SEE SHEET 2 FOR INDEX OF SHEETS

FED.RD. DIV.NO.	STATE AID PROJECT NO.		SHEET NO.
6	C 284-2-27		1
STATE	DIST.	COUNTY	
TEXAS	WFS	Throckmorton	
CONT.	SECT.	JOB	HIGHWAY NO.
0284	02	027	SH 79

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

MAIN LANE DESIGN SPEED = 60 MPH
ADT (2022) = 559
ADT (20 YR PROJECTED ADT) = 783
FUNCTIONAL CLASSIFICATION: MINOR ARTERIAL

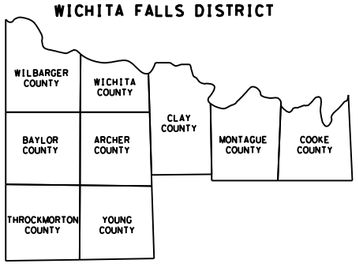
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

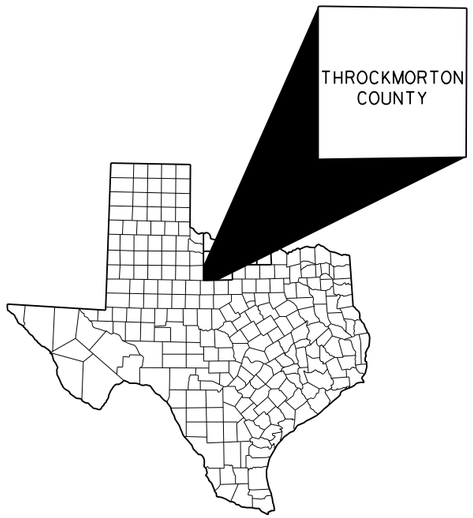
STATE AID PROJECT NO. : C 284-2-27
CONTROL SECTION JOB : 0284-02-027

THROCKMORTON COUNTY
SH 79

CONTRACTOR NAME:_____
CONTRACTOR ADDRESS:_____
LETTING DATE:_____
DATE WORK BEGAN:_____
DATE WORK COMPLETED:_____
DATE OF ACCEPTANCE:_____

WICHITA FALLS DISTRICT

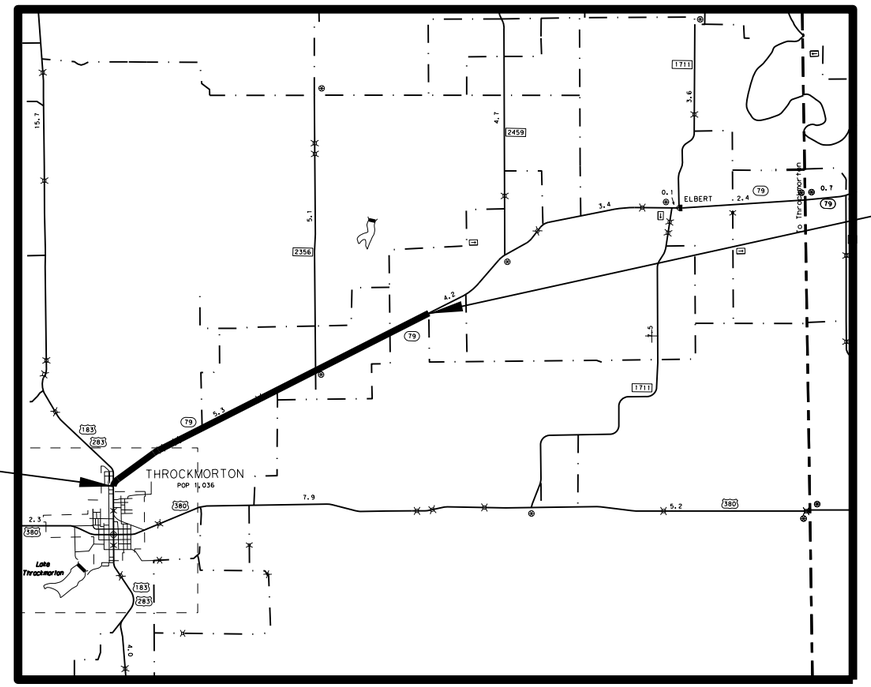




LIMITS: FROM: US 183
TO: MEXICAN SPRINGS RD.

LENGTH OF PROJECT =						
	BRIDGE	=	87.00	FT. =	0.016	MI.
	ROADWAY	=	35413.00	FT. =	6.707	MI.
	TOTAL	=	35500.00	FT. =	6.723	MI.

TYPE OF WORK: FOR THE CONSTRUCTION OF REHABILITATION OF EXISTING ROAD
CONSISTING OF: PROVIDE ADDITIONAL PAVED SURFACE WIDTH



BEGIN PROJECT
CSJ: 0284-02-027
STA. 00+00.00
REF. MARKER 280+1.732

END PROJECT
CSJ: 0284-02-027
STA. 355+00.00
REF. MARKER 288+0.454

0 1.5 3
SCALE IN MILES

NO EXCEPTIONS
NO EQUATIONS

NO RAILROAD CROSSINGS

Texas Department of Transportation®

SUBMITTED FOR LETTING 10/30/2023
Bryson Lawrence, P.E.
DESIGN ENGINEER

RECOMMENDED FOR LETTING 10/31/2023
James L. Brown P.E.
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

RECOMMENDED FOR LETTING 10/31/2023
Michael D. Brown P.E.
DISTRICT ENGINEER

COUNTY_____ PROJ. NO._____
HWY. NO._____ LETTING DATE_____
DATE ACCEPTED_____

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

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/1. General/SH 79 Title sheets.dgn
DATE: 10/30/2023

INDEX OF SHEETS

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A ## HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THE PROJECT.

Bryson Lawrence, P.E. — 10/30/2023

NAME — DATE

Texas Department of Transportation

SH 79

INDEX OF SHEETS

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		2

DATE: 10/30/2023 2:26:34 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/1- General/SH 79 Index of Sheets

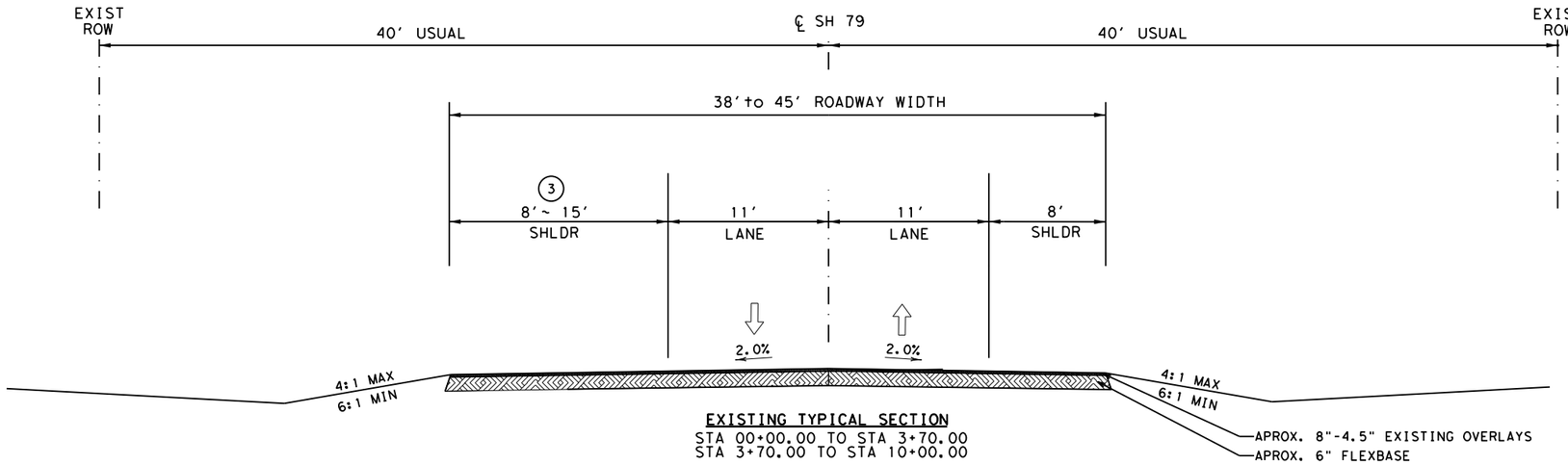
NOTES:

SEE VEGETATIVE ESTABLISHMENT DETAIL FOR SEEDING AND WATERING DETAILS.

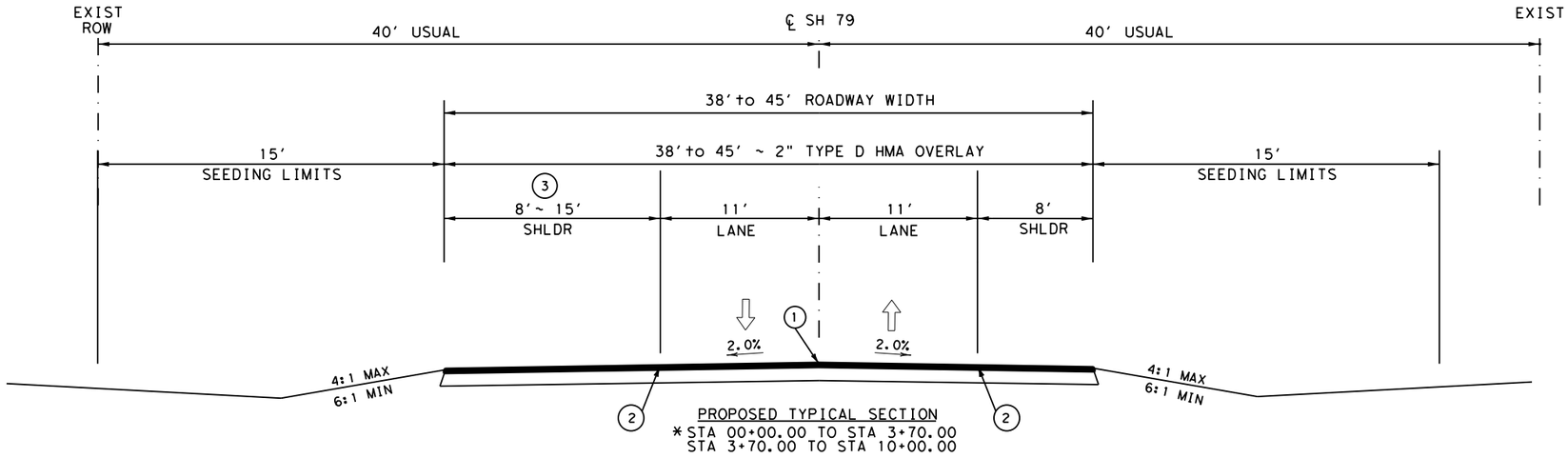
(1) INSTALL CENTERLINE RUMBLE STRIPS.

(2) INSTALL EDGELINE RUMBLE STRIPS.

(3) FROM STA 4+00 TO 6+43 15' SOUTHBOUND SHOULDER.



EXISTING TYPICAL SECTION
STA 00+00.00 TO STA 3+70.00
STA 3+70.00 TO STA 10+00.00



PROPOSED TYPICAL SECTION
* STA 00+00.00 TO STA 3+70.00
STA 3+70.00 TO STA 10+00.00

* SEE PLAN LAYOUT SHEET 1

MATCH ALL EXISTING SUPERELEVATIONS UNLESS OTHERWISE NOTED

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

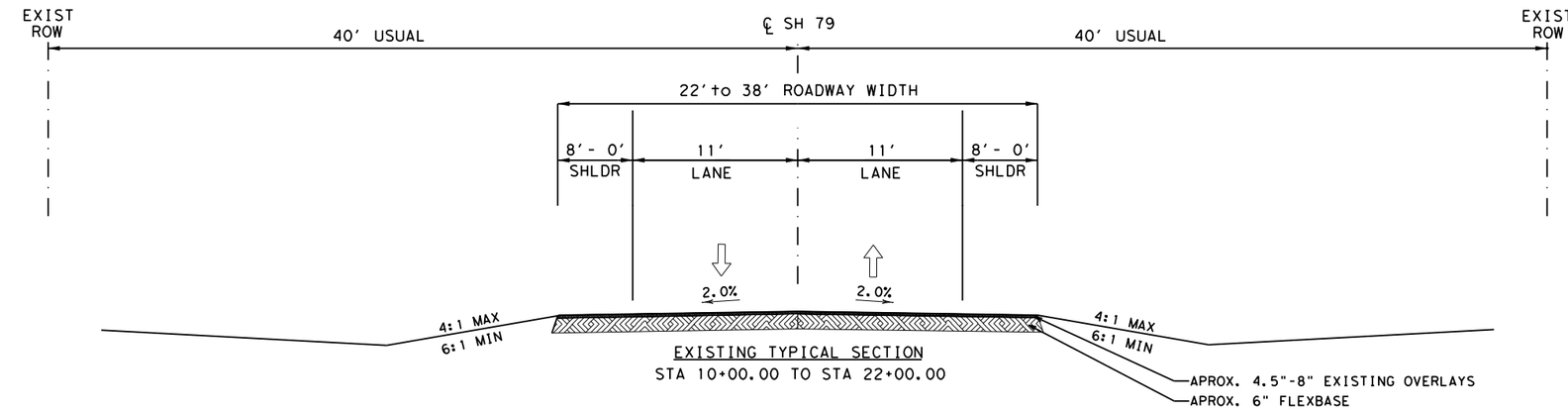
Bryson Lawrence, P.E.

10/30/2023

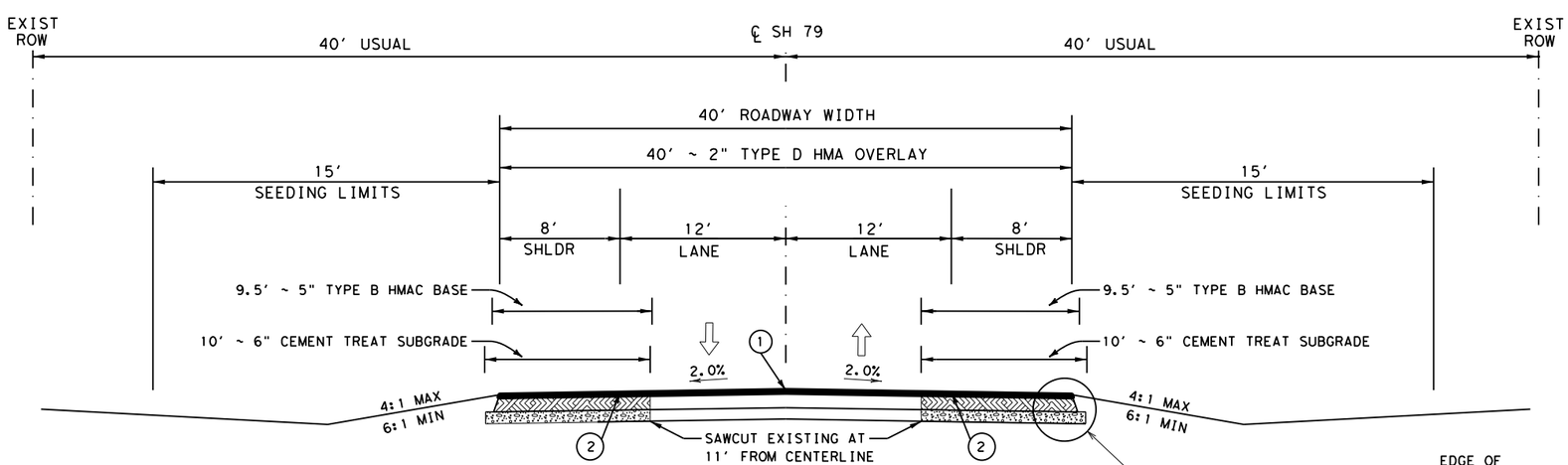
SH 79 TYPICAL SECTION

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		3

NOTES:
SEE VEGETATIVE ESTABLISHMENT DETAIL FOR SEEDING AND WATERING DETAILS.
① INSTALL CENTERLINE RUMBLE STRIPS.
② INSTALL EDGELINE RUMBLE STRIPS.



