dgn



SW3P SIGN

TxDOT & Contractor Construction Site Note (CSN)

Sign Dimensions

36" X 36"

Letters - White
Numbers - White
Border - White
Background - Blue

GENERAL NOTES:

1. The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
2. Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
3. CSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry.(See Figure 1).
4. SW3P Signs should be placed just inside the ROW line at the project limits at a readable height. It may be placed perpendicular or parallel to ROW line.If the sign cannot be placed outside the clear zone, it will be mounted per TMUTCD requirements.
5. Final location of the signs will be as approved by the Engineer.

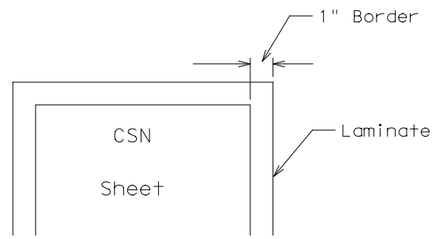
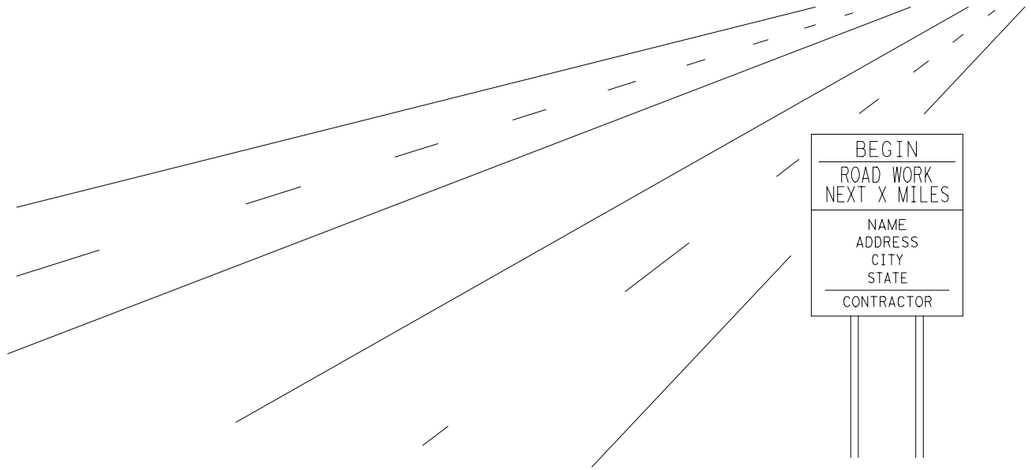
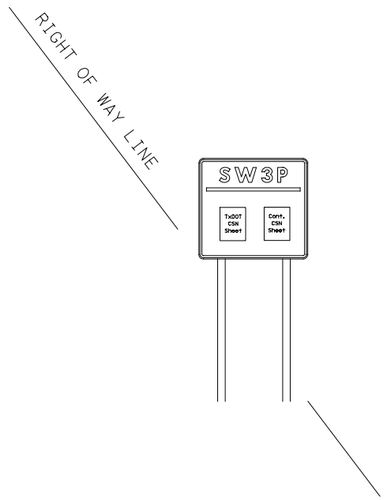


Figure 1





DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

Texas Department of Transportation
DALLAS DISTRICT STANDARD

SW3P SIGN SHEET

FILE:	DN: TxDOT	CK:	DW:	CK:	
©TxDOT 2016	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISION DATE: 10-16-15	DAL				312B
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	DENTON	0918	46	316	VA

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DATE: 3/30/2026
FILE: pw://halff-pw.bentley.com:halff-pw-01/Documents/36886.002 Shady Shores Road PS&E/500 CADD/4 - Design/Sheets/DallasDistrict_SW3PSIGN.dgn

LEVELS DISPLAYED
PATH: