FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C 142-6-29		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	KENDALL	
CONT.	SECT.	JOB	HIGHWAY NO.
0142	06	029	SH 27

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT

PROJECT NO.: C 142-6-29
CSJ:0142-06-029

KENDALL COUNTY

SH 27

LIMITS FROM:US 87
TO:KENDALL/KERR COUNTY LINE

NET LENGTH OF ROADWAY = 7280.24 FT = 1.379 MI
NET LENGTH OF BRIDGE = 313.50 FT = 0.059 MI
NET LENGTH OF PROJECT = 7593.74 FT = 1.438 MI

DESIGN SPEED = N/A
A.D.T. (2024)= 10,500
A.D.T. (2044)= 14,500
AREA OF DISTURBED SOIL = 0.19 AC
ACCESSIBILITY STANDARDS = PROWAG

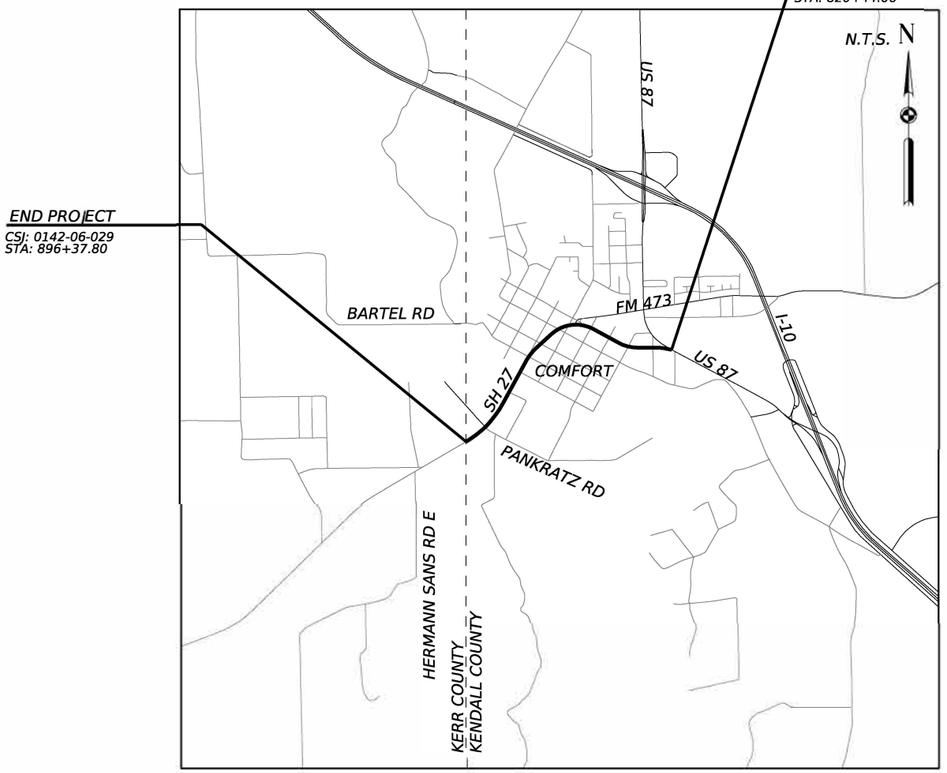
INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

FOR WORK CONSISTING OF BASE REPAIR, MILL, INLAY AND PAVEMENT MARKINGS

BEGIN PROJECT
CSJ: 0142-06-029
STA: 820+44.06

END PROJECT
CSJ: 0142-06-029
STA: 896+37.80



EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

PLANS PREPARED BY

Kimley»Horn F-928

10814 JOLLYVILLE ROAD, CAMPUS IV,
SUITE 200, AUSTIN, TX 78759
TEL: 512-418-1771
FAX: 972-239-3820

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ *P.E.* _____
AREA ENGINEER *DATE*

TEXAS DEPARTMENT OF TRANSPORTATION

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000--008)

SUBMITTED FOR LETTING 10/~~31~~/2023
DocuSigned by: Roger J. Collard, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 10/~~31~~/2023
DocuSigned by: Clayton Ripps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

REVIEWED FOR LETTING 10/~~31~~/2023
DocuSigned by: D.R. Rogers, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING 10/~~31~~/2023
DocuSigned by: Gina F. Gallegos, P.E.
DISTRICT ENGINEER

COUNTY KENDALL *PROJ. NO.*
HWY. NO. SH 27 *LETTING DATE* 01/04/2024
DATE ACCEPTED

FILE LOCATION AND NAME
T:\Engdata\Standards\Design\TITLESHEET-2014Specs.DGN

LEVELS DISPLAYED
1

SHEET			DESCRIPTION
I. GENERAL			
1			TITLE SHEET
2			INDEX OF SHEETS
3	-	6	PROJECT LAYOUT
7	-	8	EXISTING TYPICAL SECTIONS
9	-	10	PROPOSED TYPICAL SECTIONS
11, 11A	-	11E	GENERAL NOTES
12, 12A		12C	ESTIMATE & QUANTITY
13	-	14	SUMMARY OF TRAFFIC AND EROSION CONTROL PLAN QUANTITIES
15	-	16	SUMMARY OF ROADWAY QUANTITIES
17	-	18	SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES
19			TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET
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20			TRAFFIC CONTROL PLAN NARRATIVE
21	-	22	SCHEDULE OF BARRICADES & ADVANCE WARNING DEVICES
23	-	31	TRAFFIC CONTROL PLAN - TYPICAL SECTIONS
32	-	38	TRAFFIC CONTROL PLAN - LAYOUT
39			TRAFFIC CONTROL PLAN - INTERSECTION LAYOUT
40			TRAFFIC CONTROL PLAN - INTERSECTION DETAIL
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56			*TCP(1-4)-18
57			*TCP(2-4)-18
58			*TCP(3-1)-13
59			*TCP(3-3)-14
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61			*WZ(BRK)-13
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90			*DRIVEWAY DETAILS (SAT DIST STANDARD)
91			*BRIDGE NBI NUMBER STENCIL (SAT DIST STANDARD)
92			*TREE PRUNING AND REMOVAL (SAT DIST STANDARD)
93	-	96	*RL-T131RC-19
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98			*GF(31)DAT-19
99	-	100	*GF(31)TRTL3-20
101			*GF(31)TRTL2-19
102			*GF(31)MS-19
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STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER

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

, P.E. *10/11/2023*
JORDAN KIEWIT *DATE*

Kimley»Horn F-928

Texas Department of Transportation

SH27

INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		2

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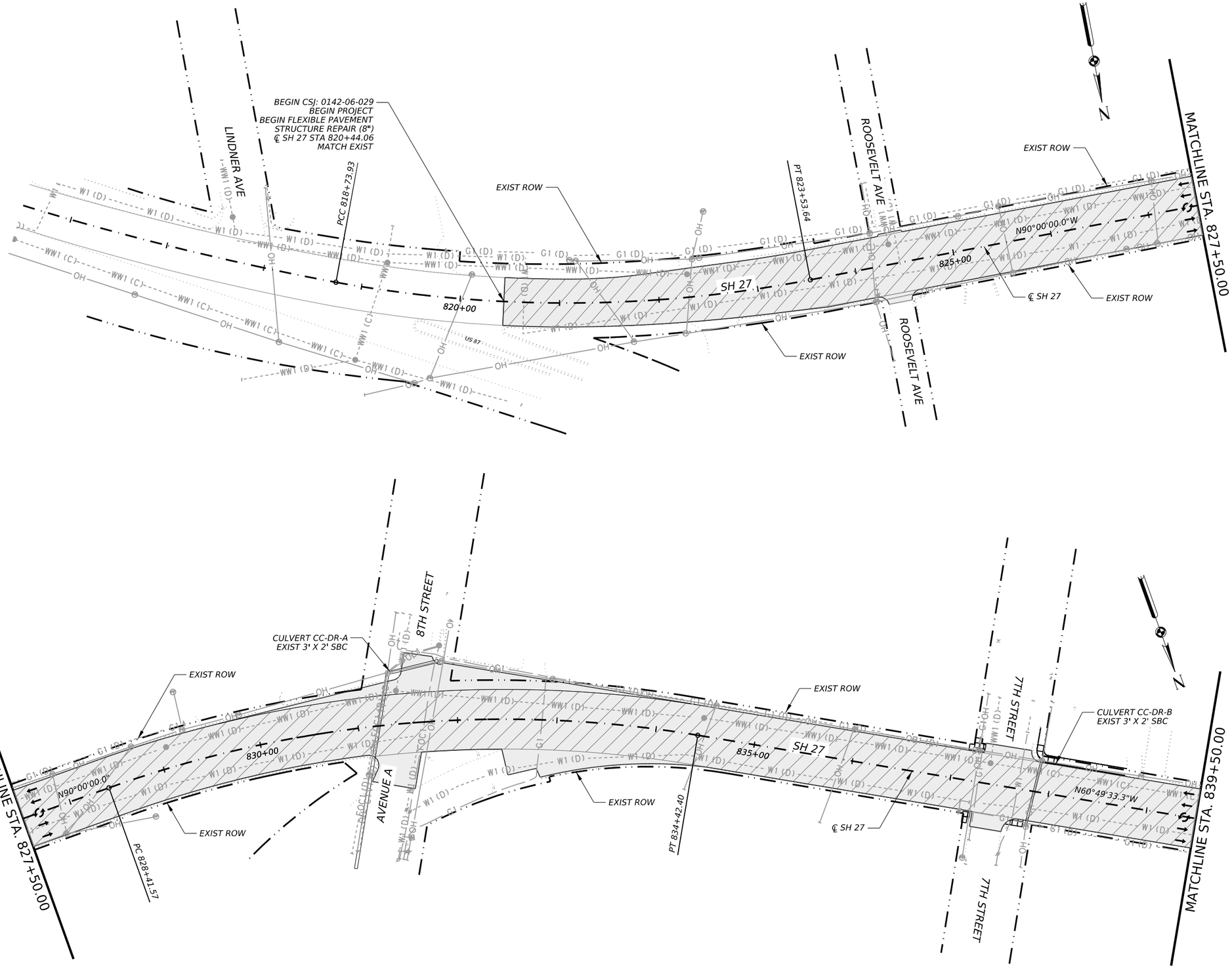

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- PROPOSED BASE REPAIR
- PROPOSED CONCRETE MEDIAN
- PROPOSED INTERSECTION PAVEMENT

NOTES:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
2. SH27 AT CYPRESS CREEK IS LOCATED IN A FEMA ZONE AE, INFORMAL COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR, MARY ELLEN SCHULLE, WAS COMPLETED ON JULY 20, 2023.

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 50' 100'

Kimley»Horn F-928

Texas Department of Transportation

SH27

PROJECT LAYOUT

BEGIN TO STA 839+50.00

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		3

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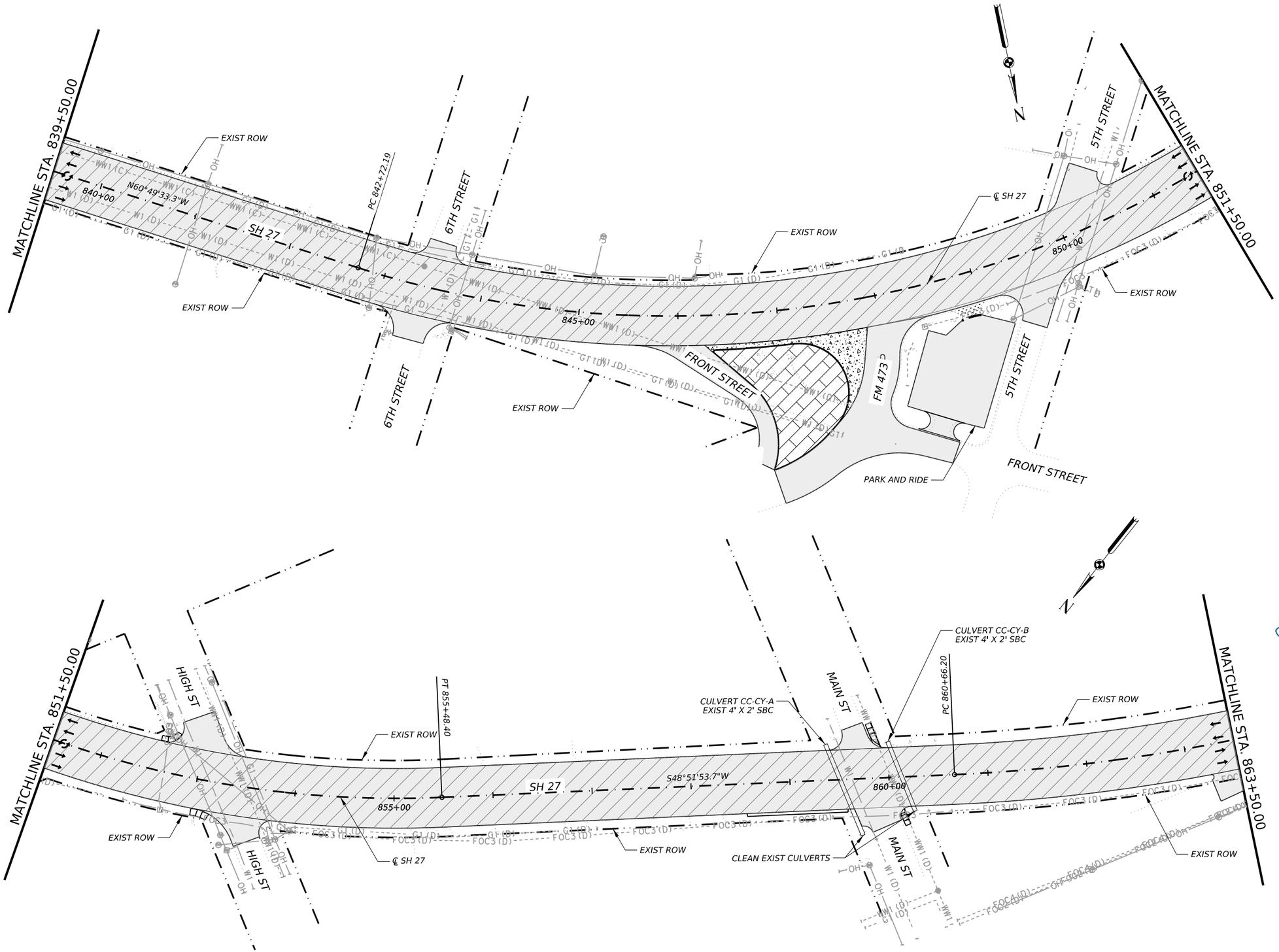

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- PROPOSED BASE REPAIR
- PROPOSED CONCRETE MEDIAN
- PROPOSED INTERSECTION PAVEMENT

NOTES:

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10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
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PROFESSIONAL ENGINEER

0' 50' 100'

Kimley»Horn F-928

Texas Department of Transportation

SH27

PROJECT LAYOUT

STA 839+50.00 TO STA 863+50.00

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		4

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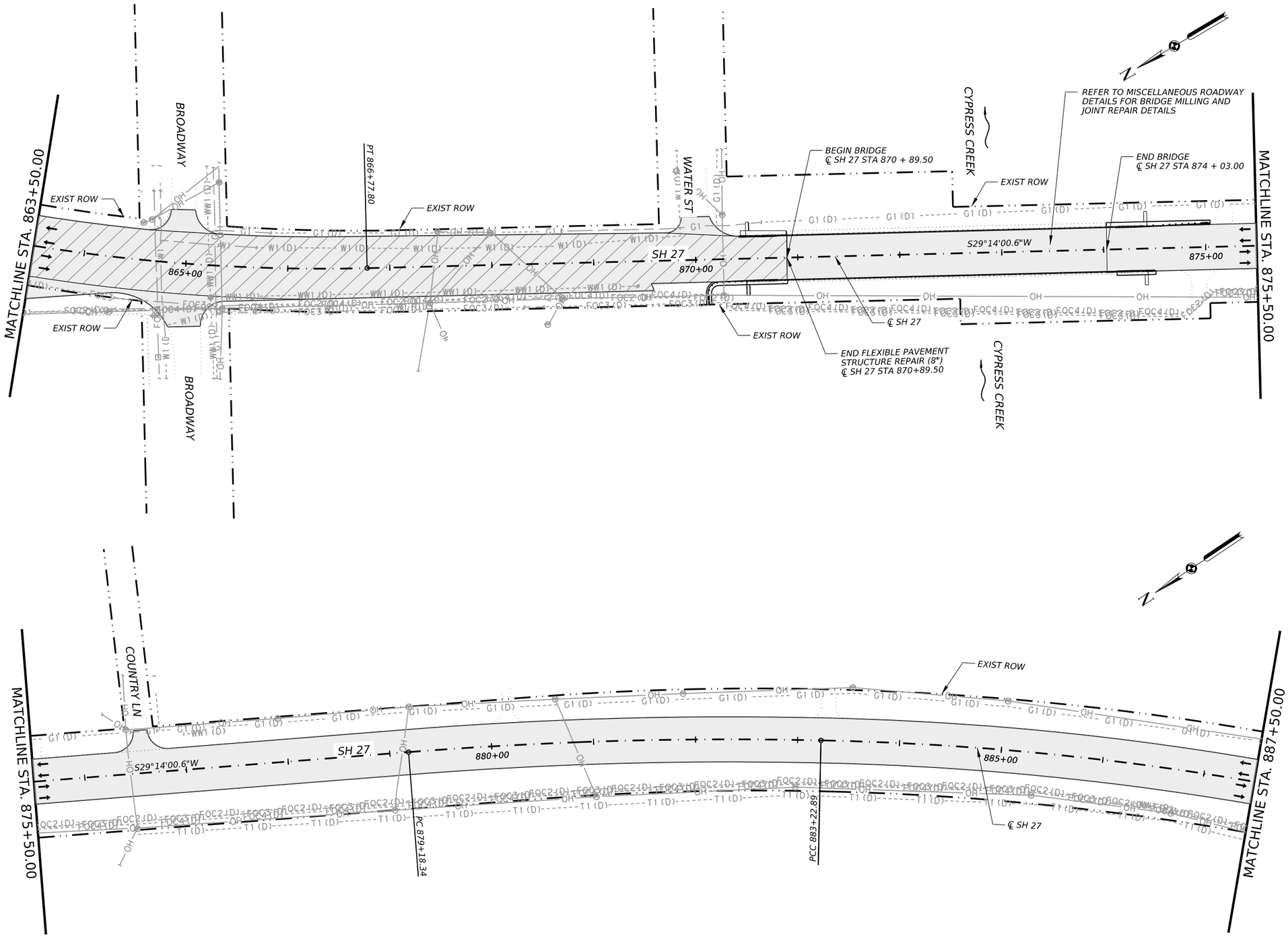

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- PROPOSED BASE REPAIR
- PROPOSED CONCRETE MEDIAN
- PROPOSED INTERSECTION PAVEMENT

NOTES:

1. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
2. SH27 AT CYPRESS CREEK IS LOCATED IN A FEMA ZONE AE, INFORMAL COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR, MARY ELLEN SCHULLE, WAS COMPLETED ON JULY 20, 2023.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER

10/11/2023

0' 50' 100'

Kimley»Horn F-928

Texas Department of Transportation

SH27

PROJECT LAYOUT

STA 863+50.00 TO STA 887+50.00

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		5

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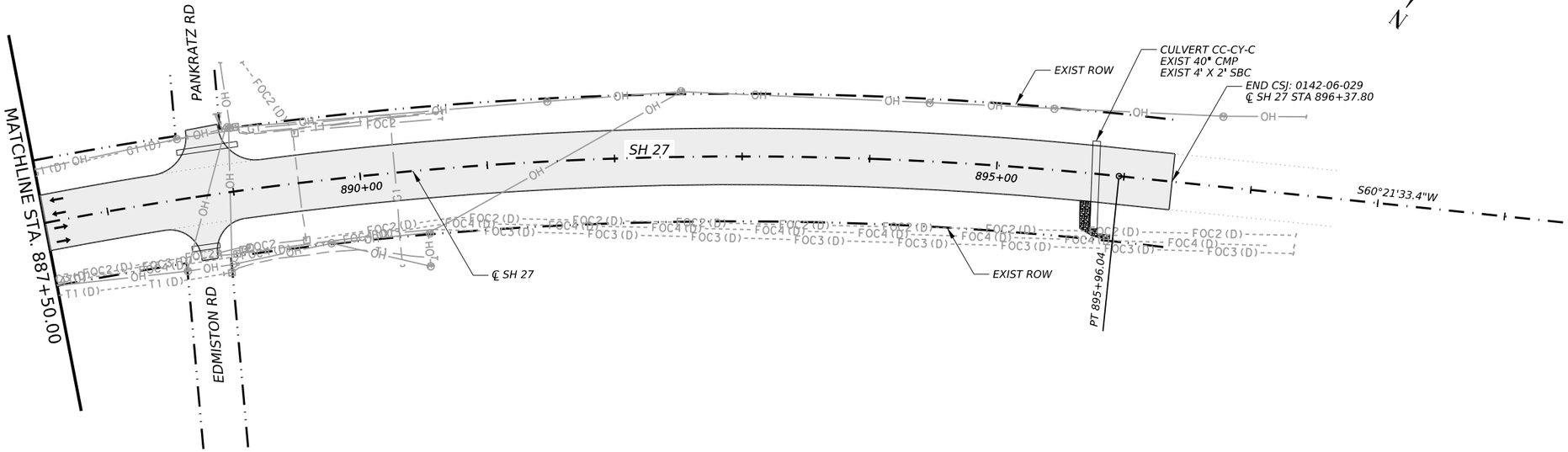

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- PROPOSED BASE REPAIR
- PROPOSED CONCRETE MEDIAN
- PROPOSED INTERSECTION PAVEMENT

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2. SH27 AT CYPRESS CREEK IS LOCATED IN A FEMA ZONE AE, INFORMAL COORDINATION WITH THE LOCAL FLOODPLAIN ADMINISTRATOR, MARY ELLEN SCHULLE, WAS COMPLETED ON JULY 20, 2023.

10/11/2023

0' 50' 100'

Kimley»Horn F-928

Texas Department of Transportation

SH27

PROJECT LAYOUT

STA 887+50.00 TO END

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		6

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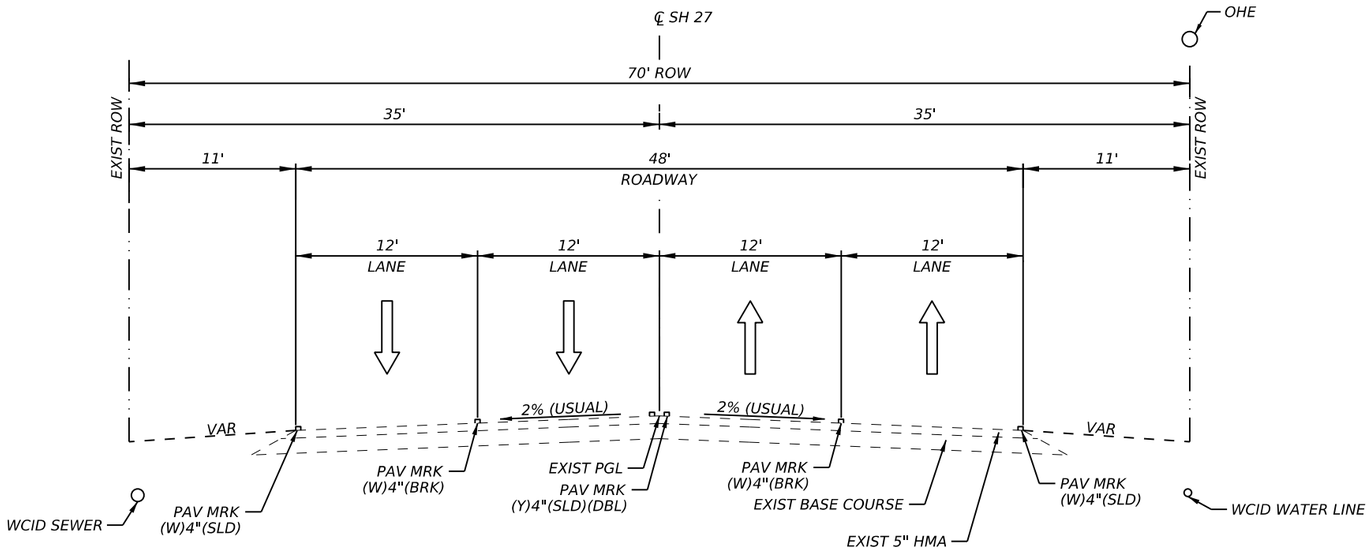
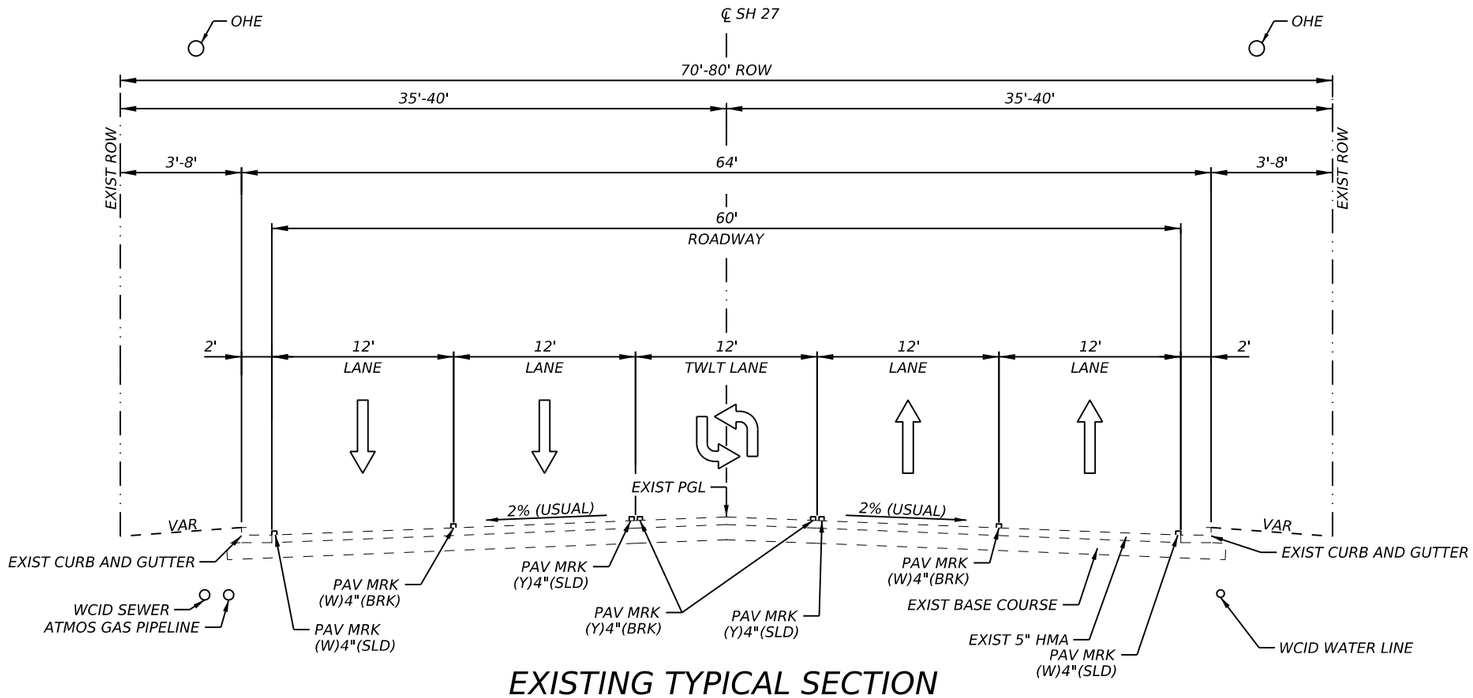


EXISTING TYPICAL SECTION

STA. 820+44.06 TO STA. 823+37.13



EXISTING TYPICAL SECTION

STA. 823+37.13 TO STA. 861+94.68

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF CURB & GUTTER AND SIDEWALK LOCATIONS

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SH27

EXISTING
TYPICAL SECTIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		7

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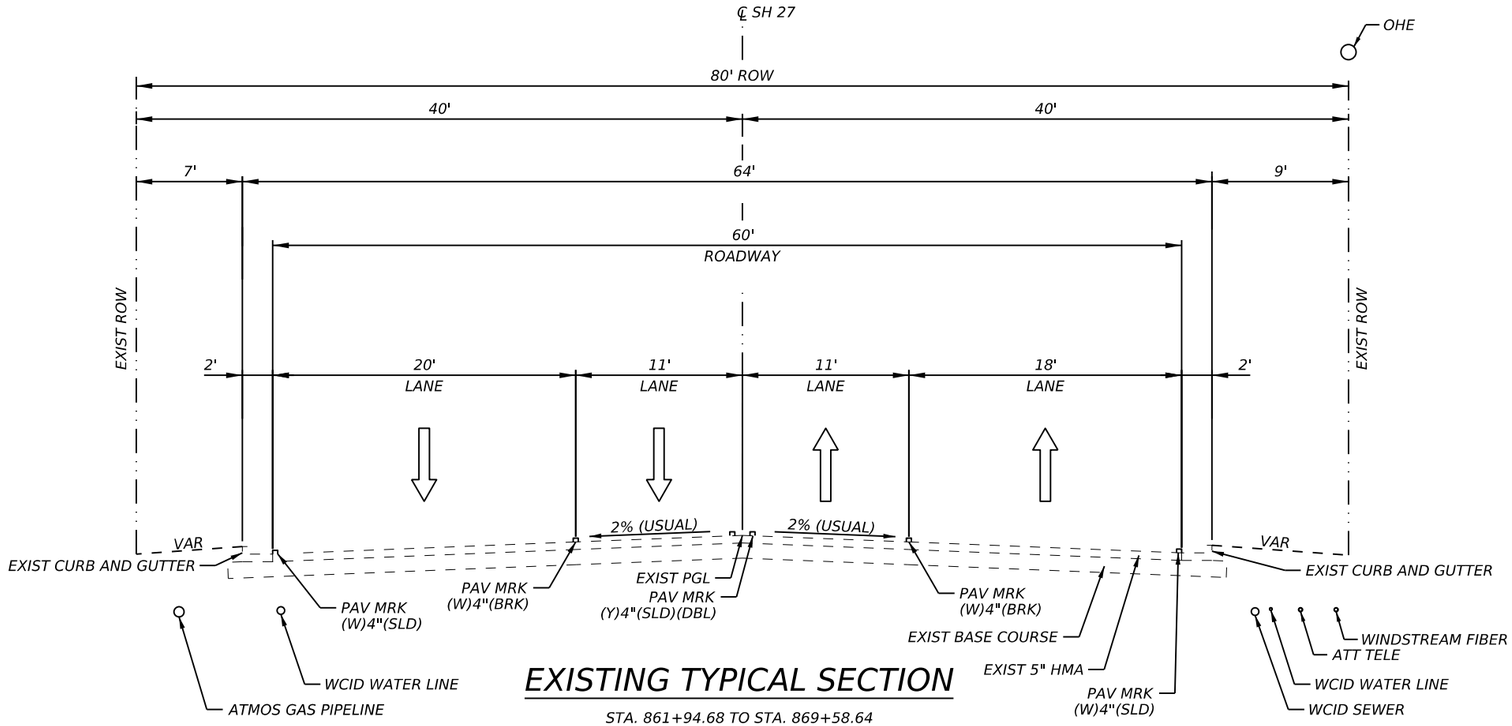
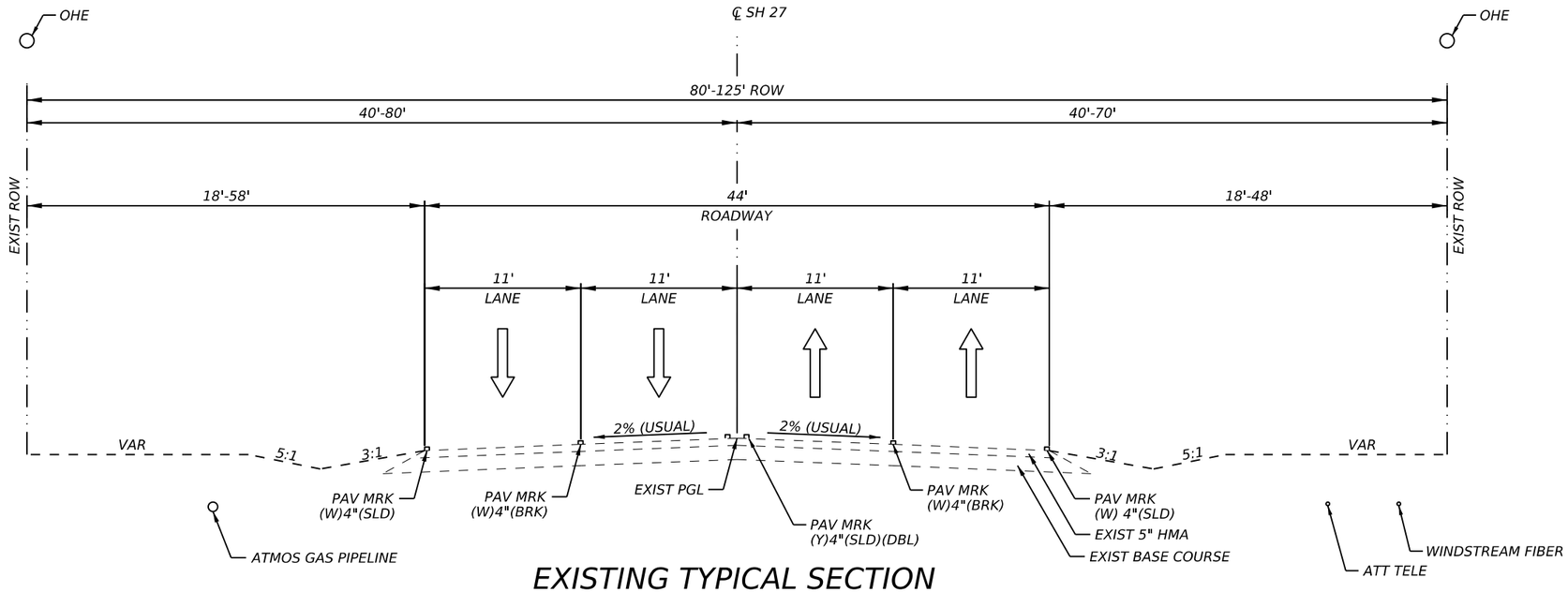


EXISTING TYPICAL SECTION

STA. 861+94.68 TO STA. 869+58.64



EXISTING TYPICAL SECTION

STA. 869+58.64 TO STA. 896+37.80
*CYPRESS CREEK BRIDGE STA. 870+89.50
TO STA. 874+03.00

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF CURB & GUTTER AND SIDEWALK LOCATIONS

10/11/2023

JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Kimley»Horn F-928

Texas Department of Transportation

SH27

EXISTING
TYPICAL SECTIONS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		8

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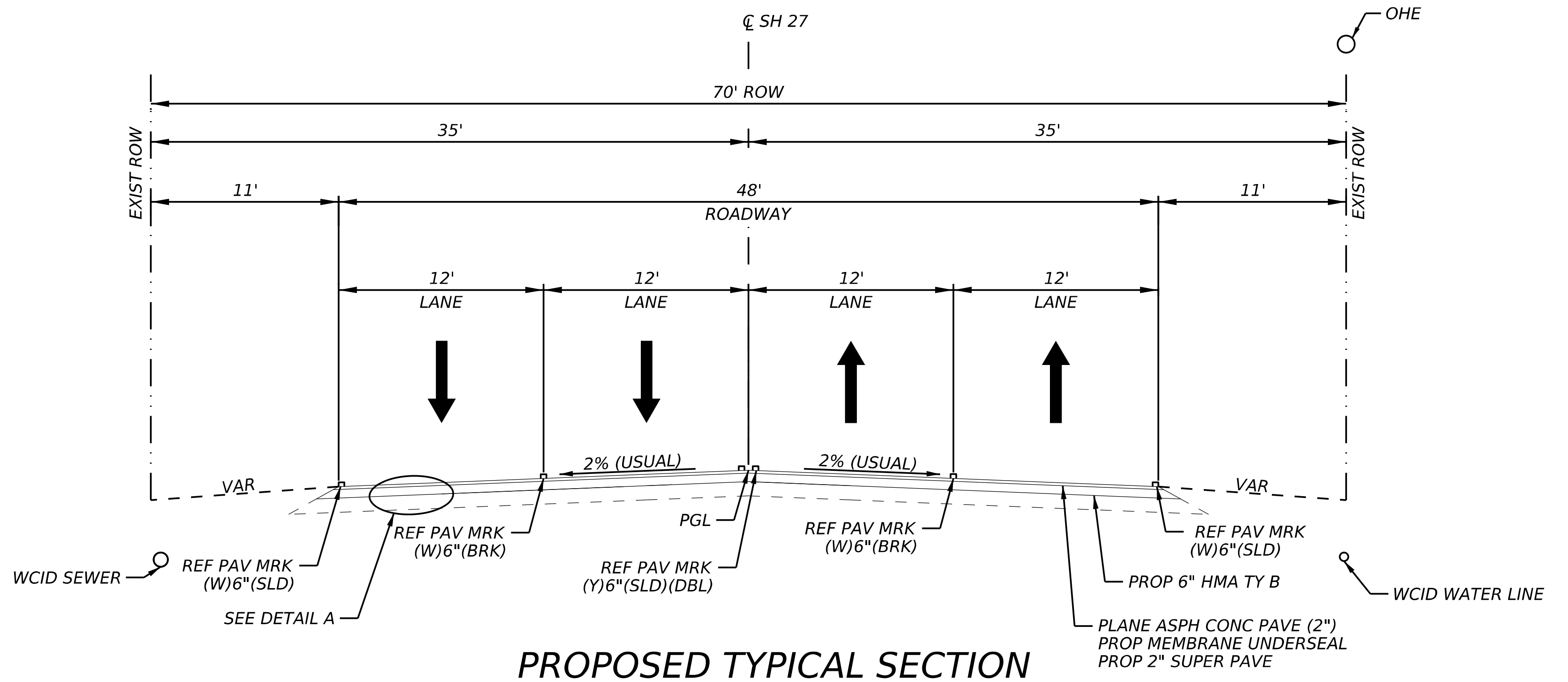
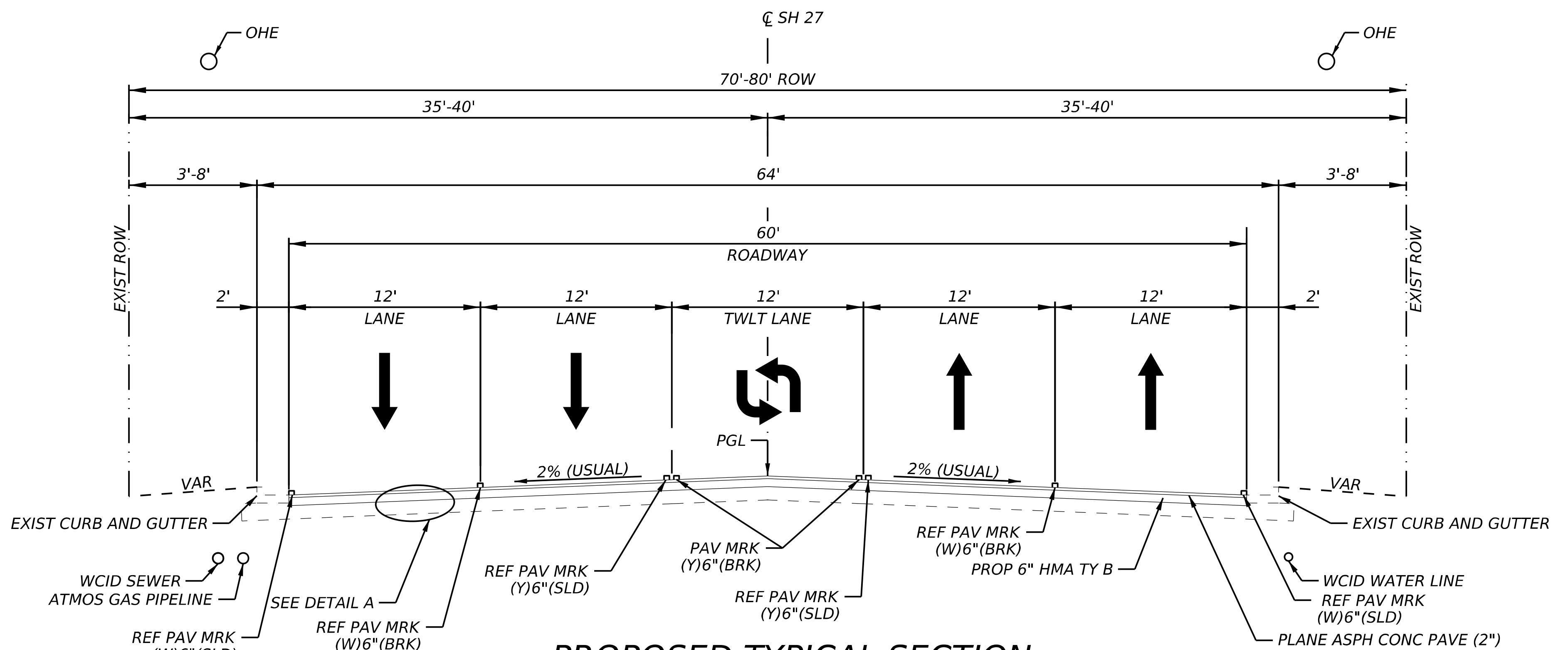


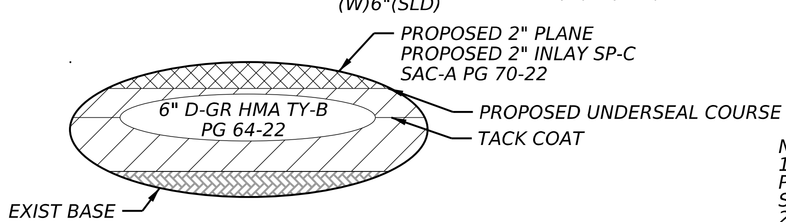
PROPOSED TYPICAL SECTION

STA. 820+44.06 TO STA. 823+37.13



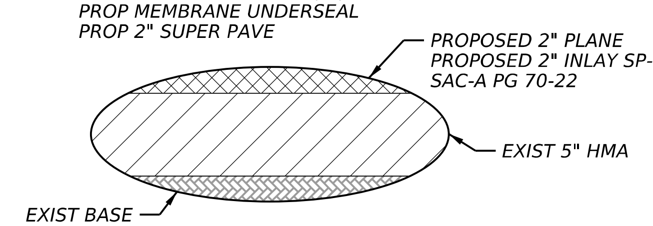
PROPOSED TYPICAL SECTION

STA. 823+37.13 TO STA. 861+94.68



DETAIL A

NOTES:
1. SAWCUTTING OF THE EXISTING PAVEMENT WHERE REQUIRED FOR THE PURPOSES OF FLEXIBLE PAVEMENT REPAIR SHALL BE CONSIDERED SUBSIDIARY TO ITEM 351, "FLEXIBLE PAVEMENT STRUCTURE REPAIR".
2. TACK COAT AND HMA TY-B SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 351.
3. 2" SP-C SAC-A PG 70-22 SHALL BE PAID FOR DIRECTLY UNDER THE PERTINENT BID ITEM.



DETAIL B

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF CURB & GUTTER AND SIDEWALK LOCATIONS
3. SEE TRAFFIC CONTROL PLAN LAYOUT FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.
4. REMOVAL OF EXISTING HMA AND CONSTRUCTION OF 8" HMA TY B TO BE PAID FOR UNDER ITEM 351.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

Kimley»Horn F-928

Texas Department of Transportation

SH27

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		9

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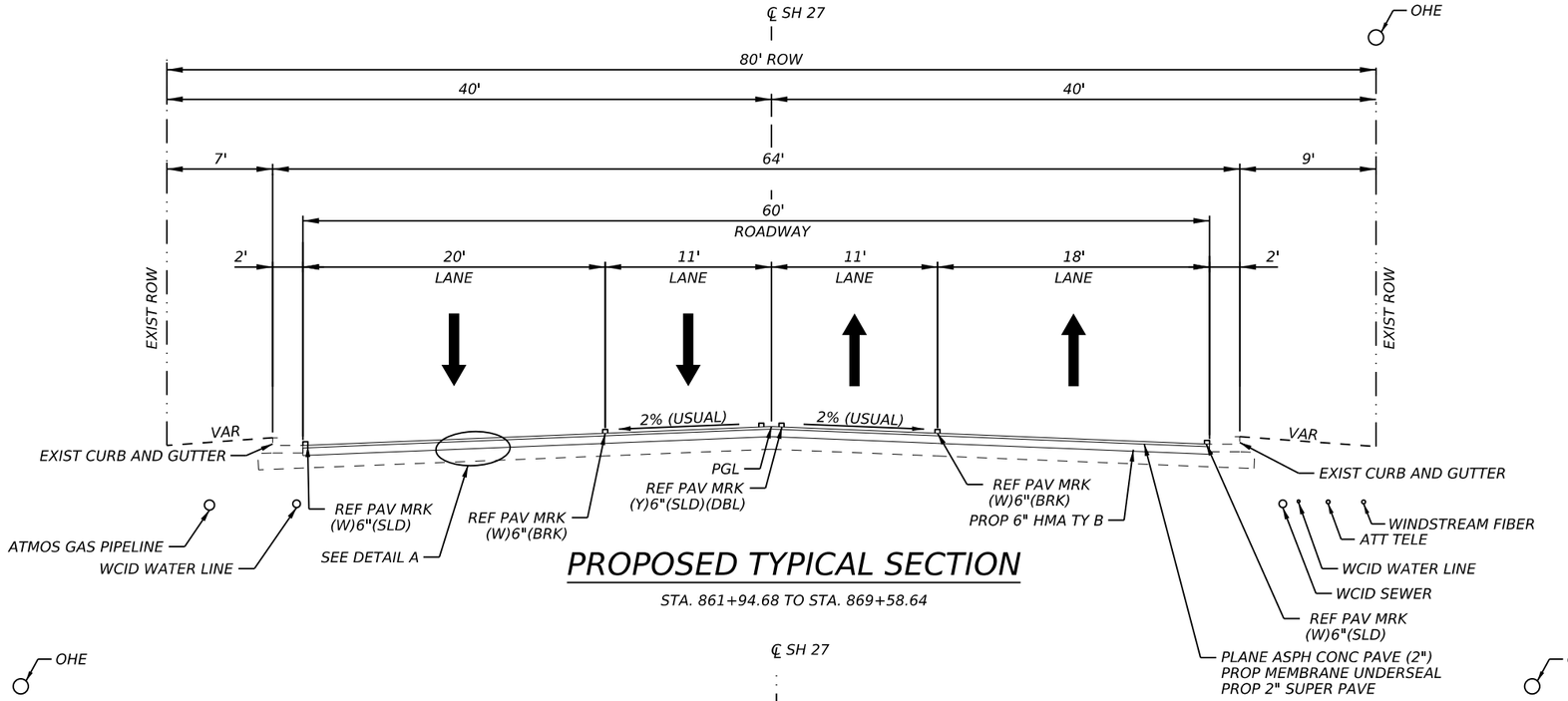
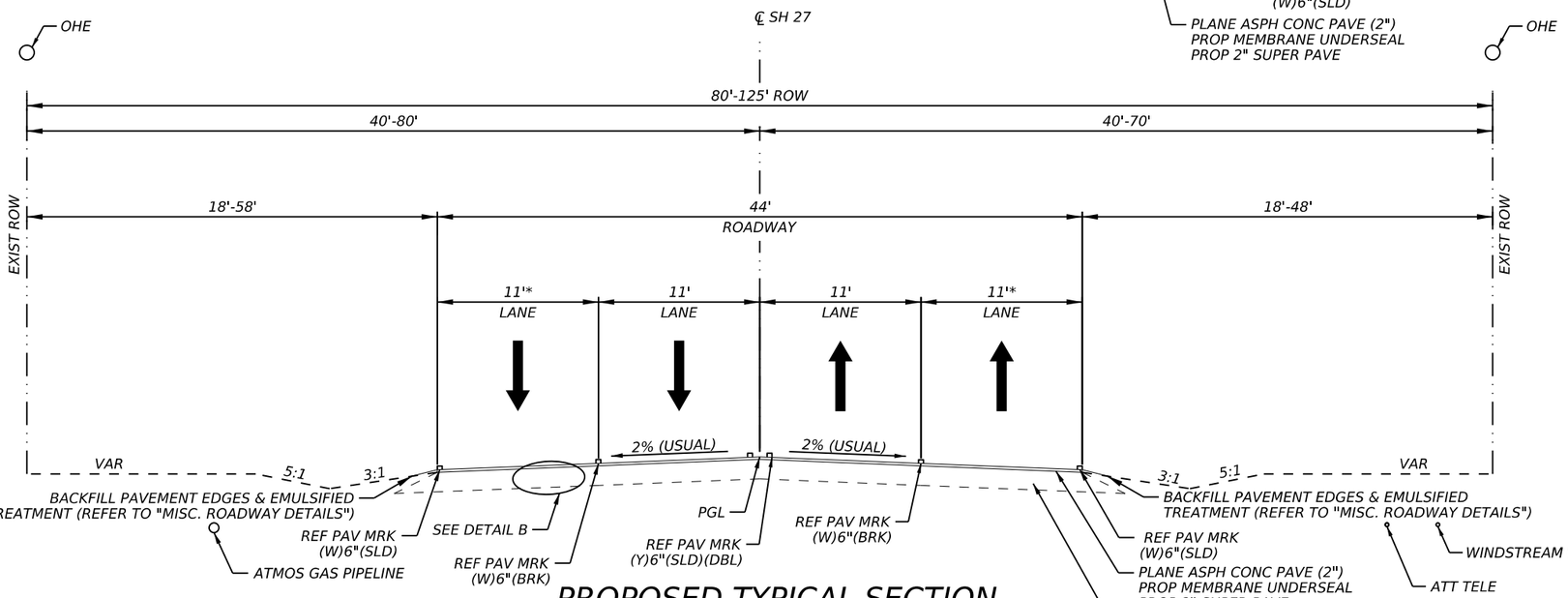


PROPOSED TYPICAL SECTION

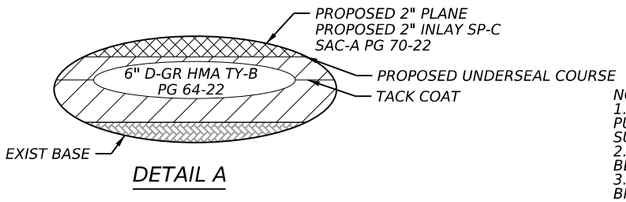
STA. 861+94.68 TO STA. 869+58.64



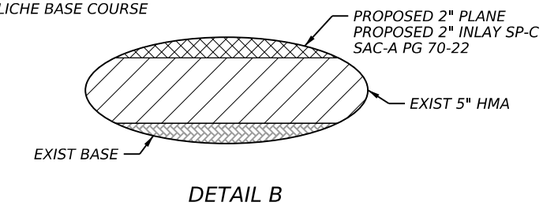
PROPOSED TYPICAL SECTION

STA. 869+58.64 TO STA. 896+37.80
*CYPRESS CREEK BRIDGE STA. 870+89.50
TO STA. 874+03.00 (SEE "ROADWAY MISCELLANEOUS DETAILS"
SHEET 2 OF 2 FOR BRDIGE TYPICAL SECTION)
#FLEXIBLE PAVEMENT STRUCTURE REPAIR FROM
STA 869+58.64TO STA 870+89.50

NOTES:
1. SAWCUTTING OF THE EXISTING PAVEMENT WHERE REQUIRED FOR THE PURPOSES OF FLEXIBLE PAVEMENT REPAIR SHALL BE CONSIDERED SUBSIDIARY TO ITEM 351, "FLEXIBLE PAVEMENT STRUCTURE REPAIR".
2. TACK COAT AND HMA TY-B SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 351.
3. 2" SP-C SAC-A PG 70-22 SHALL BE PAID FOR DIRECTLY UNDER THE PERTINENT BID ITEM.



DETAIL A



DETAIL B

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF CURB & GUTTER AND SIDEWALK LOCATIONS
3. SEE TRAFFIC CONTROL PLAN LAYOUT FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.
4. REMOVAL OF EXISTING HMA AND CONSTRUCTION OF 8" HMA TY B TO BE PAID FOR UNDER ITEM 351.

10/11/2023

JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Kimley»Horn
F-928

Texas Department of Transportation

SH27

PROPOSED
TYPICAL SECTIONS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		10

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**********GENERAL NOTES**********
2014 Specification Book (Revised September 25, 2023)

========== Basis of Estimate ==========

Item	Description	Rate	Area	Quant-Unit
3085 6001	Underseal Course	0.20gal/sy	50,477 SY	10,095 GAL
	- The Following Is For Information Only - Non Pay-			
0314 6021	Emuls Asph MS-2 or SS-1	0.08gal/sy	731.8 SY	58.54 GAL

========== Asphalt Concrete Pavement ==========

Type	Location	Depth	Rate	Area	Quant-Tons
3077 6022	Main Roadbed	2-IN	230 lbs/sy	50,477 SY	5,805 TONS
0502-6001	Main Roadbed	8-IN	920lbs/sy	33,115 SY	15,232.9 TONS*

*For Contractors Information Only

--General--
The following State, District, Local and/or Utility Standards have been modified: T131RC

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

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Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Andres Gonzalez, P.E. – Andres.Gonzalez@txdot.gov
Roberto Madrigal – Roberto.Madrigal@txdot.gov

Contractor questions will be accepted through email, phone and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

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

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

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Taper ACP placed at curb inlets, traffic inlets and slotted drains.

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

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

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Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

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Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

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Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

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--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4:Standard work week.

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The CPM schedule shall be created and maintained using software fully compatible with Primavera Project Planner version P6 Professional R15.2 .

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Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees.

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Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

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Backfill material type will be submitted and approved by the Engineer prior to installation. Notify the Engineer before stockpiling operations begin at the source or sources of material. Keep the Engineer informed on progress of stockpiling operations.

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Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 320--
Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

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--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

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Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

For closures not listed in the TCP; the lane closures are limited to between the hours of __8:30 A.M. to 4:00 P.M. for Daytime work and 9 P.M. to 5 A.M. for Nighttime work, and at least one lane must remain open at all times.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

Day time: Weekdays from 8:30AM to 4:00PM
Nighttime: *Weekdays from 9PM to 5AM excluding Holidays*
(With uniformed off duty law enforcement officers)
No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Saturday March 30
Sunday March 31

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding

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that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 510--
The length of the one-way traffic control section is limited to intersections as directed by the engineer.

--Item 531--
The curb ramp locations shown in the plans have considered the geometric features of the intersection, traffic signals, and the pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet TAS requirements.

--Item 540--
Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) leave-out in the concrete as shown in the state standard for MBGF Mow Strip. After the posts are installed, fill the leave-outs with a Grout mixture as shown in the state standard for MBGF Mow Strip.

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

--Item 585--
Use Surface Test Type B, pay adjustment schedule ___3_ to evaluate ride quality of travel lanes.

--Item 644--
The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.
--Item 666--
Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 3076 & 3077 --
Table 10 in Item 3076 and Table 11in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.

Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

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--Item 3085 --

The minimum application rates are listed in Table UC/BC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

Table UC/BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

--Item 6185--
_1__ shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project. See TMA and TA Summary sheet in the plans.

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Based on the age of the bridge rail on this project, non-galvanized bridge rail is assumed to contain lead-based paint. The torching, grinding or mechanical cutting of the rail or its components is not recommended without the use of the proper personal protective equipment (i.e. respirators). The contractor must remove the rail by unbolting the rail supports from the bridge. If a bolt is rusted in place and cannot be removed by unbolting, please notify the engineer ten working days before the rail needs to be removed and TxDOT will make arrangements with a specialty contractor to remove the bolts.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

For closures not listed in the TCP; the lane closures are limited to between the hours of __8:30 A.M. to 4:00 P.M. for Daytime work and 9 P.M. to 5 A.M. for Nighttime work, and at least one lane must remain open at all times.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

Day time: Weekdays from 8:30AM to 4:00PM
Nighttime: *Weekdays from 9PM to 5AM excluding Holidays*
(With uniformed off duty law enforcement officers)
No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Saturday March 30
Sunday March 31

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding

that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 510--
The length of the one-way traffic control section is limited to intersections as directed by the engineer.

--Item 531--
The curb ramp locations shown in the plans have considered the geometric features of the intersection, traffic signals, and the pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet TAS requirements.

--Item 540--
Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) leave-out in the concrete as shown in the state standard for MBGF Mow Strip. After the posts are installed, fill the leave-outs with a Grout mixture as shown in the state standard for MBGF Mow Strip.

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

--Item 585--
Use Surface Test Type B, pay adjustment schedule ___3_ to evaluate ride quality of travel lanes.

--Item 644--
The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.
--Item 666--
Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 3076 & 3077 --
Table 10 in Item 3076 and Table 11in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.

Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

--Item 3085 --

The minimum application rates are listed in Table UC/BC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

Table UC/BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

--Item 6185--
_1__ shadow vehicles with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project. See TMA and TA Summary sheet in the plans.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0142-06-029 **DISTRICT** San Antonio **COUNTY** Kendall
HIGHWAY SH 27

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0142-06-029**			
			PROJECT ID		**A00134957**			
			COUNTY		**Kendall**			
			HIGHWAY		**SH 27**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	100-6028	PREP ROW (TREE PRUNING)		EA	1.000		1.000	
	104-6010	REMOVING CONC (RIPRAP)		CY	6.200		6.200	
	104-6011	REMOVING CONC (MEDIANS)		SY	805.000		805.000	
	104-6021	REMOVING CONC (CURB)		LF	129.000		129.000	
	105-6015	REMOVING STAB BASE & ASPH PAV (8"-10")		SY	416.000		416.000	
	110-6001	EXCAVATION (ROADWAY)		CY	20.000		20.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)		CY	20.000		20.000	
	134-6001	BACKFILL (TY A)		STA	22.000		22.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")		SY	394.000		394.000	
	162-6002	BLOCK SODDING		SY	394.000		394.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)		SY	197.000		197.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)		SY	197.000		197.000	
	168-6001	VEGETATIVE WATERING		MG	14.000		14.000	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)		SY	394.000		394.000	
	351-6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")		SY	33,115.000		33,115.000	
	354-6045	PLANE ASPH CONC PAV (2")		SY	50,477.000		50,477.000	
	429-6001	CONC STR REPAIR(CLEAN & COAT WTH EPOXY)		SF	2.000		2.000	
	429-6009	CONC STR REPAIR (STANDARD)		SF	36.000		36.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)		CY	12.900		12.900	
	438-6009	CLEANING EXISTING JOINTS		LF	528.000		528.000	
	451-6004	RETROFIT RAIL (TY T131RC)		LF	662.200		662.200	
	454-6008	HEADER TYPE EXPANSION JOINT		CF	110.000		110.000	
	454-6009	JOINT SEALANT		LF	528.000		528.000	
	480-6001	CLEAN EXIST CULVERTS		EA	3.000		3.000	
	500-6001	MOBILIZATION		LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	7.000		7.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)		LF	229.000		229.000	
	506-6011	ROCK FILTER DAMS (REMOVE)		LF	229.000		229.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY	120.000		120.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)		SY	120.000		120.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")		LF	525.000		525.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	525.000		525.000	
	510-6001	ONE-WAY TRAF CONT (FLAGGER CONT)		HR	40.000		40.000	
	529-6002	CONC CURB (TY II)		LF	104.000		104.000	
	529-6008	CONC CURB & GUTTER (TY II)		LF	45.000		45.000	
	529-6023	CONC CURB & GUTTER(VALLEY GUTTER)(36")		LF	102.000		102.000	
	530-6001	INTERSECTIONS (CONC)		SY	284.000		284.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0142-06-029 **DISTRICT** San Antonio **COUNTY** Kendall
HIGHWAY SH 27

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0142-06-029**			
			PROJECT ID		**A00134957**			
			COUNTY		**Kendall**			
			HIGHWAY		**SH 27**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	530-6005	DRIVEWAYS (ACP)		SY	60.000		60.000	
	531-6004	CURB RAMPS (TY 1)		EA	2.000		2.000	
	531-6005	CURB RAMPS (TY 2)		EA	2.000		2.000	
	531-6006	CURB RAMPS (TY 3)		EA	1.000		1.000	
	531-6008	CURB RAMPS (TY 5)		EA	1.000		1.000	
	531-6010	CURB RAMPS (TY 7)		EA	2.000		2.000	
	531-6013	CURB RAMPS (TY 10)		EA	1.000		1.000	
	536-6002	CONC MEDIAN		SY	990.000		990.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)		LF	25.000		25.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)		EA	2.000		2.000	
	540-6014	SHORT RADIUS		LF	18.000		18.000	
	540-6015	DRIVEWAY TERMINAL ANCHOR SECTION		EA	1.000		1.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION		EA	2.000		2.000	
	540-6018	MTL BM GD FEN TRANS (NON - SYM)		EA	2.000		2.000	
	540-6039	MTL BM GD FEN TRANS (31"-28")(25')		EA	1.000		1.000	
	540-6041	MTL W-BEAM GD FEN (NESTED)(TIM POST)		LF	40.000		40.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)		EA	1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)		EA	71.000		71.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)		EA	5.000		5.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)		EA	3.000		3.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)		EA	1.000		1.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)		EA	5.000		5.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)		EA	1.000		1.000	
	644-6034	IN SM RD SN SUP&AM TYS80(1)SA(U-1EXT)		EA	1.000		1.000	
	644-6076	REMOVE SM RD SN SUP&AM		EA	96.000		96.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)		EA	8.000		8.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA	2.000		2.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)		EA	8.000		8.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND		EA	2.000		2.000	
	658-6101	INSTL OM ASSM (OM-2Z)(WFLX)SRF)SRF		EA	6.000		6.000	
	662-6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)		LF	2,280.000		2,280.000	
	662-6014	WK ZN PAV MRK NON-REMOV (W)12"(SLD)		LF	85.000		85.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)		LF	1,453.000		1,453.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)		LF	12,031.000		12,031.000	
	662-6039	WK ZN PAV MRK NON-REMOV (Y)12"(SLD)		LF	175.000		175.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W		EA	1,240.000		1,240.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2		EA	1,956.000		1,956.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0142-06-029 **DISTRICT** San Antonio **COUNTY** Kendall
HIGHWAY SH 27

			CONTROL SECTION JOB		**0142-06-029**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00134957**		
			COUNTY		**Kendall**		
			HIGHWAY		**SH 27**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	332.000		332.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	85.000		85.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	697.000		697.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	23.000		23.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	5.000		5.000	
	666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	6.000		6.000	
	666-6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	323.000		323.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	467.000		467.000	
	666-6225	PAVEMENT SEALER 6"	LF	27,372.000		27,372.000	
	666-6226	PAVEMENT SEALER 8"	LF	655.000		655.000	
	666-6228	PAVEMENT SEALER 12"	LF	552.000		552.000	
	666-6230	PAVEMENT SEALER 24"	LF	697.000		697.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA	23.000		23.000	
	666-6232	PAVEMENT SEALER (WORD)	EA	5.000		5.000	
	666-6243	PAVEMENT SEALER (YLD TRI)	EA	6.000		6.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	3,160.000		3,160.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	6,323.000		6,323.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1,453.000		1,453.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	16,436.000		16,436.000	
	672-6007	REFL PAV MRKR TY I-C	EA	199.000		199.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	635.000		635.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF	27,372.000		27,372.000	
	678-6004	PAV SURF PREP FOR MRK (8")	LF	655.000		655.000	
	678-6006	PAV SURF PREP FOR MRK (12")	LF	552.000		552.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	697.000		697.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	23.000		23.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	5.000		5.000	
	3077-6022	SP MIXES SP-C SAC-A PG70-22	TON	5,805.000		5,805.000	
	3085-6001	UNDERSEAL COURSE	GAL	10,096.000		10,096.000	
	4171-6001	INSTALL BRIDGE IDENTIFICATION NUMBERS	EA	2.000		2.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	65.000		65.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	86.000		86.000	
	01	STATE FORCE ACCOUNT WORK (NON-PARTICIPATING)	LS	1.000		1.000	
	08	CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0142-06-029 **DISTRICT** San Antonio **COUNTY** Kendall
HIGHWAY SH 27

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0142-06-029**			
		PROJECT ID		**A00134957**			
		COUNTY		**Kendall**			
		HIGHWAY		**SH 27**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF TRAFFIC AND EROSION CONTROL PLAN QUANTITIES

PLAN SHEET NO.	PHASE	STATION TO STATION	0160 6003 FURNISHING AND PLACING TOPSOIL (4")	0162 6002 BLOCK SODDING	0164 6009 BROADCAST SEED (TEMP) (WARM)	0164 6011 BROADCAST SEED (TEMP) (COOL)	0166 6002 FERTILIZER *	0168 6001 VEGETATIVE WATERING	0169 6001 SOIL RETENTION BLANKETS (CL 1) (TY A)	0351 6004 FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	0480 6001 CLEAN EXIST CULVERTS	0506 6001 ROCK FILTER DAMS (INSTALL) (TY 1)	0506 6011 ROCK FILTER DAMS (REMOVE)
TRAFFIC CONTROL PLAN SHEETS			SY	SY	SY	SY	TON	MG	SY	SY	EA	LF	LF
32	PHASE 1	BEGIN TO STA 827+50.00											
33		STA 827+50.00 TO STA 839+50.00	12	12	6	6	0.01	1	12			6	
34		STA 839+50.00 TO STA 851+50.00	30	30	15	15	0.01	1	30				
35		STA 851+50.00 TO STA 863+50.00	106	106	53	53	0.01	4	106		2	24	
36		STA 863+50.00 TO STA 875+50.00	186	186	93	93	0.01	6	186			39	
37		STA 875+50.00 TO STA 887+50.00										127	
38		STA 887+50.00 TO END	60	60	30	30	0.01	2	60		1	33	
39		INTERSECTION LAYOUT											
32	PHASE 2	BEGIN TO STA 827+50.00								4428			
33		STA 827+50.00 TO STA 839+50.00								8002			
34		STA 839+50.00 TO STA 851+50.00								8000			
35		STA 851+50.00 TO STA 863+50.00								8002			
36		STA 863+50.00 TO STA 875+50.00								4683			
37		STA 875+50.00 TO STA 887+50.00											
38		STA 887+50.00 TO END											
	PHASE 3	BEGIN TO END											229
		PROJECT TOTAL	**394**	**394**	**197**	**197**	**0.05**	**14**	**394**	**33115**	**3**	**229**	**229**

*FOR CONTRACTOR'S INFORMATION ONLY. WILL NOT BE PAID FOR DIRECTLY.

SUMMARY OF TRAFFIC AND EROSION CONTROL PLAN QUANTITIES (CONT'D)

PLAN SHEET NO.	PHASE	STATION TO STATION	0506 6020 CONSTRUCTION EXITS (INSTALL) (TY I)	0506 6024 CONSTRUCTION EXITS (REMOVE)	0506 6041 BIODEG EROSN CONT LOGS (INSTL) (12")	0506 6043 BIODEG EROSN CONT LOGS (REMOVE)	0510 6001 ONE-WAY TRAF CONT (FLAGGER CONT)	0662 6001 WK ZN PAV MRK NON-REMOV (W)4" (BRK)	0662 6014 WK ZN PAV MRK NON-REMOV (W)12" (SLD)	0662 6032 WK ZN PAV MRK NON-REMOV (Y)4" (BRK)	0662 6034 WK ZN PAV MRK NON-REMOV (Y)4" (SLD)
TRAFFIC CONTROL PLAN SHEETS			SY	SY	LF	LF	HR	LF	LF	LF	LF
32	PHASE 1	BEGIN TO STA 827+50.00									
33		STA 827+50.00 TO STA 839+50.00			20						
34		STA 839+50.00 TO STA 851+50.00									
35		STA 851+50.00 TO STA 863+50.00			12						
36		STA 863+50.00 TO STA 875+50.00			227						
37		STA 875+50.00 TO STA 887+50.00			136						
38		STA 887+50.00 TO END			130						
39		INTERSECTION LAYOUT	120	120							
32	PHASE 2	BEGIN TO STA 827+50.00						220		145	2846
33		STA 827+50.00 TO STA 839+50.00						550	85	505	2020
34		STA 839+50.00 TO STA 851+50.00					40	470		495	2600
35		STA 851+50.00 TO STA 863+50.00						460		308	2407
36		STA 863+50.00 TO STA 875+50.00						580			2158
37		STA 875+50.00 TO STA 887+50.00									
38		STA 887+50.00 TO END									
	PHASE 3	BEGIN TO END				525					
		PROJECT TOTAL	**120**	**120**	**525**	**525**	**40**	**2280**	**85**	**1453**	**12031**

Kimley»Horn F-928

Texas Department of Transportation

SH27

SUMMARY OF TRAFFIC AND EROSION CONTROL PLAN QUANTITIES

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		13

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SUMMARY OF TRAFFIC AND EROSION CONTROL PLAN QUANTITIES (CONT'D)

PLAN SHEET NO.	PHASE	STATION TO STATION	0662 6039 WK ZN PAV MRK NON-REMOV (Y)12" (SLD)	0662 6109 WK ZN PAV MRK SHT TERM (TAB) TY W	0662 6111 WK ZN PAV MRK SHT TERM (TAB) TY Y-2	60016002 PORTABLE CHANGEABLE MESSAGE SIGN	6185 6002 TMA (STATIONARY)	6185 6005 TMA (MOBILE OPERATION)
TRAFFIC CONTROL PLAN SHEETS			LF	EA	EA	EA	DAY	DAY
32	PHASE 1	BEGIN TO STA 827+50.00					26	
33		STA 827+50.00 TO STA 839+50.00						
34		STA 839+50.00 TO STA 851+50.00						
35		STA 851+50.00 TO STA 863+50.00						
36		STA 863+50.00 TO STA 875+50.00						
37		STA 875+50.00 TO STA 887+50.00						
38		STA 887+50.00 TO END						
39		INTERSECTION LAYOUT		2	36			
32	PHASE 2	BEGIN TO STA 827+50.00	70	90	158	1	39	
33		STA 827+50.00 TO STA 839+50.00		79	139			
34		STA 839+50.00 TO STA 851+50.00		43	168			
35		STA 851+50.00 TO STA 863+50.00	105	75	151			
36		STA 863+50.00 TO STA 875+50.00		61	108			
37		STA 875+50.00 TO STA 887+50.00		164	116			
38		STA 887+50.00 TO END		106	102			
	PHASE 3	BEGIN TO END		620	978	1		86
		PROJECT TOTAL	**175**	**1240**	**1956**	**2**	**65**	**86**

Kimley»Horn F-928

Texas Department of Transportation

SH27

SUMMARY OF TRAFFIC AND EROSION CONTROL PLAN QUANTITIES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		14

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SUMMARY OF ROADWAY QUANTITIES

PLAN SHEET NO.	STATION TO STATION	0100 6028 PREP ROW (TREE PRUNING)	0104 6010 REMOVING CONC (RIPRAP)	0104 6011 REMOVING CONC (MEDIANS)	0104 6021 REMOVING CONC (CURB)	0105 6015 REMOVING STAB BASE & ASPH (8"-10")	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)	0134 6001 BACKFILL (TY A)	0314 6021 EMULS ASPH (PRIME)(MS-2 O SS-1) #	0354 6045 PLANE ASPH CONC PAVE (2")	0429 6001 CONC STR REPAIR(CLEAN &COAT WITH EPOXY)
ROADWAY SHEETS		EA	CY	SY	LF	SY	CY	CY	STA	SY*	SY	SF
67	BEGIN TO 821+50										566	
68	821+50 TO 827+50										3895	
69	827+50 TO 833+50										4539	2
70	833+50 TO 839+50										4127	
71	839+50 TO 845+50										4185	
72	845+50 TO 851+50										4359	
73	851+50 TO 857+50	1									4272	
74	857+50 TO 863+50										4245	
75	863+50 TO 869+50										4391	
76	869+50 TO 875+50		6.2		129		20	20	1	33.4	3044	
77	875+50 TO 881+50								6	200	2983	
78	881+50 TO 887+50								6	200	2934	
79	887+50 TO 893+50								6	200	3132	
80	893+50 TO END								2.95	98.4	1408	
81	**INTERSECTION LAYOUT**			805		416					2397	
PROJECT TOTAL		**1**	**6.2**	**805**	**129**	**416**	**20**	**20**	**21.95**	**731.8**	**50477**	**2**

*FOR CONTRACTOR'S INFORMATION ONLY. SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.
#WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 0134

SUMMARY OF ROADWAY QUANTITIES (CONT'D)

PLAN SHEET NO.	STATION TO STATION	0429 6009 CONC STR REPAIR (STANDARD)	0432 6045 RIPRAP (MOW STRIP) (4 IN)	0438 6009 CLEANING EXISTING JOINTS	0451 6004 RETROFIT RAIL (TY T131RC)	0454 6008 HEADER TYPE EXPANSION JOINT	0454 6009 JOINT SEALANT	0529 6002 CONC CURB (TY II)	0529 6008 CONC CURB & GUTTER (TY II)	0529 6023 CONC CURB & GUTTER (VALLEY GUTTER) (36")	0530 6001 INTERSEC-TIONS (CONC)	0530 6005 DRIVEWAYS (ACP)
ROADWAY SHEETS		SF	CY	LF	LF	CF	LF	LF	LF	LF	SY	SY
67	BEGIN TO 821+50											
68	821+50 TO 827+50											
69	827+50 TO 833+50											
70	833+50 TO 839+50								24			
71	839+50 TO 845+50											
72	845+50 TO 851+50											
73	851+50 TO 857+50											
74	857+50 TO 863+50									102		
75	863+50 TO 869+50											
76	869+50 TO 875+50	36	12.9	528	662.2	110	528	104				
77	875+50 TO 881+50											
78	881+50 TO 887+50											
79	887+50 TO 893+50											
80	893+50 TO END											
81	**INTERSECTION LAYOUT**								21		284	60
PROJECT TOTAL		**36**	**12.9**	**528**	**662.2**	**110**	**528**	**104**	**45**	**102**	**284**	**60**

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Kimley»Horn F-928

Texas Department of Transportation

SH27

SUMMARY OF ROADWAY QUANTITIES

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		15

CK:
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DW:

SUMMARY OF ROADWAY QUANTITIES (CONT'D)

PLAN SHEET NO.	STATION TO STATION	05316004 CURB RAMPS (TY 1)	05316005 CURB RAMPS (TY 2)	05316006 CURB RAMPS (TY 3)	05316008 CURB RAMPS (TY 5)	05316010 CURB RAMPS (TY 7)	05316013 CURB RAMPS (TY 10)	0536 6002 CONC MEDIAN	0540 6001 MTL W-BEAM GD FEN (TIM POST)	0540 6006 MTL BEAM GD FEN TRANS (THRIE-BEAM)	0540 6014 SHORT RADIUS	0540 6015 DRIVEWAY TERMINAL ANCHOR SECTION
ROADWAY SHEETS		EA	EA	EA	EA	EA	EA	SY	LF	EA	LF	EA
67	BEGIN TO 821+50											
68	821+50 TO 827+50											
69	827+50 TO 833+50											
70	833+50 TO 839+50	2		1	1		1					
71	839+50 TO 845+50											
72	845+50 TO 851+50											
73	851+50 TO 857+50		2									
74	857+50 TO 863+50					2						
75	863+50 TO 869+50											
76	869+50 TO 875+50								25	2	18	1
77	875+50 TO 881+50											
78	881+50 TO 887+50											
79	887+50 TO 893+50											
80	893+50 TO END											
81	**INTERSECTION LAYOUT**							990				
PROJECT TOTAL		**2**	**2**	**1**	**1**	**2**	**1**	**990**	**25**	**2**	**18**	**1**

SUMMARY OF ROADWAY QUANTITIES

PLAN SHEET NO.	STATION TO STATION	0540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	0540 6018 MTL BM GD FEN TRANS (NON-SYM)	0540 6039 MTL BM GD FEN TRANS (31"-28")(25')	0540 6041 MTL BM GD FEN (NESTED) (TIM POST)	0544 6001 GUARDRAIL END TREATMENT (INSTALL)	3077 6022 SP MIXES SP-C SAC-A PG70-22	3085 6001 UNDERSEAL COURSE	41716001 INSTALL BRIDGE IDENTIFICATION NUMBERS
ROADWAY SHEETS		EA	EA	EA	LF	EA	SY*	SY*	EA
67	BEGIN TO 821+50						566	566	
68	821+50 TO 827+50						3895	3895	
69	827+50 TO 833+50						4539	4539	
70	833+50 TO 839+50						4127	4127	
71	839+50 TO 845+50						4185	4185	
72	845+50 TO 851+50						4359	4359	
73	851+50 TO 857+50						4272	4272	
74	857+50 TO 863+50						4245	4245	
75	863+50 TO 869+50						4391	4391	
76	869+50 TO 875+50	2	2	1	40	1	3044	3044	2
77	875+50 TO 881+50						2983	2983	
78	881+50 TO 887+50						2934	2934	
79	887+50 TO 893+50						3132	3132	
80	893+50 TO END						1408	1408	
81	**INTERSECTION LAYOUT**						2397	2397	
PROJECT TOTAL		**2**	**2**	**1**	**40**	**1**	**50477**	**50477**	**2**

*FOR CONTRACTOR'S INFORMATION ONLY. SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.

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Texas Department of Transportation

SH27

SUMMARY OF ROADWAY QUANTITIES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		16

CK:
DW:
CK:
DW:

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

PLAN SHEET NO.	STATION TO STATION	0644 6001 IN SM RD SN SUP&AM TY10BWG (1)SA(P)	0644 6004 IN SM RD SN SUP&AM TY10BWG (1)SA(T)	0644 6007 IN SM RD SN SUP&AM TY10BWG (1)SA(U)	0644 6027 IN SM RD SN SUP&AM TYS80 (1)SA(P)	0644 6030 IN SM RD SN SUP&AM TYS80 (1)SA(T)	0644 6033 IN SM RD SN SUP&AM TYS80 (1)SA(U)	0644 6034 IN SM RD SN SUP&AM TYS80 (1)SA (U-1EXT)	0644 6076 REMOVE SM RD SN SUP&AM	0658 6014 INSTL DEL ASSM (D-SW)SZ (BR)CTB (BI)	0658 6060 REMOVE DELIN & OBJECT MARKER ASSMS	0658 6062 INSTL DEL ASSM (D-SW)SZ1 (BRF)GF2(BI)
SPMD SHEETS		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
119	BEGIN TO 827+50.00	8							8			
120	827+50.00 TO 839+50.00	9	1			1		1	12			
121	839+50.00 TO 851+50.00	12	2	3		2			26			
122	851+50.00 TO 863+50.00	16	1			1			19			
123	863+50.00 TO 875+50.00	12					1		14	8	2	8
124	875+50.00 TO 887+50.00	5			1	1			7			
125	887+50.00 TO END	7	1						8			
81	INTERSECTION LAYOUT	2							2			
	PROJECT TOTALS	**71**	**5**	**3**	**1**	**5**	**1**	**1**	**96**	**8**	**2**	**8**

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES (CONT'D)

PLAN SHEET NO.	STATION TO STATION	0658 6099 INSTL OM ASSM (OM-2Z)(WFLX) GND	0658 6101 INSTL OM ASSM (OM-2Z)(WFLX) SRF)SRF	0666 6036 REFL PAV MRK TY I (W)8"(SLD) (100MIL)	0666 6306 RE PM W/RET REQ TY I (W) 6"(BRK) (100MIL)	0666 6042 REFL PAV MRK TY I (W)12"(SLD) (100MIL)	0666 6048 REFL PAV MRK TY I (W)24"(SLD) (100MIL)	0666 6054 REFL PAV MRK TY I (W)(ARROW) (100MIL)	0666 6078 REFL PAV MRK TY I (W)(WORD) (100MIL)	0666 6102 REF PAV MRK TY I (W) 36" (YLD TRI) (100MIL)	0666 6318 RE PM W/RET REQ TY I (Y) 6"(BRK) (100MIL)
SPMD SHEETS		EA	EA	LF	LF	LF	LF	EA	EA	EA	LF
119	BEGIN TO 827+50.00			72	220		25	3	1		145
120	827+50.00 TO 839+50.00		2	100	550	85	55	8	2		505
121	839+50.00 TO 851+50.00				470		126	4			495
122	851+50.00 TO 863+50.00		2	160	460		306	8	2		308
123	863+50.00 TO 875+50.00	2	2		580		112				
124	875+50.00 TO 887+50.00				590		10				
125	887+50.00 TO END				290		23				
81	INTERSECTION LAYOUT						40			6	
	PROJECT TOTALS	**2**	**6**	**332**	**3160**	**85**	**697**	**23**	**5**	**6**	**1453**

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

PLAN SHEET NO.	STATION TO STATION	0666 6138 REFL PAV MRK TY I (Y)8"(SLD) (100MIL)	0666 6141 REFL PAV MRK TY I (Y)12"(SLD) (100MIL)	0666 6225 PAVEMENT SEALER 6"	0666 6226 PAVEMENT SEALER 8"	0666 6228 PAVEMENT SEALER 12"	0666 6230 PAVEMENT SEALER 24"	0666 6231 PAVEMENT SEALER ARROW	0666 6232 PAVEMENT SEALER WORD	0666 6243 PAVEMENT SEALER (YLD TRI)	0666 6309 RE PM W/RET REQ TY I (W) 6"(SLD) (100MIL)
SPMD SHEETS		LF	LF	LF	LF	LF	LF	EA	EA	EA	LF
119	BEGIN TO 827+50.00		70	4549	72	70	25	3	1		1338
120	827+50.00 TO 839+50.00			3549	100	85	55	8	2		474
121	839+50.00 TO 851+50.00			3565			126	4			
122	851+50.00 TO 863+50.00		105	3481	160	105	306	8	2		306
123	863+50.00 TO 875+50.00			2952			112				214
124	875+50.00 TO 887+50.00			5256			10				2356
125	887+50.00 TO END		35	3910		35	23				1635
81	INTERSECTION LAYOUT	323	257	110	323	257	40			6	
	PROJECT TOTALS	**323**	**467**	**27372**	**655**	**552**	**697**	**23**	**5**	**6**	**6323**

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Kimley»Horn F-928

Texas Department of Transportation

SH27

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		17

CK:
DW:
CK:
DW:

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES (CONT'D)

PLAN SHEET NO.	STATION TO STATION	0666 6321 RE PM W/RET REQ TY I (Y) 6"(SLD) (100MIL)	0672 6007 REFL PAV MRKR TY I-C	0672 6009 REFL PAV MRKR TY II-A-A	0678 6002 PAV SURF PREP FOR MRK(6")	0678 6004 PAV SURF PREP FOR MRK(8")	0678 6006 PAV SURF PREP FOR MRK(12")	0678 6008 PAV SURF PREP FOR MRK(24")	0678 6009 PAV SURF PREP FOR MRK(ARROW)	0678 6016 PAV SURF PREP FOR MRK(WORD)
SPMD SHEETS		LF	EA	EA	LF	LF	LF	LF	EA	EA
119	BEGIN TO 827+50.00	2846	16	76	4549	72	70	25	3	1
120	827+50.00 TO 839+50.00	2020	53	52	3549	100	85	55	8	2
121	839+50.00 TO 851+50.00	2600	24	52	3565			126	4	
122	851+50.00 TO 863+50.00	2407	32	90	3481	160	105	306	8	2
123	863+50.00 TO 875+50.00	2158	29	110	2952			112		
124	875+50.00 TO 887+50.00	2310	30	116	5256			10		
125	887+50.00 TO END	1985	15	94	3910		35	23		
81	INTERSECTION LAYOUT	110		45	110	323	257	40		
	PROJECT TOTALS	**16436**	**199**	**635**	**27372**	**655**	**552**	**697**	**23**	**5**

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Kimley»Horn F-928

Texas Department of Transportation

SH27

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		18

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET					6185 6002	6185 6005
			FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
1	1	TCP(2-4)-18, TCP(1-3)-18	1		1	26	26	
2	2	TCP(1-4)-18, TCP(2-4)-18	1		1	39	39	
3	3	TCP(3-1)-13, TCP(3-3)-14		2	2	43		86
		TOTALS	2	2			65	86

NOTE.
FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.
RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.
TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)
DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENTUATORS WILL BE USED FOR THE SPECIFIC TCP.
TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)
TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0142	06	029	SH27
	DIST	COUNTY		
	SAT	KENDALL		
	FEDERAL AID PROJECT			SHEET NO.
				19

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN THREE (3) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL NEW ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURRING, AS PER THE PHASES NOTED BELOW.
(3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.
(4) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC"AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANDARD SPECIFICATIONS, AND TO THE GENERAL NOTES
(5) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:
PHASE 1 - PERFORM BRIDGE REPAIR, RETROFIT BRIDGE RAIL, CLEAN EXIST CULVERTS, CONSTRUCT PEDESTRIAN RAMPS AND CONSTRUCT INTERSECTION IMPROVEMENTS AT FRONT STREET.
PHASE 2 - PERFORM BASE REPAIRS FOR ALL LANES FROM US 87 TO THE CYPRESS CREEK BRIDGE.
PHASE 3 - FINAL SURFACE, FINAL MARKINGS AND SIGNS.

GENERAL

(1) NIGHTLY LANE CLOSURES WILL BE PERMITTED FOR PHASE 2A AND 2E FROM 9:00 PM TO 5:00 AM UNLESS DIRECTED BY THE ENGINEER. WORKING HOURS FOR ALL OTHER PHASES WILL BE LIMITED FROM 8:30 AM TO 4:00 PM UNLESS DIRECTED BY THE ENGINEER.
(2) THE LENGTH OF THE WORK AREA FOR FLEXIBLE PAVEMENT STRUCTURE REPAIR SHALL BE 800 LF PER DAY, OR AS DETERMINED BY THE ENGINEER.
(3) CONTRACTOR SHALL COORDINATE ALL DRIVE-WAY CLOSURES WITH PROPERTY OWNERS 48 HOURS PRIOR TO CONSTRUCTION.
(4) UP TO ONE INTERSECTION AT A TIME MAY BE CLOSED FOR CONSTRUCTION. CONTRACTOR TO COORDINATE WITH ENGINEER FOR INTERSECTION CLOSURES DURING FLEXIBLE PAVEMENT STRUCTURE REPAIR. CONTRACTOR TO WORK ON ONE INTERSECTION AT A TIME, UNLESS DIRECTED BY THE ENGINEER.
(5) PHASE 1 AND PHASE 2 CONSTRUCTION ACTIVITIES ARE PERMITTED TO BE ONGOING CONCURRENTLY OR AS DIRECTED BY THE ENGINEER.
(6) CONTRACTOR SHALL MAINTAIN ONE CROSSWALK IN EACH DIRECTION PER INTERSECTION AT ALL TIMES.

PHASE 1

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE PROPOSED PEDESTRIAN RAMPS, INTERSECTION IMPROVEMENTS AT FRONT STREET, CLEAN THE EXISTING CULVERTS, AND PERFORM BRIDGE REPAIRS. LANE CLOSURES AS REQUIRED FOR PHASE 1 SHALL BE IN ACCORDANCE WITH TXDOT STANDARD TCP(2-4)-18.

(1) INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS, AND BARRICADES IN ACCORDANCE WITH STATE TCP STANDARDS AND AS SHOWN ON THE PLANS.
(2) PLACE TEMPORARY EROSION CONTROL DEVICES PER PLANS.
(3) RETROFIT T131RC RAIL ON SB SIDE OF CYPRESS CREEK BRIDGE BEFORE REMOVING THE EXISTING RAIL.
(4) REMOVE EXIST RAIL FROM SB SIDE OF CYPRESS CREEK BRIDGE.
(5) RETROFIT T131RC RAIL ON NB SIDE OF CYPRESS CREEK BRIDGE.
(6) REMOVE PAVEMENT AND RAISED MEDIAN AT FRONT STREET AS SHOWN IN THE PLANS.
(7) CONSTRUCT RAISED MEDIAN AND INTERSECTION IMPROVEMENTS PER PLANS.
(8) CONSTRUCT CURB RAMPS AT 7TH STREET, HIGH STREET AND MAIN STREET PER PLANS.
(9) CLEAN AND REPAIR EXIST CULVERTS AS SHOWN IN THE PLANS.
(10) PERFORM CONCRETE STRUCTURE REPAIRS AT CYPRESS CREEK BRIDGE PER PLANS.

PHASE 2A (NIGHTTIME WORK)

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FLEXIBLE PAVEMENT STRUCTURE REPAIR OF THE OUTSIDE SOUTHBOUND LANE OF SH27 FROM STA 820+44.06 TO STA 870+89.50. LANE CLOSURES AS REQUIRED FOR PHASE 2A SHALL BE IN ACCORDANCE WITH TXDOT STANDARD TCP(2-4)-18.

(1) INSTALL/ADJUST ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES, AND WORK ZONE PAVEMENT MARKINGS PER PLANS.
(2) INSTALL/ADJUST TEMPORARY EROSION CONTROL DEVICES.
(3) PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIR (8") FOR OUTSIDE SOUTHBOUND LANE PER PLANS.
(4) PLACE WORKZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH WZ(STPM)-23 AND PER PLANS. TABS SHALL BE PLACED DAILY.

PHASE 2B

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FLEXIBLE PAVEMENT STRUCTURE REPAIR OF THE INSIDE SOUTHBOUND LANE OF SH27 FROM STA 820+44.06 TO STA 870+89.50. LANE CLOSURES AS REQUIRED FOR PHASE 2B SHALL BE IN ACCORDANCE WITH TXDOT STANDARD TCP(2-4)-18.

(1) INSTALL/ADJUST ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES, AND WORK ZONE PAVEMENT MARKINGS PER PLANS.
(2) INSTALL/ADJUST TEMPORARY EROSION CONTROL DEVICES.
(3) PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIR (8") FOR INSIDE SOUTHBOUND LANE PER PLANS.
(4) PLACE WORKZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH WZ(STPM)-23 AND PER PLANS. TABS SHALL BE PLACED DAILY.

PHASE 2C

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FLEXIBLE PAVEMENT STRUCTURE REPAIR OF THE TWO WAY LEFT TURN LANE OF SH27 FROM STA 823+37.13 TO STA 861+94.68. LANE CLOSURES AS REQUIRED FOR PHASE 2C SHALL BE IN ACCORDANCE WITH TXDOT STANDARD TCP(2-4)-18.

(1) INSTALL/ADJUST ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES, AND WORK ZONE PAVEMENT MARKINGS PER PLANS.
(2) INSTALL/ADJUST TEMPORARY EROSION CONTROL DEVICES.
(3) PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIR (8") FOR TWO WAY LEFT TURN LANE PER PLANS.
(4) PLACE WORKZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH WZ(STPM)-23 AND PER PLANS. TABS SHALL BE PLACED DAILY.

PHASE 2D

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FLEXIBLE PAVEMENT STRUCTURE REPAIR OF THE INSIDE NORTHBOUND LANE OF SH27 FROM STA 820+44.06 TO STA 870+89.50. LANE CLOSURES AS REQUIRED FOR PHASE 2D SHALL BE IN ACCORDANCE WITH TXDOT STANDARD TCP(2-4)-18.

(1) INSTALL/ADJUST ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES, AND WORK ZONE PAVEMENT MARKINGS PER PLANS.
(2) INSTALL/ADJUST TEMPORARY EROSION CONTROL DEVICES.
(3) PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIR (8") FOR INSIDE NORTHBOUND LANE PER PLANS.
(4) PLACE WORKZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH WZ(STPM)-23 AND PER PLANS. TABS SHALL BE PLACED DAILY.

PHASE 2E (NIGHTTIME WORK)

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FLEXIBLE PAVEMENT STRUCTURE REPAIR OF THE OUTSIDE NORTHBOUND LANE OF SH27 FROM STA 820+44.06 TO STA 870+89.50. LANE CLOSURES AS REQUIRED FOR PHASE 2E SHALL BE IN ACCORDANCE WITH TXDOT STANDARD TCP(2-4)-18.

(1) INSTALL/ADJUST ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES, AND WORK ZONE PAVEMENT MARKINGS PER PLANS.
(2) INSTALL/ADJUST TEMPORARY EROSION CONTROL DEVICES.
(3) PERFORM FLEXIBLE PAVEMENT STRUCTURE REPAIR (8") FOR OUTSIDE NORTHBOUND LANE PER PLANS.
(4) PLACE WORKZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH WZ(STPM)-23 AND PER PLANS. TABS SHALL BE PLACED DAILY.

PHASE 3

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE FINAL SURFACE, EDGE REPAIR, SIGNS AND PAVEMENT MARKINGS OF SH27 FROM 820+44.06 TO 896+37.80.

(1) INSTALL/ADJUST TCP SIGNS AND BARRICADES FOR SURFACING OPERATIONS.
(2) INSTALL/ADJUST TEMPORARY EROSION CONTROL DEVICES.
(3) PLANE AND INLAY 2" OF PAVEMENT THROUGH PROJECT LIMITS PER PLANS. CONTRACTOR TO LIMIT DAILY OPERATIONS TO WHAT CAN BE PLANED, INLAYED, HAVE TEMPORARY TABS PLACED AND FULLY OPENED TO TRAFFIC AT NIGHT.
(4) BACKFILL PAVEMENT EDGES AND APPLY EMULSIFIED ASPHALT TREATMENT PER PLANS. PLACE SEEDING PRIOR TO EMULSION APPLICATION.
(5) PLACE WORK ZONE TABS AT THE END OF EACH DAY AS NEEDED AND MAINTAIN FOR THE DURATION OF SURFACING OPERATIONS.
(6) ADJUST TCP SIGNING AND MAINTAIN WORK ZONE TABS AT THE BEGINNING OF EACH WORK DAY AS WORK PROGRESSES.
(7) PERFORM BRIDGE JOINT REPAIR PER PLANS.
(8) INSTALL FINAL SIGNS AND PAVEMENT MARKINGS FOR THE ENTIRE PROJECT LIMITS UTILIZING TXDOT STANDARDS TCP(3-1)-13 AND TCP(3-3)-14.
(9) PERFORM FINAL CLEAN-UP.
(10) OPEN ALL LANES TO TRAFFIC AS APPROVED AND/OR DIRECTED BY THE ENGINEER.

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn
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SH27

TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		20

DATE: 10/11/2023 12:10:23 PM
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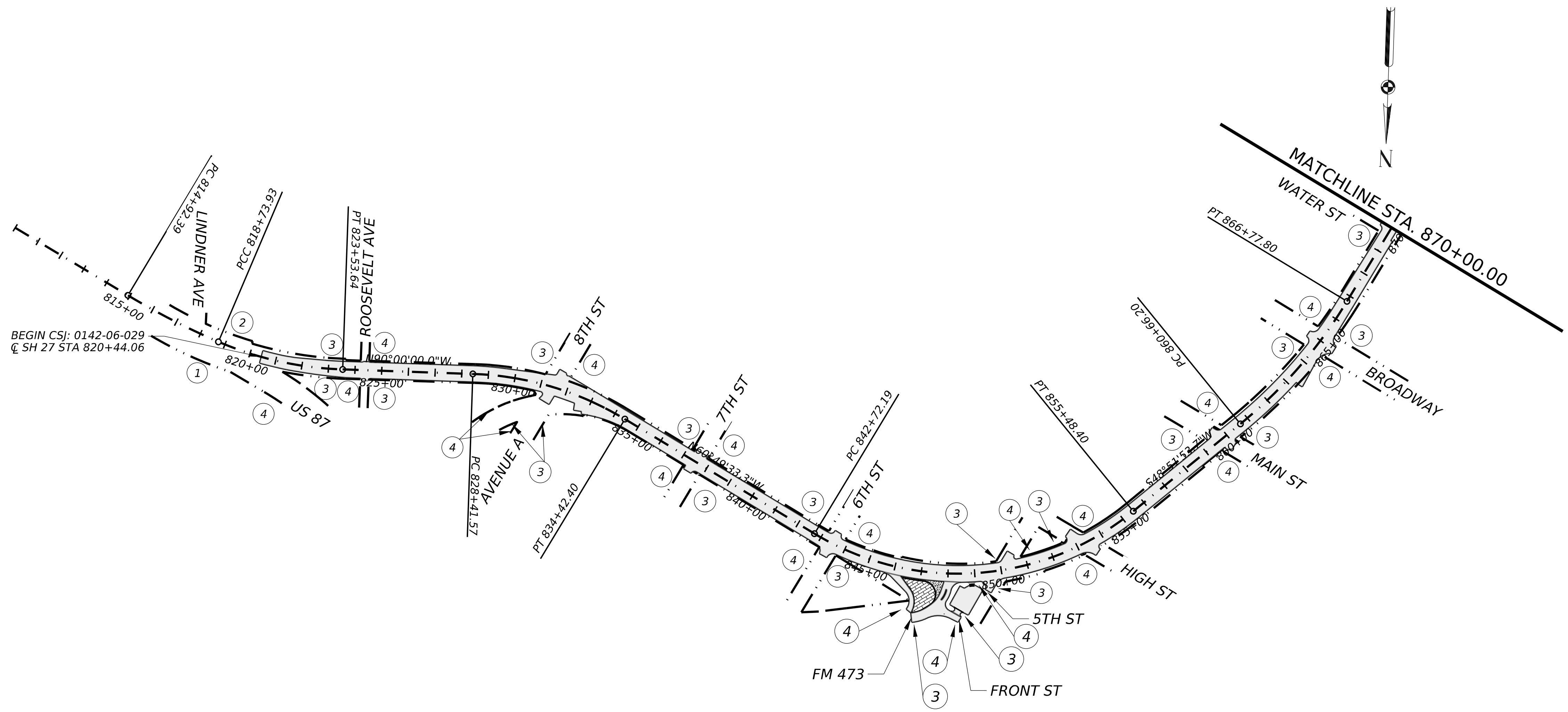
CK DW CK DW



NOTES:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
2. BARRICADES AND WARNINGS SIGNS ON THIS SHEET ARE THE MINIMUM CONSTRUCTION ZONE, SIGNING, ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. REQUIRED IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION.
3. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.
4. SEE TCP SHEETS FOR ADDITIONAL SIGNING REQUIREMENTS. APPLICABLE TCP SHEETS FOR THIS PROJECT ARE:
   TCP(1-2)-18
   TCP(1-4)-18
   TCP(2-4)-18
   TCP(3-1)-13
   TCP(3-3)-14
5. ALL ITEMS ON THIS SHEET ARE SUBSIDIARY TO ITEM 502 UNLESS STATED OTHERWISE.
6. "CAUTION OVERHEAD ELECTRIC" SIGNS ARE TO BE PLACED AT EACH OVERHEAD CROSSING.

JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 250' 500'

SCHEDULE OF TRAFFIC CONTROL DEVICES

LOCATION	USAGE / TYPE	R20-3T	G20-10T	G20-9TP	R20-5T	R20-5aTP	G20-5T	G20-6T	R2-1	CW20-1D	G20-2	G20-1aT	CW1-4R	CW1-4L	CW8-7	CTB	CHANNELIZING DEVICES	R10-6L	CW20-4D	CW8-12	CW6-3
	USAGE	OBSERVE WARNING SIGNS STATE LAW	STAY ALERT TALK OR TEXT LATER	BEGIN WORK ZONE	TRAFFIC FINES DOUBLE	WHEN WORKERS ARE PRESENT	BEGIN ROAD WORK NEXT X MILES	NAME ADDRESS CITY STATE CONTRACTOR	SPEED LIMIT XX	ROAD WORK AHEAD	END ROAD WORK	ROAD WORK NEXT XX MILES			LOOSE GRAVEL			STOP HERE ON RED	ONE LANE ROAD AHEAD	NO CENTER LINE	
1	APPROACHES TO PROJECT	X	X	X	X	X	X	X	X	X											
2	DEPARTURES FROM PROJECT								X		X										
3	SIDE STREET APPROACHES									X		X									
4	SIDE STREET DEPARTURES										X										
5	AS DIRECTED									X			X	X	X	X	X	X	X	X	X

SCHEDULE OF TRAFFIC CONTROL DEVICES

LOCATION	USAGE / TYPE	CW20-7	CW13-1P	R4-1	CW20-5bTL	CW1-6aT	CW21-10cT	CW3-4	G20-2bT	G20-1bTL	TY III BARRICADE	CW20-5TR	CW20-5TL	CW20-8T	CW8-11	CW21-1T			
	USAGE		XX MPH	DO NOT PASS	LEFT LANE CLOSED		WORK CONVOY / X VEHICLE CONVOY	BE PREPARED TO STOP	END WORK ZONE	ROAD CONSTRUCTION NEXT XX MILES		RIGHT LANE CLOSED	LEFT LANE CLOSED	NARROW LANES AHEAD	UNEVEN LANES	Give Us A BRAKE			
1	APPROACHES TO PROJECT																		
2	DEPARTURES FROM PROJECT								X										
3	SIDE STREET APPROACHES									X									
4	SIDE STREET DEPARTURES								X										
5	AS DIRECTED	X	X	X	X	X	X	X			X	X	X	X	X	X			

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SH27

SCHEDULE OF BARRICADES & ADVANCE WARNING DEVICES

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST		COUNTY	SHEET NO.
SAT		KENDALL	21

DATE: 10/11/2023 12:10:48 PM
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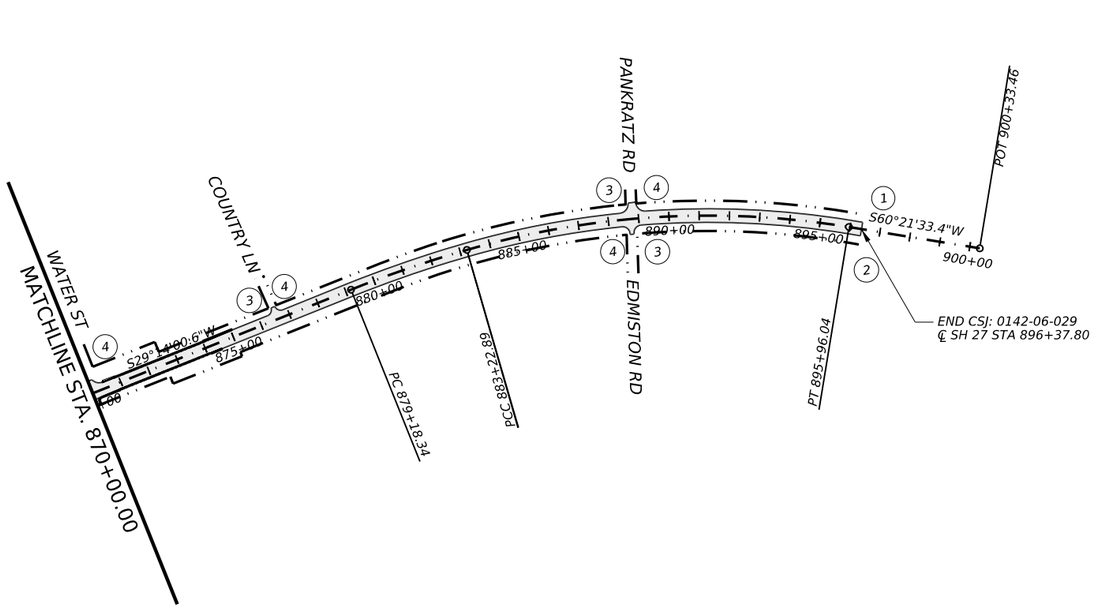

NOTES:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
2. BARRICADES AND WARNINGS SIGNS ON THIS SHEET ARE THE MINIMUM CONSTRUCTION ZONE, SIGNING, ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. REQUIRED IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION.
3. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.
4. SEE TCP SHEETS FOR ADDITIONAL SIGNING REQUIREMENTS. APPLICABLE TCP SHEETS FOR THIS PROJECT ARE:
   TCP(1-2)-18
   TCP(1-4)-18
   TCP(2-4)-18
   TCP(3-1)-13
   TCP(3-3)-14
5. ALL ITEMS ON THIS SHEET ARE SUBSIDIARY TO ITEM 502 UNLESS STATED OTHERWISE.
6. "CAUTION OVERHEAD ELECTRIC" SIGNS ARE TO BE PLACED AT EACH OVERHEAD CROSSING.

SCHEDULE OF TRAFFIC CONTROL DEVICES

LOCATION	USAGE	OBSERVE WARNING SIGNS STATE LAW	STAY ALERT TALK OR TEXT LATER	BEGIN WORK ZONE	TRAFFIC FINES DOUBLE	WHEN WORKERS ARE PRESENT	BEGIN ROAD WORK NEXT X MILES	NAME ADDRESS CITY STATE CONTRACTOR	SPEED LIMIT XX	ROAD WORK AHEAD	END ROAD WORK	ROAD WORK ⇦ NEXT XX MILES NEXT XX MILES ⇨			LOOSE GRAVEL		CHANNELIZING DEVICES	STOP HERE ON RED	ONE LANE ROAD AHEAD	NO CENTER LINE	
	TYPE	R20-3T	G20-10T	G20-9TP	R20-5T	R20-5aTP	G20-5T	G20-6T	R2-1	CW20-1D	G20-2	G20-1aT	CW1-4R	CW1-4L	CW8-7	CTB		R10-6L	CW20-4D	CW8-12	CW6-3
1	APPROACHES TO PROJECT	X	X	X	X	X	X	X	X	X											
2	DEPARTURES FROM PROJECT								X		X										
3	SIDE STREET APPROACHES									X		X									
4	SIDE STREET DEPARTURES										X										
5	AS DIRECTED									X			X	X	X	X	X	X	X	X	X

SCHEDULE OF TRAFFIC CONTROL DEVICES

LOCATION	USAGE		XX MPH	DO NOT PASS	LEFT LANE CLOSED		WORK CONVOY	X VEHICLE CONVOY	BE PREPARED TO STOP	END WORK ZONE	ROAD CONSTRUCTION ⇦ NEXT XX MILES		RIGHT LANE CLOSED	LEFT LANE CLOSED	NARROW LANES AHEAD	UNEVEN LANES	Be Safe Give Us A Brake			
	TYPE	CW20-7	CW13-1P	R4-1	CW20-5bTL	CW1-6aT	CW21-10cT		CW3-4	G20-2bT	G20-1bTL	TY III BARRICADE	CW20-5TR	CW20-5TL	CW20-8T	CW8-11	CW21-1T			
1	APPROACHES TO PROJECT																			
2	DEPARTURES FROM PROJECT									X										
3	SIDE STREET APPROACHES										X									
4	SIDE STREET DEPARTURES									X										
5	AS DIRECTED	X	X	X	X	X	X		X			X	X	X	X	X	X			

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
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0' 250' 500'

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SH27

SCHEDULE OF BARRICADES & ADVANCE WARNING DEVICES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		22

DATE: 10/11/2023 12:11:12 PM
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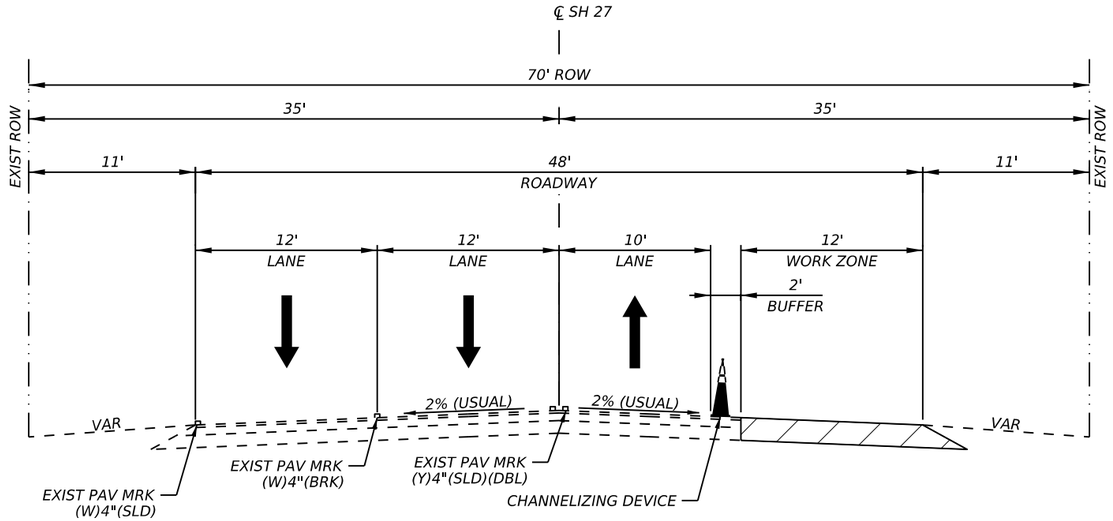
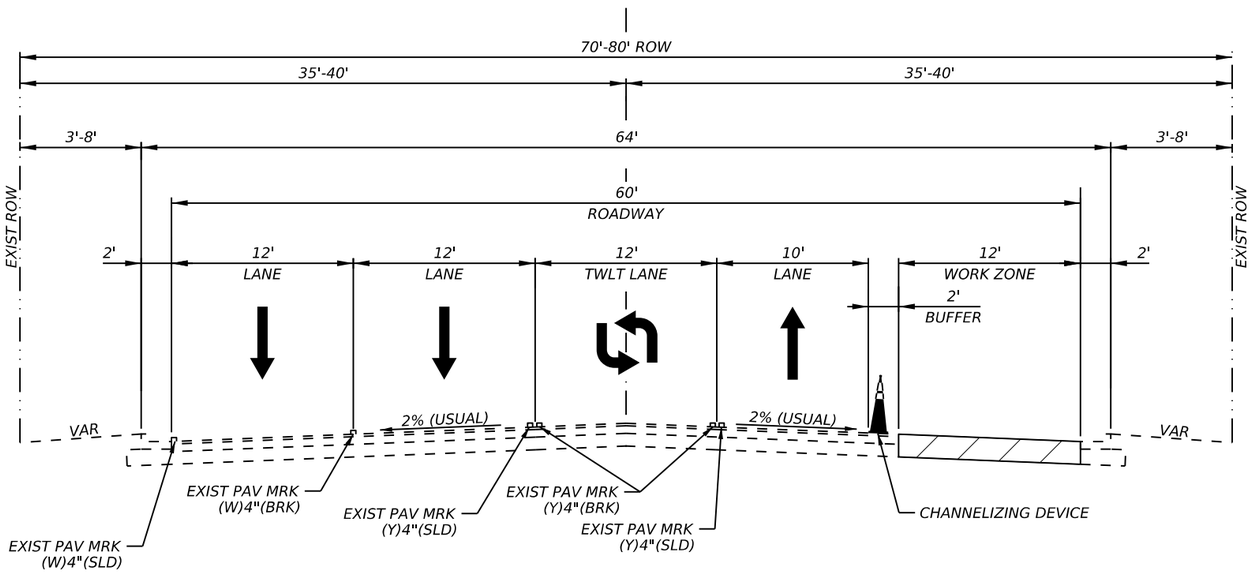


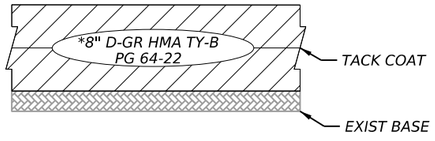
PHASE 2A (NIGHTTIME WORK)

STA. 820+44.06 TO STA. 823+37.13



PHASE 2A (NIGHTTIME WORK)

STA. 823+37.13 TO STA. 861+94.68



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

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Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 1 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		23

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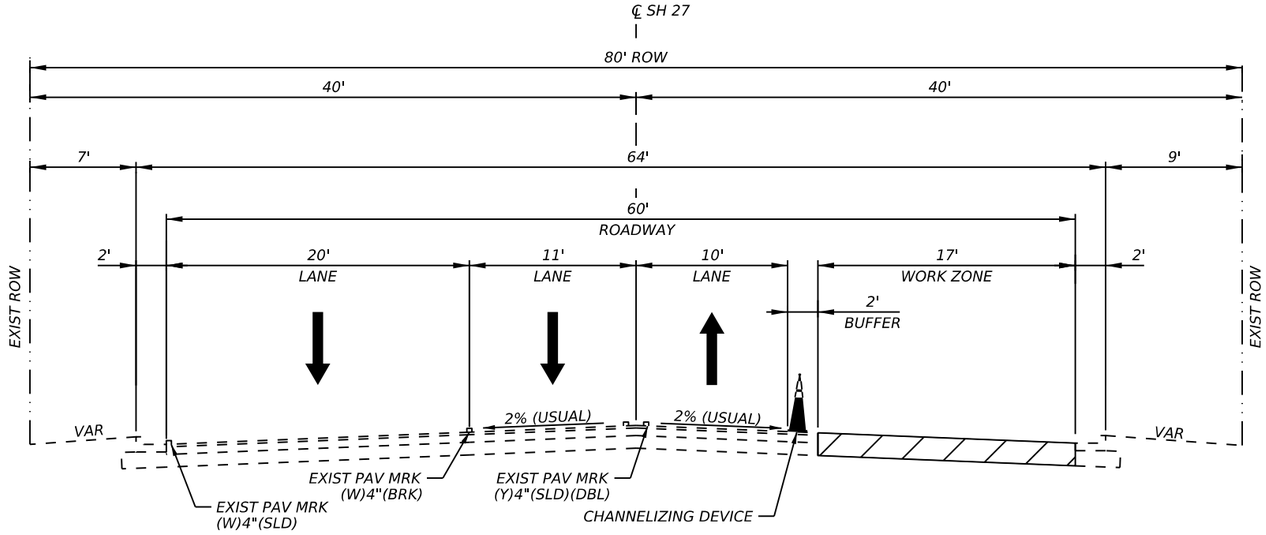
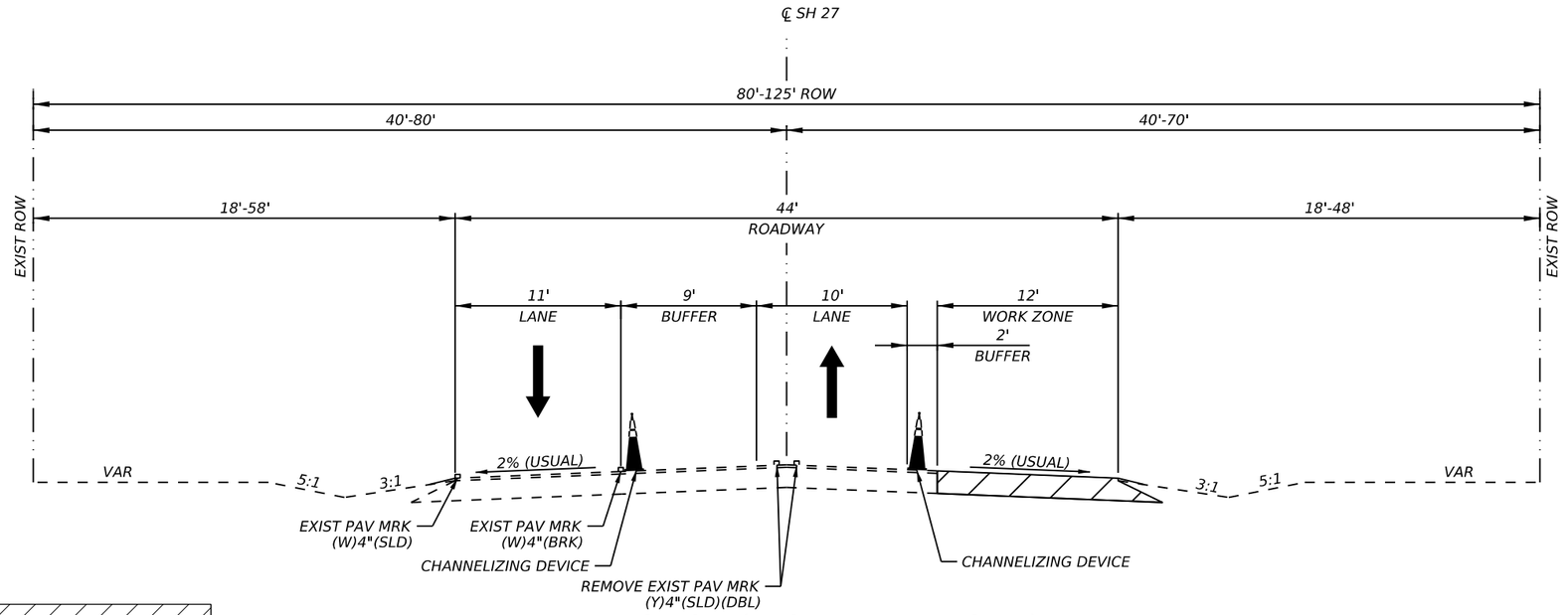


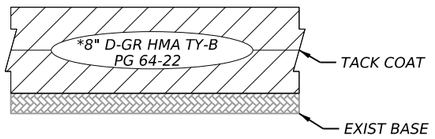
PHASE 2A (NIGHTTIME WORK)

STA. 861+94.68 TO STA. 869+58.64



PHASE 2A (NIGHTTIME WORK)

STA. 869+58.64 TO STA. 870+89.50



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

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TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 2 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		24

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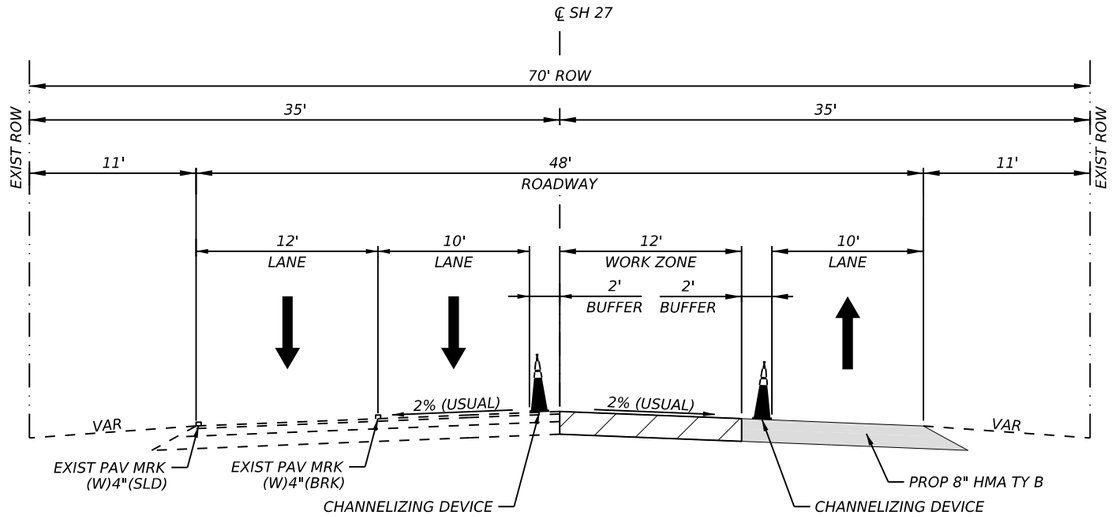
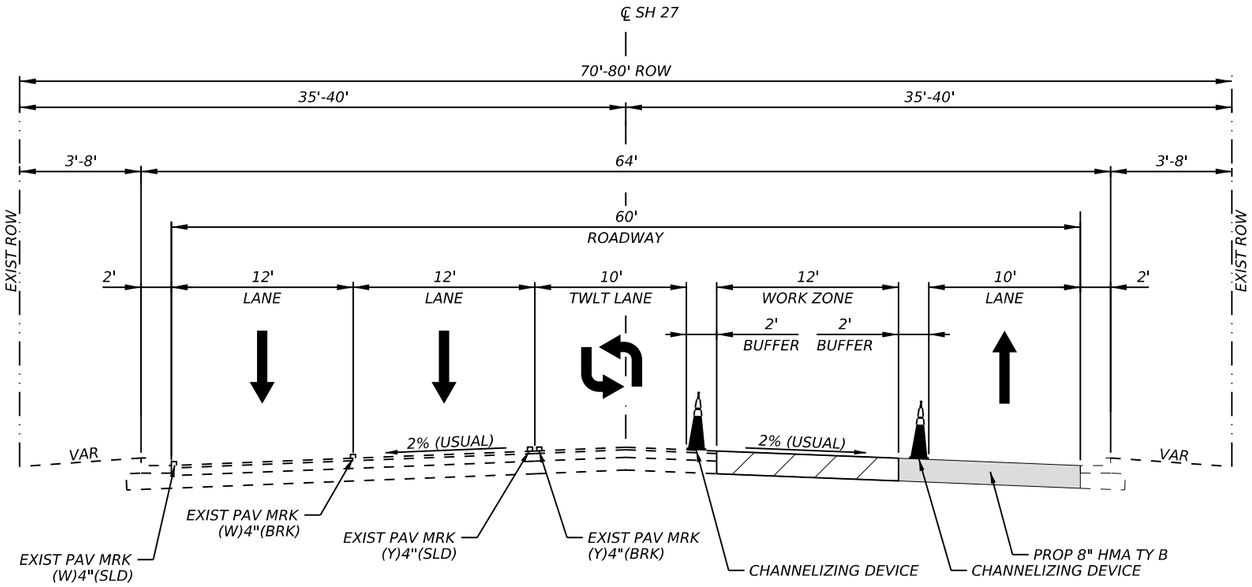


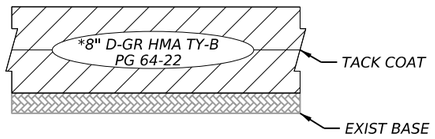
PHASE 2B

STA. 820+44.06 TO STA. 823+37.13



PHASE 2B

STA. 823+37.13 TO STA. 861+94.68



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

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TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 3 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		25

DATE: 10/11/2023 12:12:21 PM
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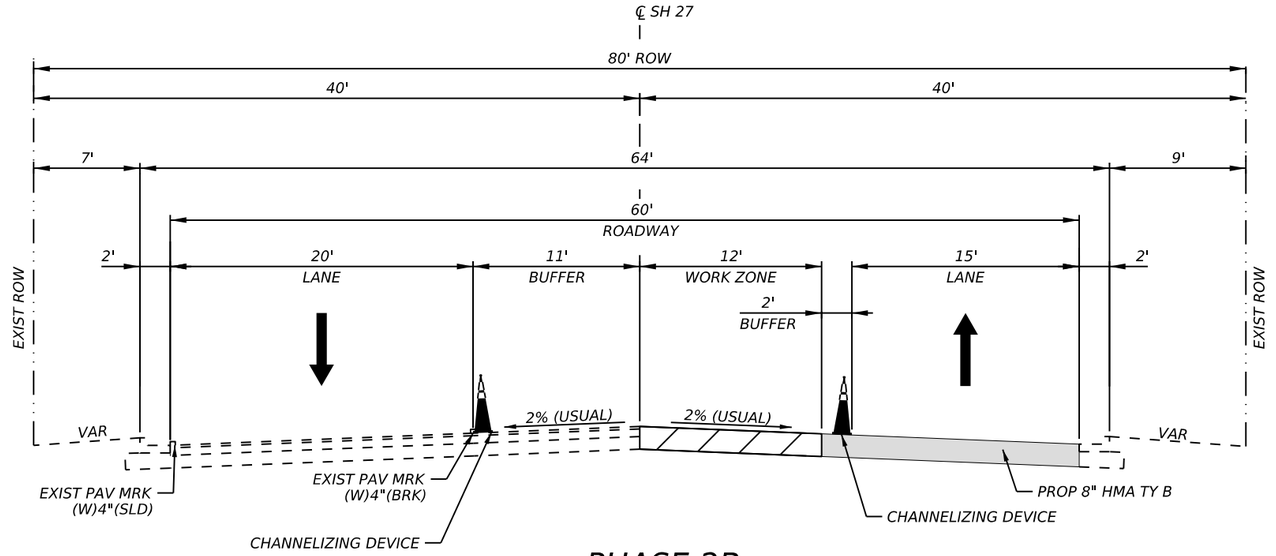
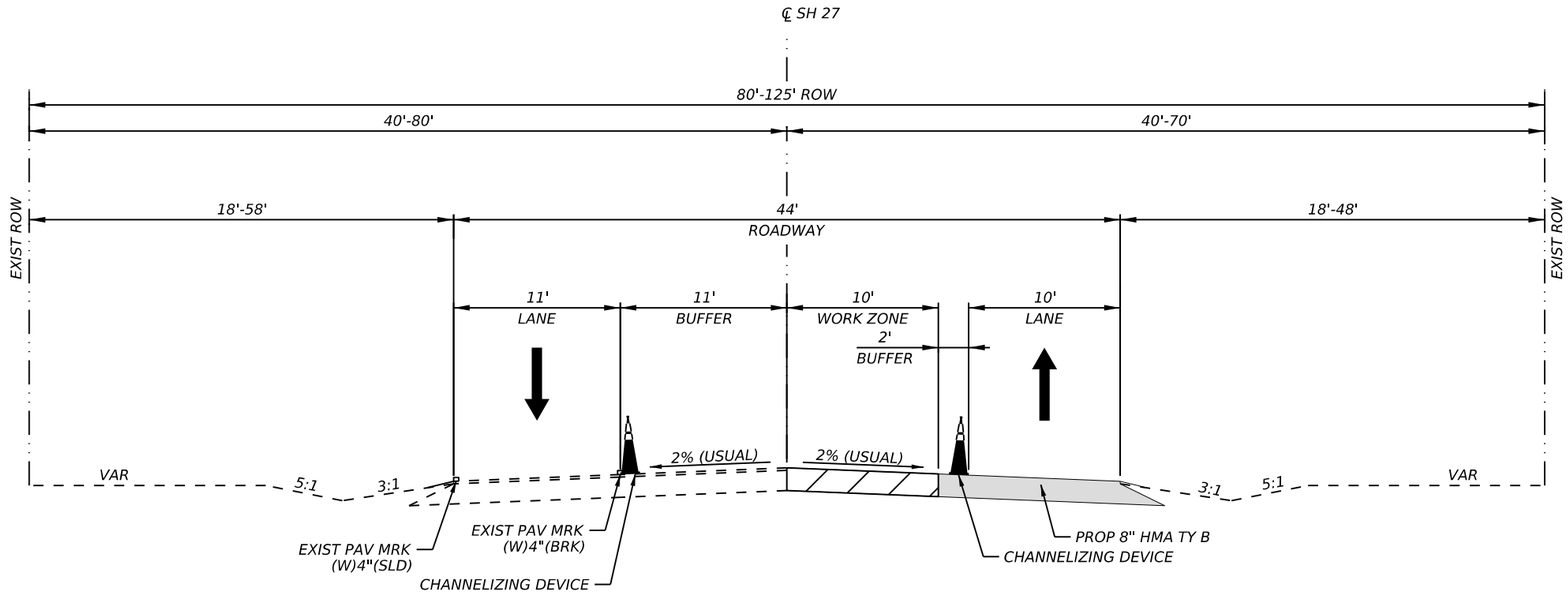


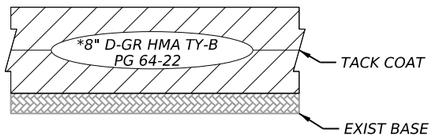
PHASE 2B

STA. 861+94.68 TO STA. 869+58.64



PHASE 2B

STA. 869+58.64 TO STA. 870+89.50



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
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PROFESSIONAL ENGINEER

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Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 4 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		26

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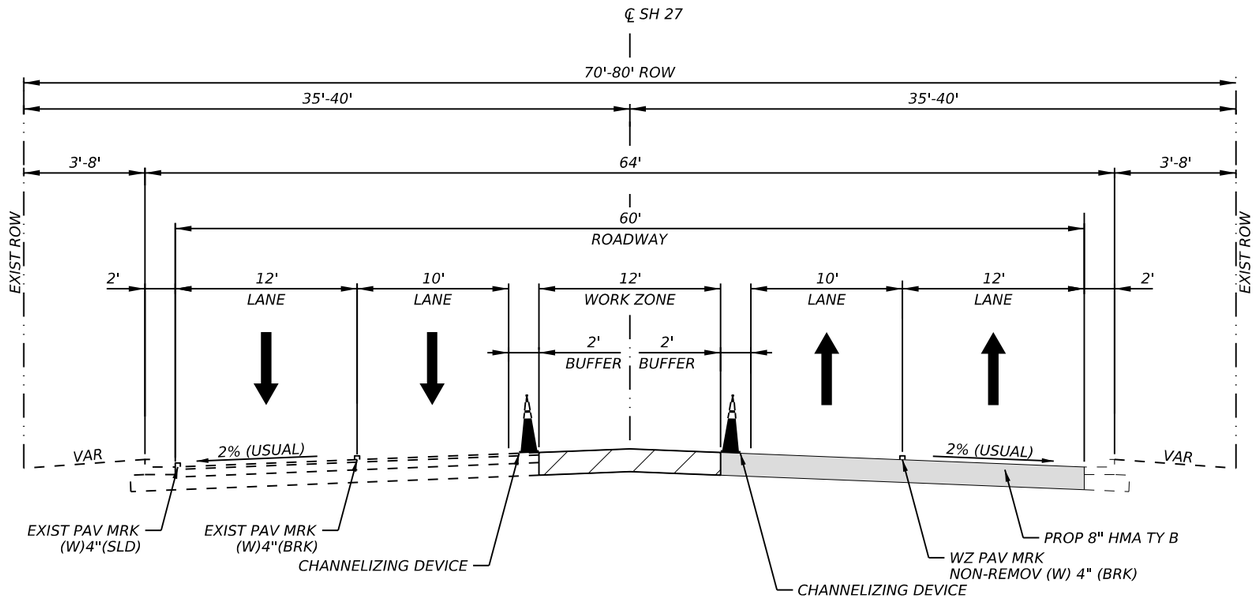
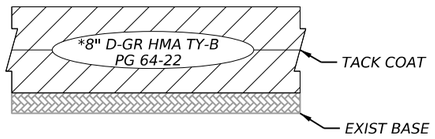


PHASE 2C

STA. 823+37.13 TO STA. 861+94.68



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
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Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 5 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		27

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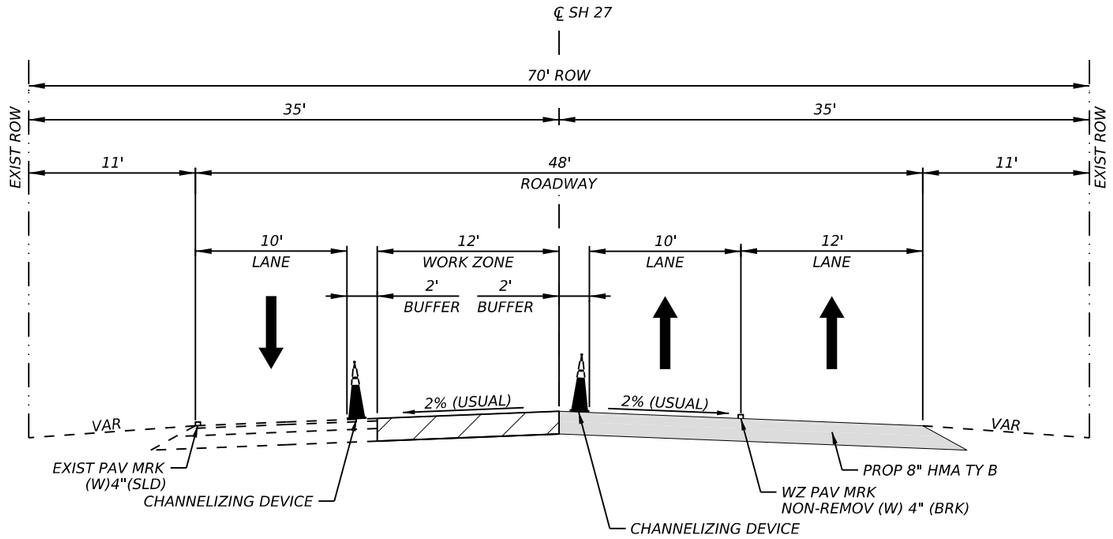
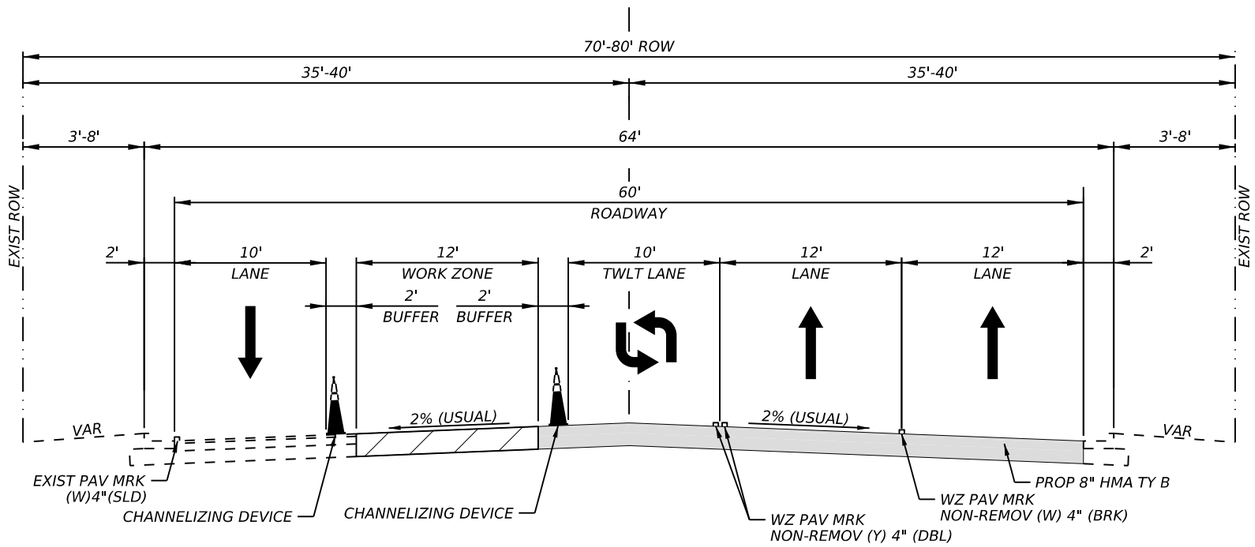


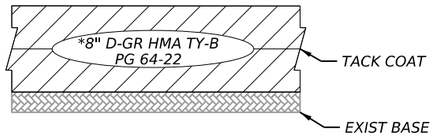
PHASE 2D

STA. 820+44.06 TO STA. 823+37.13



PHASE 2D

STA. 823+37.13 TO STA. 861+94.68



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 6 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		28

DATE: 10/11/2023 12:13:48 PM
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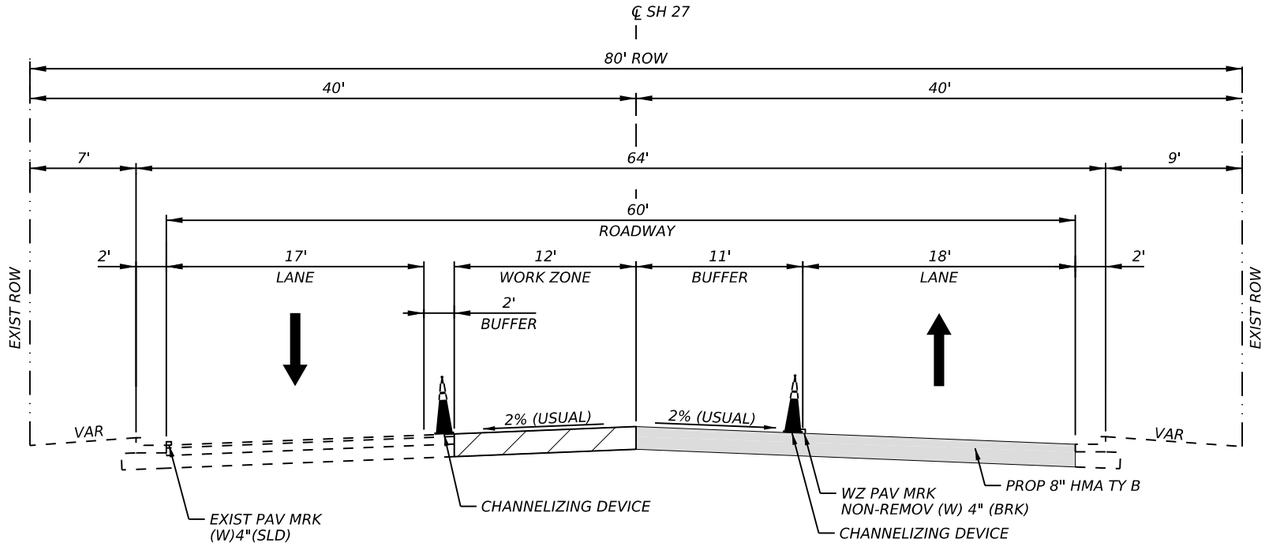
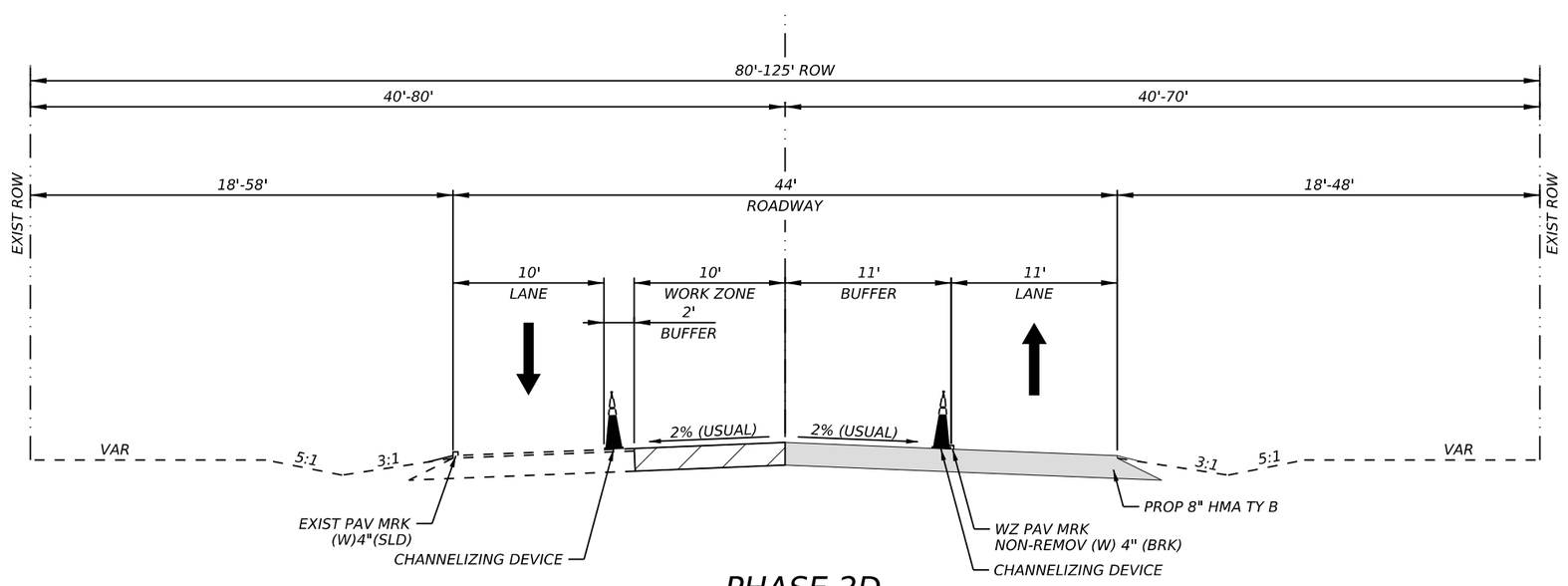


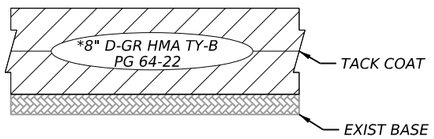
PHASE 2D

STA. 861+94.68 TO STA. 869+58.64



PHASE 2D

STA. 869+58.64 TO STA. 870+89.50



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

STATE OF TEXAS
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TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 7 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		29

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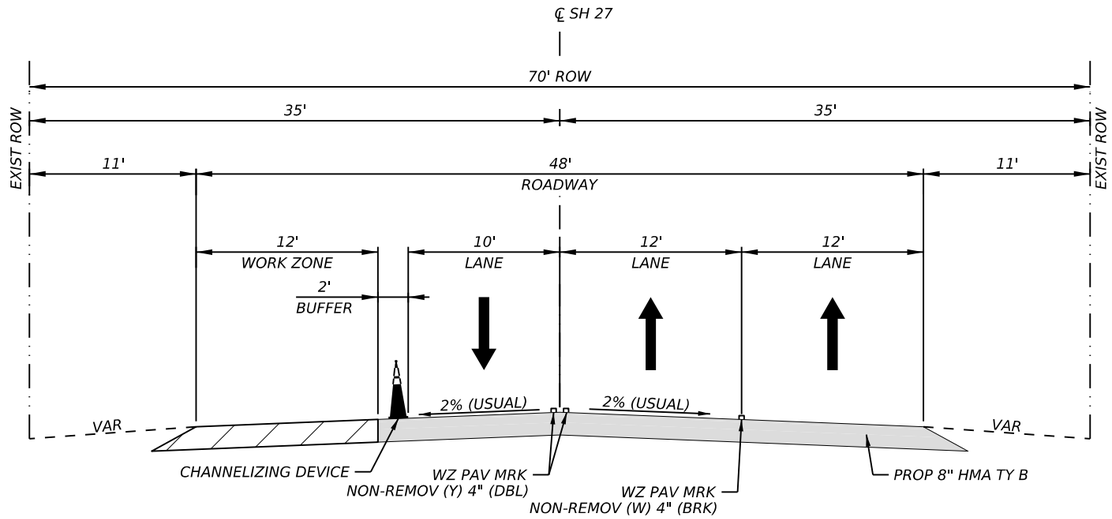
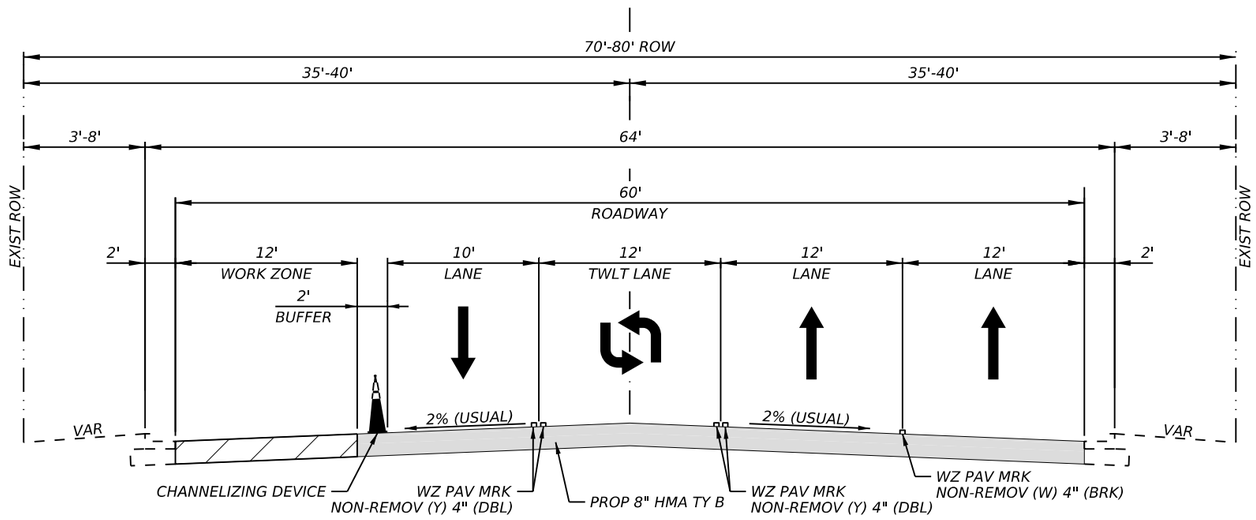


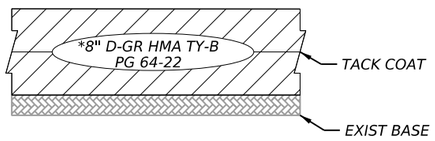
PHASE 2E (NIGHTTIME WORK)

STA. 820+44.06 TO STA. 823+37.13



PHASE 2E (NIGHTTIME WORK)

STA. 823+37.13 TO STA. 861+94.68



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

JORDAN S. KIEWIT
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SH27

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 8 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		30

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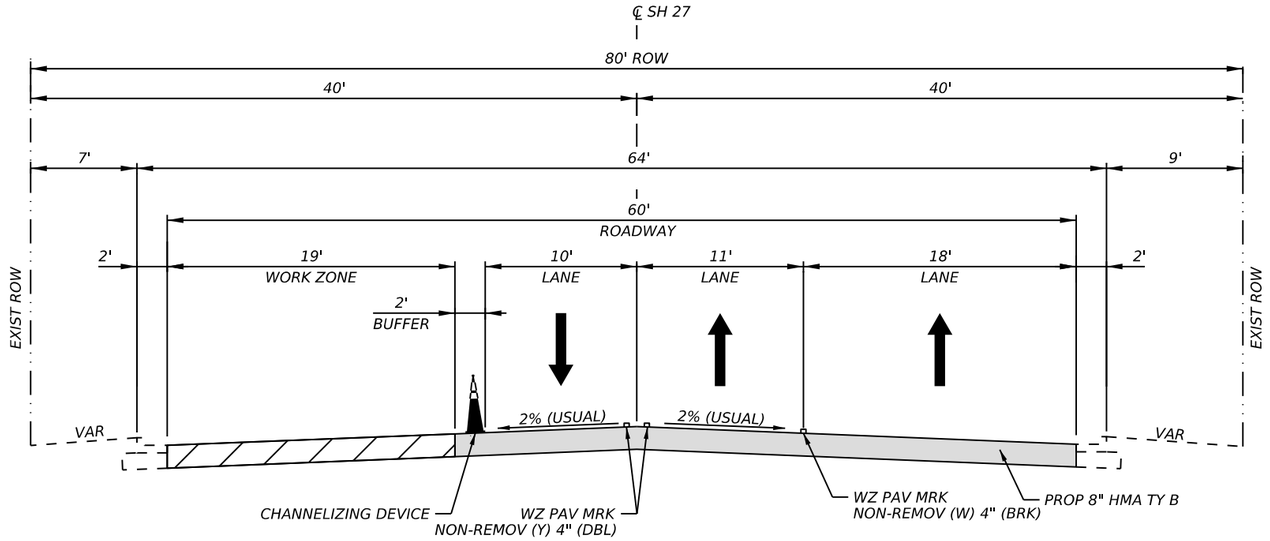
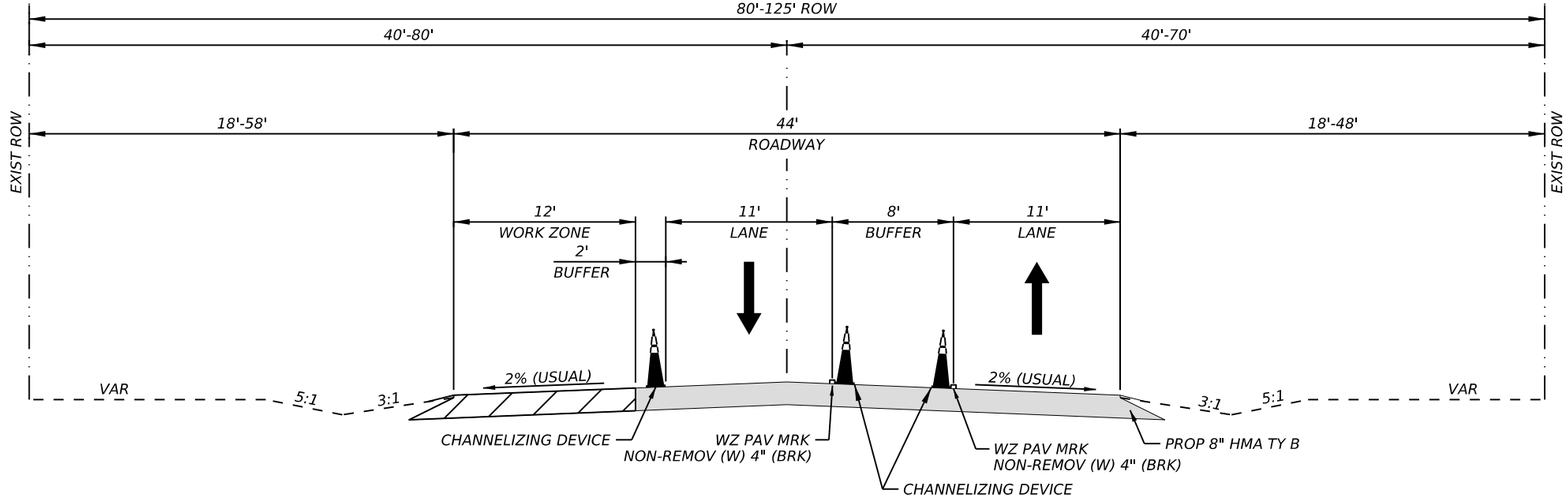


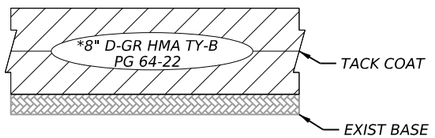
PHASE 2E (NIGHTTIME WORK)

STA. 861+94.68 TO STA. 869+58.64



PHASE 2E (NIGHTTIME WORK)

STA. 869+58.64 TO STA. 870+89.50



FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")

*TO BE PLACED IN TWO EQUAL LIFTS

LEGEND

CONSTRUCTION THIS PHASE

CONSTRUCTION PREVIOUS PHASE

NOTES

1. TYPICAL SECTIONS ARE NOT TO SCALE.
2. SEE ROADWAY PLAN AND PROFILE SHEETS FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.

NOT TO SCALE

10/11/2023

STATE OF TEXAS
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Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 9 OF 9

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		31

DATE: 10/11/2023 12:14:55 PM
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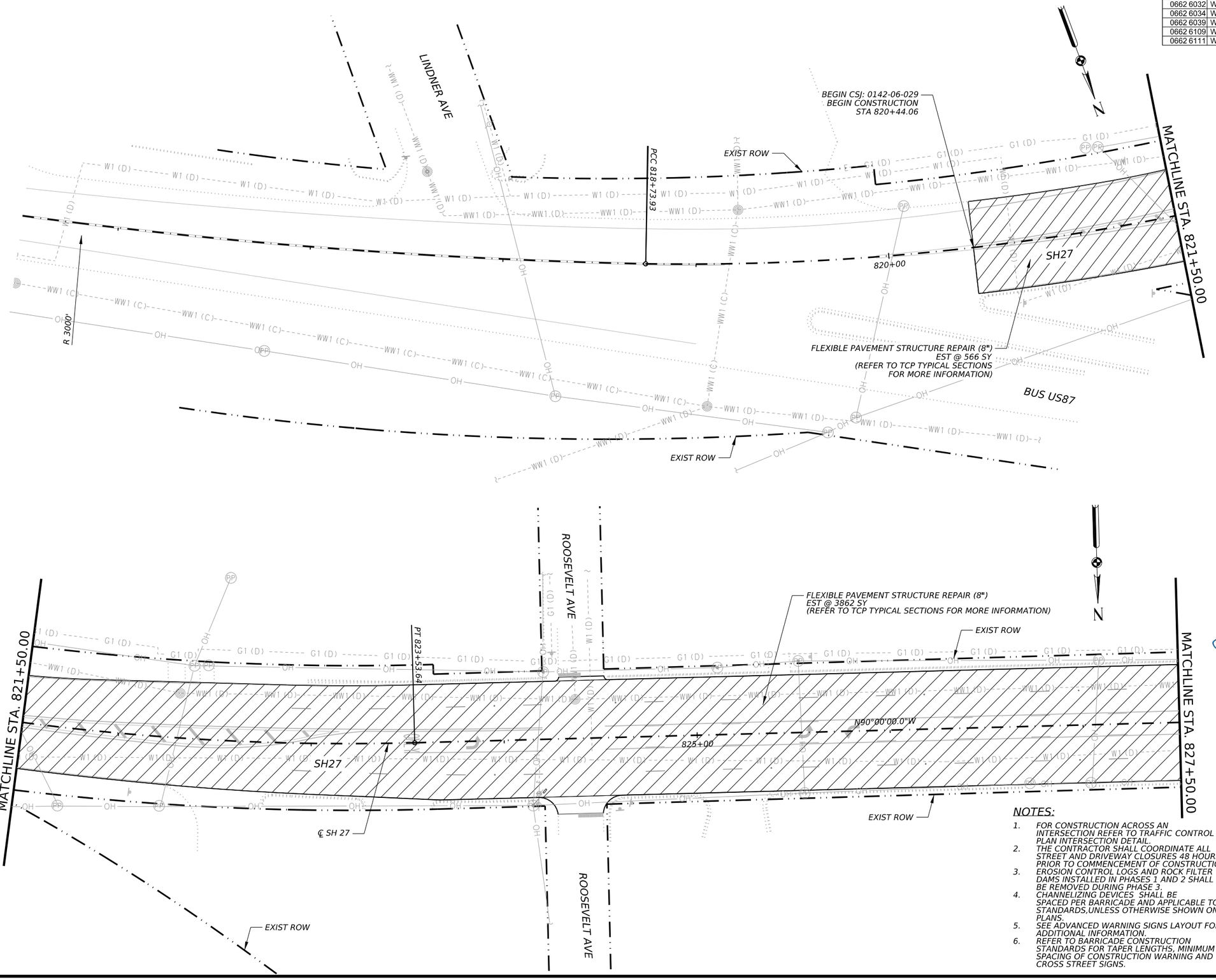
SHEET #			1
ITEM	DESCRIPTION	UNIT	QTY
0351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	4428
0662 6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	220
0662 6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	145
0662 6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	2846
0662 6039	WK ZN PAV MRK NON-REMOV (Y)12"(SLD)	LF	70
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	90
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	158



LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"

10/11/2023

0' 25' 50'

NOTES:

1. FOR CONSTRUCTION ACROSS AN INTERSECTION REFER TO TRAFFIC CONTROL PLAN INTERSECTION DETAIL.
2. THE CONTRACTOR SHALL COORDINATE ALL STREET AND DRIVEWAY CLOSURES 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION
3. EROSION CONTROL LOGS AND ROCK FILTER DAMS INSTALLED IN PHASES 1 AND 2 SHALL BE REMOVED DURING PHASE 3.
4. CHANNELIZING DEVICES SHALL BE SPACED PER BARRICADE AND APPLICABLE TCP STANDARDS,UNLESS OTHERWISE SHOWN ON PLANS.
5. SEE ADVANCED WARNING SIGNS LAYOUT FOR ADDITIONAL INFORMATION.
6. REFER TO BARRICADE CONSTRUCTION STANDARDS FOR TAPER LENGTHS, MINIMUM SPACING OF CONSTRUCTION WARNING AND CROSS STREET SIGNS.

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SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 1 OF 7

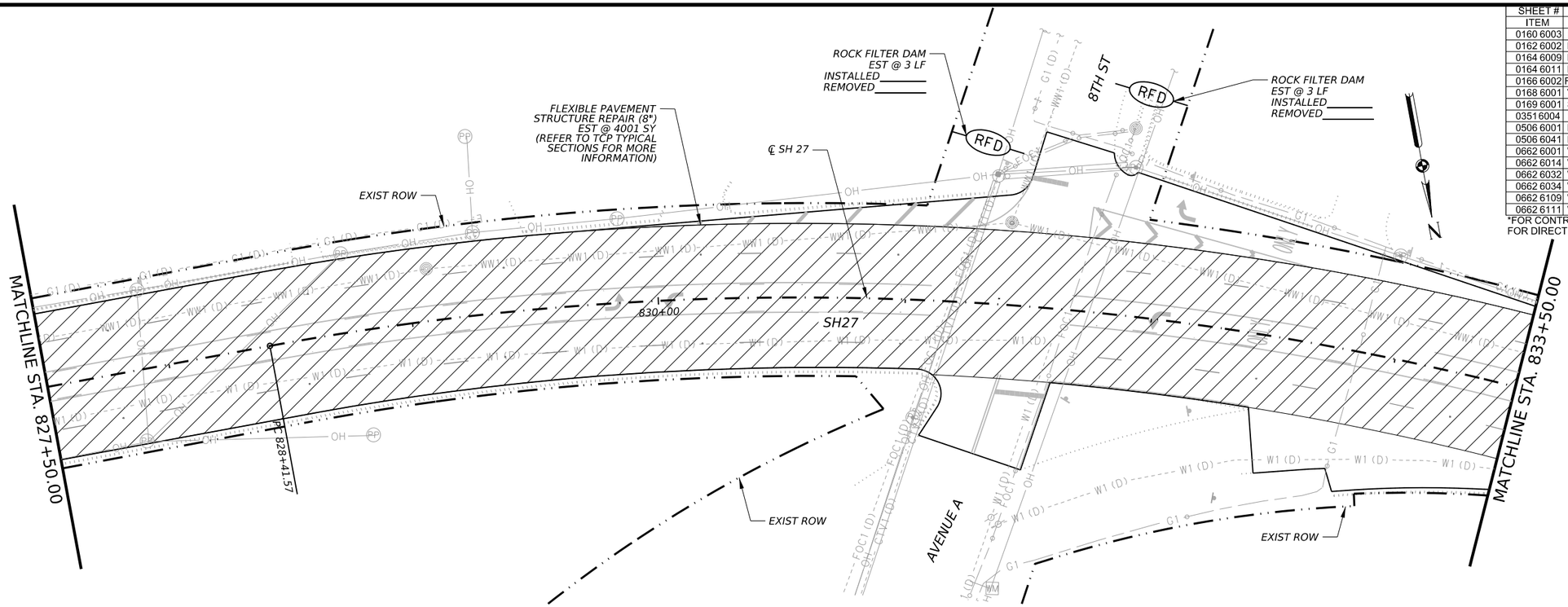
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		32

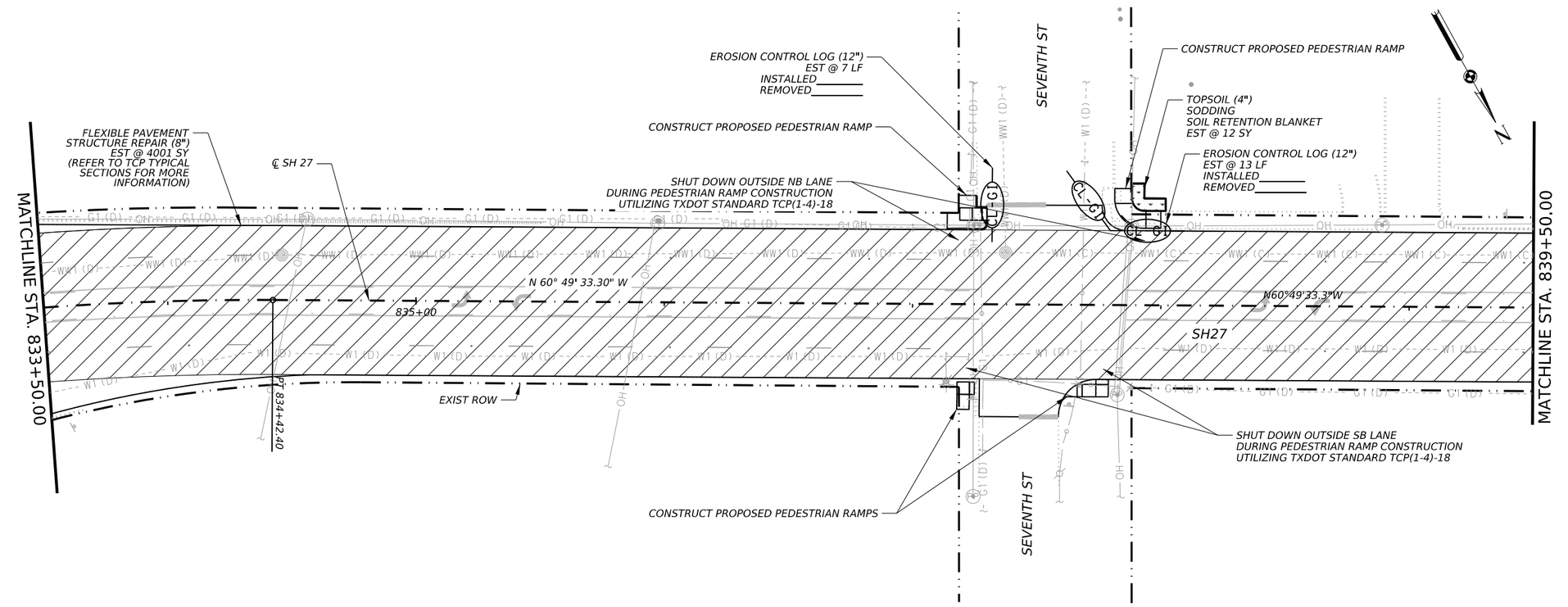
DATE: 10/11/2023 12:15:23 PM
FILE: c:\pw\khi1d025461402\XX SH27 TCP 01.dgn

CK:
DW:
CK:
DW:

SHEET #			2
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	12
0162 6002	BLOCK SODDING	SY	12
0164 6009	BROADCAST SEED (TEMP) (WARM)	SY	6
0164 6011	BROADCAST SEED (TEMP) (COOL)	SY	6
0166 6002	FERTILIZER *	TON	0.01
0168 6001	VEGETATIVE WATERING	MG	1
0169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	12
0351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	8002
0506 6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	6
0506 6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	20
0662 6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	550
0662 6014	WK ZN PAV MRK NON-REMOV (W)12"(SLD)	LF	85
0662 6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	505
0662 6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	2020
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	79
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	139

*FOR CONTRACTOR'S INFORMATION ONLY.WILL NOT BE PAID FOR DIRECTLY.





LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- --X# (C)-- QUALITY LEVEL "C"
- --X# (D)-- QUALITY LEVEL "D"

NOTES:

1. REFER TO SHEET 1 OF "TRAFFIC CONTROL PLAN LAYOUT" FOR PERTINENT NOTES.

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		33

DATE: 10/11/2023 12:15:49 PM
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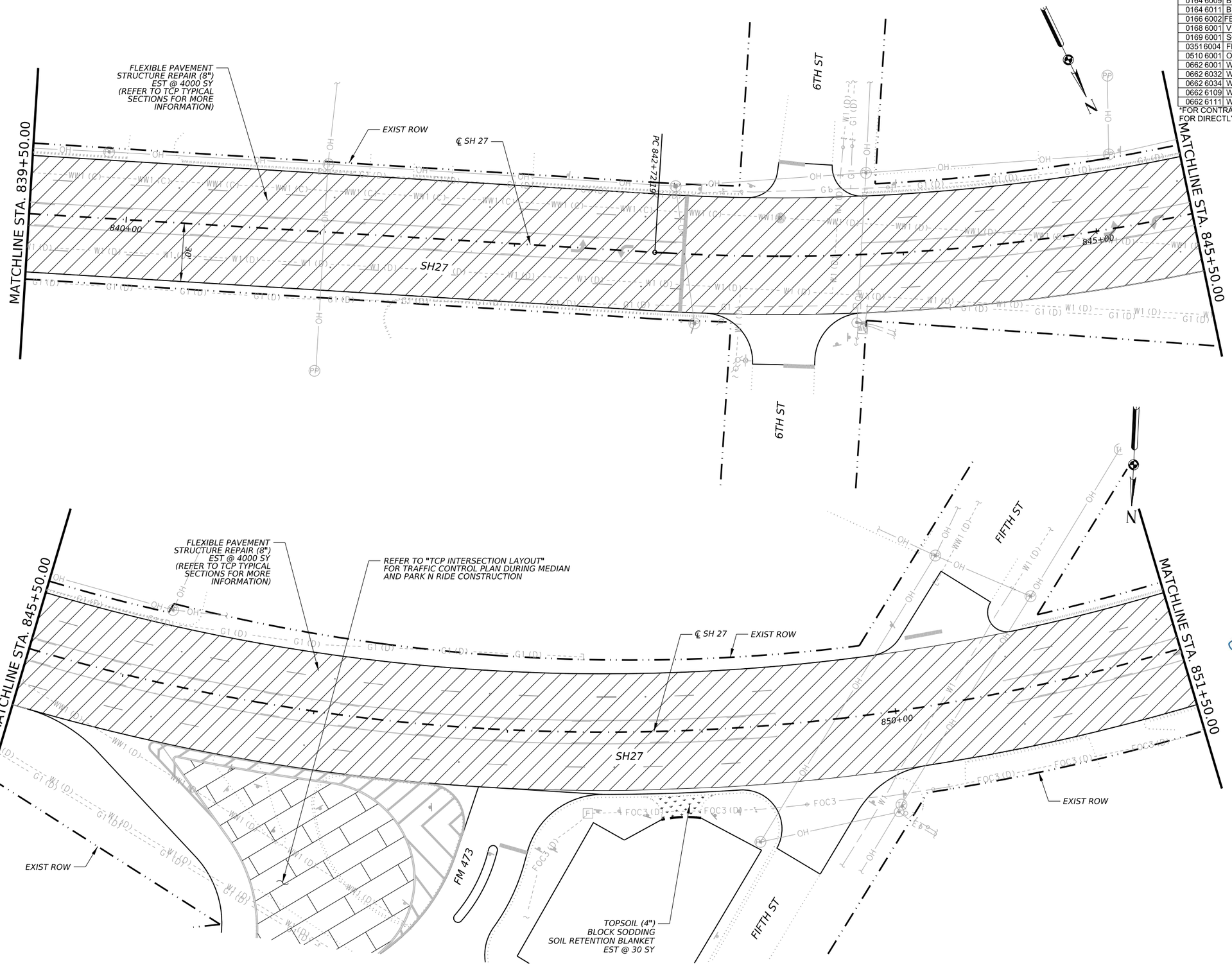
SHEET #			3
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	30
0162 6002	BLOCK SODDING	SY	30
0164 6009	BROADCAST SEED (TEMP) (WARM)	SY	15
0164 6011	BROADCAST SEED (TEMP) (COOL)	SY	15
0166 6002	FERTILIZER *	TON	0.01
0168 6001	VEGETATIVE WATERING	MG	1
0169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	30
0351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	8000
0510 6001	ONE-WAY TRAF CONT (FLAGGER CONT)	HR	40
0662 6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	470
0662 6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	495
0662 6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	2600
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	43
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	168

*FOR CONTRACTOR'S INFORMATION ONLY.WILL NOT BE PAID FOR DIRECTLY.



LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- --X# (C)-- QUALITY LEVEL "C"
- --X# (D)-- QUALITY LEVEL "D"

NOTES:

1. REFER TO SHEET 1 OF "TRAFFIC CONTROL PLAN LAYOUT" FOR PERTINENT NOTES.

JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		34

DATE: 10/11/2023 12:16:16 PM
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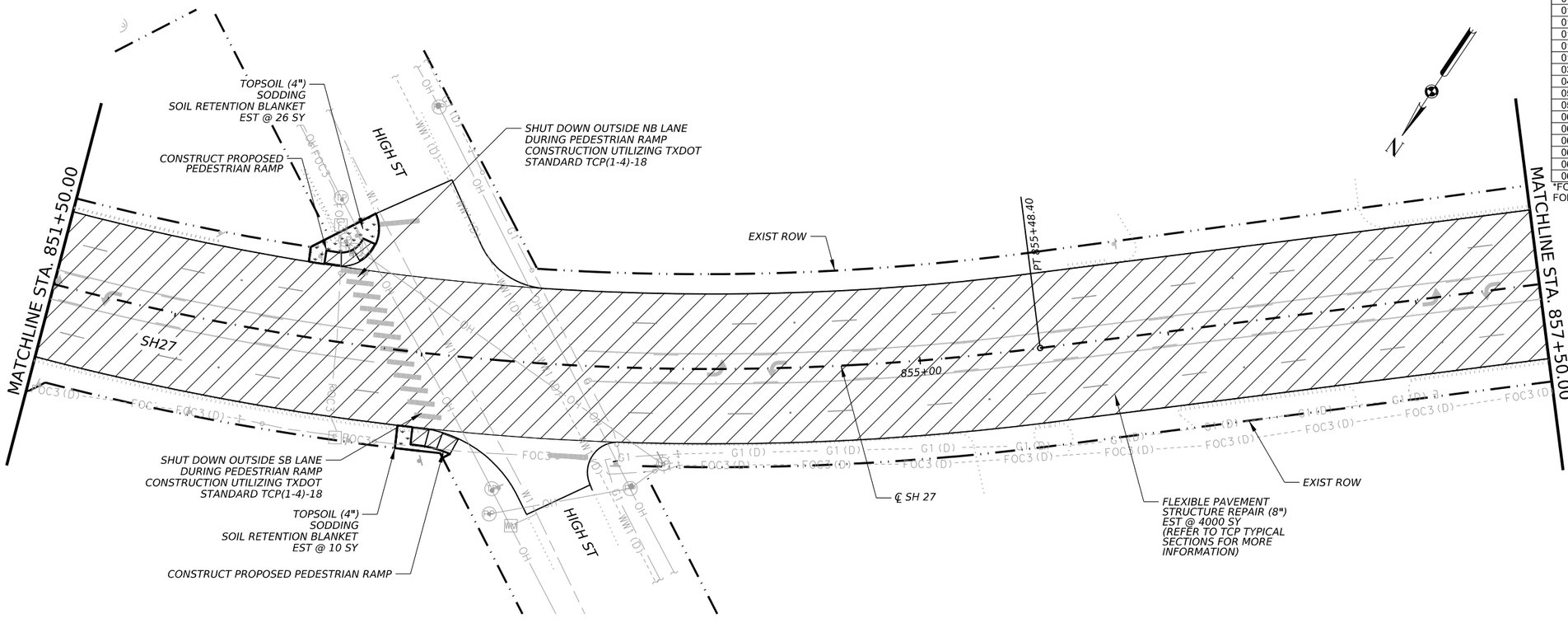
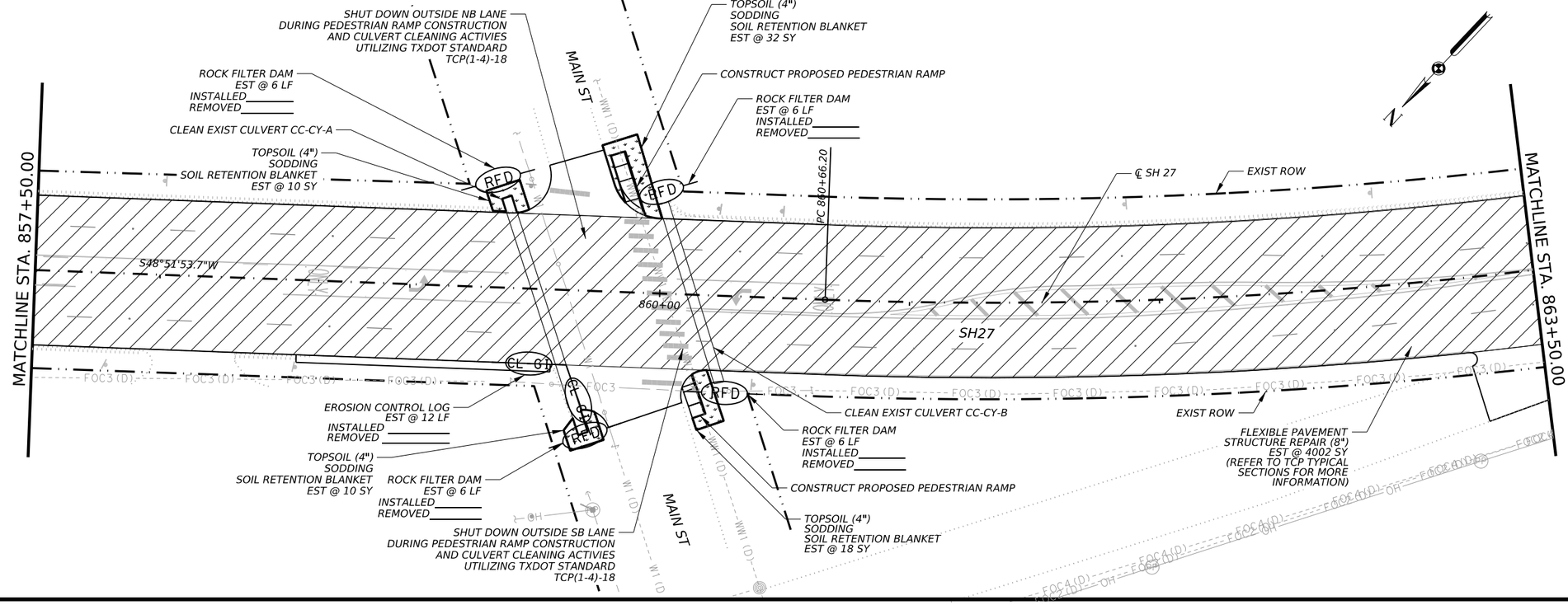
DW: CK: DW: CK:

SHEET #			4
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	106
0162 6002	BLOCK SODDING	SY	106
0164 6009	BROADCAST SEED (TEMP) (WARM)	SY	53
0164 6011	BROADCAST SEED (TEMP) (COOL)	SY	53
0166 6002	FERTILIZER *	TON	0.01
0168 6001	VEGETATIVE WATERING	MG	4
0169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	106
0351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	8002
0480 6001	CLEAN EXIST CULVERTS	EA	2
0506 6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	24
0506 6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	12
0662 6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	460
0662 6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	308
0662 6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	2407
0662 6039	WK ZN PAV MRK NON-REMOV (Y)12"(SLD)	LF	105
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	75
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	151

*FOR CONTRACTOR'S INFORMATION ONLY.WILL NOT BE PAID FOR DIRECTLY.





LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- --X# (C)-- QUALITY LEVEL "C"
- --X# (D)-- QUALITY LEVEL "D"

NOTES:

1. REFER TO SHEET 1 OF "TRAFFIC CONTROL PLAN LAYOUT" FOR PERTINENT NOTES.

10/11/2023

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		35

DATE: 10/11/2023 12:16:45 PM
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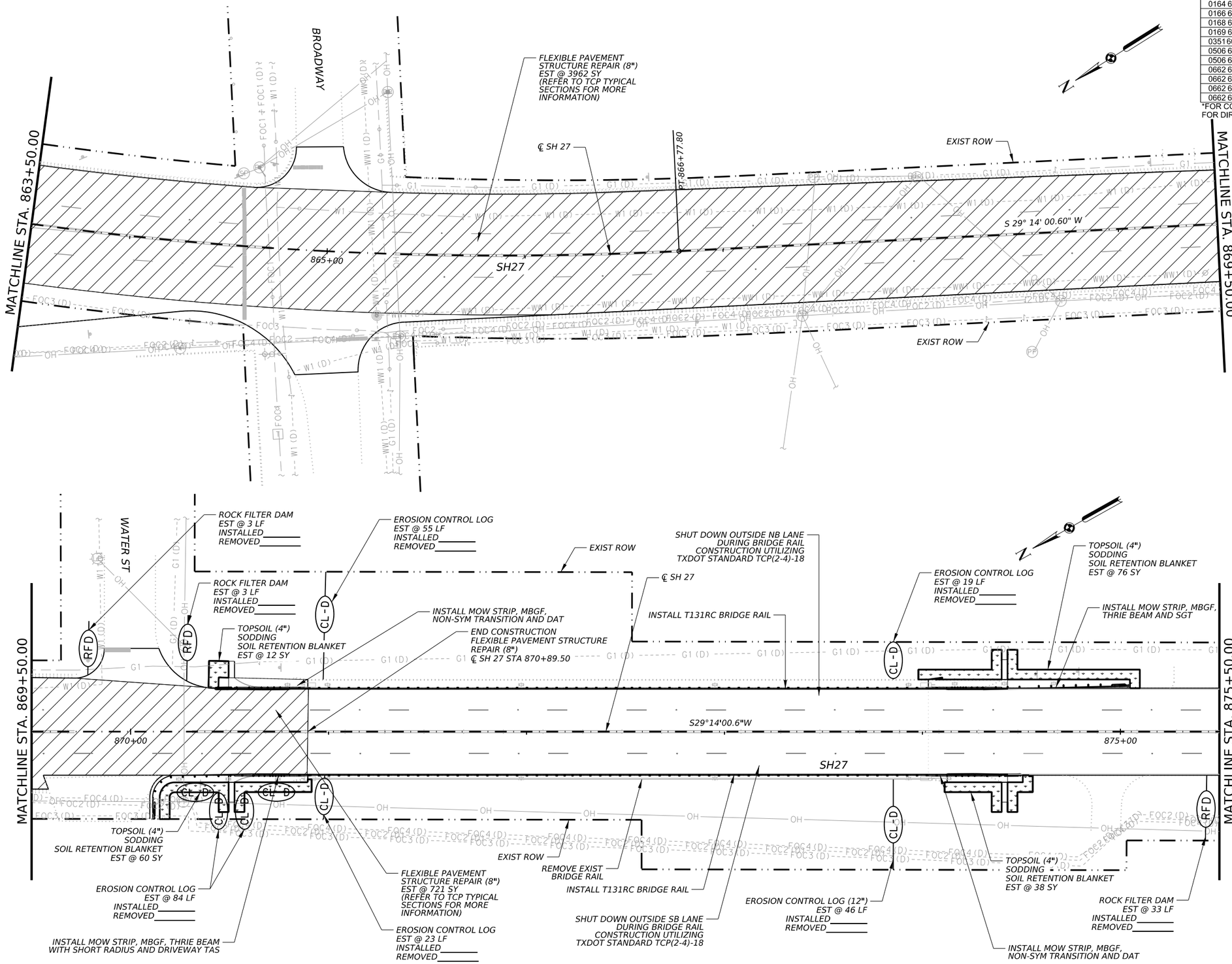
DW: CK: DW: CK: DW:

SHEET #			5
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	186
0162 6002	BLOCK SODDING	SY	186
0164 6009	BROADCAST SEED (TEMP) (WARM)	SY	93
0164 6011	BROADCAST SEED (TEMP) (COOL)	SY	93
0166 6002	FERTILIZER *	TON	0.01
0168 6001	VEGETATIVE WATERING	MG	6
0169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	186
0351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	4683
0506 6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	39
0506 6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	227
0662 6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	580
0662 6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	2158
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	61
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	108

*FOR CONTRACTOR'S INFORMATION ONLY.WILL NOT BE PAID FOR DIRECTLY.



LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- --X# (C)-- QUALITY LEVEL "C"
- --X# (D)-- QUALITY LEVEL "D"

NOTES:

1. REFER TO SHEET 1 OF "TRAFFIC CONTROL PLAN LAYOUT" FOR PERTINENT NOTES.

JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		36

DATE: 10/11/2023 12:17:12 PM
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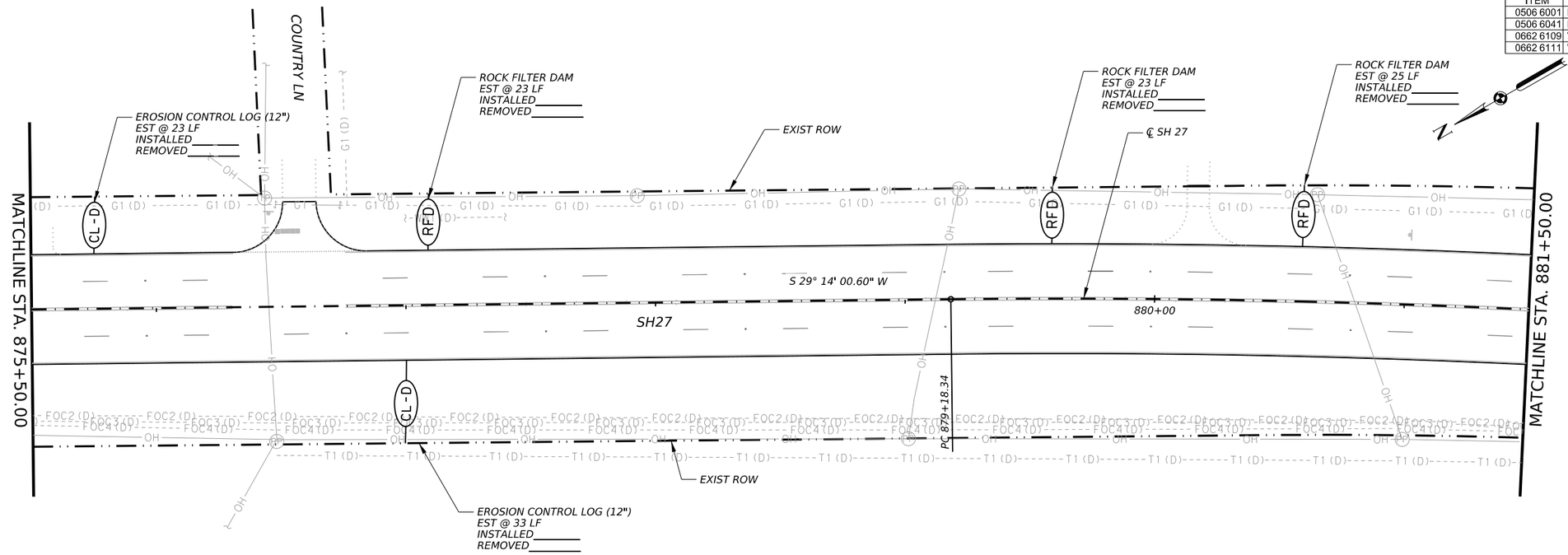
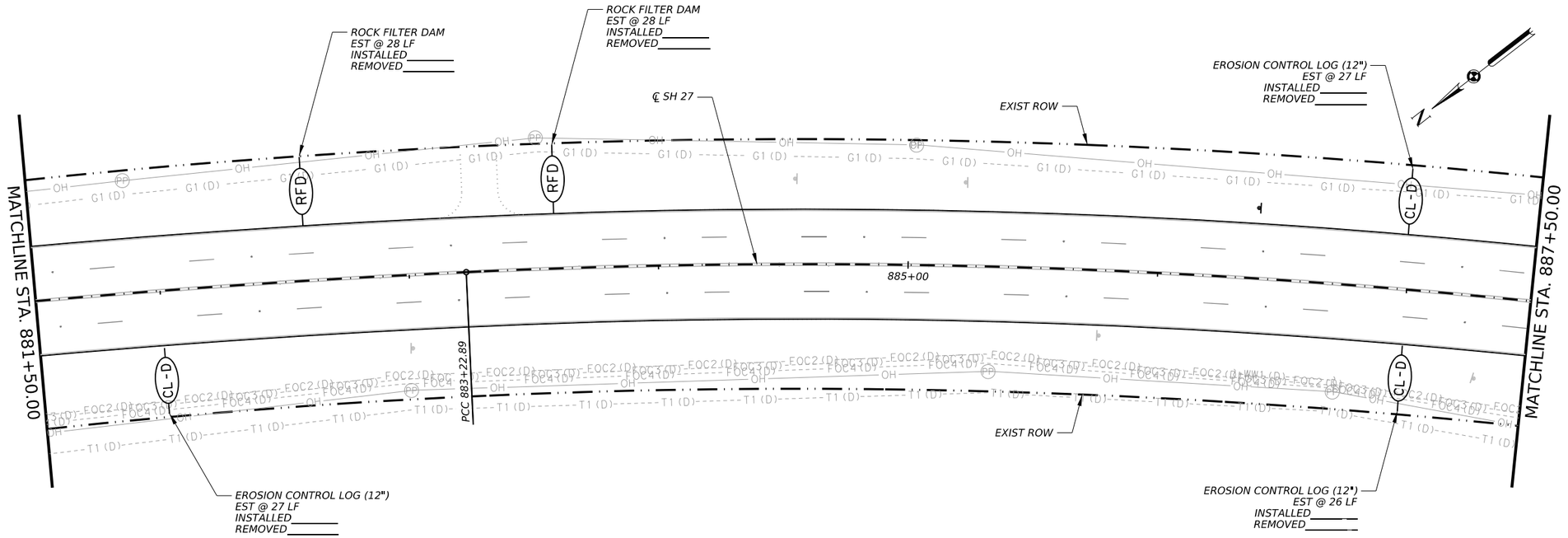
DW: CK: DW: CK:

SHEET #			6
ITEM	DESCRIPTION	UNIT	QTY
0506 6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	127
0506 6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	136
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	164
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	116





LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 - COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"

NOTES:

1. REFER TO SHEET 1 OF "TRAFFIC CONTROL PLAN LAYOUT" FOR PERTINENT NOTES.

JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		37

DATE: 10/11/2023 12:17:38 PM
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CK:
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SHEET #			7
ITEM	DESCRIPTION	UNIT	QTY
0160 6003	FURNISHING AND PLACING TOPSOIL (4")	SY	60
0162 6002	BLOCK SODDING	SY	60
0164 6009	BROADCAST SEED (TEMP) (WARM)	SY	30
0164 6011	BROADCAST SEED (TEMP) (COOL)	SY	30
0166 6002	FERTILIZER *	TON	0.01
0168 6001	VEGETATIVE WATERING	MG	2
0169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	60
0480 6001	CLEAN EXIST CULVERTS	EA	1
0506 6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	33
0506 6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	130
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	106
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	102

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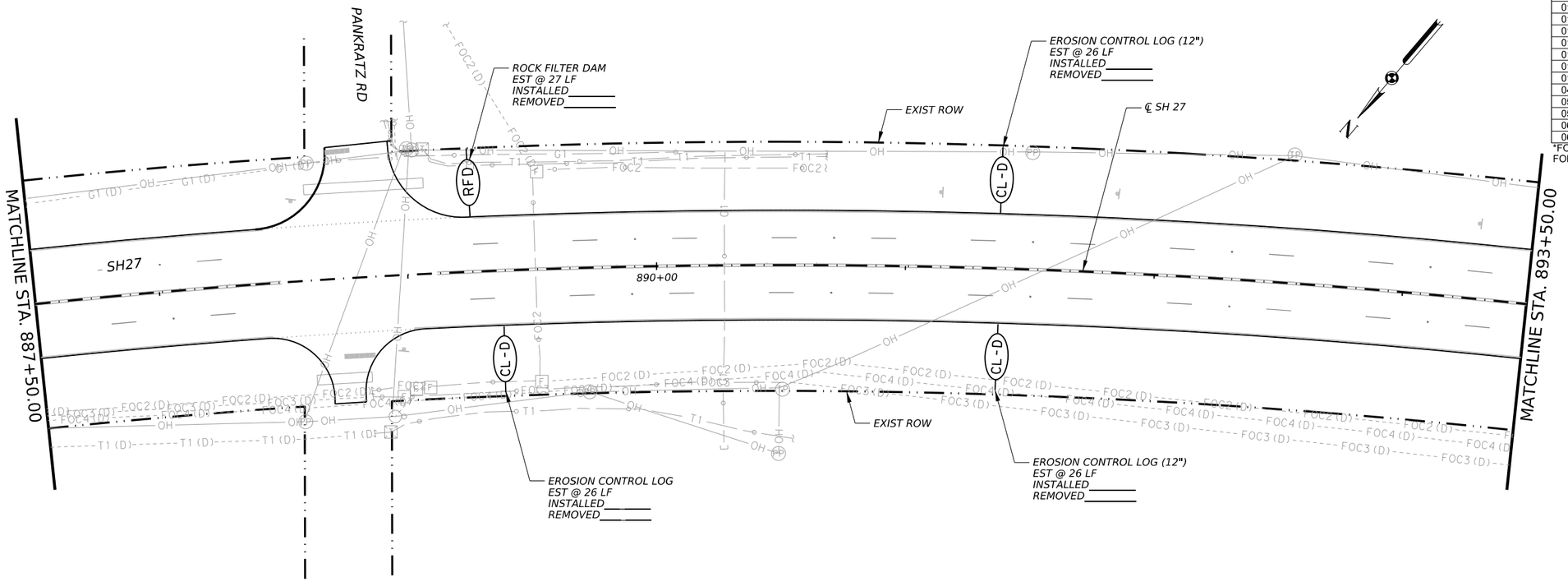

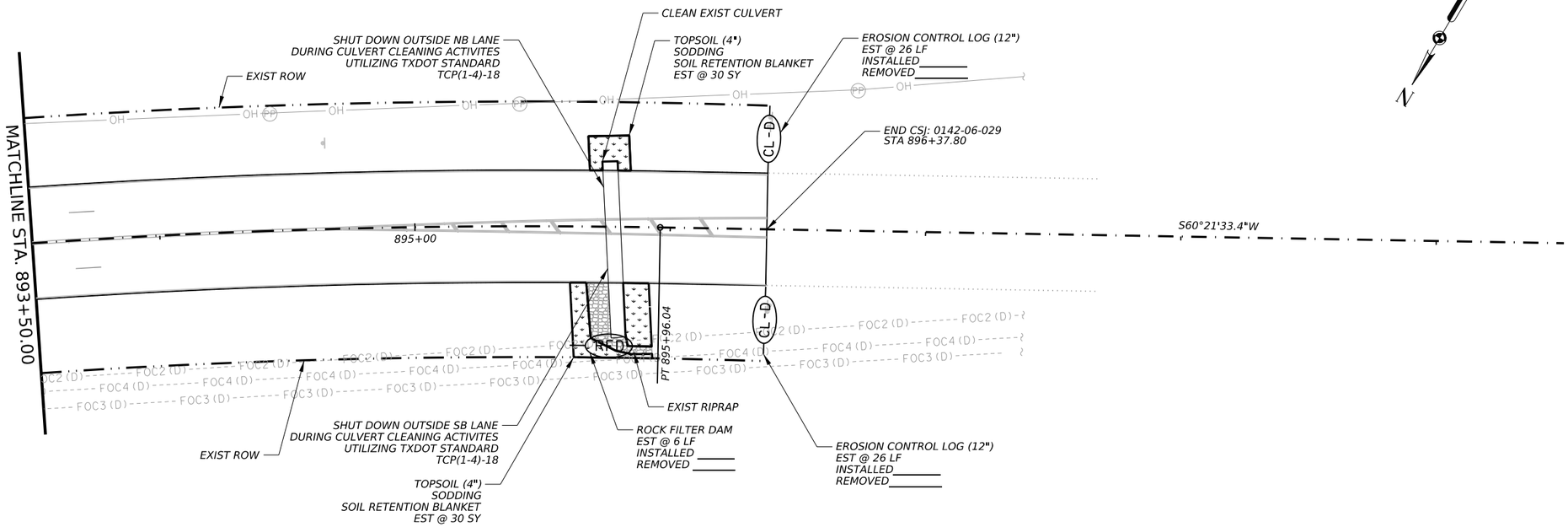

LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR (8")
- RFD — ROCK FILTER DAM
- CL-D — EROSION CONTROL LOG
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
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- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"

NOTES:

1. REFER TO SHEET 1 OF "TRAFFIC CONTROL PLAN LAYOUT" FOR PERTINENT NOTES.

10/11/2023

0' 25' 50'

STATE OF TEXAS · JORDAN S. KIEWIT · 131234 · LICENSED PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN LAYOUT

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		38

DATE: 10/11/2023 12:18:06 PM
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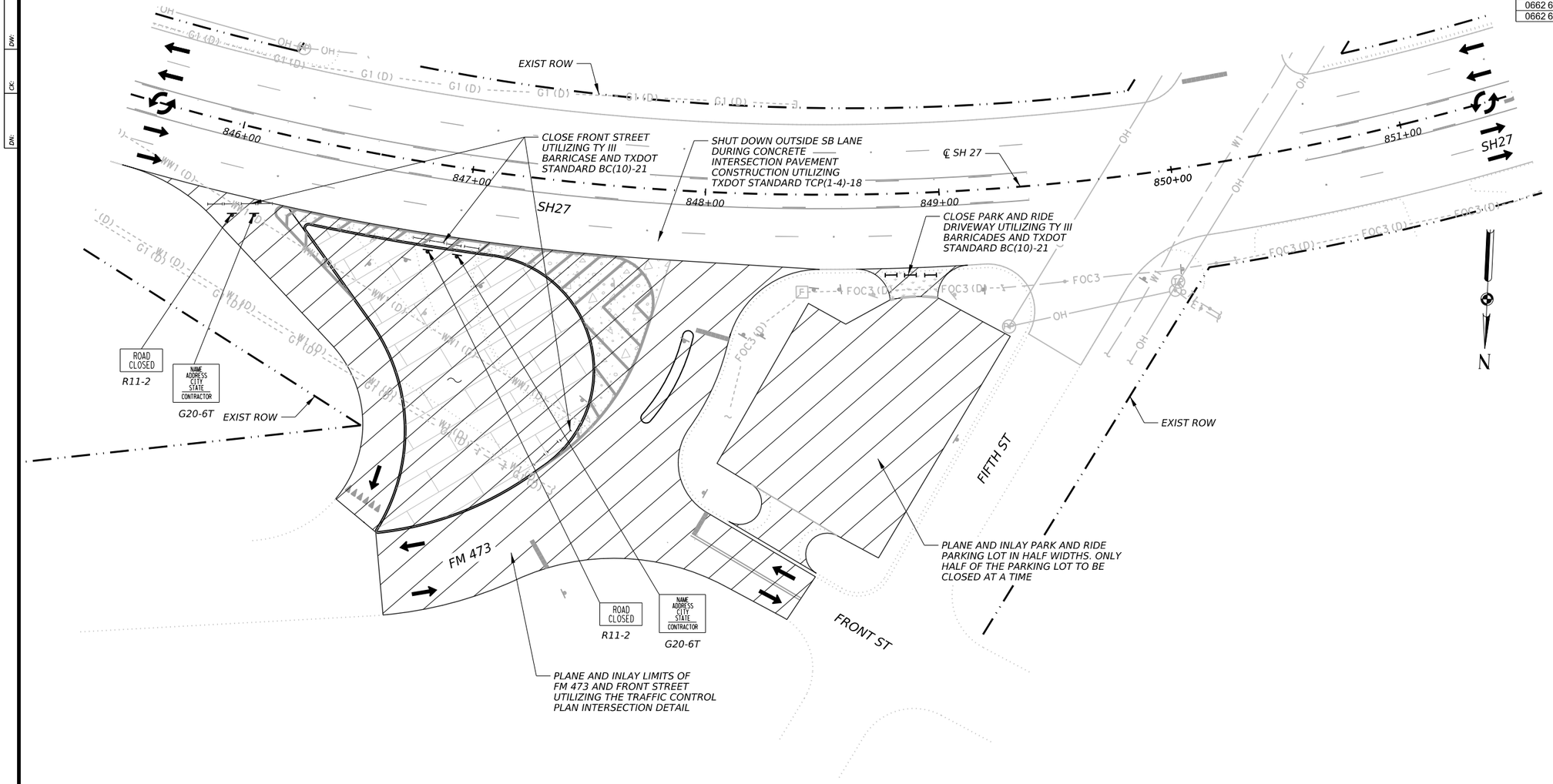
CK: DW: CK: DW:

SHEET #			1
ITEM	DESCRIPTION	UNIT	QTY
0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	120
0506 6024	CONSTRUCTION EXITS (REMOVE)	SY	120
0662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	2
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	36



LEGEND

.....	EXIST FEATURES
— · —	EXIST RIGHT OF WAY
	WORKZONE THIS PHASE
	PROPOSED CONCRETE MEDIAN
	TY III BARRICADES
– FOC1 —	HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
– FOC2 —	WINDSTREAM (FO/DUCT) QLB
– FOC3 —	ZAYO (FO/DUCT) QLB
– FOC4 —	AT&T (FO/DUCT) QLB
— FOC5 -	COMMZOOM (FO/DUCT) QLB
— T1 —	HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
– CTV1 —	SPECTRUM (CABLE) QLB
— G1 —	ATMOS (GAS) QLB
— W1 —	KENDALL COUNTY WCID (WATER) QLB
— WW1 —	KENDALL COUNTY WCID (WASTE WATER) QLB
— E1 —	BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
— TS1 —	CITY OF COMFORT (TRAFFIC SIGNAL) QLB
— OH —	BANDERA ELECTRIC COOPERATIVE (OHE) QLD
— OH —	HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
— OH —	SPECTRUM (OHE) QLD
— OH —	BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
— OH —	TXDOT QLD
— X# —	QUALITY LEVEL "B"
--X# (C)--	QUALITY LEVEL "C"
--X# (D)--	QUALITY LEVEL "D"

10/11/2023

0' 25' 50'

NOTES:

1. FOR CONSTRUCTION ACROSS AN INTERSECTION REFER TO TRAFFIC CONTROL PLAN INTERSECTION DETAIL.
2. THE CONTRACTOR SHALL COORDINATE ALL STREET AND DRIVEWAY CLOSURES 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION
3. EROSION CONTROL LOGS AND ROCK FILTER DAMS INSTALLED IN PHASES 1 AND 2 SHALL BE REMOVED DURING PHASE 3.
4. CHANNELIZING DEVICES SHALL BE SPACED PER BARRICADE AND APPLICABLE TCP STANDARDS,UNLESS OTHERWISE SHOWN ON PLANS.
5. SEE ADVANCED WARNING SIGNS LAYOUT FOR ADDITIONAL INFORMATION.
6. REFER TO BARRICADE CONSTRUCTION STANDARDS FOR TAPER LENGTHS, MINIMUM SPACING OF CONSTRUCTION WARNING AND CROSS STREET SIGNS.

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SH27

TRAFFIC CONTROL PLAN INTERSECTION LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		39

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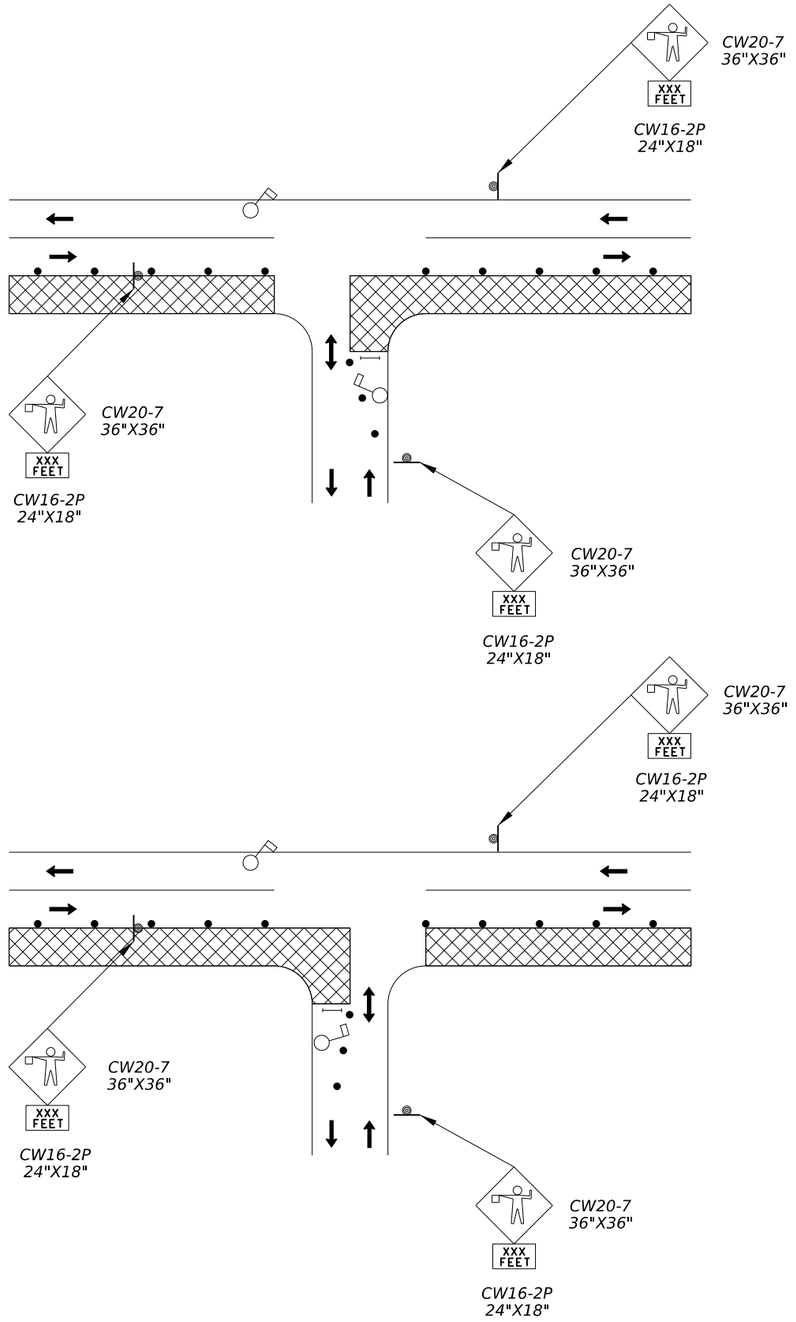
TYPICAL SIDE STREET/DRIVEWAY
HALF-SECTION CONSTRUCTION DETAILS
STEP 1



TYPICAL SIDE STREET/DRIVEWAY
HALF-SECTION CONSTRUCTION DETAILS
STEP 2

LEGEND

- WORK ZONE
- CHANNELIZING DEVICE
- SIGN POST
- TYPE III BARRICADE
- FLAGGER
- TRAFFIC FLOW ARROW

NOTES:

1. THE CONTRACTOR SHALL COORDINATE ALL STREET AND DRIVEWAY CLOSURES 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. EXPERIENCED FLAGGERS TO BE USED TO DIRECT TRAFFIC DURING INTERSECTION CONSTRUCTION.
3. CHANNELIZING DEVICES SHALL BE SPACED PER BARRICADE STANDARDS, UNLESS OTHERWISE SHOWN ON PLANS.
4. SEE ADVANCED WARNING SIGNS LAYOUT FOR ADDITIONAL INFORMATION.
5. REFER TO BARRICADE CONSTRUCTION STANDARDS FOR TAPER LENGTHS, MINIMUM SPACING OF CONSTRUCTION WARNING AND CROSS STREET SIGNS.
6. TRAFFIC CONTROL PLAN INTERSECTION DETAIL IS TO BE USED AT THE DISCRETION OF THE ENGINEER.