EXISTING TYPICAL SECTION
STA 10+00.00 TO STA 22+00.00



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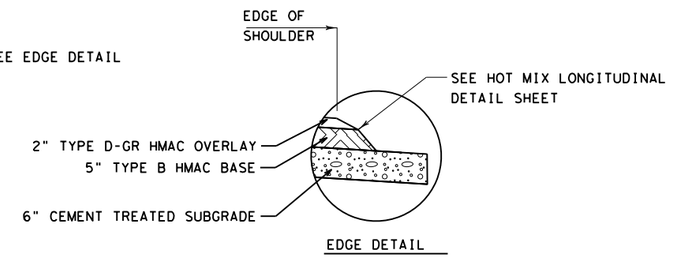


EDGE DETAIL

MATCH ALL EXISTING SUPERELEVATIONS UNLESS OTHERWISE NOTED.
SEE SUPERELEVATION DETAIL SHEET FOR MORE INFORMATION.

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SH 79 TYPICAL SECTION

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		4

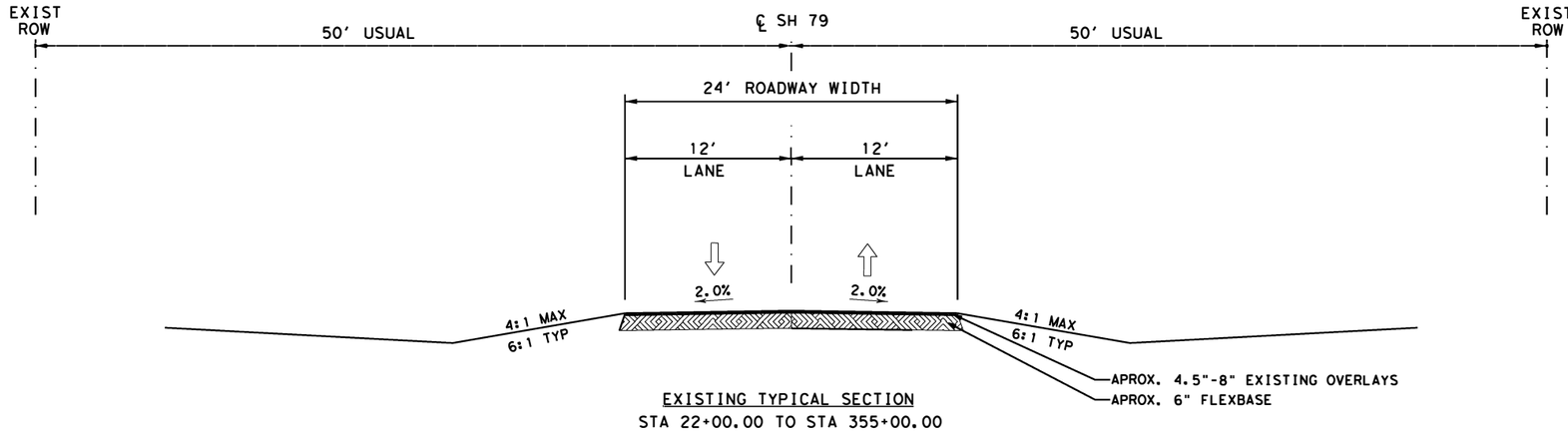
NOTES:

SEE VEGETATIVE ESTABLISHMENT DETAIL FOR SEEDING AND WATERING DETAILS.

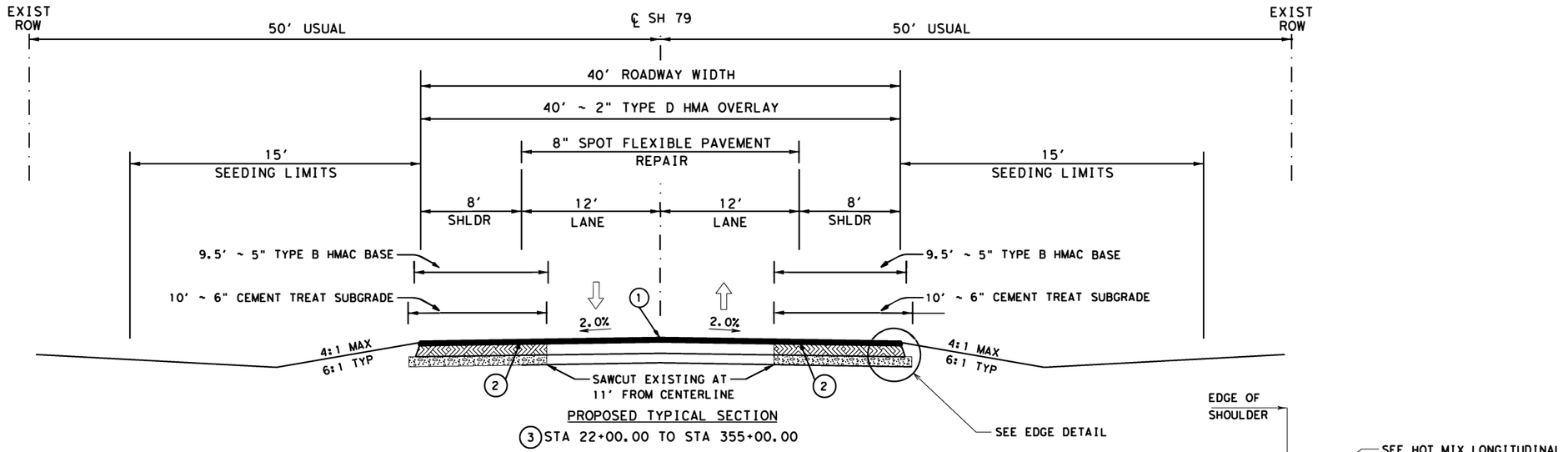
① INSTALL CENTERLINE RUMBLE STRIPS.

② INSTALL EDGELINE RUMBLE STRIPS.

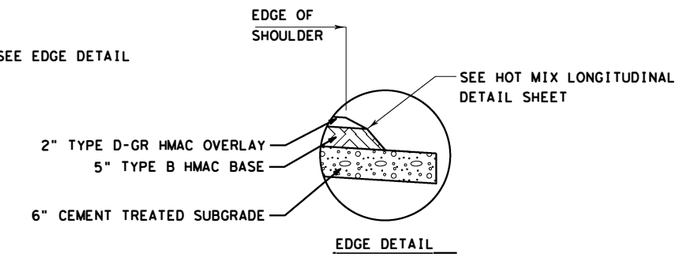
③ SUSPENDING WIDENING FOR 79+59.23 TO 80+52.59. ONLY PREFORM 2" OVERLAY FOR BRIDGE. REFER TO "MISC DETAILS" SHEET FOR MORE INFORMATION.



EXISTING TYPICAL SECTION
STA 22+00.00 TO STA 355+00.00



PROPOSED TYPICAL SECTION
③ STA 22+00.00 TO STA 355+00.00



EDGE DETAIL

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SH 79 TYPICAL SECTION

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		5

GENERAL NOTES

Basis of Estimate:

Item - Description	Rate*	Unit
168 - Vegetative Watering	1.4 GAL/SY per Application every 2 weeks for 3 months	MG
275 - Cement (6”)	4% by weight Est @ 120 LB /CU FT	TON
310 – Prime Coat (MC-30)	0.25 GAL/SY	GAL
314 – Emulsified Asphalt Treatment (Erosion Control) (MS-2 or SS-1)	0.20 GAL/SY	GAL
3076 – Dense Graded Hot Mix Asphalt	110 LB / SY / Inch	TON
3084 – Bonding Course	0.06 GAL/SY (Residual)	GAL

For contractor’s information only, actual production rates may vary.

General Requirements

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

Zachary Husen, P.E.: Zachary.Husen@txdot.gov
Anthony Boucher, P.E.: Anthony.Boucher@txdot.gov

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.

Bid Item Specific General Notes

Item 4 - Scope of Work

For the preconstruction conference submit a work schedule; temporary water pollution control plan; material sources; the person responsible for the SW3P; written utility coordination plan; certification statements; request for proposed subcontractors and letters designating the project superintendent, safety officer, and payroll officer.

Item 5 - Control of the Work
Provide the Engineer a minimum 24 hours’ notice for work requiring inspection or testing.

Item 6 - Control of Materials
In accordance with Production Sampling for sampler will split each HMAC sample into three (3) equal portions in accordance with TEX-200-F and label these portions as “Contractor”, “Engineer”, and Referee”. Deliver Engineer and Referee samples to the Graham Area Office Laboratory for testing.

Item 7 - Legal Relations and Responsibilities

- No significant traffic generator events identified for this project.

Use an all-weather material in conjunction with item 7.2.4. This work will not be paid for directly, but will be subsidiary to item 132.

Item 8 - Prosecution and Progress
For this project, contract time will be computed as described in Item 8 based on a Standard Workweek (8.3.1.4.)

Item Specific

Item 132 - Embankment
All borrow/aggregate sites shall meet the requirements of the Texas Aggregate Quarry and Pit Safety Act which can be found at www.txdot.gov/inside-txdot/division/maintenance/quarry.html
This material shall consist of suitable earth material such as loam, clay or other materials that will form a stable embankment and be free from vegetation or other objectionable matter. Any embankment needed from a borrow pit must first be approved by the Engineer.
Windrow approximately 4” of existing grass and topsoil adjacent to the right of way line or vegetative buffer zone prior to beginning earthwork operations. Upon completion of earthwork operations scarify the slopes and ditches longitudinally to a depth of approximately 4 inches and return the windrowed material to the slopes and the ditches as a permanent erosion control measure. This work will not be paid for directly but is considered subsidiary to item 132.

Item 134 – Backfilling Pavement Edges
For Type A Backfill, Use easily cultivated fertile backfill that is free from objectionable material and resists erosion. Ensure that the soil obtained from sites outside the right of way has a pH of 5.5 to 8.5, per Tex-128-E and a PI <=15, per Tex-106-E. Soil is subject to testing by the Engineer.

Backfill pavement edges in accordance with “Hot Mix Longitudinal Joint Detail” sheet.

RAP generated from this project may be used as backfill material. Pulverize and/or rework RAP to ensure no particles larger than two inches are incorporated into the final backfill. The Contractor shall provide emulsified asphalt at the rate indicated on the Basis of Estimate and will be paid for under Item 314. Apply emulsion after placing and compacting RAP. Vegetative watering will also be paid for under Item 168. Backfill pavement edges in accordance with “Hot Mix Longitudinal Joint Details” sheet.
The thickness of backfill material varies and the Contractor shall bid accordingly. Approximately 5 CY/STA of crushed RAP will cover both sides of the roadway

Complete backfilling operations within 14 days after the surface course is completed. Failure to complete backfilling during this time will result in the withholding of payment for all hot mix placed until all backfilling has been completed.

Item 164 - Seeding for Erosion Control
Temporary seeding will be required in several small areas as work progresses to comply with the storm water pollution prevention plan and may require multiple mobilizations of seeding crew. The Engineer may blend temporary and permanent seeding according to the temperatures and time of year in order to achieve maximum coverage in the least amount of time.

The contractor is responsible for the protection and maintenance of all seeded areas until final acceptance of the project. Maintenance includes:

1. Protection of seeded and mulched areas against traffic.

2. Fully mowing the project twice (2) for a rehab/widening job or once (1) for an overlay. This work will not be paid for directly.

Item 168 - Vegetative Watering
Water as directed by the Engineer all areas that receive seed to sustain grass growth to obtain a minimum 70% vegetative cover within the right of way. This may require the contractor to water the newly established grass for a period of up to three months after all other work on the contract is completed and before the project is accepted. Watering shall be done at times determined by the Engineer in order to minimize any loss due to evaporation.

Item 275 – Cement Treatment (Road Mixed)
Cement percentage in the Basis of Estimate are for estimating purposes only.

Item 354 – Planing and Texturing Pavement
Refer to the Hot Mix Longitudinal Joint Detail for all edge treatments. This work will be considered subsidiary to item 354.

Construct butt joints at all locations where planning, inlay, and overlay operations begin and end.

Material is to be used as backfill pavement edges. Any remaining material will become property of TXDOT and be stockpiled at the following location (33°12'17.58"N, 99° 9'15.39"W).

Item 502 - Barricades, Signs, and Traffic Handling
The Traffic Control Plan (TCP) for this project includes the plans, the Texas Manual on Traffic Control Devices, Barricade and Construction Standard Sheets, Standard TCP Sheets, and as otherwise required by the Engineer.

The Contractor's person responsible for TCP compliance is available by local telephone 24 hours a day and must respond to traffic control needs within 45 minutes of being notified.

Work will not be permitted without adequate traffic control devices in place. Work will only be permitted on one side of the roadway at any time.

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.

Work vehicles within 30 feet of the traveled way shall have strobe lights or rotating beacons in use.

Wear appropriate personal protective equipment at all times while outside of vehicles and equipment on the project.

Provide adequate flagging on side roads to ensure that traffic flow is not compromised during one way traffic control operations.
Repair barricades within 48 hours after barricade report has been delivered to the Contractor. Failure to comply will cease all work until barricades are repaired to the satisfaction of the Department. Replace all damaged traffic control devices immediately. Remove any damaged traffic control devices from the project within 24 hours.

Failure to make necessary corrections to Traffic Control items based on barricade inspections will be cause for withholding the monthly estimate until such corrections are made.

Remove from the roadway and store in a central location approved by the Engineer all temporary traffic control devices, such as cones, barrels, portable signs, vertical panels, etc., which will not

be used within 24 hours. This includes removal of temporary traffic control devices from the roadway over the weekend.