NOT TO SCALE

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

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Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
INTERSECTION DETAIL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		40

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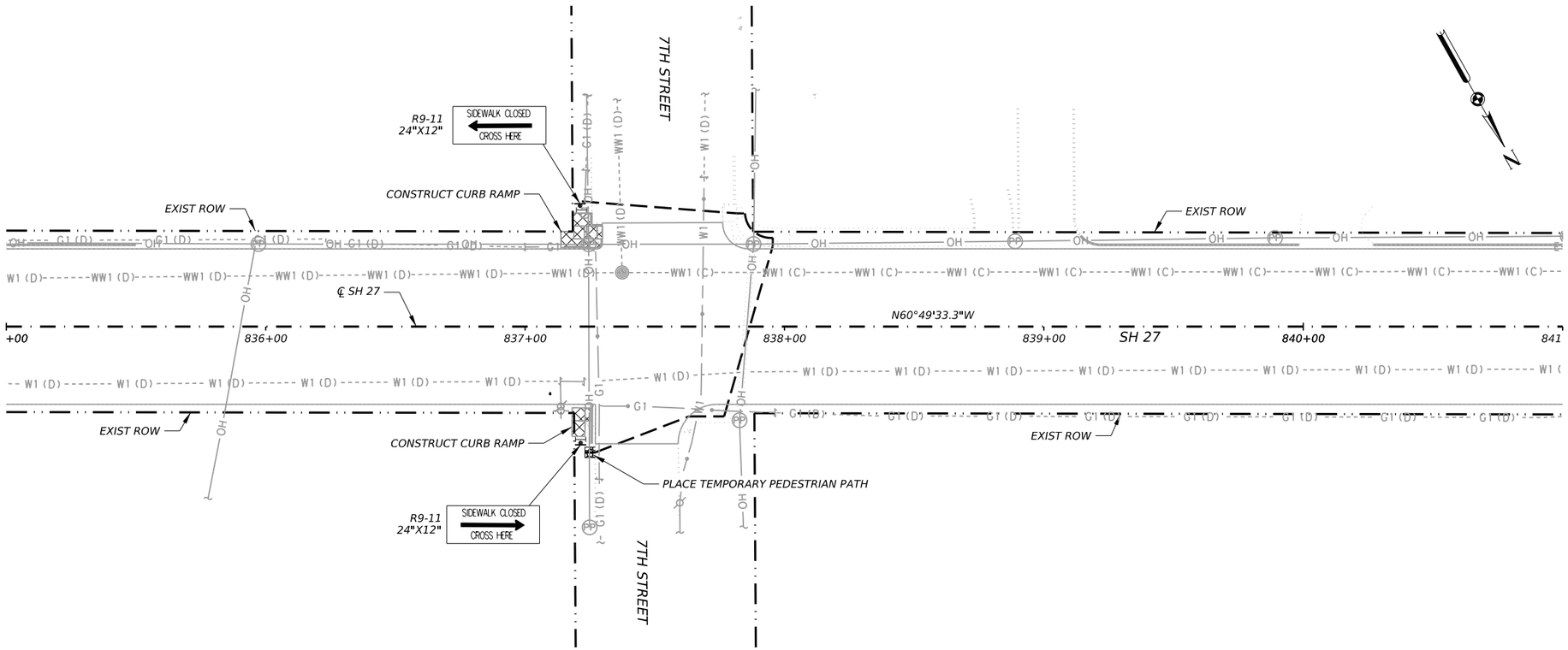

LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- PEDESTRIAN ROUTE
- TY III BARRICADES
- WARNING SIGN
- WORKZONE THIS PHASE
- WORKZONE PREVIOUS PHASE
- TEMPORARY PEDESTRIAN PATH

NOTES:

1. CONTRACTOR SHALL PHASE CONSTRUCT CORNERS AND UTILIZE EXISTING RAMPS TO MAINTAIN PEDESTRIAN CROSSINGS.
2. ALL TEMPORARY PEDESTRIAN PATHS AND TRANSITIONS MUST BE ADA COMPLIANT.
3. ADDITIONAL TEMPORARY PEDESTRIAN PATH WORK REQUIRED, INCLUDING THE REMOVAL OF TEMPORARY PEDESTRIAN PATH AND REESTABLISHMENT OF WORK AREA TO EXISTING CONDITIONS, SHALL NOT BE PAID FOR DIRECTLY BUT IS SUBSIDIARY TO ITEM 0531.

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

0' 25' 50'

Kimley»Horn
F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
PEDESTRIAN DETOUR
(STEP 1)

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		41

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CK:
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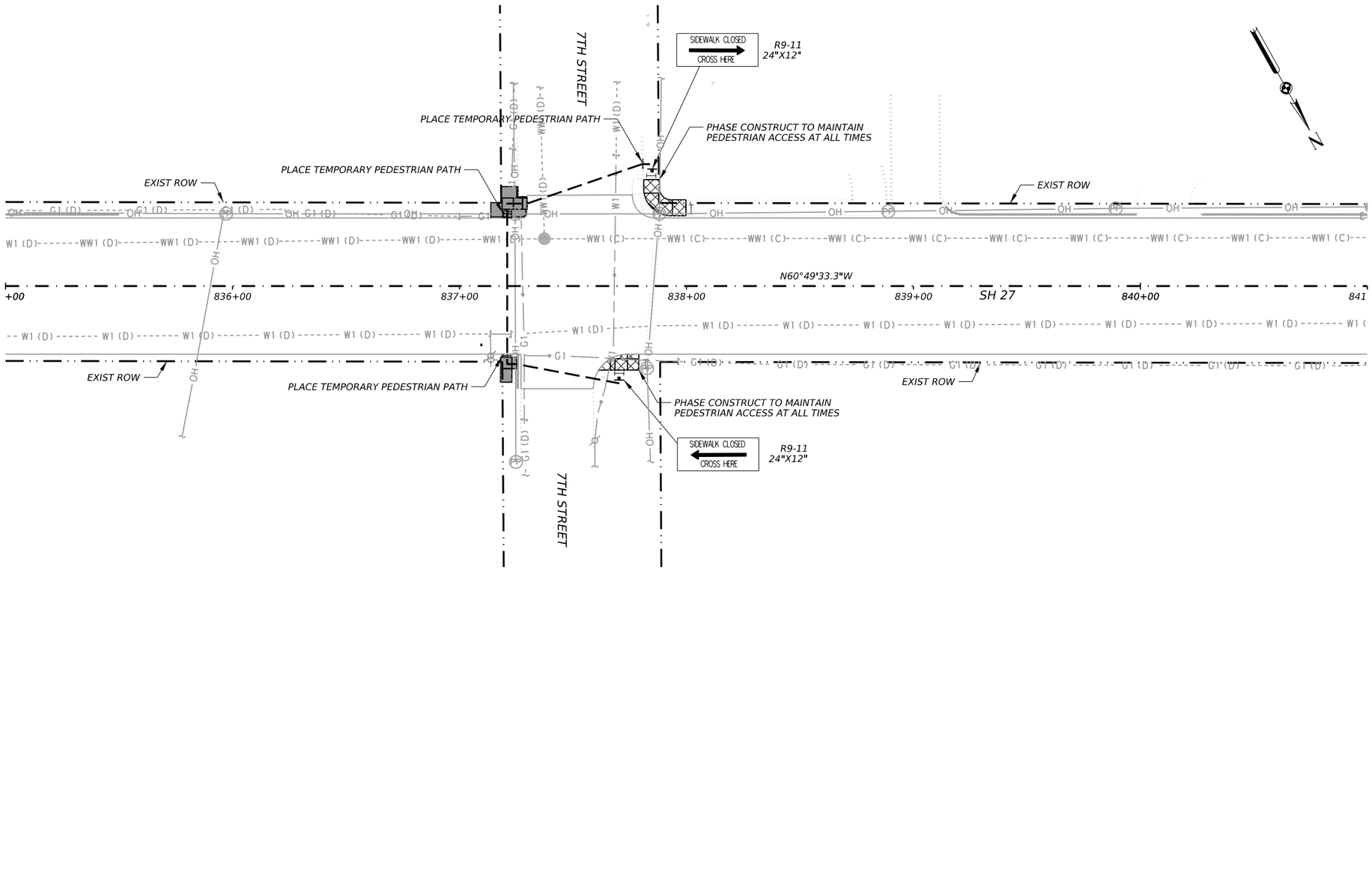

LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- PEDESTRIAN ROUTE
- TY III BARRICADES
- WARNING SIGN
- WORKZONE THIS PHASE
- WORKZONE PREVIOUS PHASE
- TEMPORARY PEDESTRIAN PATH

NOTES:

1. CONTRACTOR SHALL PHASE CONSTRUCT CORNERS AND UTILIZE EXISTING RAMPS TO MAINTAIN PEDESTRIAN CROSSINGS.
2. ALL TEMPORARY PEDESTRIAN PATHS AND TRANSITIONS MUST BE ADA COMPLIANT.
3. ADDITIONAL TEMPORARY PEDESTRIAN PATH WORK REQUIRED, INCLUDING THE REMOVAL OF TEMPORARY PEDESTRIAN PATH AND REESTABLISHMENT OF WORK AREA TO EXISTING CONDITIONS, SHALL NOT BE PAID FOR DIRECTLY BUT IS SUBSIDIARY TO ITEM 0531.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

TRAFFIC CONTROL PLAN
PEDESTRIAN DETOUR
(STEP 2)

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		42

DATE: 10/11/2023 12:19:51 PM
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CK:
DW:
CK:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0142	06	029	SH27
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	SAT	KENDALL		43

95

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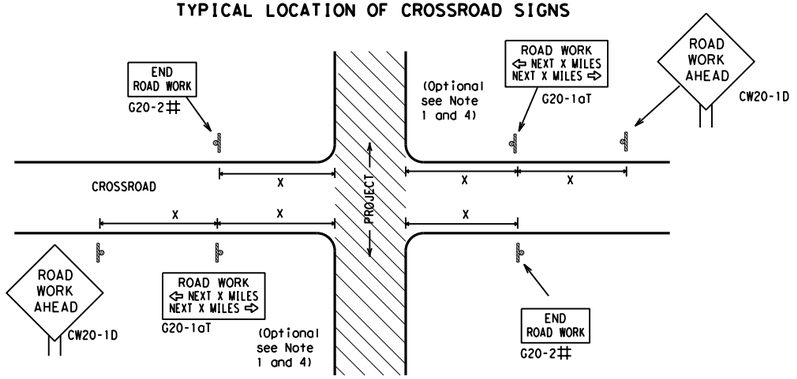
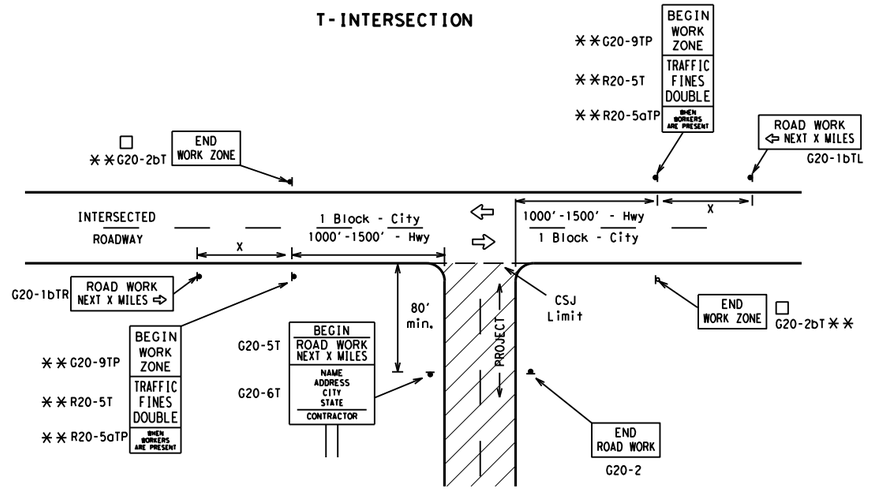
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

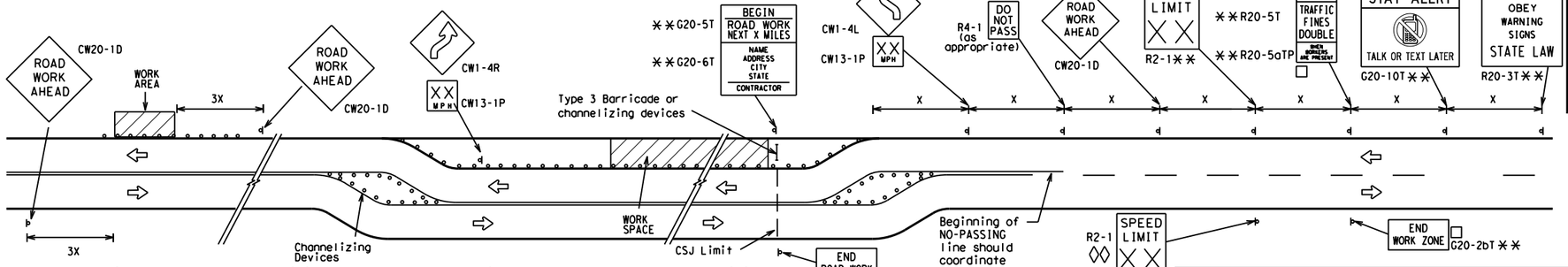
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

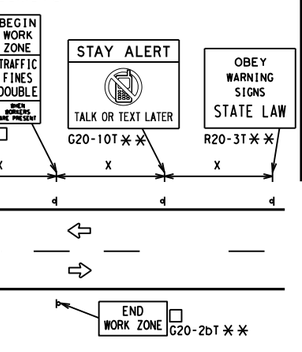
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

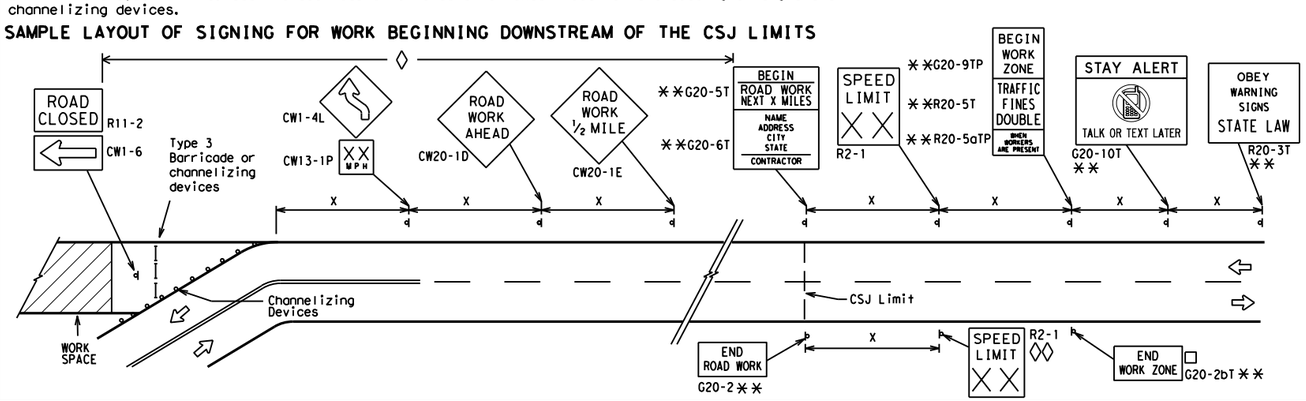


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing 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	0142	06	029	SH27
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	KENDALL		44

DATE: 10/11/2023 12:20:15 PM
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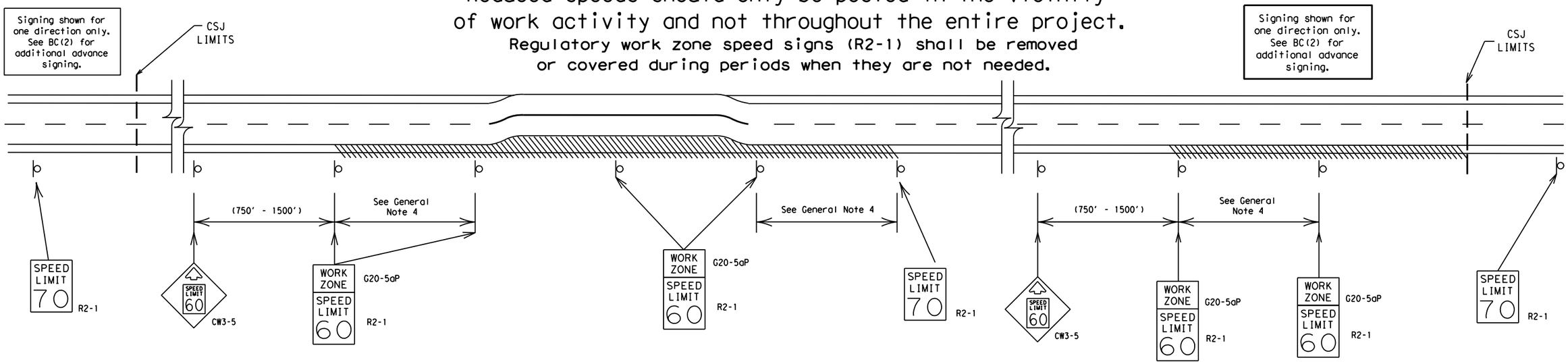
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	KENDALL		45

DATE: 10/11/2023 12:20:18 PM
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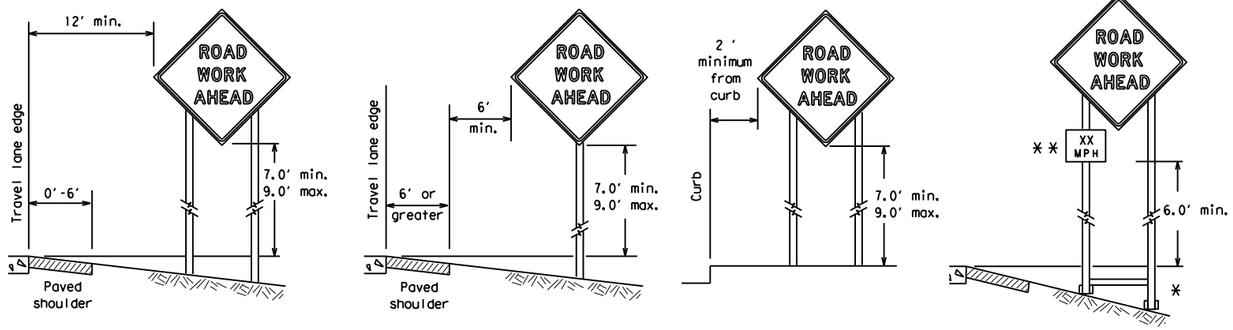
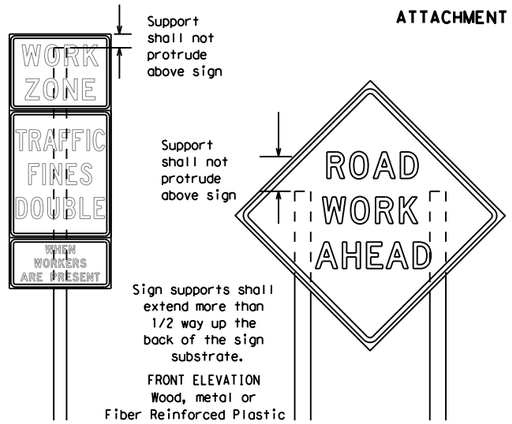
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

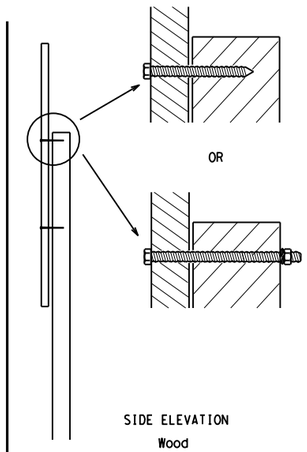


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





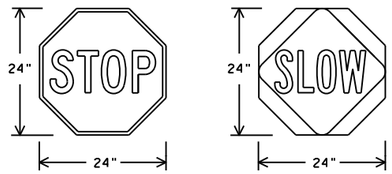
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
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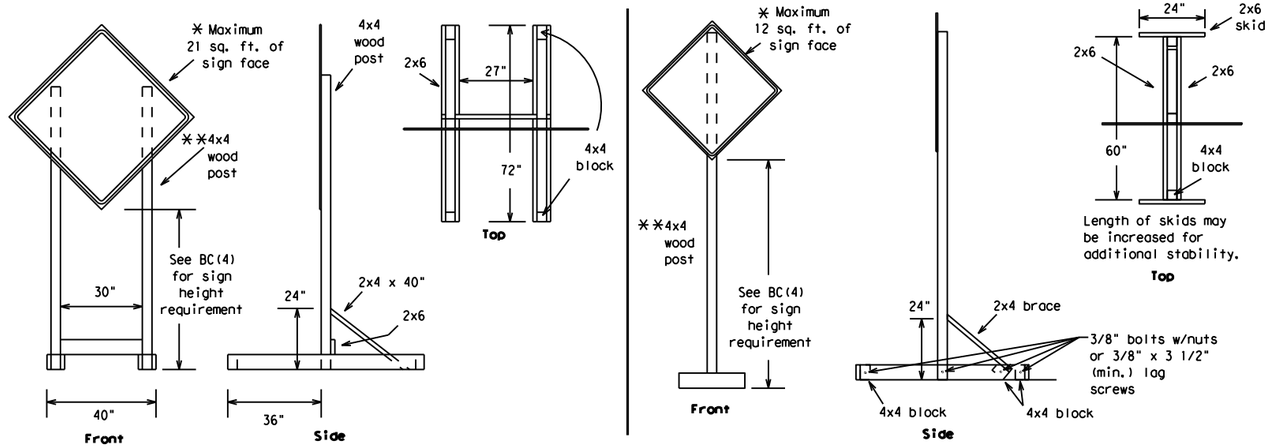
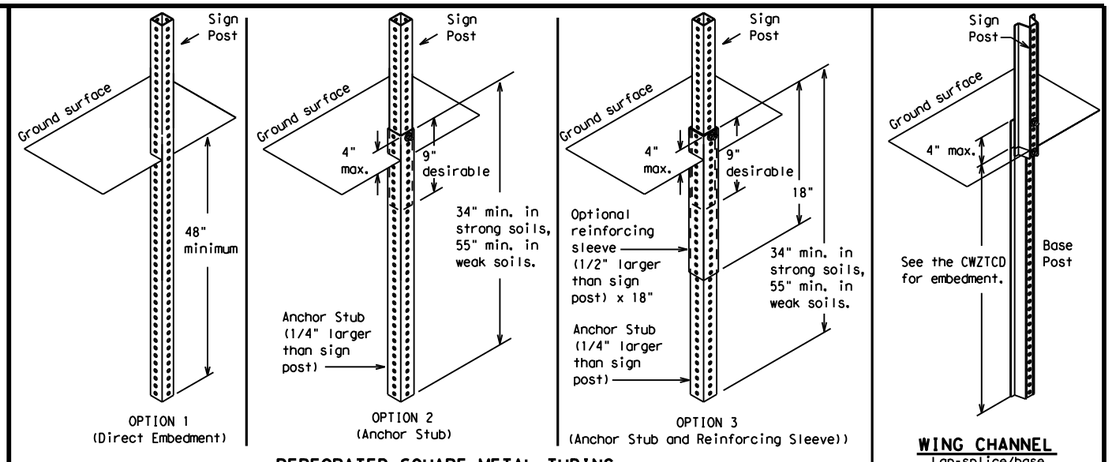


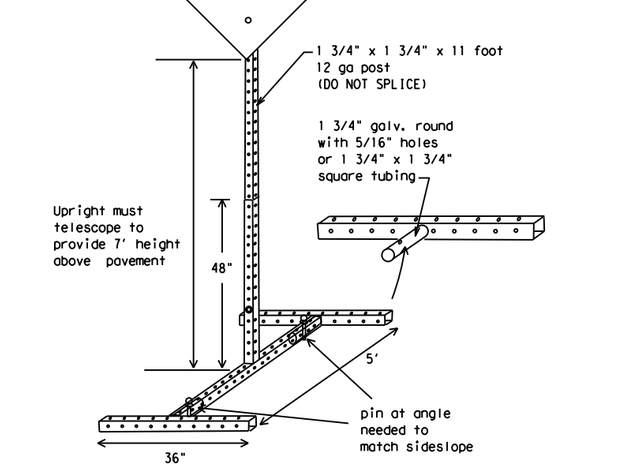
SKID MOUNTED WOOD SIGN SUPPORTS

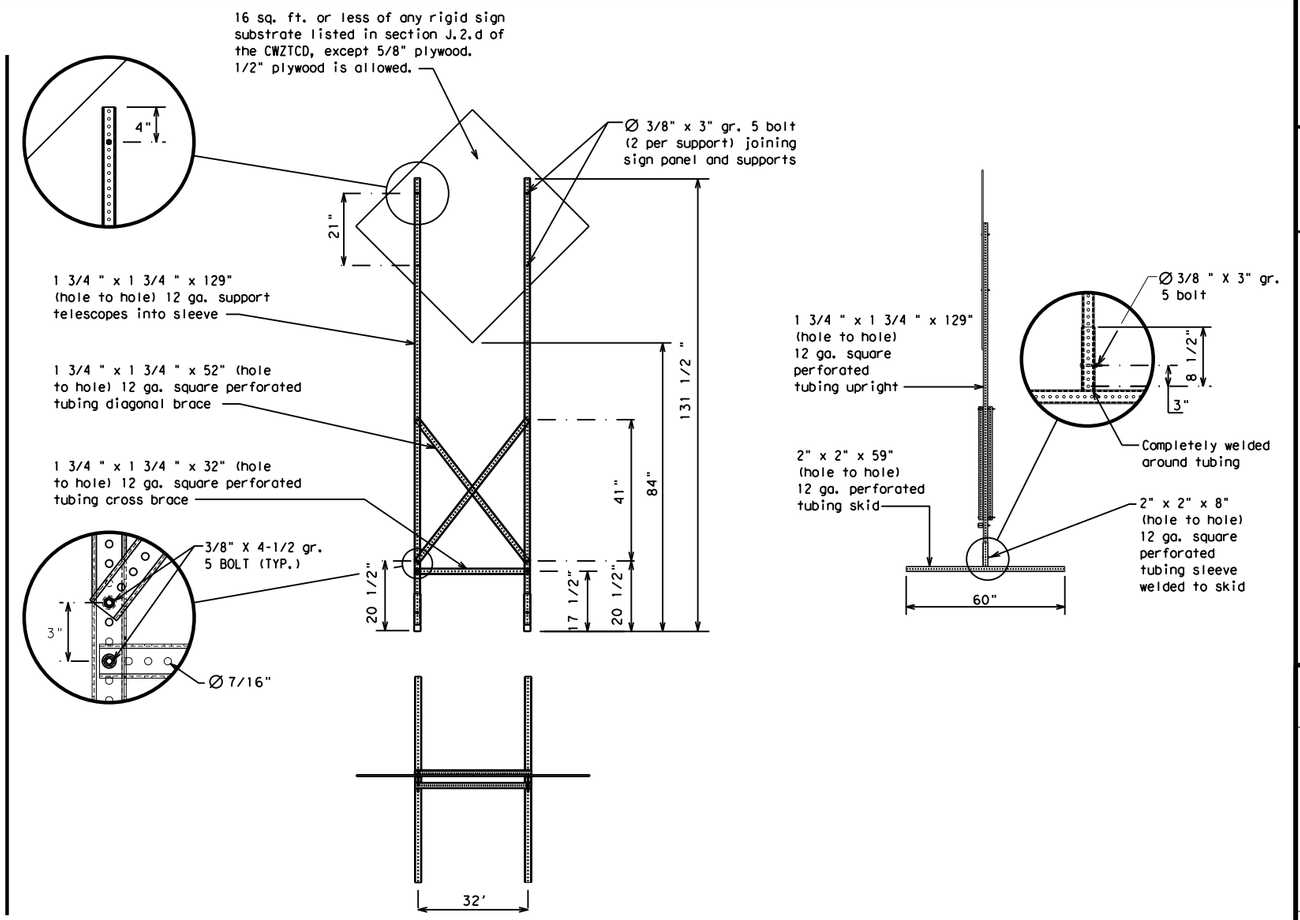
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



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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7-13 5-21	SAT	KENDALL		47

DATE: 10/11/2023 12:20:23 PM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic 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	0142	06	029	SH27
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	KENDALL		48

100

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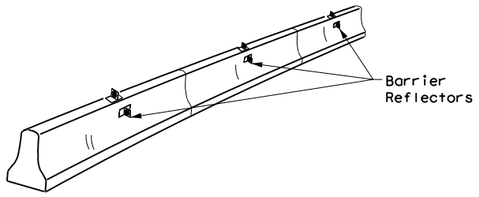
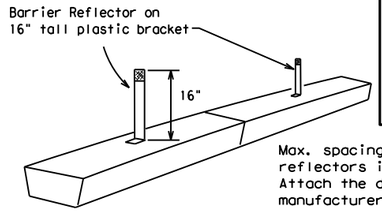
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

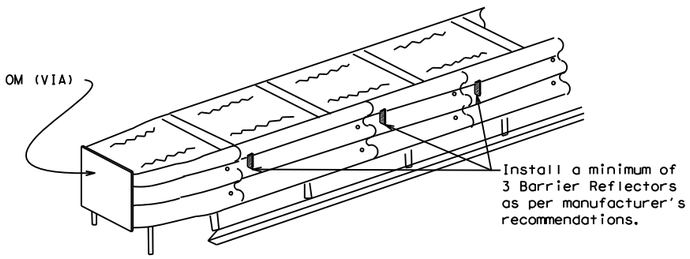


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

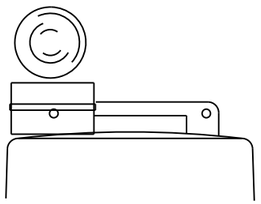


DELINEATION OF END TREATMENTS

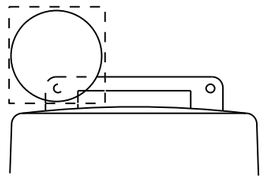
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

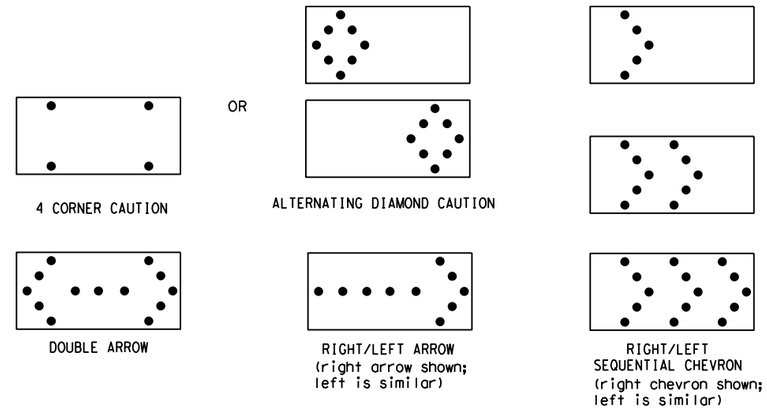
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

SHEET 7 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	KENDALL		49

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

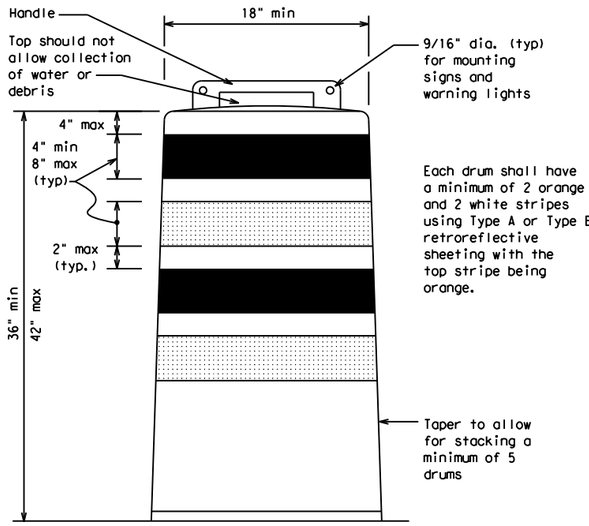
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

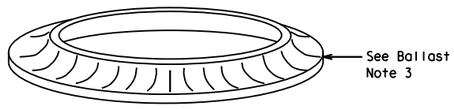
RETROREFLECTIVE SHEETING

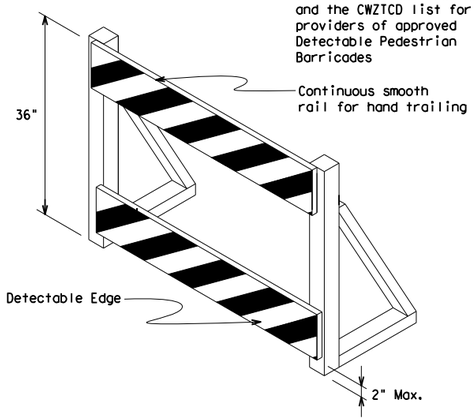
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

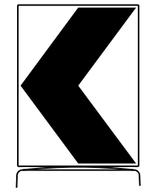




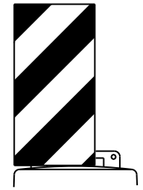


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0142	06	029	SH27
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9-07 5-21	SAT	KENDALL		50
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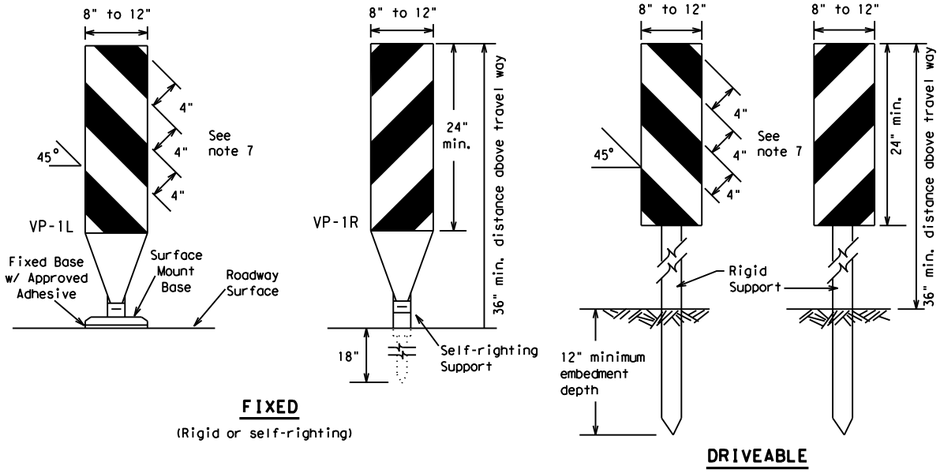
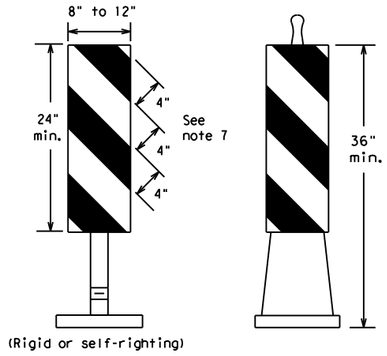


FIXED
(Rigid or self-righting)

DRIVEABLE

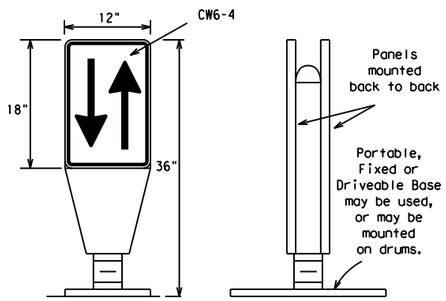


(Rigid or self-righting)

PORTABLE

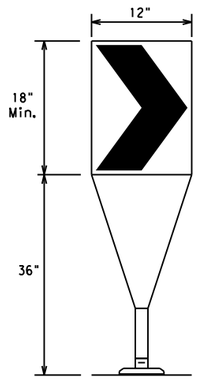
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



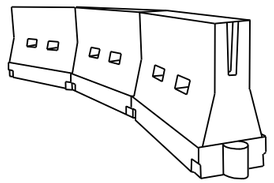
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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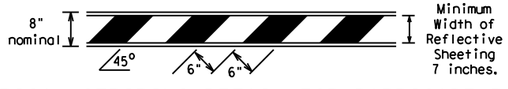
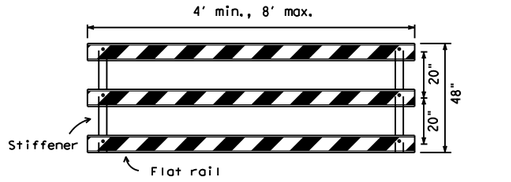
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



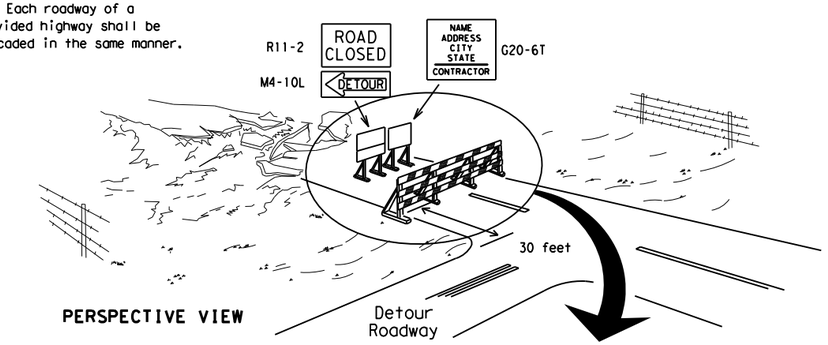
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

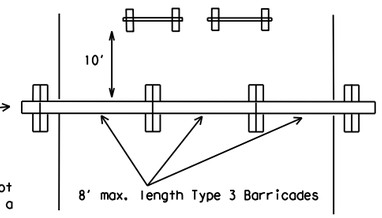
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

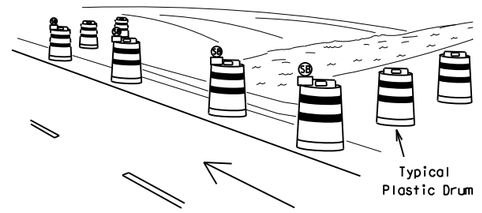
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

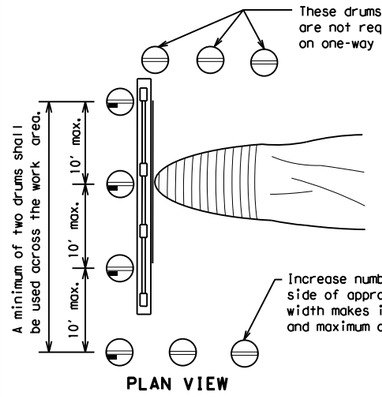
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

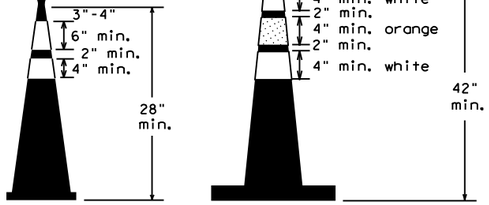
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



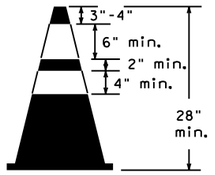
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

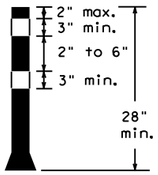
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

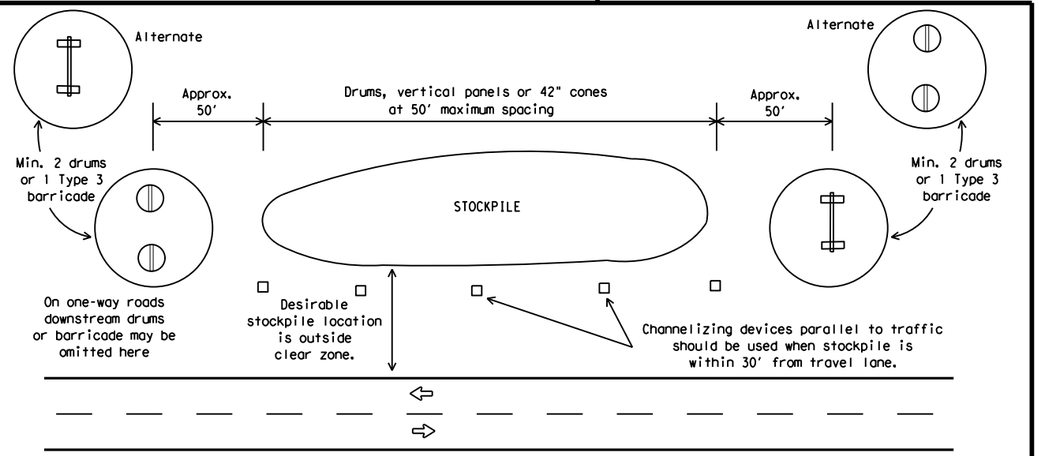


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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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.

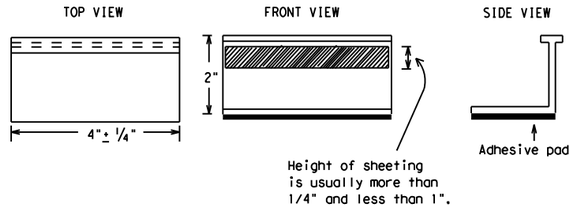
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	0142	06	029	SH27
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	SAT	KENDALL		53

DATE: 10/11/2023 12:20:39 PM
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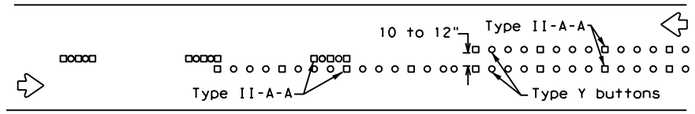
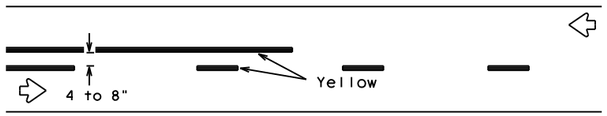
PAVEMENT MARKING PATTERNS

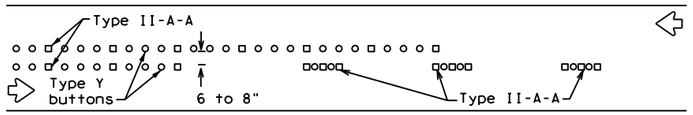
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



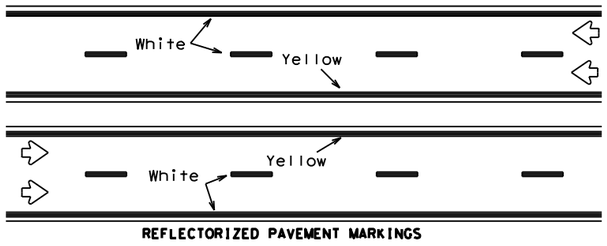
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



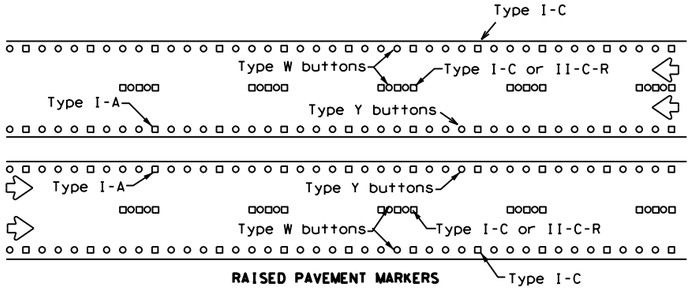
RAISED PAVEMENT MARKERS - PATTERN B

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

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



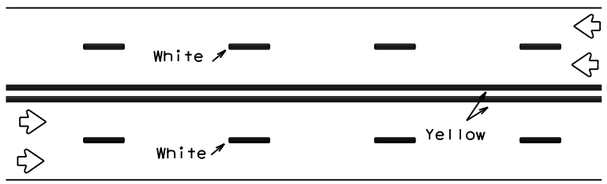
REFLECTORIZED PAVEMENT MARKINGS



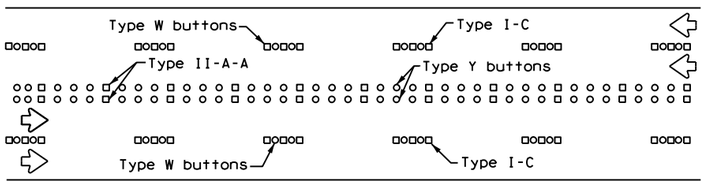
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



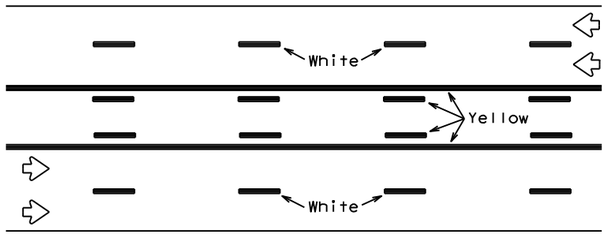
REFLECTORIZED PAVEMENT MARKINGS



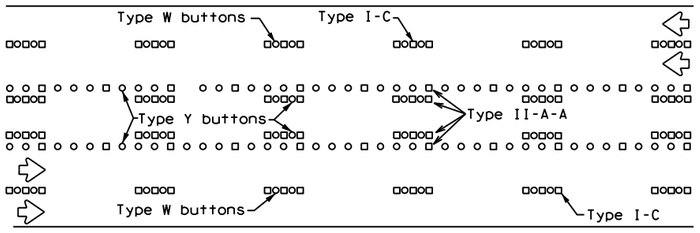
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

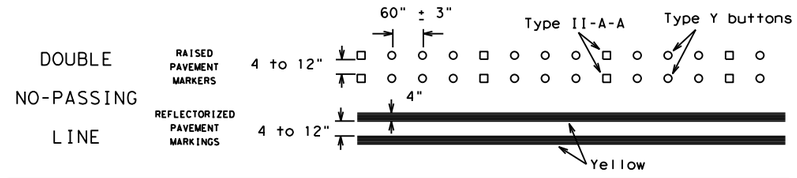
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

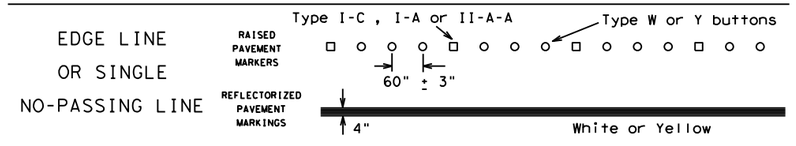
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

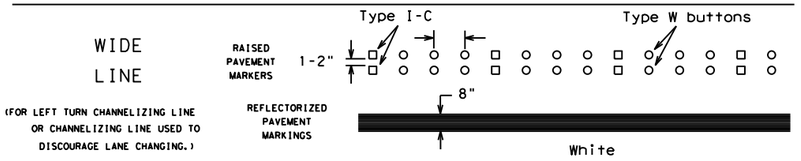


EDGE LINE OR SINGLE NO-PASSING LINE



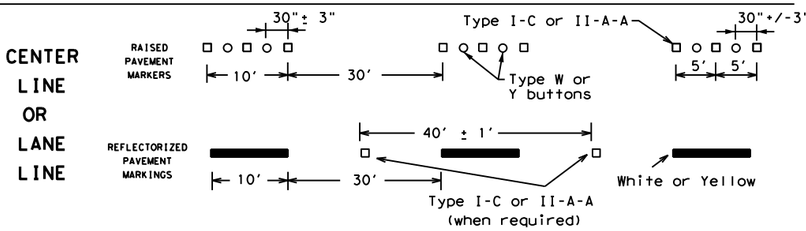
WIDE LINE

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

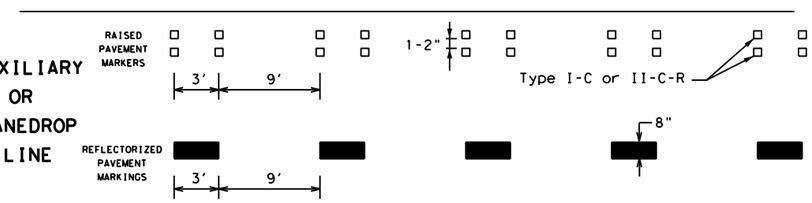


BROKEN LINES

CENTER LINE OR LANE LINE

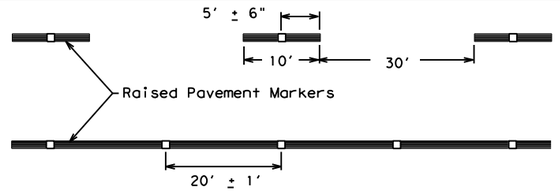


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21	0142	06	029	SH27
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	SAT	KENDALL		54

106

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DATE: 10/11/2023 12:21:02 PM
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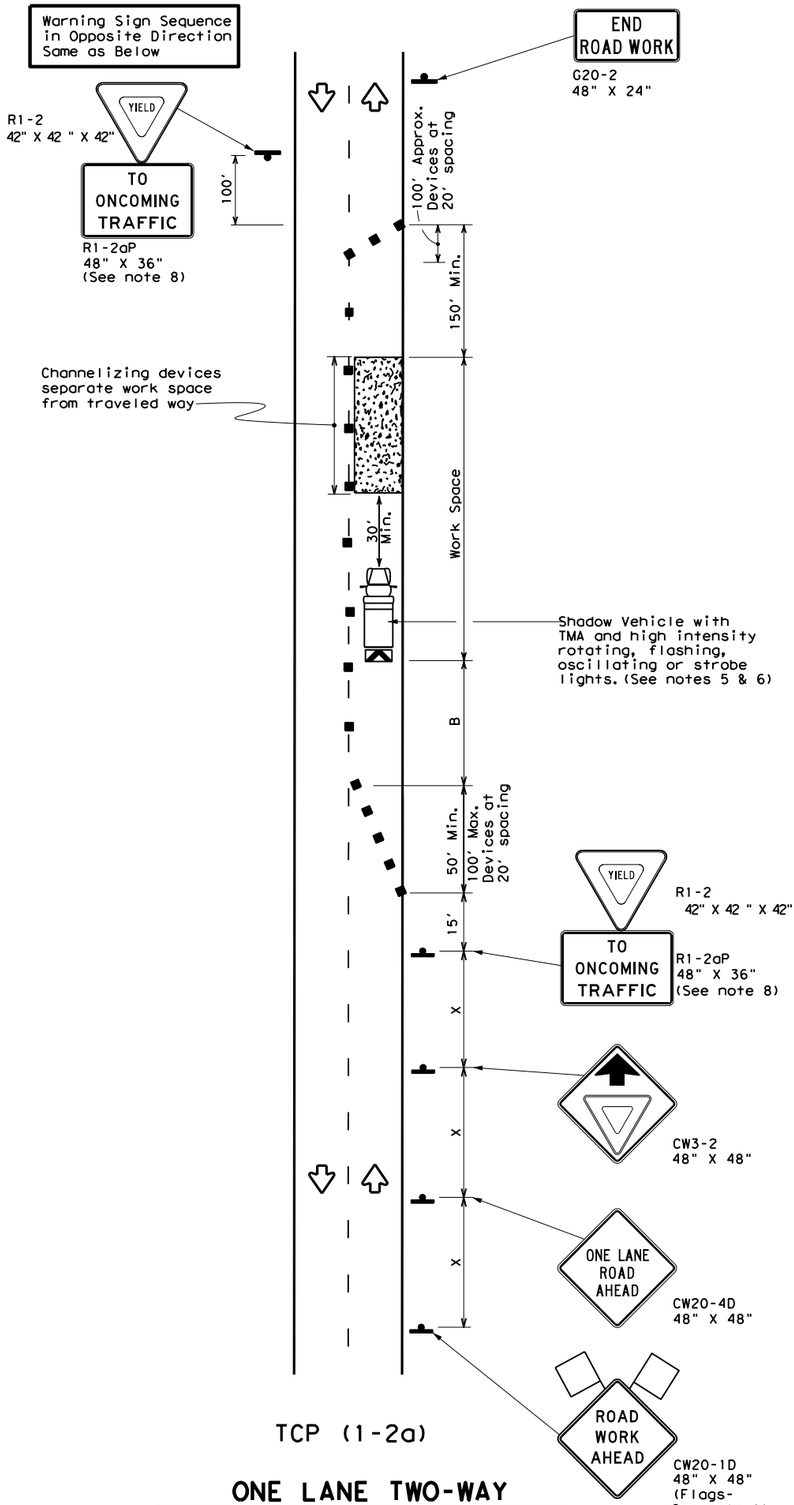
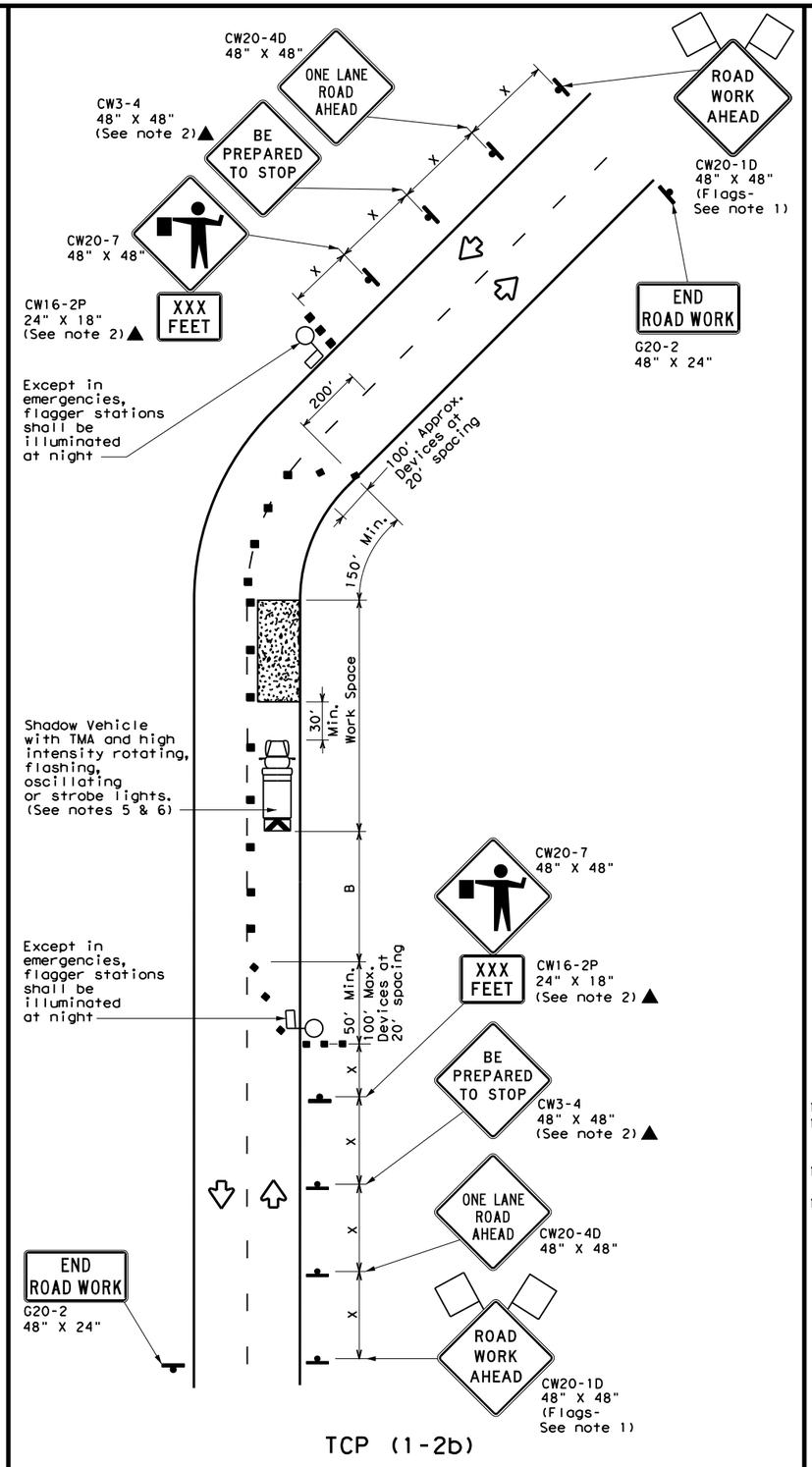


TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



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.

TCP (1-2a)

7. 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.
8. 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)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. 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).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. 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 2-94 2-12 1-97 2-18	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
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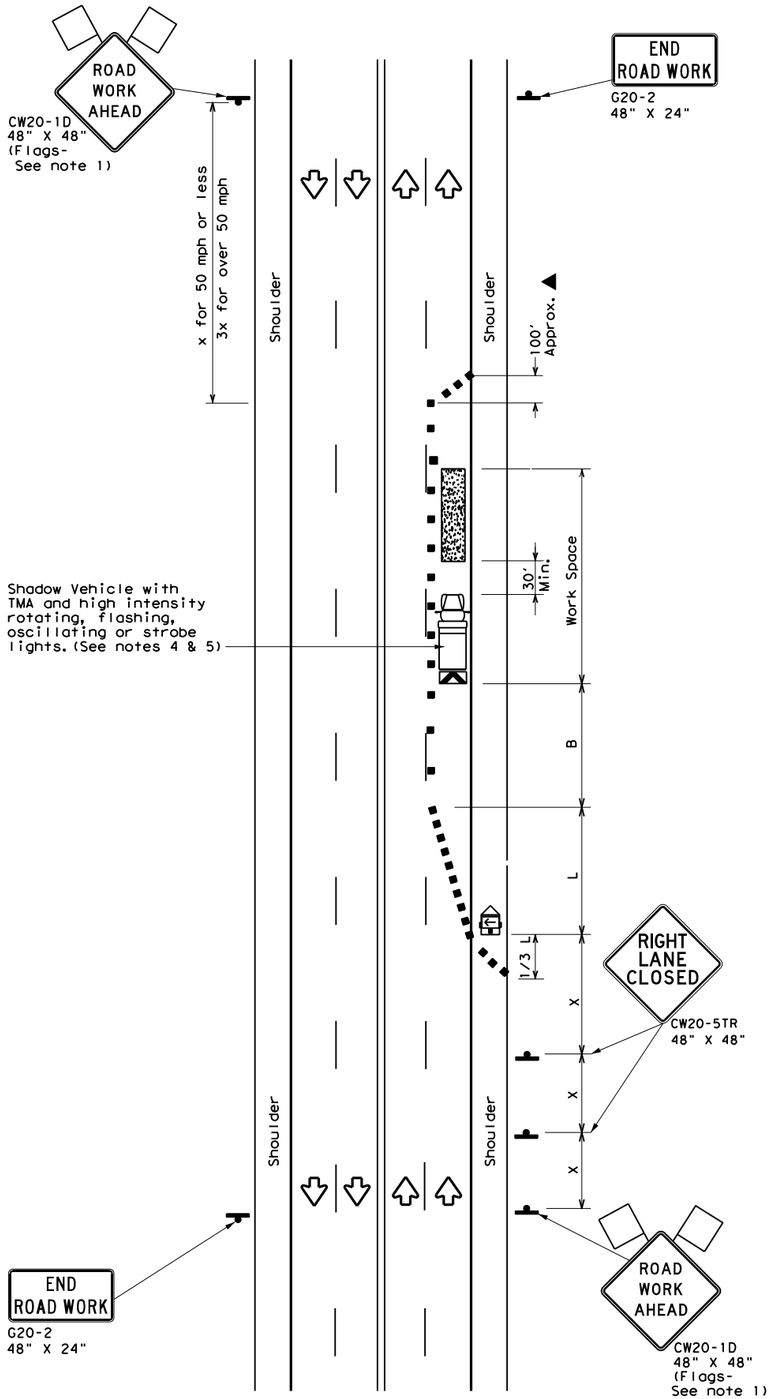
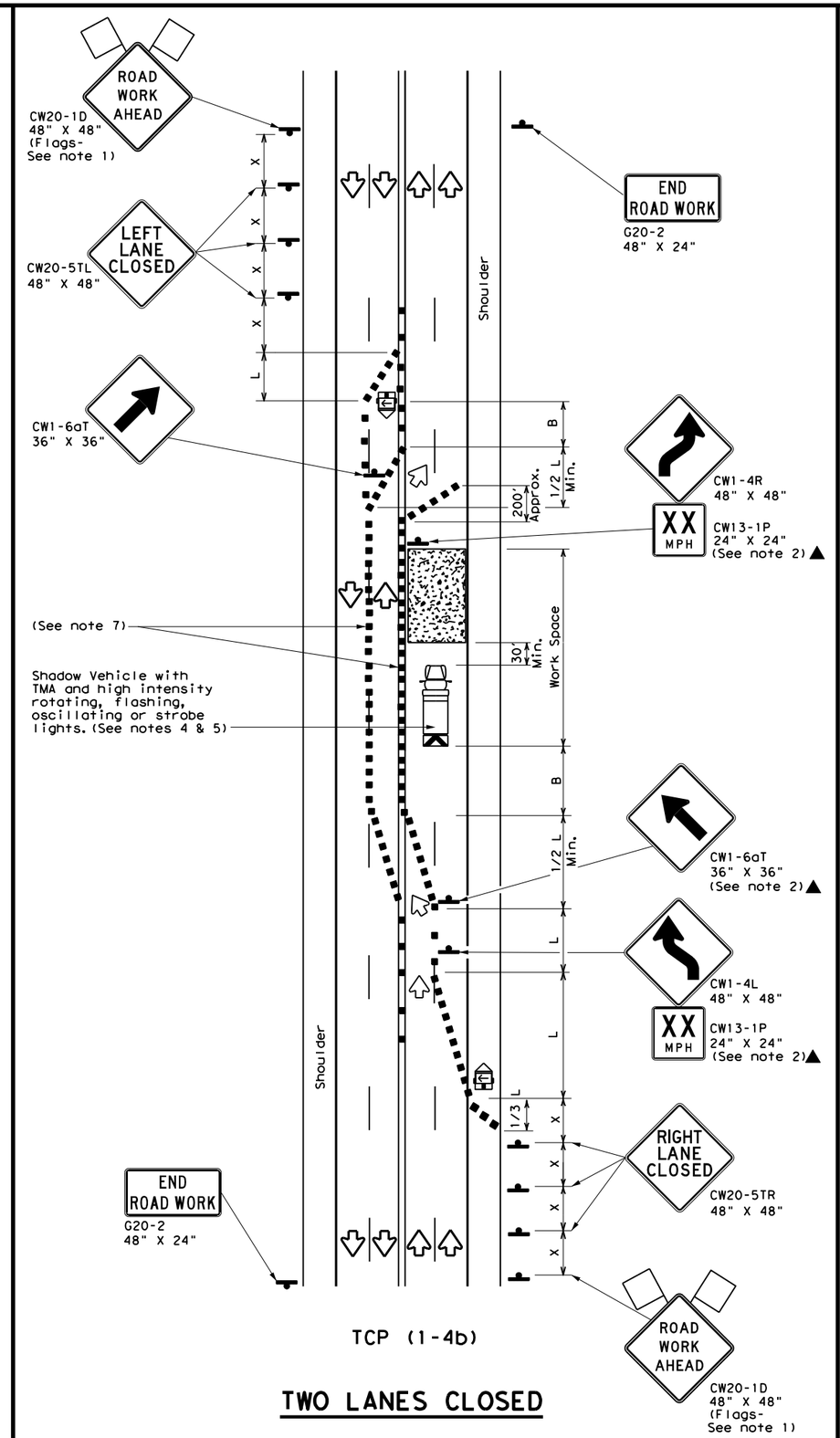


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
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.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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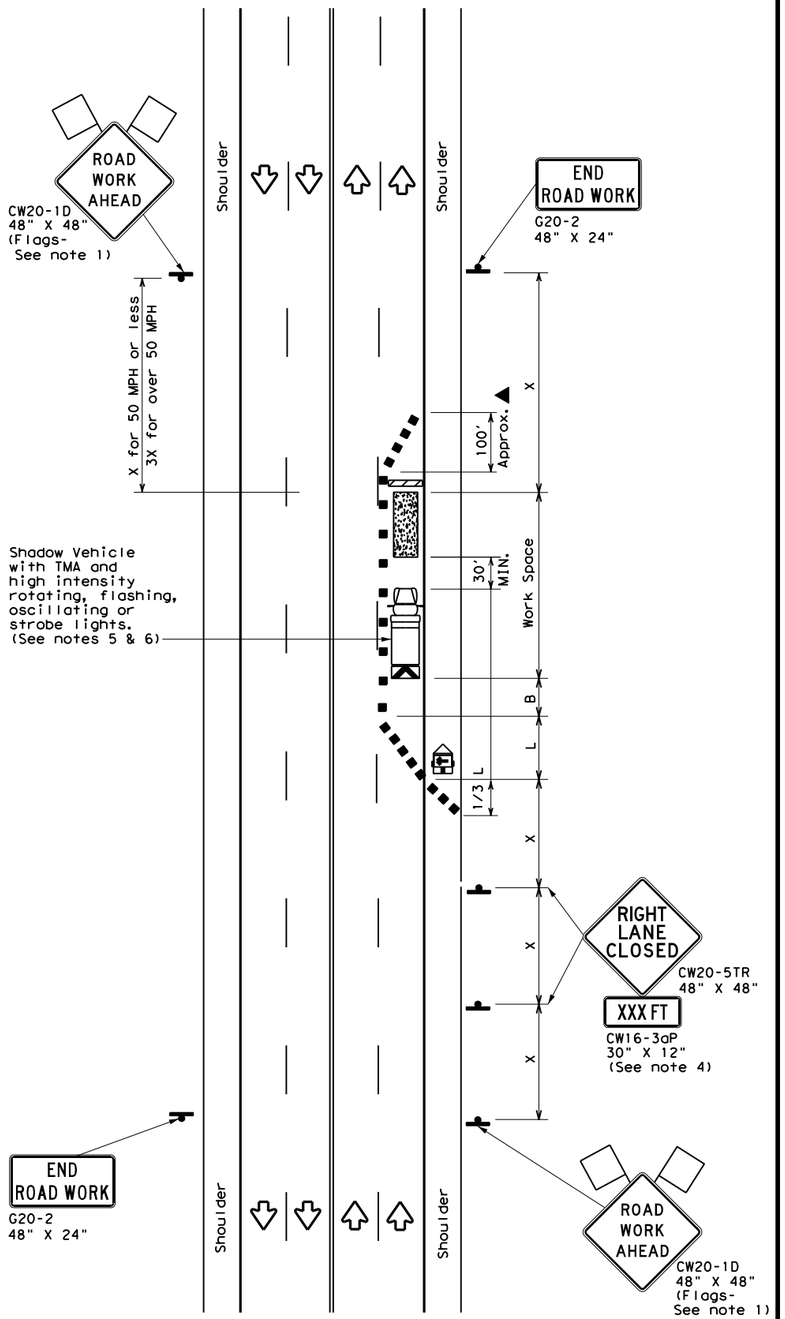
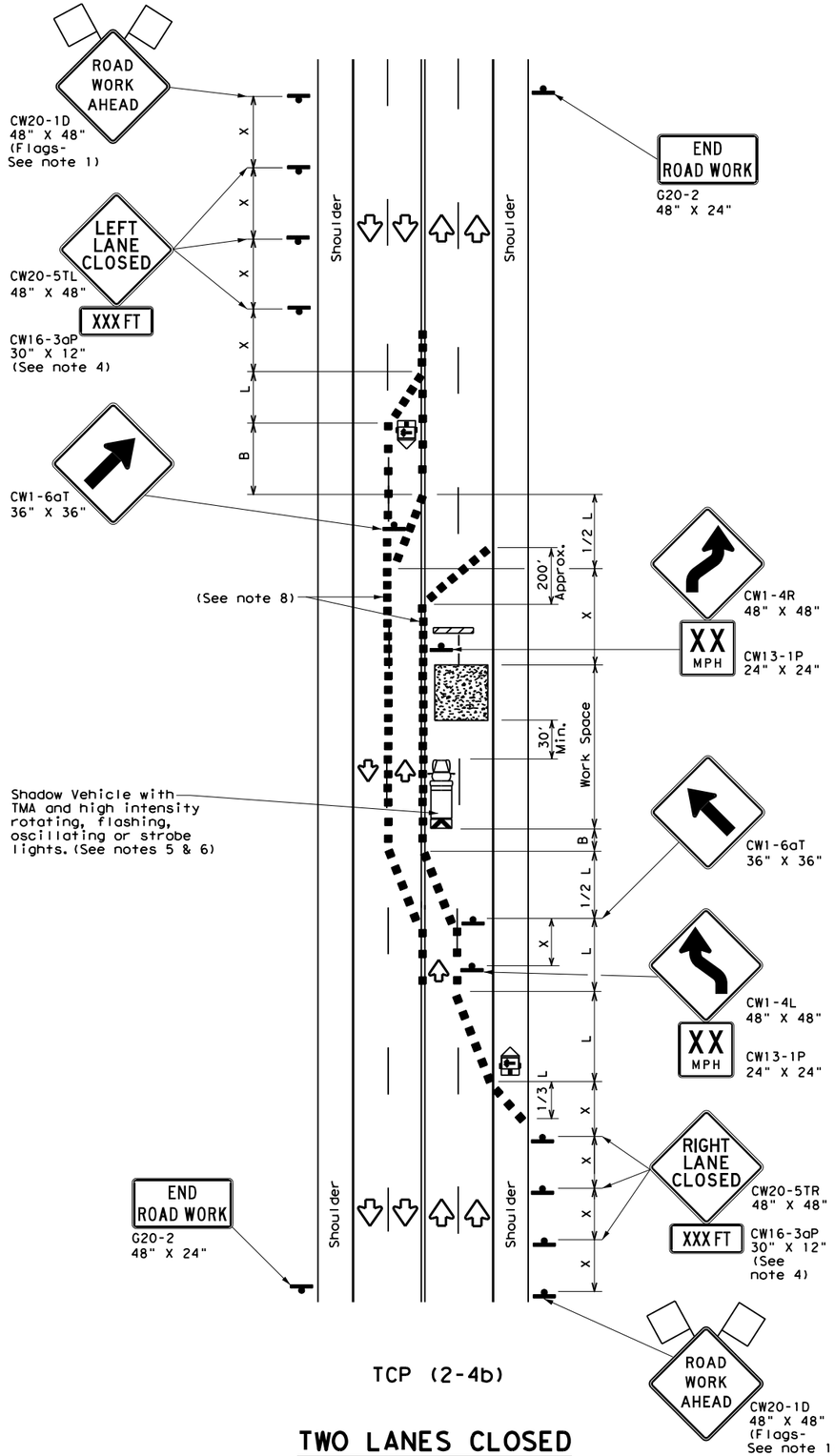
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SAT	KENDALL		56
1-97 2-18				



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	SAT	KENDALL		57
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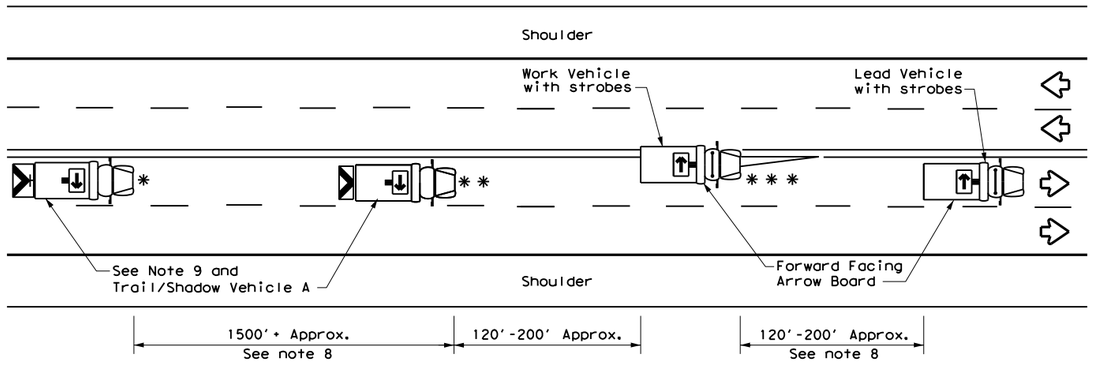
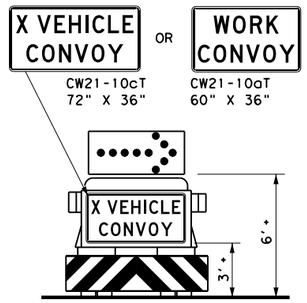


TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

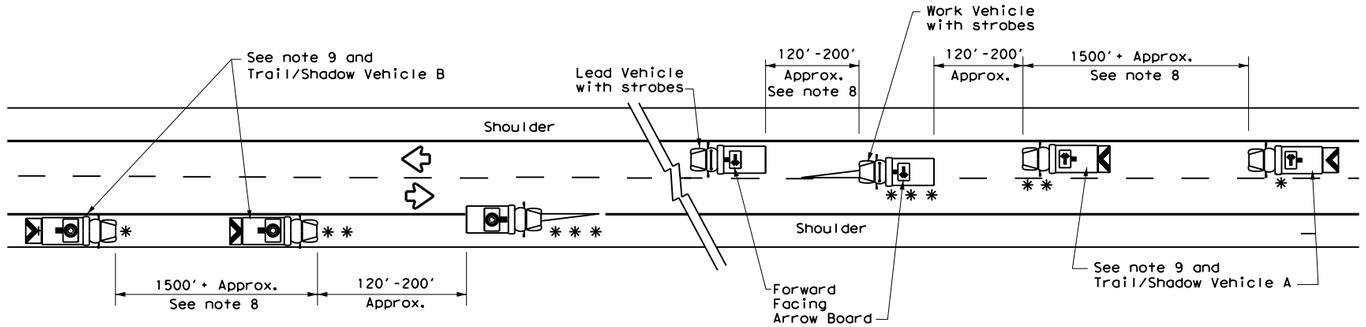
with RIGHT Directional display Flashing Arrow Board

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

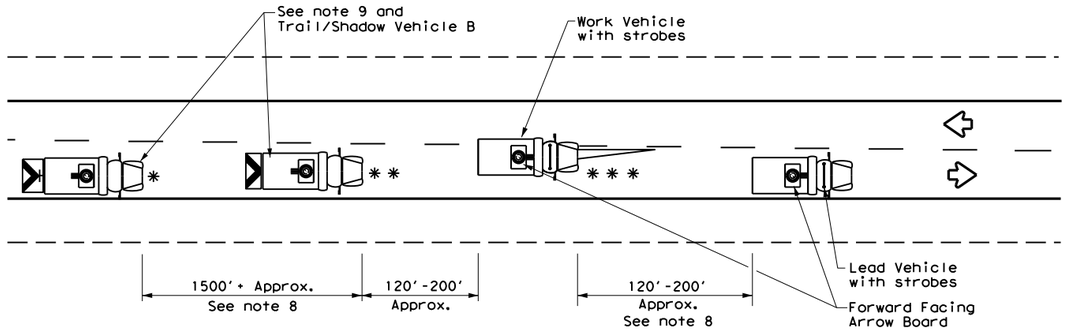
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



WORK ON SHOULDER — WORK ON TRAVEL LANE

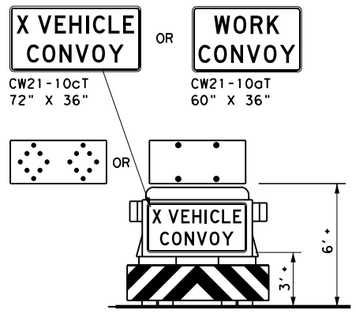
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



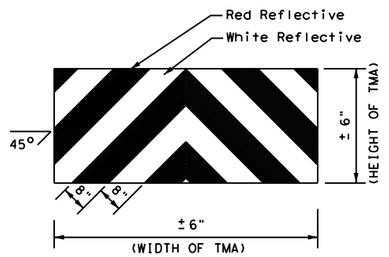
TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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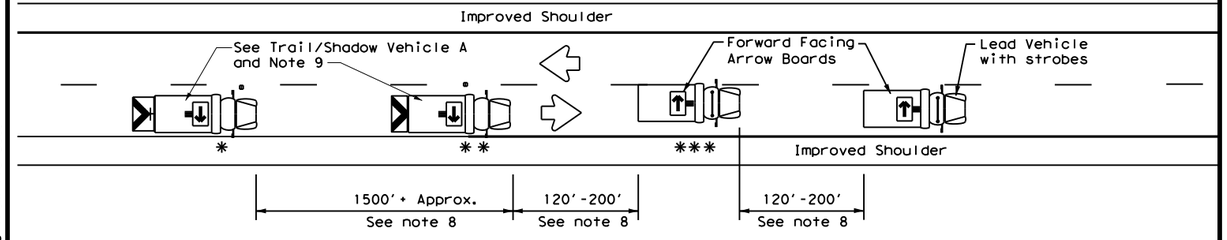
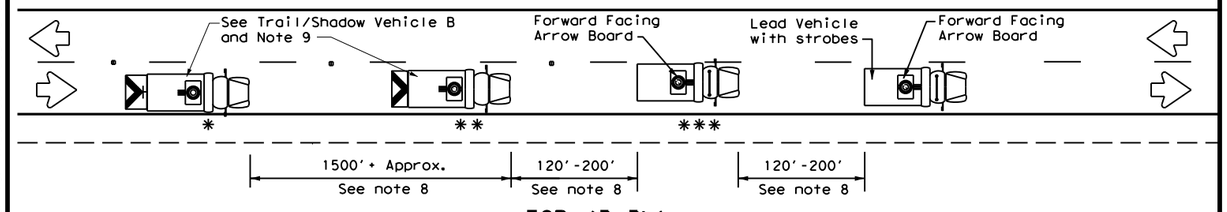
	SAT	KENDALL		58



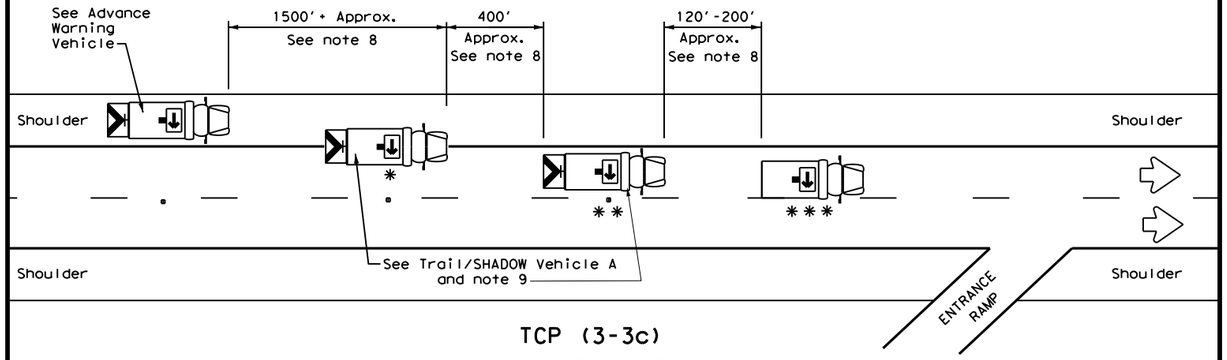
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



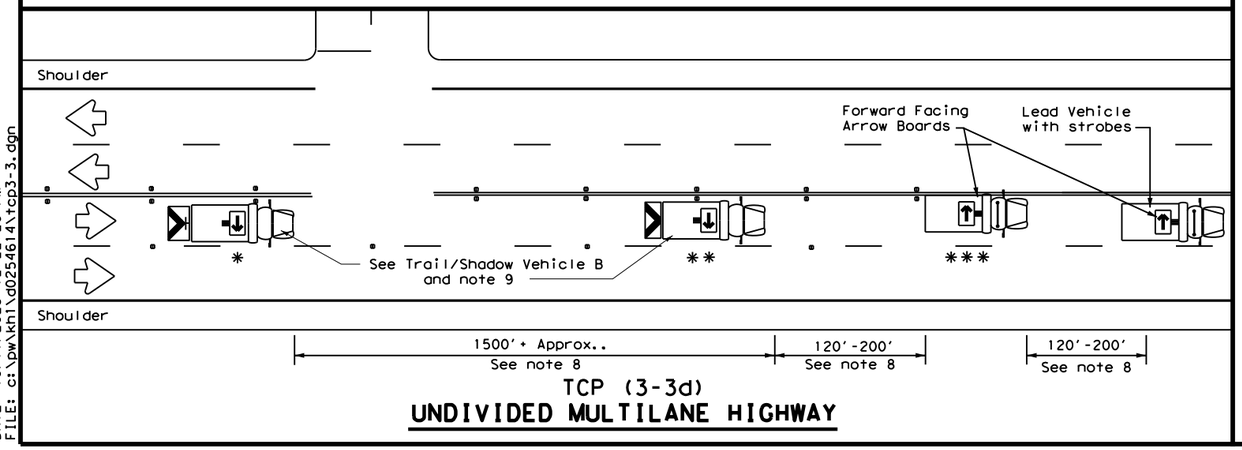
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



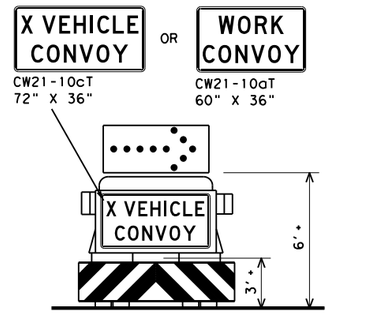
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



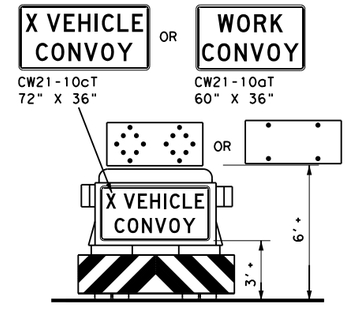
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



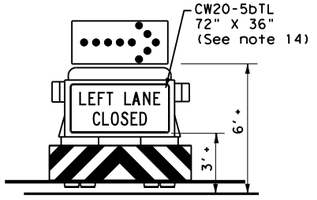
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

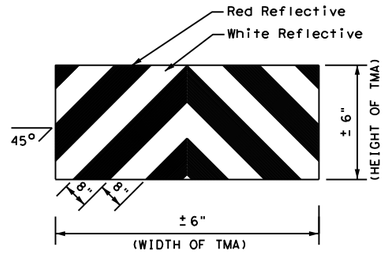


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	SAT	KENDALL		59
1-97 7-14				

DATE: 10/11/2023 12:22:26 PM
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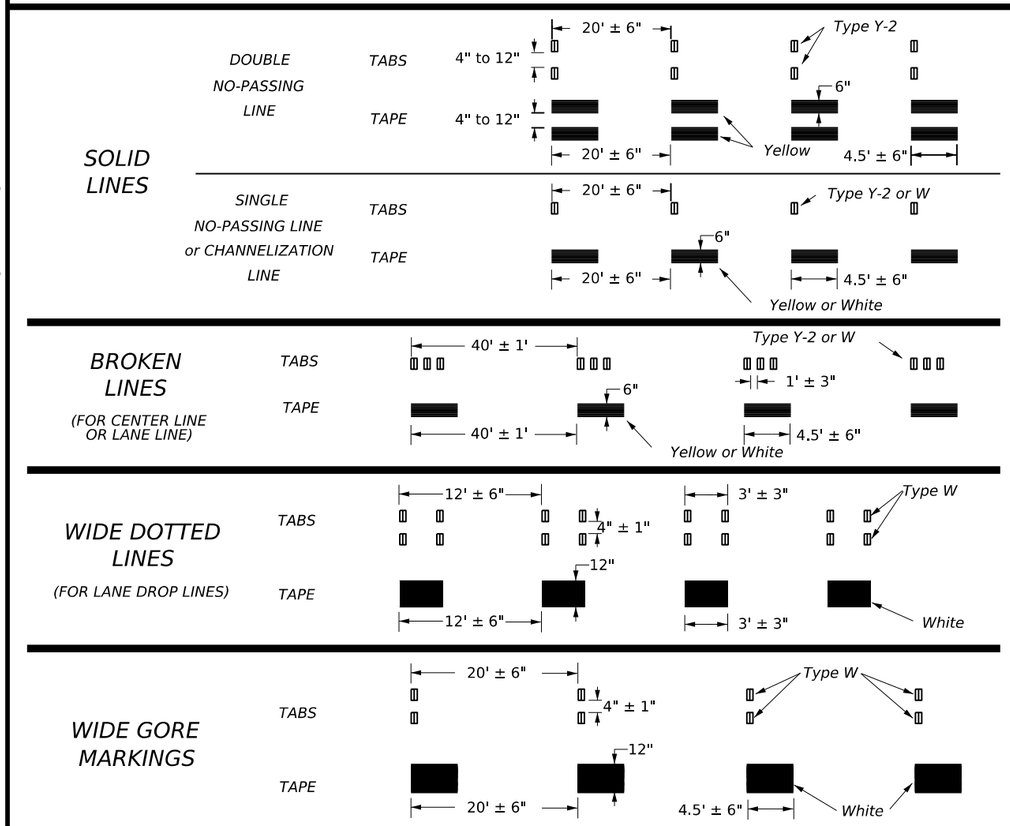
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



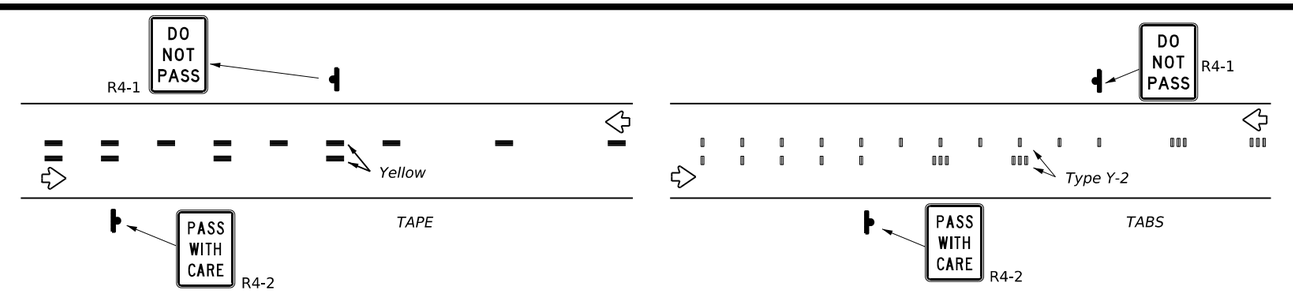
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

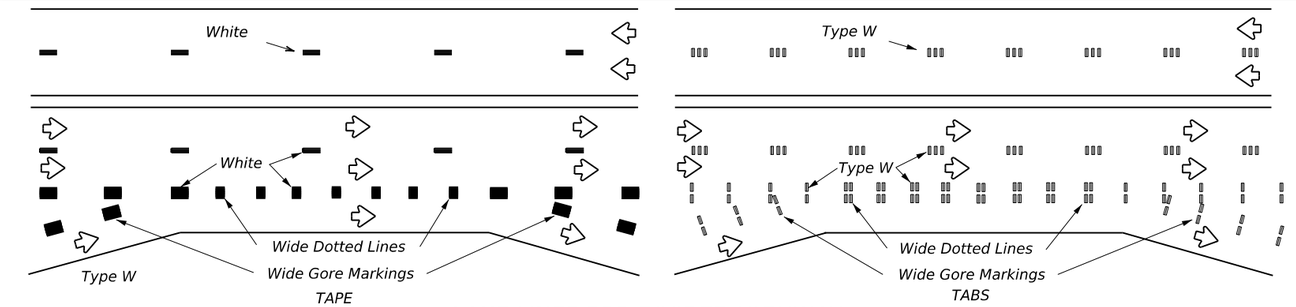
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

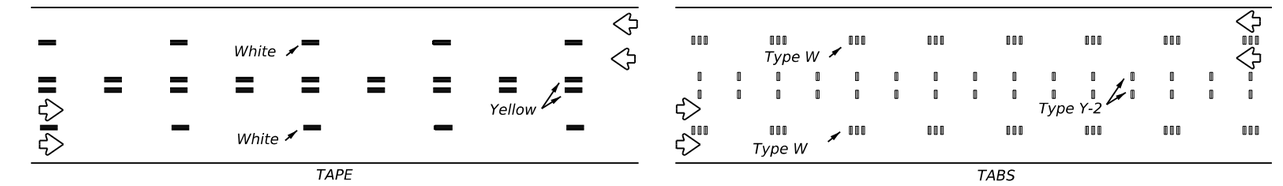
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



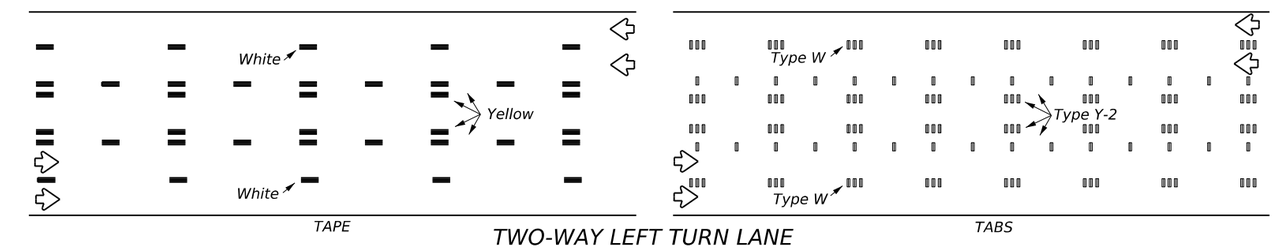
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



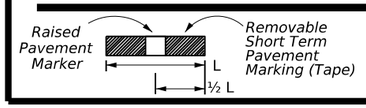
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

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©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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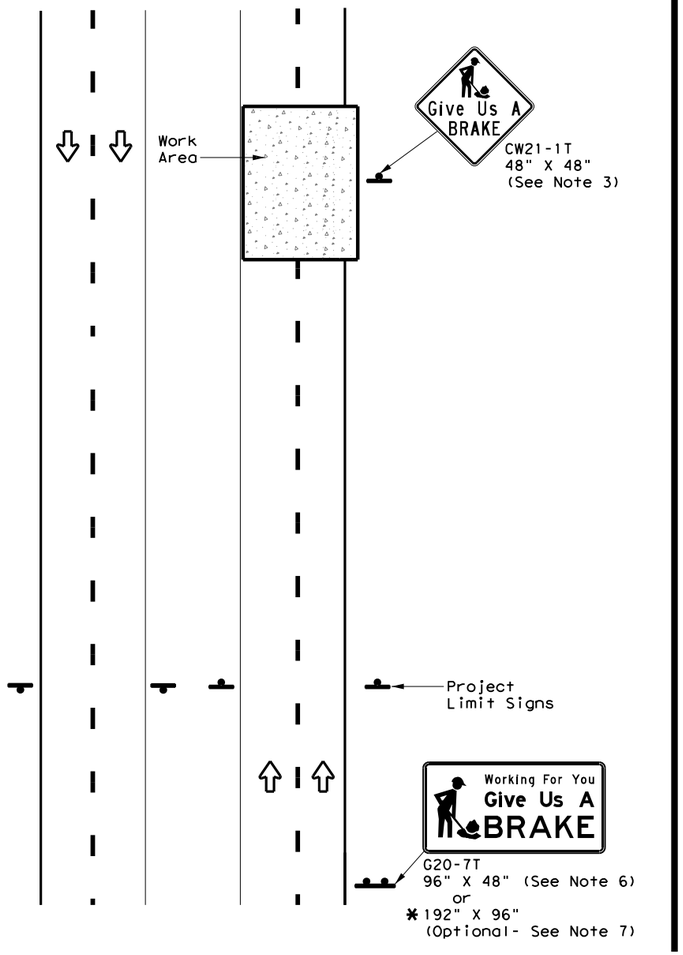
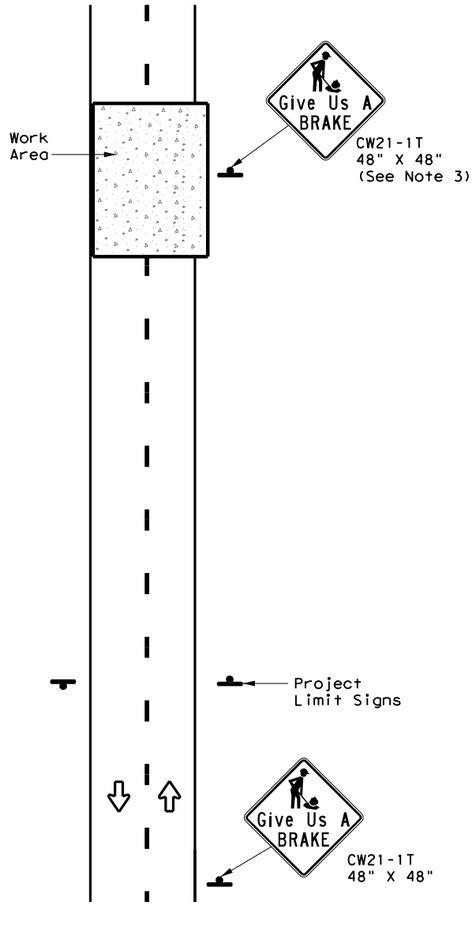


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL Size	GALVANIZED STRUCTURAL STEEL (LF) ①	GALVANIZED STRUCTURAL STEEL (LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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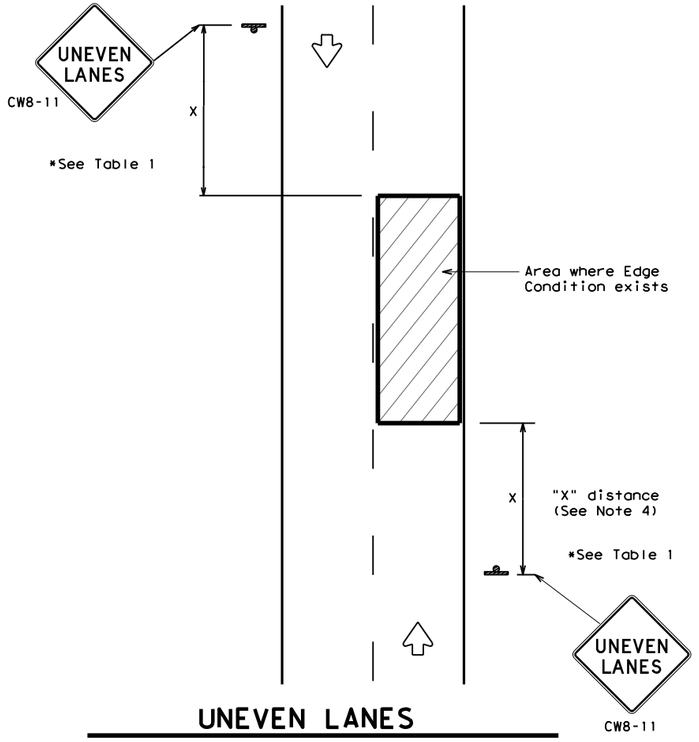
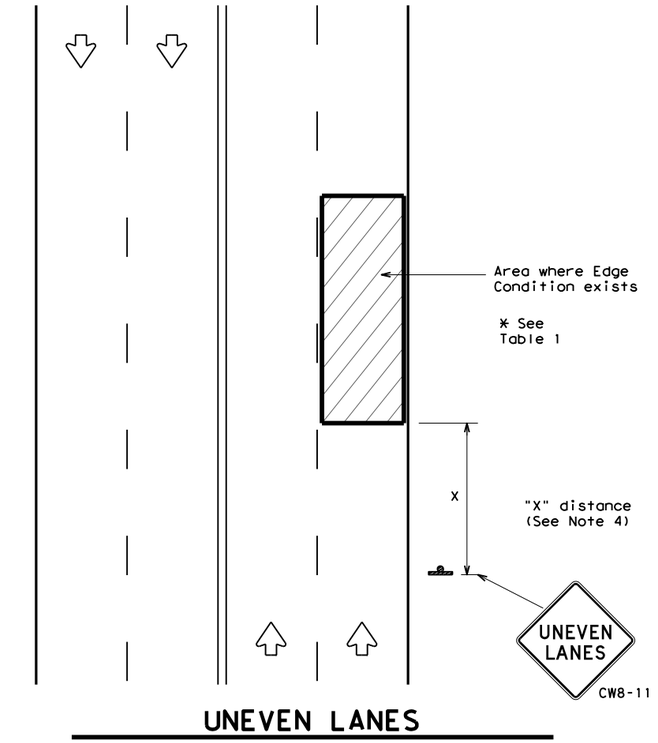
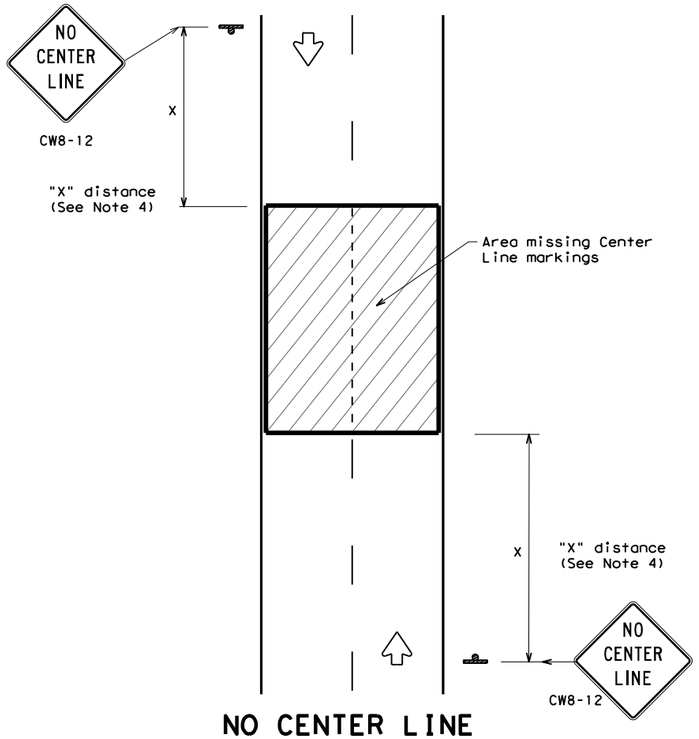


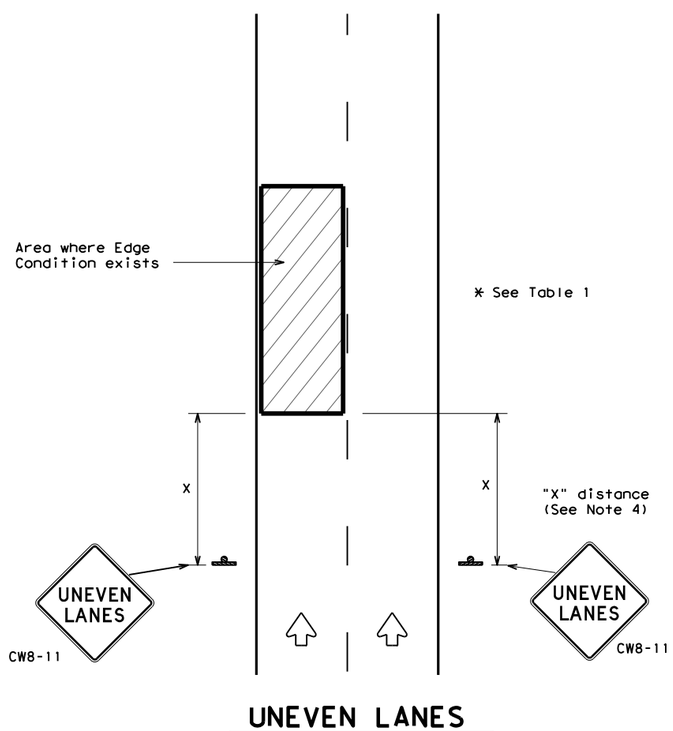
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

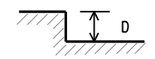
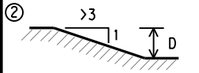
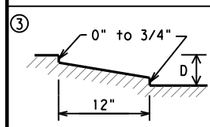
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

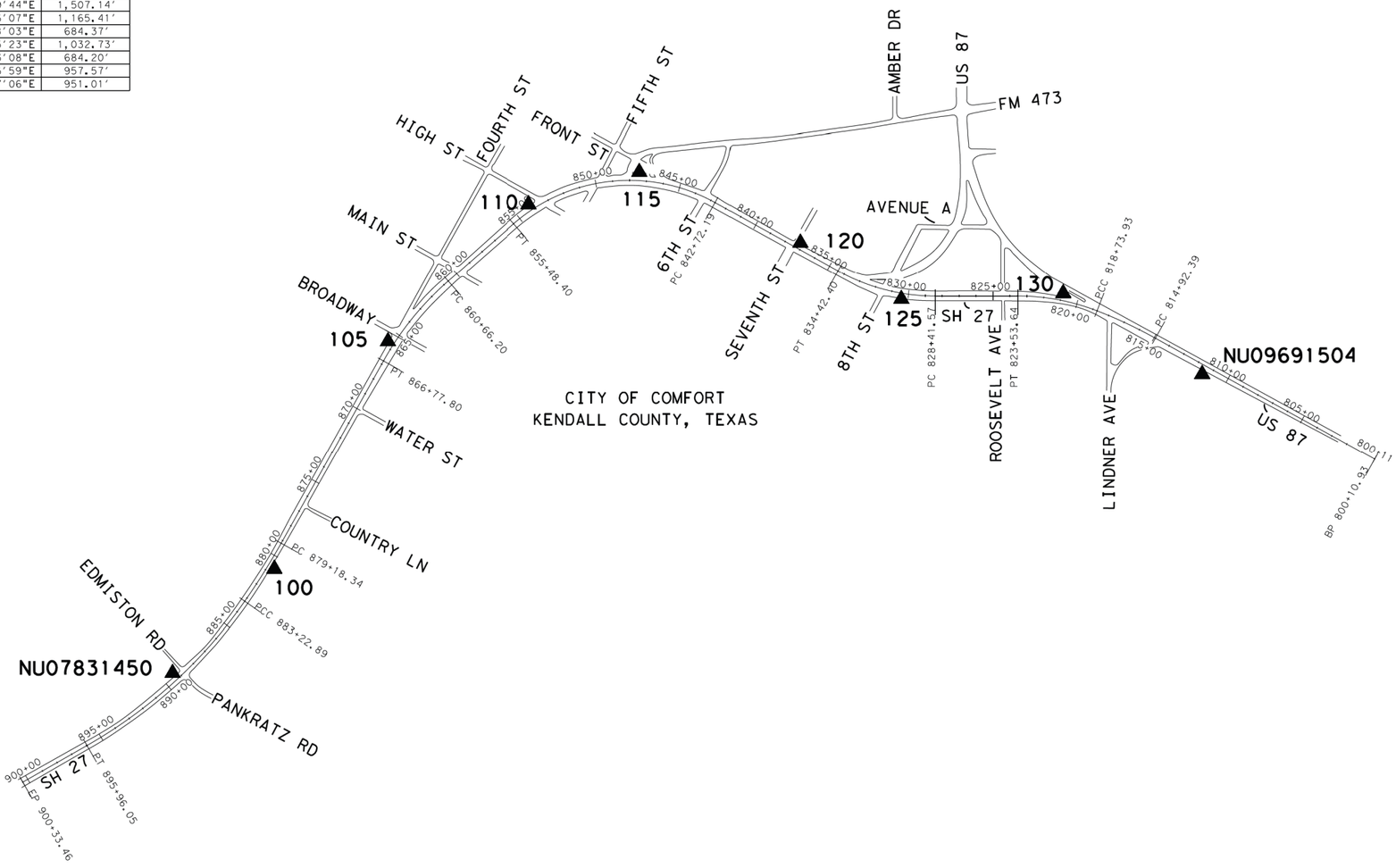
FILE:	wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0142	06	029	SH27
8-95 2-98 7-13		DIST	COUNTY		SHEET NO.
1-97 3-03		SAT	KENDALL		62

DATE: 10/11/2023 12:23:37 PM
FILE: c:\pw\kni\d0254614\wzul-13.dgn

PRIMARY CONTROL POINT NAME	OBSERVED INFORMATION			MONUMENT DESCRIPTION
	N COORD.	E COORD.	ELEV.	
NU07831450	13,899,185.36	1,994,522.87	1,430.20	ALUMINUM ROD DRIVEN TO REFUSAL
NU09691504	13,900,954.13	2,000,613.36	1,412.14	ALUMINUM ROD DRIVEN TO REFUSAL

SECONDARY CONTROL POINT NAME	OBSERVED INFORMATION			MONUMENT DESCRIPTION
	N COORD.	E COORD.	ELEV.	
100	13,899,799.21	1,995,125.02	1,427.81	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING
105	13,901,148.05	1,995,797.40	1,416.26	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING
110	13,901,960.99	1,996,632.45	1,419.06	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING
115	13,902,146.17	1,997,291.29	1,430.29	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING
120	13,901,733.10	1,998,237.81	1,425.31	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING
125	13,901,398.46	1,998,834.59	1,422.14	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING
130	13,901,432.72	1,999,791.55	1,413.28	3 1/4" ALUMINUM CAP SET ATOP A 5/8" IRON ROD IN LIGHT DUTY SETTING

SURVEY CONTROL MONUMENT INVERSE TABLE			
FROM	TO	BEARING	DISTANCE
NU07831450	100	N44° 26' 54"E	859.88'
100	105	N26° 29' 44"E	1,507.14'
105	110	N45° 46' 07"E	1,165.41'
110	115	N74° 18' 03"E	684.37'
115	120	S66° 25' 23"E	1,032.73'
120	125	S60° 43' 08"E	684.20'
125	130	N87° 56' 59"E	957.57'
130	NU09691504	S59° 47' 06"E	951.01'



LEGEND

▲ SURVEY CONTROL MONUMENT

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83) (2011 ADJUSTMENT), EPOCH 2010.00, TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE. ALL DISTANCES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR OF 1.00015. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.