Refer to the “Treatment for Various Edge Conditions” sheet for the proper traffic control devices to be used for the various edge conditions.

The use of Portable Traffic Signals are not required, but may be used as an option to the contractor.

Place portable CW 21-2 "FRESH OIL" signs prior to the placing of asphalt onto roadway and remove signs when they are no longer needed.

Cover or remove portable CW 8-12 "NO CENTER STRIPE" signs immediately upon completion of striping of the roadway.

A pilot car is required for this project. Provide a “Queue time” of no longer than 10 (ten) minutes during roadway work operations. When traffic backs up behind the placement of striping and/or raised pavement markers, cease operations and pull over to alleviate vehicle queues every 1 mile or every 10 minutes whichever comes first.

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls
Anticipate multiple mobilizations for SWP3 work.

Verify locations and dimensions of BMP’s and obtain the Engineer’s approval prior to placement. BMP locations indicated on the plans are approximate and may be adjusted as necessary by the Engineer.

The disturbed area for this project, as shown on the plans, is 16.66 acres. The total disturbed area (TDA) will establish the required authorization for storm water discharges. The TDA of the project will be determined as described by the Environmental Permits Issues and Commitments (EPIC) sheet.

Contractor shall meet the requirements for the Project SW3P binder as described on the SW3P sheet.

The Contractor shall collect and dispose of all waste material as required by the Storm Water Pollution Prevention Plan (SW3P).

If sediment escapes the construction site, immediately stop all work on the project, remove the sediment, and modify the SW3P site plan to prevent future non-compliance issues.

The Contractor shall install concrete truck washouts as shown on the WFS-TA-BMP plan sheet. This work including materials and labor will not be measured or paid for directly but will be subsidiary to Item 506.

The Contractor shall develop a dewatering plan per the TCEQ Construction General Permit to mitigate planned and unplanned dewatering operations. This plan must be submitted to TxDOT for review and approval prior to ground disturbance activities.

Item 530 - Intersections, Driveways, and Turnouts
Removal of existing asphalt or concrete driveways will not be paid for directly but will be considered subsidiary to this pay item.

Coordinate the replacement of driveways with the property owners prior to performing work. Driveway locations and widths will be verified by the Engineer before placement.

Saw cut existing concrete and asphaltic concrete drives to create a smooth joint with the proposed driveway or street.

All County Roads and FM Roads shall be paved.

Item 542 – Removing Metal Beam Guard Fence
Salvage and stockpile the existing metal rail in a neat and orderly manner at the Throckmorton maintenance facility. Dispose of all posts deemed not salvageable.

Item 644 – Small Roadside Sign Assemblies
The Throckmorton Maintenance office will provide the SA bases for the new signs on this project. Contact the Throckmorton Maintenance Office prior to placing signs to allow ample time to order required bases.

Contractor is responsible for verifying sign locations prior to final placement. Stake sign support locations for verification by the engineer and obtain approval from the engineer prior to placement of sign supports.

Item 666 - Reflectorized Pavement Markings
Contractor is responsible for verifying passing/no-passing zones for final stripe. Poly-dot the locations of the proposed reflectorized pavement markings and obtain approval from the Engineer prior to placement.

Use Type II beads on all striping.

Remove temporary tabs from all roads prior to striping. Removal of tabs will be subsidiary to pertinent items.

The lead vehicle and trail vehicle will be required for all striping operations as shown on TCP (3-1)-13.

Item 672 - Raised Pavement Markers
Raised pavement marker adhesive will meet the requirements of Departmental Materials Specifications DMS-6130, “Bituminous Adhesive for Pavement Markers”.

The lead vehicle and trail vehicle(s) will be required for all marker installation operations as shown on TCP(3-3)-14.

Item 3076 – Dense-Graded Hot-Mix Asphalt
Provide mixture Type B using PG binder 64-22 for widening and provide mixture Type D using PG binder 70-28 for overlay work. No Substitute PG Binder will be allowed on this project.

Type B widening base shall be installed in two 2.5” lifts.

Design the surface mixture using the Superpave gyratory compactor with a minimum asphalt content of 5.4% and with a target lab mold density of 96.0%.

Hamburg Wheel Test requirements for this project will be a minimum of 5K passes @ 12.5 mm rut depth for PG 64-22 and 10K passes @ 12.5 mm rut depth for PG 70-28

The use of Recycled Asphalt Shingles (RAS) or Recycled Asphalt Pavement (RAP) will not be permitted in any of the mix for this project.

Level up and Pavement Repair is to be performed prior to widening.

Item 3084 – Bonding Course
Spray paver will not be used unless otherwise authorized by the Engineer. Additional quantity has been added for treatment of vertical surface of saw cuts.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0284-02-027 **DISTRICT** Wichita Falls **COUNTY** Throckmorton
HIGHWAY SH 79

				CONTROL SECTION JOB	0284-02-027		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00192962			
				COUNTY	Throckmorton			
				HIGHWAY	SH 79			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		EST.	FINAL		
	110-6001	EXCAVATION (ROADWAY)	CY		6,392.000		6,392.000	
	110-6002	EXCAVATION (CHANNEL)	CY		36.000		36.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY		6,491.000		6,491.000	
	134-6004	BACKFILL (TY A OR B)	STA		10.000		10.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY		57,501.000		57,501.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY		57,501.000		57,501.000	
	164-6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY		115,000.000		115,000.000	
	168-6001	VEGETATIVE WATERING	MG		924.000		924.000	
	275-6001	CEMENT	TON		831.000		831.000	
	275-6019	CEMENT TREAT (SUBGRADE)(6")	SY		76,467.000		76,467.000	
	310-6009	PRIME COAT (MC-30)	GAL		18,080.000		18,080.000	
	314-6010	EMULS ASPH (EROSN CONT)(SS-1)	GAL		23,000.000		23,000.000	
	351-6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY		5,000.000		5,000.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY		3,361.000		3,361.000	
	354-6030	PLANE ASPH CONC PAV(0" TO 8")	SY		1,493.000		1,493.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY		64.000		64.000	
	438-6006	CLEANING AND SEALING JOINTS (CL 3)	LF		200.000		200.000	
	451-6019	RETROFIT RAIL (TY T631)	LF		212.000		212.000	
	460-6002	CMP (GAL STL 18 IN)	LF		552.000		552.000	
	467-6348	SET (TY II) (18 IN) (CMP) (6: 1) (P)	EA		32.000		32.000	
	480-6001	CLEAN EXIST CULVERTS	EA		6.000		6.000	
	496-6004	REMOV STR (SET)	EA		4.000		4.000	
	496-6007	REMOV STR (PIPE)	LF		552.000		552.000	
	500-6001	MOBILIZATION	LS		1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO		11.000		11.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF		3,100.000		3,100.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF		3,100.000		3,100.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF		5,400.000		5,400.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF		5,400.000		5,400.000	
	530-6005	DRIVEWAYS (ACP)	SY		957.000		957.000	
	530-6016	DRIVEWAYS (BASE)	SY		2,526.000		2,526.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF		69,400.000		69,400.000	
	533-6002	RUMBLE STRIPS (CENTERLINE)	LF		34,700.000		34,700.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF		462.500		462.500	
	540-6014	SHORT RADIUS	LF		25.000		25.000	
	540-6015	DRIVEWAY TERMINAL ANCHOR SECTION	EA		1.000		1.000	
	540-6020	MTL W - BEAM GD FEN (LOW FILL CULVERT)	LF		100.000		100.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0284-02-027 **DISTRICT** Wichita Falls **COUNTY** Throckmorton
HIGHWAY SH 79

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0284-02-027**			
		PROJECT ID		**A00192962**			
		COUNTY		**Throckmorton**			
		HIGHWAY		**SH 79**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	540-6033	MTL BM GD FEN (LONG SPAN SYSTEM)	EA	2.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	411.000		411.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	6.000		6.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	11.000		11.000	
	560-6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4.000		4.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	3.000		3.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	6.000		6.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	36.000		36.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	49.000		49.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	27.000		27.000	
	662-6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	1,726.000		1,726.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	71,112.000		71,112.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	7,790.000		7,790.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	23,439.000		23,439.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	84.000		84.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	668.000		668.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	19,985.000		19,985.000	
	3076-6046	D-GR HMA TY-D SAC-B PG70-28	TON	17,447.000		17,447.000	
	3076-6047	D-GR HMA TY-D PG70-28 (LEVEL-UP)	TON	250.000		250.000	
	3084-6001	BONDING COURSE	GAL	18,380.000		18,380.000	
	6185-6002	TMA (STATIONARY)	DAY	330.000		330.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	20.000		20.000	
	08	CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	

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DATE: 10/27/2023 2:06:29 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/1. General/SH 79 ESTIMATE AND QUANTITY

SUMMARY OF ROADWAY ITEMS

LOCATION		110 6001	132 6004	134 6004	275 6001	275 6019	310 6009	351 6004	354 6021	354 6030	432 6045	438 6006	451 6019	533 6001	533 6002	540 6001	540 6014	540 6015	540 6020	540 6033	542 6001	542 6002	544 6001	560 6004	658 6062
	PLAN LAYOUT SHEET NUMBER	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY B)	BACKFILL (TY A OR B)	CEMENT	CEMENT TREAT (SUBGRADE) (6")	PRIME COAT (MC-30)	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	PLANE ASPH CONC PAV(0" TO 2")	PLANE ASPH CONC PAV(0" TO 8")	RIPRAP (MOW STRIP)(4 IN)	CLEANING AND SEALING JOINTS (CL 3)	RETROFIT RAIL (TY T631)	RUMBLE STRIPS (SHOULDER)	RUMBLE STRIPS (CENTERLINE)	MTL W-BEAM GD FEN (TIM POST)	SHORT RADIUS	DRIVEWAY TERMINAL ANCHOR SECTION	MTL W - BEAM GD FEN (LOW FILL CULVERT)	MTL BM GD FEN (LONG SPAN SYSTEM)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (INSTALL)	MAILBOX INSTALL-S (TWG-POST) TY 2	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
		CY	CY	STA	TON	SY	GAL	SY	SY	SY	CY	LF	LF	LF	LF	LF	LF	EA	LF	EA	LF	EA	EA	EA	EA
								733																	
00+00 to 24+00	1	75	469	10	34	3112	606		2383					3200	1600										
24+00 to 48+00	2	170	660		58	5334	1267							4800	2400										
48+00 to 72+00	3	238	586		58	5334	1267				24			4800	2400	200	25	1		2			3		
72+00 to 96+00	4	1216	179		55	5126	1267	1712		1493	17		200	4800	2400										
96+00 to 120+00	5	205	491		58	5334	1267					200		4800	2400	125					411	6	4		27
120+00 to 144+00	6	156	554		58	5334	1267							4800	2400										
144+00 to 168+00	7	215	824		58	5334	1267		489		16			4800	2400	75			100				2		
168+00 to 192+00	8	384	548		58	5334	1267		489		9			4800	2400	75							2		
192+00 to 216+00	9	488	404		58	5334	1267							4800	2400										
216+00 to 240+00	10	520	273		58	5334	1267							4800	2400										
240+00 to 264+00	11	618	280		58	5334	1267							4800	2400									1	
264+00 to 288+00	12	470	525		58	5334	1267							4800	2400										
288+00 to 312+00	13	639	226		58	5334	1267							4800	2400										
312+00 to 336+00	14	523	309		58	5333	1267							4800	2400										
336+00 to 355+00	15	475	163		46	4222	1003							3800	1900										
PROJECT TOTALS		6392	6491	10	831	76467	18080	2445	3361	1493	66	200	200	69400	34700	475	25	1	100	2	411	6	11	1	27

SUMMARY OF ROADWAY ITEMS

LOCATION		3076 6001	3076 6046	3076 6047	3084 6001	6185 6002
	PLAN LAYOUT SHEET NUMBER	D-GR HMA TY-B PG64-22	D-GR HMA TY-D SAC-B PG70-28	D-GR HMA TY-D PG70-28 (LEVEL-UP)	BONDING COURSE	TMA (STATIONARY)
		TON	TON	TON	GAL	DAY
00+00 to 24+00	1	813.00	1269		984	22
24+00 to 48+00	2	1394.00	1173		1248	22
48+00 to 72+00	3	1394.00	1173		1248	22
72+00 to 96+00	4	1340.00	1173		1225	22
96+00 to 120+00	5	1394.00	1173		1248	22
120+00 to 144+00	6	1394.00	1173		1248	22
144+00 to 168+00	7	1394.00	1173		1366	22
168+00 to 192+00	8	1394.00	1173	249.75	1336	22
192+00 to 216+00	9	1394.00	1173		1248	22
216+00 to 240+00	10	1394.00	1173		1248	22
240+00 to 264+00	11	1394.00	1173		1248	22
264+00 to 288+00	12	1394.00	1173		1248	22
288+00 to 312+00	13	1394.00	1173		1248	22
312+00 to 336+00	14	1394.00	1173		1248	22
336+00 to 355+00	15	1104.00	929		989	22
PROJECT TOTALS		19985	17447	250	18380	330

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	164 6009	164 6011	164 6033	168 6001	314 6010	506 6038	506 6039	506 6041	506 6043
	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	DRILL SEEDING (PERM) (RURAL) (SANDY)	VEGETATIVE WATERING	EMULS ASPH (EROSN CONT)(SS-1)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	MG	GAL	LF	LF	LF	LF
00+00 to 24+00	2334	2334	4667	28	933			270	270
24+00 to 48+00	4000	4000	8000	39	1600	200	200	240	240
48+00 to 72+00	4000	4000	8000	67	1600	700	700	300	300
72+00 to 96+00	4000	4000	8000	67	1600	300	300	600	600
96+00 to 120+00	4000	4000	8000	67	1600	300	300	300	300
120+00 to 144+00	4000	4000	8000	67	1600	150	150	330	330
144+00 to 168+00	4000	4000	8000	67	1600	250	250	510	510
168+00 to 192+00	4000	4000	8000	67	1600			360	360
192+00 to 216+00	4000	4000	8000	67	1600	200	200	360	360
216+00 to 240+00	4000	4000	8000	67	1600	150	150	450	450
240+00 to 264+00	4000	4000	8000	67	1600	150	150	540	540
264+00 to 288+00	4000	4000	8000	67	1600	350	350	300	300
288+00 to 312+00	4000	4000	8000	67	1600			300	300
312+00 to 336+00	4000	4000	8000	67	1600			300	300
336+00 to 355+00	3167	3167	6333	53	1267	350	350	240	240
PROJECT TOTALS	57501	57501	115000	924	23000	3100	3100	5400	5400

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	662 6110	666 6309	666 6318	666 6321	668 6076	672 6009	6185 6005
	WK ZN PAV MRK SHT TERM (TAB)TY Y	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	PREFAB PAV MRK TY C (W) (24") (SLD)	REFL PAV MRKR TY II-A-A	TMA (MOBILE OPERATION)
	EA	LF	LF	LF	LF	EA	DAY
0+00.00 to 3+60.11		842		679	12		20
3+60.11 to 10+36.19	68	1352		1352		34	
10+36.19 to 20+60.54	69	2000	250	1000		28	
20+60.54 to 29+38.14	63	1840	230	920		26	
29+38.14 to 33+07.62	7	720	90			1	
33+07.62 to 41+62.14	58	1680	210	840		24	
41+62.14 to 52+03.60	72	2080	260	1040		29	
52+03.60 to 56+14.10	8	800	100			1	
56+14.10 to 69+38.10	94	2720	340	1360		38	
69+38.10 to 146+70.00	145	15440	1930		12	24	
146+70.00 to 154+71.31	55	1600	200	800		23	
154+71.31 to 160+27.09	11	1120	140			2	
160+27.09 to 169+00.00	61	1760	220	880		25	
169+00.00 to 170+71.09	3	320	40			1	
170+71.09 to 182+24.32	80	2320	290	1160		33	
182+24.32 to 185+22.10	5	560	70		12	1	
185+22.10 to 194+44.62	63	1840	230	920	12	26	
194+44.62 to 210+31.40	110	3200	400	1600		45	
210+31.40 to 214+20.88	38	770		770		19	
214+20.88 to 222+15.87	55	1600	200	800		23	
222+15.87 to 229+78.36	76	1505		1515		38	
229+78.36 to 231+00.00	2	240	30		12		
231+00.00 to 236+84.83	41	1200	150	600		17	
236+84.83 to 300+26.30	119	12640	1580			20	
300+26.30 to 310+48.19	72	2080	260	1040		29	
310+48.19 to 313+60.00	6	640	80		12	1	
313+60.00 to 322+27.21	58	1680	210	840	12	24	
322+27.21 to 323+46.51	2	240	30				
323+46.51 to 333+57.19	69	2000	250	1000		28	
333+57.19 to 355+00.00	216	4323		4323		108	
PROJECT TOTALS	1726	71112	7790	23439	84	668	20

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001	644 6004	644 6007	644 6060	644 6076
	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	IN SM RD SN SUP&AM TYTWT(1)WS(P)	REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA	EA
CSJ: 0284-02-026	4	3	6	36	49
PROJECT TOTALS	4	3	6	36	49

SUMMARY OF DRAINAGE ITEMS

LOCATION	110 6002	480 6001
	EXCAVATION (CHANNEL)	CLEAN EXIST CULVERTS
	CY	EA
STRUCTURE # 1		
STRUCTURE # 2		1
STRUCTURE # 3	12	
STRUCTURE # 4		
STRUCTURE # 5		
STRUCTURE # 6		1
STRUCTURE # 7		
STRUCTURE # 8		1
STRUCTURE # 9		
STRUCTURE # 10		1
STRUCTURE # 11		
STRUCTURE # 12		1
STRUCTURE # 13		
STRUCTURE # 14	12	
STRUCTURE # 15	12	1
STRUCTURE # 16		
PROJECT TOTALS	36	6

Texas Department of Transportation

SH 79

QUANTITY SUMMARY

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		12

CK | DW | CK | DW

DATE: 10/27/2023 2:06:37 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/3. Roadway/SIDEROAD SUMMARY (0284-02-027)

SUMMARY OF SIDEROAD QUANTITIES

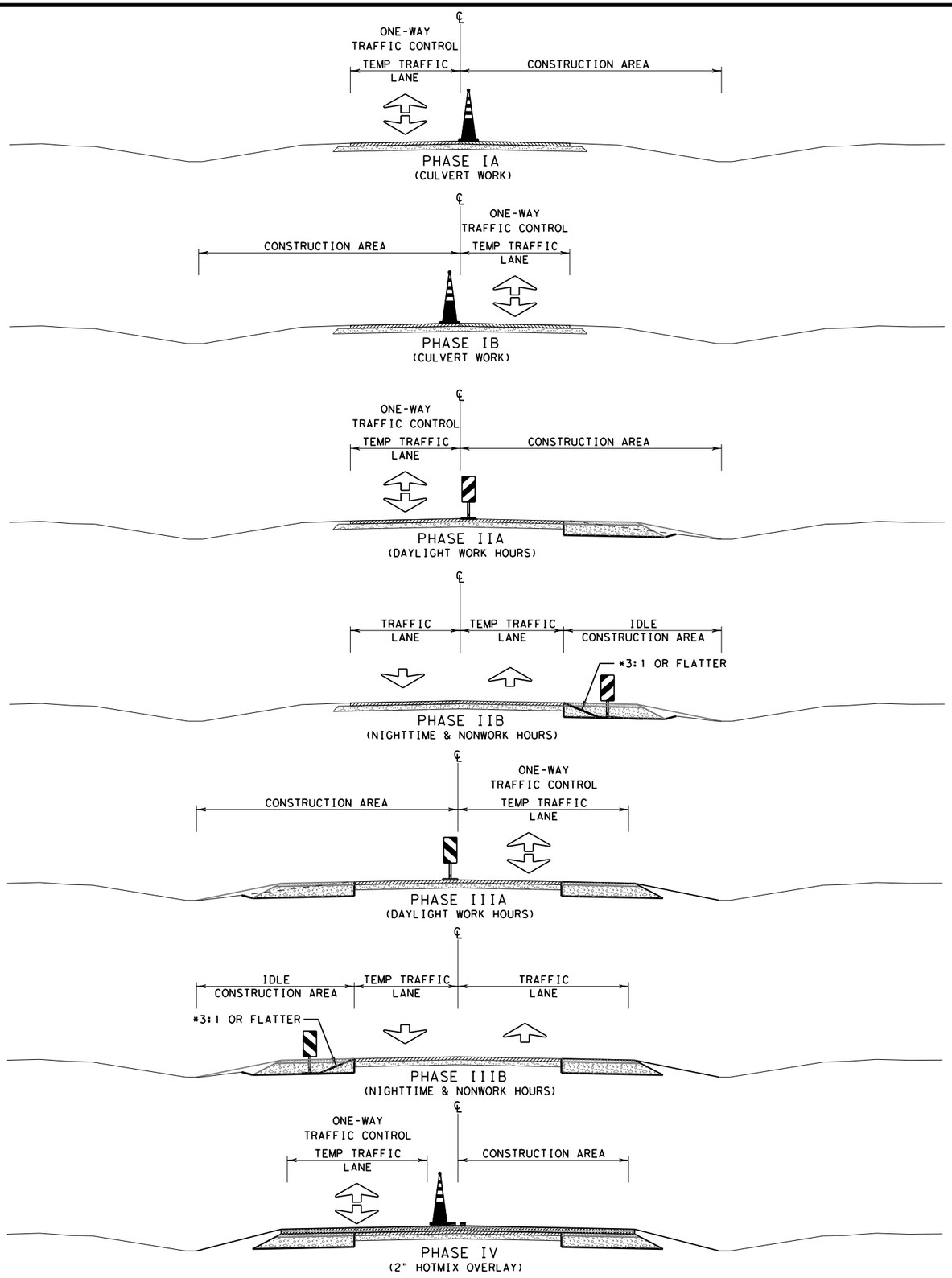
PLAN LAYOUT SHEET NUMBER	LOCATION		SIDE ROAD NUMBER	"W"	"L"	RADII		AREA	460 6002	467 6348	496 6007	530 6005	530 6016	COMMENTS
									CMP GAL STL 18 IN	SET (TY II) (18 IN) (CMP) (6: 1) (P)	REMOV STR (PIPE)	DRIVEWAYS (ACP)	DRIVEWAYS (BASE)	
	STA	TURN	##	FT	FT	R1	R2	SY	LF	EA	LF	SY	SY	
1	14+89.49	LT	1	16	30	15	15	65	22	2	22		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
1	15+33.60	RT	2	16	30	30	15	97					97	MATCH EXISTING GRADE
1	19+41.90	LT	3	16	30	15	15	65	22	2	22		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
3	60+31.78	LT	4	16	30	15	15	65					65	MATCH EXISTING GRADE
3	60+47.46	RT	5	16	30	15	15	65	24	2	24		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
3	62+11.52	LT	6	16	30	15	15	65					65	MATCH EXISTING GRADE
4	82+15.68	LT	7	16	30	15	15	65					65	MATCH EXISTING GRADE
4	82+15.68	RT	8	16	30	15	15	65					65	MATCH EXISTING GRADE
5	96+33.51	RT	9	16	35	15	15	73	22	2	22		73	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
5	104+46.41	RT	10	16	30	15	15	65					65	MATCH EXISTING GRADE
5	104+79.10	LT	11	20	29	40	30	141				141		MATCH EXISTING GRADE
5	113+74.37	RT	12	16	26	15	20	57					57	MATCH EXISTING GRADE
5	113+95.07	LT	13	16	30	15	15	65					65	MATCH EXISTING GRADE
6	130+64.33	LT	14	16	29.7	15	15	64					64	MATCH EXISTING GRADE
6	130+66.00	RT	15	16	30.5	15	15	65					65	MATCH EXISTING GRADE
6	143+72.12	LT	16	16	31	35	10	114	28	2	28		114	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
7	153+06.63	RT	17	20	30.2	15	15	78					78	MATCH EXISTING GRADE
7	155+97.70	RT	18	16	30.4	15	15	65					65	MATCH EXISTING GRADE
7	156+27.42	LT	19	16	29.7	15	15	64					64	MATCH EXISTING GRADE
7	158+57.34	LT	20	16	30.3	15	15	65	24	2	24		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
7	161+14.80	LT	21	16	30.2	15	15	65	22	2	22		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
7	161+24.95	RT	22	16	30	15	15	65					65	MATCH EXISTING GRADE
8	183+40.39	LT	23	16	30.2	15	15	65				65		MATCH EXISTING GRADE
8	183+48.49	RT	24	16	29.9	15	15	64					64	MATCH EXISTING GRADE
8	187+92.95	RT	25	16	31	15	15	66	28	2	28	66		REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
9	205+99.10	LT	26	16	30	15	15	65	46	2	46		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
9	206+01.51	RT	27	16	30	15	15	65	46	2	46		65	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
10	230+20.08	RT	28	16	30.2	30	30	97				97		MATCH EXISTING GRADE
10	230+49.31	LT	29	30	31.9	75	30	375	80	2	80		375	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
11	231+41.28	LT	30	16	28.3	15	15	61	20	2	20		61	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
11	242+69.48	RT	31	16	31	15	15	66	24	2	24		66	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
11	244+84.21	RT	32	16	30.8	15	15	66	46	2	46		66	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
11	247+02.90	RT	33	16	30.6	15	15	66	22	2	22		66	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
11	248+40.23	LT	34	16	31.7	15	15	68	46	2	46		68	REMOVE AND REPLACE CMP, ADD SET'S, AND MATCH EXISTING GRADE
11	253+04.74	RT	35	16	30.2	15	15	65					65	MATCH EXISTING GRADE
12	278+85.40	RT	36	16	40.1	15	15	83					83	MATCH EXISTING GRADE
12	279+19.23	LT	37	16	40.1	15	15	82					82	MATCH EXISTING GRADE
14	313+68.61	RT	38	20	30.2	30	30	111				111		MATCH EXISTING GRADE
14	314+18.17	LT	39	16	31.3	30	20	99				99		MATCH EXISTING GRADE
14	326+58.21	RT	40	16	30	15	15	65					65	MATCH EXISTING GRADE
14	328+26.00	LT	41	16	30	15	15	65					65	MATCH EXISTING GRADE
14	329+51.29	LT	42	16	30.3	30	15	97					97	MATCH EXISTING GRADE
15	354+75.46	RT	43	24	30	20	20	100				100		MATCH EXISTING GRADE
PROJECT TOTALS									522	32	522	679	2810	

Texas Department of Transportation

SH 79

SIDEROAD SUMMARY

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		13



SEQUENCE OF WORK:

PHASE I: COMPLETE 0-8" MILLING, PAVEMENT REPAIR, AND LEVEL UP.

PHASE II: COMPLETE PHASE II CONSTRUCTION ACCORDING TO TYPICAL.

PHASE III: COMPLETE PHASE III CONSTRUCTION ACCORDING TO TYPICAL.

PHASE IV: COMPLETE 0-2" MILLING, PLACE 2" HMAC OVERLAY, INSTALL RUMBLE STRIPS, AND FINAL STRIPING OPERATIONS.

NOTES:

ALL PAVEMENT REPAIR SHALL BE DONE PRIOR TO WIDENING AND LEVEL-UP.

LIMIT LANE CLOSURES ALONG HIGHWAY INTERSECTIONS, AND AT CROSS STREETS, TO THE HOURS DIRECTED BY THE ENGINEER.

WORK ON BOTH SIDES OF THE ROAD AT THE SAME TIME WILL NOT BE ALLOWED. PHASE II WORK SHALL BE COMPLETED PRIOR TO BEGINNING PHASE III.

MAXIMUM LANE CLOSURE WITH ONE-WAY TRAFFIC CONTROL SHALL BE TWO MILES. ONE-WAY TRAFFIC CONTROL MAY BE EXTENDED BY THE ENGINEER WHEN THE CONTRACTOR PROVES TO HAVE ADEQUATE FORCES & EQUIPMENT TO PERFORM MORE WORK.

ALL ONE-WAY TRAFFIC CONTROL WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

PILOT CAR SHALL BE REQUIRED FOR ALL ONE-WAY TRAFFIC CONTROL OPERATIONS.

CW 8-9a "Shoulder Drop-Off" OR CW 8-11 "Uneven Lanes" SIGNS PLUS VERTICAL PANELS SHALL BE PLACED DURING PHASES IIB & IIIB AT A MAXIMUM SPACING OF 1,800 FT.

PHASES II & III CHANNELIZING DEVICES SHOWN ARE BACK TO BACK MOUNTED PORTABLE VERTICAL PANELS ON SELF-RIGHTING SUPPORTS AS DESCRIBED ON BC(9)-21. OTHER APPROVED BASES AND SUPPORTS MAY BE USED AT THE ENGINEER'S APPROVAL.

COMPLETE ALL MOW STRIP AND MBGF INSTALLATION BEFORE PHASE IV BEGINS.

PHASE IV CHANNELIZING DEVICES SHOWN ARE 42 INCH, TWO-PIECE CONE AS DESCRIBED ON BC(10)-21. OTHER APPROVED DEVICES MAY BE USED AT THE ENGINEER'S APPROVAL.