2. CORS STATIONS TXFR AND TXKR WERE HELD FOR HORIZONTAL CONTROL AS PUBLISHED. HORIZONTAL SURVEY METHOD: STATIC GPS.

3. ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), USING GEOID 18.

4. ADJUSTED ELEVATIONS FOR CONTROL POINTS NU07831450 AND NU09691504 WERE FIXED FOR VERTICAL CONTROL. VERTICAL SURVEY METHOD: DIGITAL LEVEL.

5. SURVEY CONTROL MEETS THE SPECIFICATIONS FOR TXDOT SURVEY LEVEL 2 AND 3 GPS SURVEYS.

STATE OF TEXAS
REGISTERED
ROBERT M ANGUIANO
6347
PROFESSIONAL
LAND SURVEYOR

03/06/2023

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

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

GRAPHIC SCALE
0' 200' 400' 800'
SCALE: 1"=400' (22" x 34")
SCALE: 1"=800' (11" x 17")

UNIT OF MEASUREMENT: U.S. SURVEY FEET

Texas Department of Transportation

VICKREY & ASSOCIATES, LLC.
CONSULTING ENGINEERS
CIVIL • ENVIRONMENTAL • SURVEY
12940 Country Parkway
San Antonio, TX 78216
Telephone: (210) 349-3271
TBPELS #10004100 ©2023

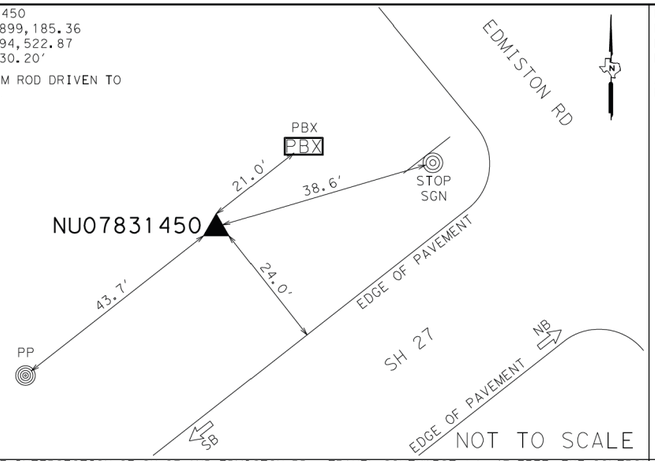
SH 27

SURVEY CONTROL INDEX SHEET

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	TEXAS				SH 27
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
SAT	KENDALL	0142	06	029	63

NU07831450
N: 13,899,185.36
E: 1,994,522.87
EL: 1,430.20'

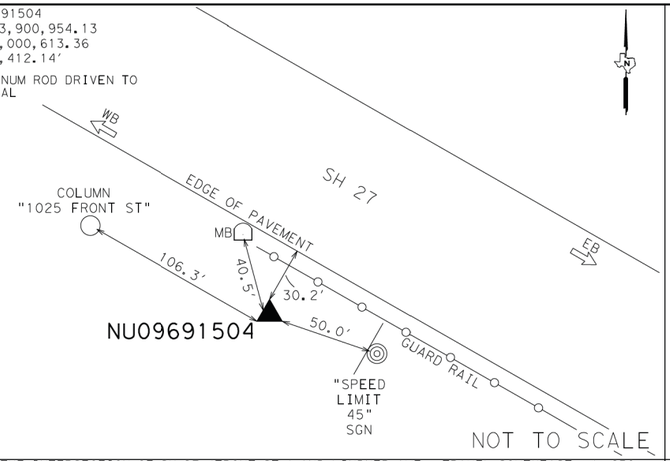
ALUMINUM ROD DRIVEN TO REFUSAL



FROM THE INTERSECTION OF SH 27 AND EDMISTON RD., TRAVEL SOUTHWEST +/- 47 FEET. THE CONTROL POINT IS LOCATED ON THE NORTHWEST SIDE OF SH 27.

NU09691504
N: 13,900,954.13
E: 2,000,613.36
EL: 1,412.14'

ALUMINUM ROD DRIVEN TO REFUSAL



FROM THE INTERSECTION OF SH 27 (FRONT ST.) AND LINDNER AVE., TRAVEL SOUTHEAST +/- 630 FEET. THE CONTROL POINT IS LOCATED ON THE SOUTH SIDE OF SH 27.

NOTES:

1. ALL BEARINGS AND COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83) (2011 ADJUSTMENT), EPOCH 2010.00, TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE. ALL DISTANCES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR OF 1.00015. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.

2. CORS STATIONS TXFR AND TXKR WERE HELD FOR HORIZONTAL CONTROL AS PUBLISHED. HORIZONTAL SURVEY METHOD: STATIC GPS.

3. ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), USING GEOID 18.

4. ADJUSTED ELEVATIONS FOR CONTROL POINTS NU07831450 AND NU09631504 WERE FIXED FOR VERTICAL CONTROL. VERTICAL SURVEY METHOD: DIGITAL LEVEL.

5. SURVEY CONTROL MEETS THE SPECIFICATIONS FOR TXDOT SURVEY LEVEL 2 AND 3 GPS SURVEYS.

LEGEND

▲ SURVEY CONTROL MONUMENT

STATE OF TEXAS
REGISTERED
ROBERT M ANGUIANO
6347
PROFESSIONAL
LAND SURVEYOR

03/06/2023

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

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

DESIGN ENGINEER DATE

Texas Department of Transportation

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

SH 27

HORIZONTAL & VERTICAL CONTROL SHEET

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
	TEXAS				SH 27
DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
	KENDALL	0142	06	029	64

Horizontal Alignment Review Report

Report Created: Wednesday, June 21, 2023
Time: 8:38:38 PM

Project: Default
Description:
File Name: c:\pw\kh1\d0254550\SH27_MDF_HALIGN.dgn
Last Revised: 6/21/2023 20:36

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: SH27_GEOM
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	( )	800+10.929 R1	13900449.3	2001632.78
PC	( )	814+92.388 R1	13901167.1	2000336.86
Tangential Direction:		N61°		
Tangential Length:		1481.459		
Element: Circular				
PC	( )	814+92.388 R1	13901167.1	2000336.86
PI	( )	816+83.434 R1	13901259.7	2000169.74
CC	( )		13898630.3	1998931.64
PCC	( )	818+73.929 R1	13901329.5	1999991.92
Radius:		2900		
Delta:		07°32'17.402" Left		
Degree of Curvature (Arc):		01°58'32.580"		
Length:		381.541		
Tangent:		191.046		
Chord:		381.266		
Middle Ordinate:		6.272		
External:		6.286		
Back Tangent Direction:		N61°		
Back Radial Direction:		N28°		
Chord Direction:		N64°		
Ahead Radial Direction:		N21°26'43.160"E		
Ahead Tangent Direction:		N68°		
Element: Circular				
PCC	( )	818+73.929 R1	13901329.5	1999991.92
PI	( )	821+16.543 R1	13901417.0	1999765.63
CC	( )		13900117.0	1999523.02
PT	( )	823+53.638 R1	13901417.0	1999523.02
Radius:		1300		
Delta:		21°08'33.167" Left		
Degree of Curvature (Arc):		04°24'26.524"		
Length:		479.709		
Tangent:		242.614		
Chord:		476.992		
Middle Ordinate:		22.064		
External:		22.445		
Back Tangent Direction:		N68°		
Back Radial Direction:		N21°08'33.167"E		
Chord Direction:		N79°		
Ahead Radial Direction:		N00°		
Ahead Tangent Direction:		N90°		
Element: Linear				
PT	( )	823+53.638 R1	13901417.0	1999523.02
PC	( )	828+41.567 R1	13901417.0	1999035.09
Tangential Direction:		N90°		
Tangential Length:		487.929		
Element: Circular				
PC	( )	828+41.567 R1	13901417.0	1999035.09
PI	( )	831+48.649 R1	13901417.0	1998728.01
CC	( )		13902597.0	1999035.09
PT	( )	834+42.403 R1	13901566.7	1998459.88
Radius:		1180		
Delta:		29°10'26.691" Right		
Degree of Curvature (Arc):		04°51'20.068"		
Length:		600.837		
Tangent:		307.082		
Chord:		594.367		
Middle Ordinate:		38.036		
External:		39.303		
Back Tangent Direction:		N90°		
Back Radial Direction:		N00°		
Chord Direction:		N75°		
Ahead Radial Direction:		N29°		
Ahead Tangent Direction:		N60°		
Element: Linear				
PT	( )	834+42.403 R1	13901566.7	1998459.88
PC	( )	842+72.192 R1	13901971.2	1997735.36
Tangential Direction:		N60°		
Tangential Length:		829.788		
Element: Circular				
PC	( )	842+72.192 R1	13901971.2	1997735.36
PI	( )	850+04.597 R1	13902328.2	1997095.87
CC	( )		13901063.2	1997228.40
PT	( )	855+48.403 R1	13901846.4	1996544.25
Radius:		1040		
Delta:		70°18'32.963" Left		
Degree of Curvature (Arc):		05°30'33.154"		
Length:		1276.211		
Tangent:		732.405		
Chord:		1197.631		
Middle Ordinate:		189.694		
External:		232.013		
Back Tangent Direction:		N60°		
Back Radial Direction:		N29°		
Chord Direction:		S84°		
Ahead Radial Direction:		N41°		
Ahead Tangent Direction:		S48°		
Element: Linear				
PT	( )	855+48.403 R1	13901846.4	1996544.25
PC	( )	860+66.200 R1	13901505.8	1996154.26
Tangential Direction:		S48°		
Tangential Length:		517.797		

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SH27

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		65

DATE: 10/11/2023 12:24:54 PM
FILE: c:\pw\kh1\d0254615\0303_SH27_HALIGN_DATA.dgn

Element: Circular				
PC	( )	860+66.200 R1	13901505.8	1996154.26
PI	( )	863+75.028 R1	13901302.7	1995921.67
CC	( )		13900161.4	1997328.50
PT	( )	866+77.800 R1	13901033.2	1995770.84
Radius:		1785		
Delta:		19°37'53.152" Left		
Degree of Curvature (Arc):		03°12'35.451"		
Length:		611.6		
Tangent:		308.827		
Chord:		608.613		
Middle Ordinate:		26.13		
External:		26.519		
Back Tangent Direction:		S48°		
Back Radial Direction:		N41°		
Chord Direction:		S39°		
Ahead Radial Direction:		N60°		
Ahead Tangent Direction:		S29°		
Element: Linear				
PT	( )	866+77.800 R1	13901033.2	1995770.84
PC	( )	879+18.337 R1	13899950.6	1995165.00
Tangential Direction:		S29°		
Tangential Length:		1240.537		
Element: Circular				
PC	( )	879+18.337 R1	13899950.6	1995165.00
PI	( )	881+20.786 R1	13899774	1995066.13
CC	( )		13901904.1	1991674.45
PCC	( )	883+22.890 R1	13899608.2	1994949.93
Radius:		4000		
Delta:		05°47'41.255" Right		
Degree of Curvature (Arc):		01°25'56.620"		
Length:		404.553		
Tangent:		202.449		
Chord:		404.38		
Middle Ordinate:		5.113		
External:		5.12		
Back Tangent Direction:		S29°		
Back Radial Direction:		N60°		
Chord Direction:		S32°		
Ahead Radial Direction:		N54°		
Ahead Tangent Direction:		S35°		
Element: Circular				
PCC	( )	883+22.890 R1	13899608.2	1994949.93
PI	( )	889+70.116 R1	13899077.6	1994579.23
CC	( )		13901252.0	1992597.31
PT	( )	895+96.045 R1	13898757.5	1994016.7
Radius:		2870		
Delta:		25°25'00.700" Right		
Degree of Curvature (Arc):		01°59'46.927"		
Length:		1273.155		
Tangent:		647.226		
Chord:		1262.741		
Middle Ordinate:		70.309		
External:		72.074		
Back Tangent Direction:		S34°		
Back Radial Direction:		N55°		
Chord Direction:		S47°		
Ahead Radial Direction:		N29°		
Ahead Tangent Direction:		S60°		

Element: Linear				
PT	( )	895+96.045 R1	13898757.5	1994016.7
POT	( )	900+33.460 R1	13898541.2	1993636.52
Tangential Direction:		S60°		
Tangential Length:		437.415		

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SH27

HORIZONTAL ALIGNMENT DATA

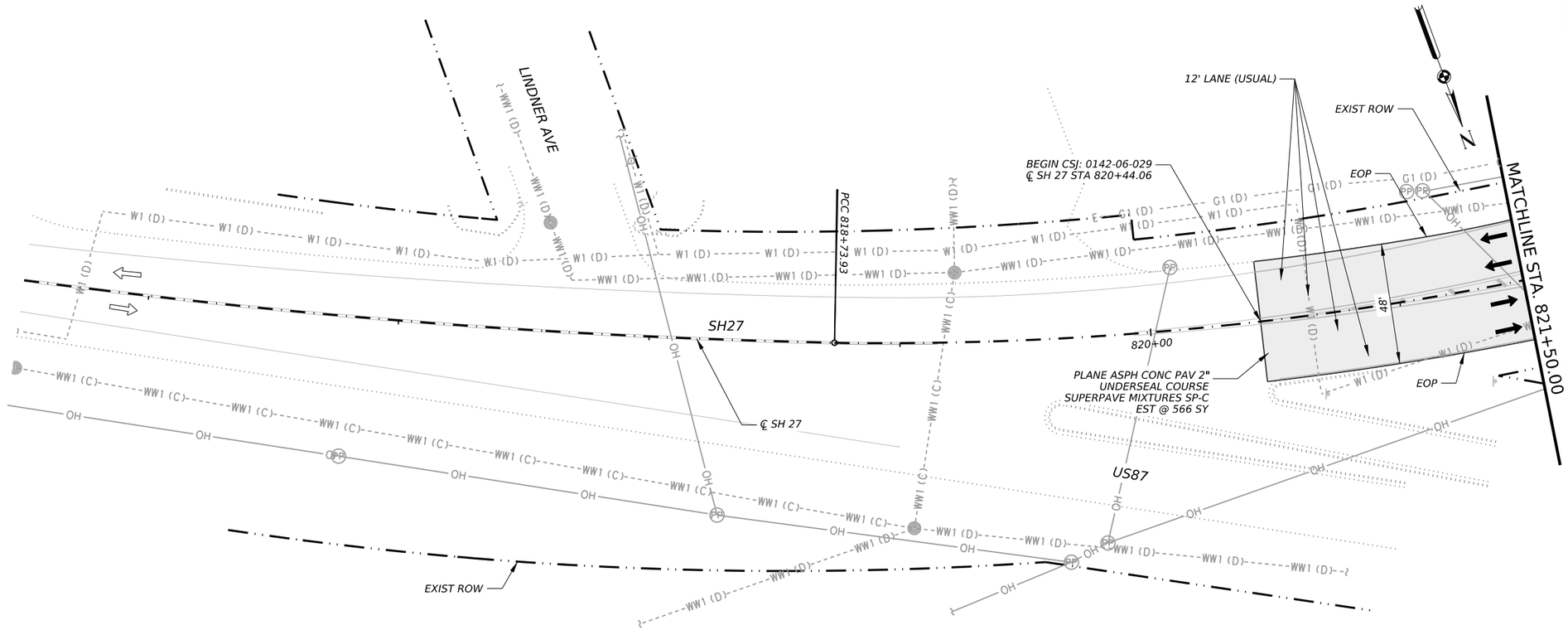
SHEET 2 OF 2

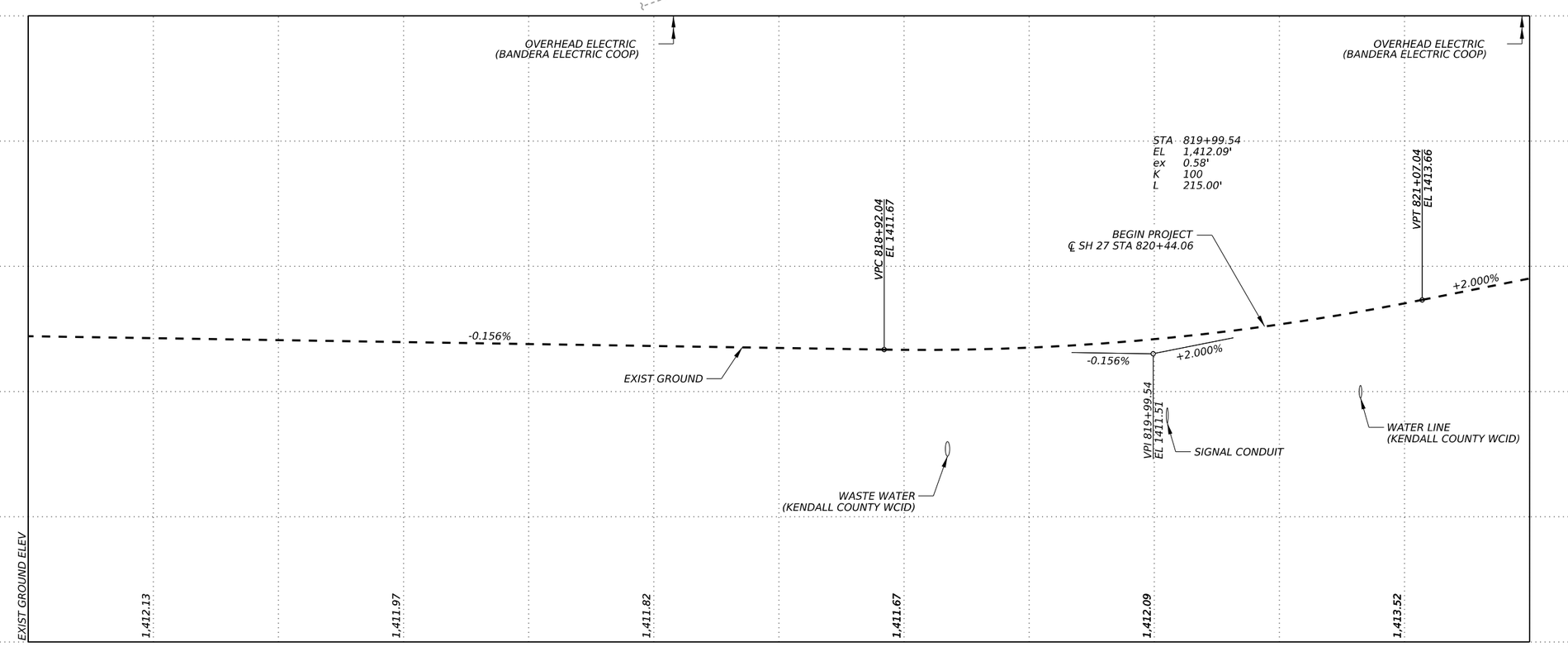
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		66

DATE: 10/11/2023 12:25:16 PM
FILE: c:\pw\kh1\d0254615\0303_SH27_HALIGN_DATA_02.dgn

SHEET #			1
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	566
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	566
3085 6001	UNDERSEAL COURSE *	SY	566

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.





LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"

NOTES:

1. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR ALIGNMENT INFORMATION.
2. HORIZONTAL DATA AND PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
3. LOCATION OF UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
4. SEE MISCELLANEOUS ROADWAY DETAILS SHEET FOR EDGE REPAIR DETAILS.
5. REFER TO TRAFFIC CONTROL PLAN LAYOUT FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.
6. IF WATER OR WASTEWATER LINES ARE ENCOUNTERED DURING CONSTRUCTION CALL KEITH MARQUART WITH KCWCID AT 830-995-2227.

JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

BEGIN TO STA 821+50.00

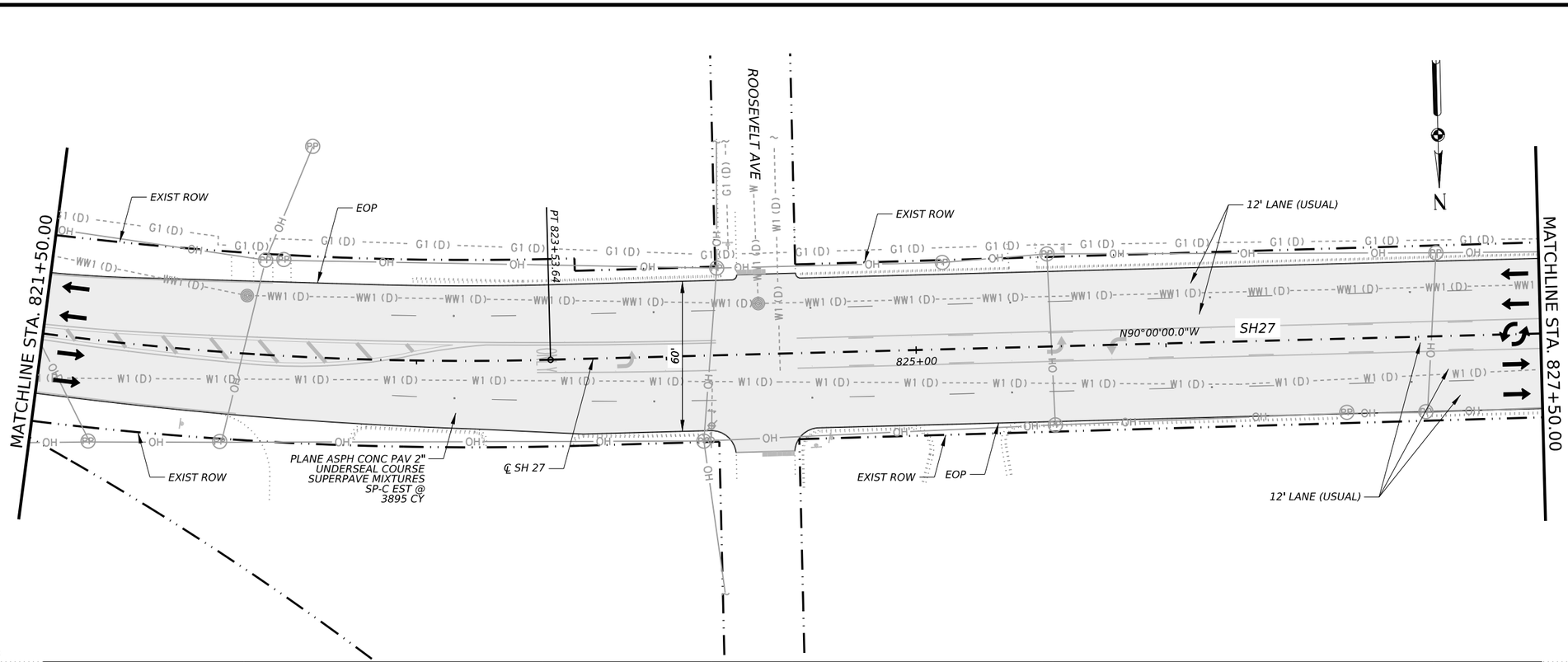
SHEET 1 OF 14

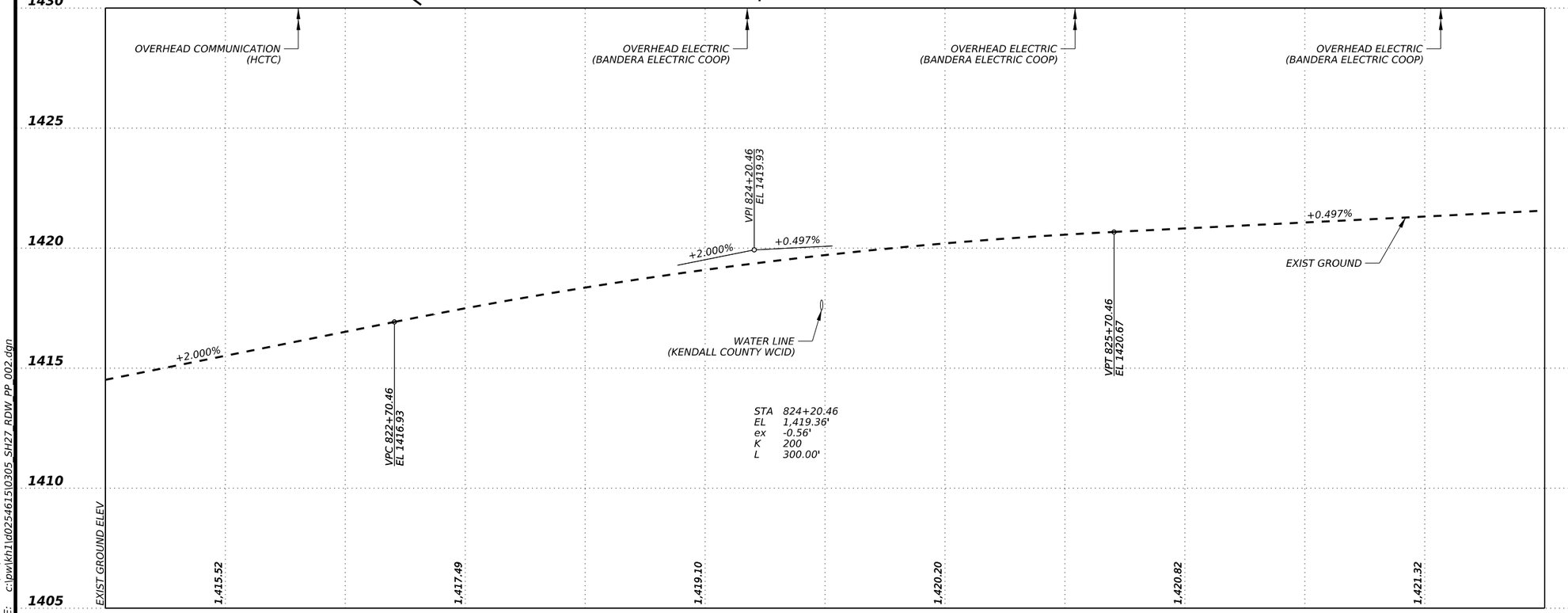
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		67

DATE: 10/11/2023 12:25:52 PM
FILE: c:\pw\kh1\d0254610304_SH27_RDW_PP_001.dgn

SHEET #			2
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	3895
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	3895
3085 6001	UNDERSEAL COURSE *	SY	3895

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.





LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"

NOTES:

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3. LOCATION OF UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
4. SEE MISCELLANEOUS ROADWAY DETAILS SHEET FOR EDGE REPAIR DETAILS.
5. REFER TO TRAFFIC CONTROL PLAN LAYOUT FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.
6. IF WATER OR WASTEWATER LINES ARE ENCOUNTERED DURING CONSTRUCTION CALL KEITH MARQUART WITH KCWCID AT 830-995-2227.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 821+50.00 TO STA 827+50.00

SHEET 2 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		68

DATE: 10/11/2023 12:26:19 PM
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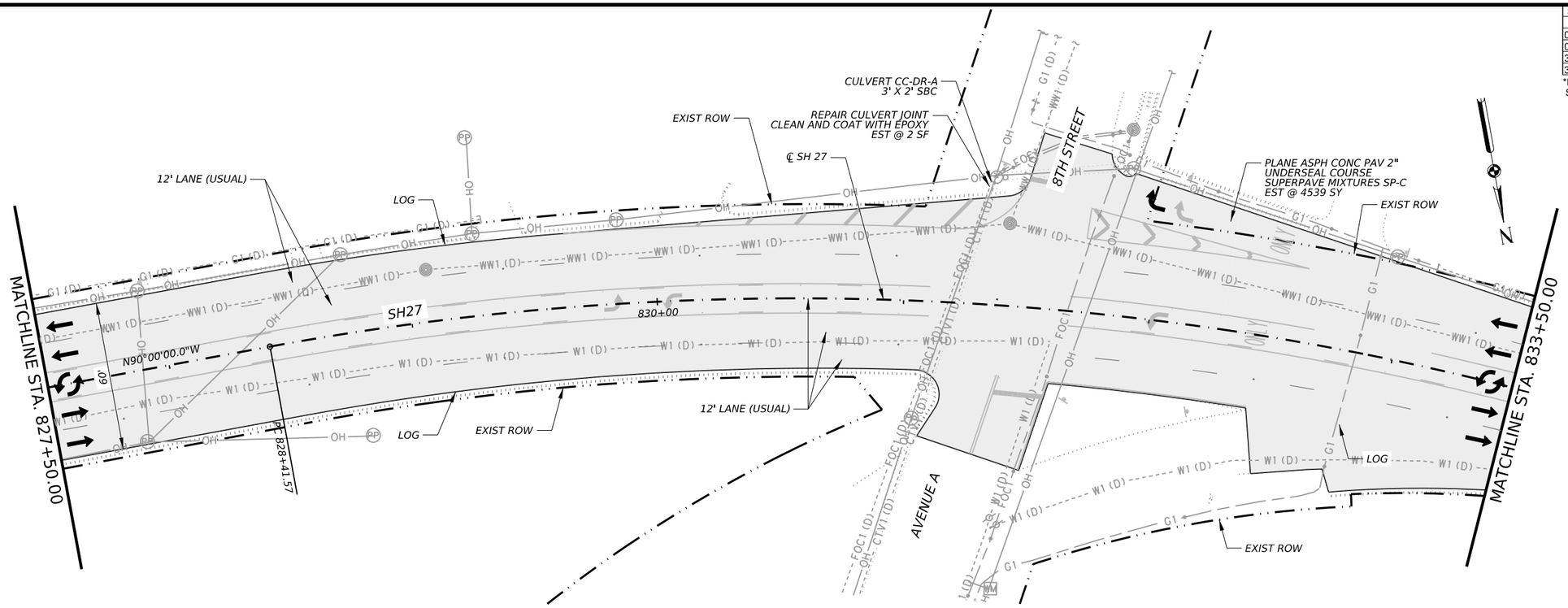
CK:
DW:
CK:
DW:

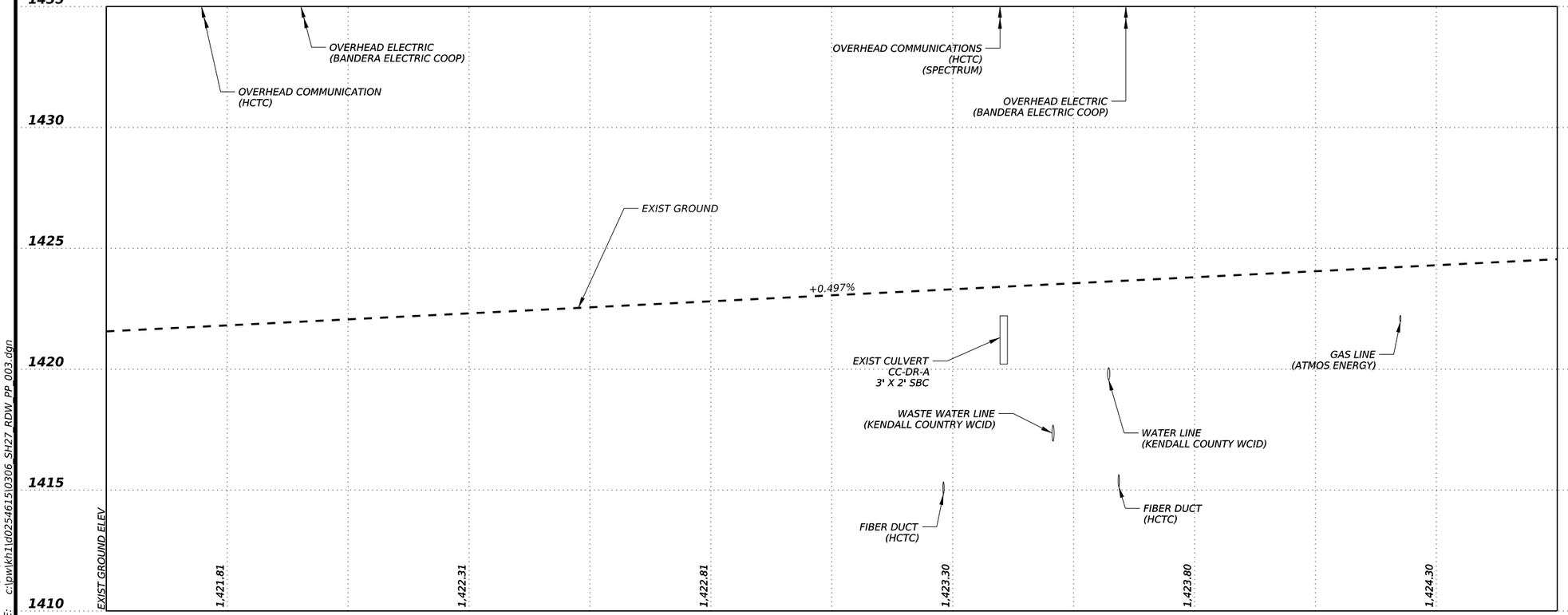
SHEET #			3
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	4539
0429 6001	CONC STR REPAIR(CLEAN & COAT WTH EPOXY	SF	2
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	4539
3085 6001	UNDERSEAL COURSE *	SY	4539

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.



LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"



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4. SEE MISCELLANEOUS ROADWAY DETAILS SHEET FOR EDGE REPAIR DETAILS.
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STATE OF TEXAS
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PROFESSIONAL ENGINEER

10/11/2023

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0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 827+50.00 TO STA 833+50.00

SHEET 3 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		69

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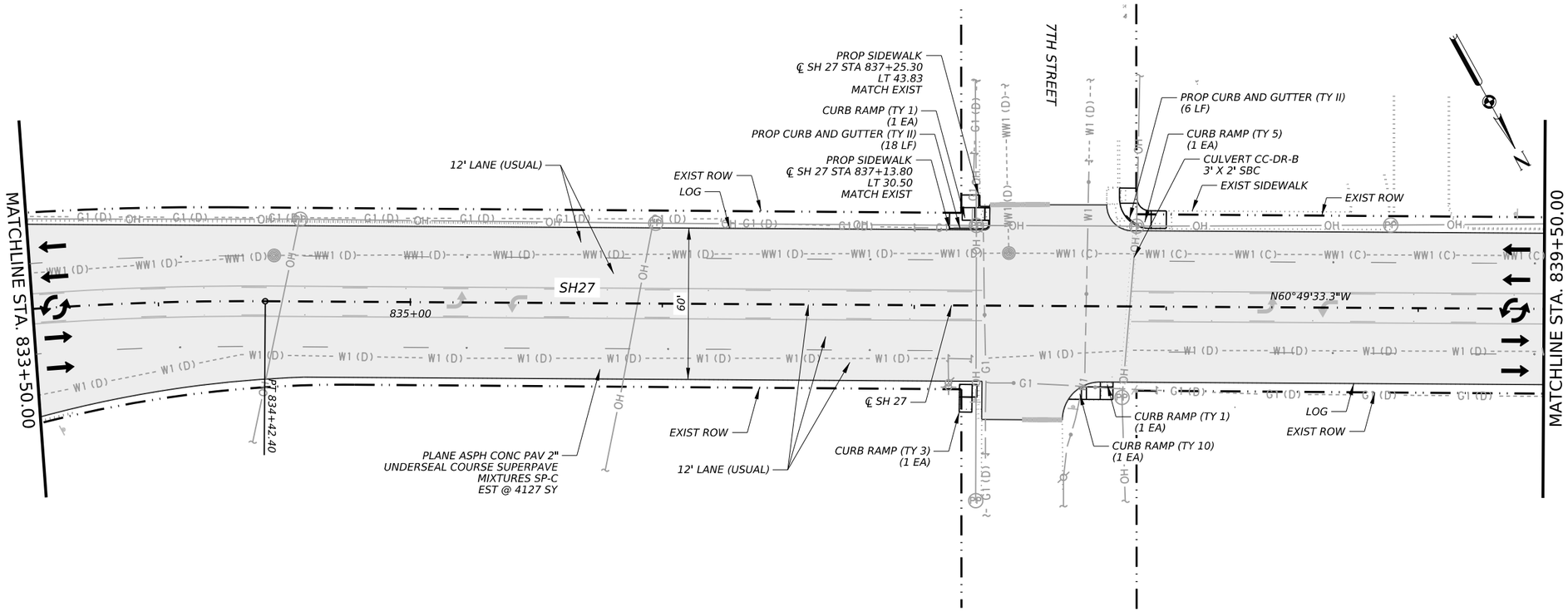

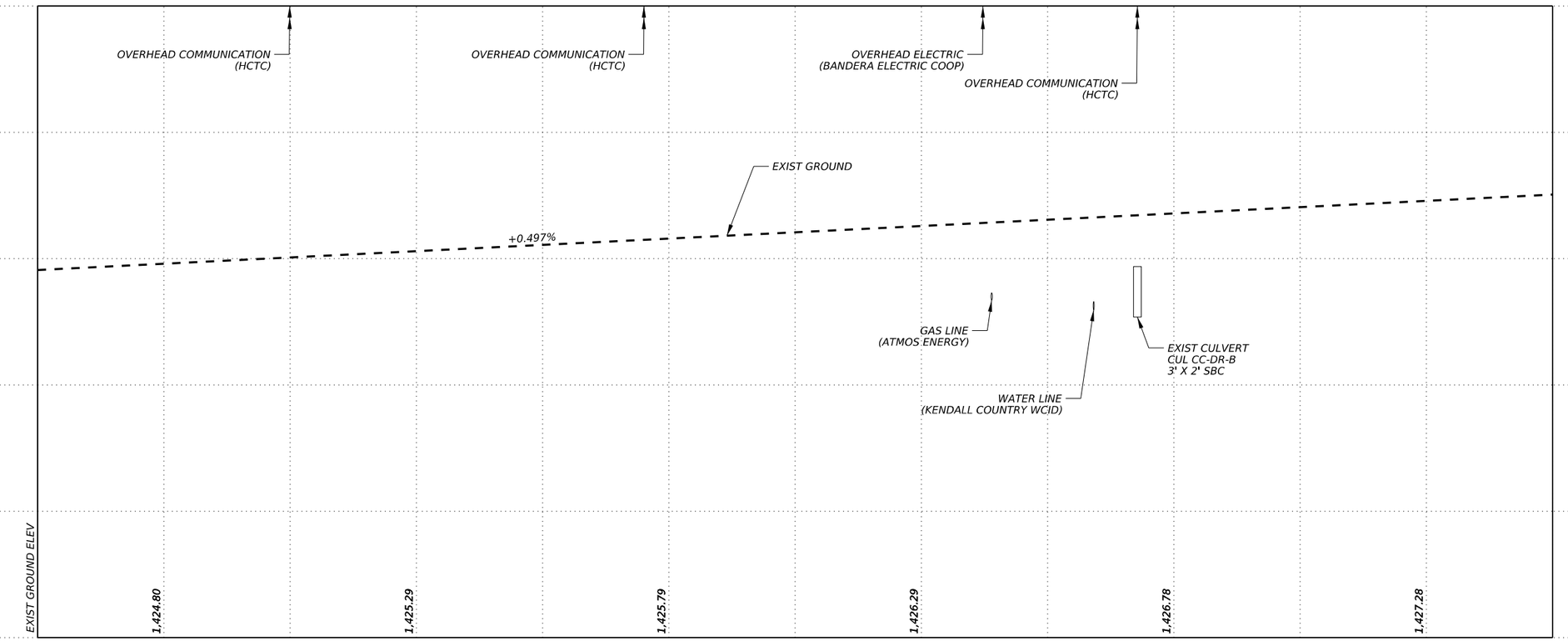

SHEET #			4
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	4127
0529 6008	CONC CURB & GUTTER (TY II)	LF	24
05316004	CURB RAMPS (TY 1)	EA	2
05316006	CURB RAMPS (TY 3)	EA	1
05316008	CURB RAMPS (TY 5)	EA	1
05316013	CURB RAMPS (TY 10)	EA	1
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	4127
3085 6001	UNDERSEAL COURSE *	SY	4127

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.

LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
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6. IF WATER OR WASTEWATER LINES ARE ENCOUNTERED DURING CONSTRUCTION CALL KEITH MARQUART WITH KCWCID AT 830-995-2227.
7. ADDITIONAL SIDEWALK WORK REQUIRED TO TIE PROPOSED RAMP TO EXISTING SIDEWALK SHALL NOT BE PAID FOR DIRECTLY BUT IS SUBSIDIARY TO ITEM 0531.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY
PLAN AND PROFILE

STA 833+50.00 TO STA 839+50.00

SHEET 4 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		70

DATE: 10/11/2023 12:27:16 PM
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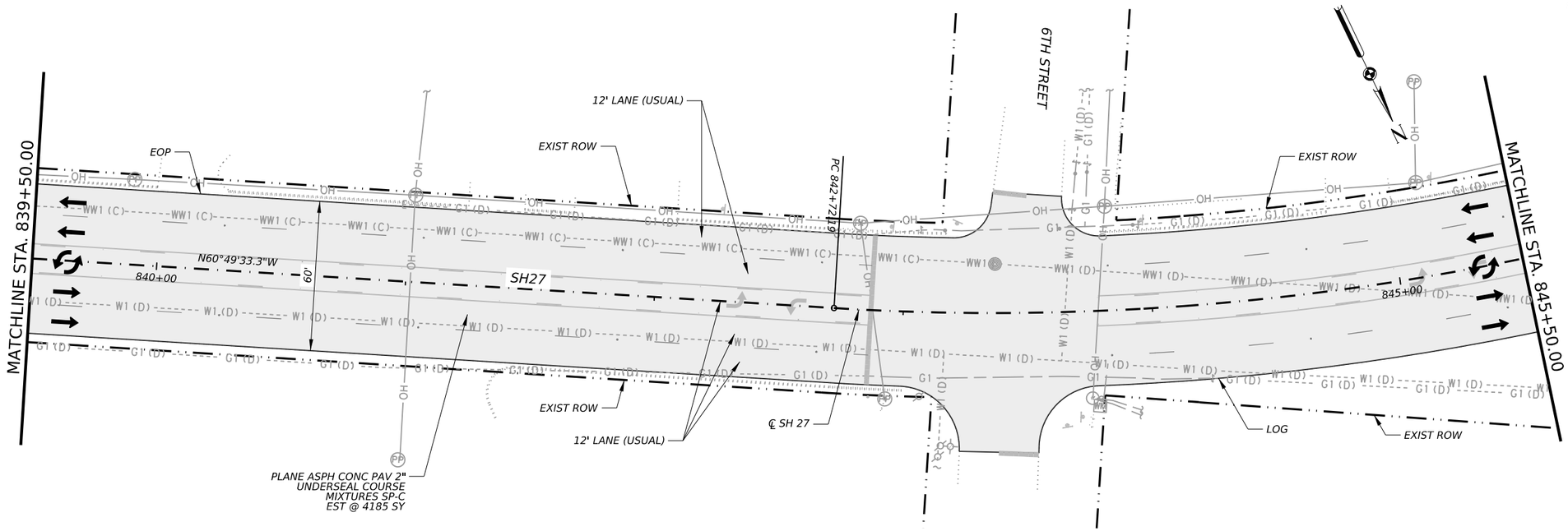
SHEET #			5
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	4185
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	4185
3085 6001	UNDERSEAL COURSE *	SY	4185

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.



LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
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- FOC3 — ZAYO (FO/DUCT) QLB
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- FOC5 - COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
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- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
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- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
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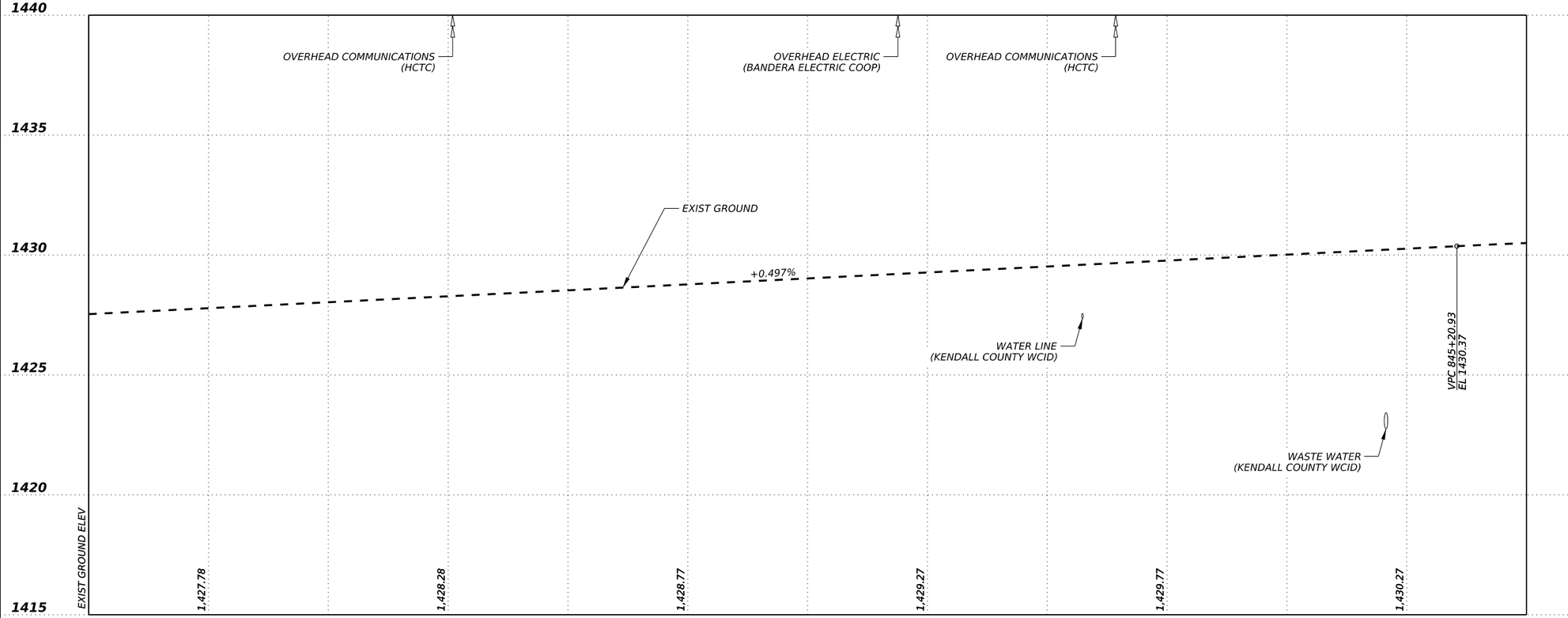
- --X# (D)-- QUALITY LEVEL "D"



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STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY
PLAN AND PROFILE

STA 839+50.00 TO STA 845+50.00

SHEET 5 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		71

DATE: 10/11/2023 12:27:46 PM
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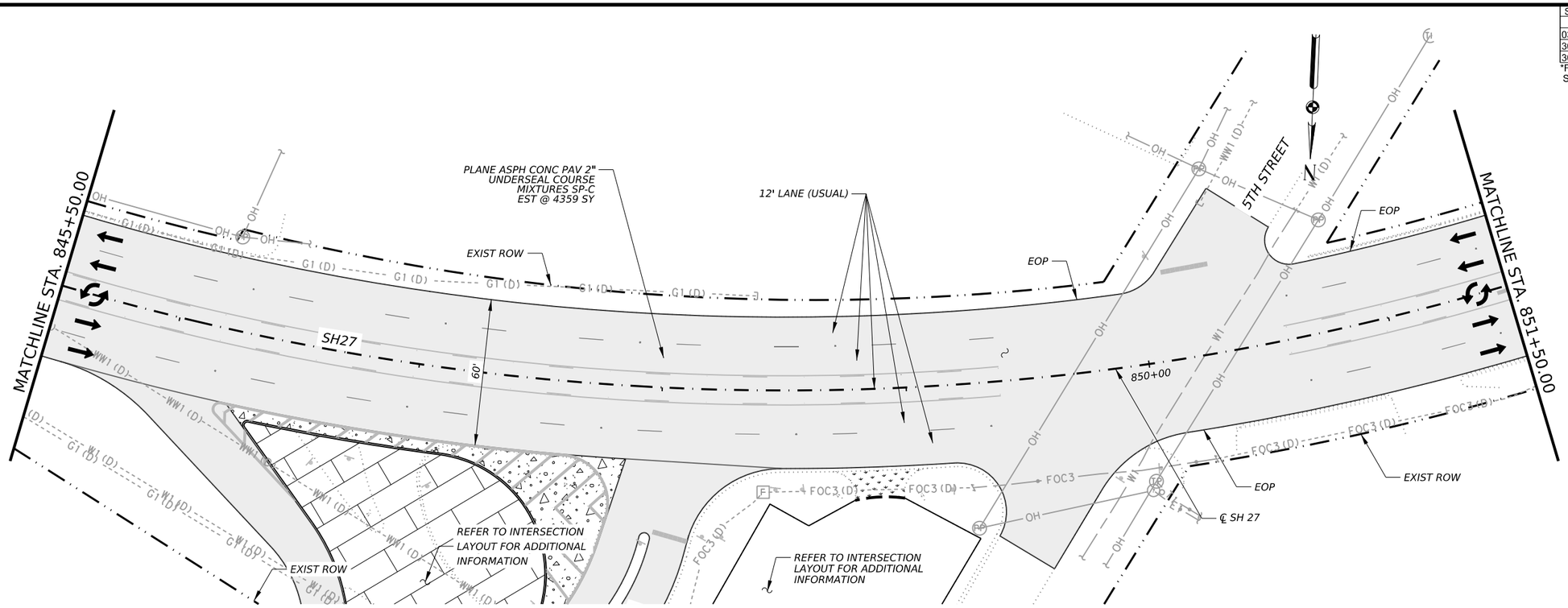
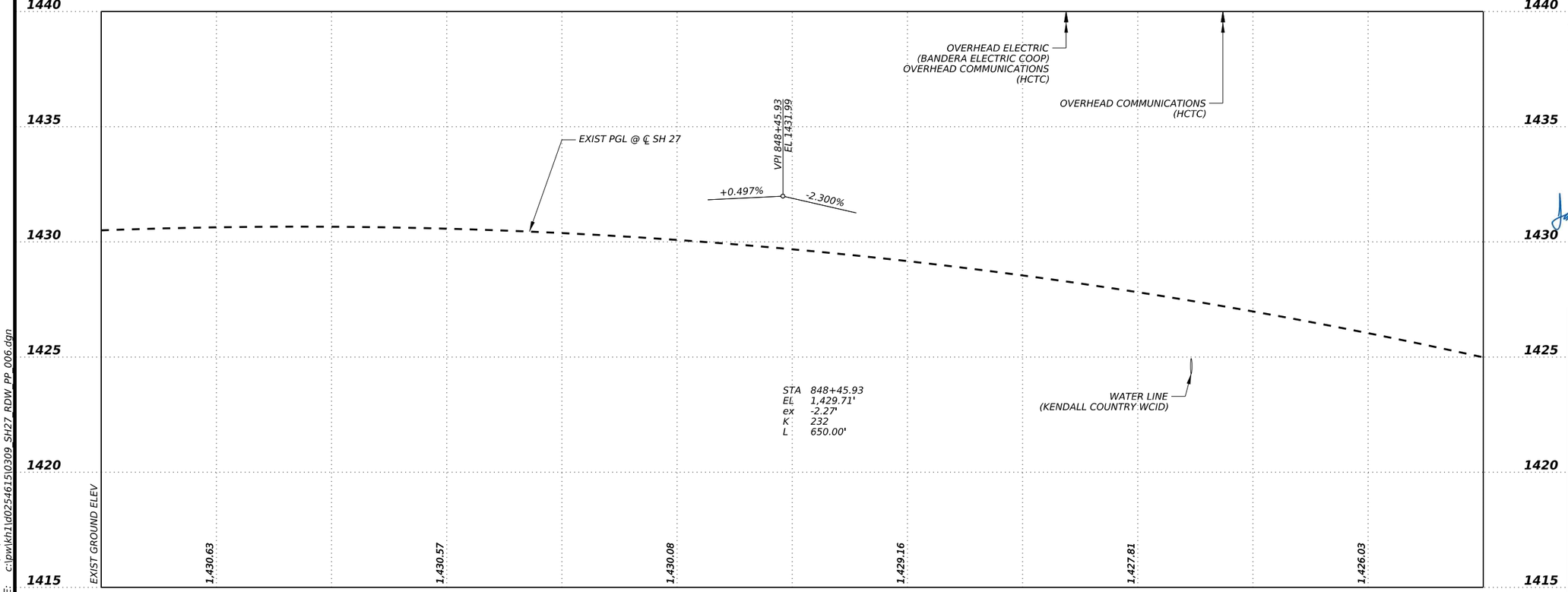
CK:
DW:
CK:
DW:

SHEET #			6
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	4359
3077 6022	SP MIXES SP-C SAC-1 PG70-22 *	SY	4359
3085 6001	UNDERSEAL COURSE *	SY	4359

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.





LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
- FOC3 — ZAYO (FO/DUCT) QLB
- FOC4 — AT&T (FO/DUCT) QLB
- FOC5 — COMMZOOM (FO/DUCT) QLB
- T1 — HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
- CTV1 — SPECTRUM (CABLE) QLB
- G1 — ATMOS (GAS) QLB
- W1 — KENDALL COUNTY WCID (WATER) QLB
- WW1 — KENDALL COUNTY WCID (WASTE WATER) QLB
- E1 — BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
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7. REFER TO PARK AND RIDE LAYOUT FOR REHAB INFORMATION AT THE PARK AND RIDE.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY
PLAN AND PROFILE

STA 845+50.00 TO STA 851+50.00

SHEET 6 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		72

DATE: 10/11/2023 12:28:18 PM
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CK: DW: CK: DW:

SHEET #			7
ITEM	DESCRIPTION	UNIT	QTY
0100 6028	PREP ROW (TREE PRUNING)	EA	1
0354 6045	PLANE ASPH CONC PAV (2")	SY	4272
05316005	CURB RAMPS (TY 2)	EA	2
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	4272
3085 6001	UNDERSEAL COURSE *	SY	4272

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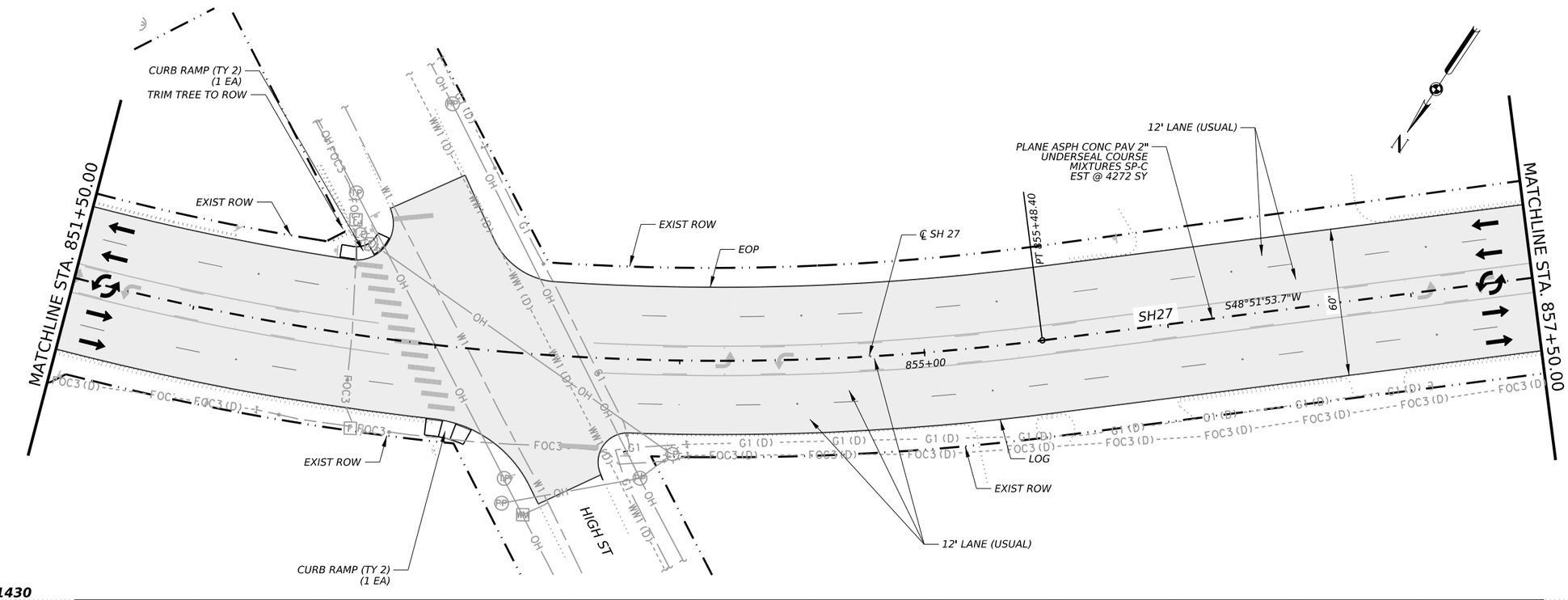

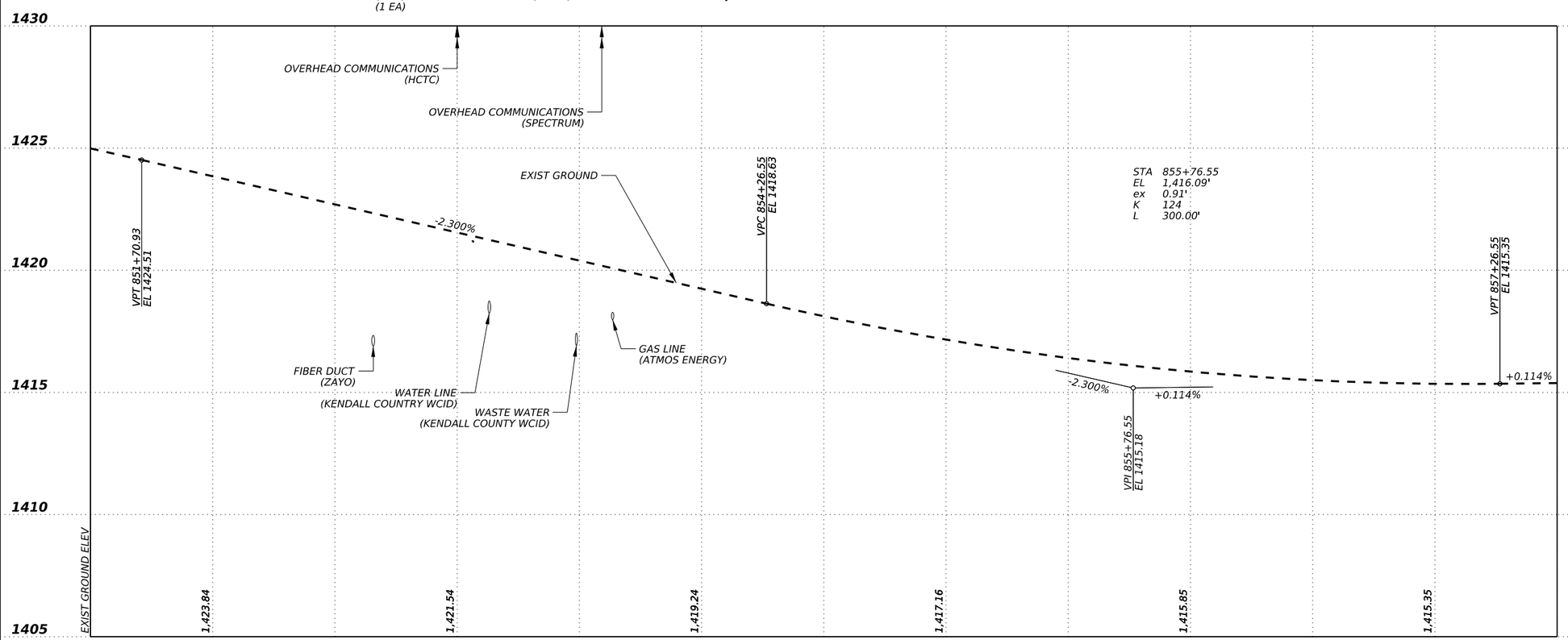

LEGEND

	EXIST FEATURES
	EXIST RIGHT OF WAY
	DIRECTION OF TRAVEL
	PROPOSED MILL & INLAY
– FOC1 –	HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
– FOC2 –	WINDSTREAM (FO/DUCT) QLB
– FOC3 –	ZAYO (FO/DUCT) QLB
– FOC4 –	AT&T (FO/DUCT) QLB
— FOC5 -	COMMZOOM (FO/DUCT) QLB
— T1 —	HILL COUNTRY TELEPHONE COOPERATIVE (TELE) QLB
– CTV1 –	SPECTRUM (CABLE) QLB
— G1 —	ATMOS (GAS) QLB
— W1 —	KENDALL COUNTY WCID (WATER) QLB
— WW1 —	KENDALL COUNTY WCID (WASTE WATER) QLB
— E1 —	BANDERA ELECTRIC COOPERATIVE (ELEC) QLB
— TS1 —	CITY OF COMFORT (TRAFFIC SIGNAL) QLB
— OH —	BANDERA ELECTRIC COOPERATIVE (OHE) QLD
— OH —	HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
— OH —	SPECTRUM (OHE) QLD
— OH —	BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
— OH —	TXDOT QLD
— X# —	QUALITY LEVEL "B"
- -X# (C)- -	QUALITY LEVEL "C"
- -X# (D)- -	QUALITY LEVEL "D"

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Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 851+50.00 TO STA 857+50.00

SHEET 7 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		73

DATE: 10/11/2023 12:28:47 PM
FILE: c:\pw\kh1\d0254615\0310 SH27 RDW PP 007.dgn

SHEET #			8
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	4245
0529 6023	CONC CURB & GUTTER (VALLEY GUTTER) (36")	LF	102
05316010	CURB RAMPS (TY 7)	EA	2
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	4245
3085 6001	UNDERSEAL COURSE *	SY	4245

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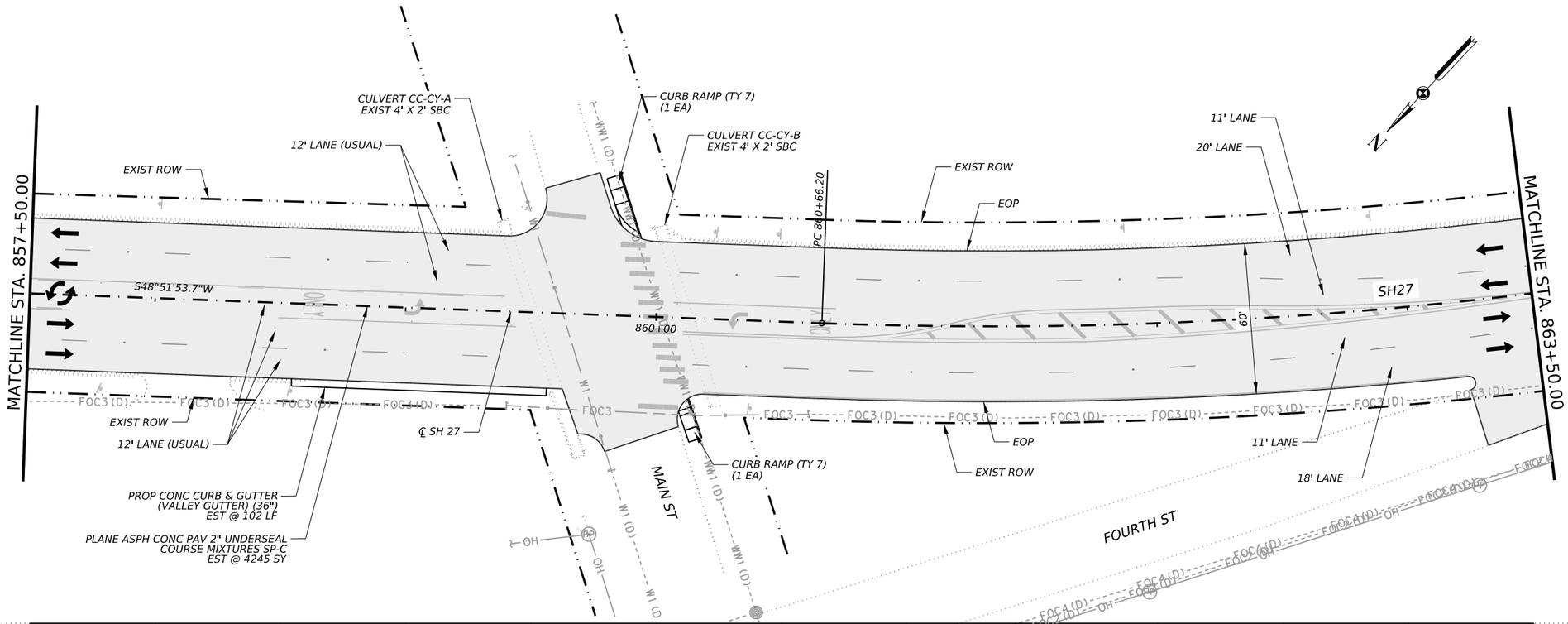

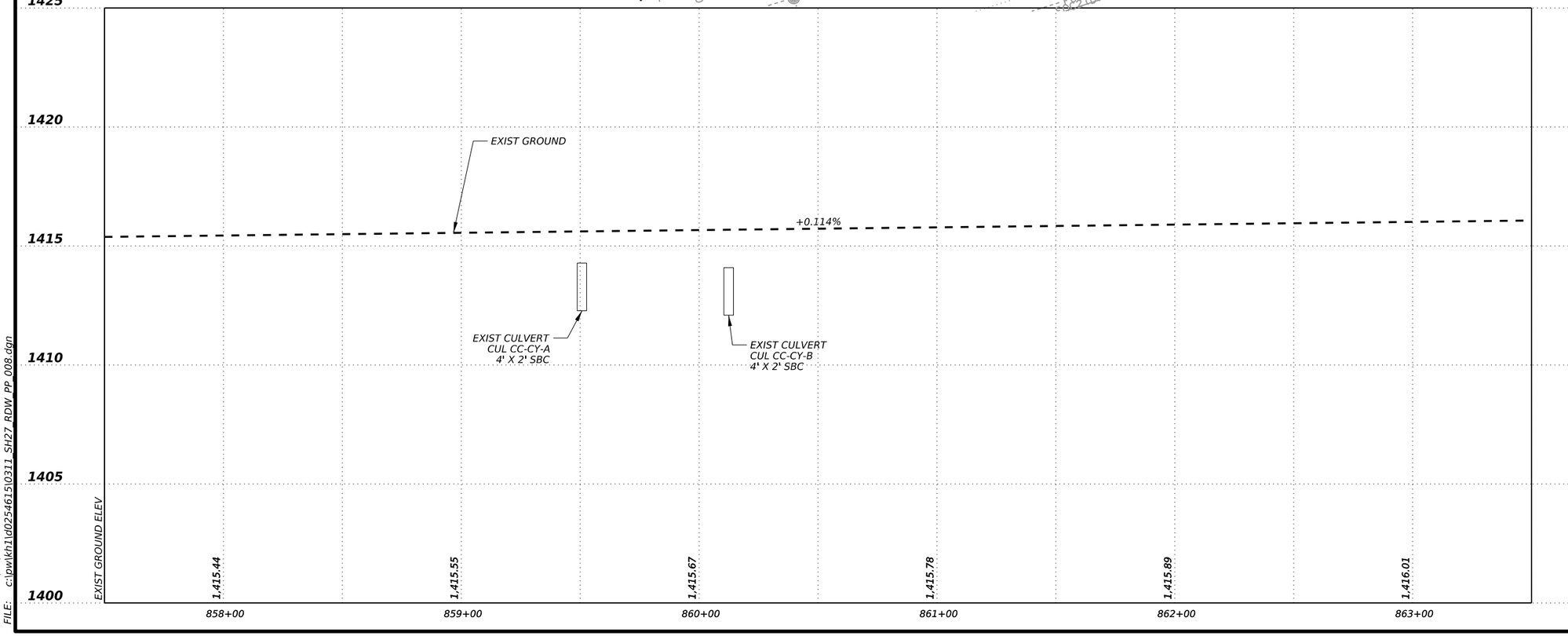

LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
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- FOC5 — COMMZOOM (FO/DUCT) QLB
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- CTV1 — SPECTRUM (CABLE) QLB
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- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
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6. IF WATER OR WASTEWATER LINES ARE ENCOUNTERED DURING CONSTRUCTION CALL KEITH MARQUART WITH KCWCID AT 830-995-2227.

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY
PLAN AND PROFILE

STA 857+50.00 TO STA 863+50.00

SHEET 8 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		74

DATE: 10/11/2023 12:29:15 PM
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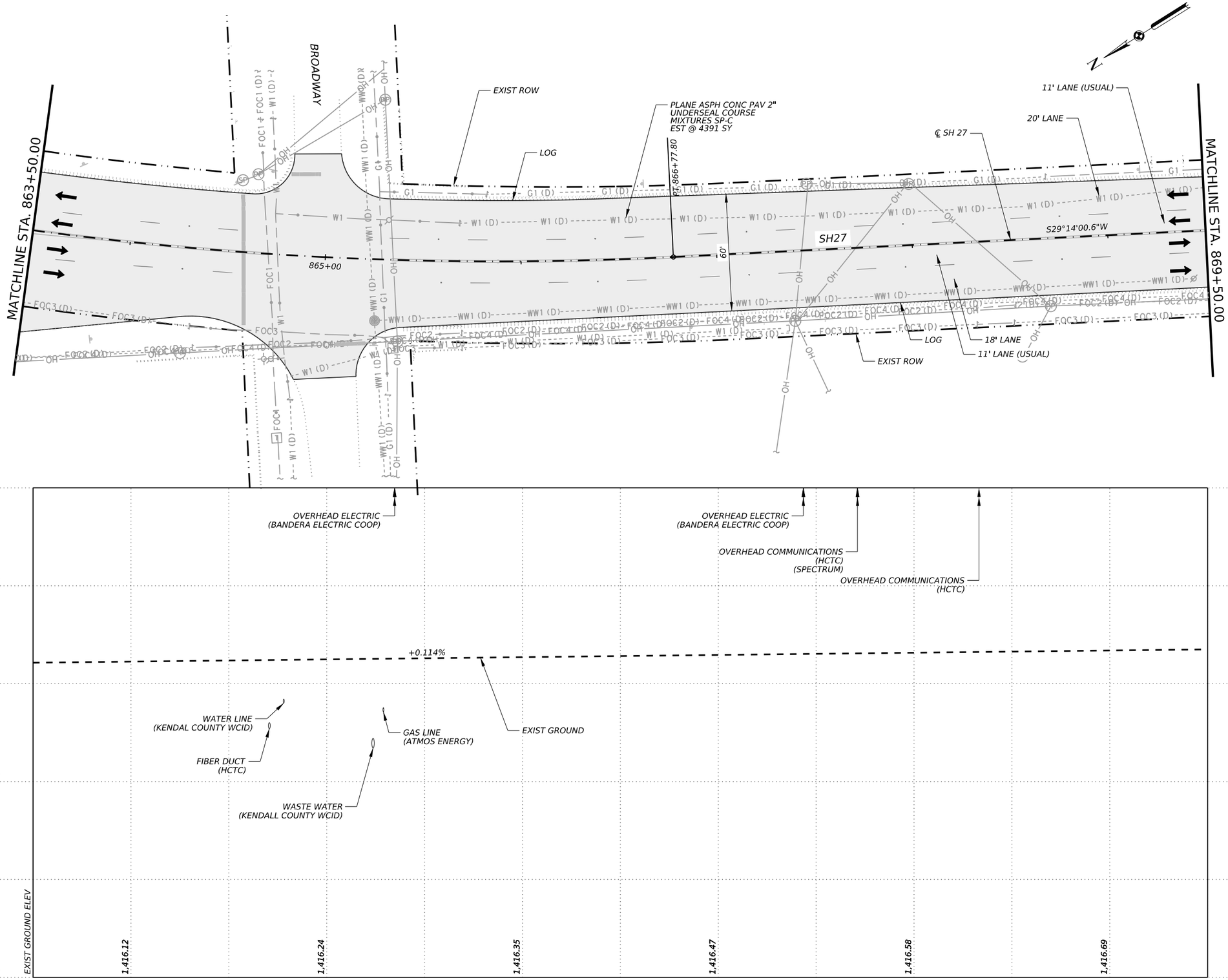
CK:
DW:
CK:
DW:

SHEET #			9
ITEM	DESCRIPTION	UNIT	QTY
0354 6045	PLANE ASPH CONC PAV (2")	SY	4391
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	4391
3085 6001	UNDERSEAL COURSE *	SY	4391

*FOR CONTRACTOR'S INFORMATION ONLY.
SEE BASIS OF ESTIMATE FOR BID ITEM QUANTITIES.



LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
- FOC2 — WINDSTREAM (FO/DUCT) QLB
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- FOC5 — COMMZOOM (FO/DUCT) QLB
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- G1 — ATMOS (GAS) QLB
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- TS1 — CITY OF COMFORT (TRAFFIC SIGNAL) QLB
- OH — BANDERA ELECTRIC COOPERATIVE (OHE) QLD
- OH — HILL COUNTRY TELEPHONE COOPERATIVE (OHE) QLD
- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- X# (C) — QUALITY LEVEL "C"
- X# (D) — QUALITY LEVEL "D"

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10/11/2023

JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

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Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 863+50.00 TO STA 869+50.00

SHEET 9 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		75

DATE: 10/11/2023 12:29:43 PM
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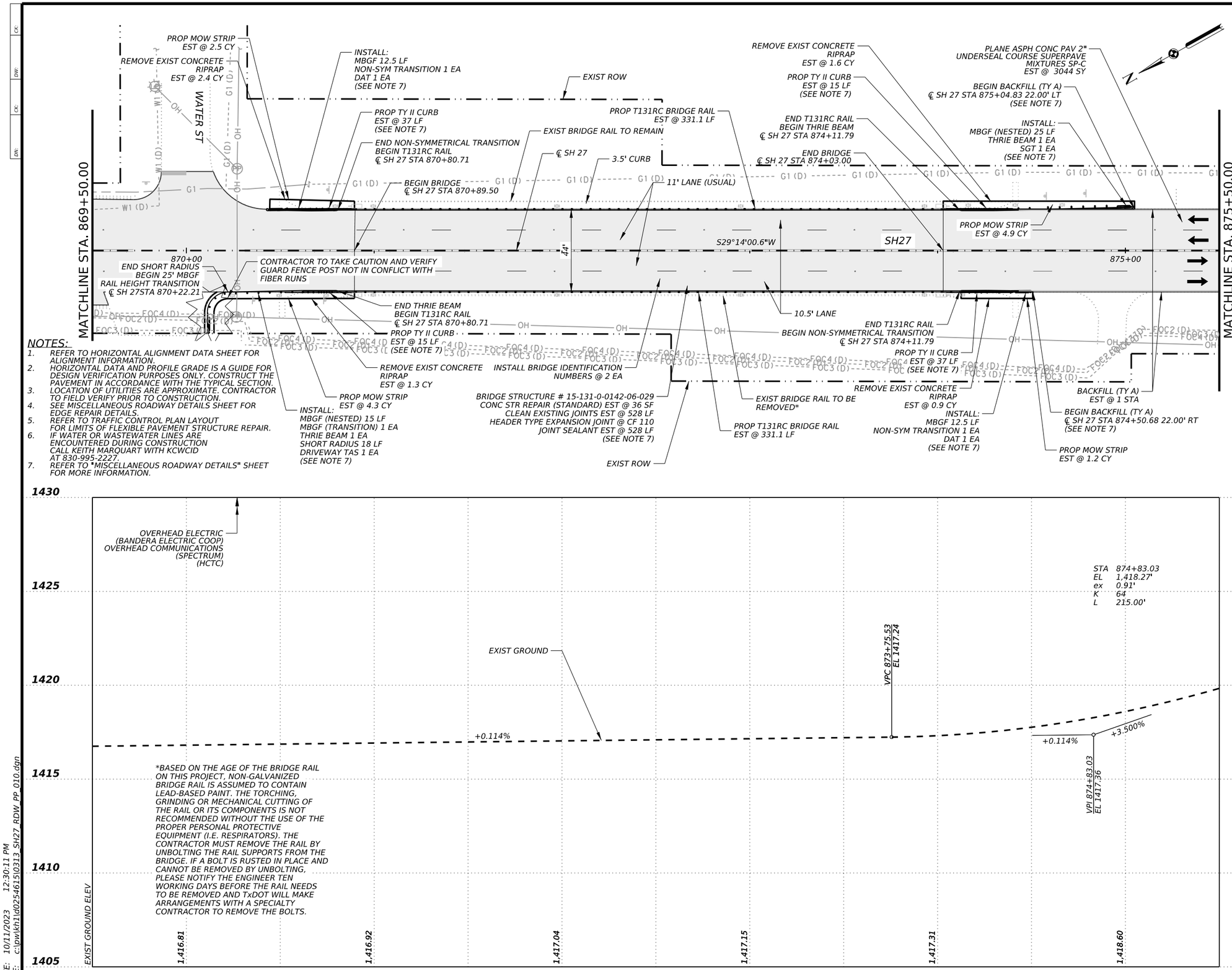

SHEET #			10
ITEM	DESCRIPTION	UNIT	QTY
0104 6010	REMOVING CONC (RIPRAP)	CY	6.2
0104 6021	REMOVING CONC (CURB)	LF	129
0110 6001	EXCAVATION (ROADWAY)	CY	20
0132 6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	20
0134 6001	BACKFILL (TY A)	STA	1
0314 6021	EMULS ASPH (PRIME)(MS-2 OR SS-1) * #	SY	33.4
0354 6045	PLANE ASPH CONC PAV (2")	SY	3044
0429 6009	CONC STR REPAIR (STANDARD)	SF	36
0432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	12.9
0438 6009	CLEANING EXISTING JOINTS	LF	528
0451 6004	RETROFIT RAIL (TY T131RC)	LF	662.2
0454 6008	HEADER TYPE EXPANSION JOINT	CF	110
0454 6009	JOINT SEALANT	LF	528
0529 6002	CONC CURB (TY II)	LF	104
0540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	25
0540 6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	2
0540 6014	SHORT RADIUS	LF	18
0540 6015	DRIVEWAY TERMINAL ANCHOR SECTION	EA	1
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
0540 6018	MTL BM GD FEN TRANS (NON-SYM)	EA	2
0540 6039	MTL BM GD FEN TRANS (31"-28")(25')	EA	1
0540 6041	MTL W-BEAM GD FEN (NESTED)(TIM POST)	LF	40
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
3077 6022	SP MIXES SP-C SAC-1 PG70-22 *	SY	3044
3085 6001	UNDERSEAL COURSE *	SY	3044
4171 6001	INSTALL BRIDGE IDENTIFICATION NUMBERS	EA	2

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#WILL NOT BE PAID FOR DIRECTLY BUT
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LEGEND

- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- PROPOSED MILL & INLAY
- FOC1 — HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) QLB
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- OH — SPECTRUM (OHE) QLD
- OH — BANDERA ELECTRIC COOPERATIVE (FIBER) QLD
- OH — TXDOT QLD
- X# — QUALITY LEVEL "B"
- --X# (C)-- QUALITY LEVEL "C"
- --X# (D)-- QUALITY LEVEL "D"

*BASED ON THE AGE OF THE BRIDGE RAIL ON THIS PROJECT, NON-GALVANIZED BRIDGE RAIL IS ASSUMED TO CONTAIN LEAD-BASED PAINT. THE TORCHING, GRINDING OR MECHANICAL CUTTING OF THE RAIL OR ITS COMPONENTS IS NOT RECOMMENDED WITHOUT THE USE OF THE PROPER PERSONAL PROTECTIVE EQUIPMENT (I.E. RESPIRATORS). THE CONTRACTOR MUST REMOVE THE RAIL BY UNBOLTING THE RAIL SUPPORTS FROM THE BRIDGE. IF A BOLT IS RUSTED IN PLACE AND CANNOT BE REMOVED BY UNBOLTING, PLEASE NOTIFY THE ENGINEER TEN WORKING DAYS BEFORE THE RAIL NEEDS TO BE REMOVED AND TxDOT WILL MAKE ARRANGEMENTS WITH A SPECIALTY CONTRACTOR TO REMOVE THE BOLTS.

JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 869+50.00 TO STA 875+50.00

SHEET 10 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		76

DATE: 10/11/2023 12:30:11 PM
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SHEET #			11
ITEM	DESCRIPTION	UNIT	QTY
0134 6001	BACKFILL (TY A)	STA	6
0314 6021	EMULS ASPH (PRIME)(MS-2 OR SS-1) * #	SY	200
0354 6045	PLANE ASPH CONC PAV (2")	SY	2983
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	2983
3085 6001	UNDERSEAL COURSE *	SY	2983

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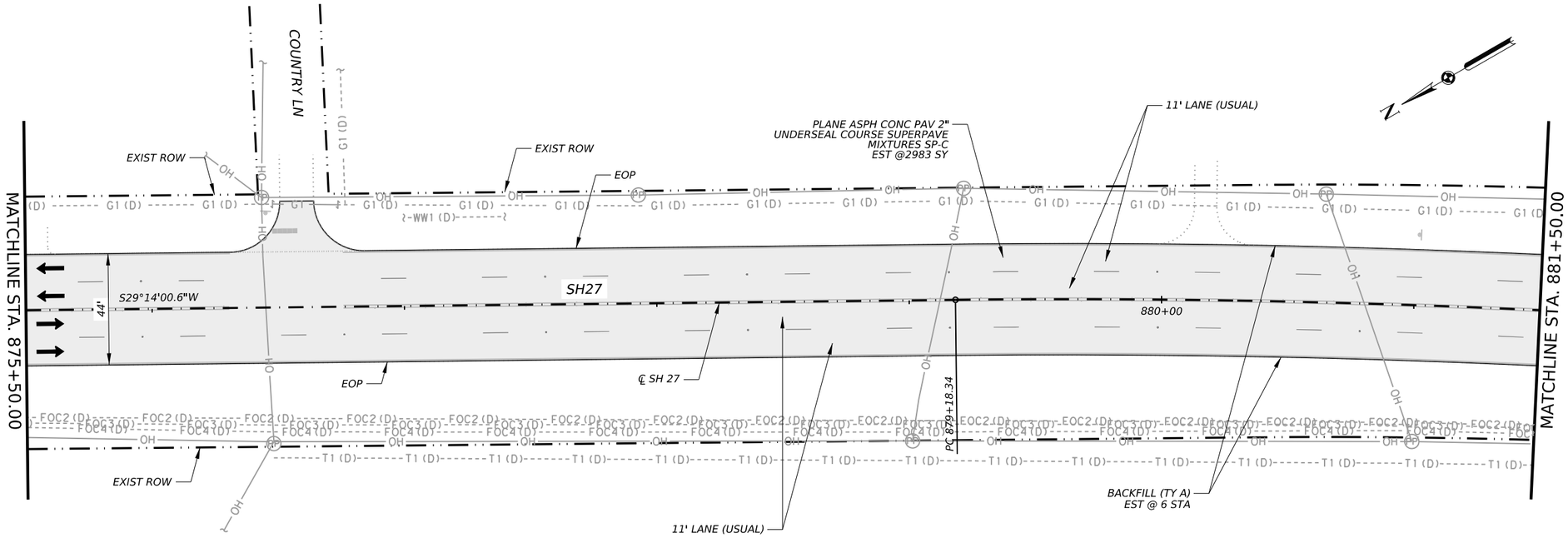

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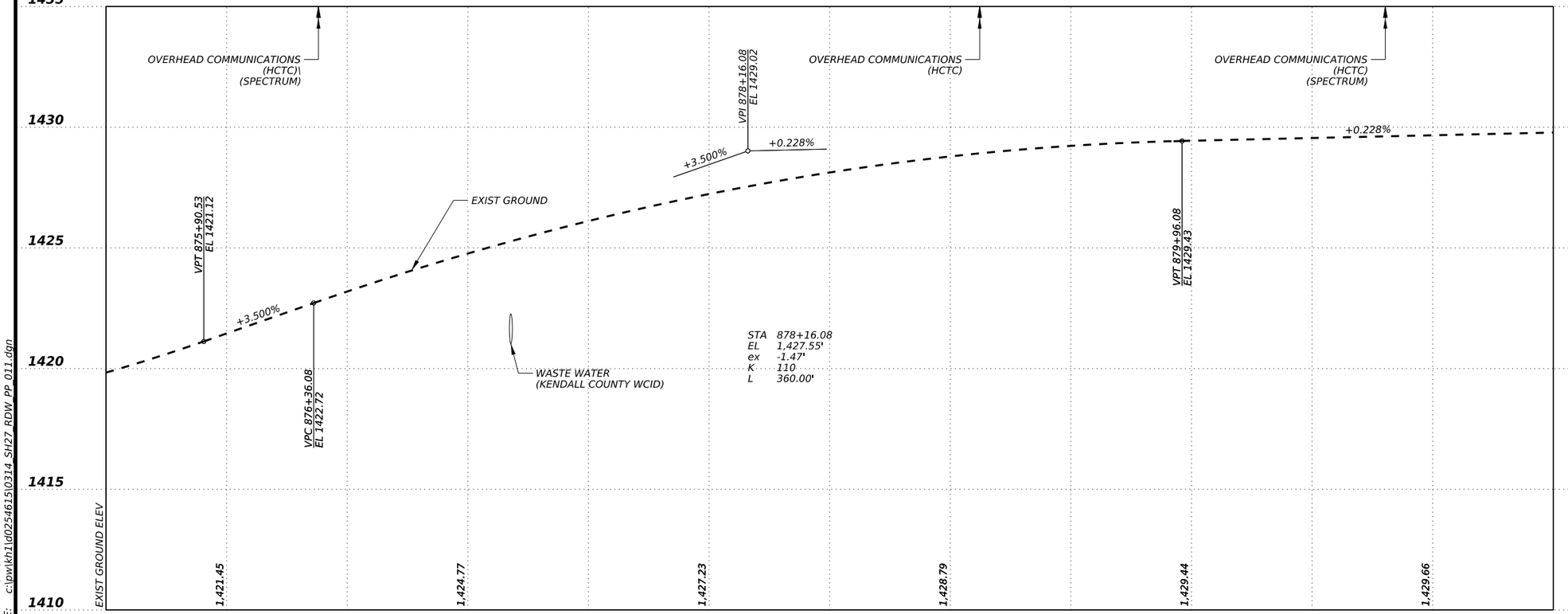

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10/11/2023

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JORDAN S. KIEWIT
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LICENSED
PROFESSIONAL ENGINEER

0' 25' 50'
0' 2.5' 5'

Kimley»Horn F-928

Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 875+50.00 TO STA 881+50.00

SHEET 11 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		77

DATE: 10/11/2023 12:30:40 PM
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DW:
CK:
DW:

SHEET #			12
ITEM	DESCRIPTION	UNIT	QTY
0134 6001	BACKFILL (TY A)	STA	6
0314 6021	EMULS ASPH (PRIME)(MS-2 OR SS-1) * #	SY	200
0354 6045	PLANE ASPH CONC PAV (2")	SY	2934
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	2934
3085 6001	UNDERSEAL COURSE *	SY	2934

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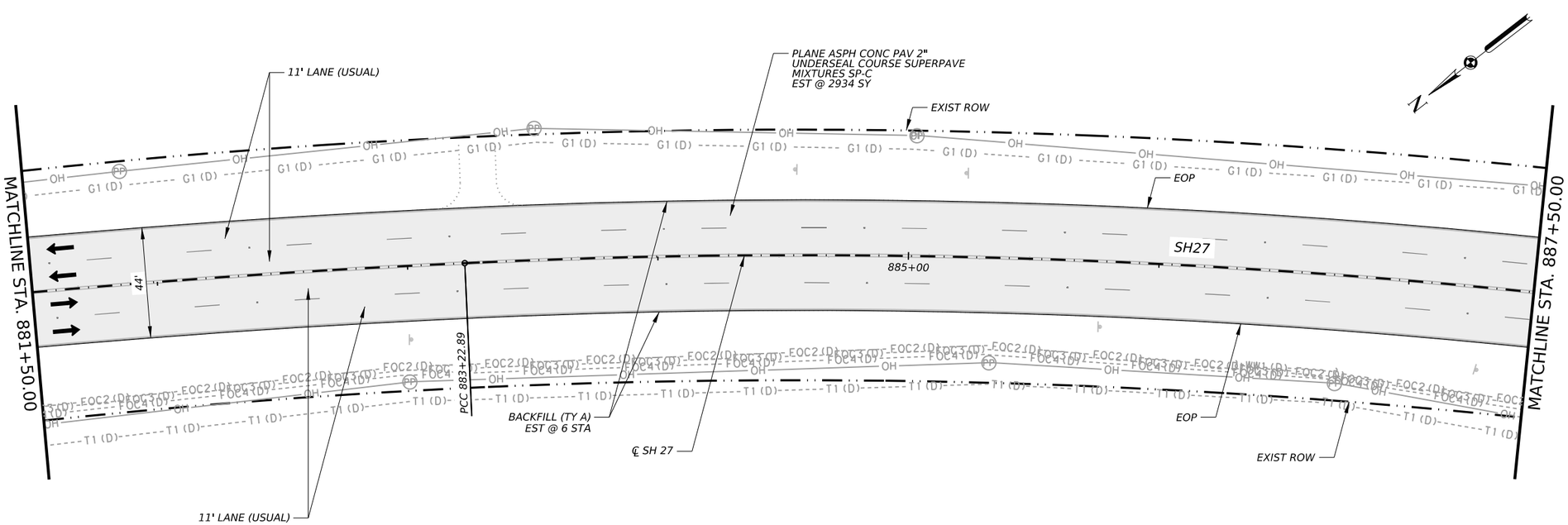

LEGEND

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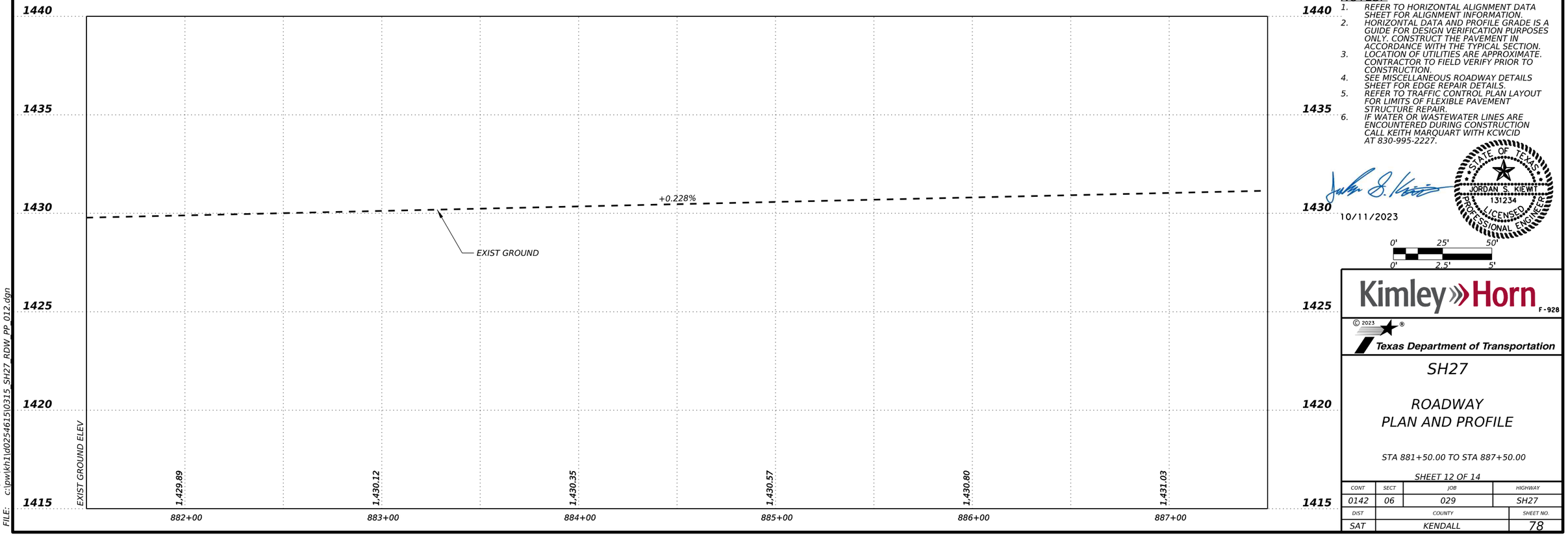

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Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 881+50.00 TO STA 887+50.00

SHEET 12 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		78

DATE: 10/11/2023 12:31:09 PM
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CK:
DW:
CK:
DW:

SHEET #			13
ITEM	DESCRIPTION	UNIT	QTY
0134 6001	BACKFILL (TY A)	STA	6
0314 6021	EMULS ASPH (PRIME)(MS-2 OR SS-1) * #	SY	200
0354 6045	PLANE ASPH CONC PAV (2")	SY	3132
3077 6022	SP MIXES SP-C SAC-1PG70-22 *	SY	3132
3085 6001	UNDERSEAL COURSE *	SY	3132

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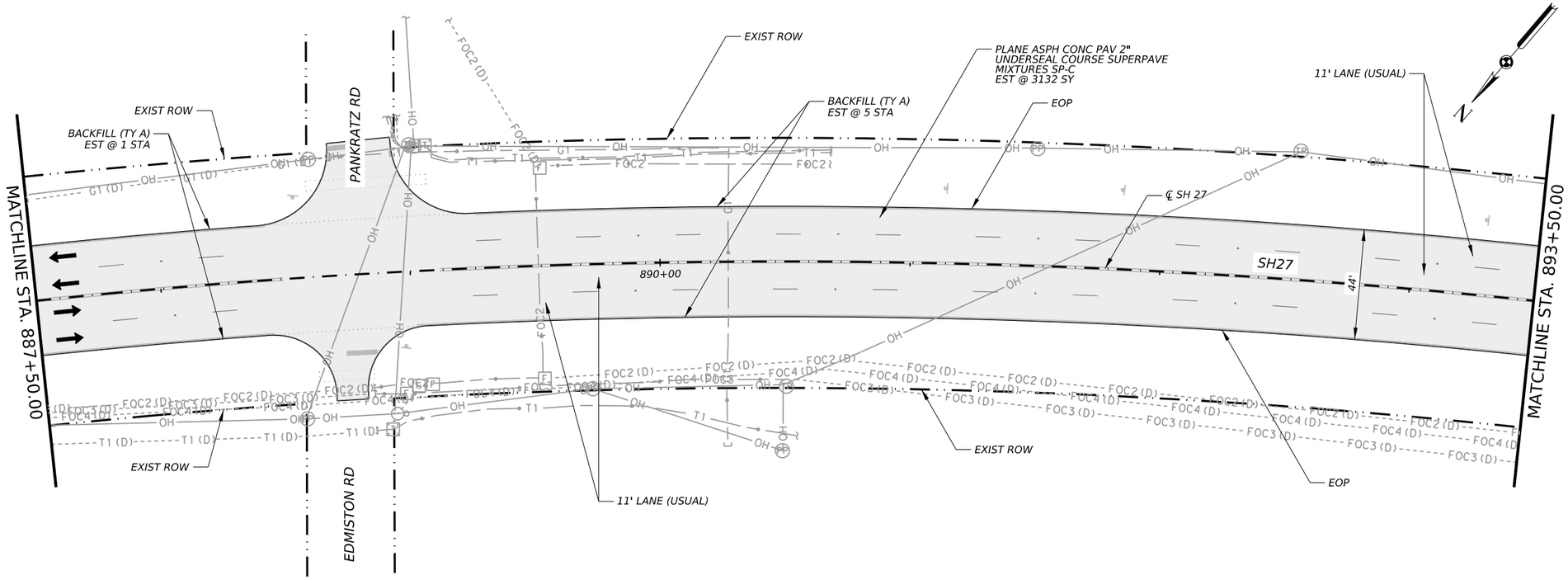

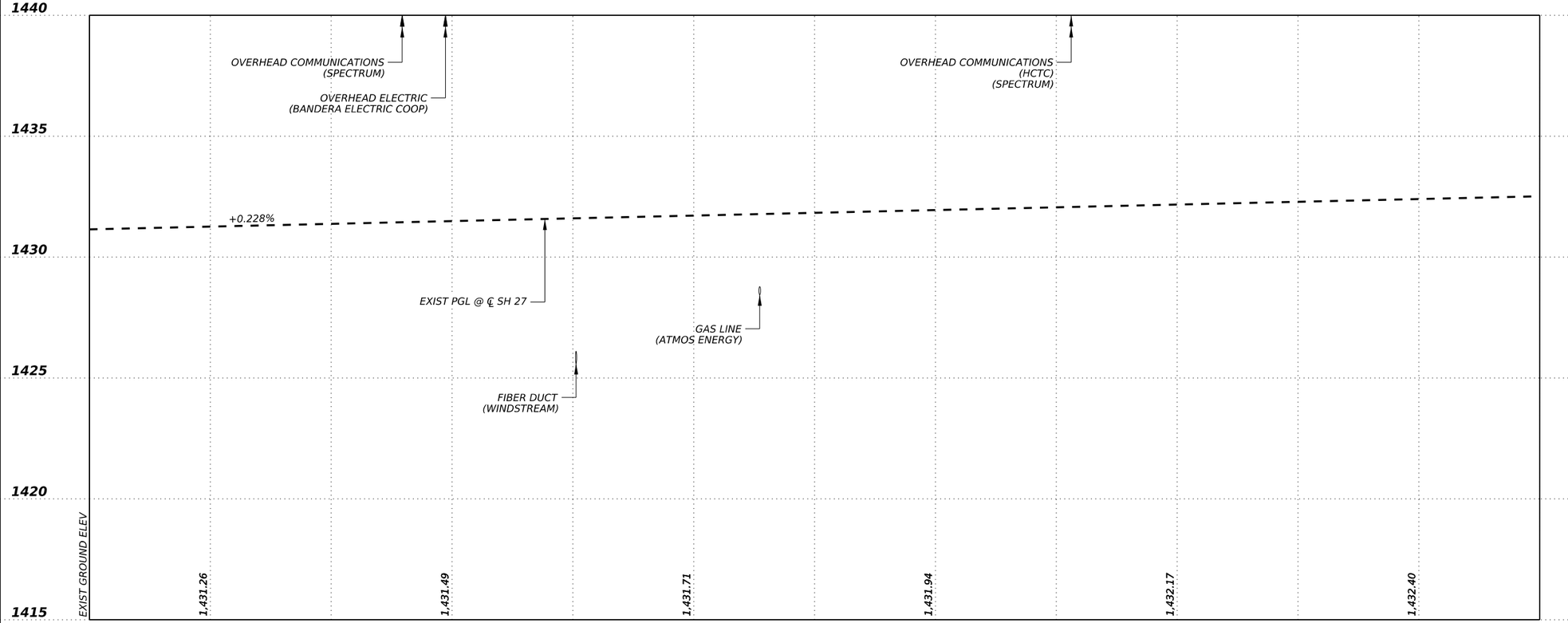

LEGEND

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ROADWAY PLAN AND PROFILE

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SHEET 13 OF 14

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		79

DATE: 10/11/2023 12:31:36 PM
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SHEET #			14
ITEM	DESCRIPTION	UNIT	QTY
0134 6001	BACKFILL (TY A)	STA	2.95
0314 6021	EMULS ASPH (PRIME)(MS-2 OR SS-1) * #	SY	98.4
0354 6045	PLANE ASPH CONC PAV (2")	SY	1408
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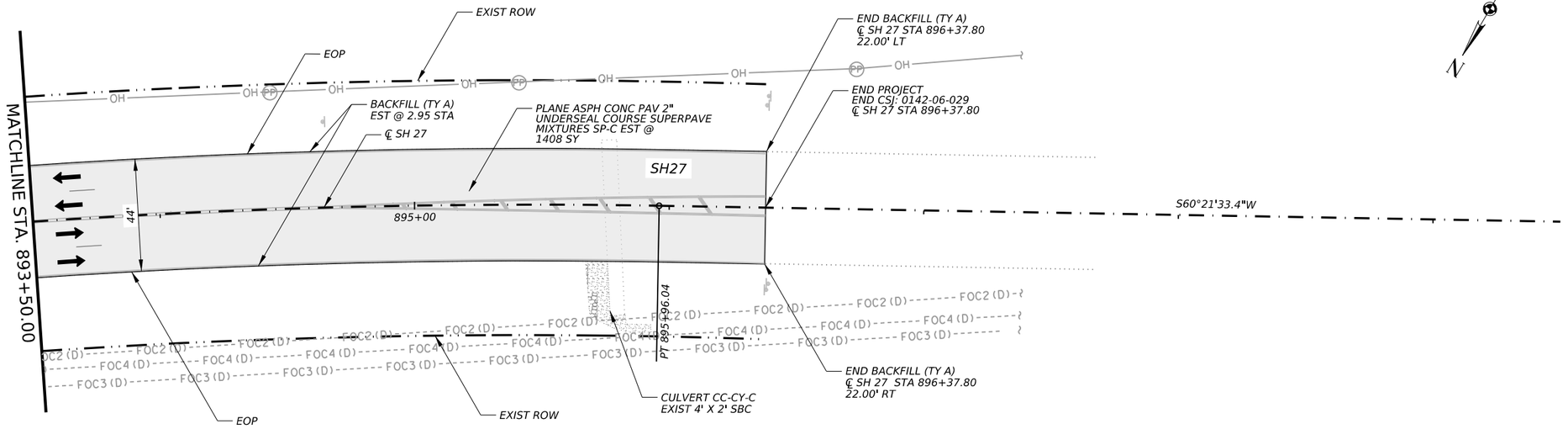

LEGEND

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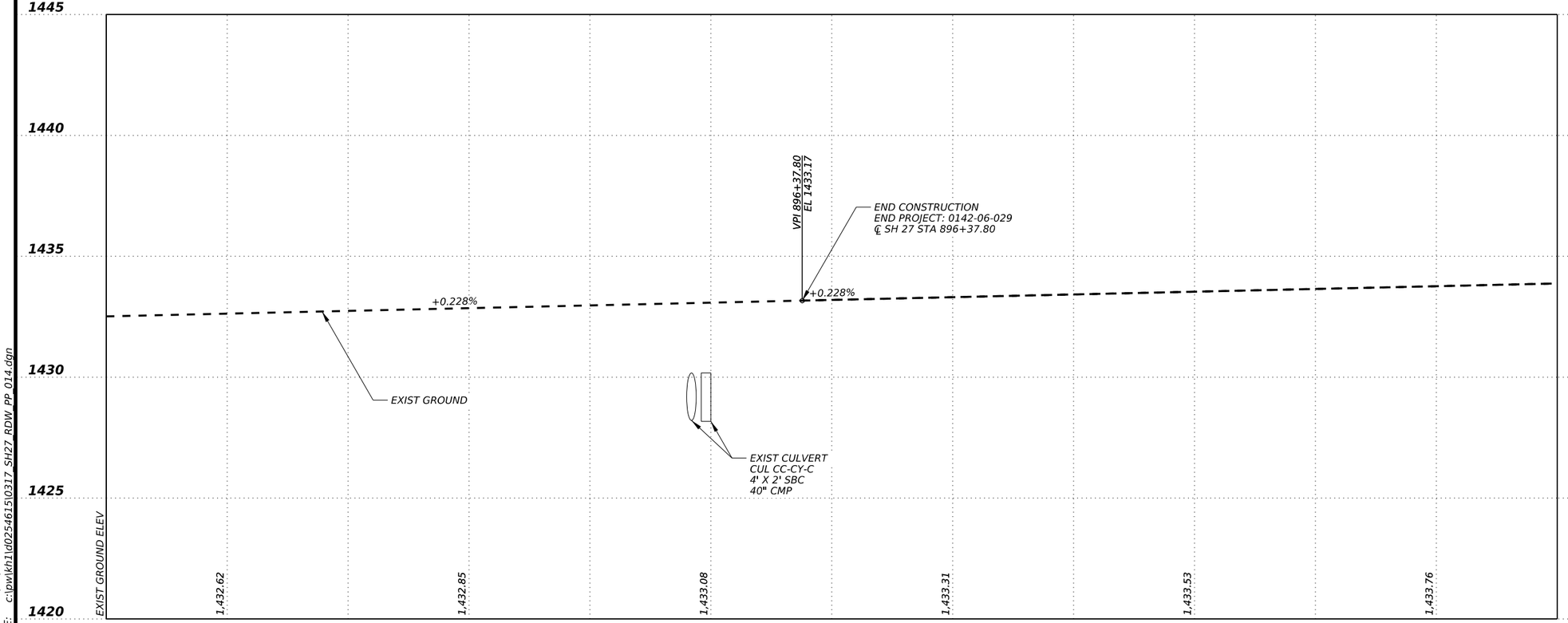
- --X# (C)-- QUALITY LEVEL "C"
- --X# (D)-- QUALITY LEVEL "D"



NOTES:

1. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR ALIGNMENT INFORMATION.
2. HORIZONTAL DATA AND PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
3. LOCATION OF UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
4. SEE MISCELLANEOUS ROADWAY DETAILS SHEET FOR EDGE REPAIR DETAILS.
5. REFER TO TRAFFIC CONTROL PLAN LAYOUT FOR LIMITS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR.
6. IF WATER OR WASTEWATER LINES ARE ENCOUNTERED DURING CONSTRUCTION CALL KEITH MARQUART WITH KCWCID AT 830-995-2227.