BARRICADE & CONSTRUCTION STDS BC(1-12)-21 REQUIRED FOR ALL PHASES. REFER TO WORK ZONE STANDARD (WZ) SHEETS FOR ADDITIONAL DETAILS. STANDARDS SHOWN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENTS FOR WORK ZONE SIGNING AND TRAFFIC CONTROL. ADDITIONAL OR OTHER DEVICES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

THESE ARE THE RECOMMENDED TRAFFIC CONTROL PLANS; ALTERNATIVES MAY BE APPROVED BY THE ENGINEER

TCP WORKSHEET	
WORK BEING PERFORMED	TCP TO BE USED
NORTH ELM CREEK PAVEMENT REPAIR AND MILLING	(2-1)-18
WIDENING ROADWAY PAVEMENT	(1-2)-18 OR (2-2)-18
US 183 79 INTERSECTION MILLING AND OVERLAY	(2-4)-18
INSTALLING BMP'S	(1-1)-18 OR (2-1)-18
TEMPORARY SEEDING	(1-1)-18 OR (2-1)-18
RAISED PAVEMENT MARKERS	(3-1)-13 OR (3-3)-14
INSTALLING MBGF	(1-1)-18, (1-2)-18, (2-1)-18, OR (2-2)-18

* - THE 3:1 SLOPE BACKFILL FOR END OF DAY OPERATIONS SHALL CONSIST OF CLEAN STONE, SCREENED MATERIALS NOT CONTAINING ANY FINES, OR OTHER MATERIALS APPROVED BY THE ENGINEER. INSTALLATION OF THIS MATERIAL WILL BE CONDUCTED FROM THE ROADWAY SIDE OF THE PROJECT TO PROTECT THE SURFACE OF THE PRIME SUBRADE. WHEN WORK IS RESUMED ON THIS EXCAVETED AREA, THIS BACKFILL MATERIAL SHALL BE INCORPORATED INTO THE ROAD WORK OR DISPOSED OF AS APPROVED BY THE ENGINEER. MATERIALS AND LABOR FOR THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO ITEM 110 EXCAVATION (ROADWAY).

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SH 79 SEQUENCE OF WORK

Texas Department of Transportation

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0284	02	026	SH 79
DIST	COUNTY		SHEET NO.
03	THROCKMORTON		14

DATE: 10/30/2023 2:29:37 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/2. TCP/SEQUENCE OF WORK

DATE: 10/27/2023 2:06:44 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/02840027/4 - Design/Plan Set/8. Traffic/BC(1)-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		15

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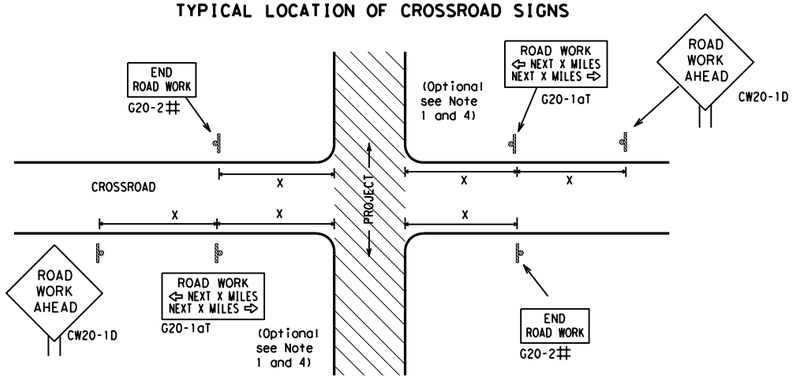
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/02840202174 - Design Plan Set/8. Traffic/BC(11)-21.dgn

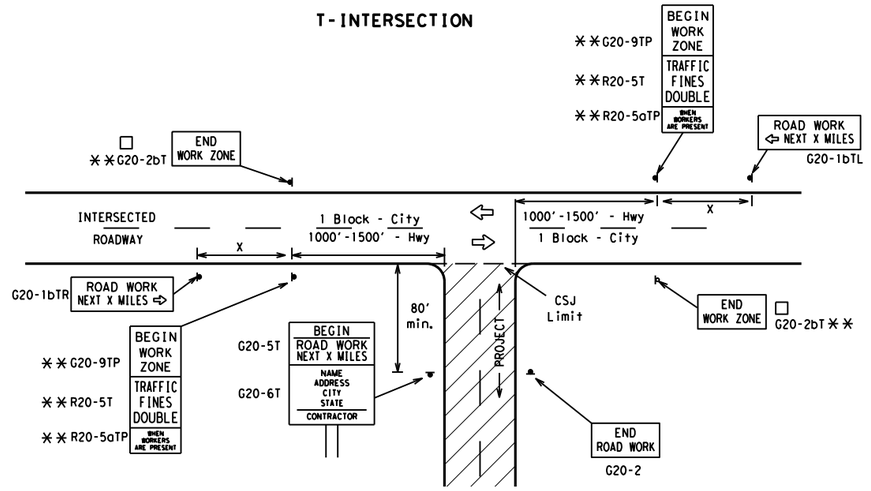
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

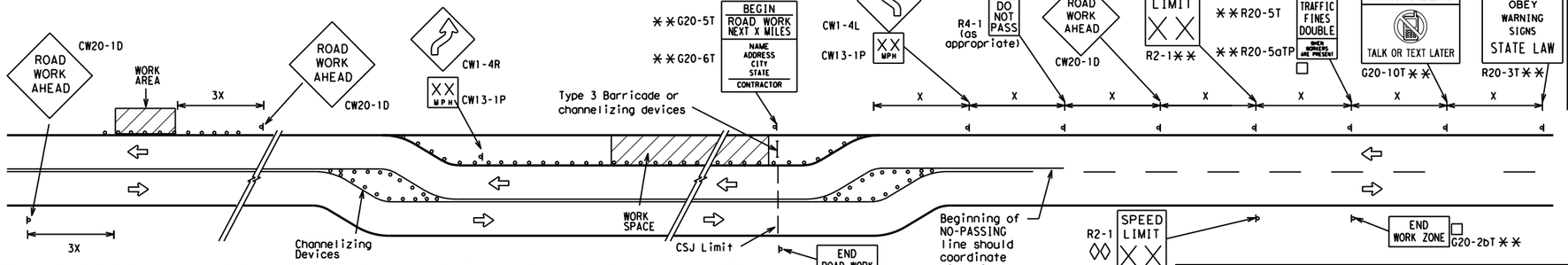
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

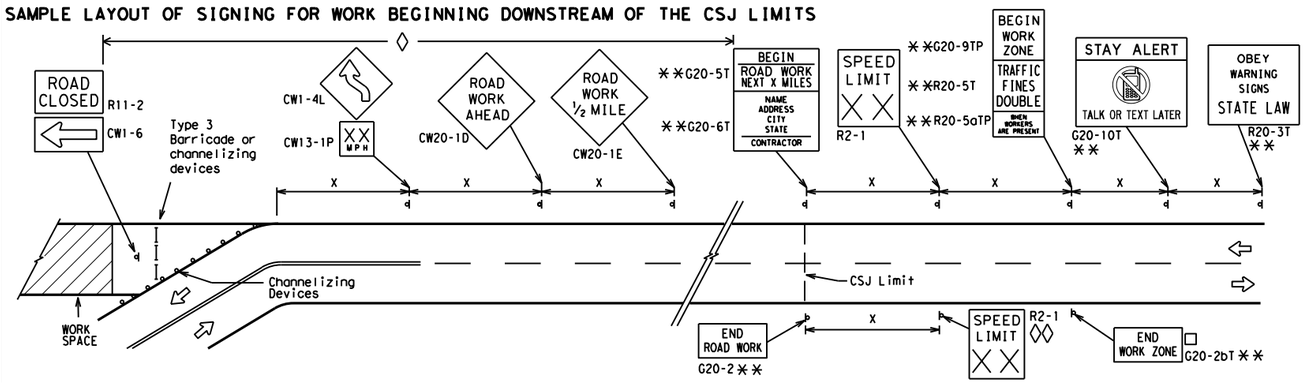
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

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	0284	02	027	SH 79
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	Throckmorton		16

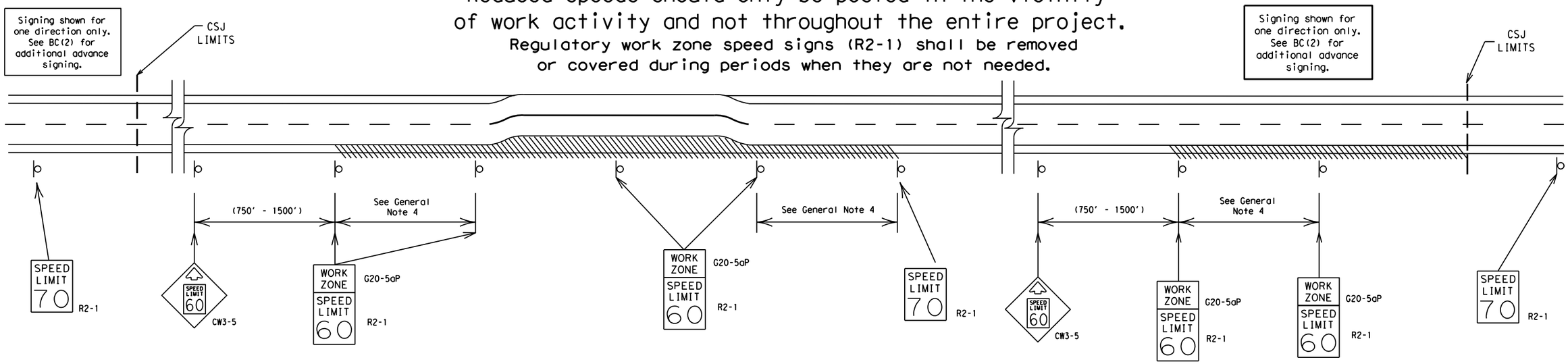
DATE: 10/27/2023 2:06:45 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/269402027A - Design/Traffic/BC(3)-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	Throckmorton		17

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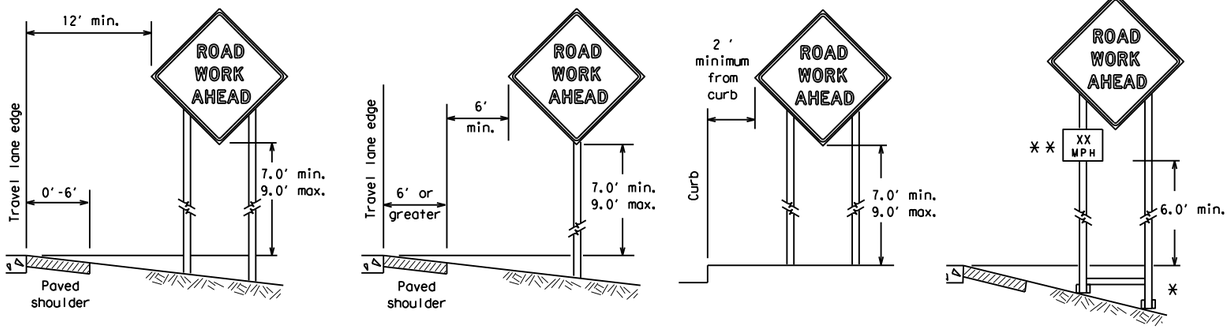
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/8. Traffic/BC(1)-21.dgn

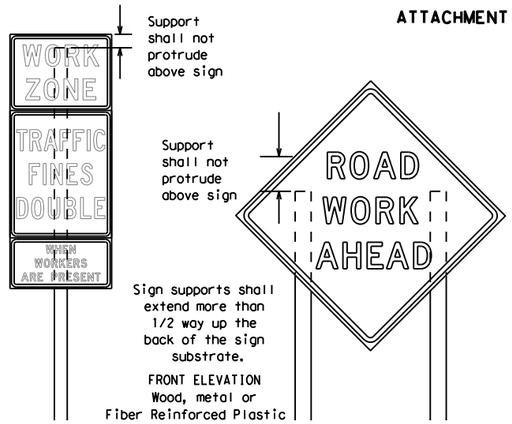
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

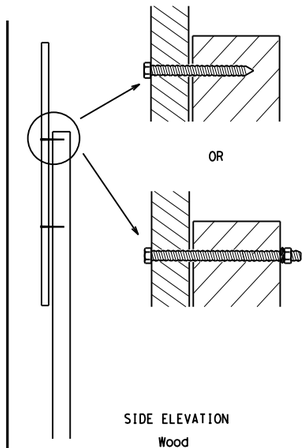


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





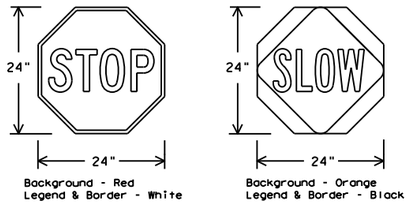
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
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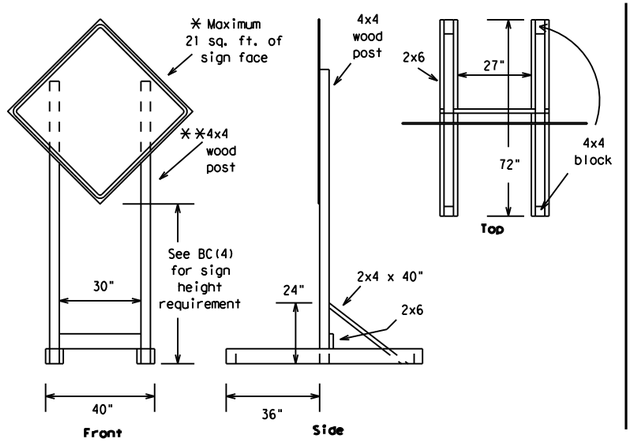
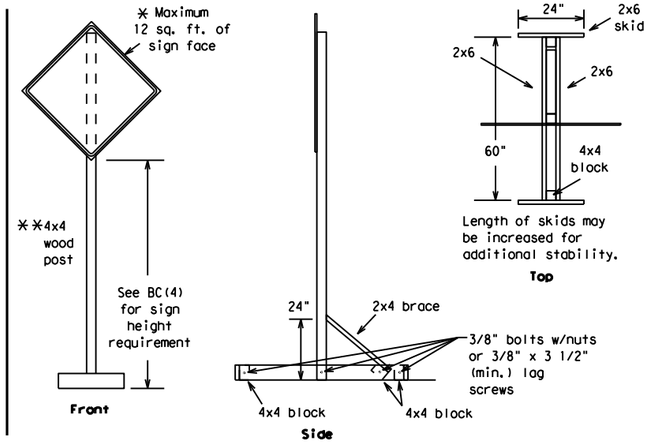
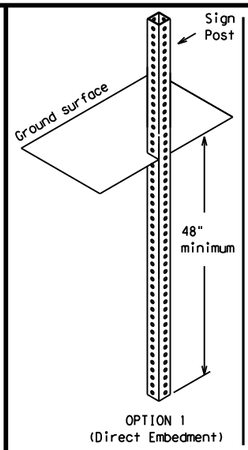
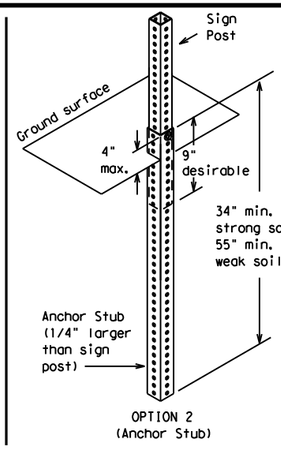


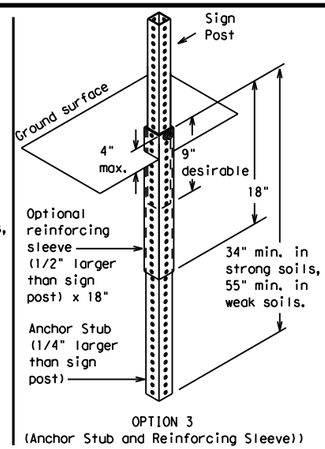


SKID MOUNTED WOOD SIGN SUPPORTS

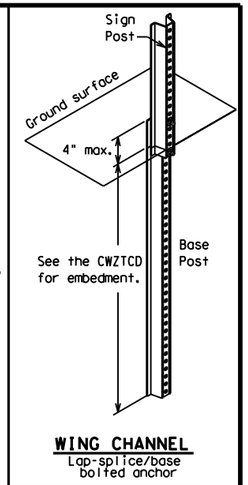
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







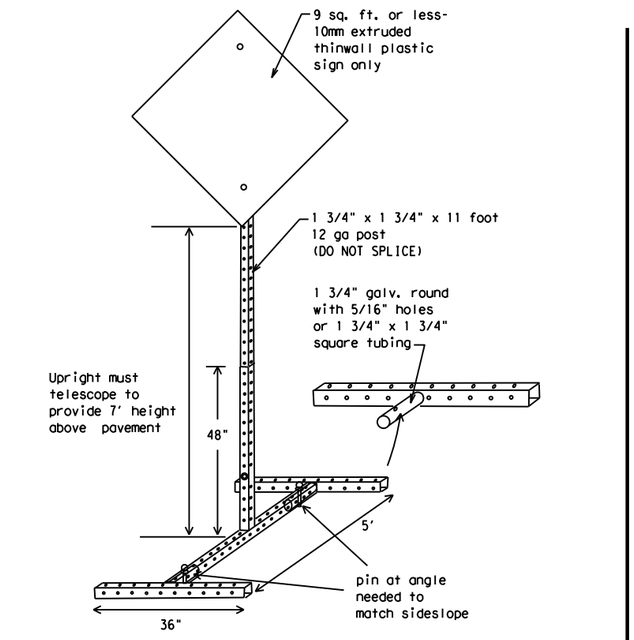
PERFORATED SQUARE METAL TUBING

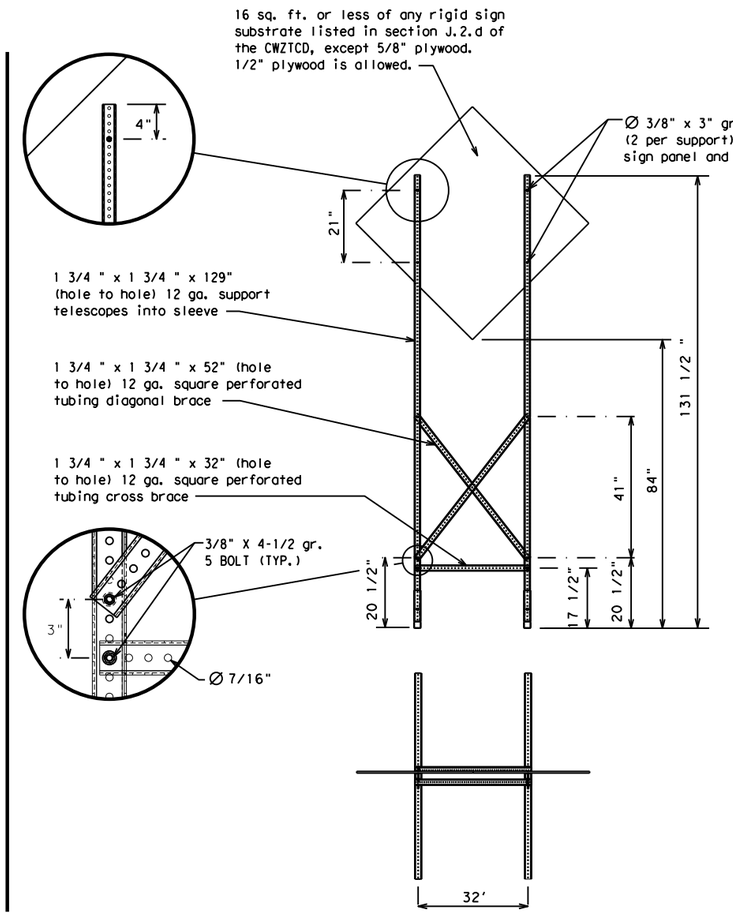


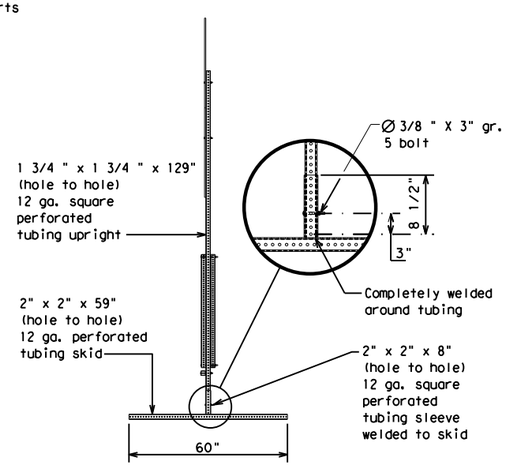
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
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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		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

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

Phase 2: Possible Component Lists

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	Throckmorton		20

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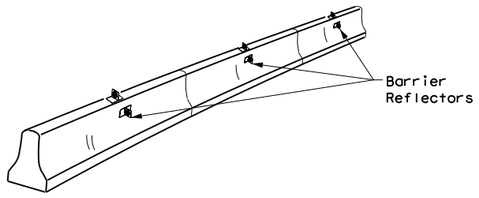
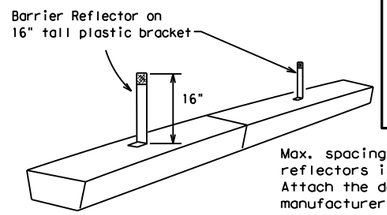
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/8. Traffic/BC(1)-21.dgn

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



CONCRETE TRAFFIC BARRIER (CTB)

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

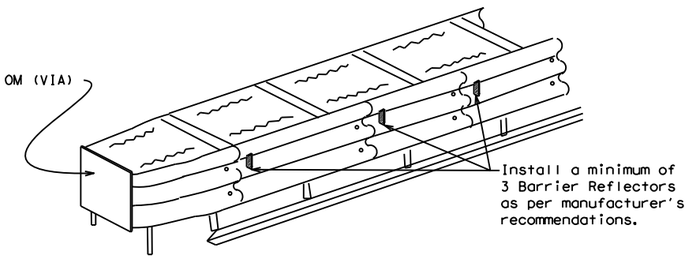


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) 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)

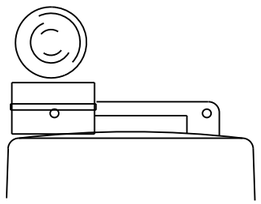


DELINEATION OF END TREATMENTS

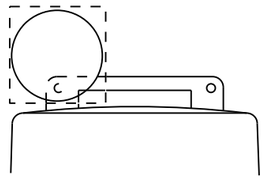
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

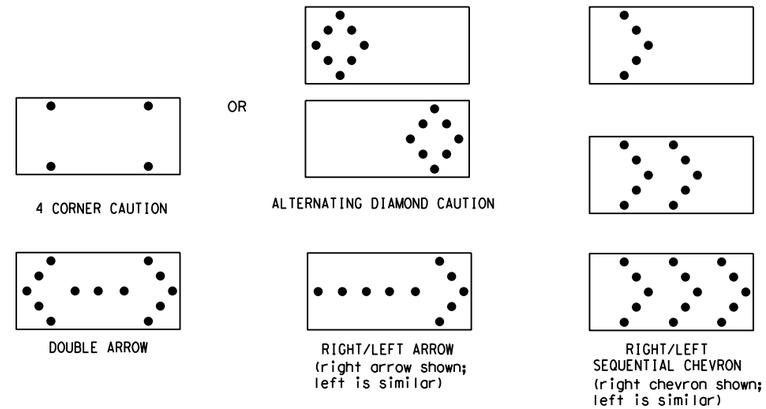
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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	0284	02	027	SH 79
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	Throckmorton		21

DATE: 10/27/2023 2:06:47 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/8. Traffic/BC(1)-21.dgn

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

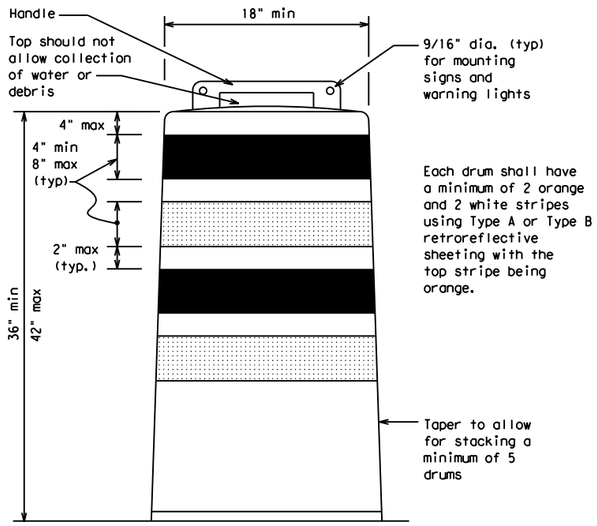
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

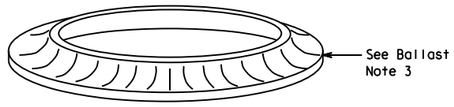
RETROREFLECTIVE SHEETING

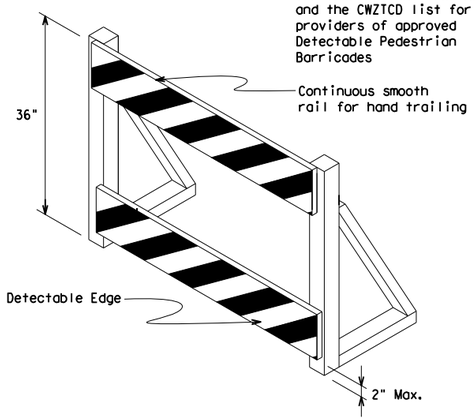
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

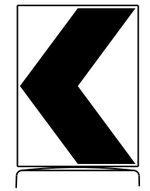




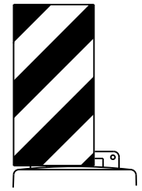


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	WFS	Throckmorton		22
7-13				

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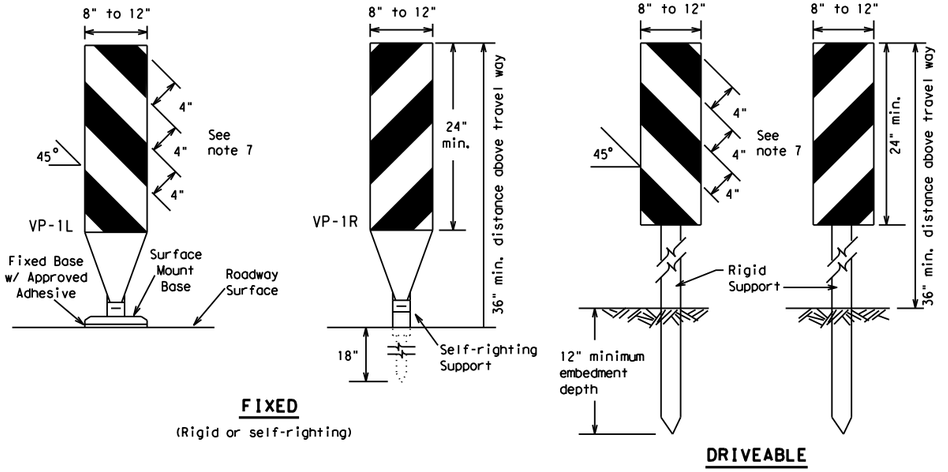
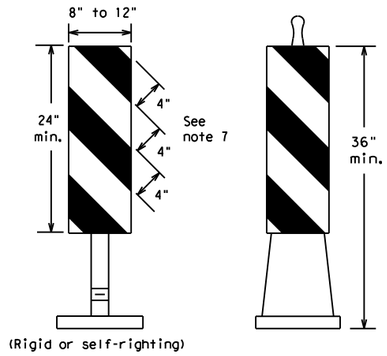


FIXED
(Rigid or self-righting)

DRIVEABLE

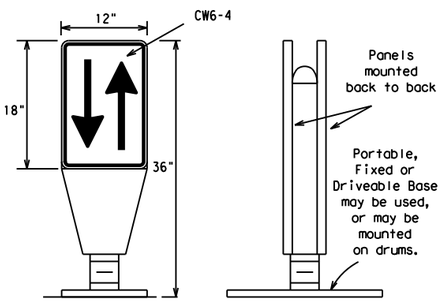


(Rigid or self-righting)

PORTABLE

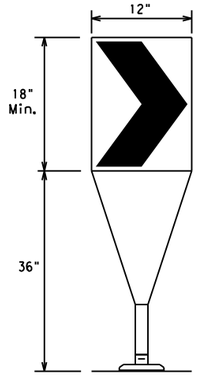
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



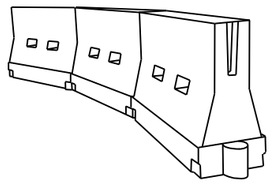
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	Throckmorton		23

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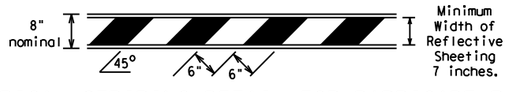
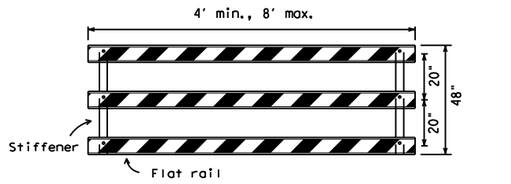
TYPE 3 BARRICADES

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.