JORDAN S. KIEWIT
131234
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

10/11/2023

0' 25' 50'
0' 2.5' 5'

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Texas Department of Transportation

SH27

ROADWAY PLAN AND PROFILE

STA 893+50.00 TO END

SHEET 14 OF 14

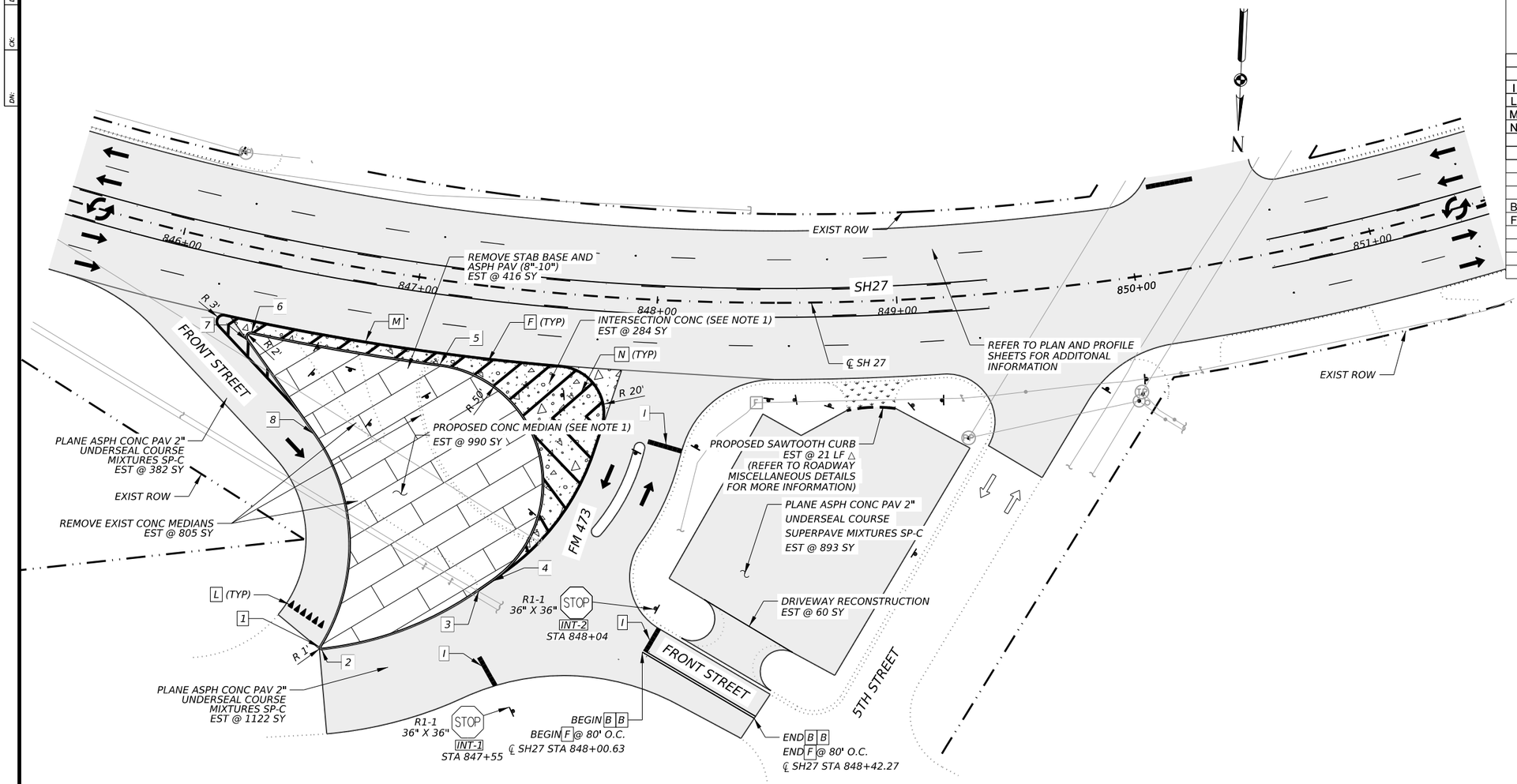
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		80

DATE: 10/11/2023 12:32:04 PM
FILE: c:\pw\kh1\d0254615\0317_SH27_RDW_PP_014.dgn

CK:
DW:
CK:
DW:

	SHEET #			15
	ITEM	DESCRIPTION	UNIT	QTY
	0104 6011	REMOVING CONC (MEDIANS)	SY	805
	0105 6015	REMOVING STAB BASE & ASPH PAV (8"-10")	SY	416
	0354 6045	PLANE ASPH CONC PAV (2")	SY	2397
	0529 6008	CONC CURB & GUTTER (TY II) △	LF	21
	0530 6001	INTERSECTIONS (CONC)	SY	284
	0530 6005	DRIVEWAYS (ACP)	SY	60
	0536 6002	CONC MEDIAN	SY	990
	3077 6022	SP MIXES SP-C SAC-1 PG70-22 *	SY	2397
	3085 6001	UNDERSEAL COURSE *	SY	2397
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
	0644 6076	REMOVE SM RD SN SUP&AM	EA	2
I	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	40
L	0666 6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	6
M	0666 6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	323
N	0666 6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	257
	0666 6225	PAVEMENT SEALER 6"	LF	110
	0666 6226	PAVEMENT SEALER 8"	LF	323
	0666 6228	PAVEMENT SEALER 12"	LF	257
	0666 6230	PAVEMENT SEALER 24"	LF	40
	0666 6243	PAVEMENT SEALER (YLD TRI)	EA	6
B	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	110
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	45
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	110
	0678 6004	PAV SURF PREP FOR MRK (8")	LF	323
	0678 6006	PAV SURF PREP FOR MRK (12")	LF	257
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	40

△ *SAWTOOTH CURB PAID FOR UTILIZING ITEM 529*



NOTES:

1. *CONTRACTOR TO GRADE PROPOSED CONCRETE MEDIAN AND CONCRETE INTERSECTION PAVEMENT TO MAINTAIN EXISTING DRAINAGE PATTERNS.*

LEGEND

- *PROPOSED PLANE AND INLAY*
- *EXIST DIRECTION OF TRAVEL*
- *PROPOSED DIRECTION OF TRAVEL*
- *PROPOSED CONCRETE MEDIAN*
- *PROPOSED INTERSECTION PAVEMENT*
- *REMOVE AND REPLACE SIGN*
- #-# *REMOVE AND REPLACE SIGN*

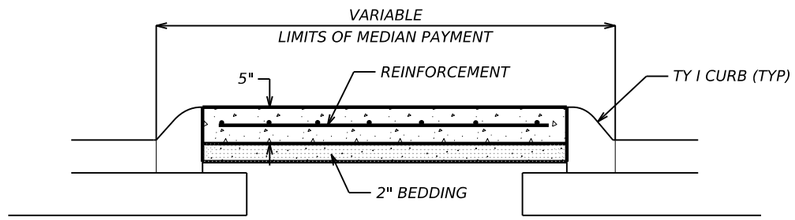
JORDAN S. KIEWIT
10/11/2023

STATE OF TEXAS — JORDAN S. KIEWIT — 131234 — LICENSED PROFESSIONAL ENGINEER

0' 25' 50'

POINT	STATION	OFFSET	LOCATION
1	846+83.36	159.02	PC
2	846+84.50	160.18	PC
3	847+38.70	127.06	PT
4	847+43.59	122.30	PC
5	847+13.30	35.00	PT
6	846+36.03	35.00	PC
7	846+34.72	38.36	PT
8	846+67.77	71.65	PC

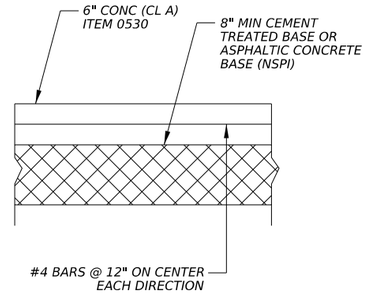
RIPRAP MEDIAN DETAIL



MEDIAN NOTES

Reinforcement will be in accordance with Item 432.3.1. Fiber reinforcement is not allowed. Class A and B Concrete are allowed to use Coarse Aggregate Grades 1-8.

Bedding may be sand, base, or RAP bedding. Furnish base meeting the requirement for any type or grade in accordance with Item 247. Base compressive strengths are waived. RAP must be 100% passing a 1 in. sieve. Bedding must be placed using ordinary compaction.



INTERSECTION PAVING SECTION

CLASS A CONCRETE, CEMENT TREATED BASE OR AC BASE AND REINFORCING WILL NOT BE PAID FOR DIRECTLY BUT ARE CONSIDERED SUBSIDIARY TO ITEM 530.

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SH27

INTERSECTION LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		81

DATE: 10/11/2023 12:32:34 PM
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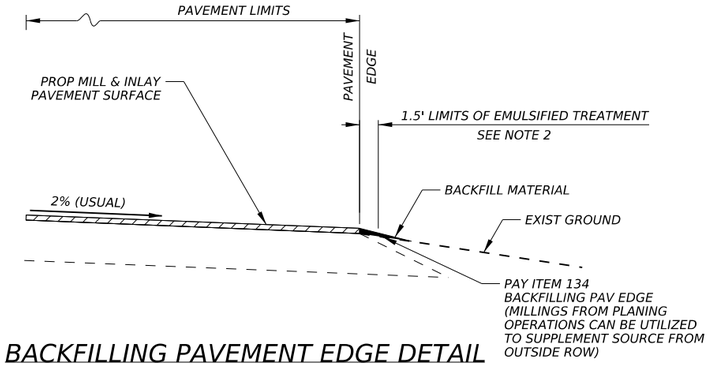
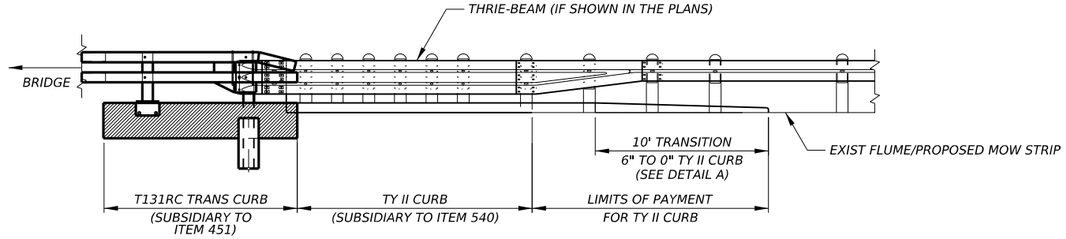


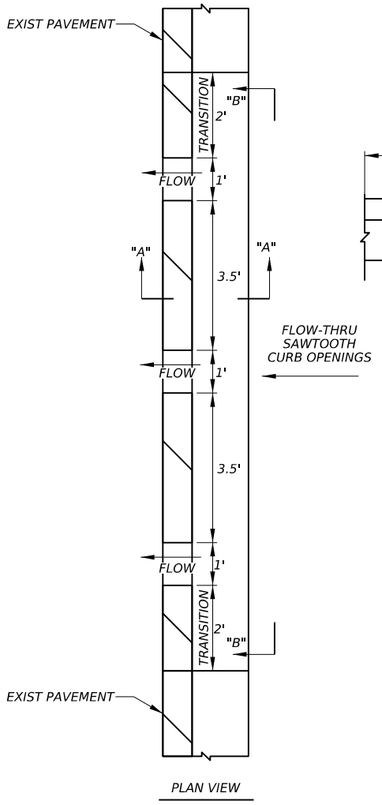
BACKFILLING PAVEMENT EDGE DETAIL

NOTES:

1. WHERE POSSIBLE GRADE AWAY FROM PAVEMENT AND PAVEMENT EDGE.
2. EMULSION APPLIES AT RATE OF 0.08 GAL/SY. EMULSIFIED TREATMENT SUBSIDIARY TO ITEM 134.
3. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.

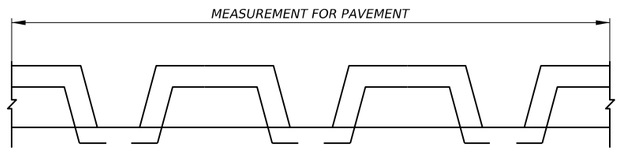


CURB TRANSITION DETAIL



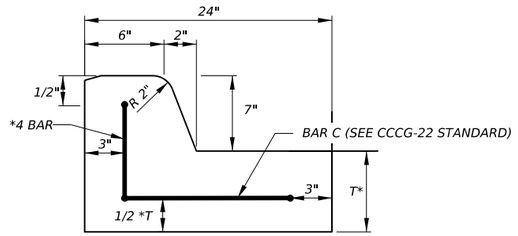
PLAN VIEW

SAWTOOTH CURB DETAIL



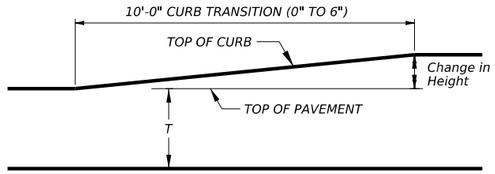
SECTION "B-B"

(BARS C AND LONGITUDINAL REINFORCING IN CURB NOT SHOWN FOR CLARITY)



SECTION "A-A"

* SEE NOTE 9 ON CCCG-22 STANDARD



DETAIL A

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
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SH27

MISCELLANEOUS ROADWAY DETAILS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		82

DATE: 10/11/2023 12:32:59 PM
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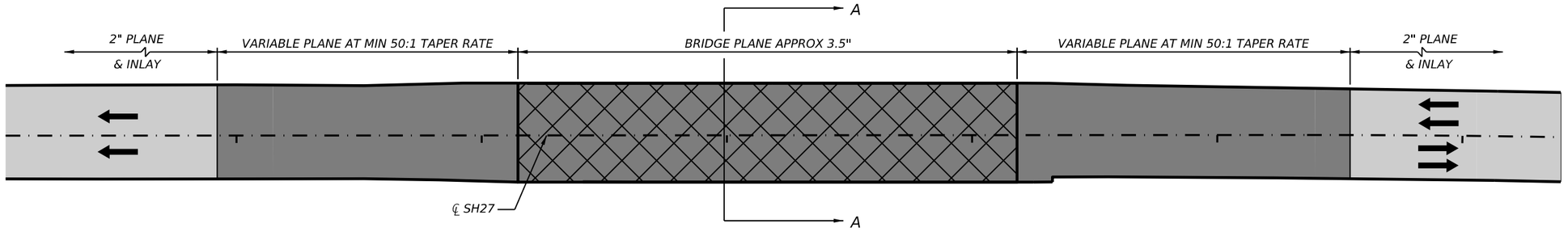
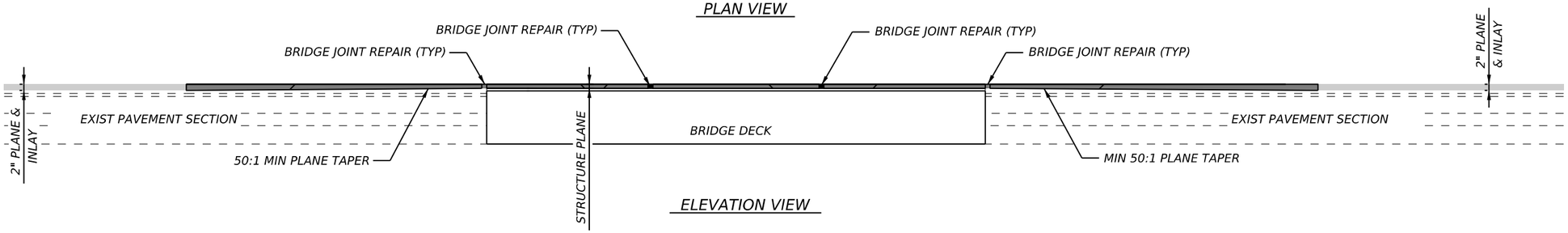
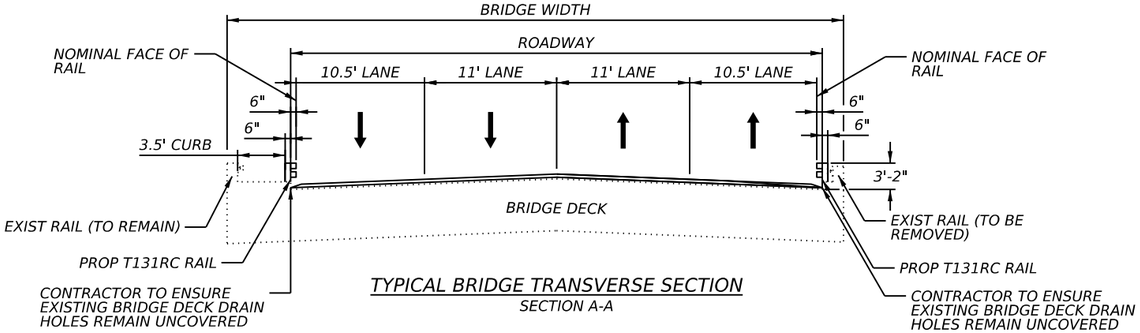


PLAN VIEW



ELEVATION VIEW



TYPICAL BRIDGE TRANSVERSE SECTION

SECTION A-A

BRIDGE PLANING						
PLAN SHEET NO.	LOCATION	STRUCTURE NUMBER	APPROX. EXIST ACP DEPTH	APPROX. STRUCTURE PLANE /INLAY DEPTH	PLANE VARIES	PLANE TAPER LENGTH @ BEGIN/END BRIDGE
72	SH 27 OVER CYPRESS CREEK	NBI# 15-131-0-0142-06-029	4"	3.5"	2"-3.5"	75'

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10/11/2023

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MISCELLANEOUS
ROADWAY DETAILS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		83

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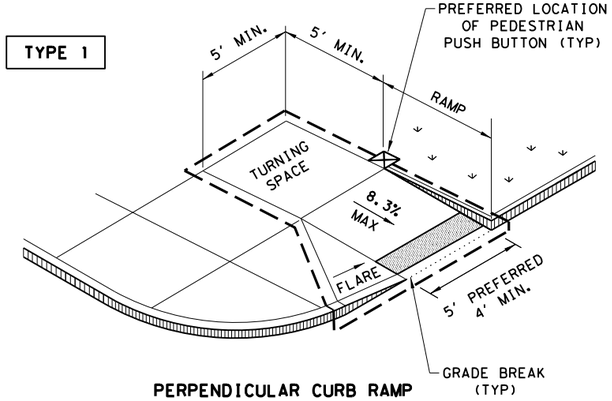
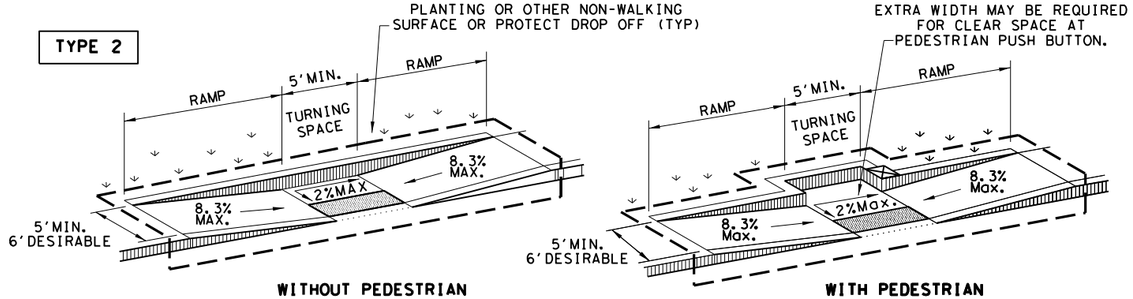
DATE: 10/11/2023
FILE: c:\pw\kml\d0278065\ped18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

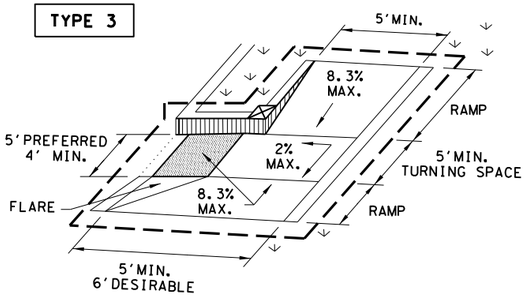


WITHOUT PEDESTRIAN PUSH BUTTON

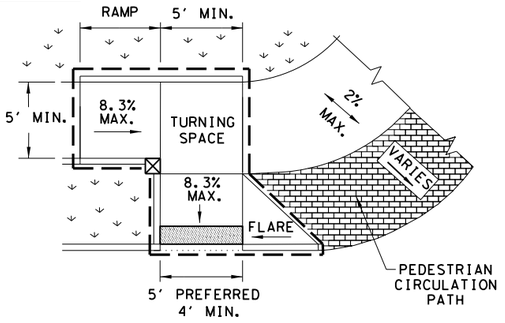
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

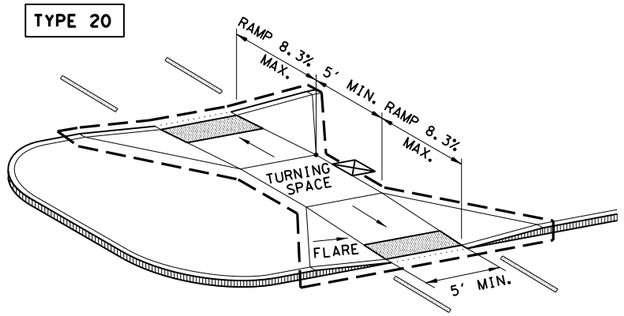


TYPE 6



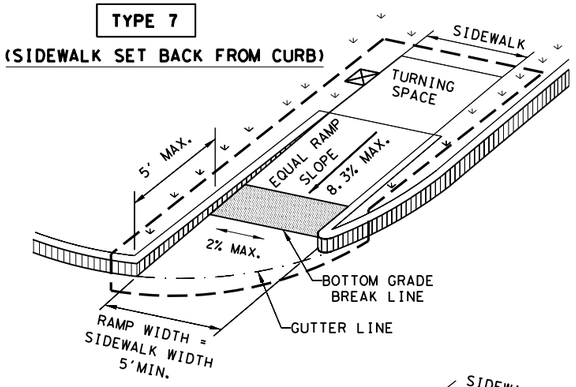
COMBINATION CURB RAMPS

TYPE 20

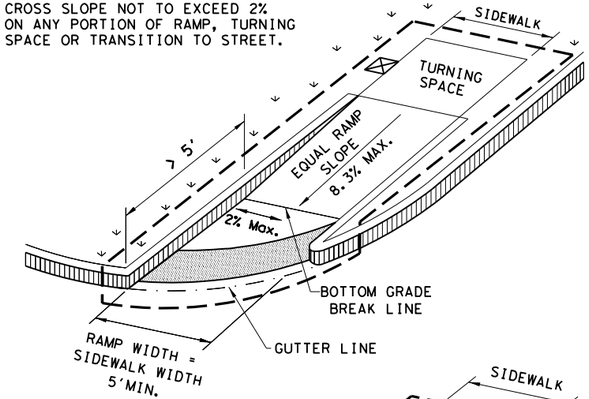


CURB RAMPS AT MEDIAN ISLANDS

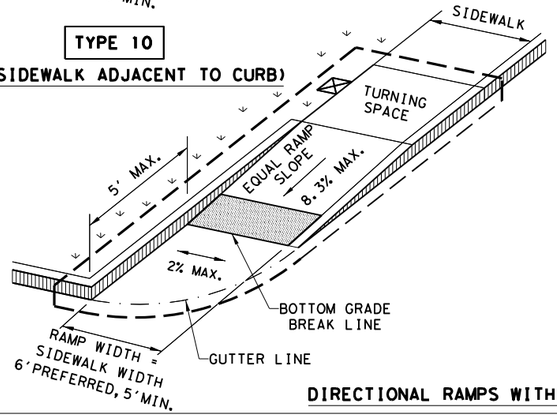
TYPE 7
(SIDEWALK SET BACK FROM CURB)



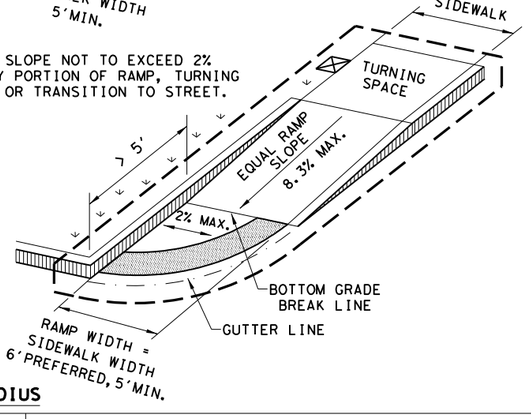
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

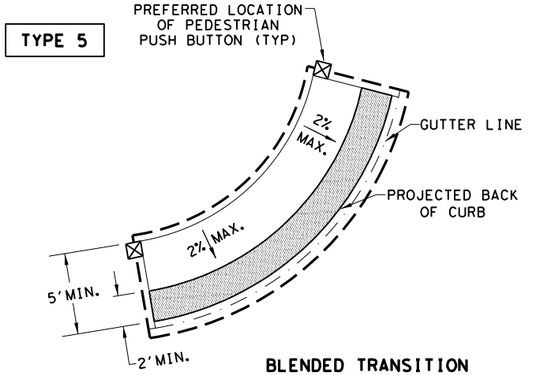


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

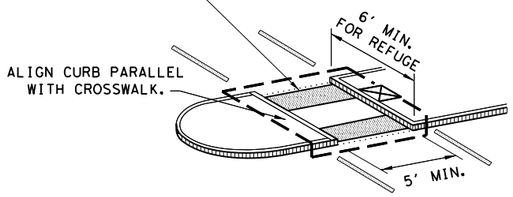
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

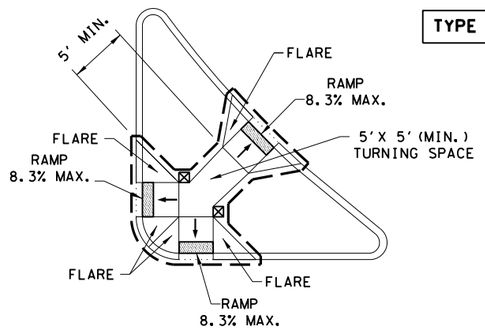
TYPE 21

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



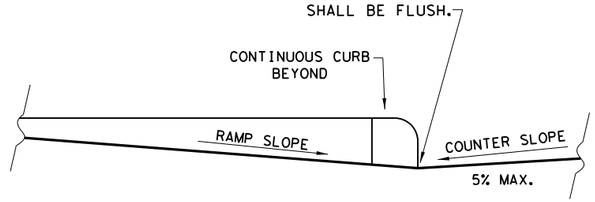
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0142	06	029	SH27	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	SAT	KENDALL		84	

DATE: 10/11/2023
FILE: c:\pw\kni\d0278065\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

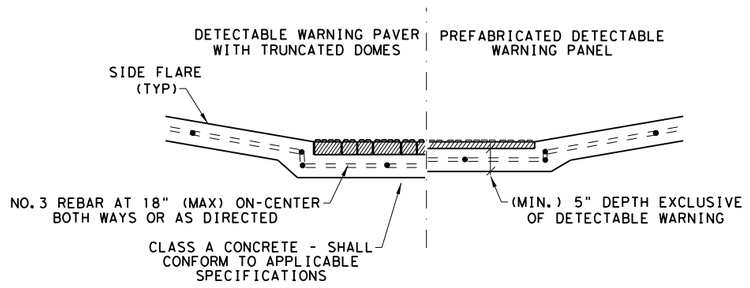
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material 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.

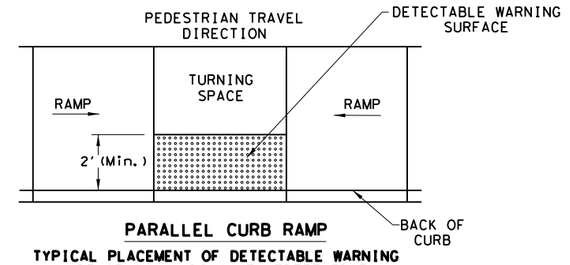
SIDEWALKS

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.

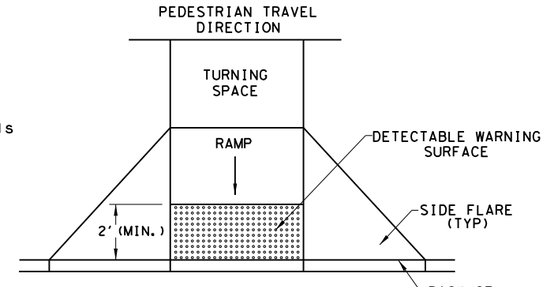


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

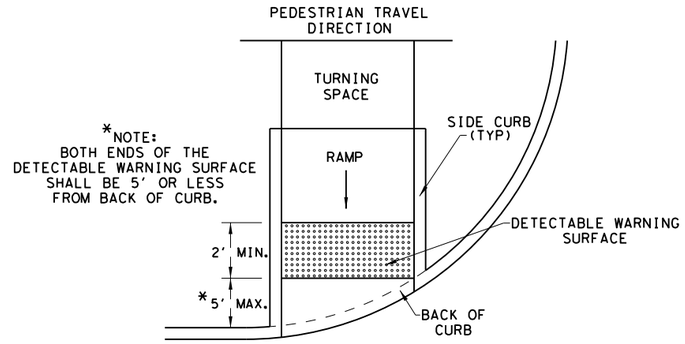
DETECTABLE WARNING SURFACE DETAILS



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.

SHEET 2 OF 4

Texas Department of Transportation | Design Division Standard

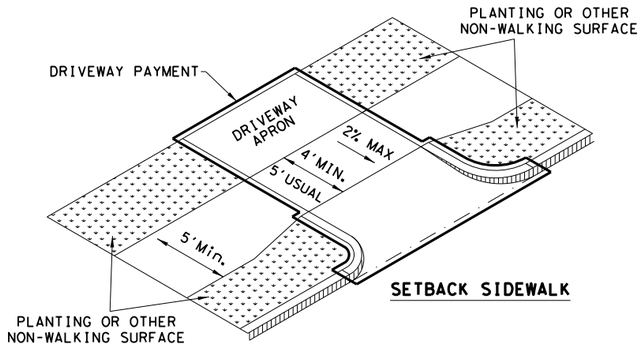
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

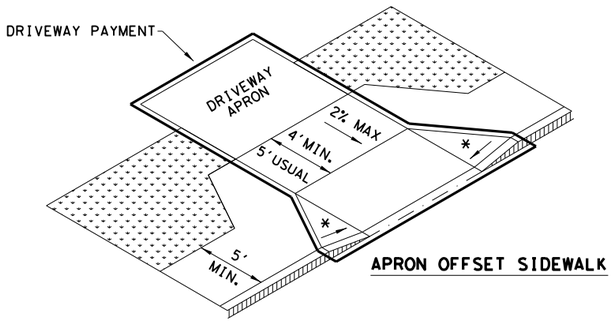
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		85

DATE: 10/11/2023
FILE: c:\pw\kml\d0278065\ped18.dgn

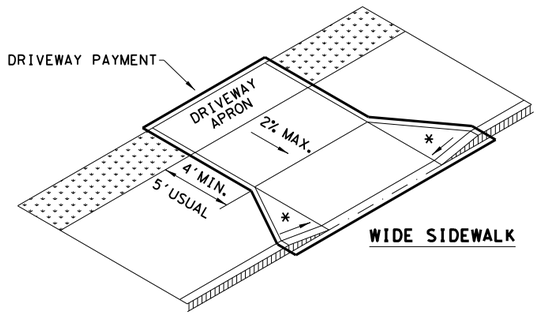
SIDEWALK TREATMENT AT DRIVEWAYS



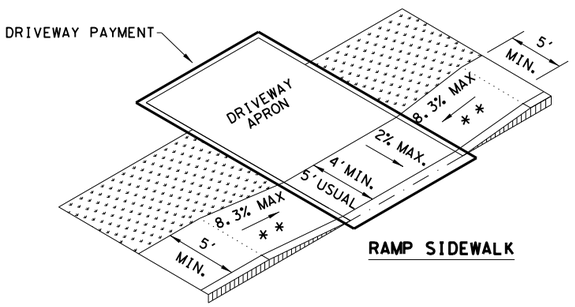
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

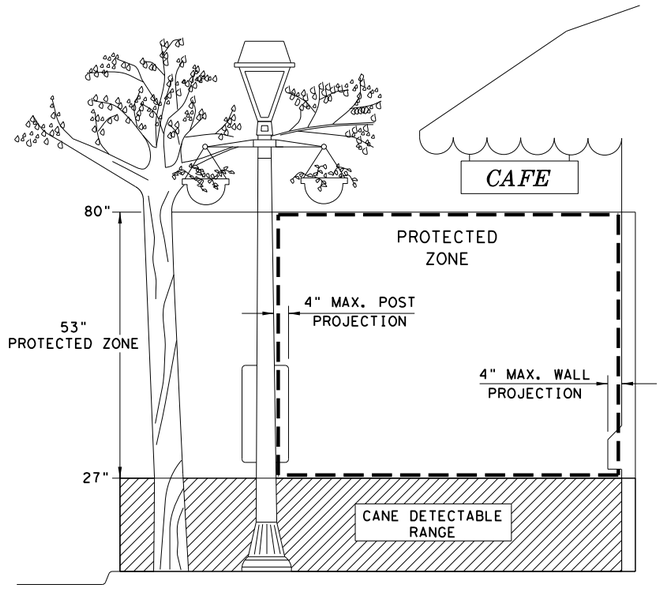


RAMP SIDEWALK

NOTES:

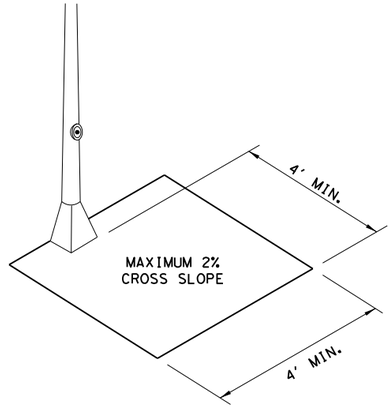
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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

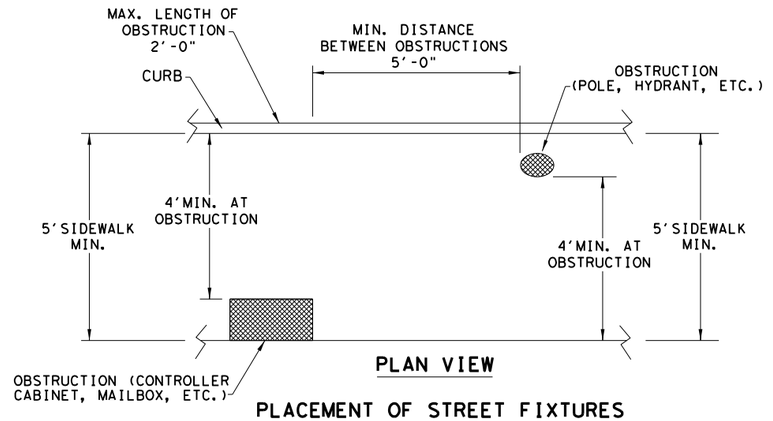


PROTECTED ZONE

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



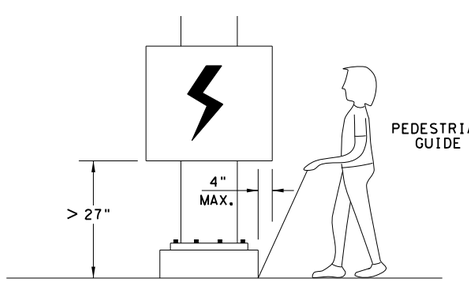
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



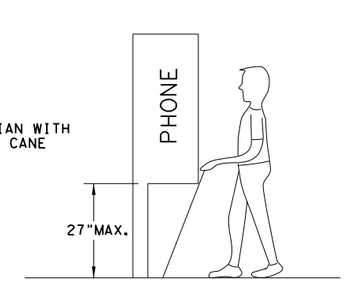
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

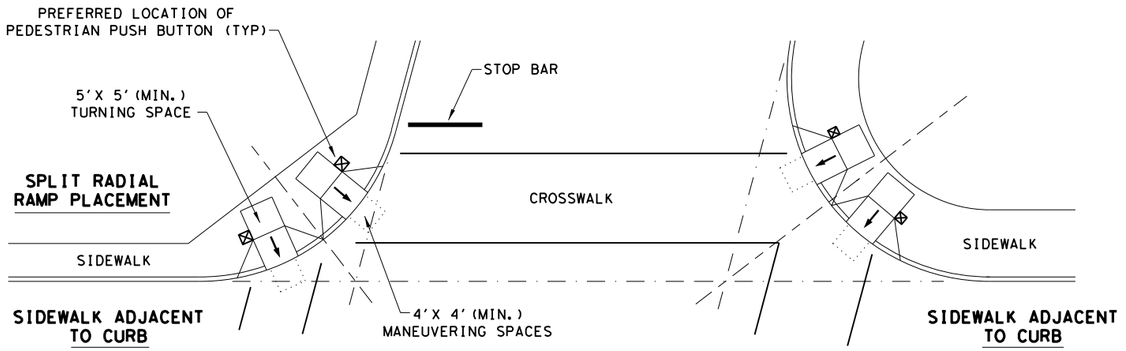
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		86

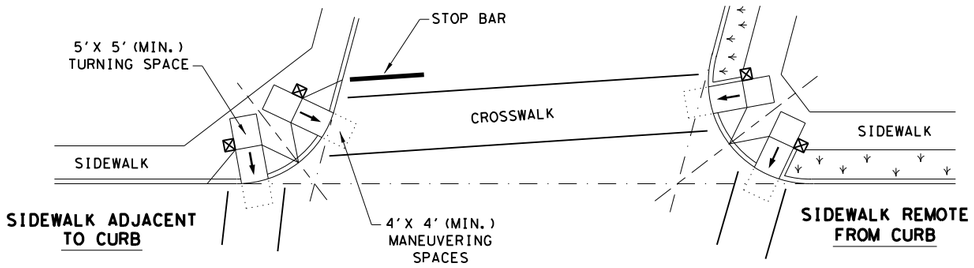
DATE: 10/11/2023
FILE: c:\pw\kh1\d0278065\ped18.dgn

TYPICAL CROSSING LAYOUTS

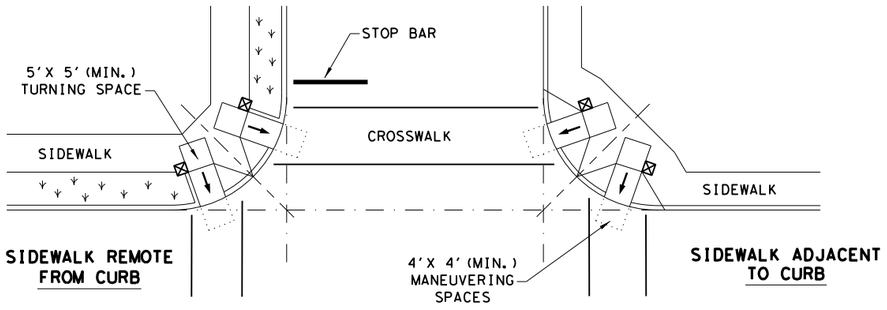
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



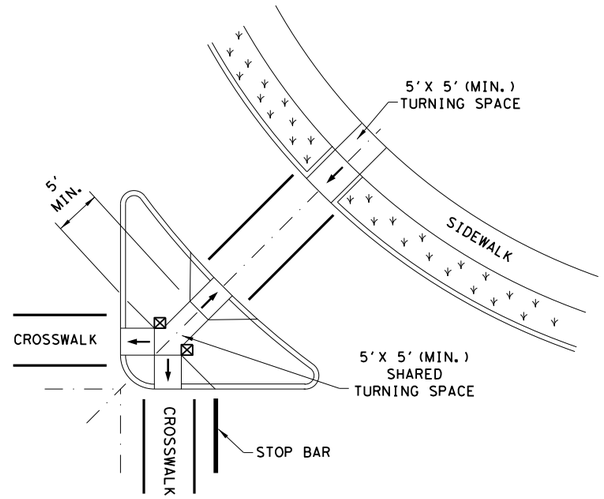
SKEWED INTERSECTION WITH "LARGE" RADIUS



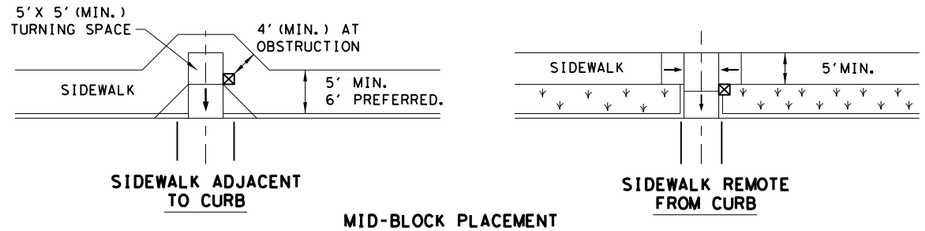
SKEWED INTERSECTION WITH "SMALL" RADIUS



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.

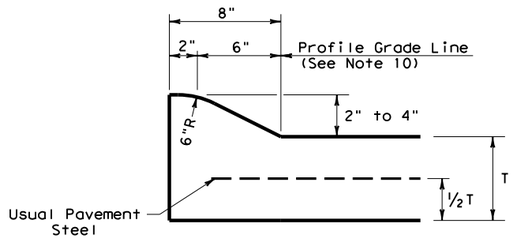
SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

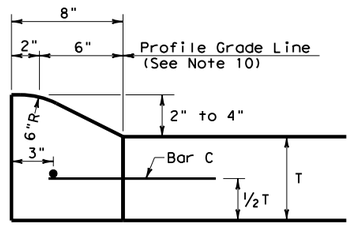
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

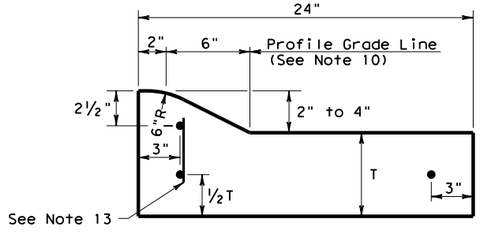
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		87



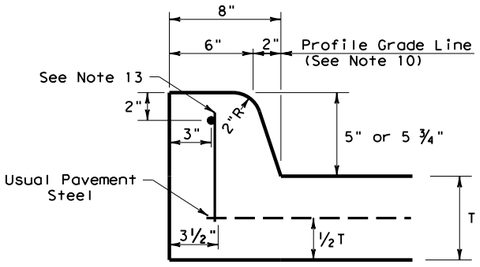
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



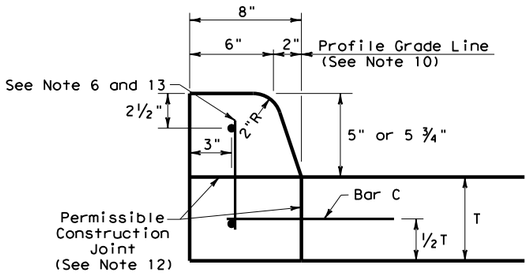
TYPE I CURB
2" - 4" HEIGHT



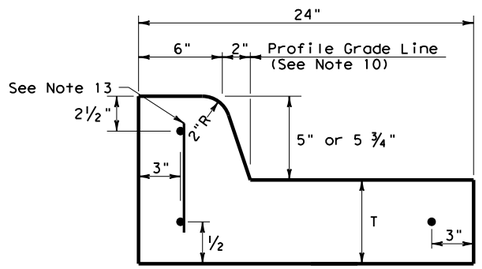
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



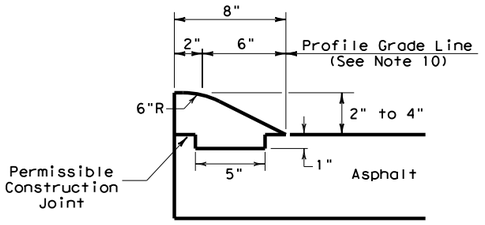
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



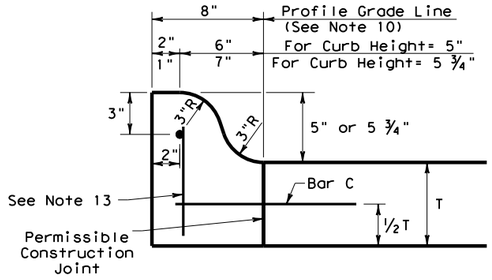
TYPE II CURB
5" - 5 ¾" HEIGHT



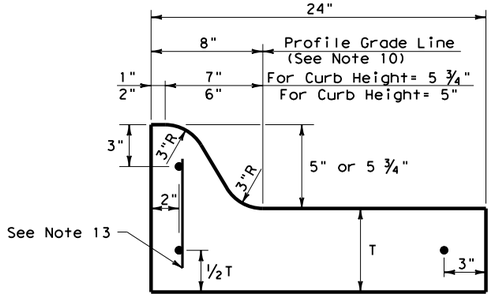
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



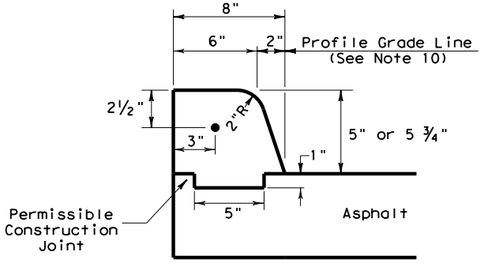
TYPE III CURB (KEYED)
2" - 4" HEIGHT



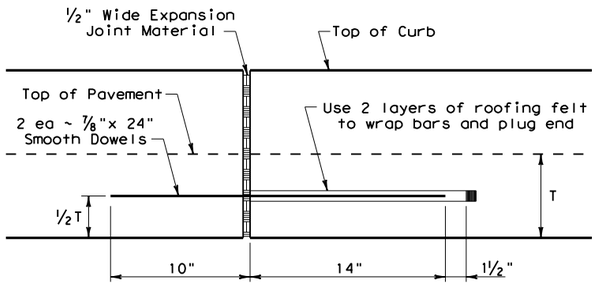
TYPE IIa CURB
5" - 5 ¾" HEIGHT



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

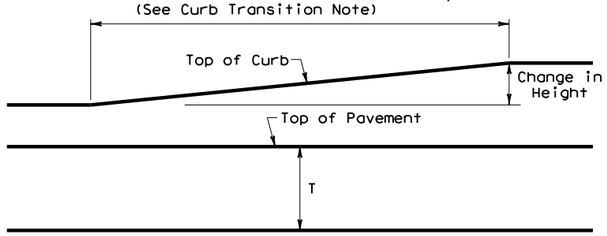


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

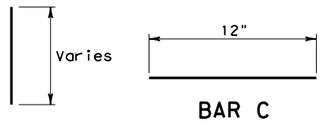
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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



BAR B

BAR C

Texas Department of Transportation

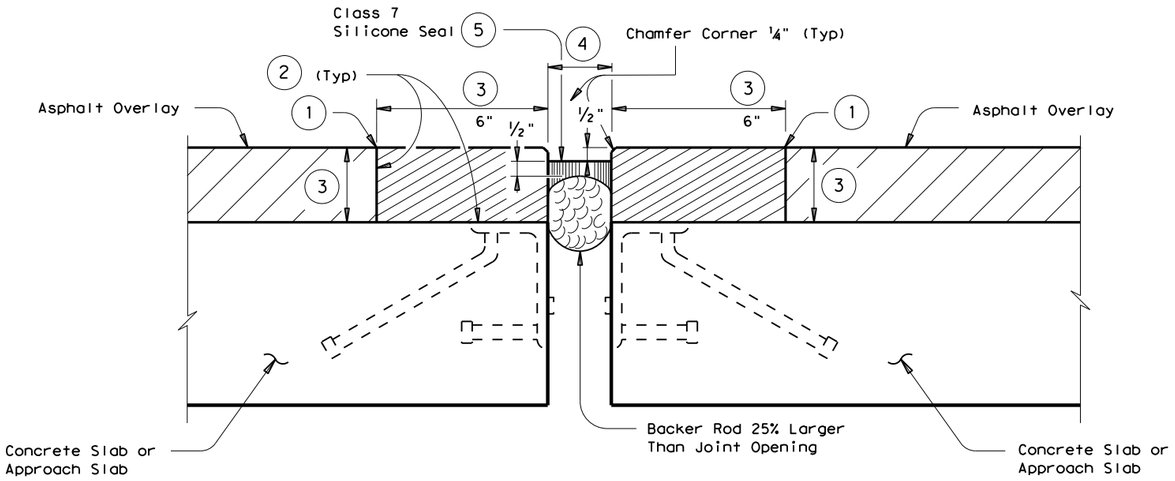
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		88

DATE: 10/11/2023
FILE: c:\pw\khi\d0278065\cccg22.dgn



SECTION

Angle type armor shown. Detail is identical for plate type armor or unarmored joint.

GENERAL NOTES:

Header Type Joint must be in accordance with Item 454, "Bridge Expansion Joints".

Unless shown otherwise on the plans, header material will be paid for by the cubic foot and sealant by the linear foot in accordance with Item 454, "Bridge Expansion Joints".

Removal and replacement of loose existing steel and repair of deck must be in accordance with Item 785, "Bridge Joint Repair or Replacement". This work is subsidiary to Item 454, "Bridge Expansion Joints - Armor Joints", or "Bridge Expansion Joints - SEJ".

Work performed and materials furnished for cleaning existing joints will be paid for by the linear foot under Item 438, "Cleaning and Sealing Joints".

Any asphaltic material deposited on bent or abutment caps must be removed.

AFTER EXISTING OVERLAY IS REMOVED:

Clean joint of any bituminous material, dirt, grease, or other deleterious material. Joint opening must be cleaned of old expansion material or devices in accordance with Item 438, "Cleaning and Sealing Joints".

The entire length of the joint must be checked. If any steel is present, remove and replace any portion determined to be unsound. Repair the deck. An approved concrete repair material must be used to repair any deep spall in the deck that leaves less than 6 inches of the original concrete below the spall. Spalls in the deck that are not so deep may be filled with header material. Removal and repair of deck must be accordance with Item 785, "Bridge Joint Repair or Replacement". Repair of damage caused by the Contractor must be repaired at the Contractor's expense in accordance with Item 429, "Concrete Structure Repair".

Place surface treatment according to the plans.

AFTER NEW OVERLAY IS PLACED:

(1) Saw cut overlay to the top of deck and remove material to expose the joint.

(2) Surfaces where header material is to be placed must be clean and dry in accordance with the manufacturer's specifications. Remove all asphaltic materials from the deck where the header material is placed.

(3) Place header material in accordance with Item 454, "Bridge Expansion Joints - Header Type Expansion Joint". Match the thickness of the header material with the thickness of the overlay as shown in the plans. Do not cantilever header material over the joint opening.

(4) Match existing joint opening or set at the minimum:

a. 1 inch at 70 degrees F when the distance between joints is 150 feet or less
b. 2 inches at 70 degrees F when the distance between joints is greater than 150 feet
c. or as directed by the Engineer

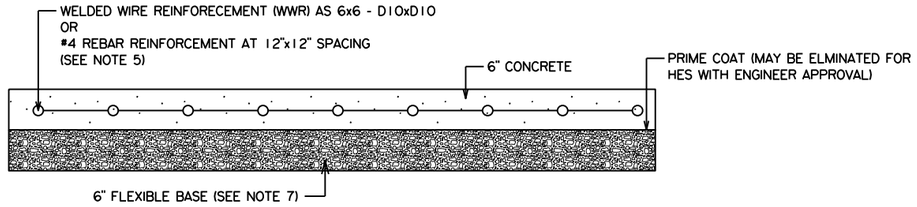
(5) After placing header material, install backer rod and sealant in accordance with Item 438, "Cleaning and Sealing Joints".
Extend sealant up into rail or curb 6 inches on low side or sides of deck. If the Class 7 sealant cannot be effectively placed in the vertical position, a Class 4 sealant is allowed for the extention of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with manufacturer's specifications.

SAN ANTONIO DISTRICT STANDARD

Texas Department of Transportation

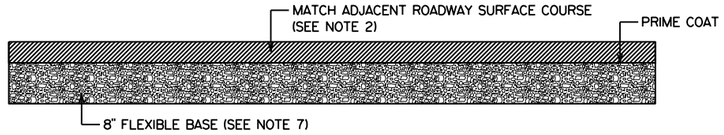
EXPANSION JOINT HEADER REPAIR

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6			89
STATE	DIST.	COUNTY	
TEXAS	SAT	KENDALL	
CONT.	SECT.	JOB	HIGHWAY NO.
0142	06	029	SH27



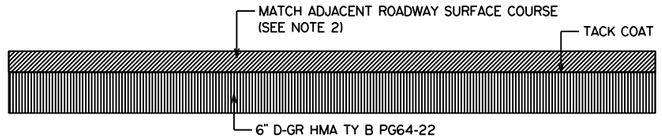
TYPICAL CONCRETE DRIVEWAY

• NOTE: STEEL SHALL BE CENTERED VERTICALLY IN CONCRETE.
PAID AS 'DRIVEWAYS CONC (HES)' OR 'DRIVEWAYS (CONC)'



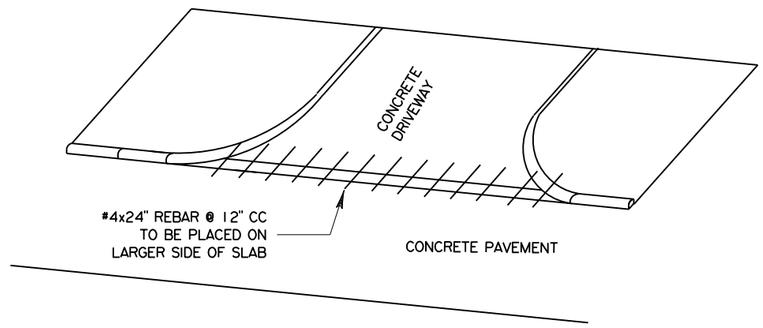
TYPICAL ROADWAY DRIVEWAY (TYPE 1)

PAID AS DRIVEWAYS ACP (TYPE 1)

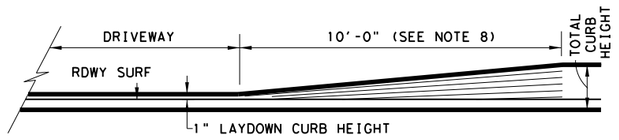


TYPICAL ROADWAY DRIVEWAY (TYPE 2)

PAID AS DRIVEWAYS ACP (TYPE 2)



TIE BAR PLACEMENT WITH CRCP



LAYDOWN CURB AT DRIVEWAYS DETAIL

NOTES:

1. USE CLASS A CONCRETE UNLESS OTHERWISE NOTED.
2. DENSE GRADED HMA MAY BE USED WHEN APPROVED BY THE ENGINEER IF THE ROADWAY SURFACE COURSE IS A PERFORMANCE MIX.
3. REFER TO PLAN SHEETS FOR GEOMETRIC DESIGN DETAILS.
4. FOR CONCRETE DRIVEWAYS, PROVIDE EXPANSION JOINT 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT.
5. FIBER REINFORCEMNT IS NOT ALLOWED.
6. MACHINE LAID HMA IS REQUIRED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OF GRADE IN ACCORDANCE WITH ITEM 247. FLEXIBLE BASE COMPRESSIVE STRENGTHS ARE WAIVED. BASE IS SUBSIDIARY TO THE ITEM.
8. WHERE SIDEWALK IS PRESENT, SLOPE AND LENGTH OF CURB TRANSITION SHOULD MATCH THE SIDEWALK AND MEET ADA REQUIREMENTS.
9. IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE THE IMPACT TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.

Texas Department of Transportation
San Antonio District

DRIVEWAY DETAILS

San Antonio District Standard
Sheet (1 of 1)

I:\engdata\Standards\Drivewaydetails.dgn	PREPARED BY AND FOR USE OF TxDoT.					
ORIGINAL DRAWING DATE: 8/1/2020	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #			SHEET
REVISIONS	TX	6				90
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	KENDALL		0142	06	029	SH27

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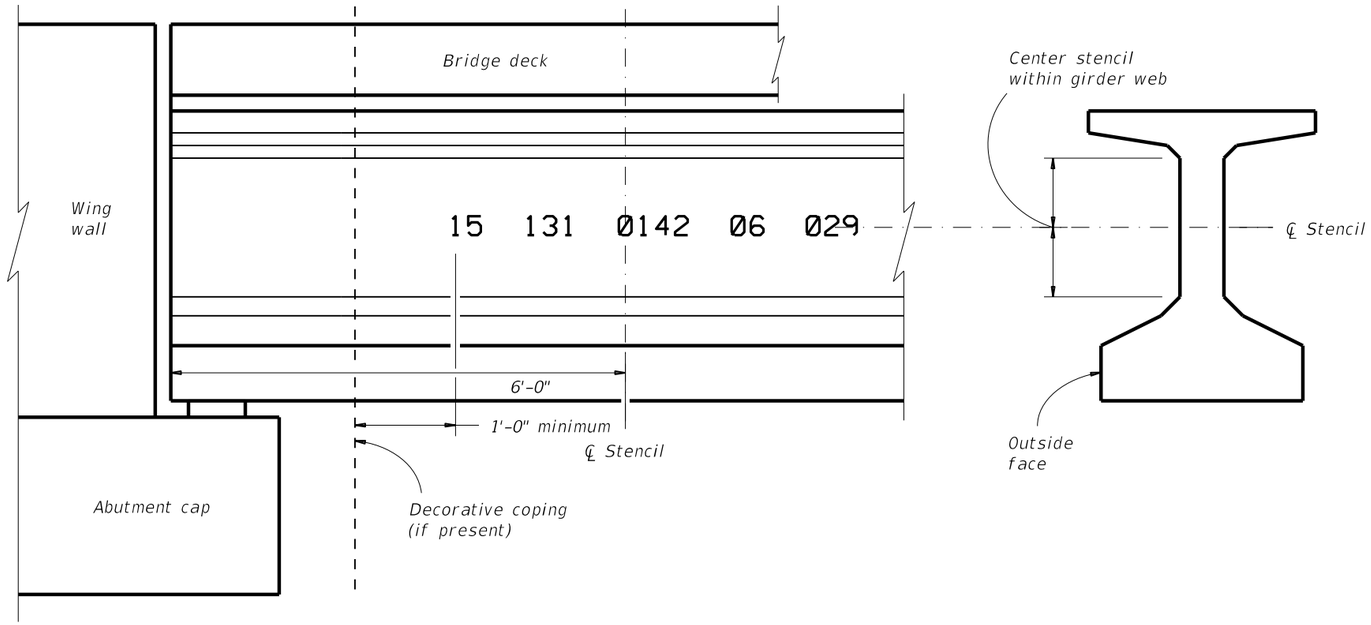
SAN ANTONIO DISTRICT COUNTY DESIGNATIONS

Atascosa 007
Bandera 010
Bexar 015
Comal 046
Frio 083
Guadalupe 095
Kendall 131
Kerr 133
McMullen 162
Medina 163
Uvalde 232
Wilson 247

15	131	0142	06	029
San Antonio District designation	County designation	Control number	Section nunber	Structure number

PAINTED STRUCTURE NUMBER DETAIL



TYPICAL BRIDGE CORNER (ELEVATION)

GENERAL NOTES:
Apply stucture number in accordance with Special Specification for Stenciling Permanent Structure Numbers.

SAN ANTONIO DISTRICT STANDARD

Texas Department of Transportation
San Antonio District (Structural Design)
Prepared by and for the use of TxDOT

BRIDGE NBI NUMBER STENCIL

DN: BCL	CK: XXX	FILENAME: 000000000 SA District Stencil.dgn		
DW: SRF	CK: XXX	ORIGINAL DRAWING DATE: August 2019		
DIST	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		COUNTY
SAT	6			KENDALL
CONTROL	SECTION	JOB	SHEET NO.	ROUTE
0142	06	029	91	SH27

REVISIONS:

DATE: 10/11/2023 12:35:21 PM
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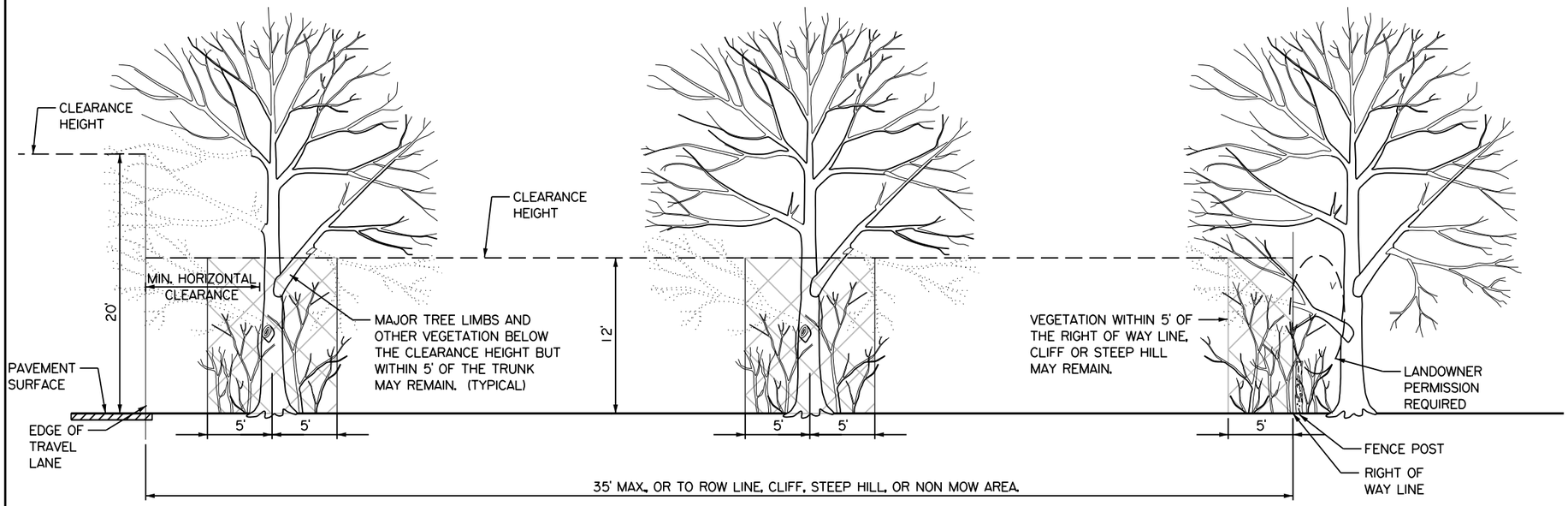
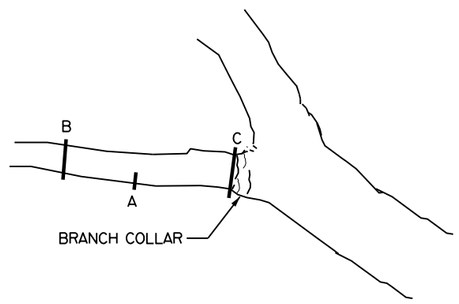


TREE PRUNING

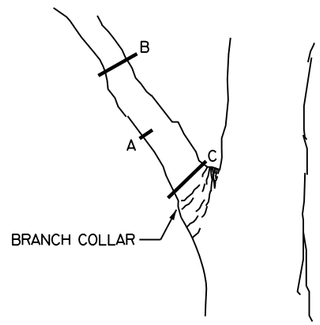
A - STEP 1
CUT 1/3 WAY THROUGH BOTTOM OF LIMB 8-12" ABOVE MAIN STEM OR TRUNK

B - STEP 2
REMOVE LIMB 4-6" BEYOND THE FIRST CUT

C - STEP 3
REMOVE STUB WITH A SMOOTH CUT JUST BEYOND THE BRANCH COLLAR OF THE REMOVED LIMB.



TREE LIMB



MAIN BRANCH

PRUNING CUTS - LIMBS 2" IN DIAMETER AND GREATER

TREE REMOVAL:

REMOVE ALL DEAD WOODY VEGETATION WITHIN THE ROW. CUT STUMPS FLUSH WITH THE GROUND.

TREE PRUNING:

THE OBJECTIVE OF TREE PRUNING IS FOR CROWN RAISING TO ALLOW CLEARANCE FOR MAINTENANCE VEHICLES.

WITH THE EXCEPTION OF WORK WITHIN OR ALONG A CHANNEL OR UNLESS OTHERWISE SHOWN ON THE PLANS, LIMIT WIDTH OF WORK TO 35' FROM THE EDGE OF THE TRAVEL LANE, OR TO ROW LINE, CLIFF, STEEP HILL, OR NON-MOW AREA, WHICHEVER IS LESS. THE ENGINEER WILL DEFINE CLIFFS, STEEP HILLS AND NON-MOW AREAS BASED ON FIELD CONDITIONS. THE ENGINEER MAY DEFINE AREAS TO RESTRICT OR INCREASE TREE PRUNING.

IF ANY TREES IN THE ROW ARE MARKED IN ANY WAY, VERIFY THE MEANING OF THE MARKINGS BEFORE BEGINNING PRUNING OPERATIONS.

WHEN PRUNING OAK TREES, DISINFECT TOOLS BEFORE MOVING FROM ONE TREE TO ANOTHER. USE 70% METHYL ALCOHOL, CHLORINE SOLUTION, OR OTHER APPROVED MATERIAL AS A DISINFECTANT.

TREAT ALL WOUNDS AND CUTS ON ALL OAK SPECIES WITH A COMMERCIAL TREE WOUND DRESSING WITHIN 20 MINUTES OF CREATING THE WOUND.

FLAILING EQUIPMENT IS NOT ALLOWED FOR THIS WORK.

REPAIR DAMAGE TO A PRIVATE FENCE OR OTHER PRIVATE PROPERTY AT CONTRACTOR EXPENSE.

PERFORM TREE PRUNING WITHIN ROW LIMITS. IF POSSIBLE, OBTAIN LANDOWNER PERMISSION AND MAKE PROPER PRUNING CUTS NECESSARY TO MAINTAIN THE HEALTH OF THE TREE.

CUT LIMBS AT A MAJOR FORK IN THE BRANCH OR, IF THE ENTIRE BRANCH IS ENCROACHING INTO THE AREA TO BE CLEARED, REMOVE THE BRANCH AT THE TRUNK.

DO NOT LEAVE A STUB BEYOND THE BRANCH COLLAR OR CUT THROUGH THE BRANCH COLLAR WHEN MAKING PRUNING CUTS. THE BRANCH COLLAR IS GENERALLY VISIBLE, BUT IF IT IS NOT, MAKE THE FINAL CUT APPROXIMATELY 1/2" FROM THE PARENT BRANCH OR TRUNK, PERPENDICULAR TO THE BRANCH OR LIMB BEING REMOVED.

THIS WORK AND ALL ASSOCIATED MATERIALS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEM 100 - PREPARING RIGHT OF WAY.

NOT TO SCALE

 Texas Department of Transportation
San Antonio District

TREE PRUNING AND REMOVAL

San Antonio District Standard

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PREPARED BY AND FOR USE OF TxDoT.

ORIGINAL DRAWING DATE: 12-18-18	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #	SHEET
REVISIONS	SAT	6		92

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
KENDALL	0142	06	029	SH27

10/11/2023

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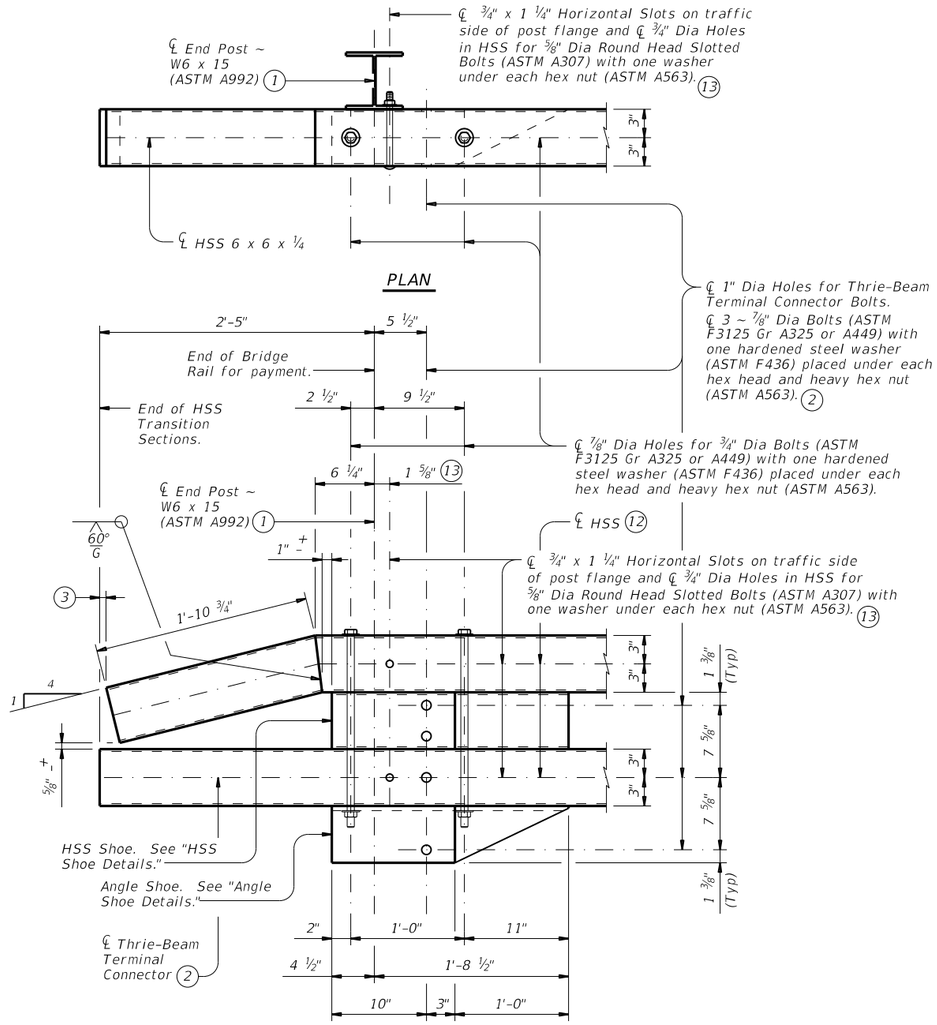

ROADWAY ELEVATION

HSS TRANSITION SECTION END DETAILS

Thrie-Beam Terminal Connector not shown for clarity.

(1) Post length = Top of rail elevation minus bottom of drilled shaft elevation.

(2) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence." Attach the appropriate Metal Beam Guard Fence Transitions or Downstream Anchor Terminal to the bridge rail using 3 bolts as shown, and extend along the embankment.

(3) Top HSS can be shorter than bottom HSS ⅝" plus or minus.

(12) HSS 6 x 6 x ¼ (ASTM A1085 or A500 Gr C).

(13) May be placed on either side of W6 x 15 web.

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

Provide Type VIII epoxy mortar under post base plates if gaps larger than 1⁄16" exist.

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

Round or chamfer exposed edges of HSS rail, rail post and plate to approximately 1⁄16" by grinding.

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.

Submit erection drawings showing panel lengths, splice locations, post placement, anchor bolt locations and adhesive anchor test data to demonstrate pullout strength to the Engineer for approval. Shop drawings are not required.

MATERIAL NOTES:

Galvanize all metal components of steel rail system.

Provide Grade 60 reinforcing steel.

Provide Class "C" concrete. As an alternate, provide Class "K" concrete, or a Type A-2 or Type C concrete repair material per DMS-4655 "Concrete Repair Materials." Do not use Type "B" (Ultra-Rapid) concrete repair materials.

Anchor bolts must be ¾" Dia ASTM A193 Gr B7 or ASTM A449 fully threaded rods with one heavy hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into concrete curb using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 6 ¾". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 30 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

GENERAL NOTES:

This retrofit railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This retrofit railing 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.

Rail anchorage details shown on this guide may require modification for select structure types.

See "Section A-A" for limits on existing overlay/seal coats thickness based on existing curb height.

This rail is to be paid for as "Retrofit Rail (Ty T131RC)" under Item 451 "Retrofit Railing."

Average weight with no overlay: 55 plf (9", 11" & 12" Curbs)
53 plf (18" Curbs)

Cover dimensions are clear dimensions, unless noted otherwise.

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Bridge Division Standard

RETROFIT GUIDE FOR T131RC RAIL ON CURBS

TYPE T131RC (MOD)

FILE: RL-T131RC-19 (MOD).dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: MAS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		93

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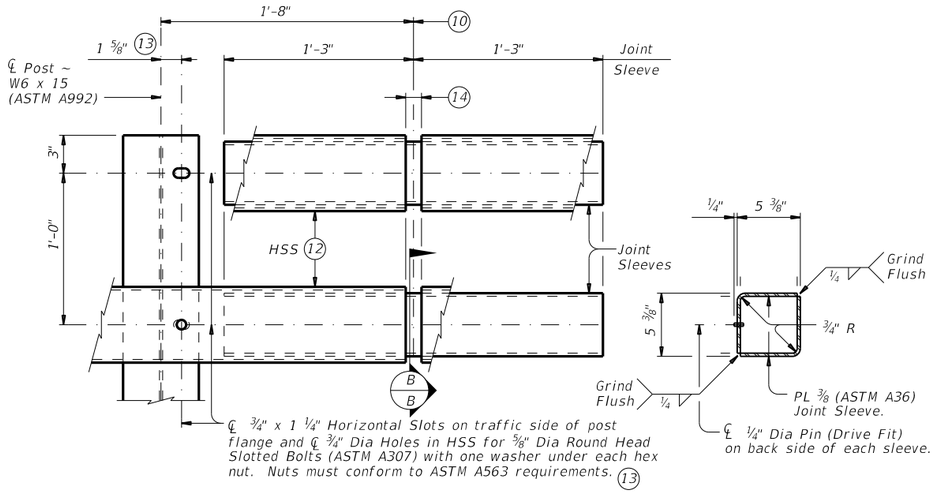


TYPICAL POST CONNECTION AND SPLICE DETAIL FOR HSS

Showing post with HSS and HSS splice.

SECTION B-B

Showing typical joint sleeve.

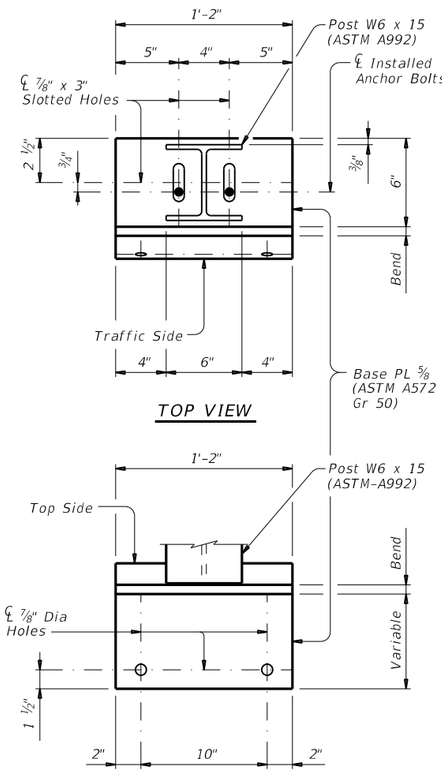
(6) Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.

(10) ℄ HSS Expansion Joint or ℄ HSS Splice Joint as required.

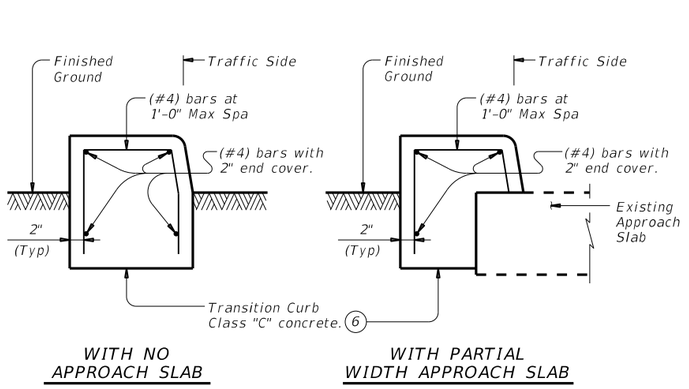
(12) HSS 6 x 6 x 1/4 (ASTM A1085 or A500 Gr C).

(13) May be placed on either side of W6 x 15 web.

(14) Place HSS Expansion Joints in rail at every slab Expansion Joint. For Expansion and Splice Joints openings, use the greater of 1" or (slab opening plus 1/2").



BASE PLATE DETAILS



(#4) anchor bars spaced longitudinally along new curb at 1'-6" Max (Spaced 3" longitudinally from outside edge). Embed (#4) anchor bars with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment is 5". Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

EXAMPLES OF TRANSITION CURB SECTIONS

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Bridge Division Standard

RETROFIT GUIDE FOR T131RC RAIL ON CURBS

TYPE T131RC (MOD)

FILE: RL-T131RC-19 (MOD).dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: MAS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		94

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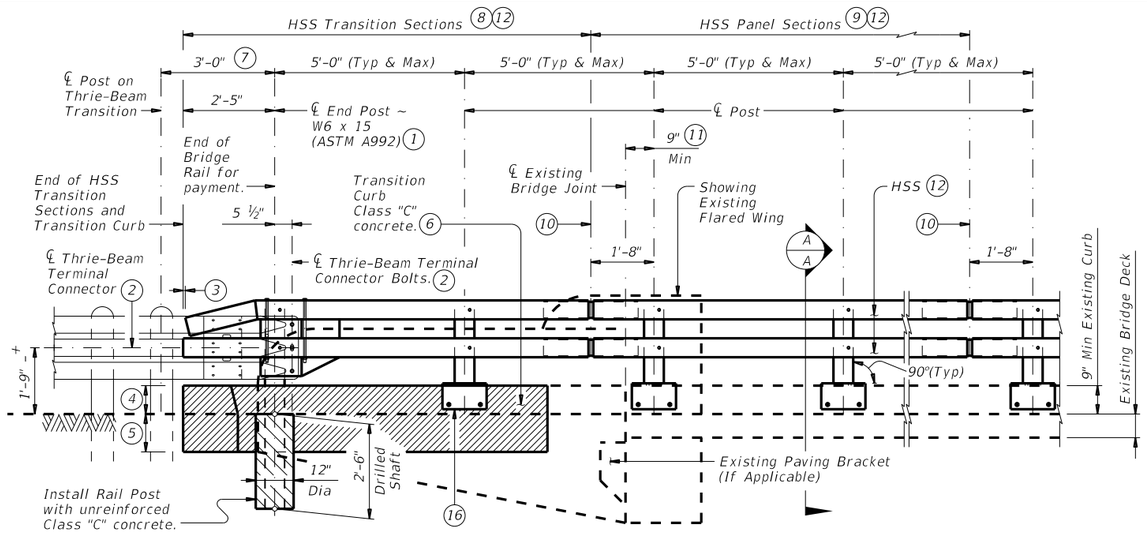
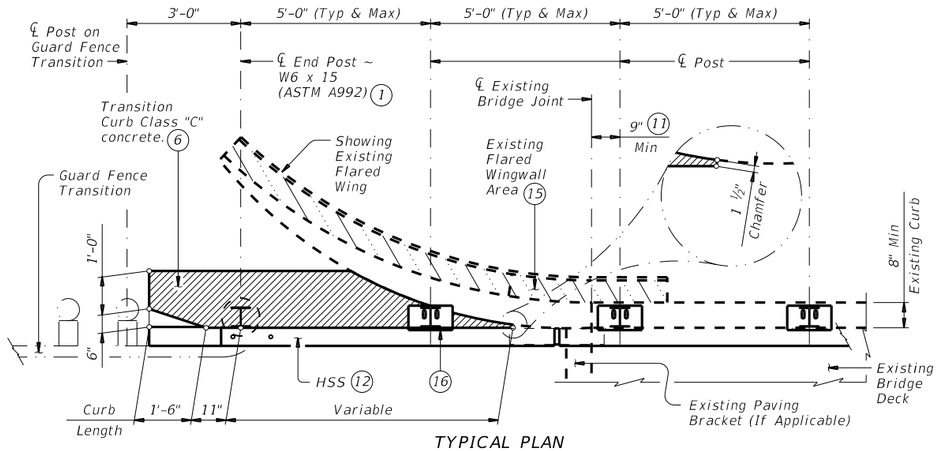


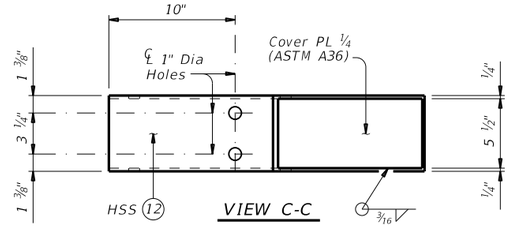
TYPICAL ROADWAY ELEVATION

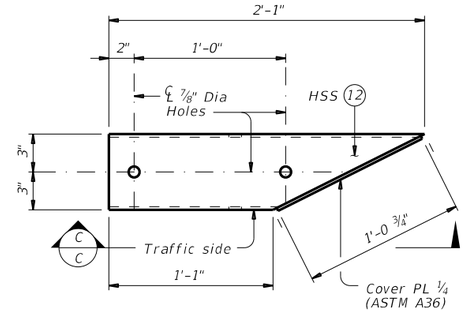


TYPICAL PLAN

EXAMPLE "C" RETROFIT WITH FLARED WING

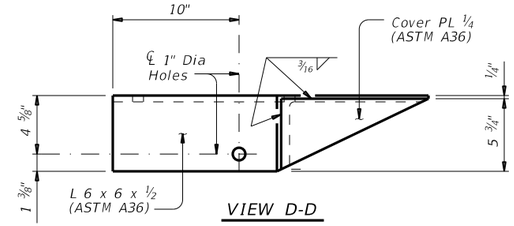
(Showing 9" high and 8" wide curbs, higher and wider curbs similar)

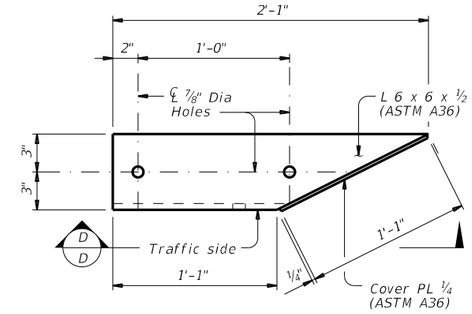




TOP VIEW

HSS SHOE DETAILS





TOP VIEW

ANGLE SHOE DETAILS

Angle Shoe shown is detailed for one side only, other side similar. For other side shoe must be built for opposite hand.

(1) Post length = Top of rail elevation minus bottom of drilled shaft elevation.

(2) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence." The appropriate Metal Beam Guard Fence Transitions or Downstream Anchor Terminal must be attached to the bridge rail and extended along the embankment.

(3) Top HSS can be shorter than bottom HSS ⅝" plus or minus.

(4) Match existing bridge curb height.

(5) Cast transition curb 1'-0" into soil or top of concrete approach slab. Remove any asphaltic concrete or mow strip if present.

(6) Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.

(7) Showing first post for a TL-3 rated guard fence transition. First post for a TL-2 rated guard fence transition or a guard fence downstream anchor terminal is 4'-4 ¾".

(8) HSS Transition Sections must have one soil mounted end post embedded in an unreinforced, Class "C" concrete drilled shaft as shown, and a minimum of one curb mounted post per transition section.

(9) HSS Panel Sections must have a minimum of three posts and a maximum of eight posts per panel section.

(10) ℄ HSS Expansion Joint or ℄ HSS Splice Joint as required.

(11) Use 9" minimum for both expansion joints and construction/controlled joints.

(12) HSS 6 x 6 x ¼ (ASTM A1085 or A500 Gr C).

(15) Remove all existing structure area from top of existing curb. Cut and grind flush all existing reinforcing extending from top of existing curb and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing."

(16) When post is mounted to the transition curb on flared wings as shown, transition curb must be supported laterally by the existing wingwall/curb.

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Bridge Division Standard

RETROFIT GUIDE FOR T131RC RAIL ON CURBS

TYPE T131RC (MOD)

FILE: RL-T131RC-19 (MOD).dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: MAS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		95

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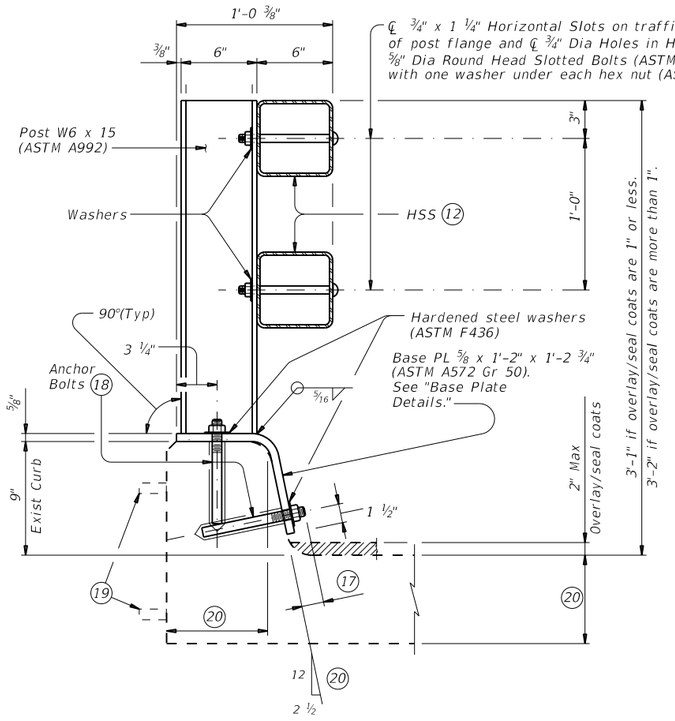
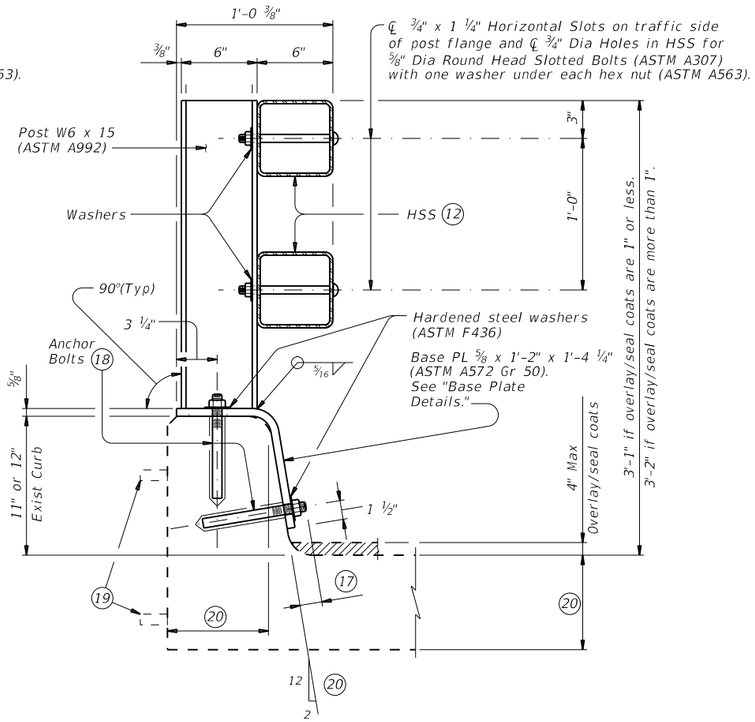


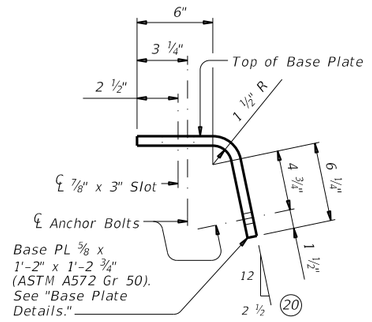
SECTION A-A OF 9" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)

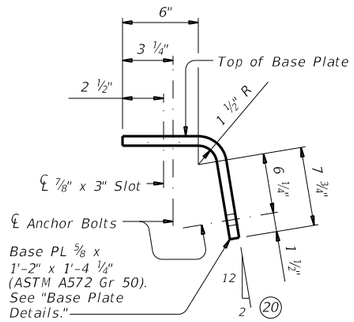


SECTION A-A OF 11" & 12" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)



9" HIGH CURB BASE PLATE DETAIL



11" & 12" HIGH CURB BASE PLATE DETAIL

(12) HSS 6 x 6 x 1/4 (ASTM A1085 or A500 Gr C).

(17) 1 3/4" Bolt Projection (Typ).

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

(19) Remove existing railing (including posts), cut and grind anchor bolts flush and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing."

(20) See elsewhere in plans for dimensions (curb width and height, slab and overlay thickness). Slope of curb may differ from what is shown. Adjust base plate as necessary to conform to curb face geometry.