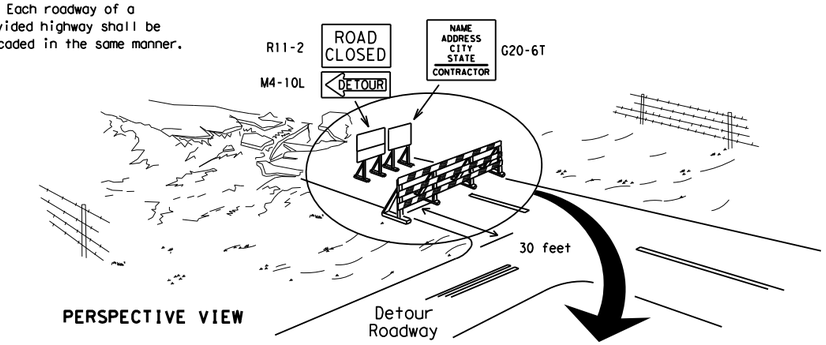
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

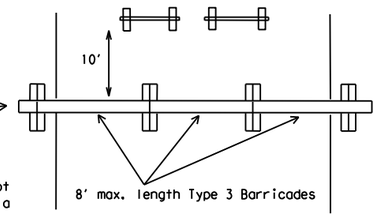
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

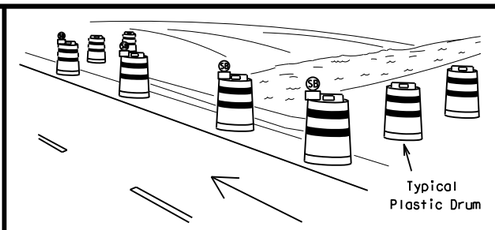
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

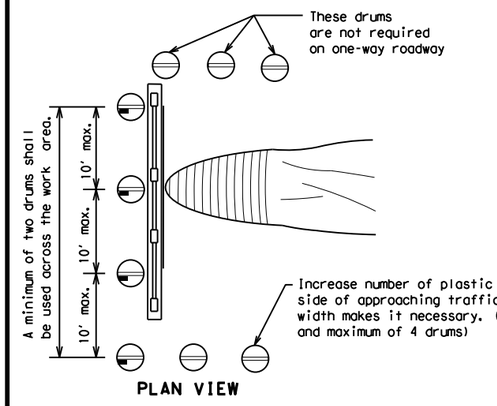
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

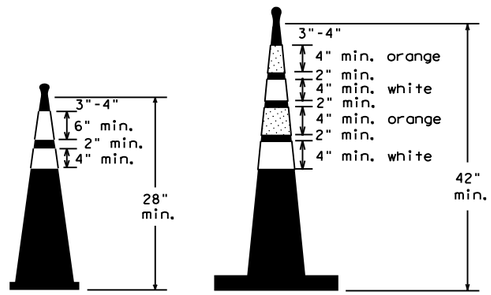
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

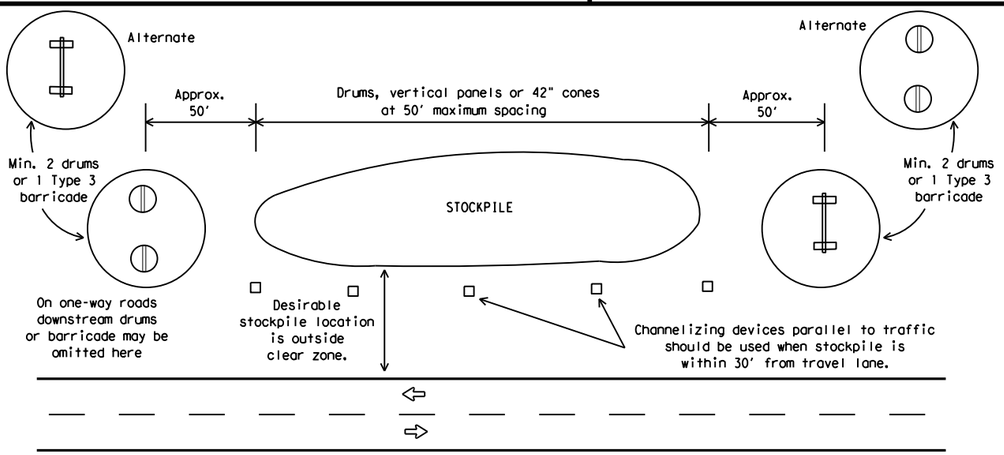
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	Throckmorton		24

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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.

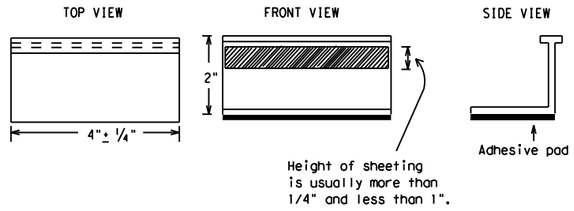
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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	0284	02	027	SH 79
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	WFS	Throckmorton		25
11-02 8-14				

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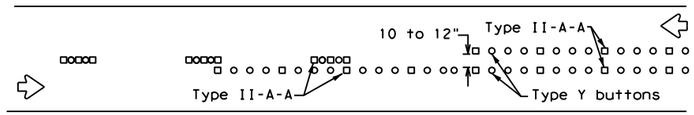
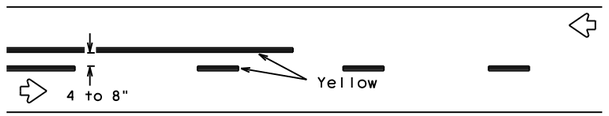
FILE: pw:/txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/028402027/4 - Design/Plan Set/8. Traffic/BC(1)-21.dgn

PAVEMENT MARKING PATTERNS

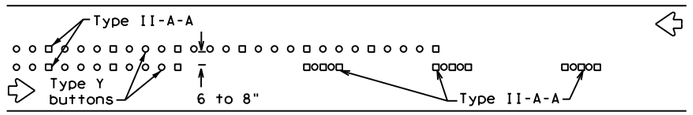
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



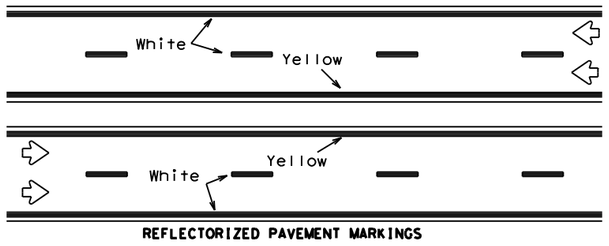
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



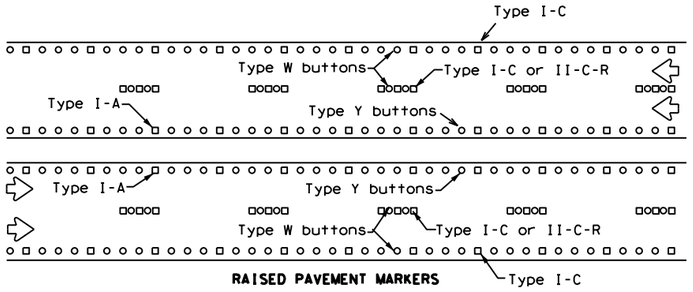
RAISED PAVEMENT MARKERS - PATTERN B

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

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



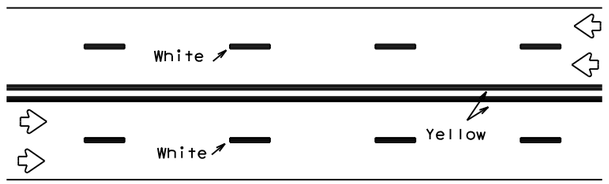
REFLECTORIZED PAVEMENT MARKINGS



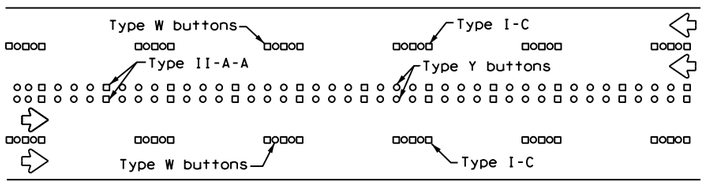
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



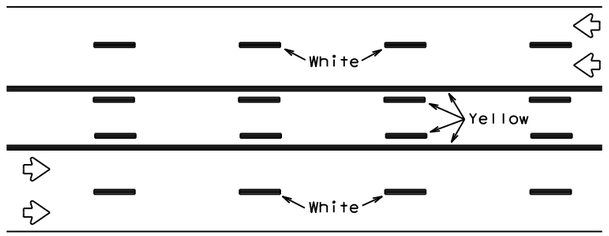
REFLECTORIZED PAVEMENT MARKINGS



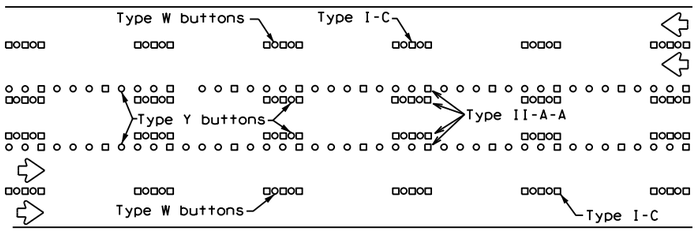
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

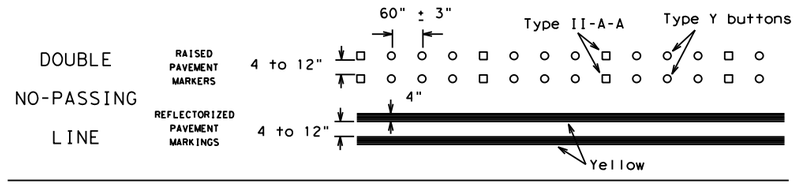
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

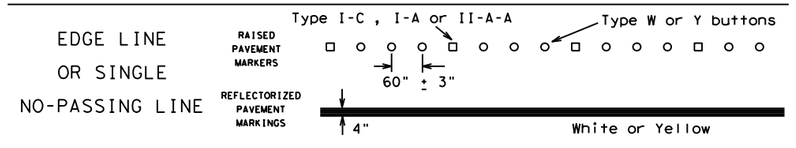
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

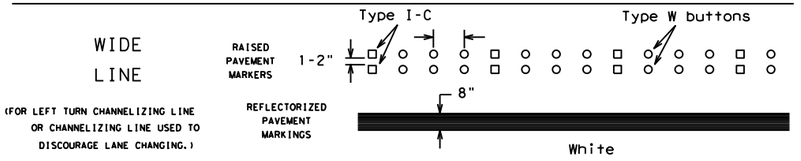


EDGE LINE OR SINGLE NO-PASSING LINE



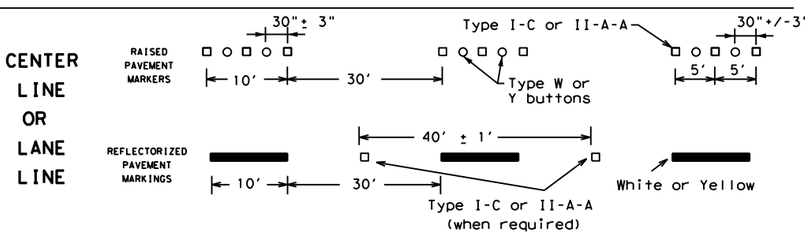
WIDE LINE

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

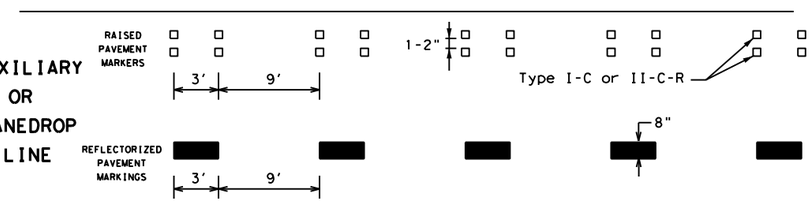


BROKEN LINES

CENTER LINE OR LANE LINE

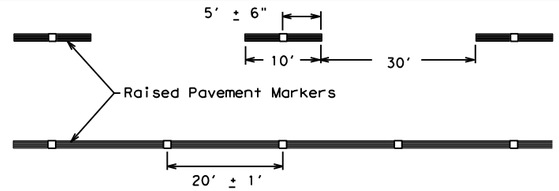


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

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	0284	02	027	SH 79
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	WFS	Throckmorton		26