10/11/2023

SHEET 4 OF 4

Texas Department of Transportation

Bridge Division Standard

RETROFIT GUIDE FOR T131RC RAIL ON CURBS

TYPE T131RC (MOD)

FILE: RL-T131RC-19 (MOD).dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: MAS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
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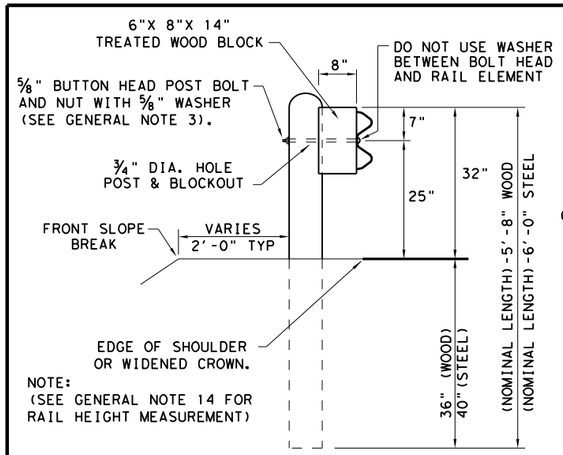
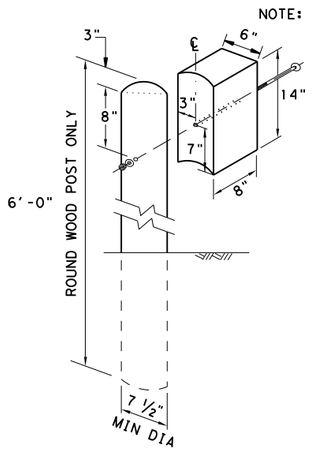
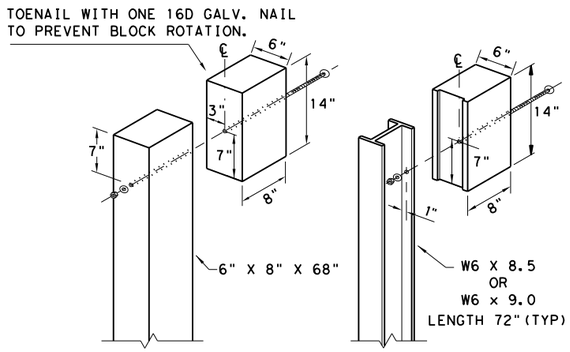


TYPICAL POST PLACEMENT



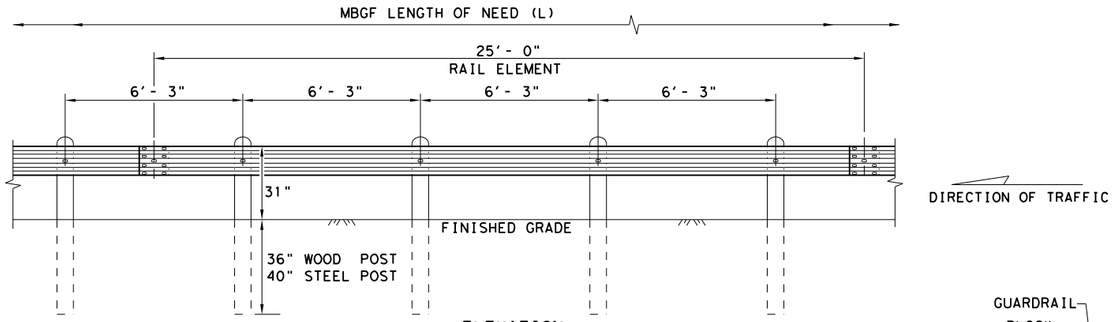
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

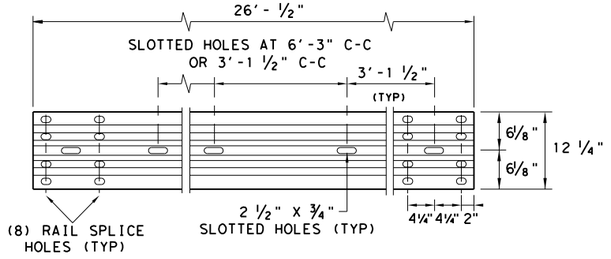
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



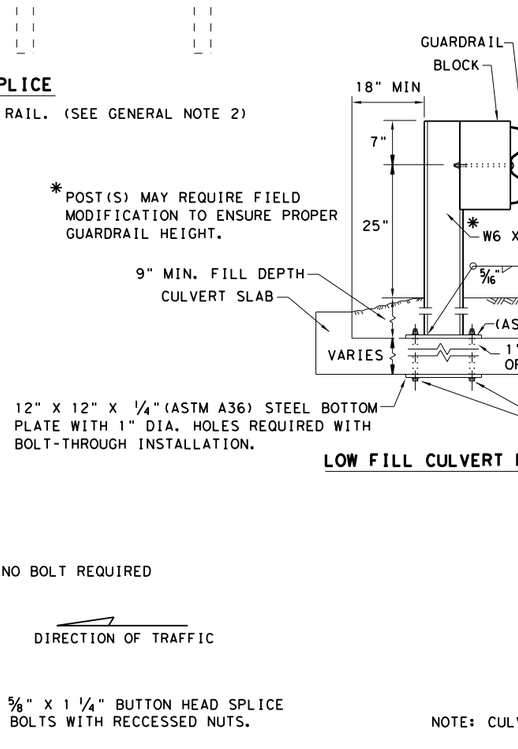
ELEVATION
MID-SPAN RAIL SPLICE

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.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" 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 ¼" MIN. BEYOND NUT.

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

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

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

SPLICE BOLT LENGTH — VARIES

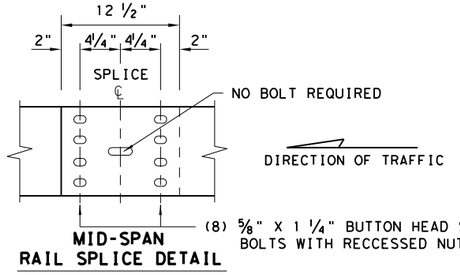
FBB01 = 1 ¼"
FBB02 = 2"

⅝"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

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.

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 ½" 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 ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

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

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	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		97

DATE: 10/11/2023
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BREAKAWAY CABLE TERMINAL (BCT) CABLE ANCHOR ASSEMBLY WITH CABLE BRACKET, BEARING PLATE AND STANDARD HARDWARE.

C3 X 5 X 80" (3) GROUND STRUTS

7 ¼" x 5 ¼" x 46" (2) DAT TERMINAL POST

NON-SYMMETRICAL TRANSITION RAIL SECTION (SEE APPLICABLE TRANSITION STANDARD)

(11) (15) (17)

(5) SHELF ANGLE BRACKET (SEE NOTE 2)

(8) (14) (17) (11)

PLAN VIEW

END PAYMENT FOR DAT SYSTEM (EA.)

BEGIN PAYMENT FOR METAL BEAM GUARD FENCE (SEE GF(31)STANDARD)

DIRECTION OF TRAFFIC

(4) 9'- 4 ½" Rail Section (SEE GENERAL NOTE 2)

12'-6" (Min.) MBGF

PAYMENT FOR NON-SYMMETRICAL TRANSITION RAIL (EA)

(9) (ROUNDED) W-BEAM END SECTION

6'- 3" | 3'-1 ½" | 3'-1 ½" | BEGIN LENGTH OF NEED (LON)

(11) (12)

(7) BCT POST SLEEVE 2" x 5 ½" (SCH 40 GALV. PIPE)

(11) (13) (17)

31"

*

(11) (16) (17)

To properly install and maintain the anchor system, a 3 ¼"(±) ½" tube projection is required above the finished grade.

FINISHED GRADE

FINISHED GRADE

* 68 ¼" (MIN.) TUBE EMBEDMENT

(10) (8)

BCT CABLE ANCHOR AND ANCHOR BRACKET WITH HARDWARE

(1) STEEL FOUNDATION TUBES WITH HARDWARE (1)

ELEVATION VIEW

(SEE NOTE 1)

DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

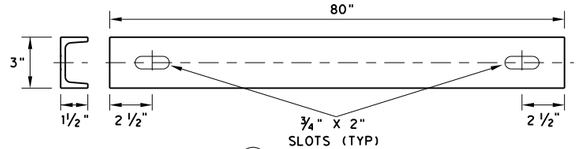
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 ¾" 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

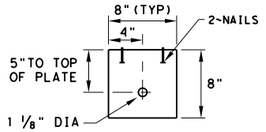
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(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 ¼" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	⅝" X 2" HEX HEAD BOLT	8
(15)	⅝" X 8" HEX HEAD BOLT	4
(16)	⅝" X 10" HEX HEAD BOLT	2
(17)	⅝" FLAT WASHER	18

(4) TERMINAL RAIL ELEMENT FOR DAT

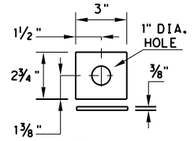


(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36

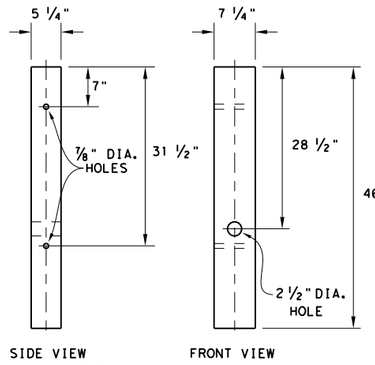


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

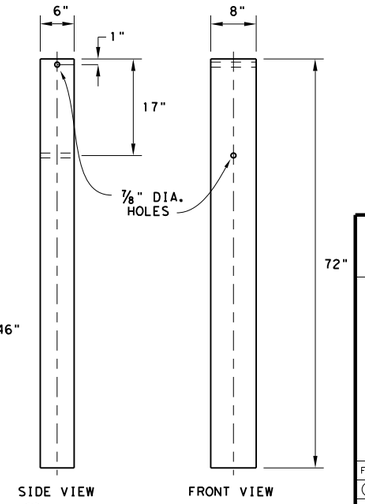
(6) BEARING PLATE
8"x 8"x ⅝" R



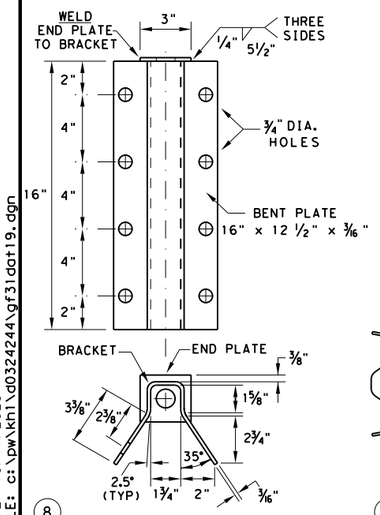
END PLATE



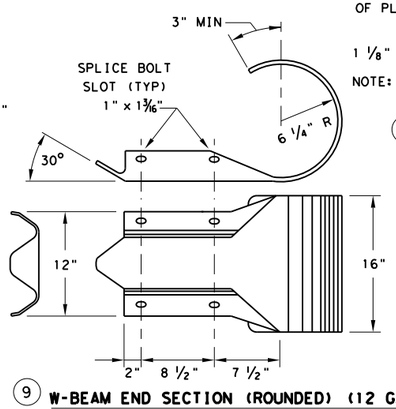
(2) TERMINAL POST
7 ¼"x 5 ¼"x 46" WOOD POST



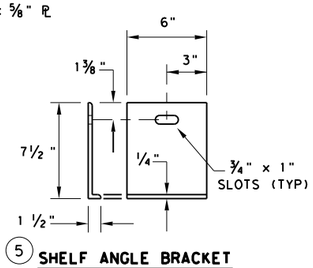
(1) STEEL FOUNDATION TUBE
6"x 8"x ⅛" x 72" STEEL TUBE



(8) GUARDRAIL ANCHOR BRACKET



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



(5) SHELF ANGLE BRACKET

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 REVISIONS	CONT	SECT	JOB	HIGHWAY
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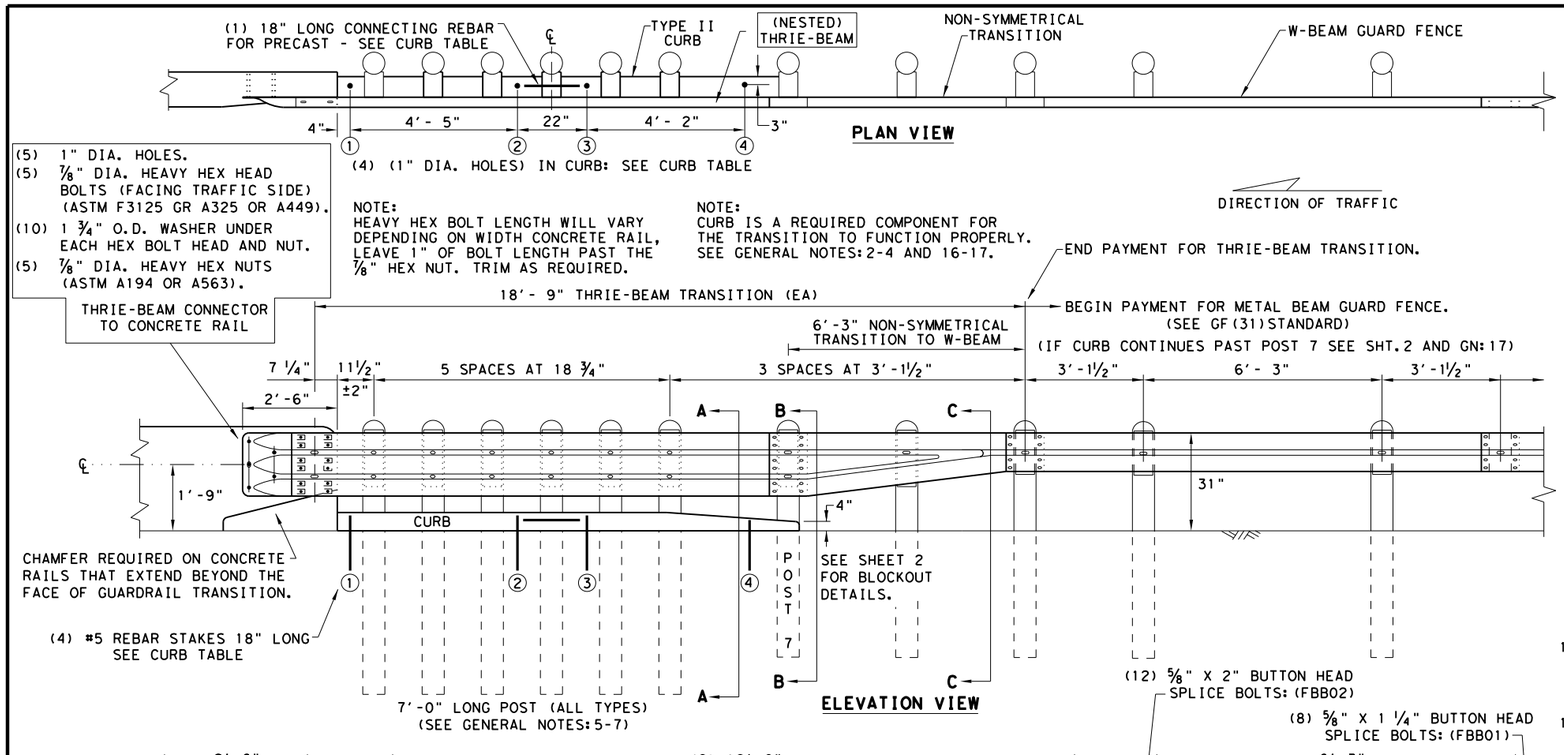
	SAT	KENDALL		98



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 (FWC16g) 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.

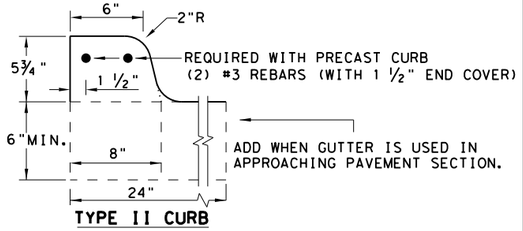
THRIE-BEAM TERMINAL - CURB TABLE

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.



TYPE II CURB

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

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

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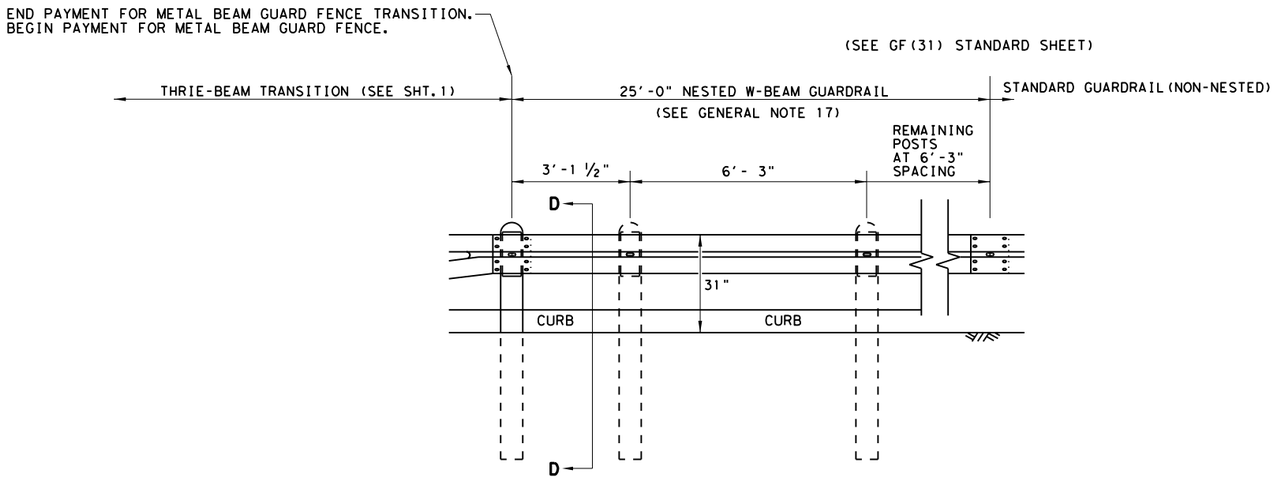
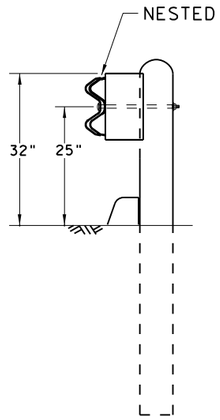
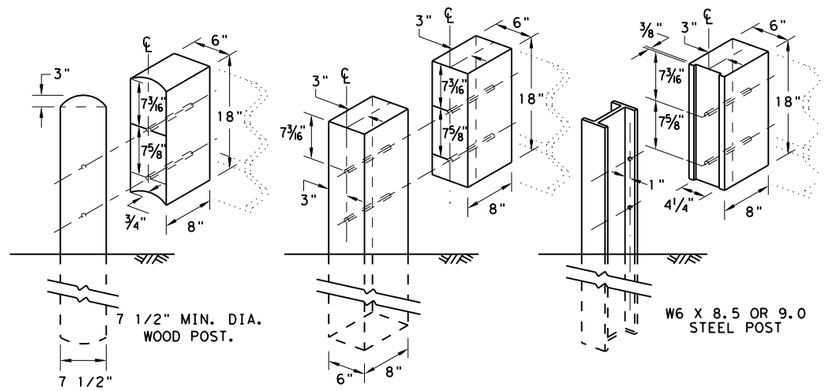
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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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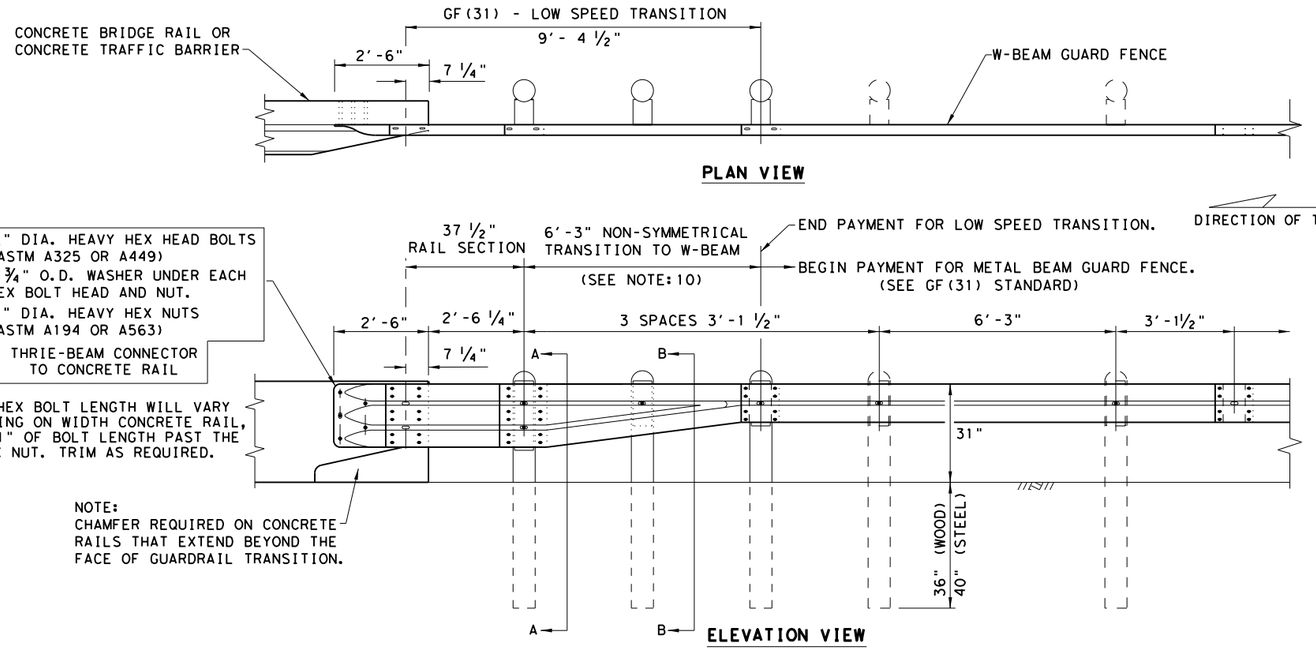

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
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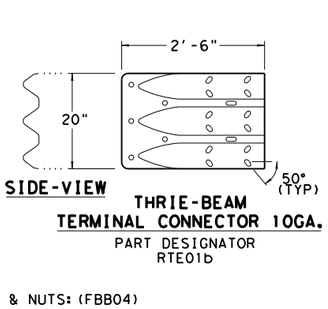
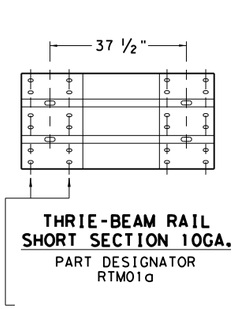
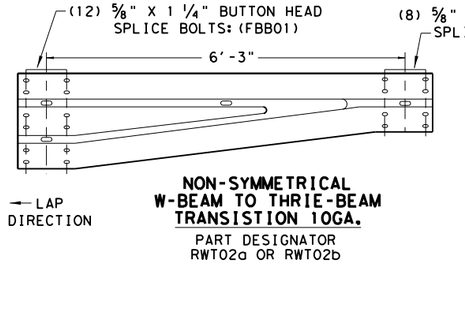
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE TRANSITION.







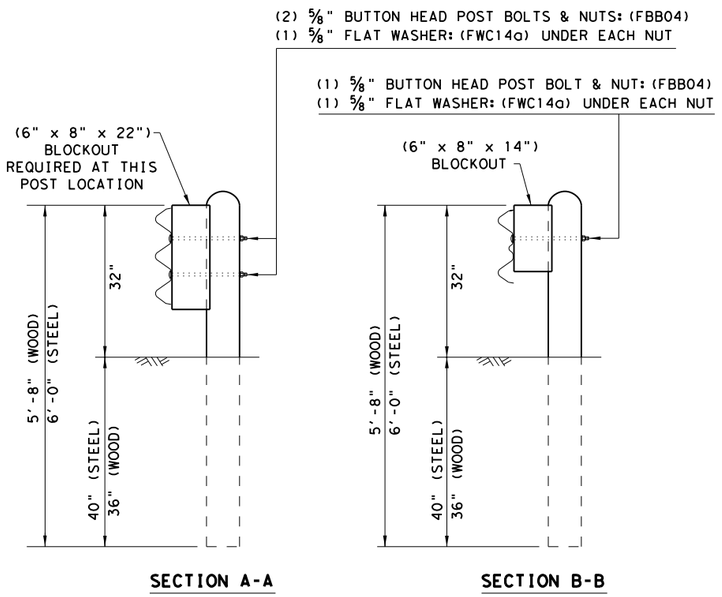
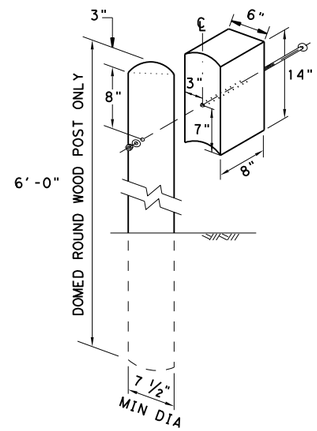
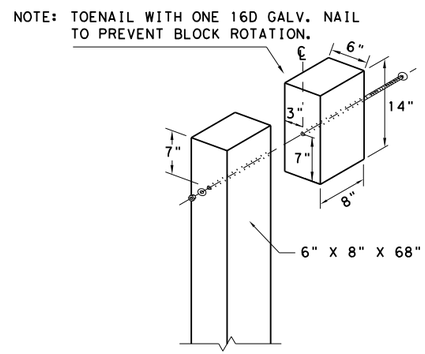
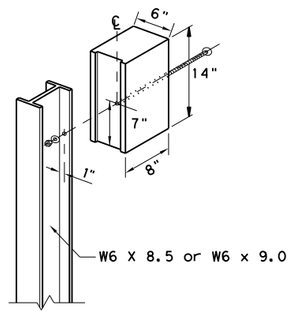


PLATE WASHER INSTRUCTIONS

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







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

LOW-SPEED TRANSITION

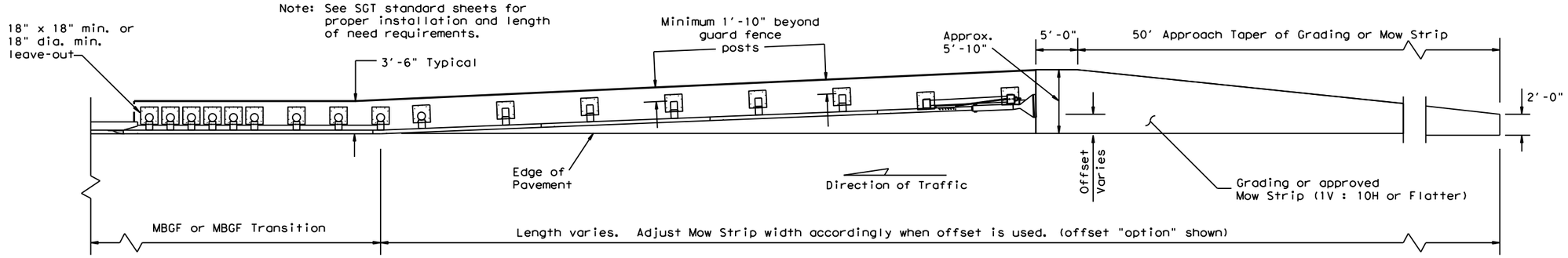
Texas Department of Transportation — Design Division Standard

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

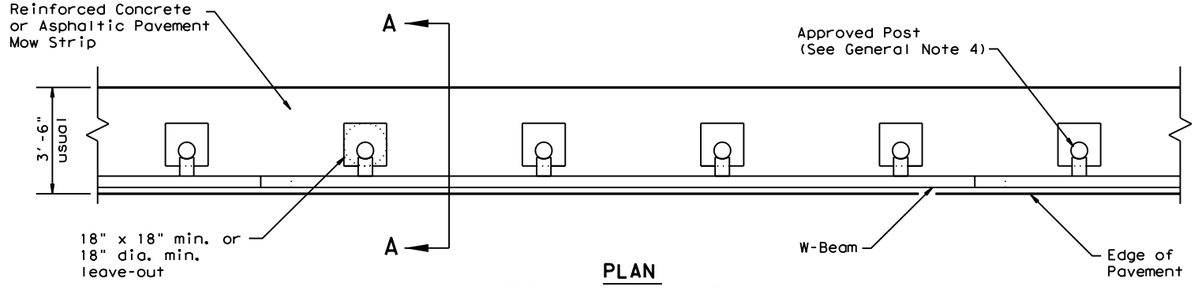
GF(31)TR TL2-19

FILE: gf31trtl219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		101

DATE: 10/11/2023
FILE: c:\pw\kni\d0324244\gf31ms19.dgn

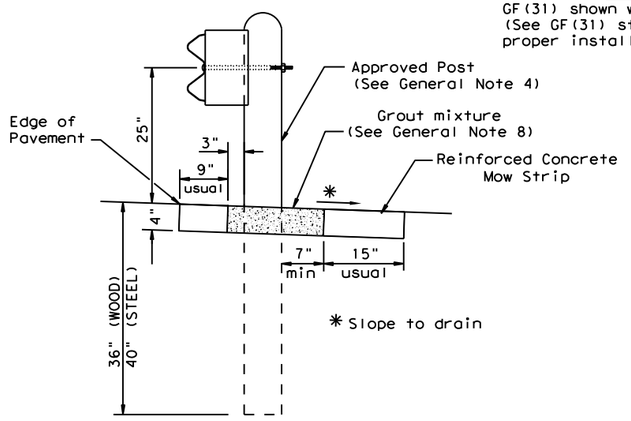


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

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

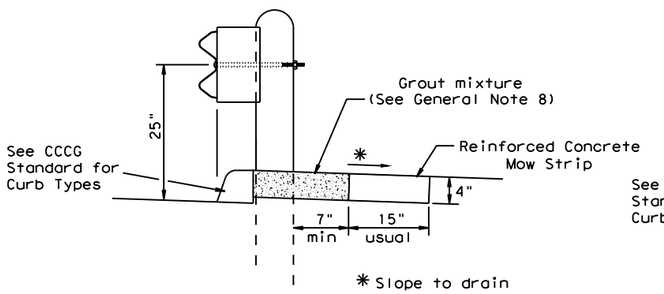


SECTION A-A

Typical

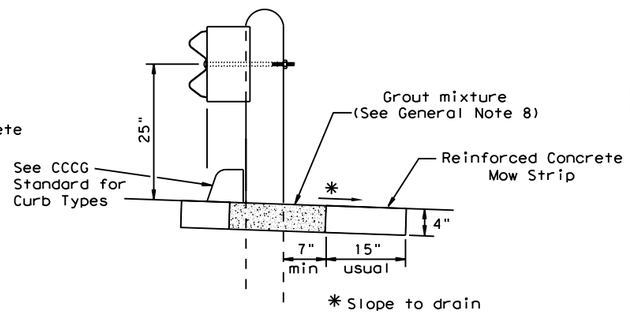
MOW STRIP DETAIL

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



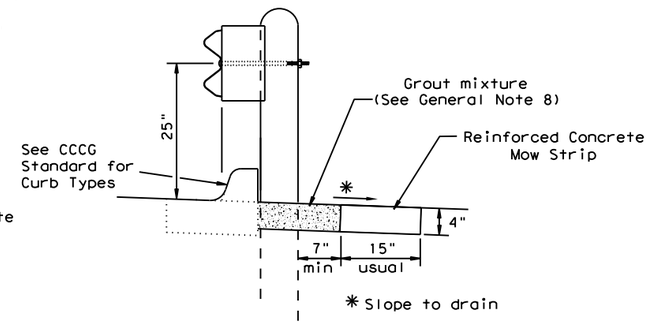
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

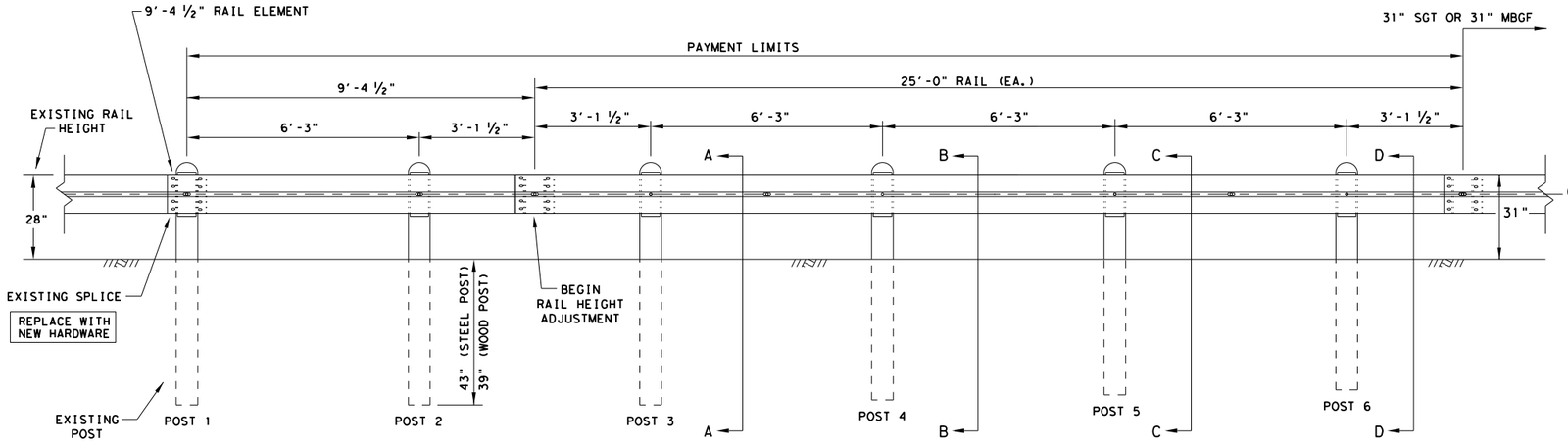
Texas Department of Transportation

Design Division Standard

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

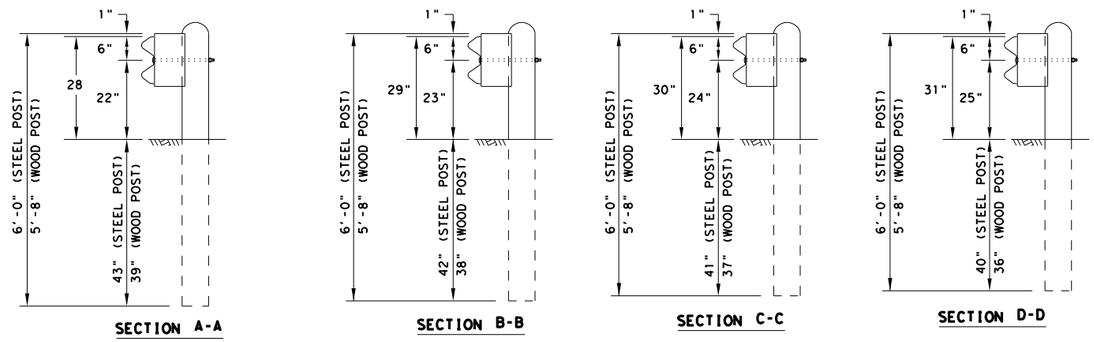
GF(31)MS-19

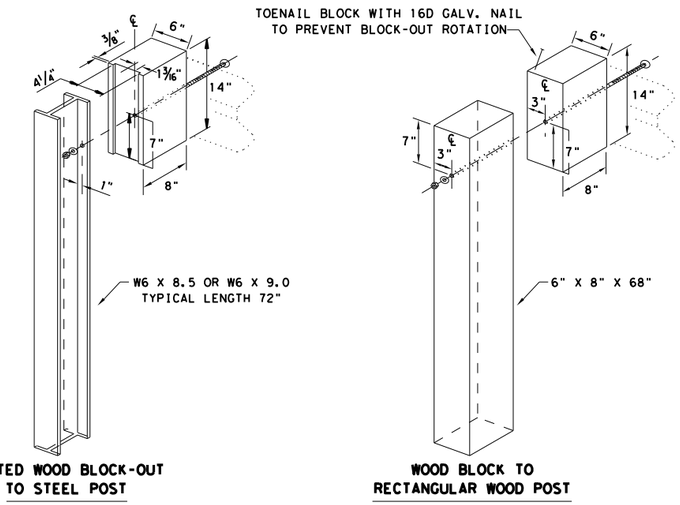
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		102



ELEVATION VIEW

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





POST AND BLOCK-OUT TYPES AVAILABLE

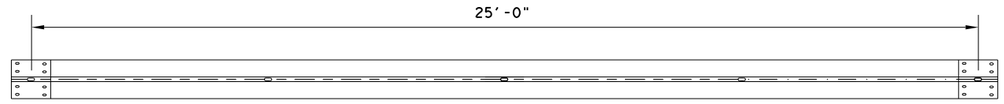
	QTY	DESCRIPTION
	1	9'-4 ½" W-BEAM RAIL ELEMENT 12GA.
	1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
	6	7 ½" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
	6	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
	6	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
	6	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
FOR WOOD POST	6	⅝" X 18" GUARDRAIL BOLTS WITH NUTS (FBB04)
	6	⅝" ROUND WASHERS (ASTM F436) (FWC16a)
FOR STEEL POST	6	⅝" X 10" GUARDRAIL BOLTS WITH NUTS (FBB03)
	24	⅝" X 1- ¼" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

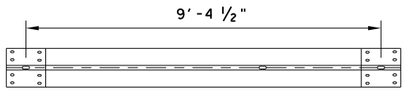
GUARDRAIL POST BOLTS (ASTM A307 GR.A)
GUARDRAIL ROUND WASHERS (ASTM F436)
GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
GUARDRAIL SPLICE NUTS (ASTM A563)

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 AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT 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 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND ⅝" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE ⅝" X 1-¼" WITH ⅝" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. 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.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.



25'-0" (NOM.) W-BEAM RAIL ELEMENT



9'-4 ½" (NOM.) W-BEAM RAIL ELEMENT

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT

RAIL-ADJ(A)-19

FILE: railadja19	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
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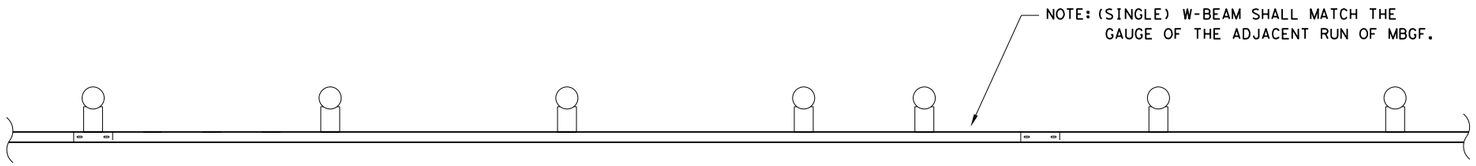
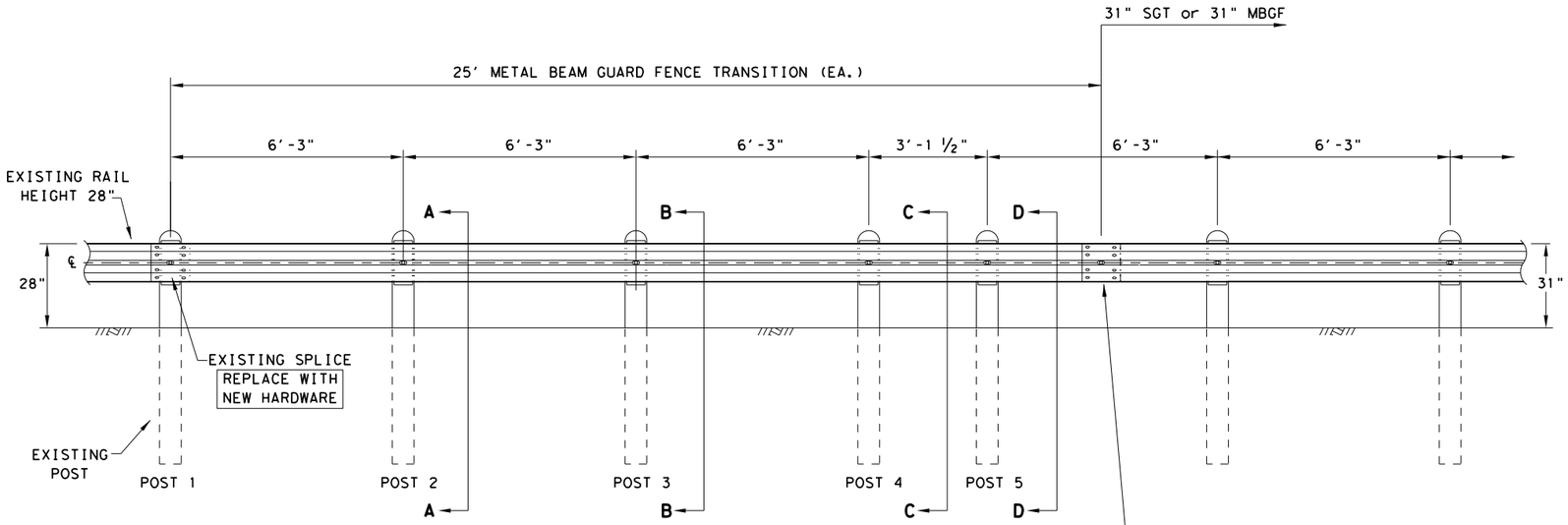
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		103

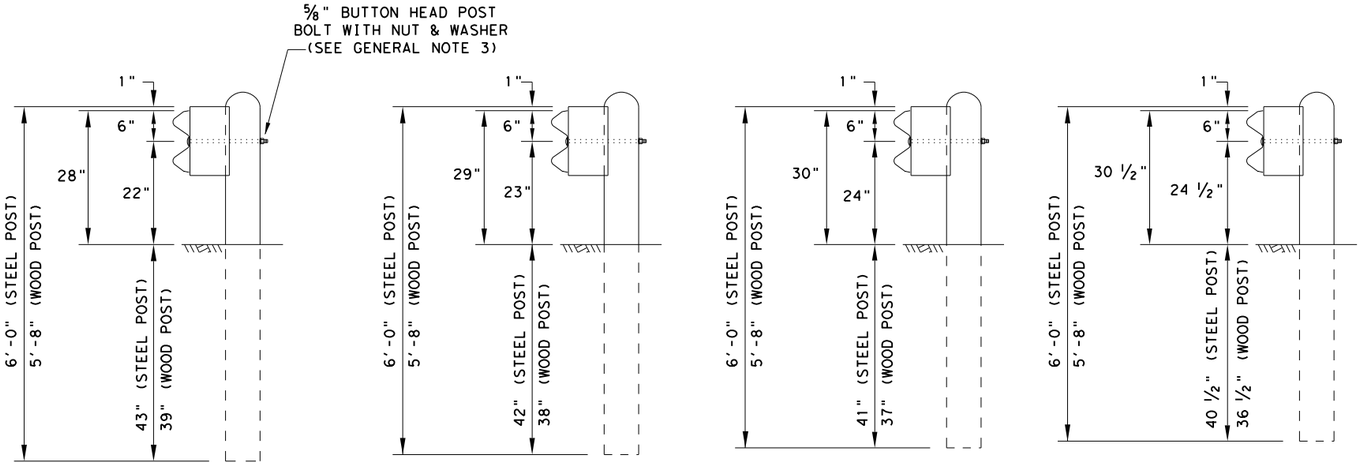


PLAN VIEW



ELEVATION VIEW

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



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 AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT 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 TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1- 1/4" WITH 5/8" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. 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.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.

POST AND BLOCK-OUT TYPES AVAILABLE

HARDWARE LIST	
QTY	DESCRIPTION
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
5	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
5	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
5	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
5	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
FOR WOOD POST 5	5/8" X 18" GUARDRAIL BOLTS AND NUTS (FBB04)
5	5/8" ROUND WASHERS (ASTM F436) (FWC16a)
FOR STEEL POST 5	5/8" X 10" GUARDRAIL BOLTS AND NUTS (FBB03)
16	5/8" X 1- 1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

GUARDRAIL POST BOLTS (ASTM A307 GR.A)
GUARDRAIL ROUND WASHERS (ASTM F436)
GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
GUARDRAIL SPLICE NUTS (ASTM A563)

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT

RAIL-ADJ(B)-19

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©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
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	SAT	KENDALL		104

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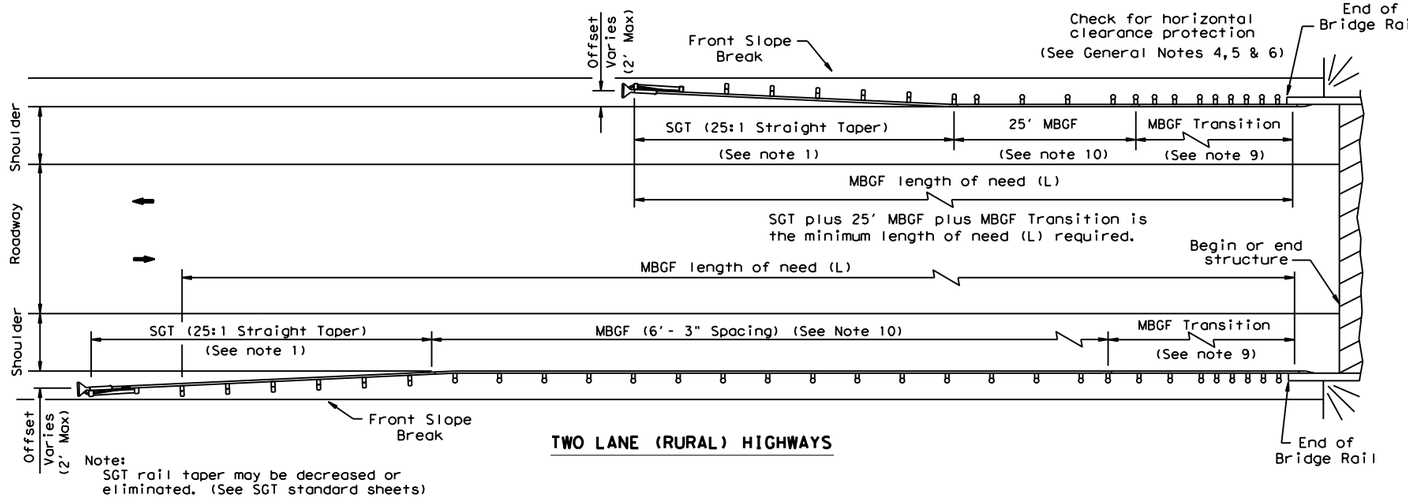
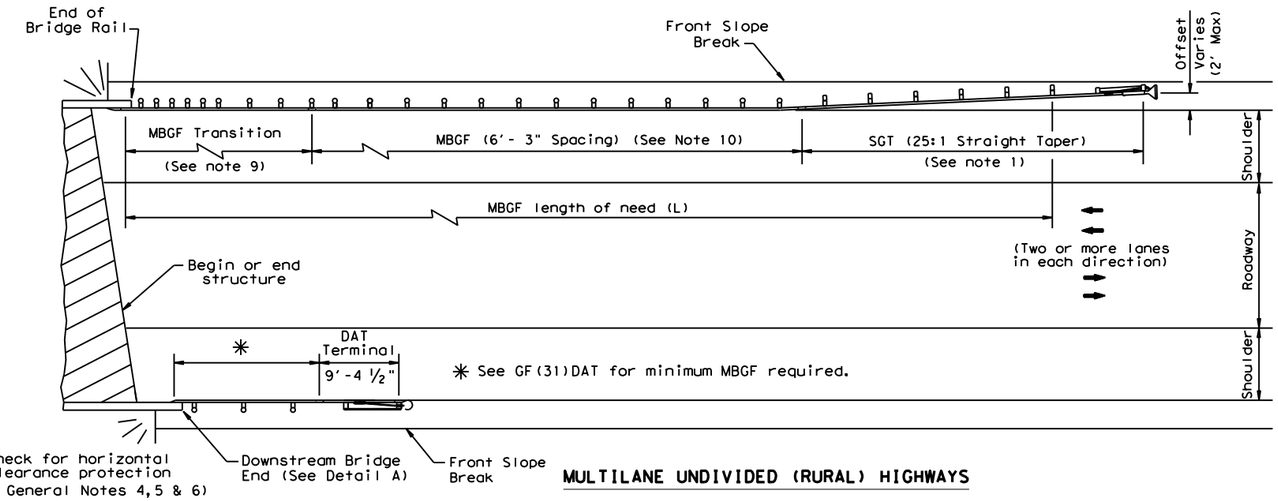
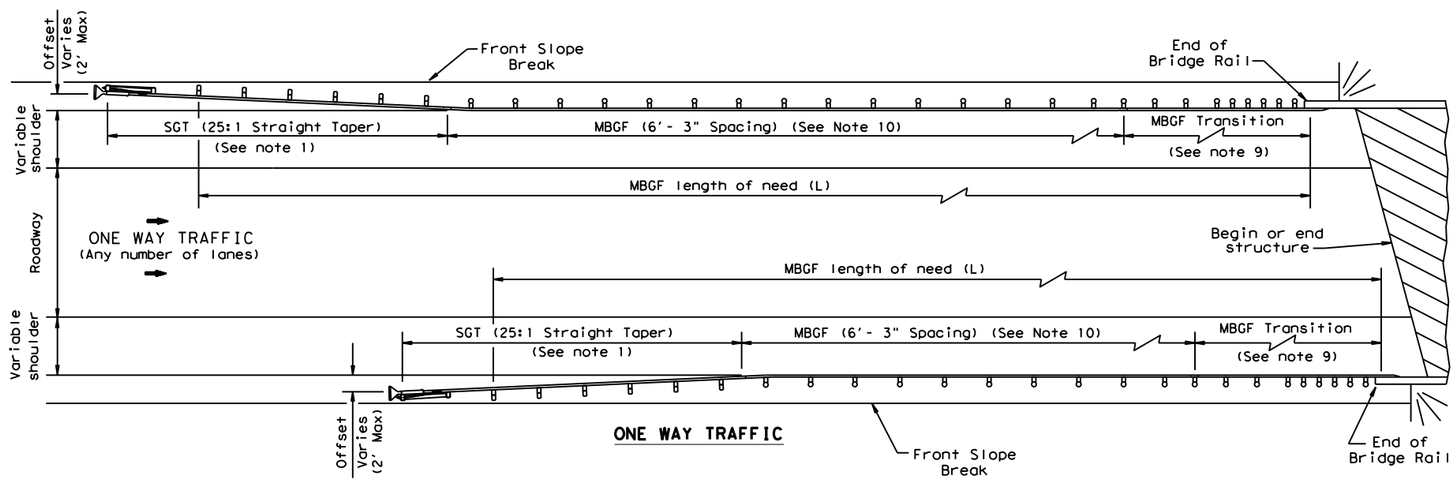


TWO LANE (RURAL) HIGHWAYS

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



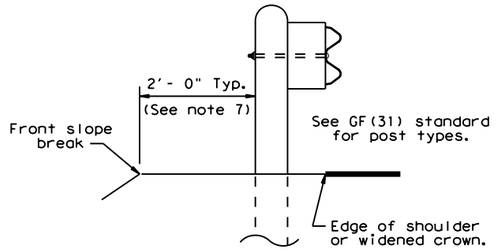
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



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. <u>For restrictive bridge widths:</u> The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft."maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF

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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
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	SAT	KENDALL		105

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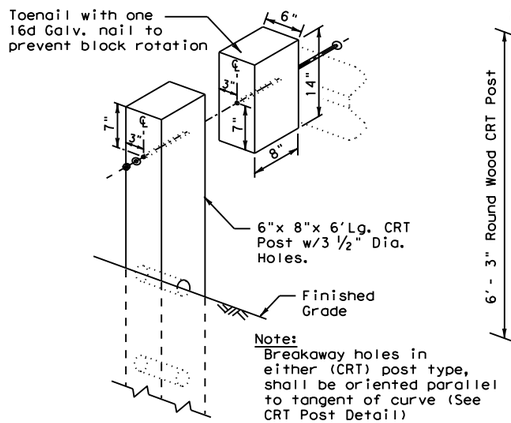
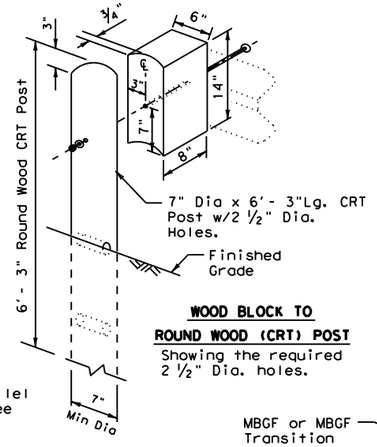


Note: Breakaway holes in either (CRT) post type, shall be oriented parallel to tangent of curve (See CRT Post Detail)

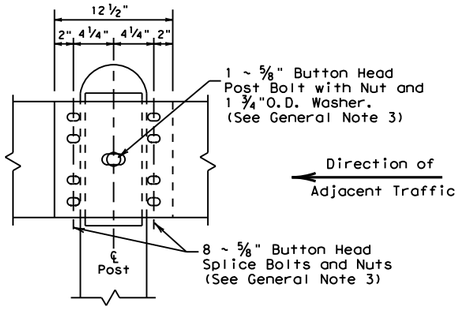
WOOD BLOCK TO RECTANGULAR WOOD (CRT) POST

Showing the required 3 ½" Dia. holes.

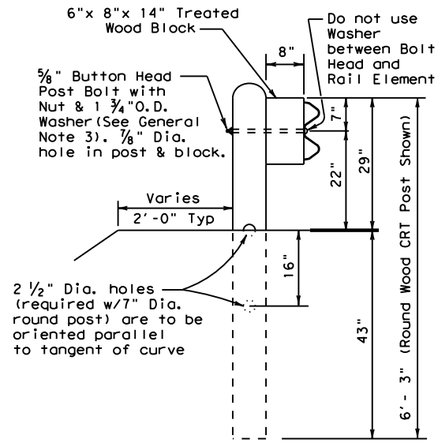


WOOD BLOCK TO ROUND WOOD (CRT) POST

Showing the required 2 ½" Dia. holes.

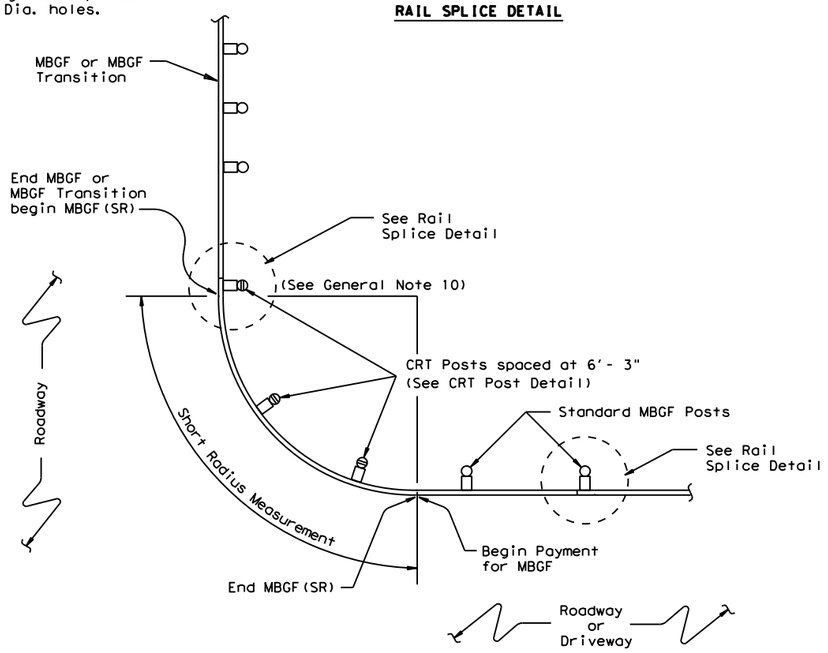


RAIL SPLICE DETAIL



(CRT) POST DETAIL
CONTROLLED RELEASE TERMINAL POST

Two or more wood CRT post(s) are required at any radius installation located at intersecting roadways or driveways.



PLAN VIEW
SHOWING TYPICAL RADIUS

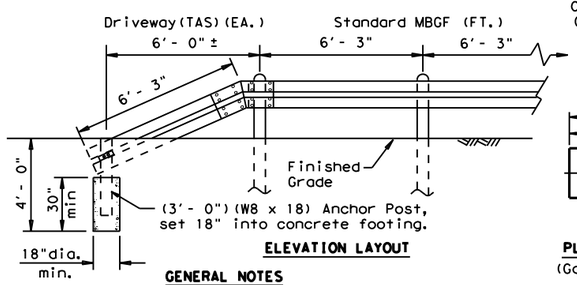
The required radius is shown elsewhere on the plans.

GENERAL NOTES

1. The type of (CRT) post (round wood post, or rectangular wood post) will be shown elsewhere in the plans. The exact position of MBGF shall be shown elsewhere in the plans or as directed by the Engineer.
2. Steel posts are not permitted at CRT post positions.
3. Rail element shall meet the requirements of Item 540,"Metal Beam Guard Fence" except as modified on the plans. The Contractor may furnish rail elements of 12 ½ or 25 foot nominal lengths.
4. Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 ¾" O.D.)washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are ⅝" x 1 ¼" (or 2" long at triple rail splices) with a ⅝" double recessed nut (ASTM A563).
5. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
6. Crown shall be widened to accommodate the Metal Beam Guard Fence.
7. The lateral approach to the guard fence, shall have a slope rate of not more than 1V:10H.
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 block. Rail placed over curbs shall be installed so that the post bolt is located approximately 21 inches above the gutter pan or roadway surface.
9. If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, 24" into the rock, or drill two 12" dia. front to back overlapping holes, 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 is less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
10. Guardrail posts shall not be set in concrete, of any depth.
11. Special rail fabrication will be required at installations having a curvature of less than 150 ft. radius. The required radius shall be shown on the plans.
12. The terminal anchor section (TAS) post shall be set in Class A concrete (unless otherwise shown in the plans) in accordance with Item 421,"Hydraulic Cement Concrete." Concrete shall be subsidiary to the bid item requiring construction of the terminal anchor section (TAS). Terminal anchor post to be galvanized in accordance with Item 445, "Galvanizing."
13. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210,"Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL can furnish composite material posts and/or blocks.

"DRIVEWAY" TERMINAL ANCHOR SECTION

Only for use within driveway locations, where a standard (TAS) Terminal Anchor Section can not be installed.



ELEVATION LAYOUT

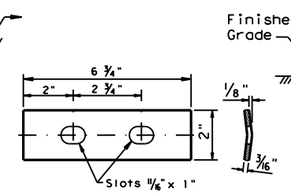
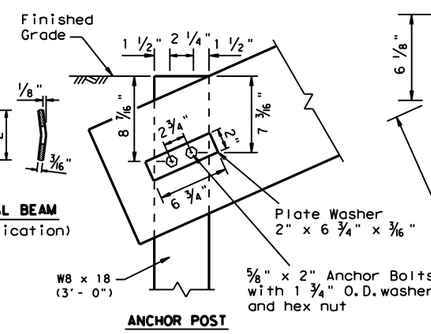
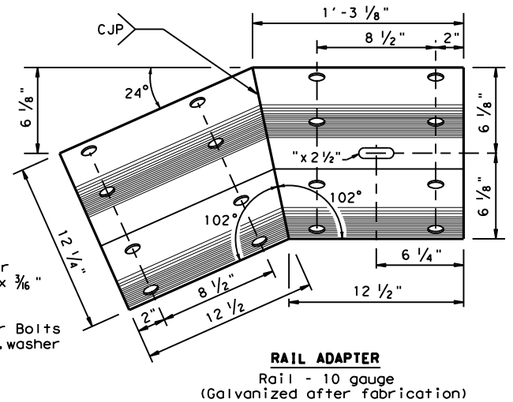


PLATE WASHER FOR METAL BEAM
(Galvanized after fabrication)



ANCHOR POST



RAIL ADAPTER
Rail - 10 gauge
(Galvanized after fabrication)

GENERAL NOTES

1. The "Driveway" Terminal Anchor Section is ONLY to be used within driveway locations, where the ROW is limited and a standard 25 ft.(TAS)Terminal Anchor Section,is too long.
2. Terminal anchor post shall be set in Class A concrete.
3. All steel shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."

ONLY FOR USE IN MAINTENANCE REPAIRS OR HIGHLY CONSTRAINED SITE CONDITIONS.

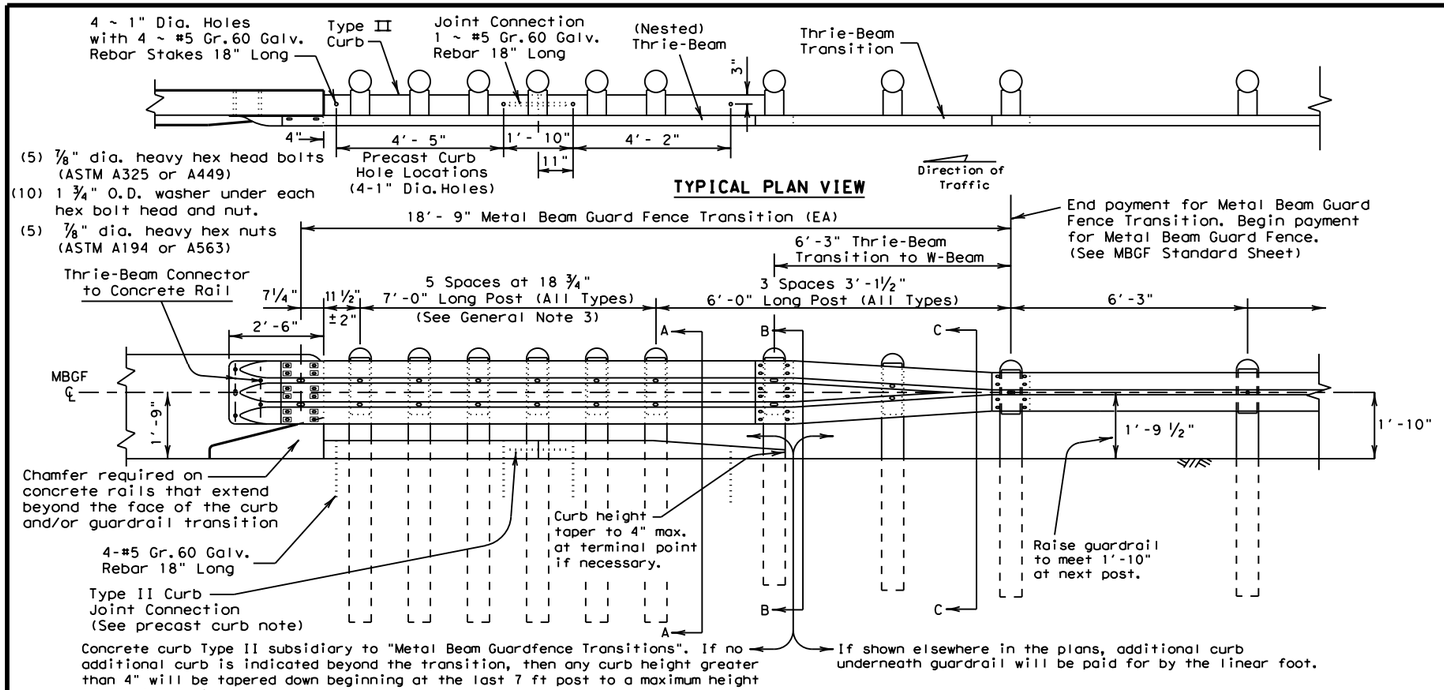
Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
(SHORT RADIUS)
MBGF(SR)-19

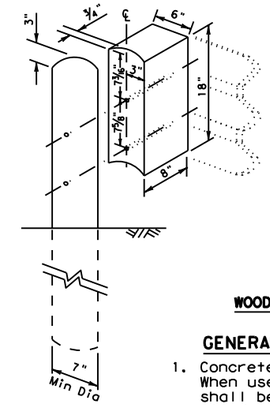
FILE: mbgfsr19.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
©TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		106

DATE: 10/11/2023
FILE: c:\pw\kh1\d0324244\mbgfsr19.dgn

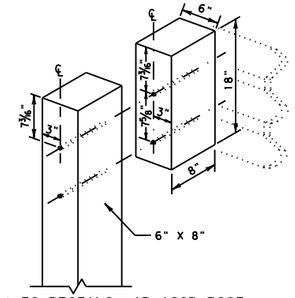
DATE: 10/11/2023
FILE: c:\pw\kni\d0324244\mbgftr19 (1).dgn



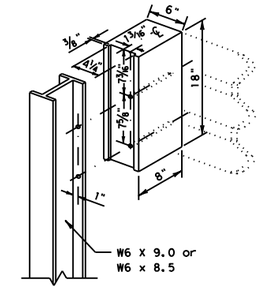
TYPICAL PLAN VIEW



WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK TO STEEL POST

GENERAL NOTES

1. Concrete curb may be cast-in-place or precast as shown on this sheet. When used in conjunction with thrie-beam guard fence transitions, curb shall be Type II (Typically 5 3/4" height above surface; See CCCG standard sheet) unless otherwise shown in the plans. 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.

   Contact the Design Division for drainage cut options needed within the curb section of the transition.

2. The type of post (round wood, rectangular wood or steel) will be shown elsewhere in the plans.

3. 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 5/8" in height, and visible after installation. Wooden posts shall be marked with a brand, and steel posts with a stencil before galvanizing.

4. Rail element 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.

5. Unless otherwise shown in the plans, transitions shall be placed with the block face in front of or directly above the curb face.

6. Install terminal connector with (12) rectangular guardrail plate washers: (FWR03) and (12) 5/8" X 2" button head splice bolts with recessed nuts.

7. 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.

8. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing". Fittings shall be subsidiary to the bid item.

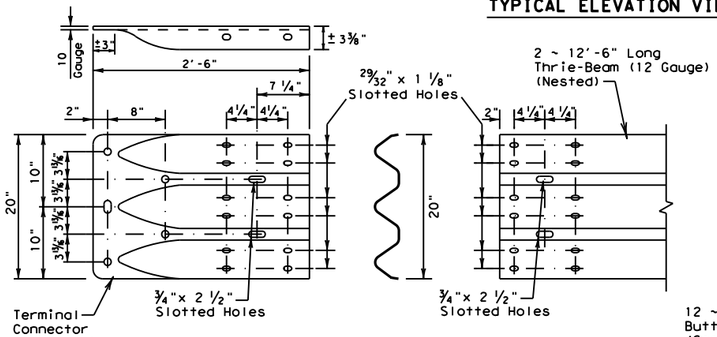
9. Crown shall be widened to accommodate transitions.

10. If solid rock is encountered. See the MBGF standard sheet for the proper installation guidance.

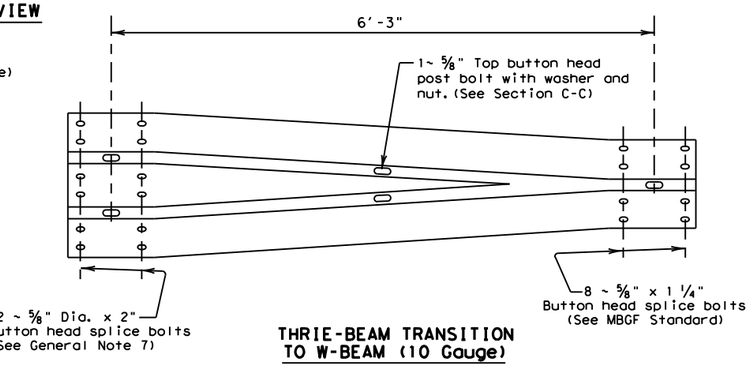
11. Posts shall not be set in concrete.

12. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT, maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL can furnish composite material posts and/or blocks.

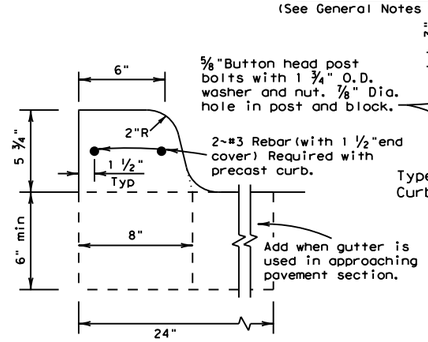
TYPICAL ELEVATION VIEW



THRIE-BEAM TERMINAL CONNECTION
(See General Notes 6 & 7 for required hardware)

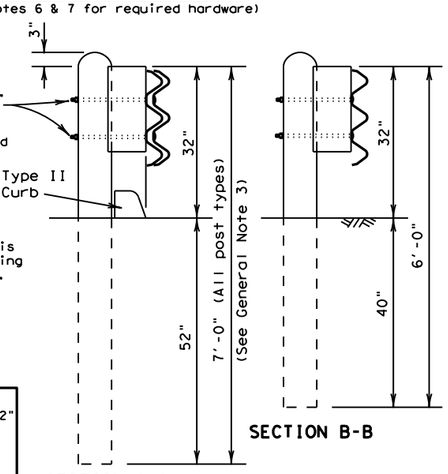


THRIE-BEAM TRANSITION TO W-BEAM (10 Gauge)



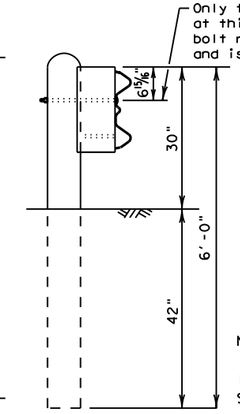
TYPE II CURB
Cast-in-Place or Precast

PRECAST CURB: Type II Precast Curb secured with 4~#5 Gr.60 Galv. Rebar stakes 18" long. The 12'- 2" section of curb may be cast in two sections.
Section ① 5'- 8" long
Section ② 6'- 6" long with the last 3'- 6" of curb tapered to a 4" height.
The Joint Connection is two 9" long 1" dia female ends connected with 1~#5 Gr.60 Galv. Rebar 18" long.



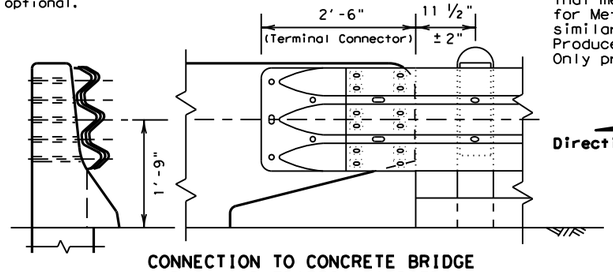
SECTION A-A

SECTION B-B



SECTION C-C

TRANSITION SECTIONS



CONNECTION TO CONCRETE BRIDGE RAIL AND TRAFFIC BARRIERS

Direction of Traffic

NOTES:
(5) 7/8" dia. heavy hex bolts, length will vary depending on width of concrete rail, leave 1" of bolt length past the 5/8" hex nut. Trim as required.
See General Notes: 6 & 7 for additional connection details.

PLATE WASHER INSTRUCTIONS

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

ONLY FOR USE IN MAINTENANCE REPAIRS.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE TRANSITION (THRIE-BEAM TRANSITION) MBGF(TR)-19

FILE: mbgftr19.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
© TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		107

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

BEGIN LENGTH OF NEED

PLAN VIEW

TRAFFIC FLOW

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

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) 1½" X 6'-9 ⅝"

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

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

SoftStop ANCHOR RAIL (12GA) PN: 15215G

SoftStop FACE SEE GN(3) & NOTE: B

3'-1 ½"(+/-) 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: C

SEE NOTE: A

POST 32" HEIGHT

31" RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

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

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

POST 40" DEPTH (TYP 1-8)

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

SEE DETAIL 3

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

6'-1⅜"

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)

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)

(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

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

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

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

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

TRAFFIC FLOW

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"

FINISHED GRADE

LINE POST (3, 4, 5, 6, 7 & 8)

SECTION VIEW B-B

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

6" X 8" X 14" BLOCKOUT WOOD

W-BEAM RAIL 25'-0"

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

FINISHED GRADE

POST(2)

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	0142	06	029		SH27	
	DIST	COUNTY			SHEET NO.	
	SAT	KENDALL			108	

DATE: 10/11/2023
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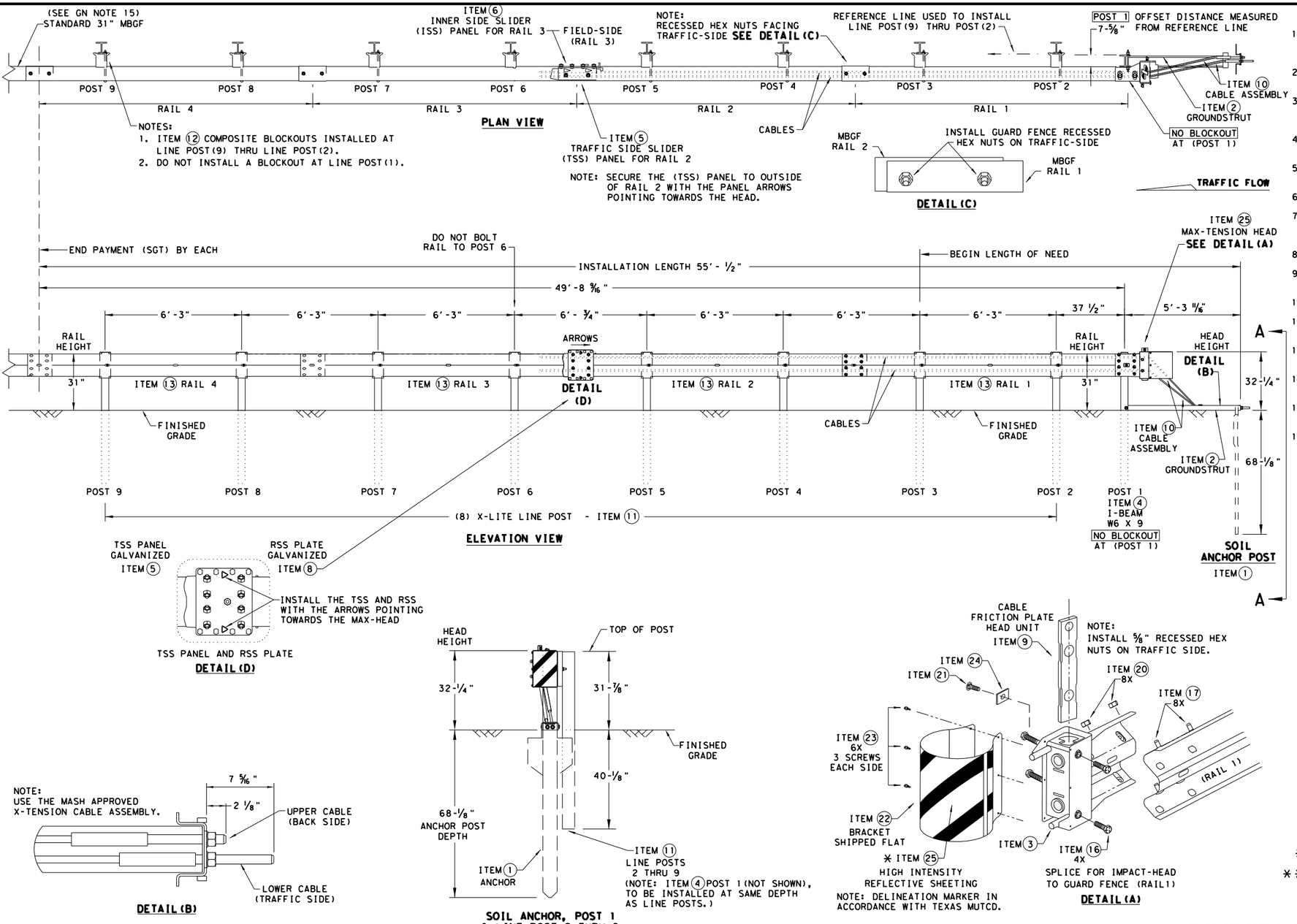

GENERAL NOTES

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

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

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		109

DATE: 10/11/2023
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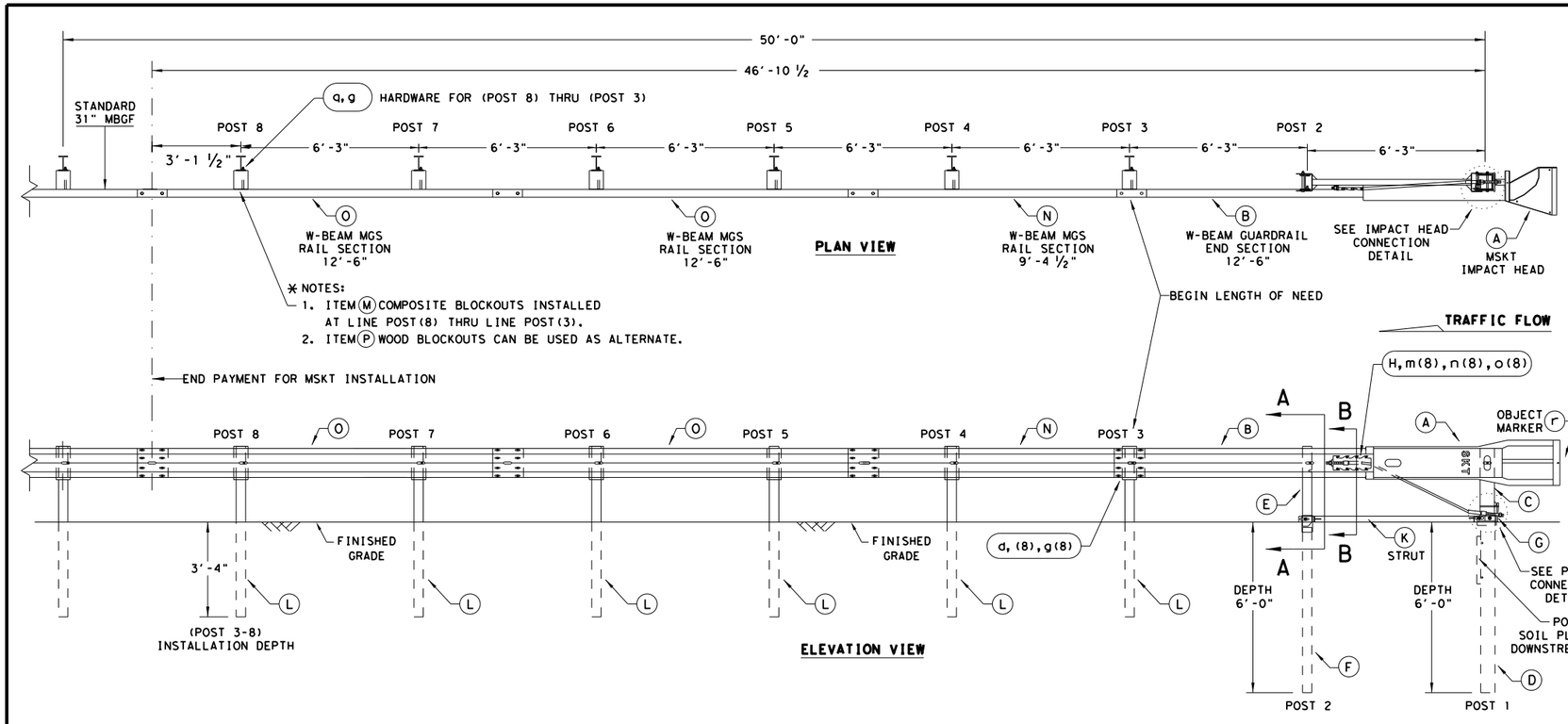
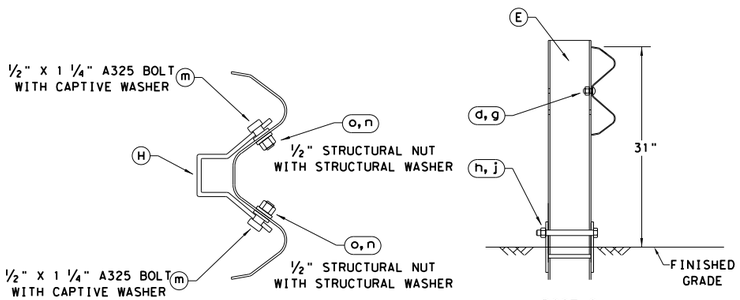
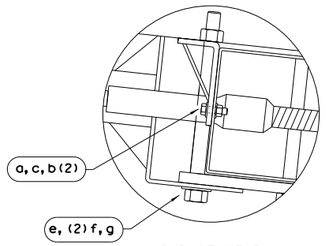
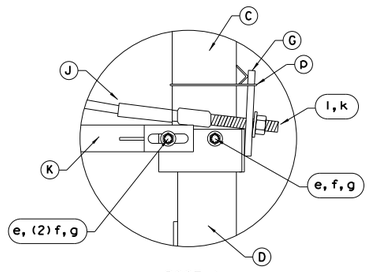


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.







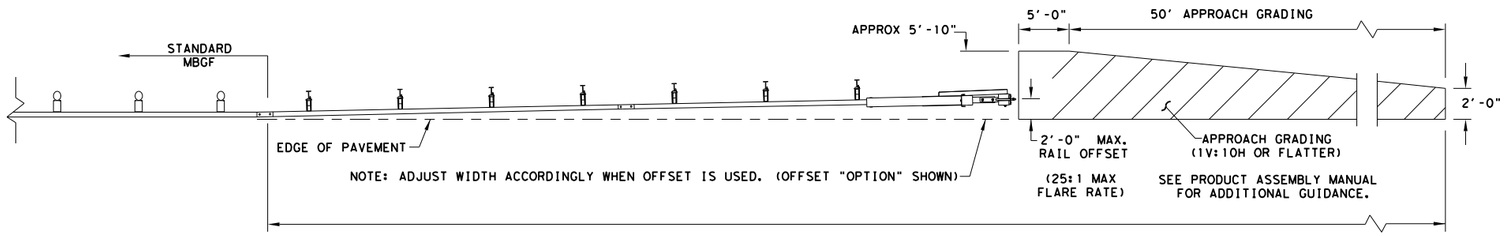
GENERAL NOTES

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

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

SEE NOTES: *

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



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	0142	06	029	SH27	
	DIST	COUNTY		SHEET NO.	
	SAT	KENDALL		110	

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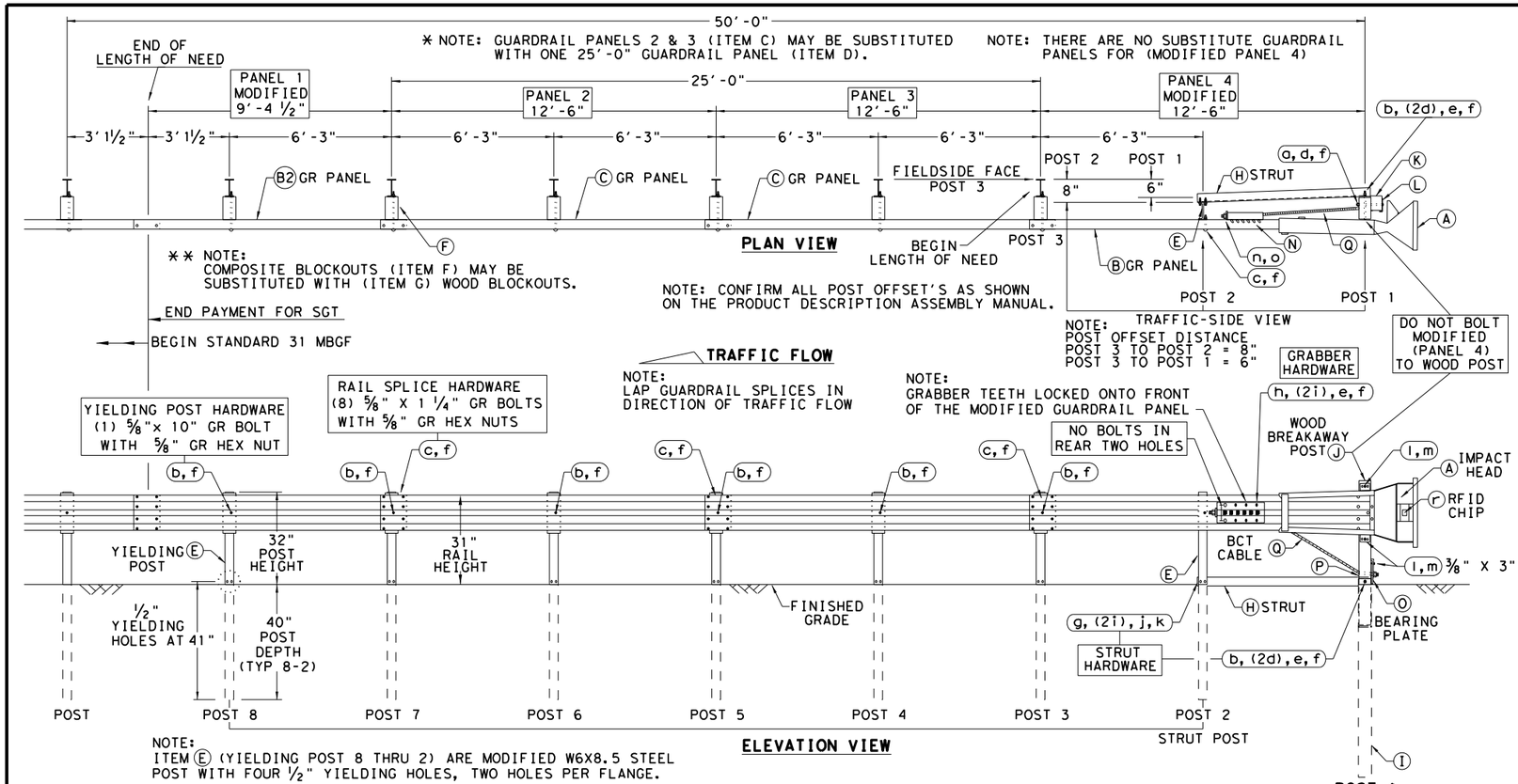
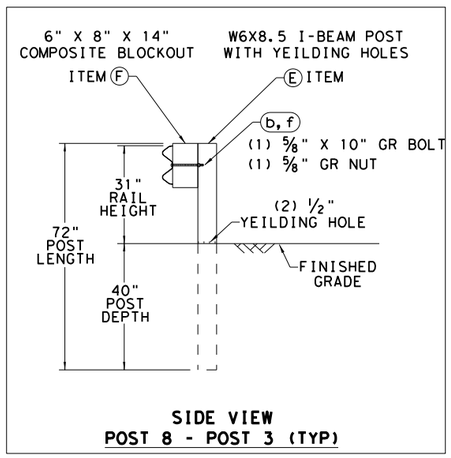


GENERAL NOTES

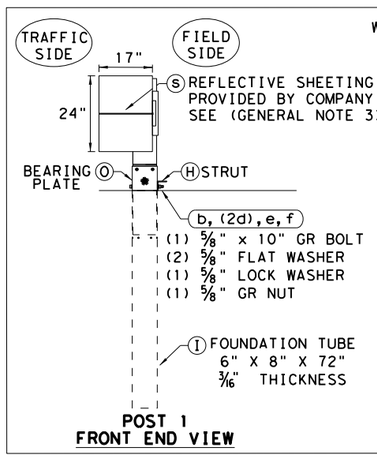
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	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

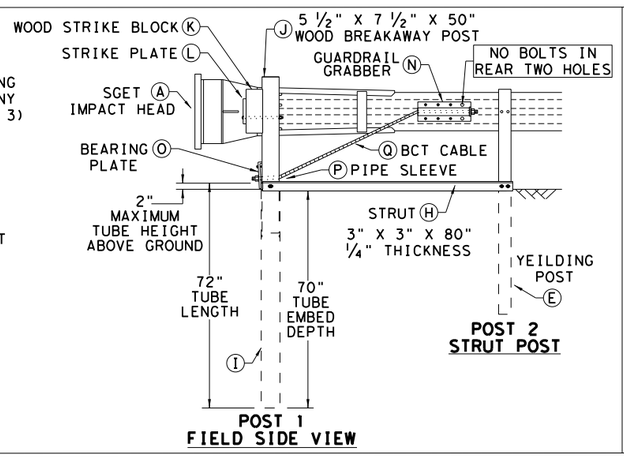
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



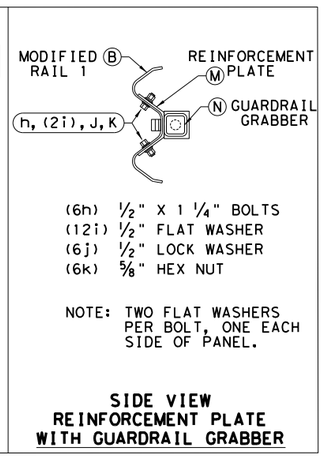
SIDE VIEW
POST 8 - POST 3 (TYP)



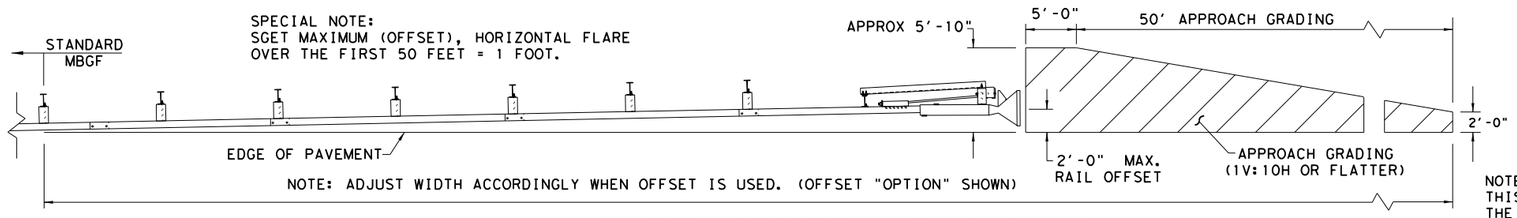
POST 1
FRONT END VIEW



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	0142	06	029		SH27	
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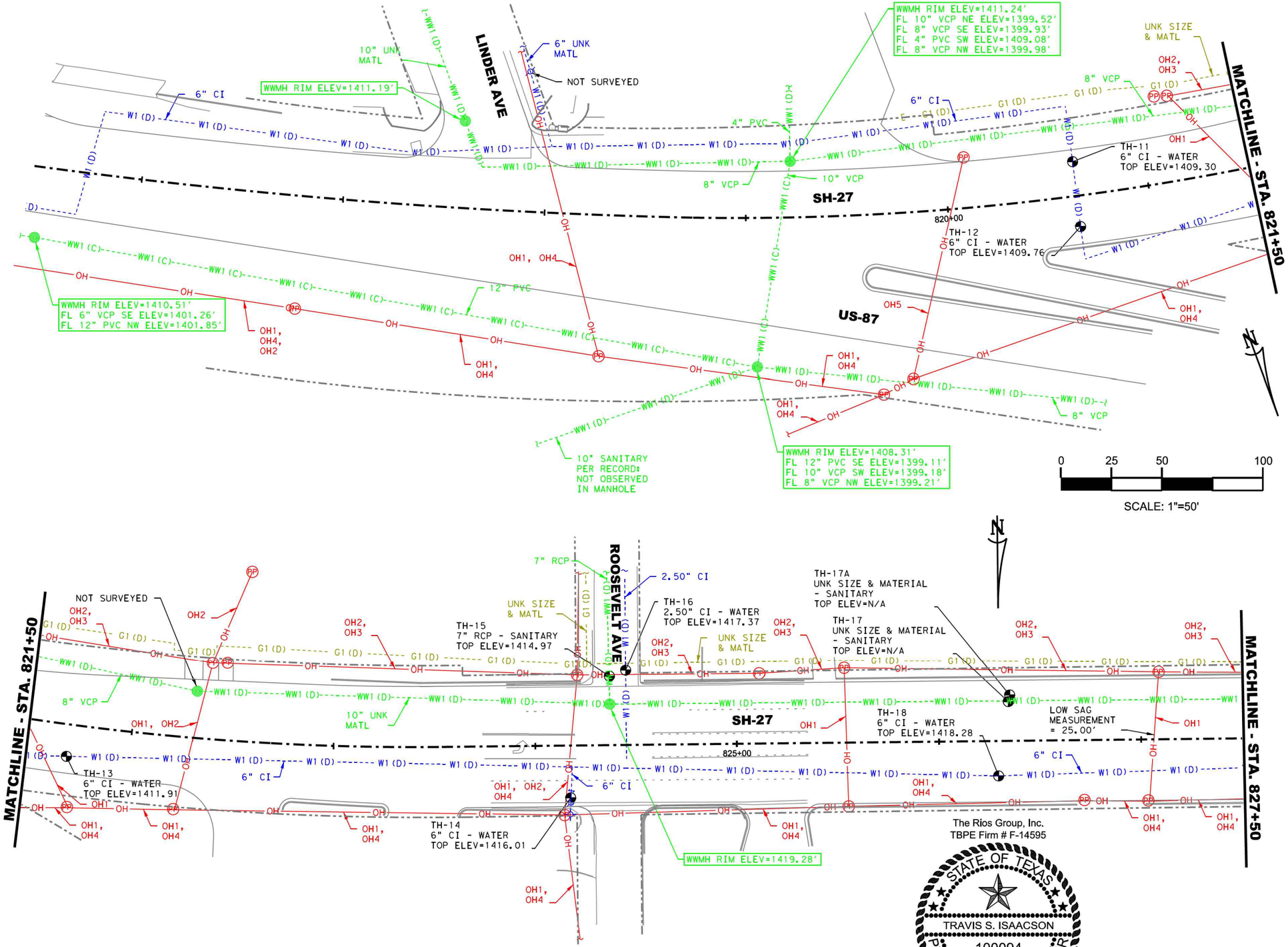


NOTE:
LOW SAG MEASUREMENTS CONTAINED WITHIN THIS PLAN SET WERE OBTAINED BY TRG. OVERHEAD LOW SAGS NOT IDENTIFIED WERE OBTAINED BY OTHERS.

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

09-29-2023

Subsurface Utility Engineering (SUE) Certification

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B" — X#
- QUALITY LEVEL "C" — X#(C)
- QUALITY LEVEL "D" — X#(D)
- ABANDONED UTILITY — X X X X
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS QL "B"
- HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) — FOC1
- WINDSTREAM (FO/DUCT) — FOC2
- ZAYO (FO/DUCT) — FOC3
- AT&T (FO/DUCT) — FOC4
- COMMZOOM (FO/DUCT) — FOC5
- HILL COUNTRY TELEPHONE COOPERATIVE (TELE) — T1
- SPECTRUM (CABLE) — CTV1

ELECTRIC / POWER QL "B"
- BANDERA ELECTRIC COOPERATIVE — E1

GAS / PETROLEUM QL "B"
- ATMOS ENERGY — G1

SANITARY SEWER QL "B"
- KENDALL COUNTY WCID#1 — WW1

POTABLE WATER QL "B"
- KENDALL COUNTY WCID#1 — W1

TRAFFIC SIGNALS QL "B"
- CITY OF COMFORT — TS1

OVERHEAD UTILITY QL "D"
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC — OH
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE — OH
- OH3 - SPECTRUM — OH
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER — OH
- OH5 - TXDOT — OH

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE POLE
- TELEPHONE POLE W/RISER
- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

REV	DATE	BY	DESCRIPTION

Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd Suite 200 Universal City, Texas 78148

SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

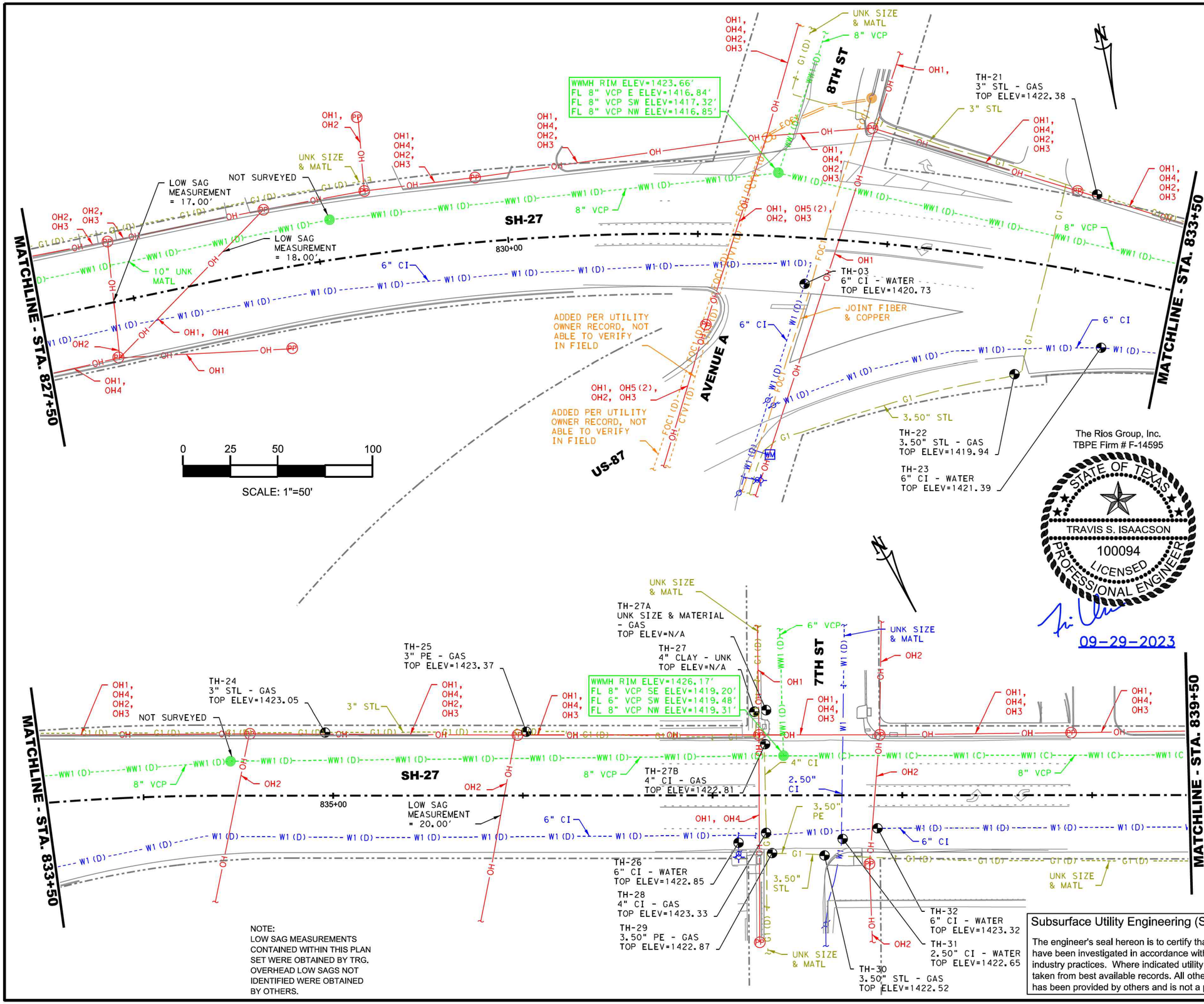
BEGIN TO STA 827+50

DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023

CSJ NUMBER	PLAN SHEET NO.
0142-06-029	112

STATE	DISTRICT	COUNTY
TX	SA	KENDALL



NOTE:
LOW SAG MEASUREMENTS CONTAINED WITHIN THIS PLAN SET WERE OBTAINED BY TRG. OVERHEAD LOW SAGS NOT IDENTIFIED WERE OBTAINED BY OTHERS.

LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B"
- QUALITY LEVEL "C"
- QUALITY LEVEL "D"
- ABANDONED UTILITY
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS (QL "B")
- HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) — FOC1
- WINDSTREAM (FO/DUCT) — FOC2
- ZAYO (FO/DUCT) — FOC3
- AT&T (FO/DUCT) — FOC4
- COMMZOOM (FO/DUCT) — FOC5
- HILL COUNTRY TELEPHONE COOPERATIVE (TELE) — T1
- SPECTRUM (CABLE) — CTV1

ELECTRIC / POWER (QL "B")
- BANDERA ELECTRIC COOPERATIVE — E1

GAS / PETROLEUM (QL "B")
- ATMOS ENERGY — G1

SANITARY SEWER (QL "B")
- KENDALL COUNTY WCID#1 — WW1

POTABLE WATER (QL "B")
- KENDALL COUNTY WCID#1 — W1

TRAFFIC SIGNALS (QL "B")
- CITY OF COMFORT — TS1

OVERHEAD UTILITY (QL "D")
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC — OH
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE — OH
- OH3 - SPECTRUM — OH
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER — OH
- OH5 - TXDOT — OH

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE POLE
- TELEPHONE POLE W/RISER
- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

09-29-2023

Subsurface Utility Engineering (SUE) Certification

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

REV	DATE	BY	DESCRIPTION

Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd Suite 200 Universal City, Texas 78148

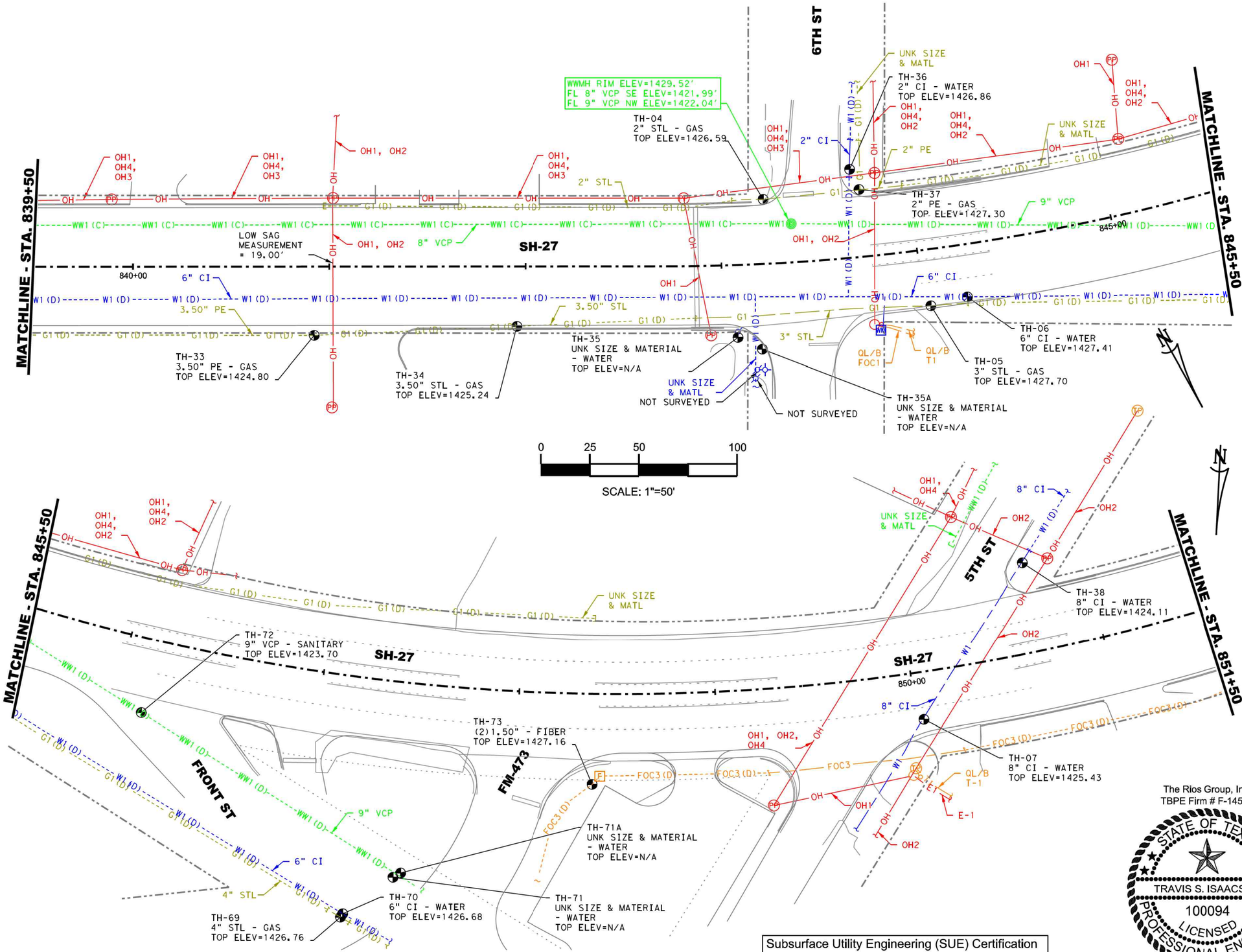
SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

STA 827+50 TO 839+50

DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023
CSJ NUMBER	PLAN SHEET NO.	
0142-06-029	113	
STATE: TX	DISTRICT: SA	COUNTY: KENDALL



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LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B"
- QUALITY LEVEL "C"
- QUALITY LEVEL "D"
- ABANDONED UTILITY
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS QL "B"
- HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) — FOC1
- WINDSTREAM (FO/DUCT) — FOC2
- ZAYO (FO/DUCT) — FOC3
- AT&T (FO/DUCT) — FOC4
- COMMZOOM (FO/DUCT) — FOC5
- HILL COUNTRY TELEPHONE COOPERATIVE (TELE) — T1
- SPECTRUM (CABLE) — CTV1

ELECTRIC / POWER QL "B"
- BANDERA ELECTRIC COOPERATIVE — E1

GAS / PETROLEUM QL "B"
- ATMOS ENERGY — G1

SANITARY SEWER QL "B"
- KENDALL COUNTY WCID#1 — WW1

POTABLE WATER QL "B"
- KENDALL COUNTY WCID#1 — W1

TRAFFIC SIGNALS QL "B"
- CITY OF COMFORT — TS1

OVERHEAD UTILITY QL "D"
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC — OH
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE — OH
- OH3 - SPECTRUM — OH
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER — OH
- OH5 - TXDOT — OH

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE POLE
- TELEPHONE POLE W/RISER
- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

REV	DATE	BY	DESCRIPTION

Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd
Suite 200
Universal City, Texas 78148

SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

STA 839+50 TO 851+50

DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023

CSJ NUMBER	PLAN SHEET NO.
0142-06-029	114

STATE	DISTRICT	COUNTY
TX	SA	KENDALL

Subsurface Utility Engineering (SUE) Certification

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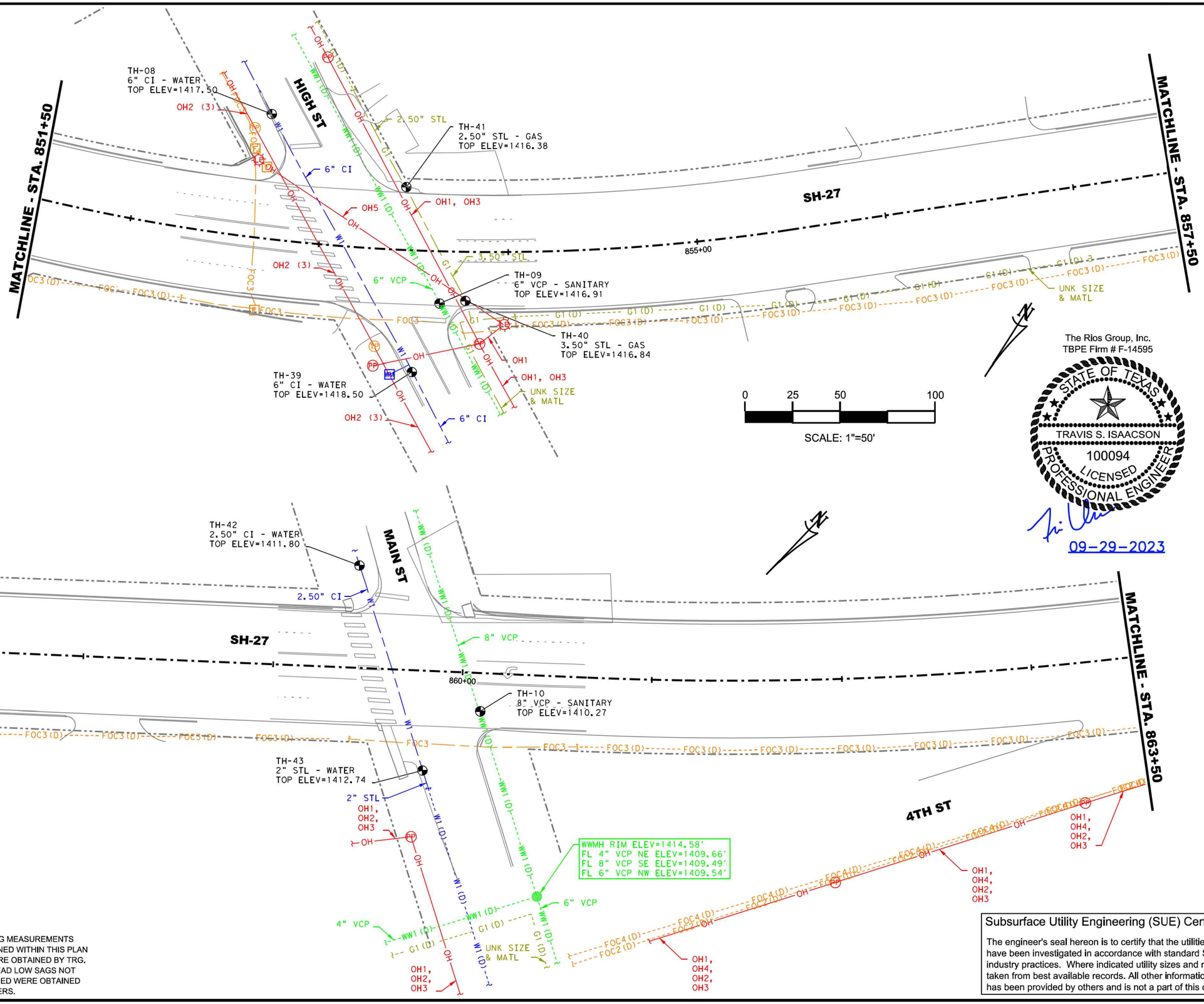
The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

09-29-2023



NOTE:
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LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B"
- QUALITY LEVEL "C"
- QUALITY LEVEL "D"
- ABANDONED UTILITY
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS QL "B"
- HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) — FOC1
- WINDSTREAM (FO/DUCT) — FOC2
- ZAYO (FO/DUCT) — FOC3
- AT&T (FO/DUCT) — FOC4
- COMMZOOM (FO/DUCT) — FOC5
- HILL COUNTRY TELEPHONE COOPERATIVE (TELE) — T1
- SPECTRUM (CABLE) — CTV1

ELECTRIC / POWER QL "B"
- BANDERA ELECTRIC COOPERATIVE — E1

GAS / PETROLEUM QL "B"
- ATMOS ENERGY — G1

SANITARY SEWER QL "B"
- KENDALL COUNTY WCID#1 — WW1

POTABLE WATER QL "B"
- KENDALL COUNTY WCID#1 — W1

TRAFFIC SIGNALS QL "B"
- CITY OF COMFORT — TS1

OVERHEAD UTILITY QL "D"
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE
- OH3 - SPECTRUM
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER
- OH5 - TXDOT

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE POLE
- TELEPHONE POLE W/RISER
- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED PROFESSIONAL ENGINEER

09-29-2023

Subsurface Utility Engineering (SUE) Certification

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

REV	DATE	BY	DESCRIPTION

Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd Suite 250 Universal City, Texas 78148

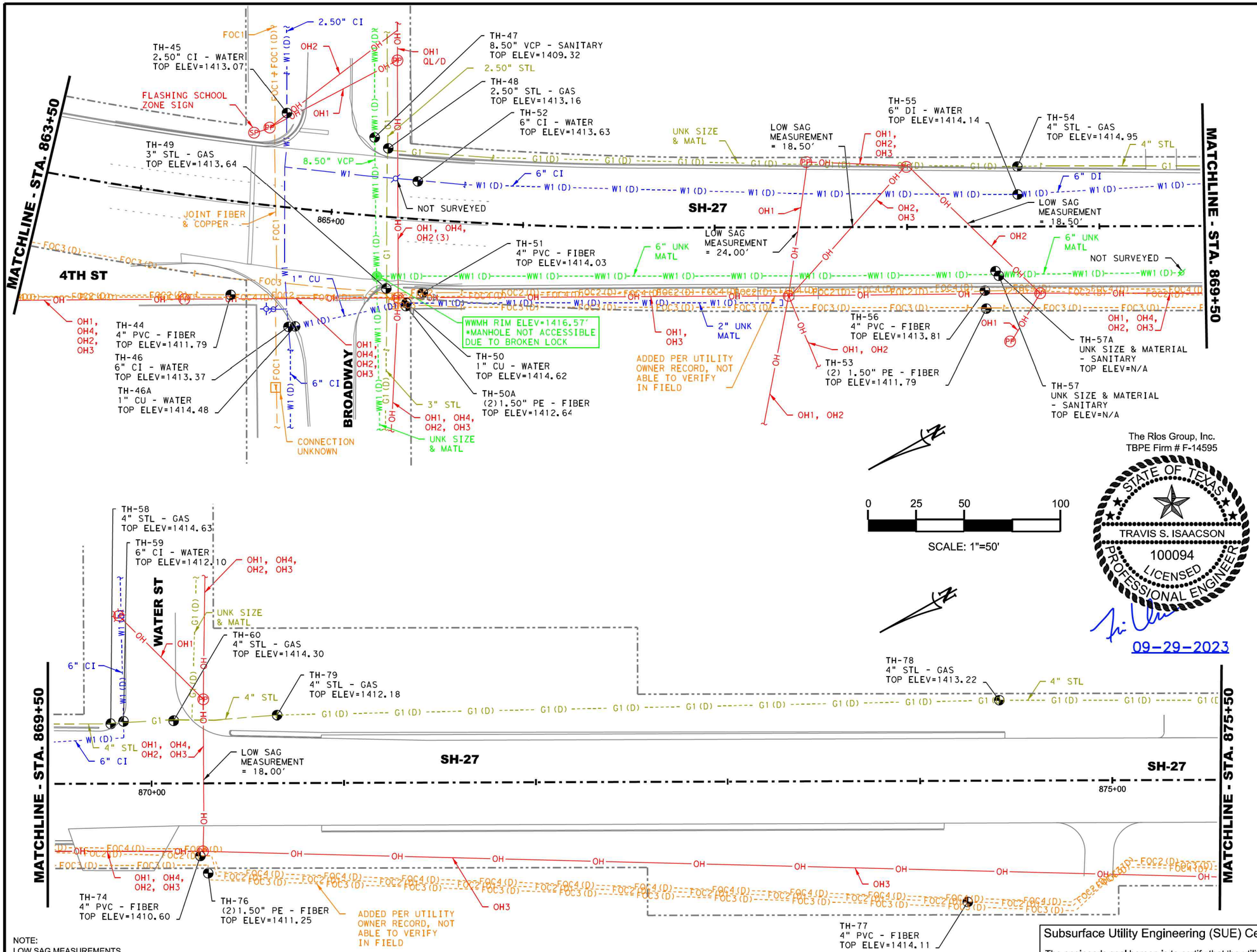
SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

STA 851+50 TO 863+50

DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023
CSJ NUMBER	PLAN SHEET NO.	
0142-06-029	115	
STATE	DISTRICT	COUNTY
TX	SA	KENDALL



NOTE:
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0 25 50 100

SCALE: 1"=50'

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED PROFESSIONAL ENGINEER

09-29-2023

LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B" — X# —
- QUALITY LEVEL "C" ------ X#(C) ------
- QUALITY LEVEL "D" ------ X#(D) ------
- ABANDONED UTILITY —X—X—X—X—
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS QL "B"
- HILL COUNTRY TELEPHONE — FOC1 —
- COOPERATIVE (FO/DUCT)
- WINDSTREAM (FO/DUCT) — FOC2 —
- ZAYO (FO/DUCT) — FOC3 —
- AT&T (FO/DUCT) — FOC4 —
- COMMZOOM (FO/DUCT) — FOC5 —
- HILL COUNTRY TELEPHONE — T1 —
- COOPERATIVE (TELE)
- SPECTRUM (CABLE) — CTV1 —

ELECTRIC / POWER QL "B"
- BANDERA ELECTRIC COOPERATIVE — E1 —

GAS / PETROLEUM QL "B"
- ATMOS ENERGY — G1 —

SANITARY SEWER QL "B"
- WCID — WW1 —

POTABLE WATER QL "B"
- WCID — W1 —

TRAFFIC SIGNALS QL "B"
- CITY OF COMFORT — TS1 —

OVERHEAD UTILITY QL "D"
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC — OH —
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE — OH —
- OH3 - SPECTRUM — OH —
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER — OH —
- OH5 - TXDOT — OH —

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE POLE
- TELEPHONE POLE W/RISER
- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

REV	DATE	BY	DESCRIPTION

Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd
Suite 200
Universal City, Texas 78148

SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

STA 863+50 TO 875+50

DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

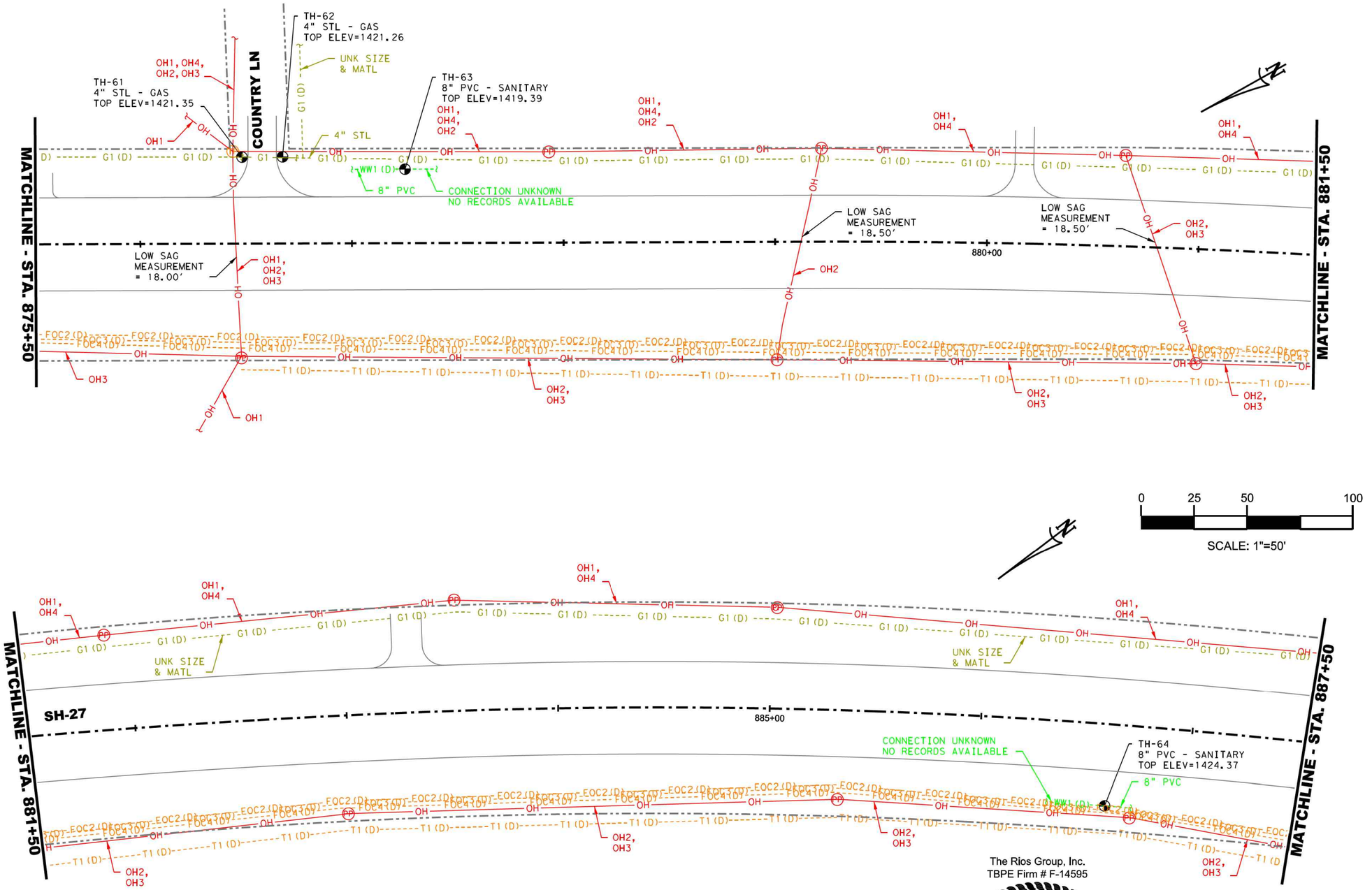
TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023

CSJ NUMBER	PLAN SHEET NO.
0142-06-029	116

STATE	DISTRICT	COUNTY
TX	SA	KENDALL

Subsurface Utility Engineering (SUE) Certification

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.



NOTE:
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LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B" — X#
- QUALITY LEVEL "C" — X#(C)
- QUALITY LEVEL "D" — X#(D)
- ABANDONED UTILITY
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS QL "B"
- HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) — FOC1
- WINDSTREAM (FO/DUCT) — FOC2
- ZAYO (FO/DUCT) — FOC3
- AT&T (FO/DUCT) — FOC4
- COMMZOOM (FO/DUCT) — FOC5
- HILL COUNTRY TELEPHONE COOPERATIVE (TELE) — T1
- SPECTRUM (CABLE) — CTV1

ELECTRIC / POWER QL "B"
- BANDERA ELECTRIC COOPERATIVE — E1

GAS / PETROLEUM QL "B"
- ATMOS ENERGY — G1

SANITARY SEWER QL "B"
- KENDALL COUNTY WCID#1 — WW1

POTABLE WATER QL "B"
- KENDALL COUNTY WCID#1 — W1

TRAFFIC SIGNALS QL "B"
- CITY OF COMFORT — TS1

OVERHEAD UTILITY QL "D"
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC — OH
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE — OH
- OH3 - SPECTRUM — OH
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER — OH
- OH5 - TXDOT — OH

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE POLE
- TELEPHONE POLE W/RISER
- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

REV	DATE	BY	DESCRIPTION

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

09-29-2023

Subsurface Utility Engineering (SUE) Certification

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Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd
Suite 200
Universal City, Texas 78148

SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

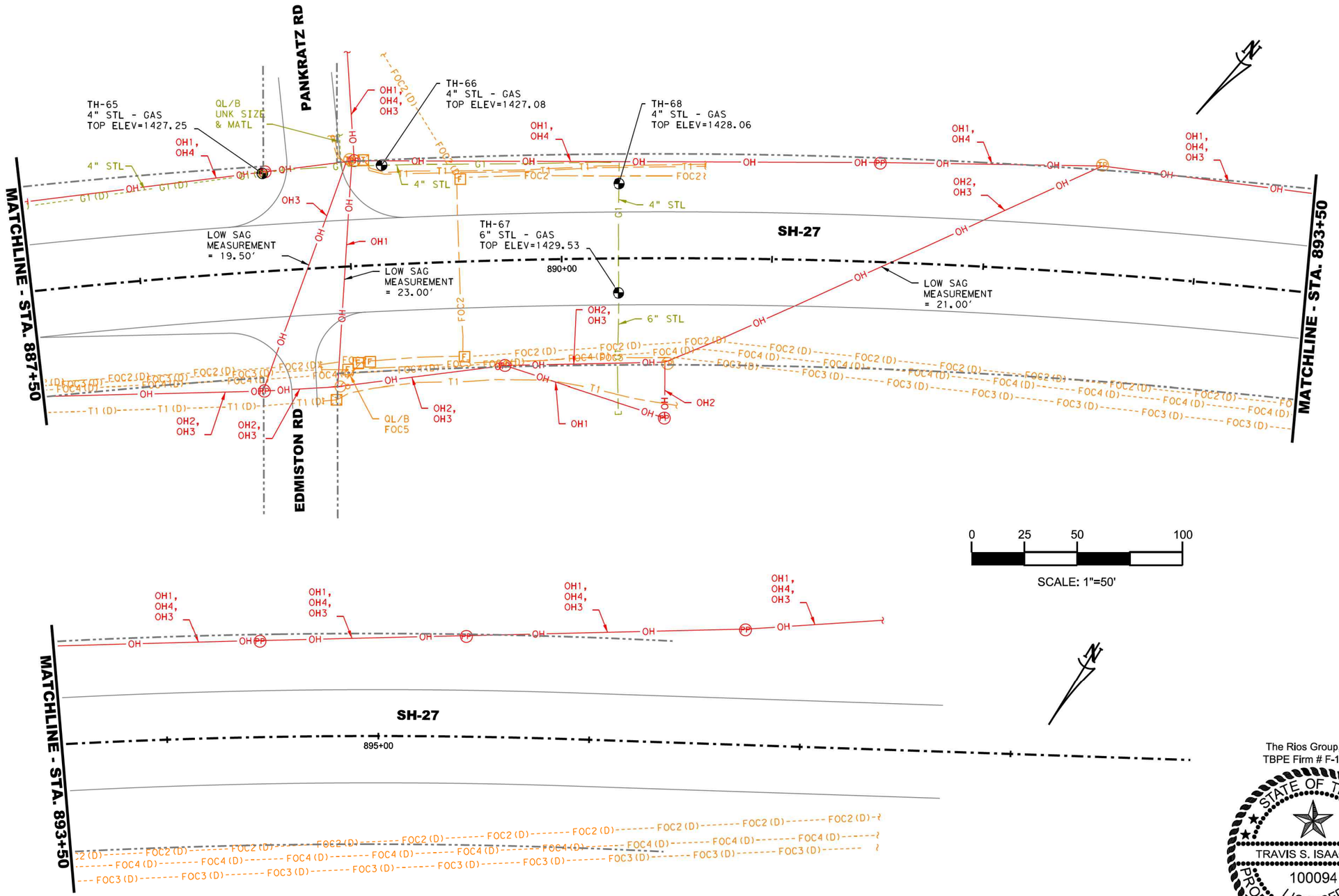
STA 875+50 TO 887+50

DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023

CSJ NUMBER	PLAN SHEET NO.
0142-06-029	117

STATE	DISTRICT	COUNTY
TX	SA	KENDALL



NOTE:
LOW SAG MEASUREMENTS CONTAINED WITHIN THIS PLAN SET WERE OBTAINED BY TRG. OVERHEAD LOW SAGS NOT IDENTIFIED WERE OBTAINED BY OTHERS.

LEGEND OF UTILITY TYPES

QUALITY LEVELS
- QUALITY LEVEL "B"
- QUALITY LEVEL "C"
- QUALITY LEVEL "D"
- ABANDONED UTILITY
- PROPOSED UTILITY
- UNKNOWN UTILITY

COMMUNICATIONS QL "B"
- HILL COUNTRY TELEPHONE COOPERATIVE (FO/DUCT) — FOC1
- WINDSTREAM (FO/DUCT) — FOC2
- ZAYO (FO/DUCT) — FOC3
- AT&T (FO/DUCT) — FOC4
- COMMZOOM (FO/DUCT) — FOC5
- HILL COUNTRY TELEPHONE COOPERATIVE (TELE) — T1
- SPECTRUM (CABLE) — CTV1

ELECTRIC / POWER QL "B"
- BANDERA ELECTRIC COOPERATIVE — E1

GAS / PETROLEUM QL "B"
- ATMOS ENERGY — G1

SANITARY SEWER QL "B"
- KENDALL COUNTY WCID#1 — WW1

POTABLE WATER QL "B"
- KENDALL COUNTY WCID#1 — W1

TRAFFIC SIGNALS QL "B"
- CITY OF COMFORT — TS1

OVERHEAD UTILITY QL "D"
- OH1 - BANDERA ELECTRIC COOPERATIVE - ELECTRIC — OH
- OH2 - HILL COUNTRY TELEPHONE COOPERATIVE — OH
- OH3 - SPECTRUM — OH
- OH4 - BANDERA ELECTRIC COOPERATIVE - FIBER — OH
- OH5 - TXDOT — OH

LEGEND OF UTILITY SYMBOLS

- END CAP
- QUALITY LEVEL CHANGE
- TEST HOLE
- UTILITY CONTINUATION
- FIBER HANDHOLE
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- ELECTRIC POLE (POWER)
- ELECTRIC POLE W/RISER
- LIGHT POLE
- SIGNAL POLE
- WASTE WATER CLEANOUT
- WASTE WATER MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE

REV	DATE	BY	DESCRIPTION

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

09-29-2023

Subsurface Utility Engineering (SUE) Certification

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Kimley»Horn F-928

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING
UTILITY COORDINATION
1740 Universal City Blvd
Suite 250
Universal City, Texas 78148

SH-27
US-87
TO
KERR/KENDALL COUNTY LINE

S.U.E. PLAN SHEET

STA 887+50 TO END

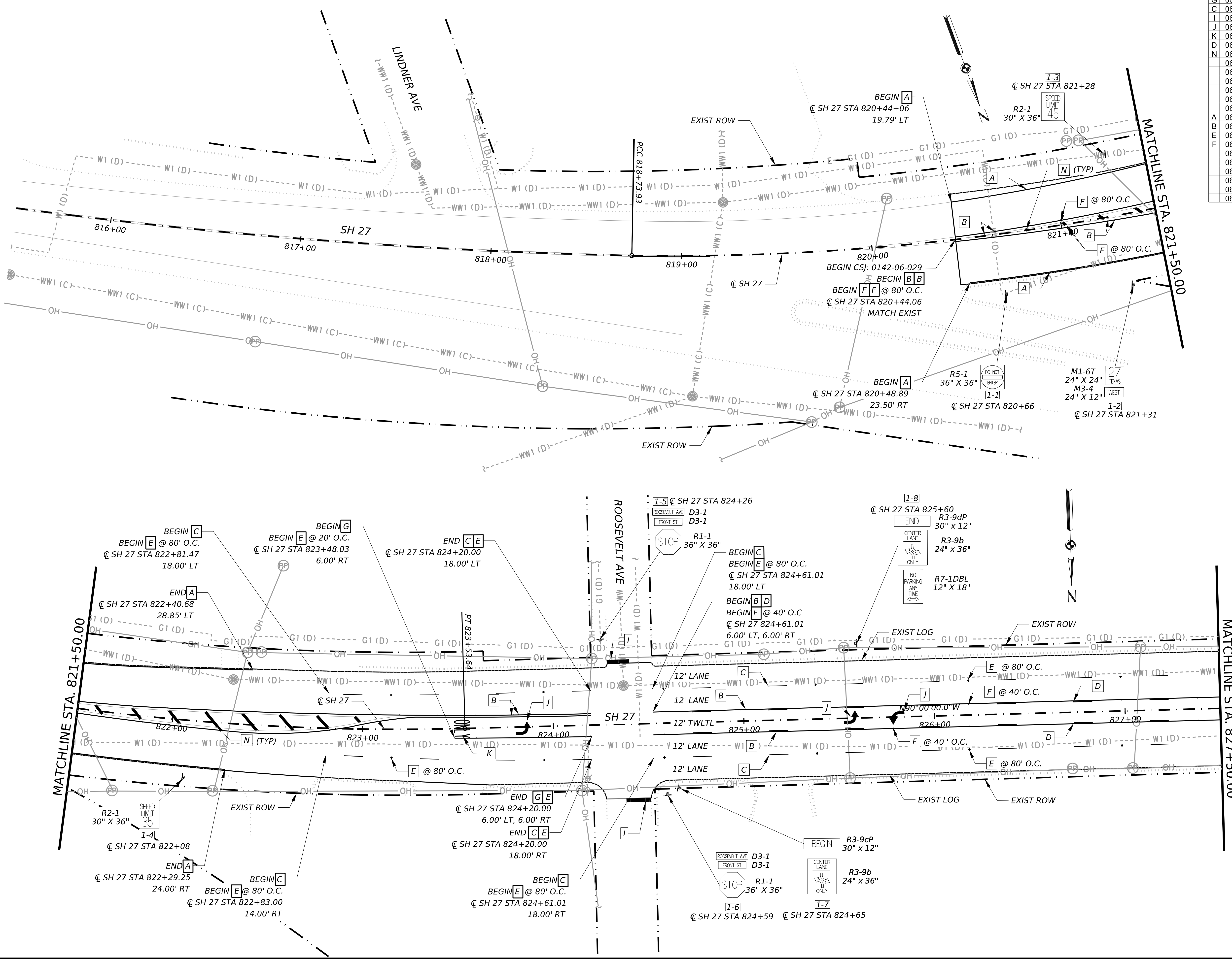
DESIGNED BY: RDC	CHECKED BY: TF	DATE: 09-29-2023
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
KHA1921.08		09-29-2023

CSJ NUMBER	PLAN SHEET NO.
0142-06-029	118

STATE	DISTRICT	COUNTY
TX	SA	KENDALL

	SHEET #			1
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	8
	0644 6076	REMOVE SM RD SN SUP&AM	EA	8
G	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	72
C	0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	220
I	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	25
J	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	3
K	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	1
D	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	145
N	0666 6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	70
	0666 6225	PAVEMENT SEALER 6"	LF	4549
	0666 6226	PAVEMENT SEALER 8"	LF	72
	0666 6228	PAVEMENT SEALER 12"	LF	70
	0666 6230	PAVEMENT SEALER 24"	LF	25
	0666 6231	PAVEMENT SEALER (ARROW)	EA	3
	0666 6232	PAVEMENT SEALER (WORD)	EA	1
A	0666 6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	1338
B	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2846
E	0672 6007	REFL PAV MRKR TY I-C	EA	16
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	76
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	4549
	0678 6004	PAV SURF PREP FOR MRK (8")	LF	72
	0678 6006	PAV SURF PREP FOR MRK (12")	LF	70
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	25
	0678 6009	PAV SURF PREP FOR MRK (ARROW)	EA	3
	0678 6016	PAV SURF PREP FOR MRK (WORD)	EA	1



LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- REMOVE AND REPLACE SIGN
- REMOVE AND REPLACE SIGN

10/11/2023

0' 25' 50'

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

BEGIN TO STA 827+50.00

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST		COUNTY	SHEET NO.
SAT		KENDALL	119

DATE: 10/11/2023 12:43:29 PM
FILE: c:\pw\kh1d0254620\08XXX SH27 TRF SPMD 01.dgn

	SHEET #			2
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	9
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
	0644 6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1
	0644 6034	IN SM RD SN SUP&AM TYS80(1)SA(U-1EXT)	EA	1
	0644 6076	REMOVE SM RD SN SUP&AM	EA	12
	0658 6101	INSTL OM ASSM(OM-2Z)(WFLX)SRF)SRF	EA	2
G	0666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	LF	100
C	0666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	LF	550
H	0666 6042	REFL PAV MRK TY I(W)12"(SLD)(100MIL)	LF	85
I	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	55
J	0666 6054	REFL PAV MRK TY I(W)(ARROW)(100MIL)	EA	8
K	0666 6078	REFL PAV MRK TY I(W)(WORD)(100MIL)	EA	2
D	0666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	LF	505
	0666 6225	PAVEMENT SEALER 6"	LF	3549
	0666 6226	PAVEMENT SEALER 8"	LF	100
	0666 6228	PAVEMENT SEALER 12"	LF	85
	0666 6230	PAVEMENT SEALER 24"	LF	55
	0666 6231	PAVEMENT SEALER (ARROW)	EA	8
	0666 6232	PAVEMENT SEALER (WORD)	EA	2
A	0666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	LF	474
B	0666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	LF	2020
E	0672 6007	REFL PAV MRKR TY I-C	EA	53
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	52
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	3549
	0678 6004	PAV SURF PREP FOR MRK (8")	LF	100
	0678 6006	PAV SURF PREP FOR MRK (12")	LF	85
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	55
	0678 6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
	0678 6016	PAV SURF PREP FOR MRK (WORD)	EA	2

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- REMOVE AND REPLACE SIGN
- #-# REMOVE AND REPLACE SIGN

MATCHLINE STA. 827+50.00

2-1 ℄ SH 27 STA 827+94
LANE ENDS MERGE LEFT W9-2TL 36" x 36"
E @ 80' O.C.
EXIST ROW
F @ 40' O.C.
12' LANE
12' TWLTL
12' LANE
12' LANE
SH 27
828+00
829+00
830+00
831+00
832+00
833+00
℄ SH 27
EXIST ROW
C
828+41.57
END B D
END F @ 80' O.C.
℄ SH 27 STA 831+10.48
6.00' LT, 6.00' RT
END C
END E @ 80' O.C.
℄ SH 27 STA 831+10.48
18.00' RT
BEGIN B D
BEGIN F @ 40' O.C.
℄ SH 27 STA 831+67.33
6.00' RT
END B B
END F F @ 80' O.C.
℄ SH 27 STA 831+39.69
28.00' RT
BEGIN C
BEGIN E @ 80' O.C
℄ SH 27 STA 831+64.44
18.00' RT
BEGIN B B
BEGIN F F @ 80' O.C.
℄ SH 27 STA 831+31.62
61.00' LT
BEGIN A
℄ SH 27 STA 831+61.59
29.28' RT
AVENUE A
2-4 D3-1 D3-1 EIGHTH ST FRONT ST R1-1 36" X 36" STOP
℄ SH 27 STA 831+69
2-5 LANE ENDS MERGE LEFT W9-2TL 36" X 36" DO NOT ENTER R5-1 36" x 36"
℄ SH 27 STA 832+20
END A
TIE IN TO EXIST
℄ SH 27 STA 832+44.43
29.50' RT
BEGIN B D F
℄ SH 27 STA 833+15.05
6.00' LT
2-2 ℄ SH 27 STA 831+38
D3-1 D3-1 EIGHTH ST FRONT ST R1-1 36" X 36" STOP
BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 831+72.94
18.00' LT
BEGIN G
BEGIN E @ 20' O.C.
℄ SH 27 STA 831+67.33
6.00' LT
PROP (OM - 2Z) (WFLX) SRF @ 2 EA
E (TYP)
8TH STREET
2-3 WEST INTERSTATE 10 M3-4B 24" X 12" M1-1 24" X 24" M6-1B 21" X 15" NORTH M3-1 24" X 12" 87 M1-4 24" X 24" M6-1 21" X 15" EAST INTERSTATE 10 M3-2B 24" X 12" M1-1 24" X 24" M6-3B 21" X 15"
℄ SH 27 STA 832+09
END G
END E @ 20' O.C.
℄ SH 27 STA 832+66.83
6.00' LT
2-6 ℄ SH 27 STA 832+97
Wareg San Antonio Fredericksburg D1-3 90" x 36"

MATCHLINE STA. 833+50.00

2-9 ℄ SH 27 STA 837+27
D3-1 D3-1 SEVENTH ST FRONT ST R1-1 36" X 36" STOP
7TH STREET
BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 837+86.18
18.00' LT, 18.00' RT
BEGIN B D
BEGIN F @ 40' O.C.
℄ SH 27 STA 837+86.18
6.00' LT, 6.00' RT
2-12 ℄ SH 27 STA 839+38
TOAST NOT COVER D9-10T 48" X 48"
EXIST EOP
EXIST ROW
℄ SH 27
12' LANE
12' LANE
12' TWLTL
12' LANE
12' LANE
SH 27
834+00
835+00
836+00
837+00
838+00
839+00
60°49'33.3"W
834+42.40
EXIST ROW
EXIST EOP
END B D
END F @ 80' O.C.
℄ SH 27 STA 837+26.90
6.00' LT, 6.00' RT
END C
END E @ 80' O.C.
℄ SH 27 STA 837+26.90
18.00' LT, 18.00' RT
S1-1 36" X 36" SW16-9P 24" X 12" AHEAD 2-8
℄ SH 27 STA 837+24
SEVENTH ST FRONT ST D3-1 D3-1 R1-1 36" X 36" STOP 2-10
℄ SH 27 STA 837+63
JCT 473 M2-1 21" X 15" M1-6R 24" X 24" 2-11
℄ SH 27 STA 837+88
SPEED LIMIT 35 R2-1 30" X 36" 2-7
℄ SH 27 STA 833+59

10/11/2023

STATE OF TEXAS JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

STA 827+50.00 TO STA 839+50.00

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		120

DATE: 10/11/2023 12:43:56 PM
FILE: c:\pw\kh1\d0254620\08XXX SH27 TRF SPMD 02.dgn

	SHEET #			3
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	12
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
	0644 6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	3
	0644 6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	2
	0644 6076	REMOVE SM RD SN SUP&AM	EA	26
C	0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	470
I	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	126
J	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
D	0666 6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	495
	0666 6225	PAVEMENT SEALER 6"	LF	3565
	0666 6230	PAVEMENT SEALER 24"	LF	126
	0666 6231	PAVEMENT SEALER (ARROW)	EA	4
B	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2600
E	0672 6007	REFL PAV MRKR TY I-C	EA	24
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	52
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	3565
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	126
	0678 6009	PAV SURF PREP FOR MRK (ARROW)	EA	4

MATCHLINE STA. 839+50.00

MATCHLINE STA. 845+50.00

MATCHLINE STA. 845+50.00

MATCHLINE STA. 851+50.00

SH 27

6TH STREET

FRONT STREET

5TH STREET

FM 473

EXIST ROW

EXIST EOP

PC 842+72.19

℄ SH 27

840+00 841+00 842+00 843+00 844+00 845+00 846+00 847+00 848+00 849+00 850+00 851+00

12' LANE

12' TWLTL

3-1 ℄ SH 27 STA 842+25 — D2-2 78" X 24" — WARNING SAN ANTONIO 8 47

3-2 ℄ SH 27 STA 842+87 — S4-3P 24" X 8" — R2-1 24" X 30" — S4-1P 24" X 10" — S7-1T 36" X 18" — SCHOOL — SPEED LIMIT 25 — 7:30 - 8:30 AM 3:00 - 4:00 PM — WHEN FLASHING

3-3 ℄ SH 27 STA 842+94 — R2-1 30" X 36" — SPEED LIMIT 35

3-4 ℄ SH 27 STA 843+21 — FRONT ST D3-1 — SIXTH ST D3-1 — STOP R1-1 36" X 36"

3-5 ℄ SH 27 STA 845+19 — FRONT ST D3-1 — SIXTH ST D3-1 — STOP R1-1 36" X 36"

3-6 ℄ SH 27 STA 843+71 — Center Point Solarcafe D1-2 96" X 30"

3-7 ℄ SH 27 STA 843+97 — EAST 27 TEXAS M3-2 24" X 12" — M1-6T 24" X 24"

3-8 ℄ SH 27 STA 845+19 — S4-3P 24" X 8" — R2-1 24" X 30" — S4-1P 24" X 10" — S7-1T 36" X 18" — SCHOOL — SPEED LIMIT 25 — 7:30 - 8:30 AM 3:00 - 4:00 PM — WHEN FLASHING

3-9 ℄ SH 27 STA 846+64 — M1-6T 24" X 24" — 27 TEXAS — 473 FM ROAD — M1-6R 24" X 24" — M6-3B 21" X 15" — M6-2R 21" X 15"

3-10 STA 848+57 — Solarcafe D1-1 90"X 18"

3-11 STA 847+94 — R4-7 24" X 30"

3-12 STA 848+18 — FM 473 D3-1 — SH 27 D3-1 — STOP R1-1 36" X 36"

3-13 ℄ SH 27 STA 848+25 — M1-6T 24" X 24" — 27 TEXAS — M3-2 24" X 12" — EAST — M6-1 21" X 15" — WEST — M3-4B 24" X 24" — M3-4B 24" X 12" — M6-1 21" X 15"

3-14 ℄ SH 27 STA 848+47 — M1-6R 24" X 24" — 473 FM ROAD — M6-1 21" X 15" — 27 TEXAS — M1-6T 24" X 24" — M6-3B 21" X 15"

3-16 ℄ SH 27 STA 849+02 — VIA VANPOOL SERVICE 210.362.2555 — D12-2 72" X 42"

3-18 ℄ SH 27 STA 849+16 — PARK & RIDE D4-2R 30" X 36" — PARK & RIDE D4-2L 30" X 36"

3-19 ℄ SH 27 STA 849+83 — FIFTH ST D3-1 — SH 27 D3-1 — STOP R1-1 36" X 36"

3-20 ℄ SH 27 STA 849+99 — S4-3P 24" X 8" — R2-1 24" X 30" — S4-1P 24" X 10" — S7-1T 36" X 18" — SCHOOL — SPEED LIMIT 25 — 7:30 - 8:30 AM 3:00 - 4:00 PM — WHEN FLASHING

3-21 ℄ SH 27 STA 850+04 — FIFTH ST D3-1 — SH 27 D3-1 — STOP R1-1 36" X 36"

END B D
END F @ 40' O.C.
℄ SH 27 STA 842+86.69
6.00' LT, 6.00' RT

END C
END E @ 80' O.C.
℄ SH 27 STA 842+86.75
18.27' RT

END B D
END F @ 40' O.C.
℄ SH 27 STA 849+38.32
6.00' LT, 6.00' RT

END C
END E @80' O.C.
℄ SH 27 STA 849+35.98
18.00' LT, 18.00' RT

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 843+79.07
18.00' LT, 18.00' RT

BEGIN B D
BEGIN F @40' O.C.
℄ SH 27 STA 843+78.41
6.00' LT, 6.00' RT

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 850+57.09
18.00' LT, 18.00' RT

BEGIN B D
BEGIN F @ 40' O.C.
℄ SH 27 STA 850+57.09
6.00' LT, 6.00' RT

E @ 80' O.C.
F @ 40' O.C.
B
C
D
I
J

REFER TO PLAN SHEET "INTERSECTION LAYOUT" FOR STRIPING INFORMATION AND PAYMENT

REMOVE EXIST SIGN

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- REMOVE AND REPLACE SIGN
- #-# REMOVE AND REPLACE SIGN

10/11/2023

JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

STA 839+50.00 TO STA 851+50.00

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		121

DATE: 10/11/2023 12:44:23 PM
FILE: c:\pw\khl\d0254620\08XXX_SH27_TRF_SPMD_03.dgn

CK: DW: CK: DW:

	SHEET #			4
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	16
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
	0644 6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1
	0644 6076	REMOVE SM RD SN SUP&AM	EA	19
	0658 6101	INSTL OM ASSM(OM-2Z)(WFLX)(SRF)SRF	EA	2
G	0666 6036	REFL PAV MRK TY I(W)8"(SLD)(100MIL)	LF	160
C	0666 6306	RE PM W/RET REQ TY I(W)6"(BRK)(100MIL)	LF	460
I	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	306
J	0666 6054	REFL PAV MRK TY I(W)(ARROW)(100MIL)	EA	8
K	0666 6078	REFL PAV MRK TY I(W)(WORD)(100MIL)	EA	2
D	0666 6318	RE PM W/RET REQ TY I(Y)6"(BRK)(100MIL)	LF	308
N	0666 6141	REFL PAV MRK TY I(Y)12"(SLD)(100MIL)	LF	105
	0666 6225	PAVEMENT SEALER 6"	LF	3481
	0666 6226	PAVEMENT SEALER 8"	LF	160
	0666 6228	PAVEMENT SEALER 12"	LF	105
	0666 6230	PAVEMENT SEALER 24"	LF	306
	0666 6231	PAVEMENT SEALER (ARROW)	EA	8
	0666 6232	PAVEMENT SEALER (WORD)	EA	2
A	0666 6309	RE PM W/RET REQ TY I(W)6"(SLD)(100MIL)	LF	306
B	0666 6321	RE PM W/RET REQ TY I(Y)6"(SLD)(100MIL)	LF	2407
E	0672 6007	REFL PAV MRKR TY I-C	EA	32
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	90
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	3481
	0678 6004	PAV SURF PREP FOR MRK (8")	LF	160
	0678 6006	PAV SURF PREP FOR MRK (12")	LF	105
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	306
	0678 6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
	0678 6016	PAV SURF PREP FOR MRK (WORD)	EA	2

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- REMOVE AND REPLACE SIGN
- #-# REMOVE AND REPLACE SIGN

MATCHLINE STA. 851+50.00

MATCHLINE STA. 857+50.00

MATCHLINE STA. 863+50.00

SH 27

HIGH ST

MAIN ST

REMOVE EXIST SIGN

EXIST ROW

EXIST EOP

EXIST LOG

PT 855+48.40

PC 860+66.20

4-1 ℄ SH 27 STA 851+54
D7-7aTR 48" X 48" HISTORICAL MARKER

4-2 ℄ SH 27 STA 852+11
R7-1L 12" X 18" NO PARKING ANY TIME

4-3 ℄ SH 27 STA 852+13
D2-2 78" X 24" Center Point Kerrville 9 19

4-4 ℄ SH 27 STA 852+76
S1-1 36" X 36" SW16-7PL 24" X 12"

4-5 ℄ SH 27 STA 853+67
M2-1 21" X 15"
M1-6R 24" X 24" JCT 473 RANCH ROAD

4-6 ℄ SH 27 STA 852+68
D7-7aTL 48" x 48" HISTORICAL MARKER

4-7 ℄ SH 27 STA 852+68
D3-1 HIGH ST SH 27
D3-1
R1-1 36" X 36" STOP

4-8 ℄ SH 27 STA 853+35
S7-1 36" X 18" CELL PHONE PROHIBITED IN SCHOOL ZONE

4-9 ℄ SH 27 STA 853+79
D3-1 HIGH ST SH 27
D3-1
R1-1 36" X 36" STOP

4-10 ℄ SH 27 STA 857+80
R2-1 30" X 36" SPEED LIMIT 35

4-11 ℄ SH 27 STA 858+00
M1-6T 24" X 24" 27 TEXAS

4-12 ℄ SH 27 STA 858+55
S1-1 36" X 36" SW16-7PL 24" X 12"

4-13 ℄ SH 27 STA 859+47
D3-1 MAIN STREET SH 27
D3-1
R1-1 36" X 36" STOP

4-14 ℄ SH 27 STA 860+15
D3-1 MAIN STREET SH 27
D3-1
R1-1 36" X 36" STOP

4-15 ℄ SH 27 STA 860+22
R3-9cP 30" X 12" BEGIN CENTER LANE ONLY
R3-9B 24" X 36"
R7-1R 12" X 18" NO PARKING ANY TIME

4-16 ℄ SH 27 STA 860+48
S1-1 36" X 36" SW16-7PL 24" X 12"

4-17 ℄ SH 27 STA 860+39
R3-9dP 30" X 12" END CENTER LANE ONLY
R3-9b 24" X 36"

4-18 ℄ SH 27 STA 861+87
R7-1DBL 12" X 18" NO PARKING ANY TIME

4-19 ℄ SH 27 STA 862+88
R2-1 30" X 36" SPEED LIMIT 35

BEGIN B D
BEGIN F @ 40' O.C.
℄ SH 27 STA 853+64.54
6.00' LT

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 853+68.73
18.00' LT, 18.00' RT

BEGIN B D
BEGIN F @ 40' O.C.
℄ SH 27 STA 853+68.73
6.00' RT

END C
END E @ 80' O.C.
℄ SH STA 852+68.22
18.00' LT

END B D
END F @ 40' O.C.
℄ SH STA 853+68.73
6.00' LT

END B D
END F @ 40' O.C.
℄ SH 27 STA 852+81.66
6.00' RT

END C
END E @ 80' O.C.
℄ SH 27 STA 852+92.31
18.00' RT

BEGIN G
BEGIN E @ 20' O.C.
℄ SH 27 STA 858+49.40
6.00'RT

END G
END E @ 20' O.C.
℄ SH 27 STA 859+44.40
6.00' RT

END C
END E @ 80' O.C.
℄ SH 27 STA 859+45.72
18.00' RT

BEGIN G
BEGIN E @ 20' O.C.
℄ SH 27 STA 860+06.65
6.00' LT

END C
END E @ 80' O.C.
℄ SH 27 STA 859+39.87
18.00' LT

END B D
END F @ 40' O.C.
℄ SH 27 STA 859+39.33
6.00' LT

BEGIN A
℄ SH 27 STA 860+19.93
29.50' RT

BEGIN B B
BEGIN F @ 80' O.C.
℄ SH 27 STA 860+10.86

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 860+15.22
18.67' RT

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 860+08.80
18.00' LT

END G
END E @ 20' O.C.
℄ SH 27 STA 860+71.67
6.00' LT

END A
℄ SH 27 STA 863+21.30
29.50' RT

INSTALL PROP OM-27(WFLX)(SRF)(SRF) @ 2 EA

S48°51'53.7"W 858+00

12' LANE
12' LTL
12' LANE
12' LANE

857+00
858+00
859+00
860+00
861+00
862+00
863+00
855+00
856+00
854+00

10/11/2023

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

STA 851+50.00 TO STA 863+50.00

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		122

DATE: 10/11/2023 12:44:51 PM
FILE: c:\pw\kh1\d0254620\08XX_SH27_TRF_SPMD_04.dgn

DW:
CK:
DW:
CK:

	SHEET #			5
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	12
	0644 6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	1
	0644 6076	REMOVE SM RD SN SUP&AM	EA	14
	0658 6014	INSTL DEL ASSM (D-SW)SZ (BR)CTB (BI)	EA	8
	0658 6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	2
	0658 6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	8
	0658 6099	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	2
	0658 6101	INSTL OM ASSM(OM-2Z)(WFLX)SRF)SRF	EA	2
C	0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	580
I	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	112
	0666 6225	PAVEMENT SEALER 6"	LF	2952
	0666 6230	PAVEMENT SEALER 24"	LF	112
A	0666 6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	214
B	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2158
E	0672 6007	REFL PAV MRKR TY I-C	EA	29
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	110
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	2952
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	112

MATCHLINE STA. 863+50.00

MATCHLINE STA. 869+50.00

MATCHLINE STA. 875+50.00

BROADWAY

WATER ST

SH 27

5-1 ℄ SH 27 STA 863+71 — R7-1L 12" X 18"

5-2 ℄ SH 27 STA 863+86 — STOP R1-1 36" X 36"

5-3 ℄ SH 27 STA 864+52 — SCHOOL SPEED LIMIT 20 WHEN FLASHING S5-1 24" X 48" S7-1T 24" X 18"

5-4 ℄ SH 27 STA 864+70 — BROADWAY SH 27 D3-1 D3-1 STOP R1-1 36" X 36"

5-5 ℄ SH 27 STA 865+26 — BROADWAY SH 27 D3-1 D3-1 STOP R1-1 36" X 36"

5-6 ℄ SH 27 STA 866+63 — NEWSOME VINEYARDS D21-1A 66" X 24" HILL COUNTRY DISTILLERS 72" X 24"

5-7 ℄ SH 27 STA 866+83 — CROSS MAY ICE IN ICY WEATHER W8-13aT 36" X 36"

5-8 ℄ SH 27 STA 869+17 — S1-1 36" X 36" SW16-9P 24" X 12" AHEAD

5-9 ℄ SH 27 STA 869+79 — WATER ST SH 27 D3-1 D3-1 STOP R1-1 36" X 36"

5-10 ℄ SH 27 STA 870+36 — SPEED LIMIT 45 R2-1 30" X 36"

5-11 ℄ SH 27 STA 870+74 — CYPRESS CREEK I-3 60" X 30"

5-12 ℄ SH 27 STA 870+75 — SPEED LIMIT 30 R2-1 30" X 36"

5-13 ℄ SH 27 STA 874+57 — CYPRESS CREEK I-3 60" X 30"

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 865+31.38
11.00' LT, 11.00' RT

BEGIN B B
BEGIN F F @ 80' O.C.
℄ SH 27 STA 865+33.80

PT 866+77.80

EXIST ROW

END F @ 20' O.C.
BEGIN F F @ 80' O.C.
℄ SH 27 STA 863+88.12

END C
END E @ 80' O.C.
℄ SH 27 STA 864+58.34
11.00' LT, 11.00' RT

END B B
END F @ 80' O.C.
℄ SH 27 STA 864+71.92

BEGIN C
BEGIN E @ 80' O.C.
℄ SH 27 STA 870+31.03
11.00' LT, 11.00' RT

BEGIN B B
BEGIN F F @ 80' O.C.
℄ SH 27 STA 870+31.03

END C
END E @ 80' O.C.
℄ SH 27 STA 869+71.75
11.00' LT

END B B
END F @ 80' O.C.
℄ SH 27 STA 869+71.75

PROP (D-SW) SZ (BRF) CTB (BI) (TYP) @ 4 EA

PROP (D-SW) SZ 1 (BRF) GF2 (BI) (TYP) @ 1 EA

PROP (OM-2Z) (WFLX)SRF)SRF @ 1 EA

PROP (D-SW) SZ 1 (BRF) GF2 (BI) (TYP) @ 3 EA

PROP (OM-2Z) (WFLX) GND @ 1 EA

REMOVE EXIST DELINEATOR

PROP (D-SW) SZ (BRF) CTB (BI) (TYP) @ 4 EA

PROP (OM-2Z) (WFLX) GND @ 1 EA

REMOVE EXIST DELINEATOR

PROP (D-SW) SZ 1 (BRF) GF2 (BI) @ 1EA

PROP (D-SW) SZ 1 (BRF) GF2 (BI) (TYP) @ 3 EA

BEGIN A
℄ SH 27 STA 874+43.20
22.00' LT

REMOVE EXIST SIGN

EXIST ROW

BEGIN A
℄ SH 27 STA 874+43.20
22.00' RT

11' LANE

10.5' LANE

℄ SH 27

SH 27

S29°14'00.6"W

864+00 865+00 866+00 868+00 869+00 870+00 871+00 872+00 873+00 874+00 875+00

LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- REMOVE AND REPLACE SIGN
- #-# REMOVE AND REPLACE SIGN

10/11/2023

STATE OF TEXAS — JORDAN S. KIEWIT 131234 — LICENSED PROFESSIONAL ENGINEER

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

STA 863+50.00 TO STA 875+50.00

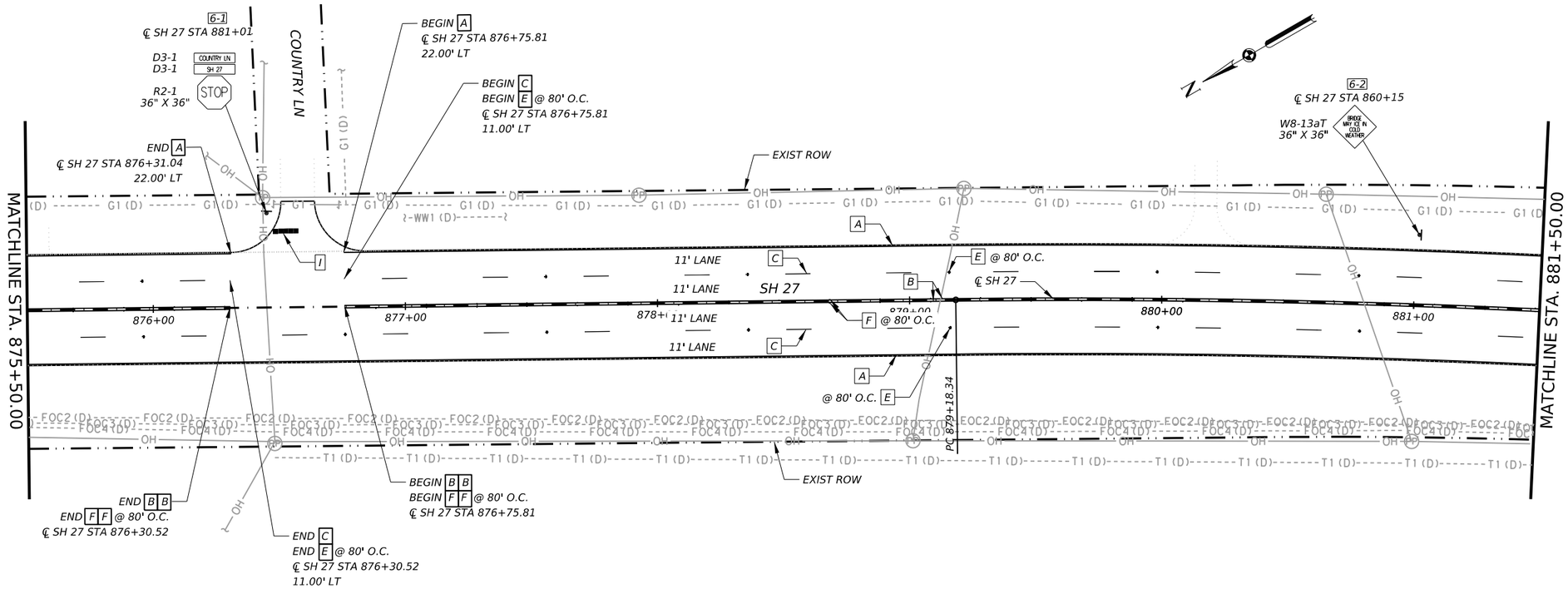
SHEET 5 OF 7

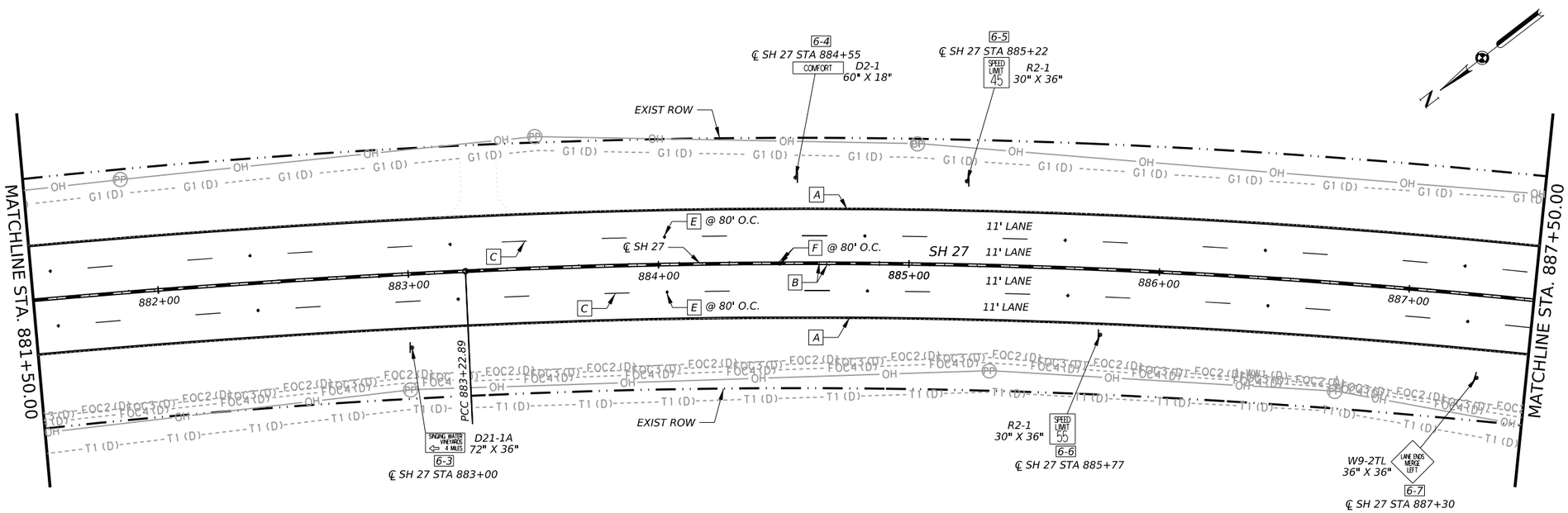
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		123

DATE: 10/11/2023 12:45:18 PM
FILE: c:\pwikh1\d0254620\08XX_SH27_TRF_SPMD_05.dgn

CK: DW: CK: DW:

	SHEET #			6
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	5
	0644 6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	1
	0644 6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1
	0644 6076	REMOVE SM RD SN SUP&AM	EA	7
C	0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	590
I	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	10
	0666 6225	PAVEMENT SEALER 6"	LF	5256
	0666 6230	PAVEMENT SEALER 24"	LF	10
A	0666 6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	2356
B	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	2310
E	0672 6007	REFL PAV MRKR TY I-C	EA	30
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	116
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	5256
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	10





LEGEND

- EXIST FENCE
- EXIST FEATURES
- EXIST RIGHT OF WAY
- DIRECTION OF TRAVEL
- REMOVE AND REPLACE SIGN
- #-# REMOVE AND REPLACE SIGN

10/11/2023

JORDAN S. KIEWIT 131234 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

0' 25' 50'

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

STA 875+50.00 TO STA 887+50.00

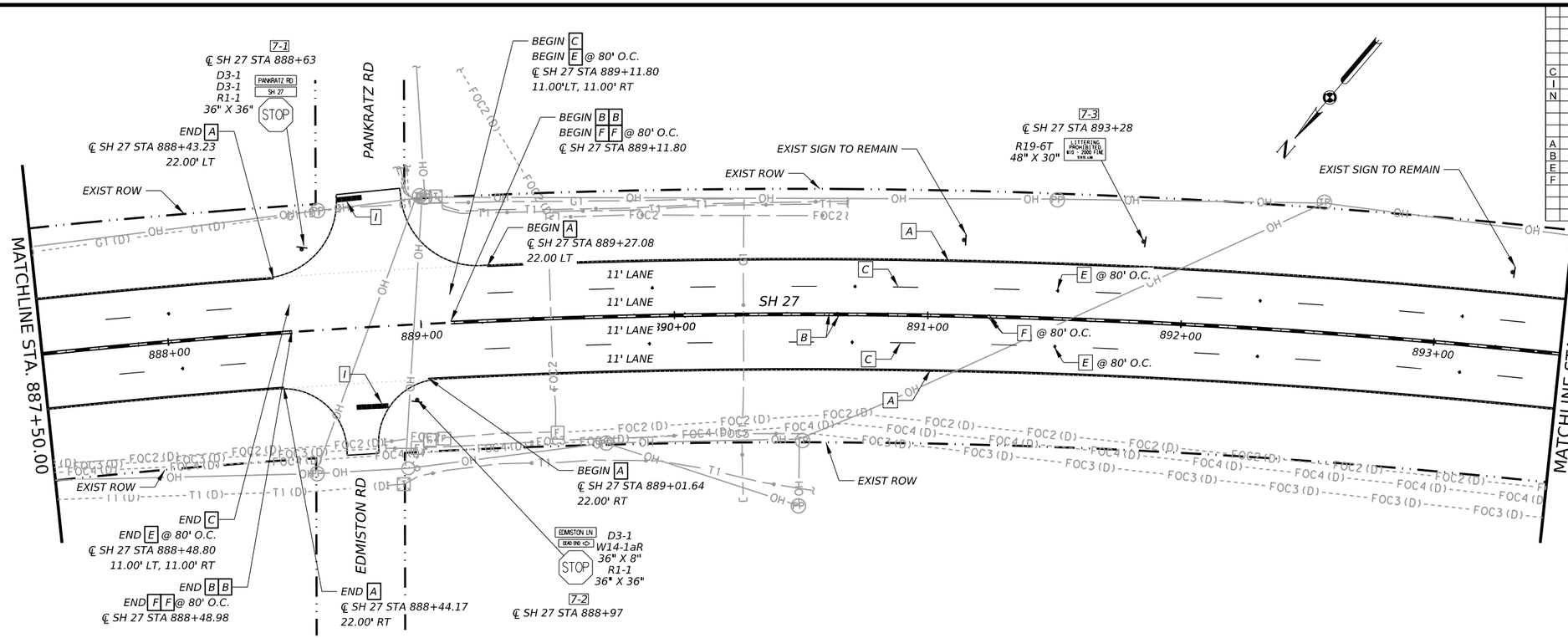
SHEET 6 OF 7

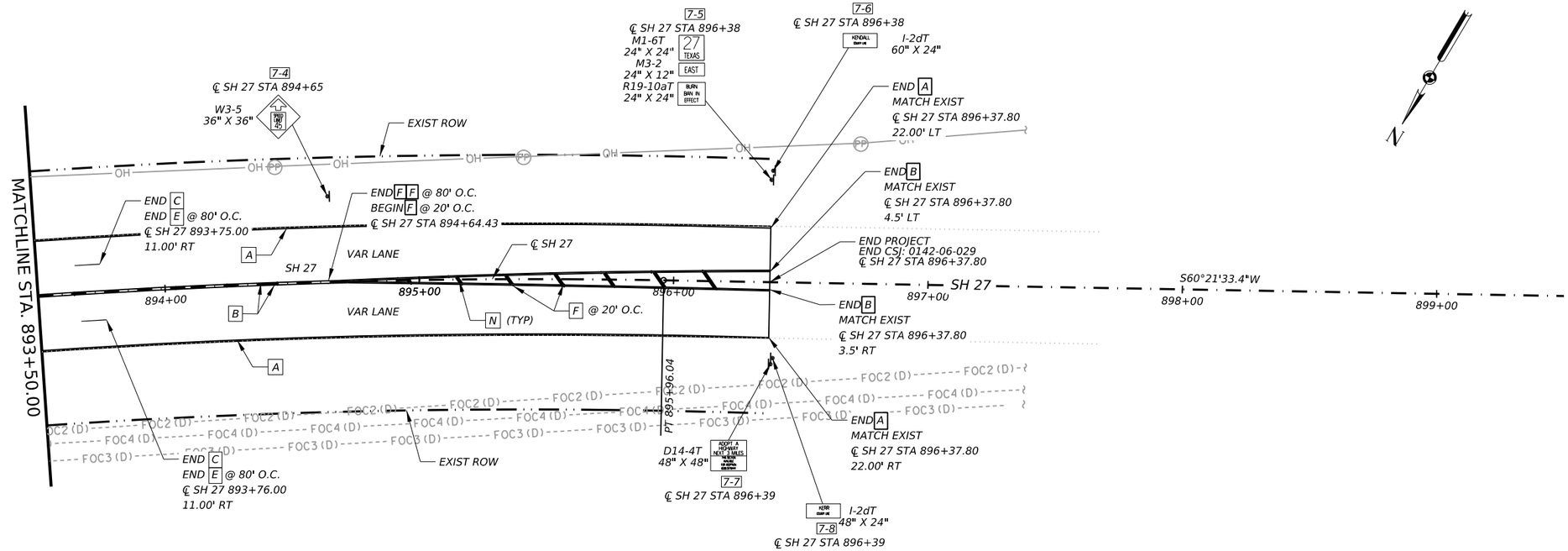
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		124

DATE: 10/11/2023 12:45:46 PM
FILE: c:\pw\kh1\d0254620\l08\XX_SH27_TRF_SPMD_06.dgn

CK: DW: CK: DW:

	SHEET #			7
	ITEM	DESCRIPTION	UNIT	QTY
	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	7
	0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
	0644 6076	REMOVE SM RD SN SUP&AM	EA	8
C	0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	290
I	0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	23
N	0666 6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	35
	0666 6225	PAVEMENT SEALER 6"	LF	3910
	0666 6228	PAVEMENT SEALER 12"	LF	35
	0666 6230	PAVEMENT SEALER 24"	LF	23
A	0666 6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	1635
B	0666 6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	1985
E	0672 6007	REFL PAV MRKR TY I-C	EA	15
F	0672 6009	REFL PAV MRKR TY II-A-A	EA	94
	0678 6002	PAV SURF PREP FOR MRK (6")	LF	3910
	0678 6006	PAV SURF PREP FOR MRK (12")	LF	35
	0678 6008	PAV SURF PREP FOR MRK (24")	LF	23





10/11/2023

0' 25' 50'

DATE: 10/11/2023 12:46:13 PM
FILE: c:\pw\kh1\d0254620\08XX_SH27_TRF_SPMD_07.dgn

Kimley»Horn F-928

Texas Department of Transportation

SH27

SIGN AND PAVEMENT MARKING LAYOUT

STA 887+50.00 TO END

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		125

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
1 OF 7												
	1-1	R5-1	DO NOT ENTER	36 X 36	X		10BWG	1	SA	P		
	1-2	M1-6T	27 TEXAS	24 X 24	X		10BWG	1	SA	P		
		M3-4	WEST	24 X 12	X							
	1-3	R2-1	SPEED LIMIT 45	30 X 36	X		10BWG	1	SA	P		
	1-4	R2-1	SPEED LIMIT 35	30 X 36	X		10 BWG	1	SA	P		
	1-5	D3-1	Roosevelt Ave	42 X 8	X		10 BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	1-6	D3-1	Roosevelt Ave	42 X 8	X		10 BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0142	06	029	SH27
4-16 8-16		DIST	COUNTY		SHEET NO.
		SAT	KENDALL		126

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 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
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
1 OF 7												
	1-7	R3-9cP	BEGIN	30 X 12	X		10 BWG	1	SA	P		
		R3-9b	CENTER LANE ONLY	24 X 36	X							
	1-8	R3-9dP	END	30 X 12	X		10 BWG	1	SA	P		
		R3-9b	CENTER LANE ONLY	24 X 36	X							
		R7-1DBL	NO PARKING ANY TIME	12 x 18	X							

DATE: *DATE TIME*
FILE: *DOCUMENT NAME*

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.

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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.
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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		0142	06	029	SH27
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	KENDALL		127

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
2 OF 7												
	2-1	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		10BWG	1	SA	P		
	2-2	D3-1	Eighth St	30 X 8	X		10BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	2-3	M3-4B	WEST	24 X 12	X		S80	1	SA	U	1EXT	
		M1-1	INTERSTATE 10	24 X 24	X							
		M6-1B		21 X 15	X							
		M3-1	NORTH	24 X 12	X							
		M1-4	87	24 X 24	X							
		M6-1		21 X 15	X							
		M3-2B	EAST	24 X 12	X							
		M1-1	INTERSTATE 10	24 X 24	X							
		M6-3B		21 X 15	X							
	2-4	R1-1	Eighth St	30 X 8	X		10BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		D3-1	STOP	36 X 36	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		128

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
2 OF 7												
	2-5	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		10BWG	1	SA	P		
		R5-1	DO NOT ENTER	36 X 36	X							
	2-6	D1-3	Waring San Antonio Fredericksburg	90 X 36	X		S80	1	SA	T		
	2-7	R2-1	SPEED LIMIT 35	30 X 36	X		10BWG	1	SA	P		
	2-8	S1-1		36 X 36	X		10BWG	1	SA	P		
		SW16-9P	AHEAD	24 X 12	X							
	2-9	D3-1	Seventh St	36 X 8	X		10BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	2-10	D3-1	Seventh St	36 X 8	X		10BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	2-11	M2-1	JCT	21 X 15	X		10BWG	1	SA	P		
		M1-6R	RANCH 473 ROAD	24 X 24	X							
	2-12	D9-10T	TOURIST INFO CENTER	48 X 48	X		10BWG	1	SA	T		

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).

DATE: DATE TIME
FILE: DOCUMENT NAME

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	0142	06	029	SH27
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		129

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 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
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
3 OF 7												
	3-1	D2-2	Waring 8 San Antonio 47	78 X 24	X		10BWG	1	SA	T		
	3-2	S4-3P	SCHOOL	24 X 8	X		10BWG	1	SA	P		
		R2-1	SPEED LIMIT 25	24 X 30	X							
		S4-1P	7:00 - 8:00 AM 3:00 - 4:00 PM	24 X 10	X							
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	36 X 18	X							
	3-3	R2-1	SPEED LIMIT 35	30 X 36	X		10BWG	1	SA	P		
	3-4	D3-1	Sixth St	30 X 8	X		10BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	3-5	D3-1	Sixth St	30 X 8	X		10BWG	1	SA	P		
		D3-1	Front St	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	3-6	D1-2	Center Point Sisterdale	96 X 30	X		S80	1	SA	T		
	3-7	M3-2	EAST	24 X 12	X		10BWG	1	SA	P		
		M1-6T	27 TEXAS	24 X 24	X							

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:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE: *DATE TIME*
FILE: *DOCUMENT NAME*

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	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		130

TB

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext; BM = Extruded Wind Beam; WC = 1.12 #/ft Wing Channel; EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
3 OF 7												
	3-8	S4-3P	SCHOOL	24 X 8	X		10BWG	1	SA	P		
		R2-1	SPEED LIMIT 25	24 X 30	X							
		S4-1P	7:00 - 8:00 AM 3:00 - 4:00 PM	24 X 10	X							
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	36 X 18	X							
	3-9	M1-6R	RANCH 473 ROAD	24 X 24	X		10BWG	1	SA	U		
		M6-2		21 X 15	X							
		M1-6T	27 TEXAS	24 X 24	X							
		M6-3		21 X 15	X							
	3-10	D1-1	Sisterdale	90 X 18	X		10BWG	1	SA	T		
	3-11	R4-7		24 X 30	X		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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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		131

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 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
3 OF 7							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
	3-12	D3-1	FM 473	30 X 8	X		10BWG	1	SA	P		
		D3-1	SH 27	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	3-13	M1-6T	27 TEXAS	24 X 24	X		10BWG	1	SA	U		
		M3-2	EAST	24 X 12	X							
		M6-1	⇦	21 X 15	X							
		M1-6T	27 TEXAS	24 X 24	X							
		M3-4	WEST	24 X 12	X							
		M6-1	⇨	21 X 15	X							
	3-14	M1-6R	RANCH 473 ROAD	24 X 24	X		10BWG	1	SA	U		
		M6-1	⇦	21 X 15	X							
		M1-6T	27 TEXAS	24 X 24	X							
		M6-3	⇧	21 X 15	X							
	3-16	D12-2	VIA VANPOOL SERVICE 210.362.2555	72 X 42	X		S80	1	SA	T		

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.

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NOTE:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

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FILE: *DOCUMENT NAME*

Texas Department of Transportation

Traffic Operations Division Standard

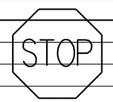
SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		132

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
3 OF 7												
	3-18	D4-2R		30 X 36	X		10BWG	1	SA	P		
		D4-2L		30 X 36	X							
	3-19	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							
	3-20	S4-3P		24 X 8	X		10BWG	1	SA	P		
		R2-1		24 X 30	X							
		S4-1P		24 X 10	X							
		S7-1T		36 X 18	X							
	3-21	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							

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.

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NOTE:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0142	06	029	SH27
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		133

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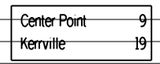
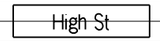
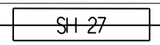
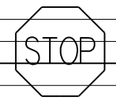
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
4 OF 7												
	4-1	D7-7aTR		48 X 48	X		10BWG	1	SA	T		
	4-2	R7-1L		12 X 18	X		10BWG	1	SA	P		
	4-3	D2-2		78 X 24	X		S80	1	SA	T		
	4-4	S1-1		36 X 36	X		10BWG	1	SA	P		
		SW16-7PL		24 X 12	X							
	4-5	M2-1		21 X 15	X		10BWG	1	SA	P		
		M1-6R		24 X 24	X							
	4-6	D7-7aTL		48 X 48	X		10BWG	1	SA	T		
	4-7	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							

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.

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NOTE:

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0142	06	029	SH27
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		134

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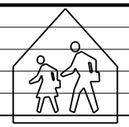
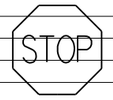
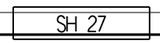
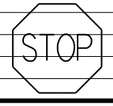
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
4 OF 7												
	4-8	S1-1		36 X 36	X		10BWG	1	SA	P		
		S7-1T		36 X 18	X							
	4-9	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							
	4-10	R2-1		30 X 36	X		10BWG	1	SA	P		
	4-11	M1-6T		24 X 24	X		10BWG	1	SA	P		
	4-12	S1-1		36 X 36	X		10BWG	1	SA	P		
		SW16-7PL		24 X 12	X							
	4-13	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							
	4-14	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							

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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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	0142	06	029	SH27
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		135

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SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 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
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
4 OF 7												
	4-15	R3-9cP	BEGIN	30 X 12	X		10BWG	1	SA	P		
		R3-9b	CENTER LANE ONLY	24 X 36	X							
		R7-1R	NO PARKING ANY TIME	12 X 18	X							
	4-16	S1-1		36 X 36	X		10BWG	1	SA	P		
		SW16-7PL		24 X 12	X							
	4-17	R3-9dP	END	30 X 12	X		10BWG	1	SA	P		
		R3-9b	CENTER LANE ONLY	24 X 36	X							
	4-18	R7-1DBL	NO PARKING ANY TIME	12 X 18	X		10BWG	1	SA	P		
	4-19	R2-1	SPEED LIMIT 35	30 X 36	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		136

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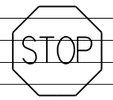
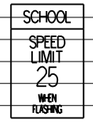
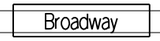
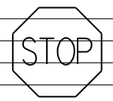
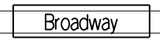
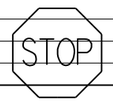
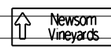
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
5 OF 7												
	5-1	R7-1L		12 X 18	X		10BWG	1	SA	P		
	5-2	R1-1		36 X 36	X		10BWG	1	SA	P		
	5-3	S5-1		24 X 48	X		10BWG	1	SA	P		
		S7-1T		24 X 18	X							
	5-4	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							
	5-5	D3-1		30 X 8	X		10BWG	1	SA	P		
		D3-1		30 X 8	X							
		R1-1		36 X 36	X							
	5-6	D21-1a		66 X 24	X							
		D21-1a		72 X 24	X		S80	1	SA	U		
	5-7	W8-13aT		36 X 36	X		10BWG	1	SA	P		
	5-8	S1-1		36 X 36	X							
		SW16-9P		24 X 12	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		137

18

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
5 OF 7												
	5-9	D3-1	Water St	30 X 8	X		10BWG	1	SA	P		
		D3-1	SH 27	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	5-10	R2-1	SPEED LIMIT 45	30 X 36	X		10BWG	1	SA	P		
	5-11	I-3	Cypress Creek	60 X 30	X		10BWG	1	SA	P		
	5-12	R2-1	SPEED LIMIT 35	30 X 36	X		10BWG	1	SA	P		
	5-13	I-3	Cypress Creek	60 X 30	X		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).

DATE: *DATE TIME*
FILE: *DOCUMENT NAME*

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		0142	06	029	SH27
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	KENDALL		138

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
6 OF 7												
	6-1	D3-1	Country Ln	36 X 8	X		10BWG	1	SA	P		
		D3-1	SH 27	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	6-2	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 X 36	X		10BWG	1	SA	P		
	6-3	D21-1a	Singing Water Vineyards ⇦ 4 Miles	72 X 36	X		S80	1	SA	T		
	6-4	D2-1	Comfort	60 x 18	X		S80	1	SA	P		
	6-5	R2-1	SPEED LIMIT 45	30 X 36	X		10 BWG	1	SA	P		
	6-6	R2-1	SPEED LIMIT 55	30 X 36	X		10 BWG	1	SA	P		
	6-7	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		10 BWG	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).

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		139

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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
7 OF 7												
	7-1	D3-1	Pankratz Rd	36 X 8	X		10 BWG	1	SA	P		
		D3-1	SH 27	30 X 8	X							
		R1-1	STOP	36 X 36	X							
	7-2	D3-1	Edmiston Ln	36 X 8	X		10 BWG	1	SA	P		
		W14-1aR	DEAD END ⇨	36 X 8	X							
		R1-1	STOP	36 X 36	X							
	7-3	R19-6T	LITTERING PROHIBITED $10 - 2000 FINE STATE LAW	48 X 30	X		10 BWG	1	SA	P		
	7-4	W3-5	SPEED LIMIT 45	36 X 36	X		10 BWG	1	SA	P		
	7-5	M1-6T	27 TEXAS	24 X 24	X		10 BWG	1	SA	P		
		M3-2	EAST	24 X 12	X							
		R19-10aT	BURN BAN IN EFFECT	24 X 24	X							
	7-6	I-2dT	Kendall COUNTY LINE	60 X 24	X		10 BWG	1	SA	P		
	7-7	D14-4T	ADOPT A HIGHWAY NEXT 3 MILES THIS SECTION AVAILABLE FOR ADOPTION (830) 257-8444	48 X 48	X		10 BWG	1	SA	T		
	7-8	I-2dT	Kerr COUNTY LINE	48 X 24	X		10 BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE: *DATE TIME*
FILE: *DOCUMENT NAME*

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	0142	06	029	SH27
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	KENDALL		140

18

DATE: *DATE TIME*
FILE: *DOCUMENT NAME*

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
INTERSECTION												
	INT-1	R1-1	STOP	36 X 36	X		10BWG	1	SA	P		
	INT-2	R1-1	STOP	36 X 36	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

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NOTE:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

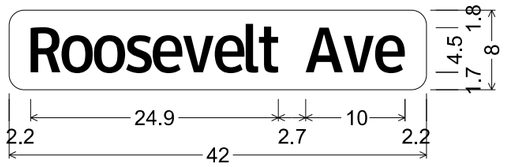
Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

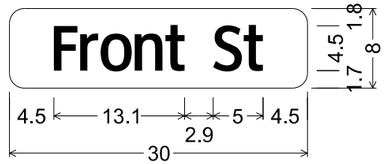
FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0142	06	029	SH27
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	KENDALL		141

18



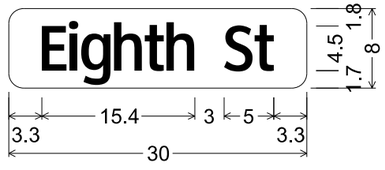
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Roosevelt Ave", ClearviewHwy-3-W 10% spacing;

1-5, 1-6



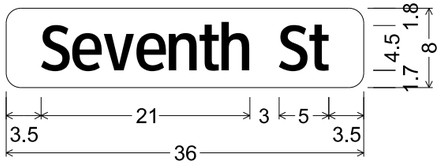
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Front St", ClearviewHwy-3-W 25% spacing;

1-5, 1-6, 2-2, 2-4, 2-9, 2-10, 3-4, 3-5



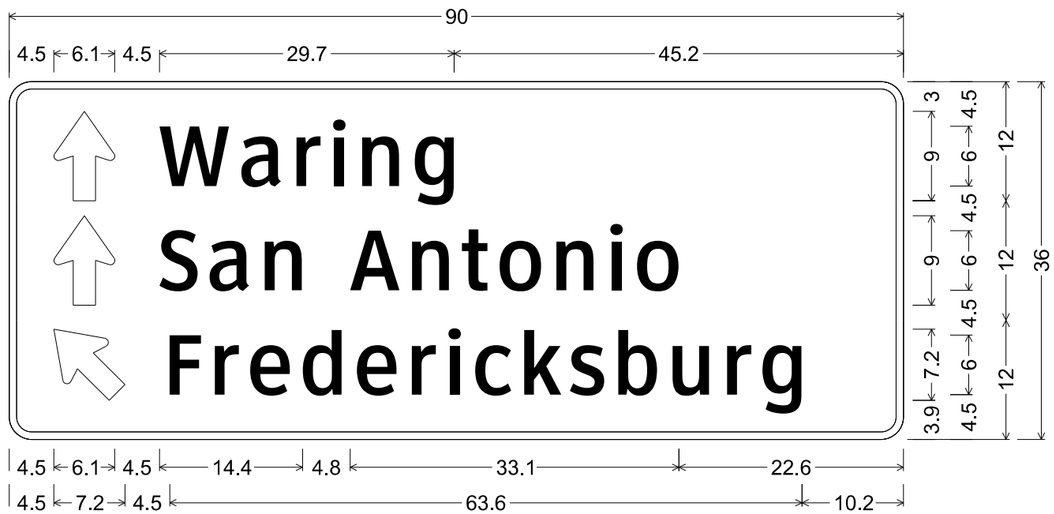
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Eighth St", ClearviewHwy-3-W 25% spacing;

2-2, 2-4



D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Seventh St", ClearviewHwy-3-W 25% spacing;

2-9, 2-10



D1-3 6in UP-UP-45LT;

2.25" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 9.0" X 6.1" 90°; "Waring", ClearviewHwy-3-W;

2.25" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 9.0" X 6.1" 90°; "San Antonio", ClearviewHwy-3-W;

2.25" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 9.0" X 6.1" 135°; "Fredericksburg", ClearviewHwy-3-W;

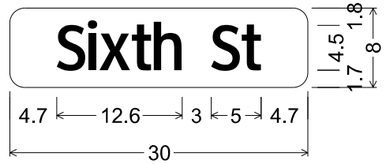
2-6

D2-2 6in;

1.5" Radius, 0.75" Border, White on Green;
"Waring", ClearviewHwy-3-W; "8", ClearviewHwy-3-W;

1.5" Radius, 0.75" Border, White on Green;
"San Antonio", ClearviewHwy-3-W; "47", ClearviewHwy-3-W;

3-1



D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Sixth St", ClearviewHwy-3-W 25% spacing;

3-4, 3-5

Kimley»Horn F-928

Texas Department of Transportation

SH 27

SIGN DETAILS

SHEET 1 OF 4

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 27

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	KENDALL	142
CONT.	SECT.	JOB	
0142	06	029	

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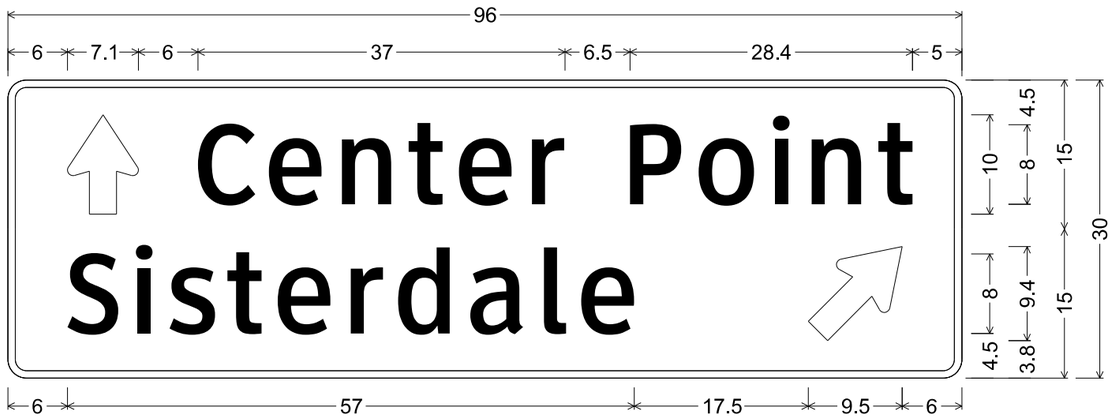


D1-2 8in UP-45RT;

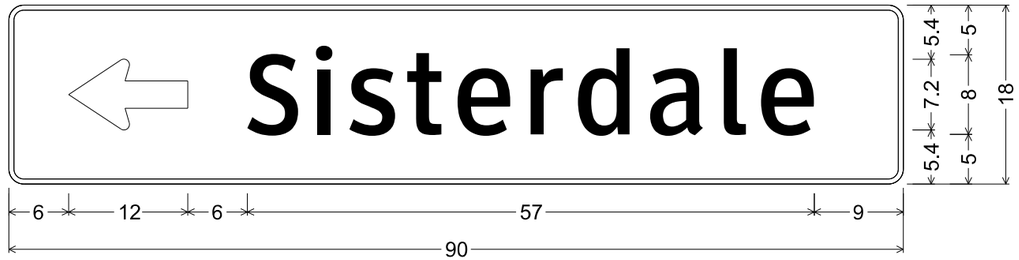
1.9" Radius, 0.75" Border, White on Green;
Standard Arrow Custom 10.0" X 7.1" 90°; "Center Point", ClearviewHwy-3-W;

1.9" Radius, 0.75" Border, White on Green;
"Sisterdale", ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 45°;

3-6

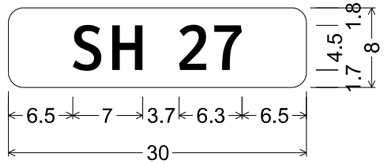
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"FM 473", ClearviewHwy-3-W 25% spacing;

3-12



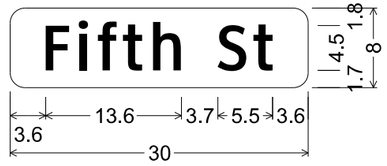
D1-1 8in LT;
1.5" Radius, 0.5" Border, White on Green;
Standard Arrow Custom 12.0" X 7.1" 180°; "Sisterdale", ClearviewHwy-3-W;

3-10



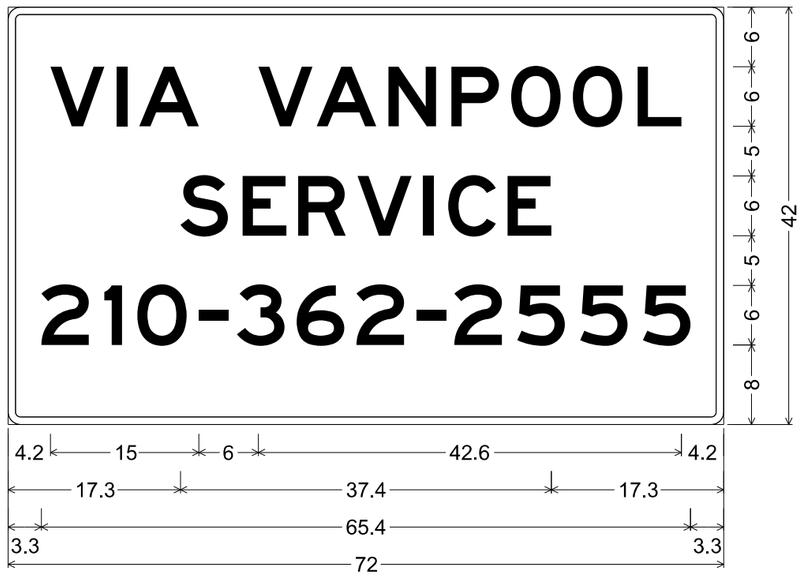
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"SH 27", ClearviewHwy-3-W;

3-12, 3-19, 3-21, 4-7, 4-9, 4-13, 4-14, 5-4, 5-5, 5-9, 6-1, 7-1



D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Fifth St", ClearviewHwy-3-W;

3-19, 3-21



D12-2_60x42;
1.3" Radius, 0.8" Border, White on Blue;
"VIA VANPOOL", E; "SERVICE", E 96% spacing;
"210-362-2555", E;

3-16

STATE OF TEXAS
MATTHEW A. GAAL
140753
LICENSED
PROFESSIONAL ENGINEER

Matthew Gaal
10/11/2023

Kimley»Horn F-928

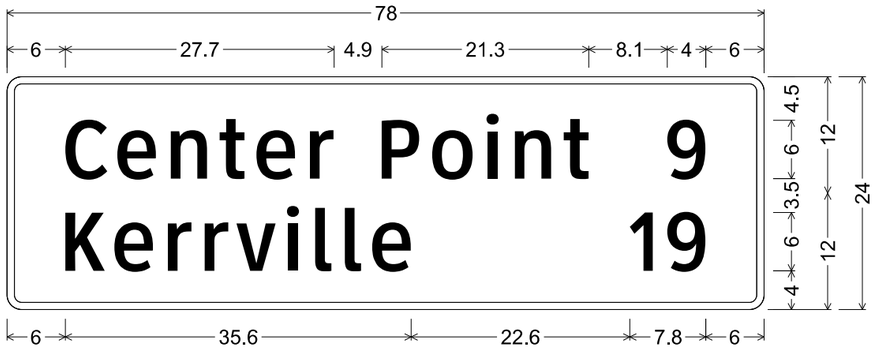
Texas Department of Transportation

SH 27

SIGN DETAILS

SHEET 2 OF 4

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			SH 27
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	KENDALL	143
CONT.	SECT.	JOB	
0142	06	029	

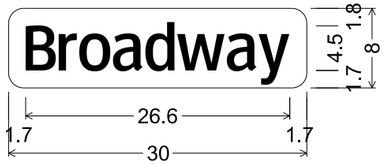


D2-2 6in;

1.5" Radius, 0.75" Border, White on Green;
"Center Point", ClearviewHwy-3-W; "9", ClearviewHwy-3-W;

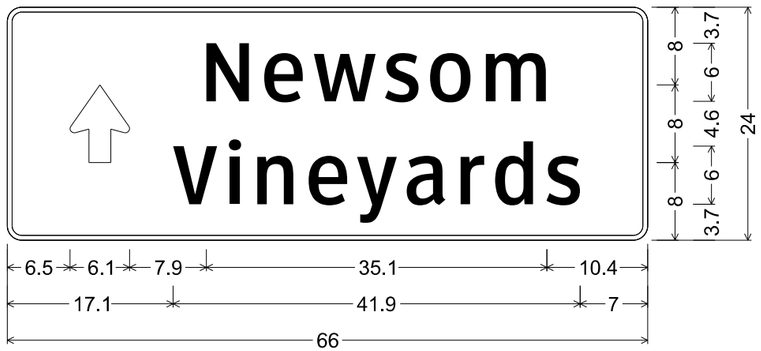
1.5" Radius, 0.75" Border, White on Green;
"Kerrville", ClearviewHwy-3-W; "19", ClearviewHwy-3-W;

4-3



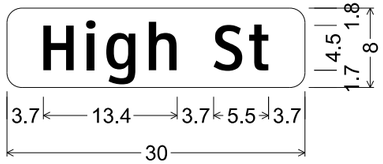
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Broadway", ClearviewHwy-3-W 25% spacing;

5-4, 5-5



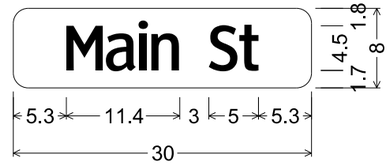
D21-1aTR_VARx24;
1.5" Radius, 0.5" Border, White on Blue;
Standard Arrow Custom 8.0" X 6.1" 90°;
"Newsom", ClearviewHwy-3-W; "Vineyards", ClearviewHwy-3-W;

5-6



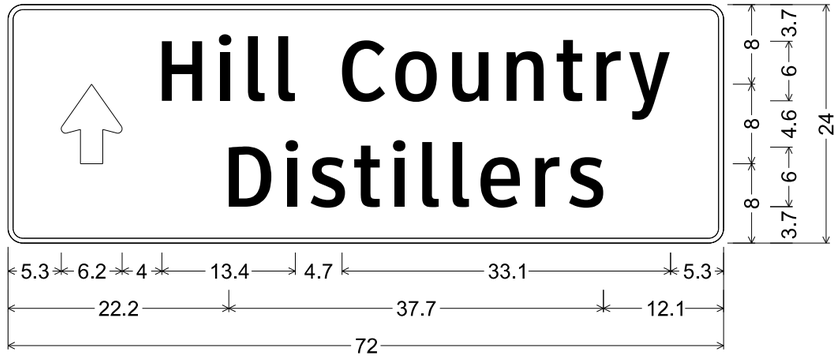
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"High St", ClearviewHwy-3-W;

4-7, 4-9



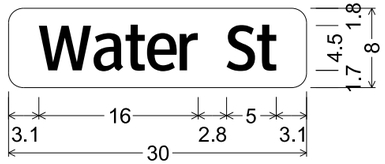
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Main St", ClearviewHwy-3-W 25% spacing;

4-13, 4-14



D21-1aTR_VARx24;
1.5" Radius, 0.5" Border, White on Blue;
Standard Arrow Custom 8.0" X 6.1" 90°;
"Hill Country", ClearviewHwy-3-W; "Distillers", ClearviewHwy-3-W;

5-6



D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Water St", ClearviewHwy-3-W 25% spacing;

5-9

10/11/2023

Kimley»Horn F-928

Texas Department of Transportation

SH 27

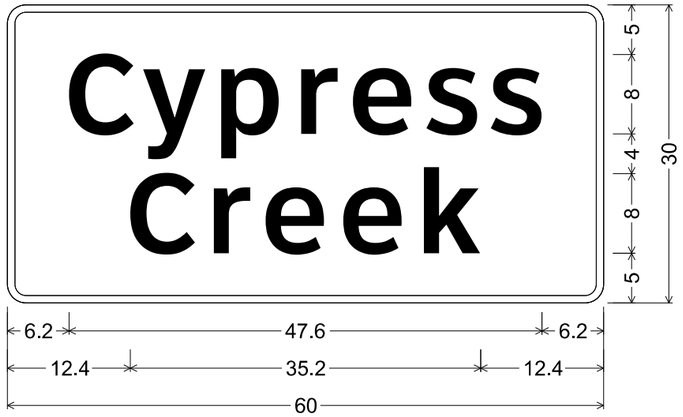
SIGN DETAILS

SHEET 3 OF 4

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 27

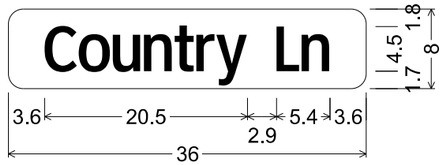
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	KENDALL	144
CONT.	SECT.	JOB	
0142	06	029	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-AUS-069273208 - SH 27/4 - Design/Plan Set/8. Traffic/08XXX_SH27_TRF_SIGNS_03.dgn
PLOTTED: 10/11/2023 11:58:21 AM



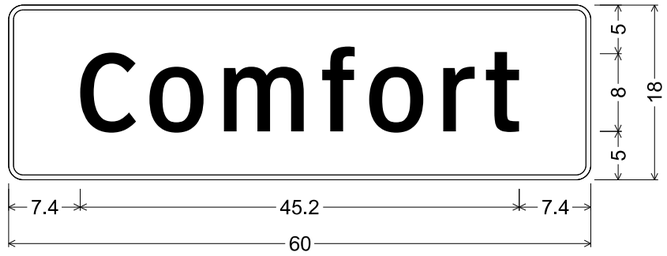
I-3 8in;
1.875" Radius, 0.75" Border, White on Green;
"Cypress", ClearviewHwy-5-W-R;
"Creek", ClearviewHwy-5-W-R;

5-11, 5-13



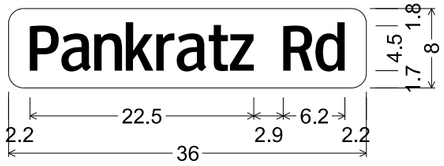
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Country Ln", ClearviewHwy-3-W 25% spacing;

6-1



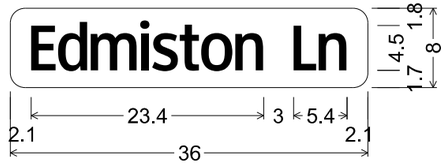
D2-1 6in;
1.5" Radius, 0.5" Border, White on Green;
"Comfort", ClearviewHwy-3-W;

6-4



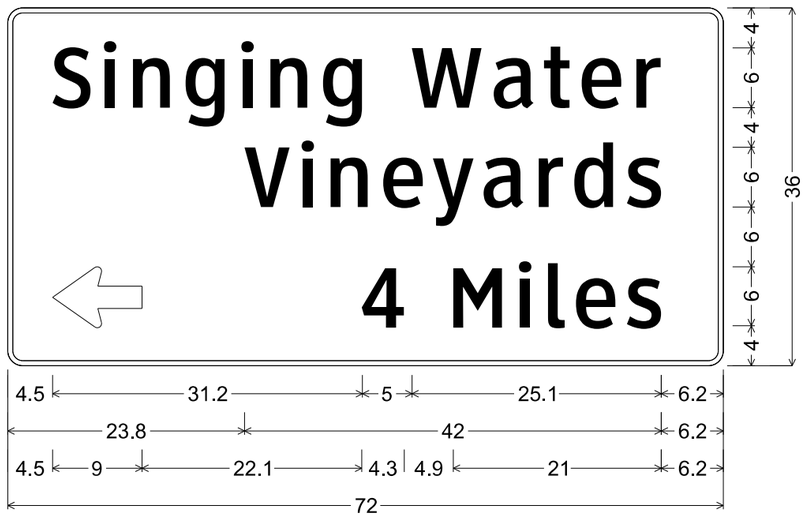
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Pankratz Rd", ClearviewHwy-3-W 25% spacing;

7-1



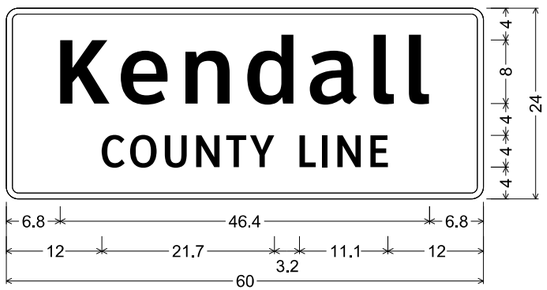
D3-1G(1) 6in;
1.5" Radius, No border, White on Green;
"Edmiston Ln", ClearviewHwy-3-W 25% spacing;

7-2



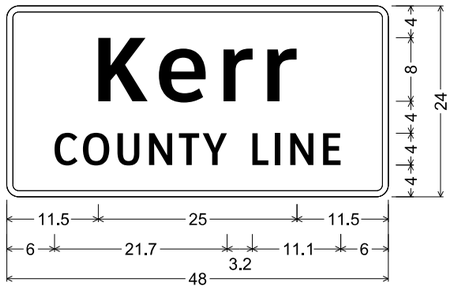
D21-1aTR_VARx24;
1.5" Radius, 0.5" Border, White on Blue;
"Singing Water", ClearviewHwy-3-W; "Vineyards", ClearviewHwy-3-W;
Standard Arrow Custom 9.0" X 6.1" 180°;
"4 Miles", ClearviewHwy-3-W;

6-3



I-2dT 8in;
1.5" Radius, 0.75" Border, White on Green;
"Kendall", ClearviewHwy-5-W-R;
"COUNTY LINE", ClearviewHwy-3-W;

7-6



I-2dT 8in;
1.5" Radius, 0.75" Border, White on Green;
"Kerr", ClearviewHwy-5-W-R;
"COUNTY LINE", ClearviewHwy-3-W;

7-8

Kimley»Horn F-928

Texas Department of Transportation

SH 27

SIGN DETAILS

SHEET 4 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		SH 27

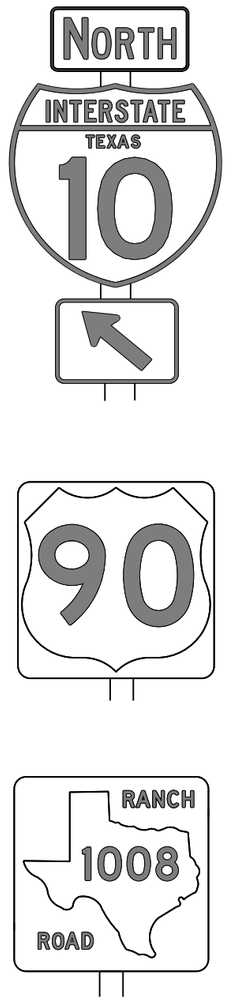
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	SAT	KENDALL	145
CONT.	SECT.	JOB	
0142	06	029	

FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-AUS-069273208 - SH 27/4 - Design/Plan Set/8. Traffic/08XXX_SH27_TRF_SIGNS_04.dgn
PLOTTED: 10/11/2023 11:58:45 AM

DATE: 10/11/2023 12:49:18 PM
FILE: c:\pw\khl\d0292552\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

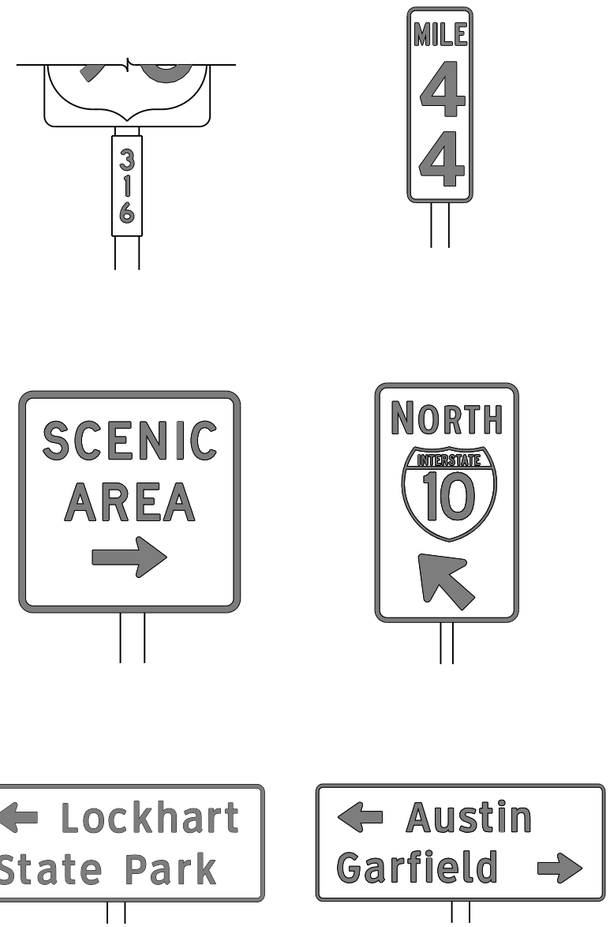
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

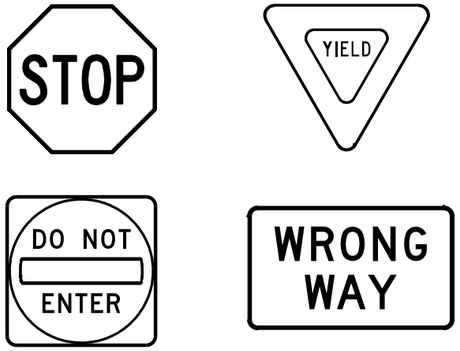
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	KENDALL		146

DATE: 10/11/2023 12:49:40 PM
FILE: c:\pw\kni\d0292552\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

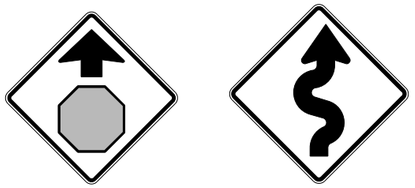
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

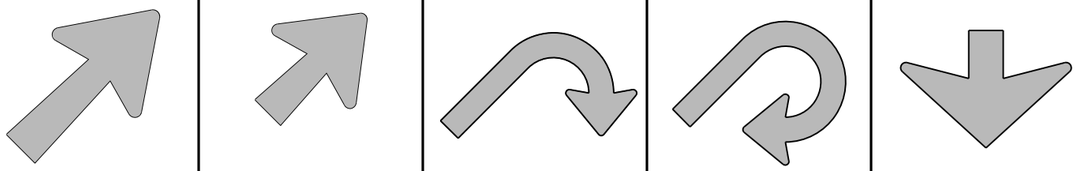
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	KENDALL		147

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

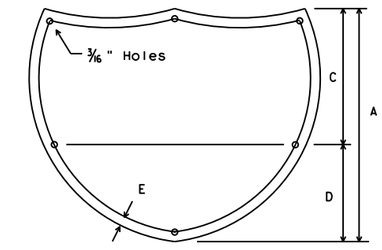
NOTE

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.

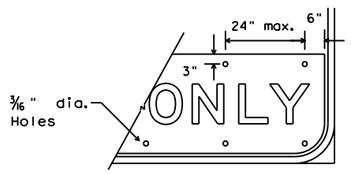
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

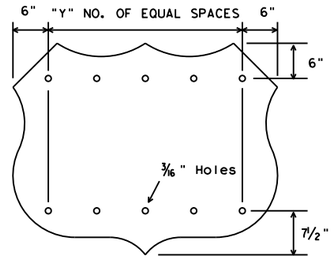


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

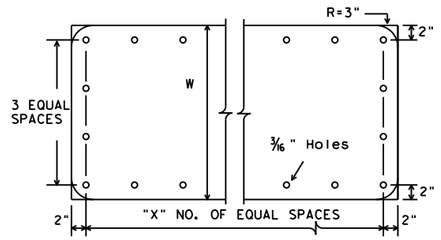


EXIT ONLY PANEL



U.S. ROUTE MARKERS

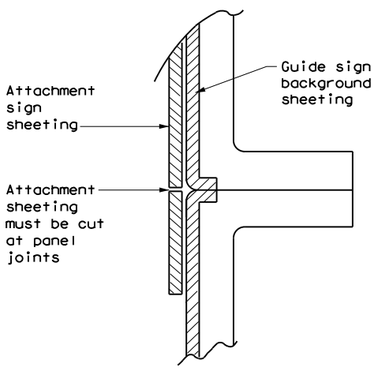
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



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

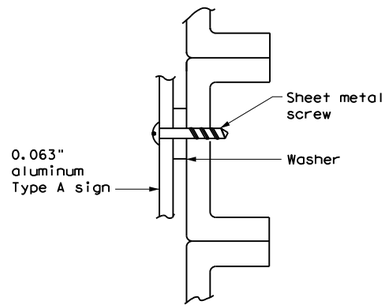
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



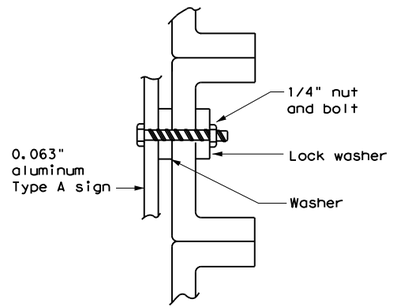
DIRECT APPLIED ATTACHMENT

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".



SCREW ATTACHMENT



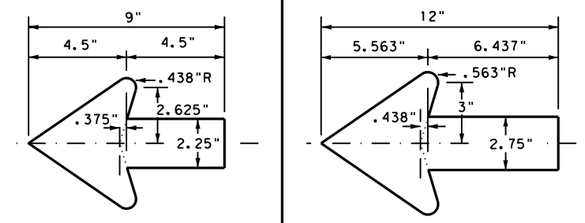
NUT/BOLT ATTACHMENT

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

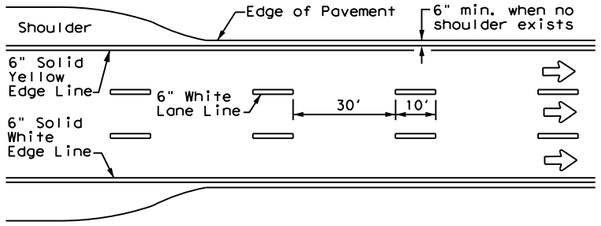
TYPICAL SIGN REQUIREMENTS

TSR(5)-13

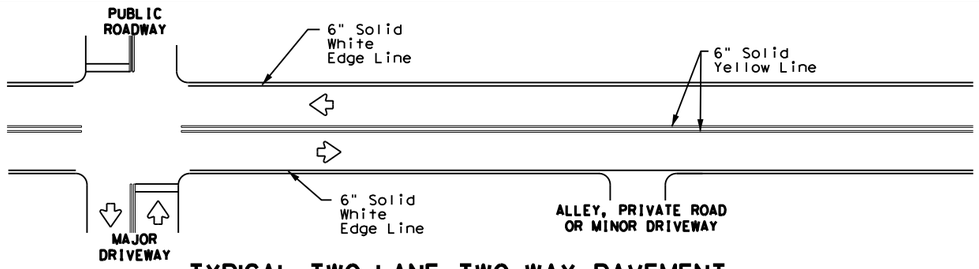
FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	KENDALL		148

5

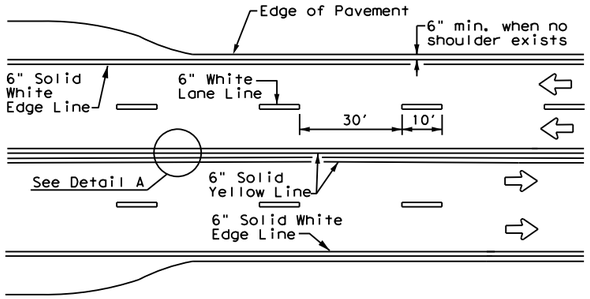
DATE: 10/11/2023 12:50:03 PM
FILE: c:\pw\khl\d029552\tsr5-13.dgn

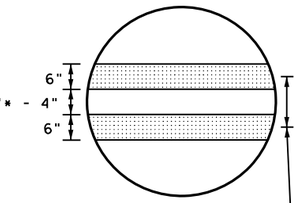


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





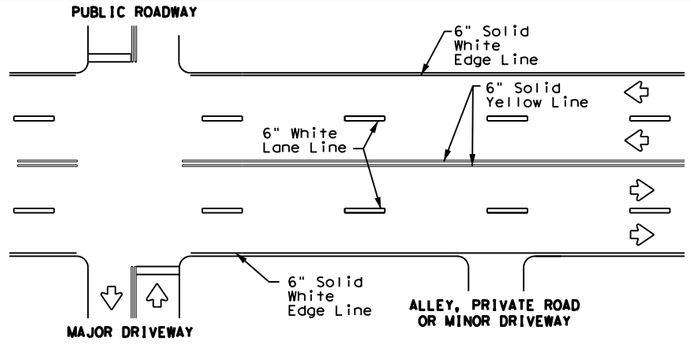
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

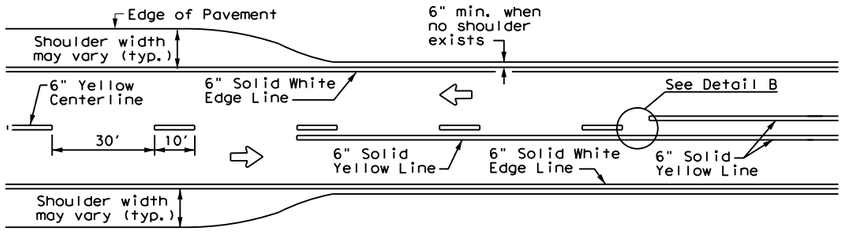
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

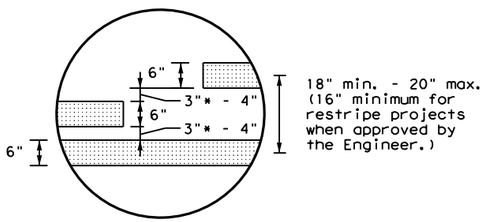
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

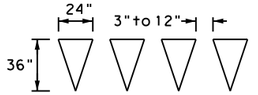


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



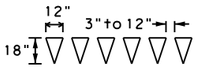
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

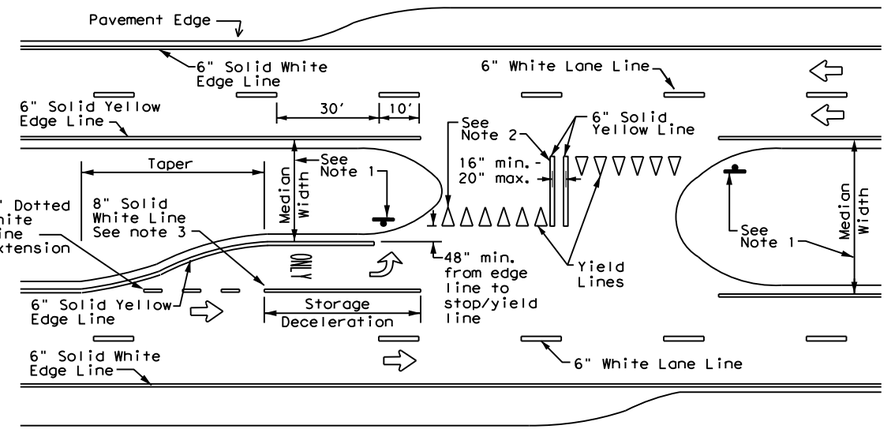


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

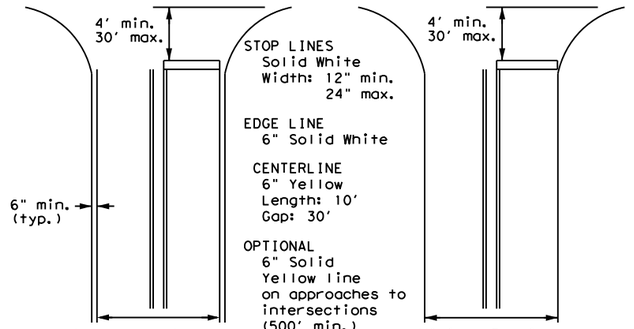
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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

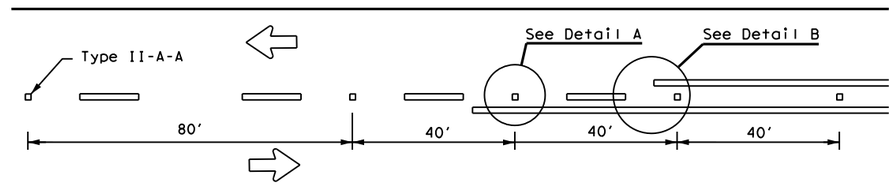
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0142	06	029	SH27
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	SAT	KENDALL		149

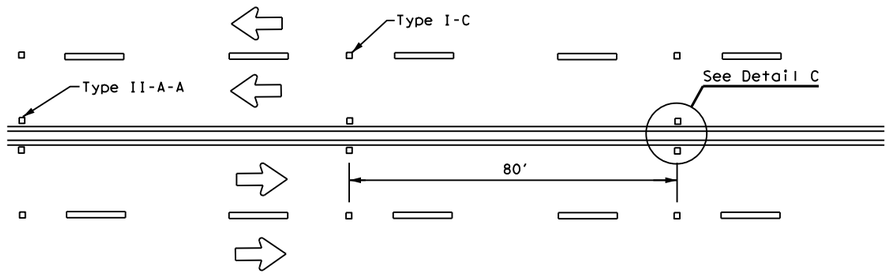
22A

DATE: 10/11/2023 12:50:26 PM
FILE: c:\pw\khl\d0292552\pm1-22.dgn

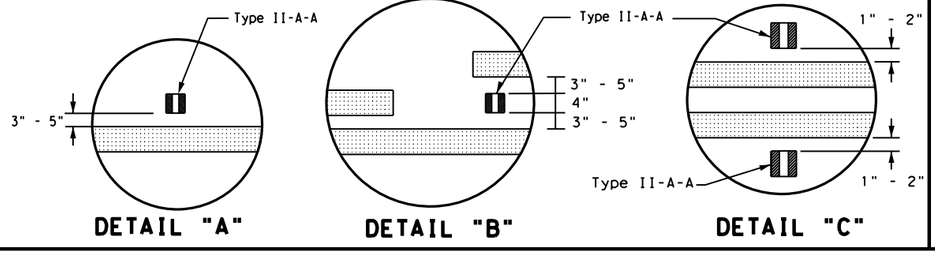
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

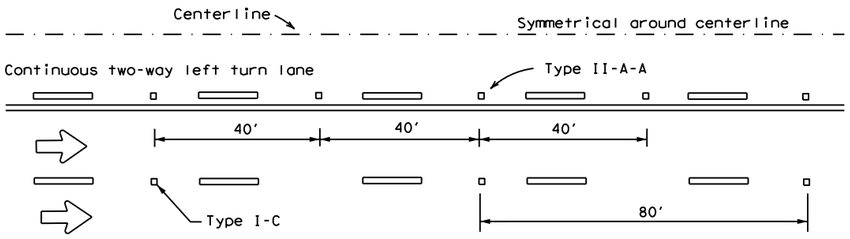


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

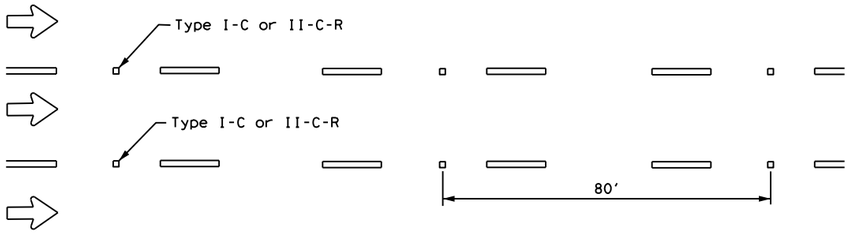


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



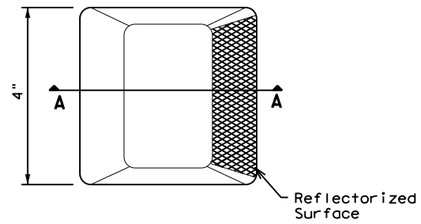
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

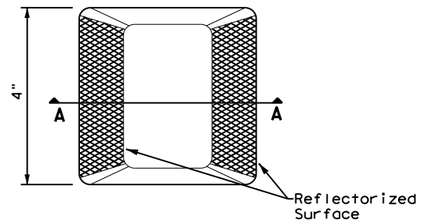
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

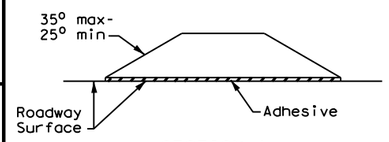
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

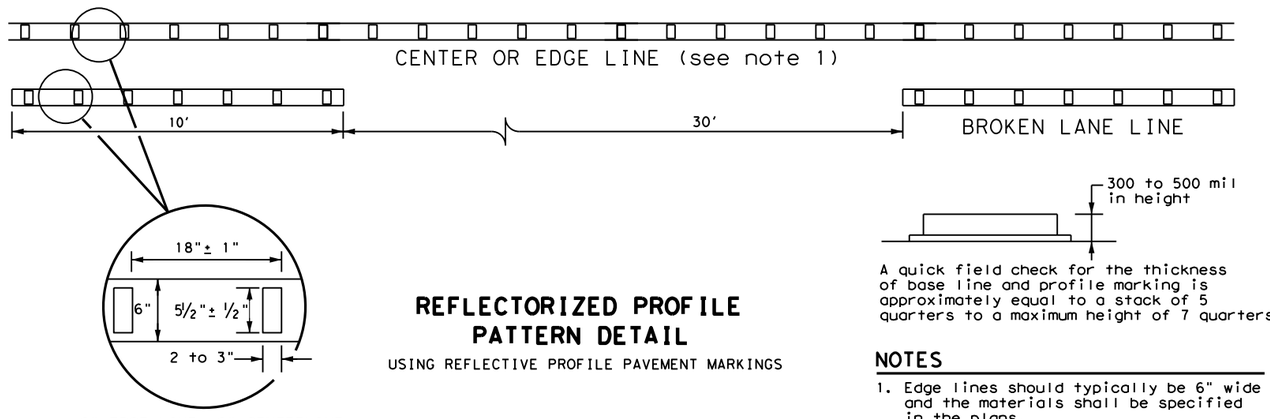


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

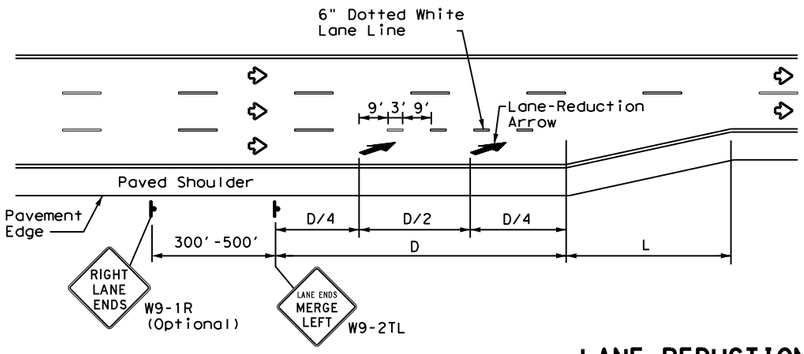
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	SAT	KENDALL		150
5-00 2-12				

22B

DATE: 10/11/2023 12:50:49 PM
FILE: c:\pw\khl\d0292552\pm2-22.dgn

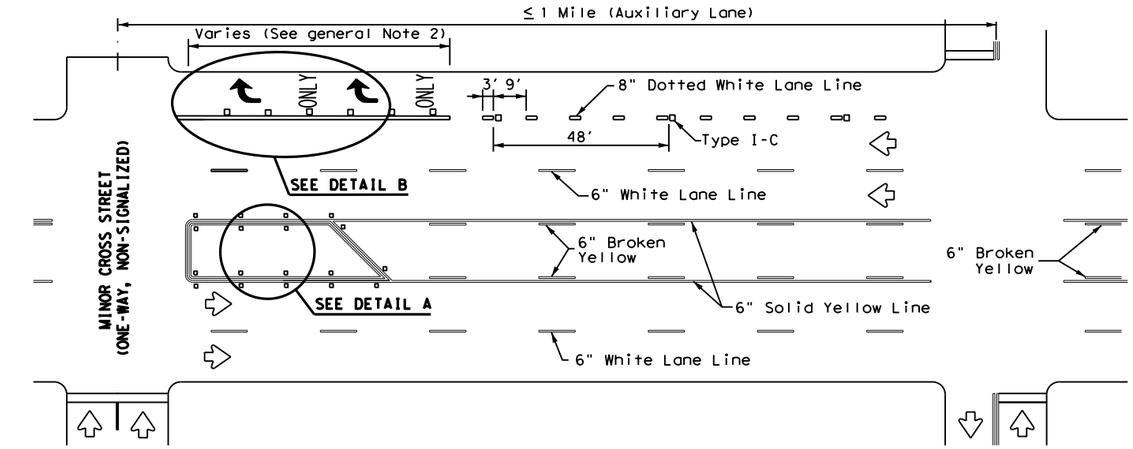


LANE REDUCTION

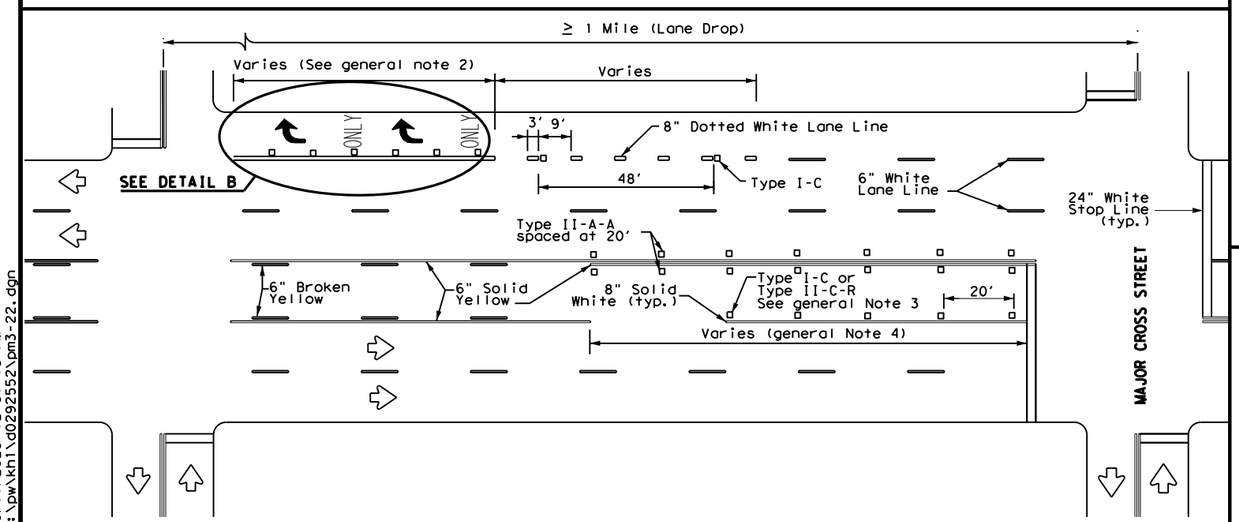
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

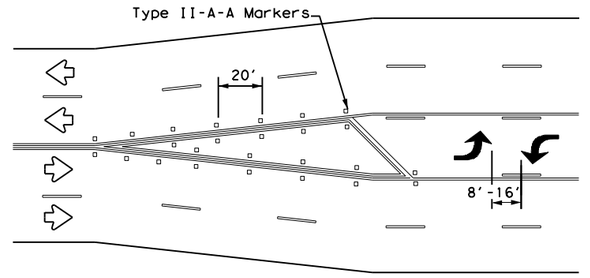
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

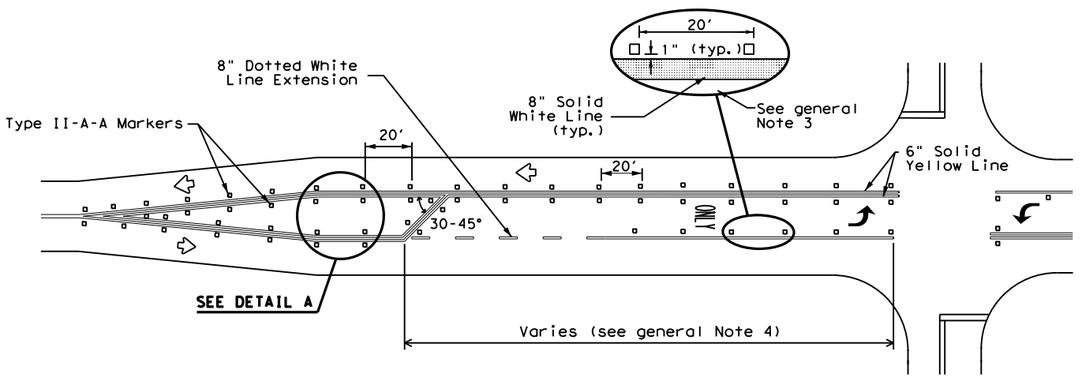
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

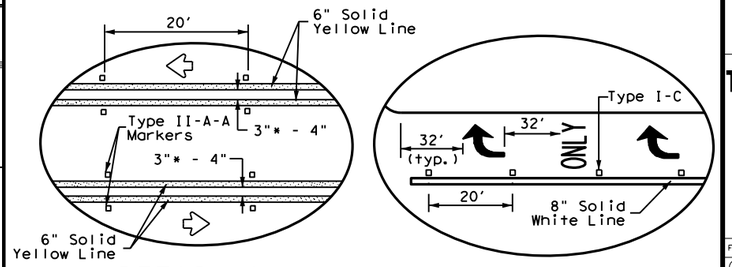
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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.



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		151

22C

DATE: 10/11/2023 12:51:13 PM
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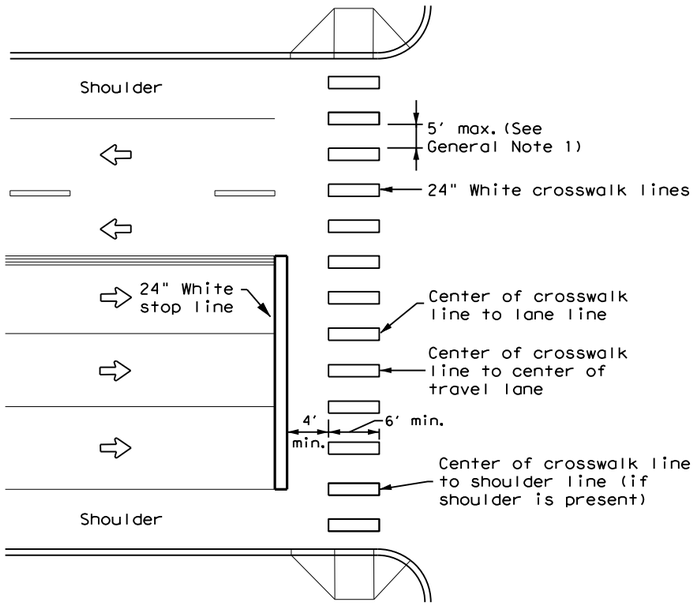


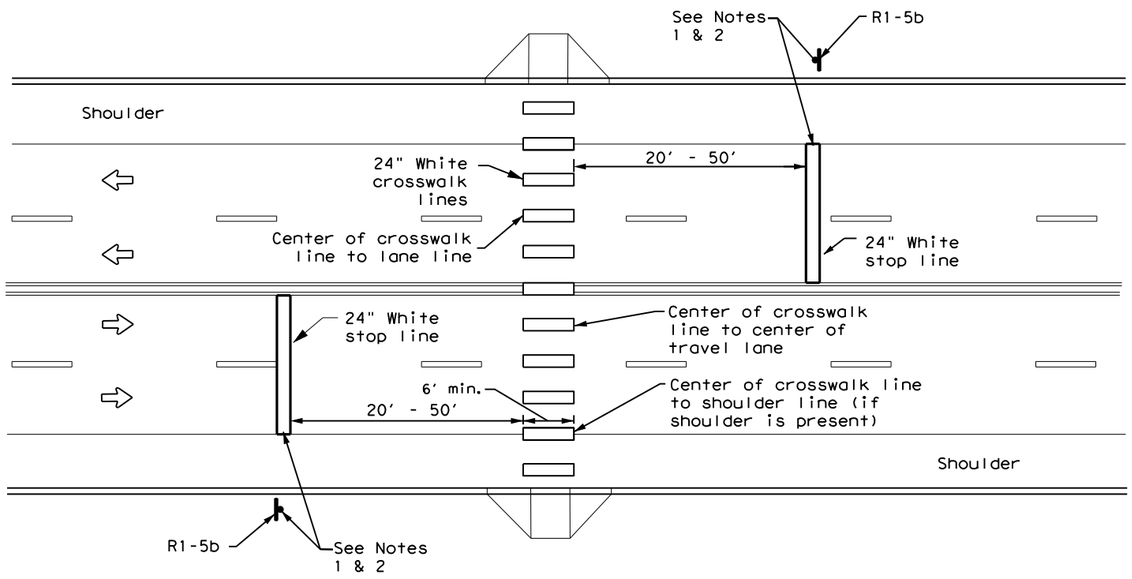
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

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

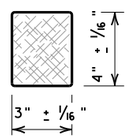
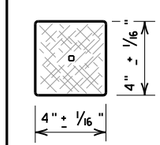
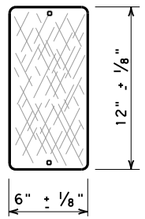
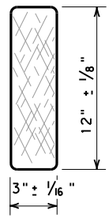
PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
6-20	DIST	COUNTY		SHEET NO.
6-22	SAT	KENDALL		152
12-22				

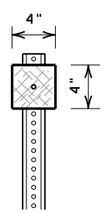
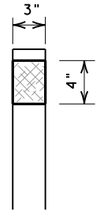
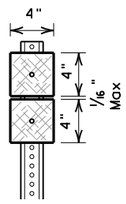
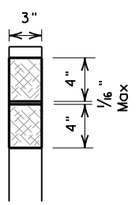
22D

DATE: 10/11/2023 12:51:42 PM
FILE: c:\pw\khl\d0292552\pm4-22a.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

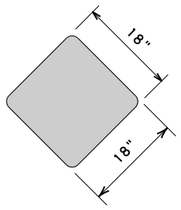
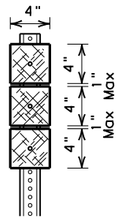
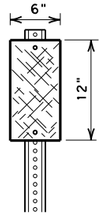
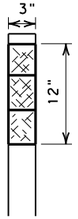
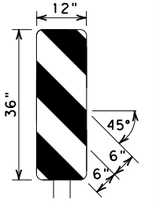
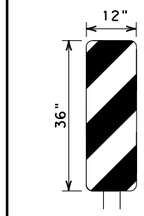
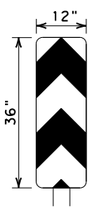
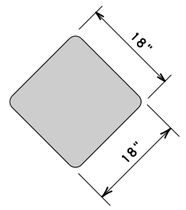
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

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

DIRECTION
If Required
BI = Bi-Directional

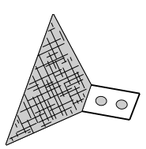
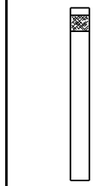
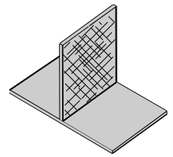
OBJECT MARKERS

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

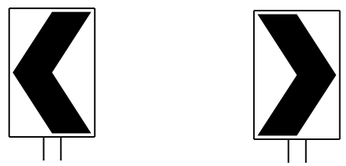
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



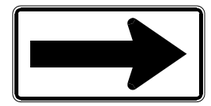
W1-8

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

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

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

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

NOTE:

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

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	KENDALL		153

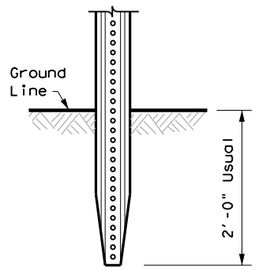
20A

DATE: 10/11/2023 12:52:06 PM
FILE: c:\pw\kni\d0292552\dom1-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

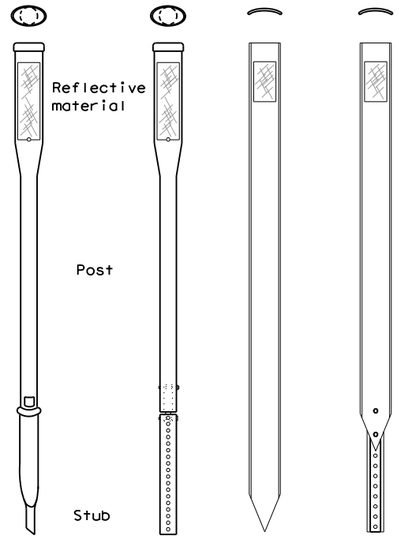


NOTES

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

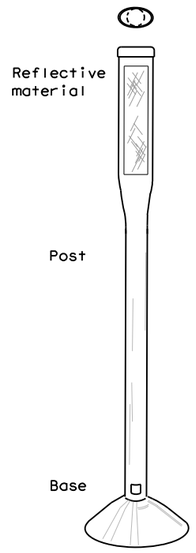
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



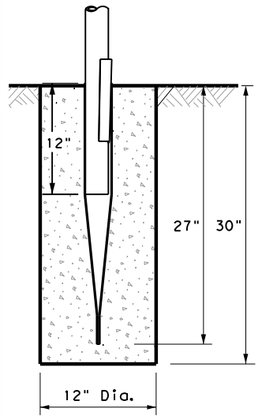
SURFACE MOUNT

NOTES

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

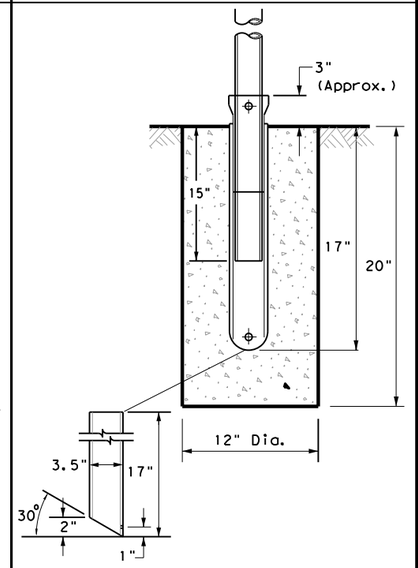
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

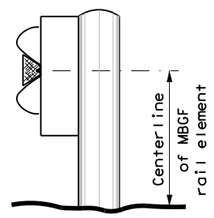
NOTE

1. Install per manufacturer's recommendations.

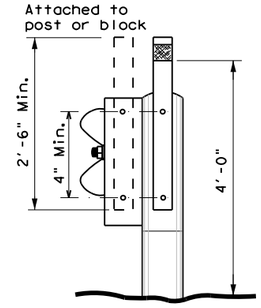
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

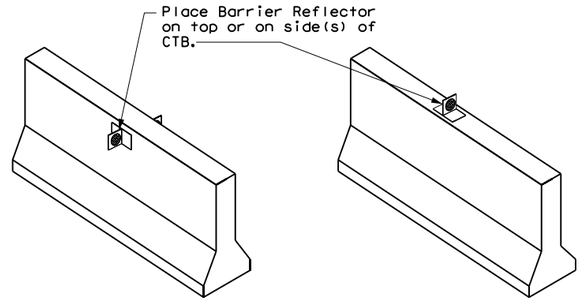
GF1



GF2



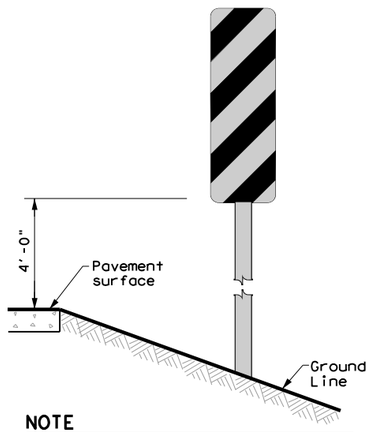
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

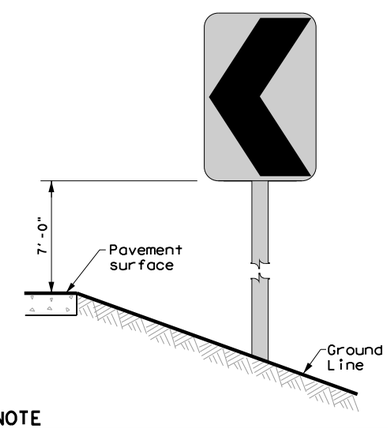
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

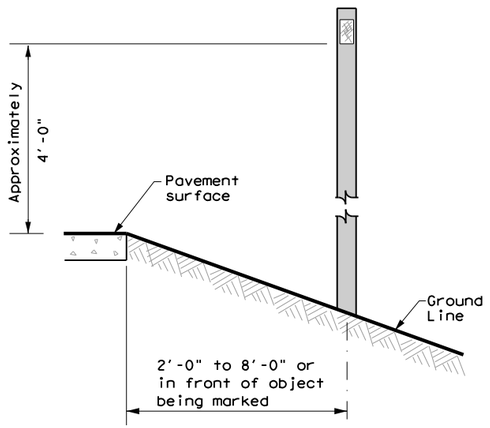
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0142	06	029	SH27
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	KENDALL		154

20B

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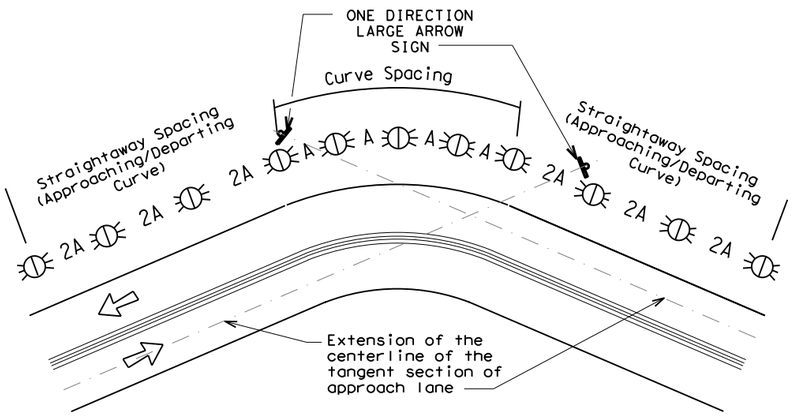
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

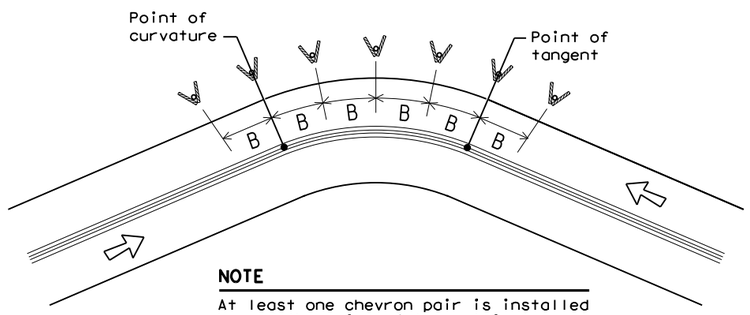
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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8-15 7-20	SAT	KENDALL		155

20C

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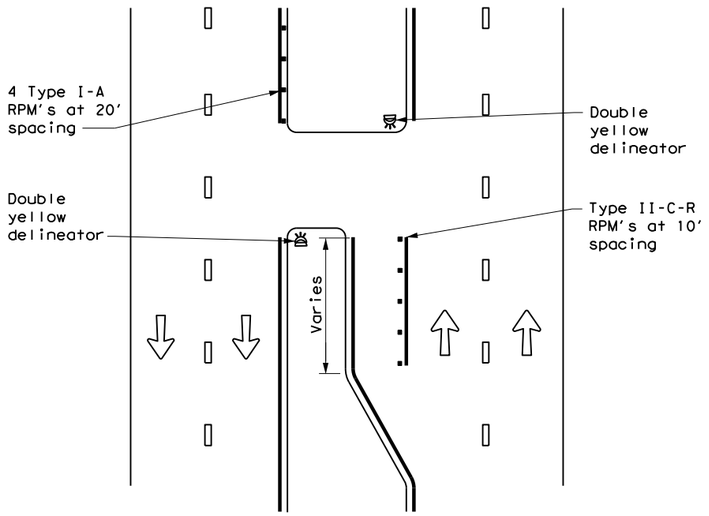
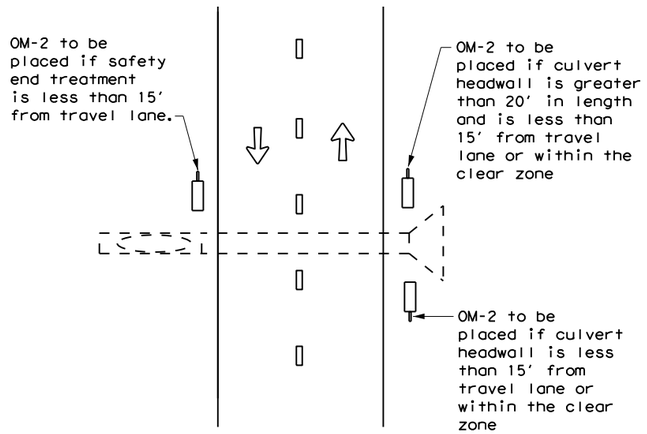
CROSSOVERS



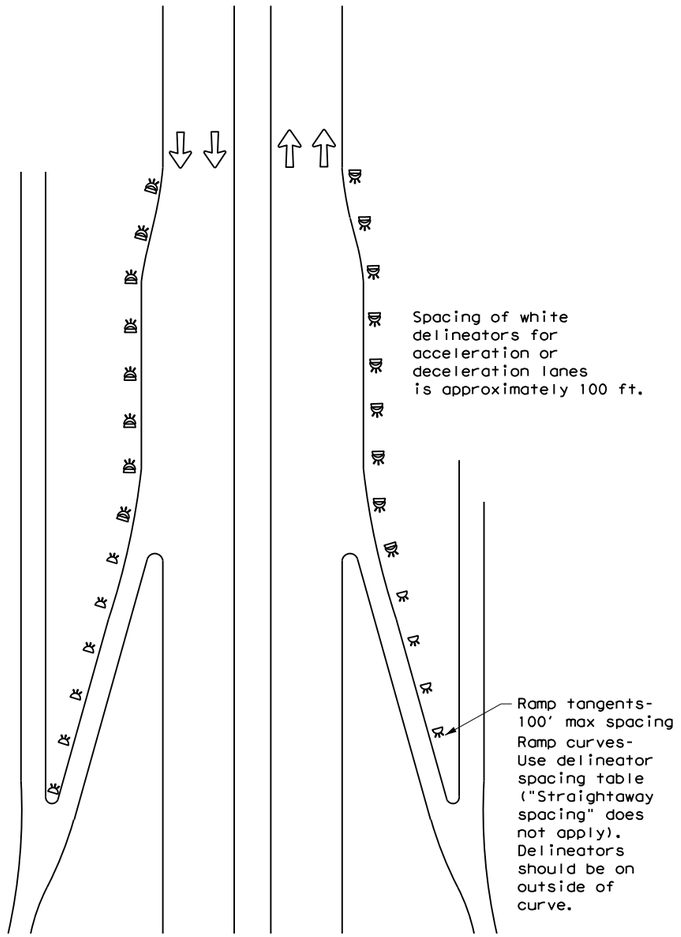
DETAIL 1

FOR CULVERTS WITHOUT MBGF



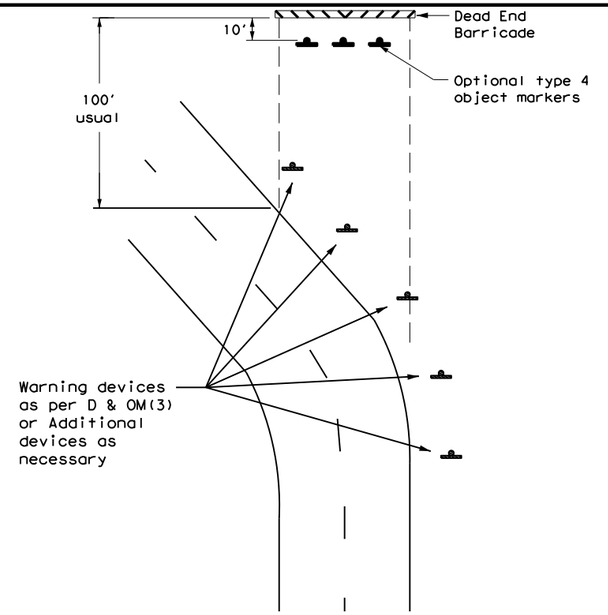
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



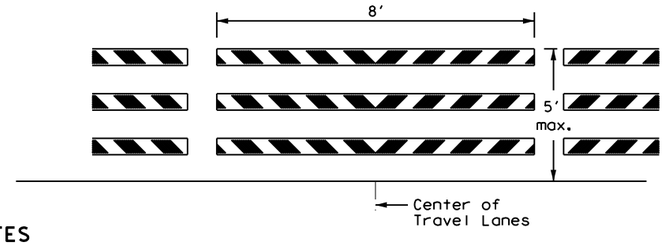
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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3-15	DIST	COUNTY		SHEET NO.
7-20	SAT	KENDALL		156

20D

DATE: 10/11/2023 12:53:13 PM
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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)

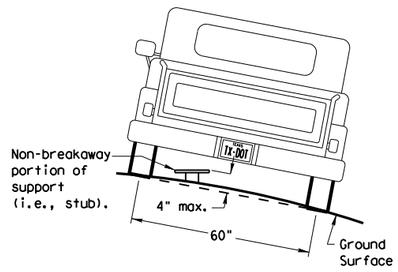
Anchor Type

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))

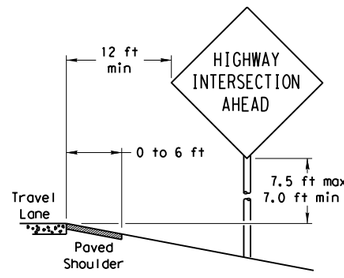
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

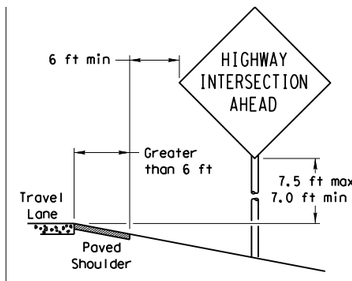
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

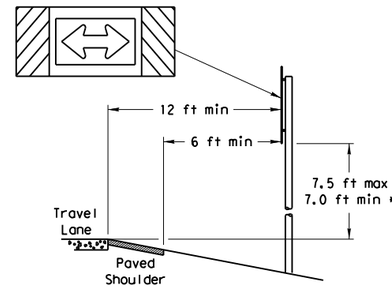
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



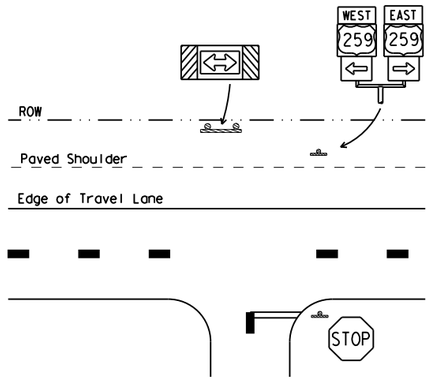
GREATER THAN 6 FT. WIDE

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.

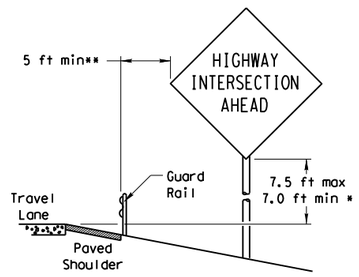
T-INTERSECTION



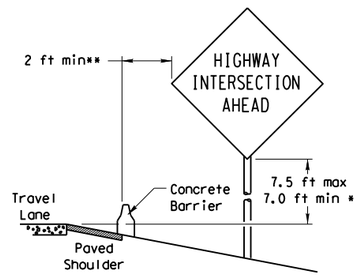
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



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

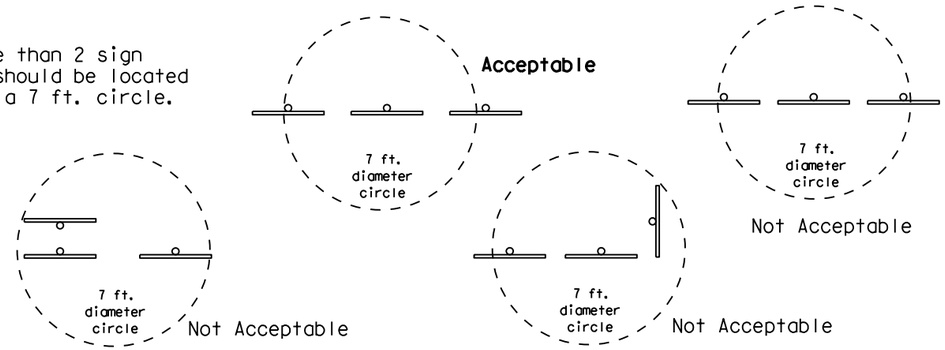
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

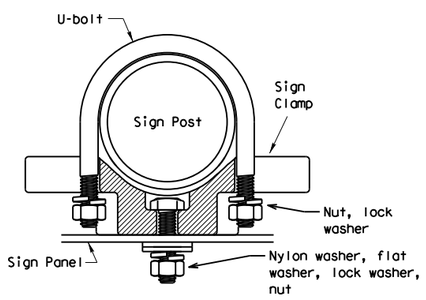
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

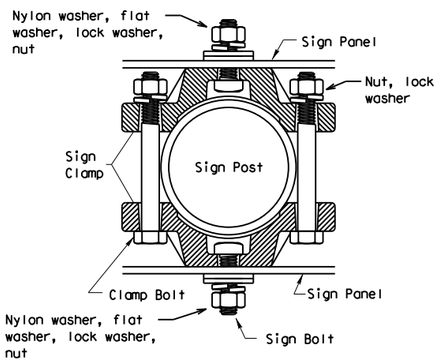


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

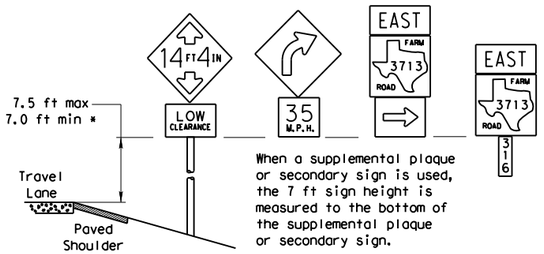
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



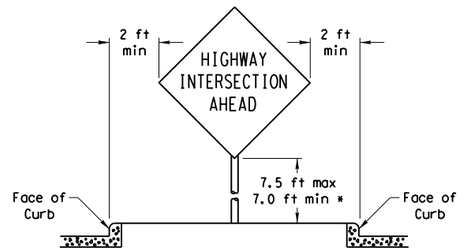
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



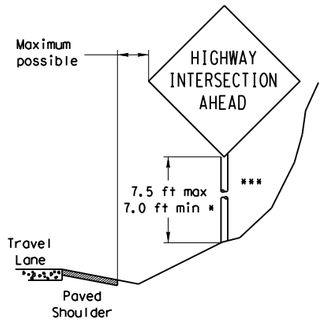
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		157

DATE: 10/11/2023 12:53:36 PM
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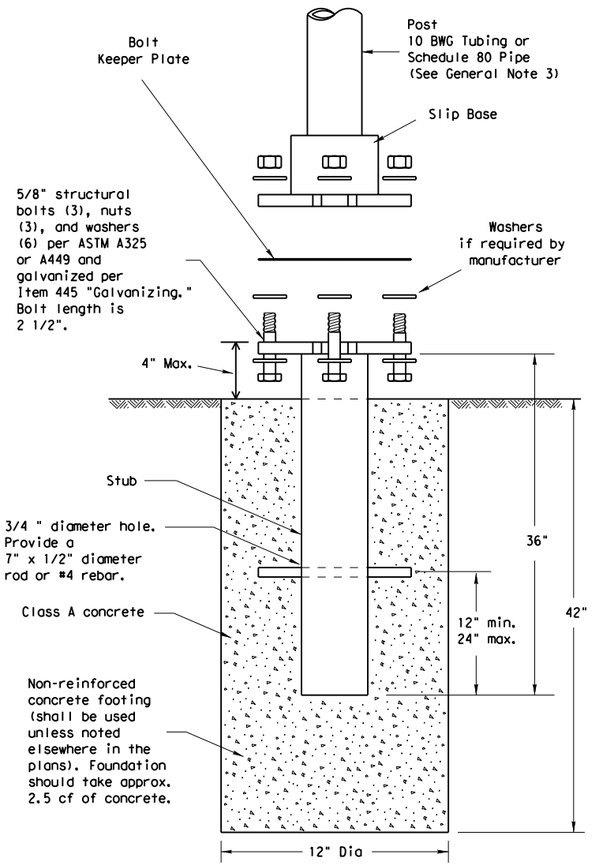
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

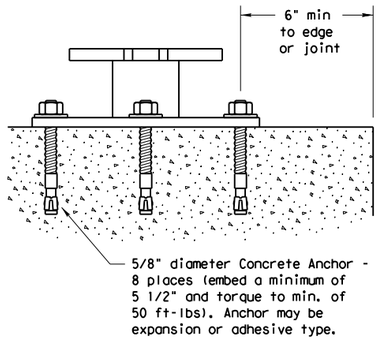
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27

DIST	COUNTY	SHEET NO.
SAT	KENDALL	158

DATE: 10/11/2023 12:54:00 PM
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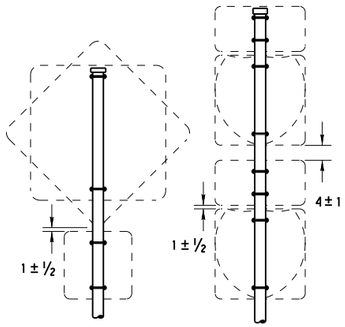
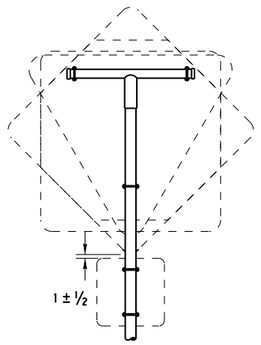
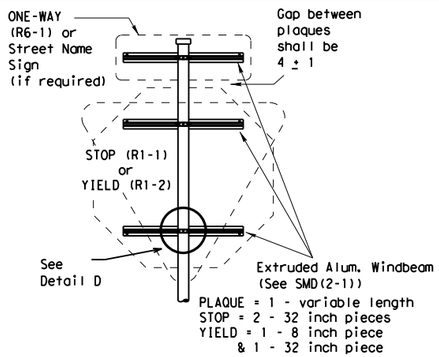


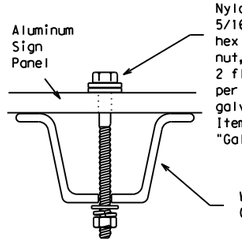
SM RD SGN ASSM TY XXXXX(1)XX(P)



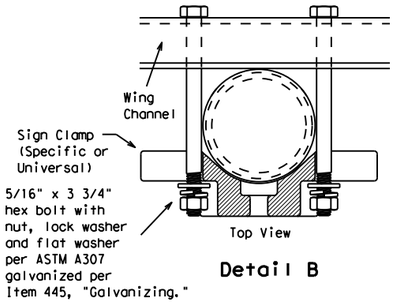
SM RD SGN ASSM TY XXXXX(1)XX(T)



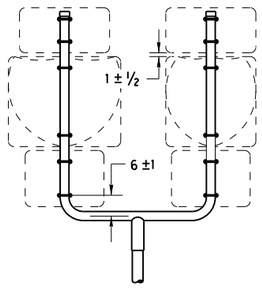
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



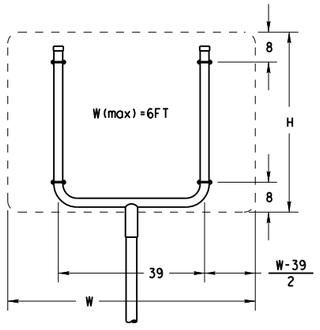
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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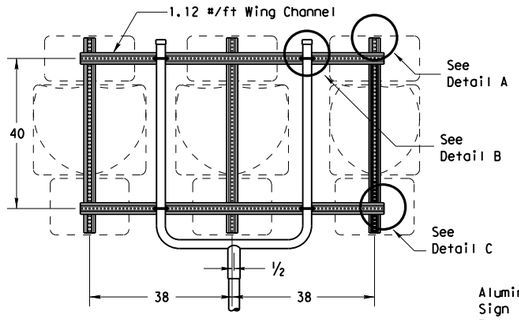


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

Drill 7/16" hole (through) after assembly and install bolt, nut, 2 flat washers and lock washer.

3/8" x 3 1/2" heavy hex bolt with nut, lock washer and 2 flat washers per ASTM A307 galvanized per Item 445 "Galvanizing."

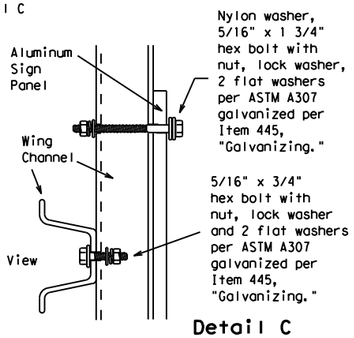
1 1/2"

Extender

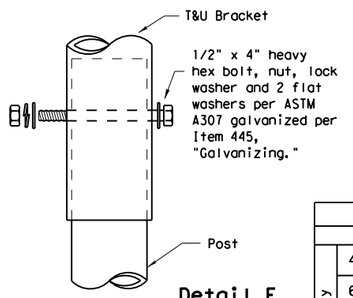
U-Bracket

Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



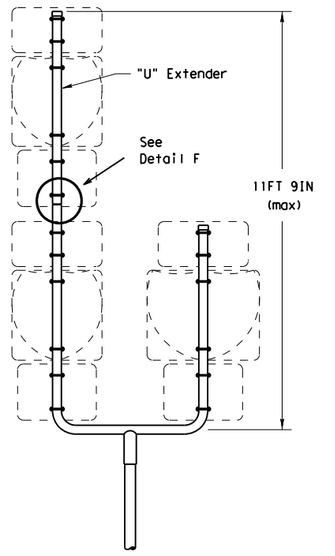
Detail E

GENERAL NOTES:

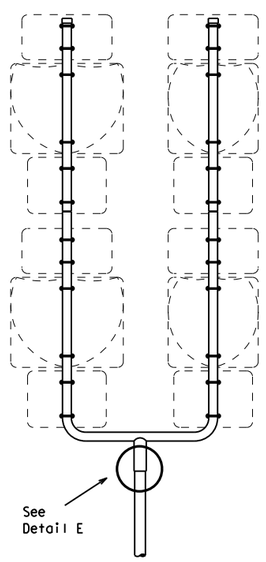
1.

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.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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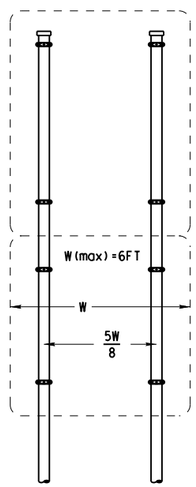
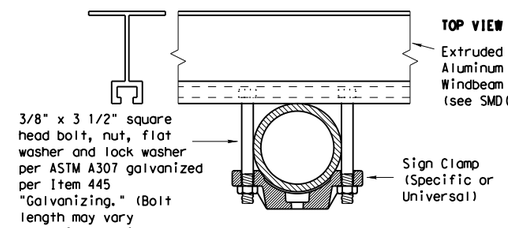
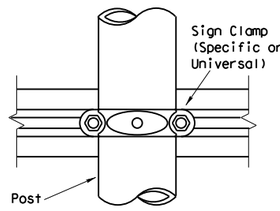


SM RD SGN ASSYM TY XXXXX(2)XX(P)

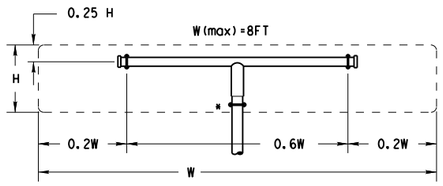
SIDE VIEW



Detail D



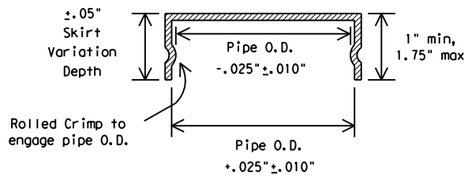
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth 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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27
DIST	COUNTY		SHEET NO.
SAT	KENDALL		159

9-08 REVISIONS

26C

DATE:10/11/2023 12:54:22 PM
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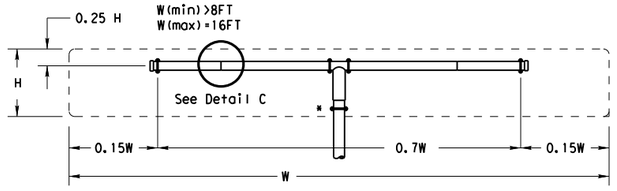
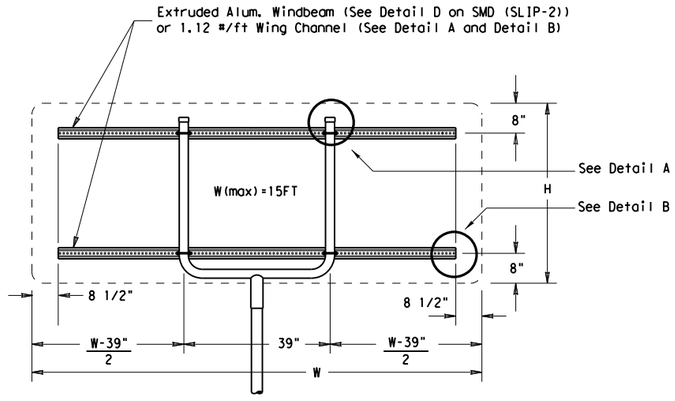


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

(* - See Note 12)



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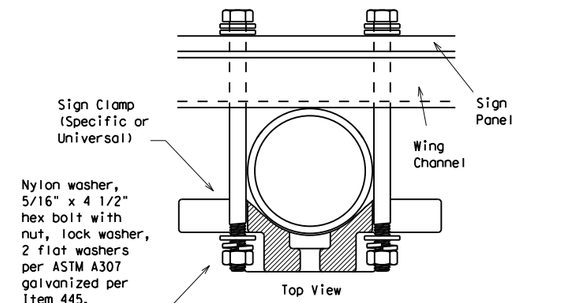
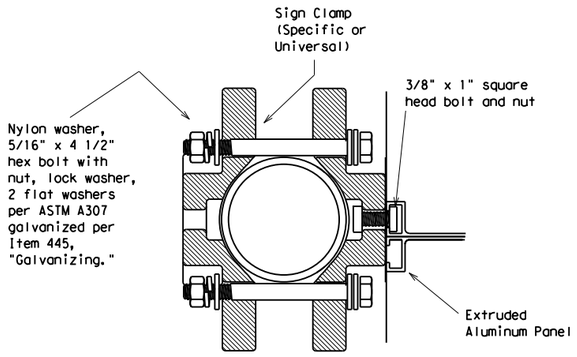
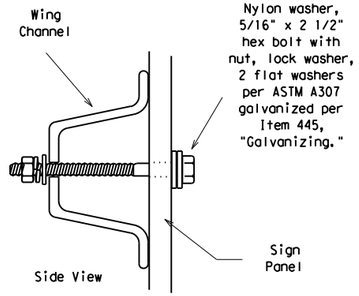


Detail A

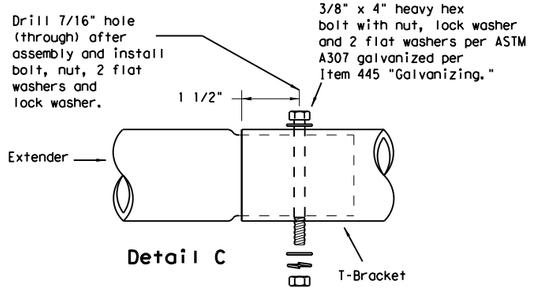


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

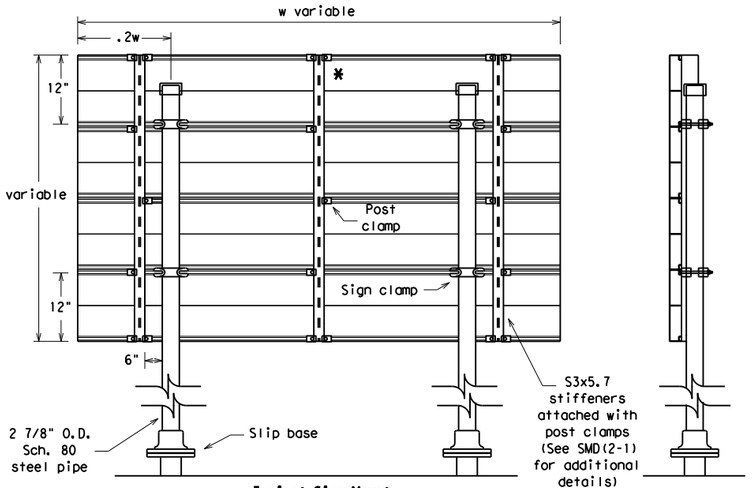


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

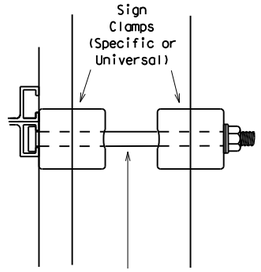


Typical Sign Mount

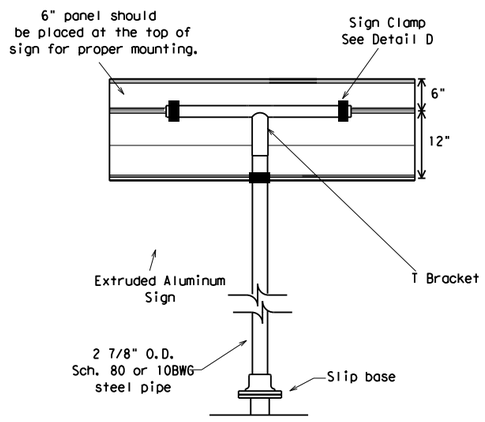
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

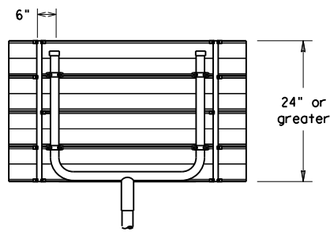
See Detail E
for clamp installation



Detail E



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

1. 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.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. 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.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. 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.
6. 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.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. 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."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. 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.
11. 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

REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
0142	06	029	SH27

DIST	COUNTY	SHEET NO.
SAT	KENDALL	160

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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 any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

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
EXISTING ROADWAY REHABILITATION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0142-06-029

1.2 PROJECT LIMITS:

From: Kendall/Kerr County Line

To: US 87

1.3 PROJECT COORDINATES:

BEGIN: 29° 58' 9.30" N, 98° 54' 34.31" W

END: 29° 57' 35.80" N, 98° 55' 14.84" W

1.4 TOTAL PROJECT AREA (Acres):15.68 ac

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.19 ac

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Grading, base, surfacing,signs and markings.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Barbarosa silty clay loam, 0 to 1 percent slopes	95% Barbarosa and similar soils, 5% minor components, well drained, medium runoff
Nuvalde silty clay, moist 1 to 3 percent slopes	90% Nuvalde, moist and similar soils, 10% minor components, well drained, medium runoff
Oakalla silty clay loam, occasionally flooded, 0 to 2 percent slopes	90% Oakalla and simailar soils, 10% minor components, well drained, low runoff

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☒ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☒ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
Cypress Creek	*Guadalupe River above Canyon Lake (1806)
N/A	Cypress Creek (1806B)
NO TMDLs or I-PLANS WERE IDENTIFIED	

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☐ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
No MS4s recieve storm water discharge from the site.

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			161
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	KENDALL	
CONT.	SECT.	JOB	HIGHWAY NO.
0142	06	029	SH 27

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

- ☒ ☒ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☒ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☒ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☒ ☐ Biodegradable Erosion Control Logs
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☒ ☐ Inlet Protection
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☒ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

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
  - ☒ 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
No permanent erosion controls are planned		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☒ Loaded haul trucks to be covered with tarpaulin
- ☒ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☒ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
Vegetated buffer zones not planned		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 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 .

2.9 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 SWP3.

10/11/2023

STATE OF TEXAS
JORDAN S. KIEWIT
131234
LICENSED
PROFESSIONAL ENGINEER

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			162
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	KENDALL	
CONT.	SECT.	JOB	HIGHWAY NO.
0142	06	029	SH 27

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (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 Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required

☐ Nationwide Permit 14 - PCN Required

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

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	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

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 appropiate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☒ Required Action

Action No.

1. Based on the age of the bridge rail on this project, non-galvanized bridge rail is assumed to contain lead-based paint. The torching, grinding or mechanical cutting of the rail or its components is not recommended without the use of the proper personal protective equipment (i.e. respirators). The contractor must remove the rail by unbolting the rail supports from the bridge. If a bolt is rusted in place and cannot be removed by unbolting, please notify the engineer ten working days before the rail needs to be removed and TxDOT will make arrangements with a specialty contractor to remove the bolts.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		163

10/11/2023 12:55:37 PM
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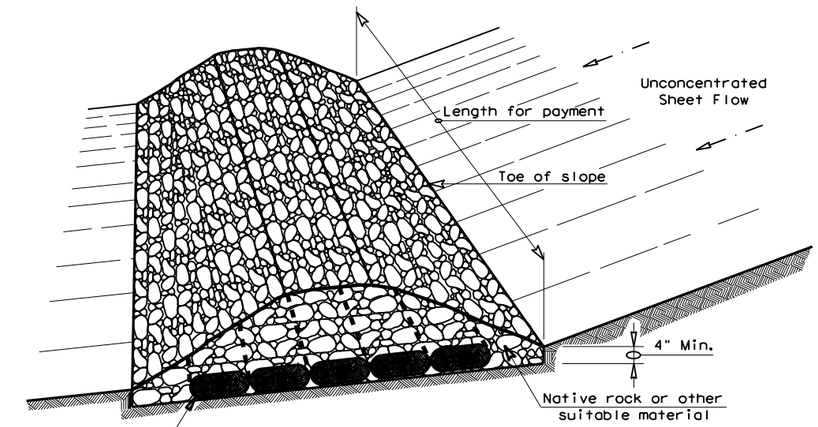
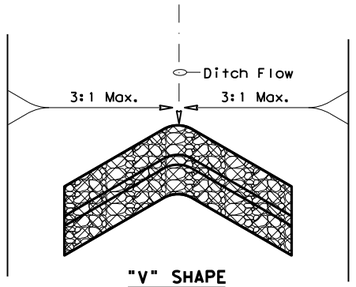
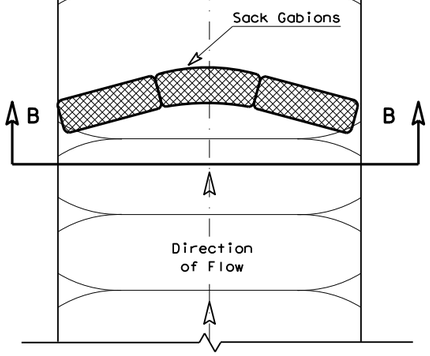


FILTER DAM AT TOE OF SLOPE

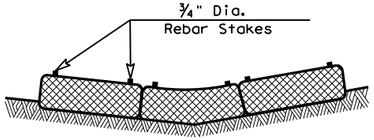
RFD1



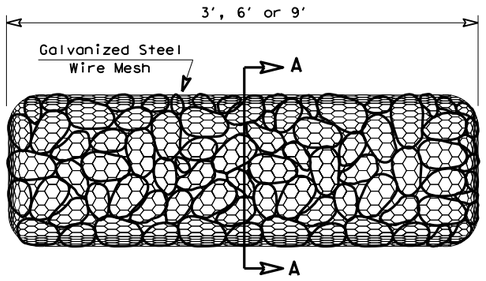
"V" SHAPE PLAN VIEW



PLAN VIEW

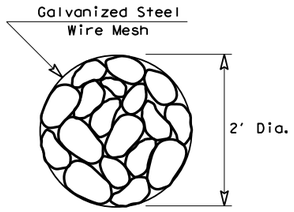


SECTION B-B

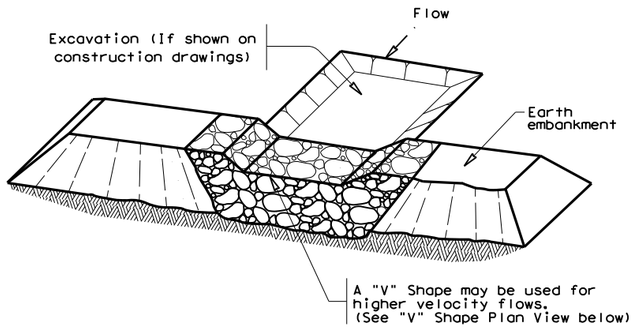


TYPE 4 (SACK GABIONS)

RFD4

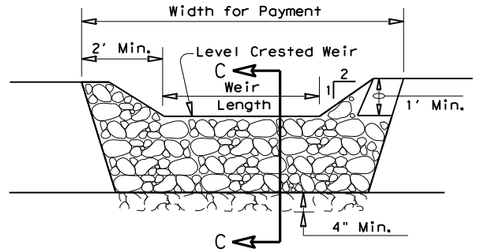


SECTION A-A

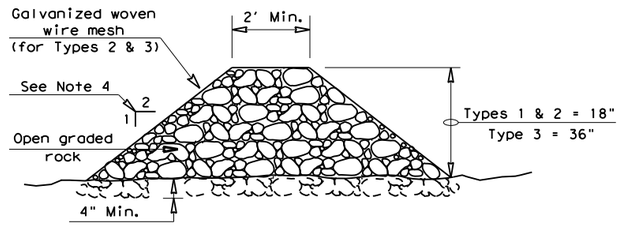


FILTER DAM AT SEDIMENT TRAP

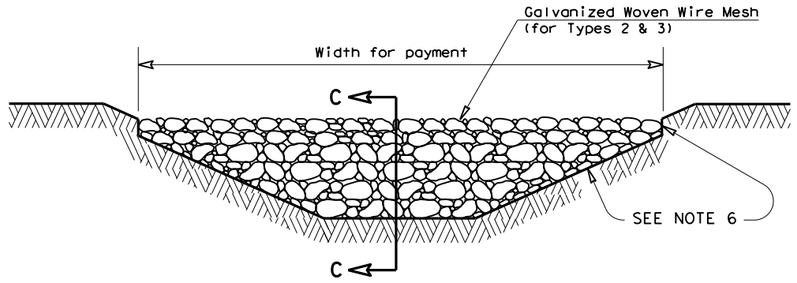
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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	SAT	KENDALL		164

DATE: 10/11/2023
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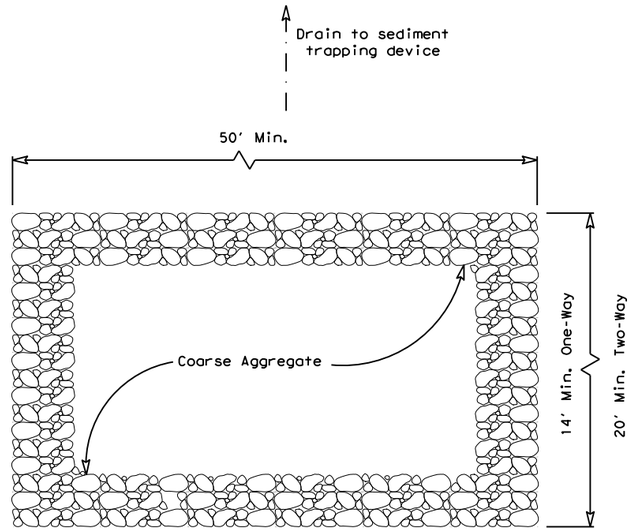
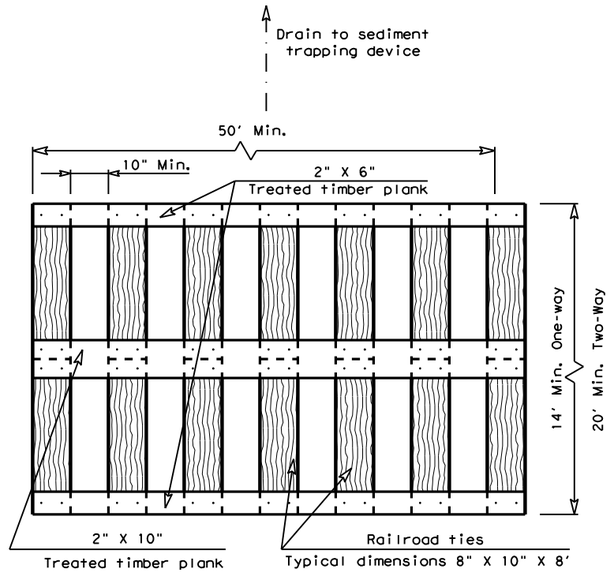
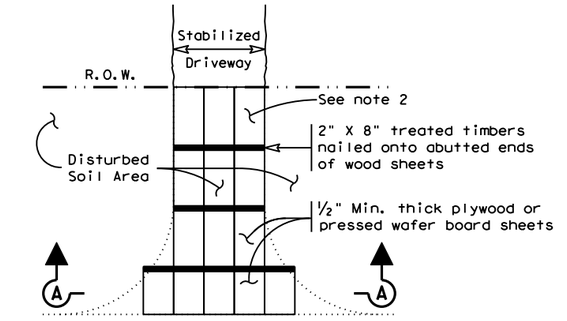


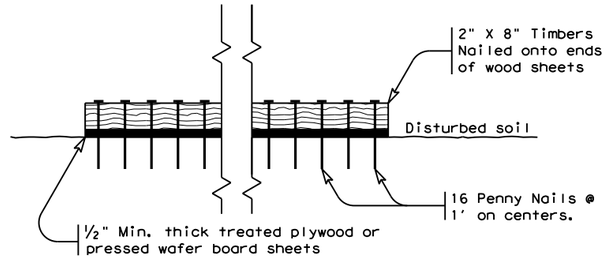
PLAN VIEW



PLAN VIEW



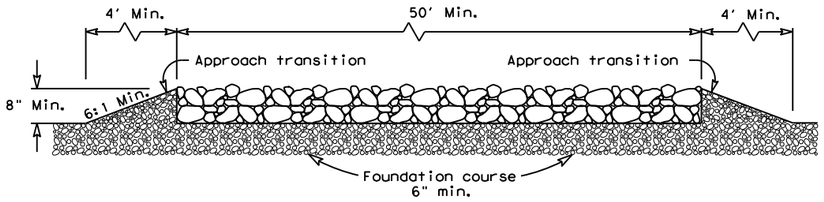
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

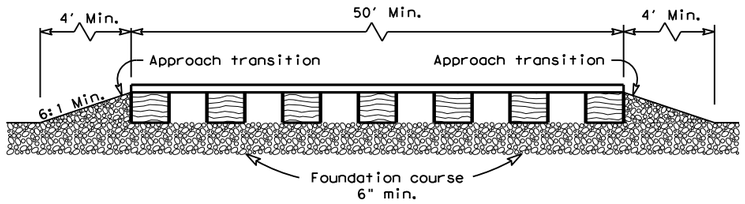
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0142	06	029	SH27
	DIST	COUNTY		SHEET NO.
	SAT	KENDALL		165

DATE: 10/11/2023
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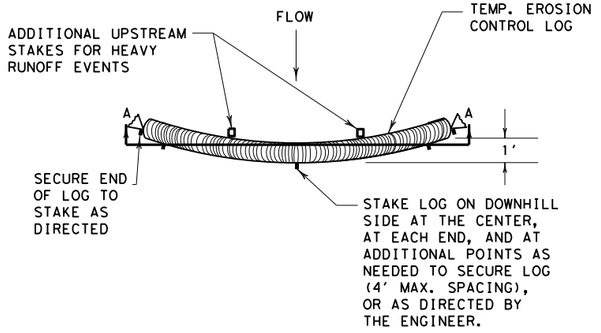
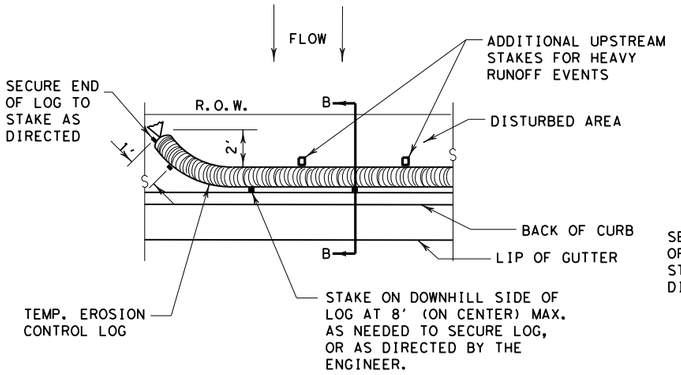
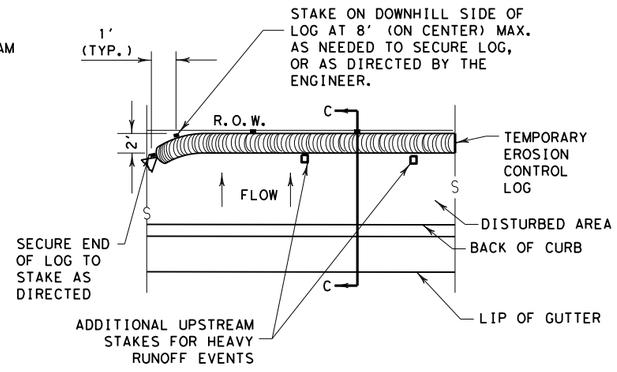


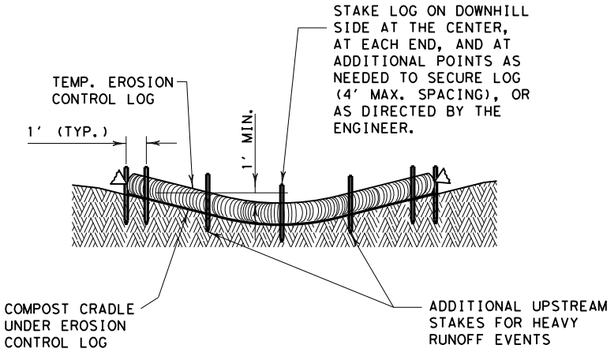
PLAN VIEW



PLAN VIEW



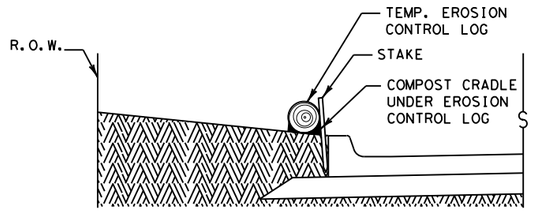
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

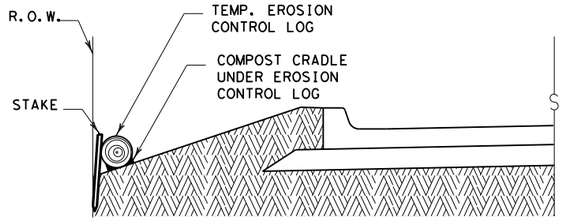
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

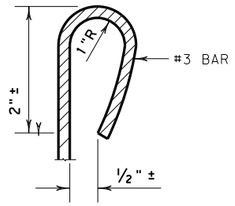
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



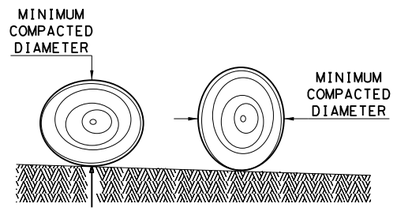
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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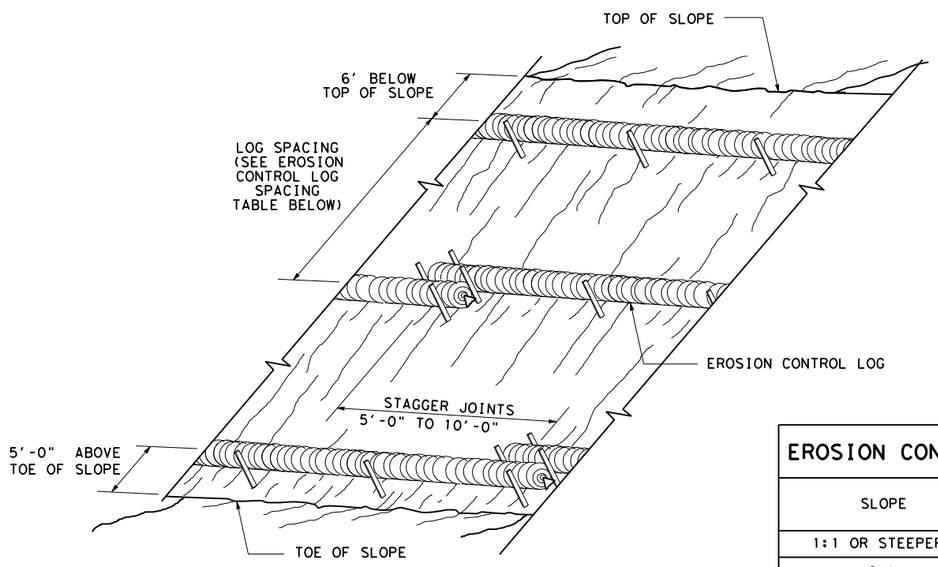
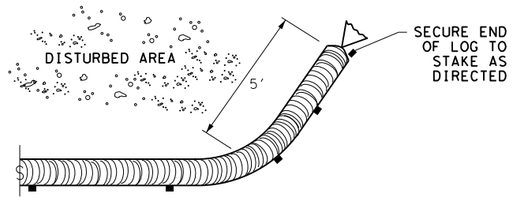


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

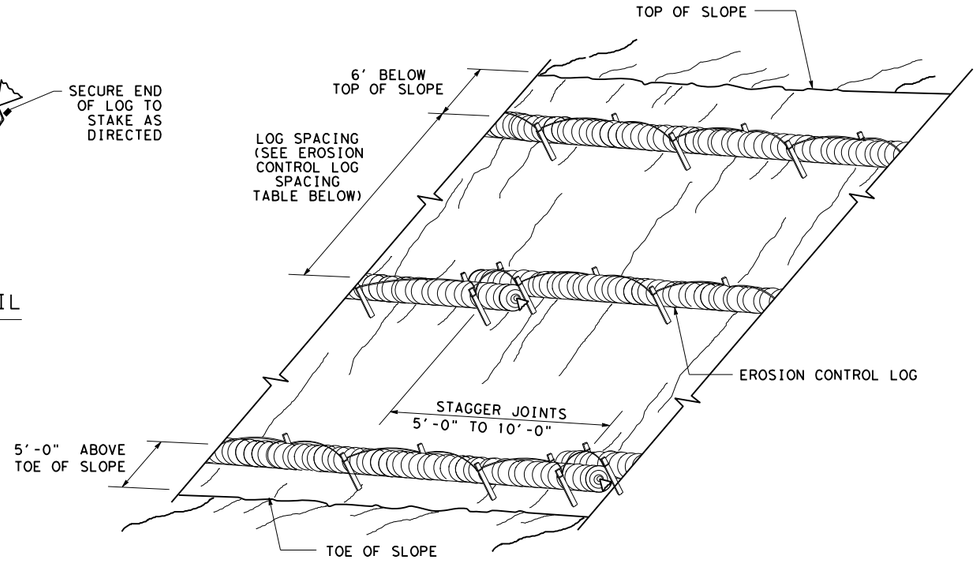
CL-SST



END SECTION RAP DETAIL

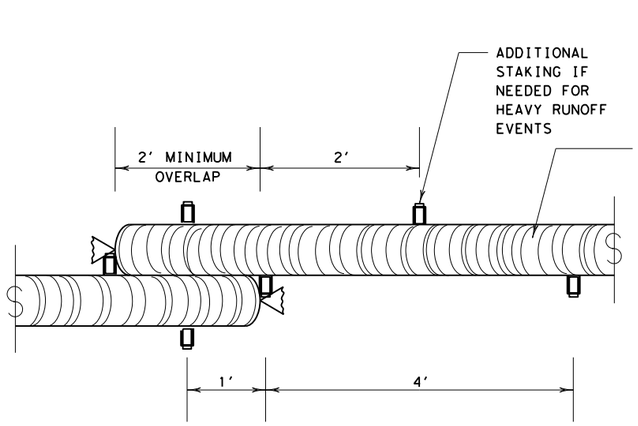
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

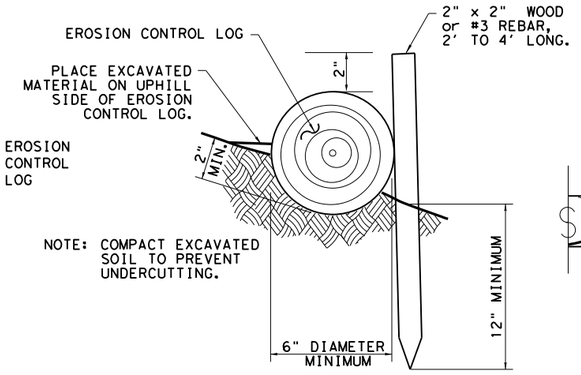
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

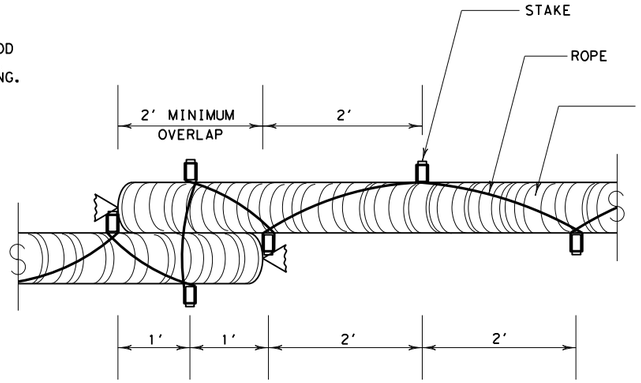


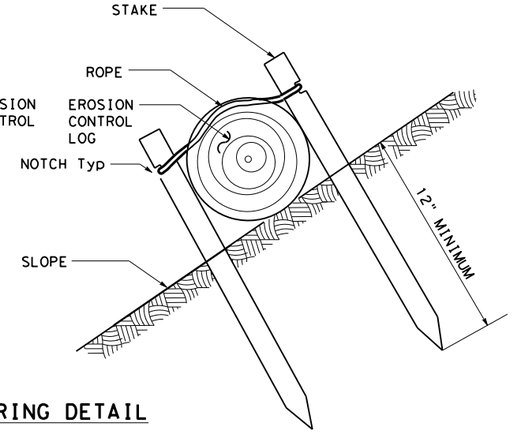


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

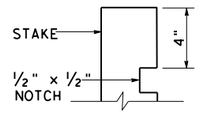
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





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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DATE: 10/11/2023
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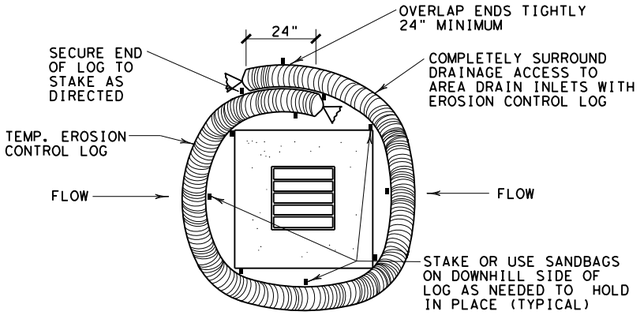
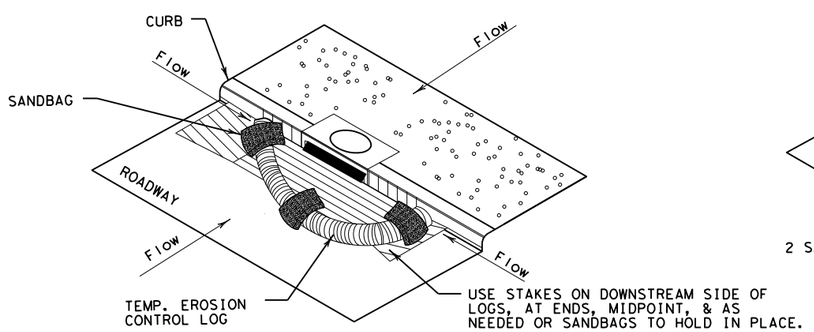


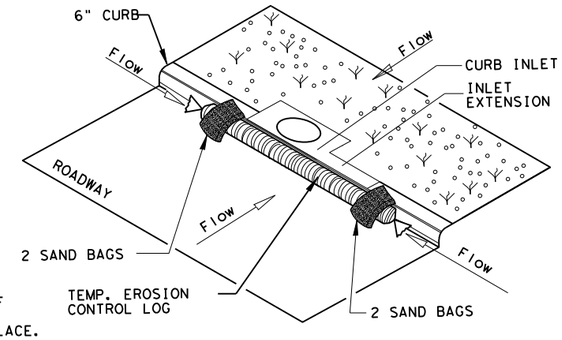
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

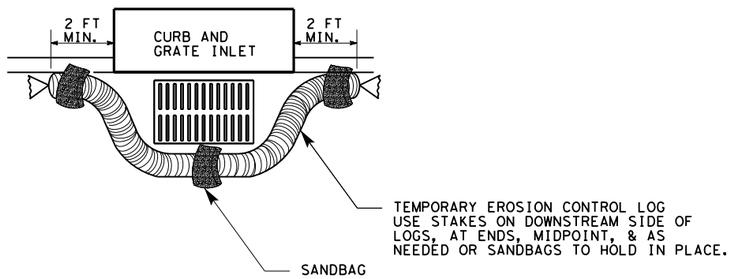
CL-CI



EROSION CONTROL LOG AT CURB INLET

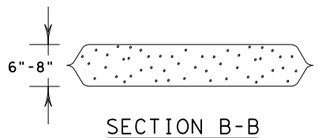
CL-CI

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.

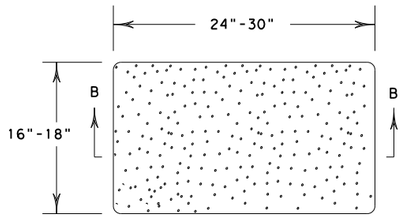


EROSION CONTROL LOG AT CURB & GRADE INLET

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	0142	06	029	SH27		
	DIST	COUNTY		SHEET NO.		
	SAT	KENDALL		168		

DATE: 10/11/2023
FILE: c:\pw\khi\d0278065\ec916.dgn