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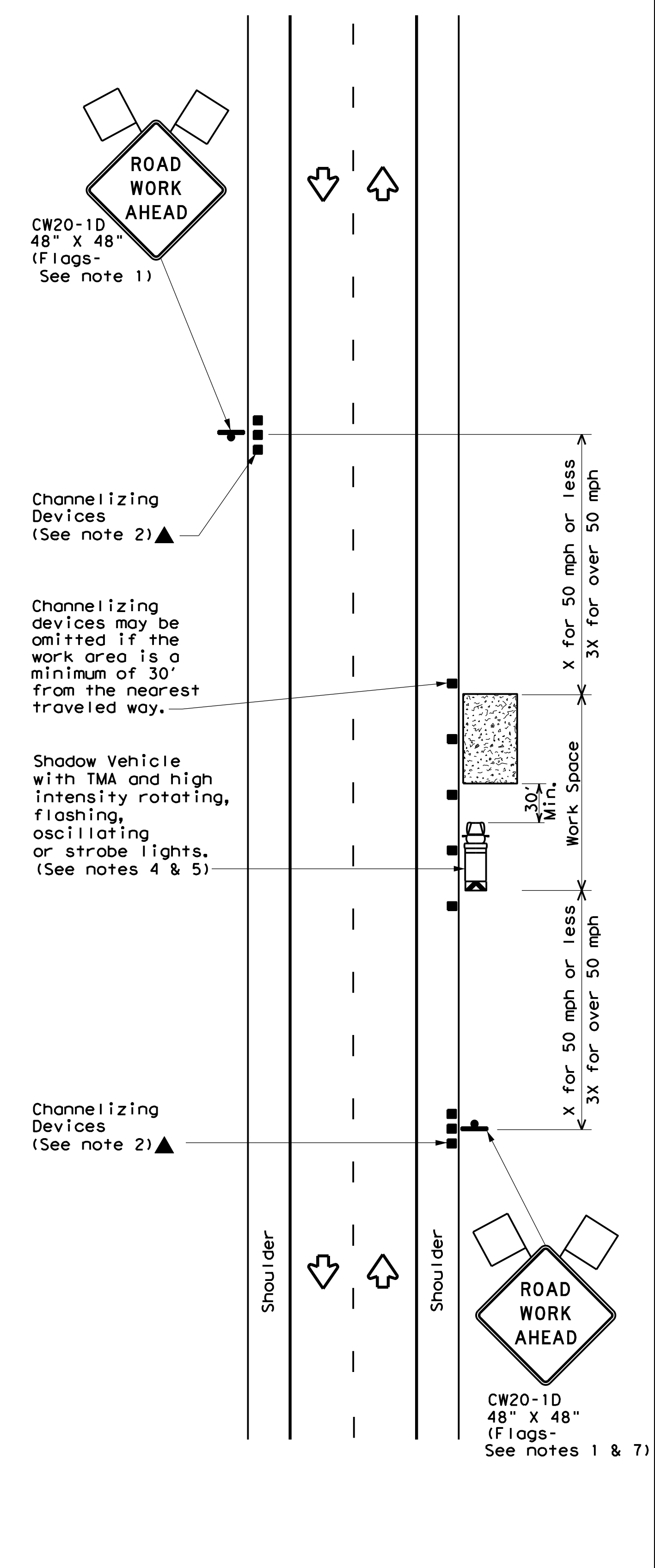
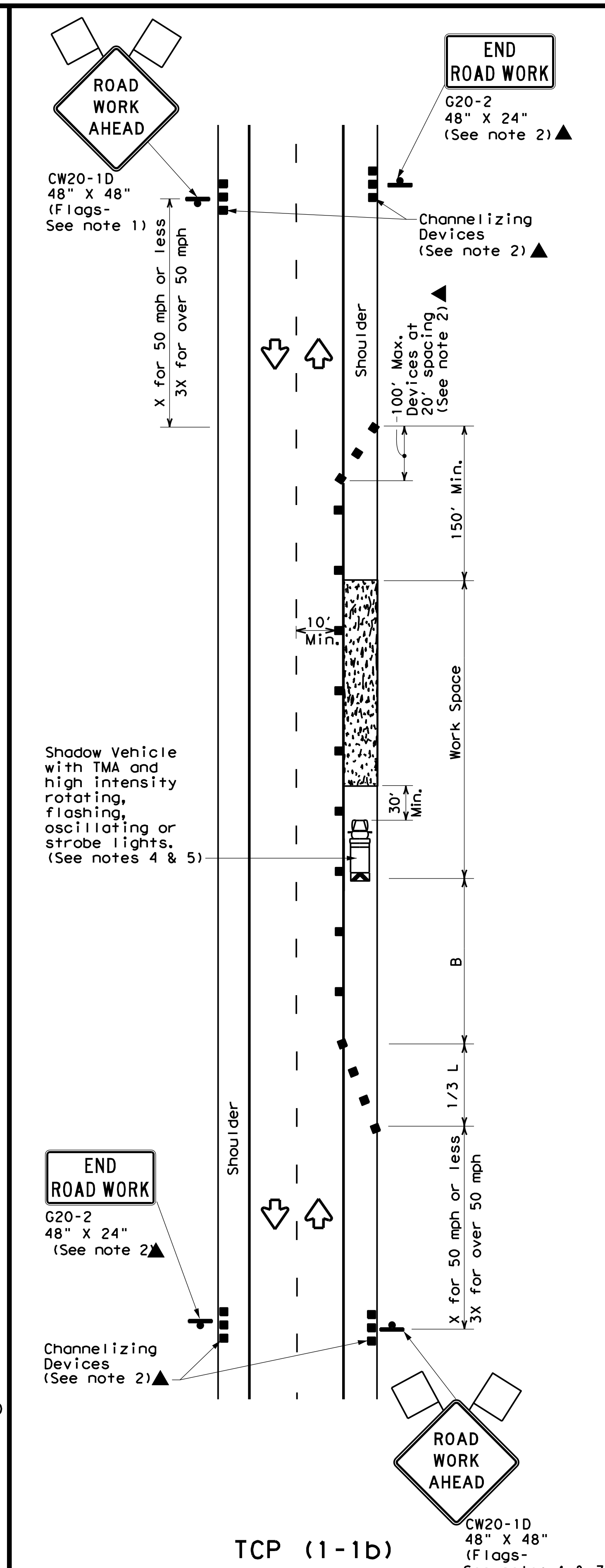


TCP (1-1a)

WORK SPACE NEAR SHOULDER

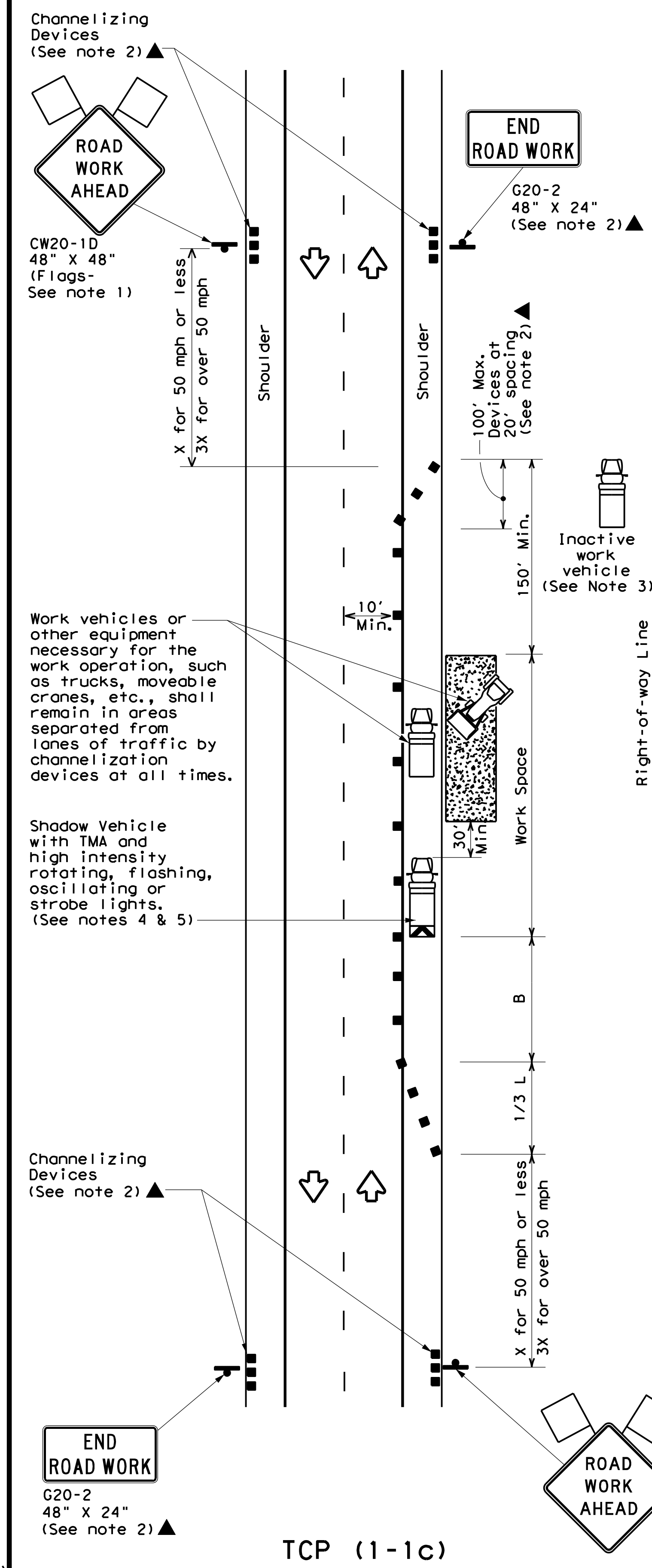
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
2-94 4-98	DIST		COUNTY	SHEET NO.
8-95 2-12 / 1-97 2-18	WFS		Throckmorton	27

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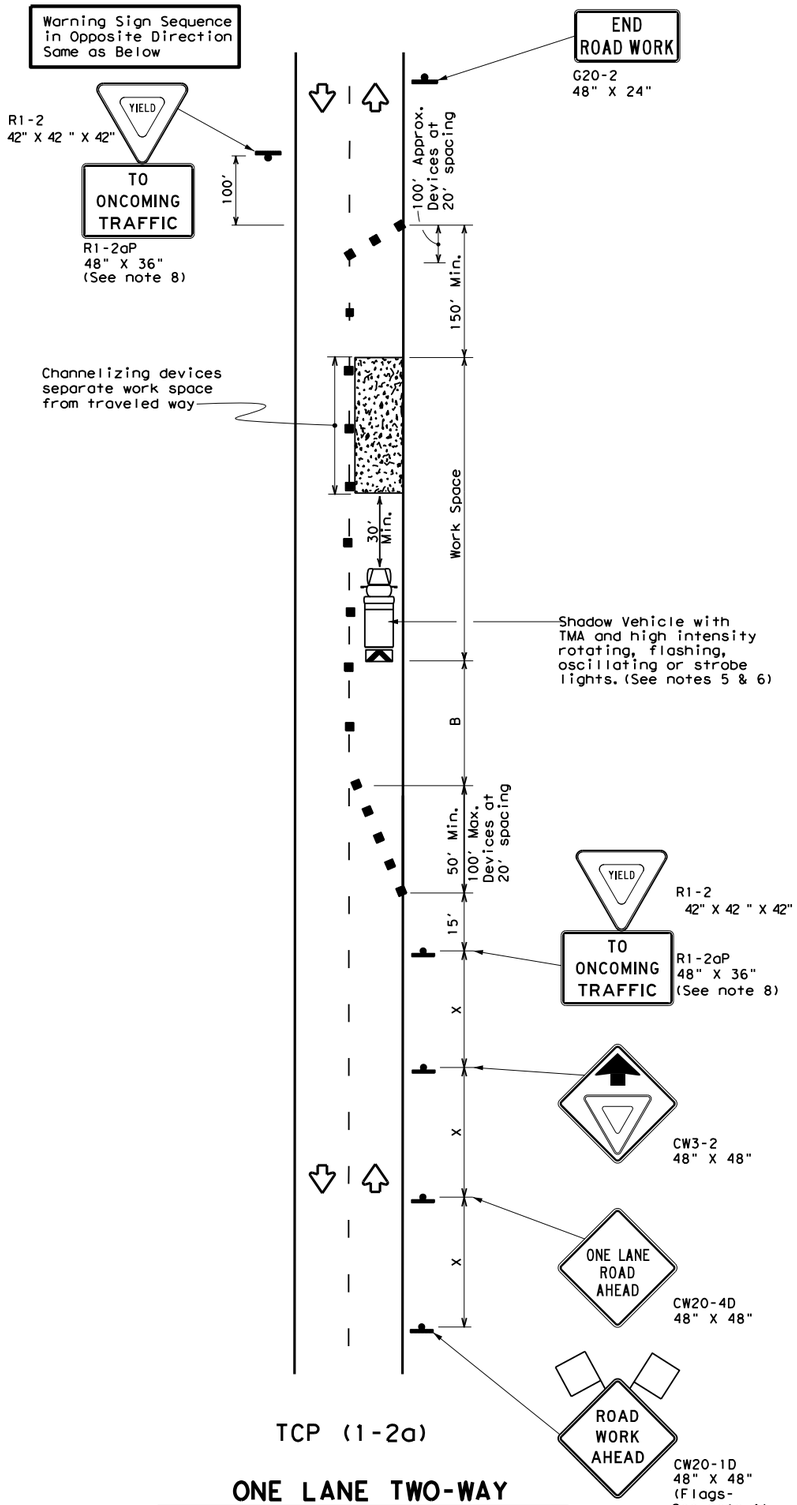
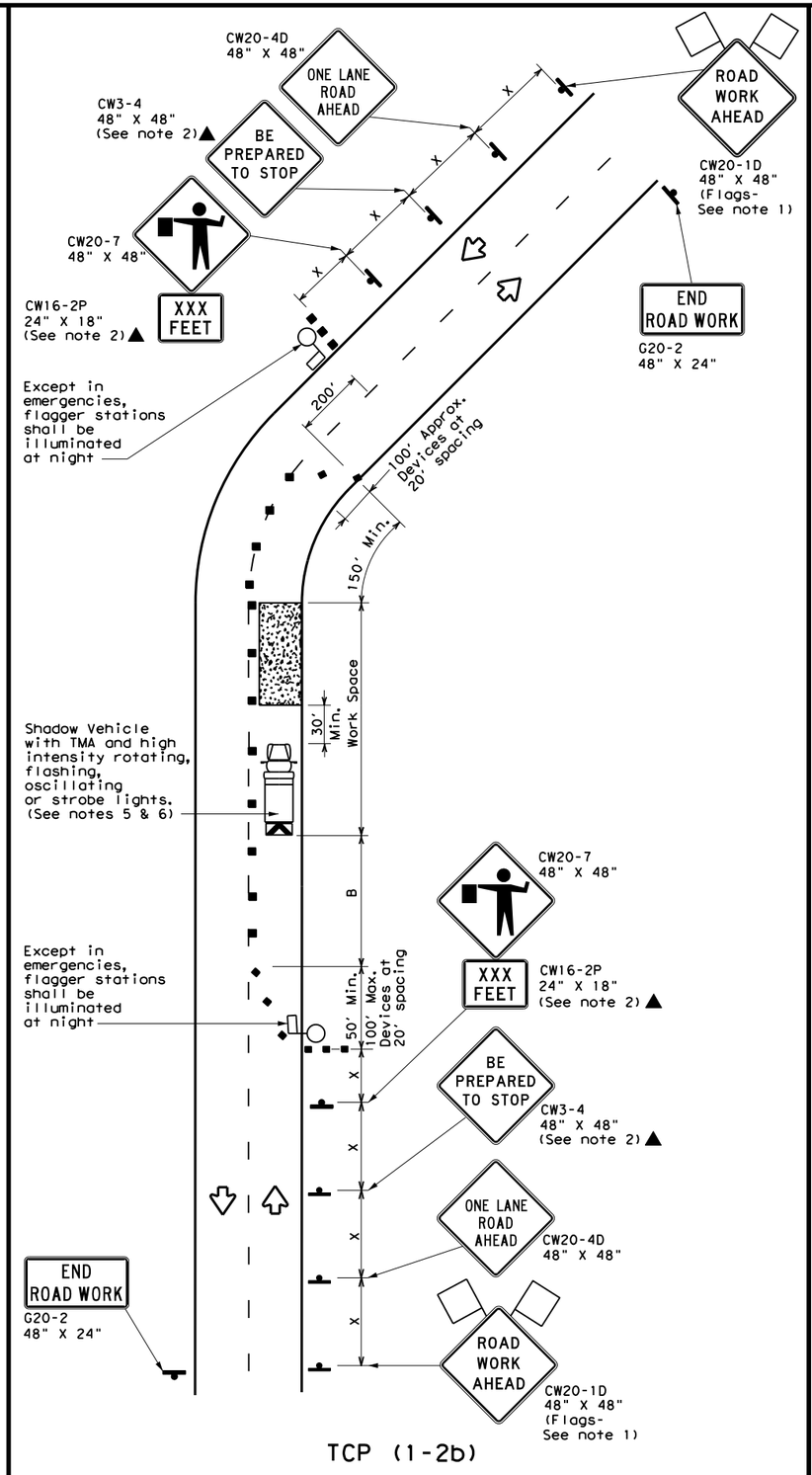


TCP (1-2a)

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	0284	02	027	SH 79
2-94 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	WFS	Throckmorton		28

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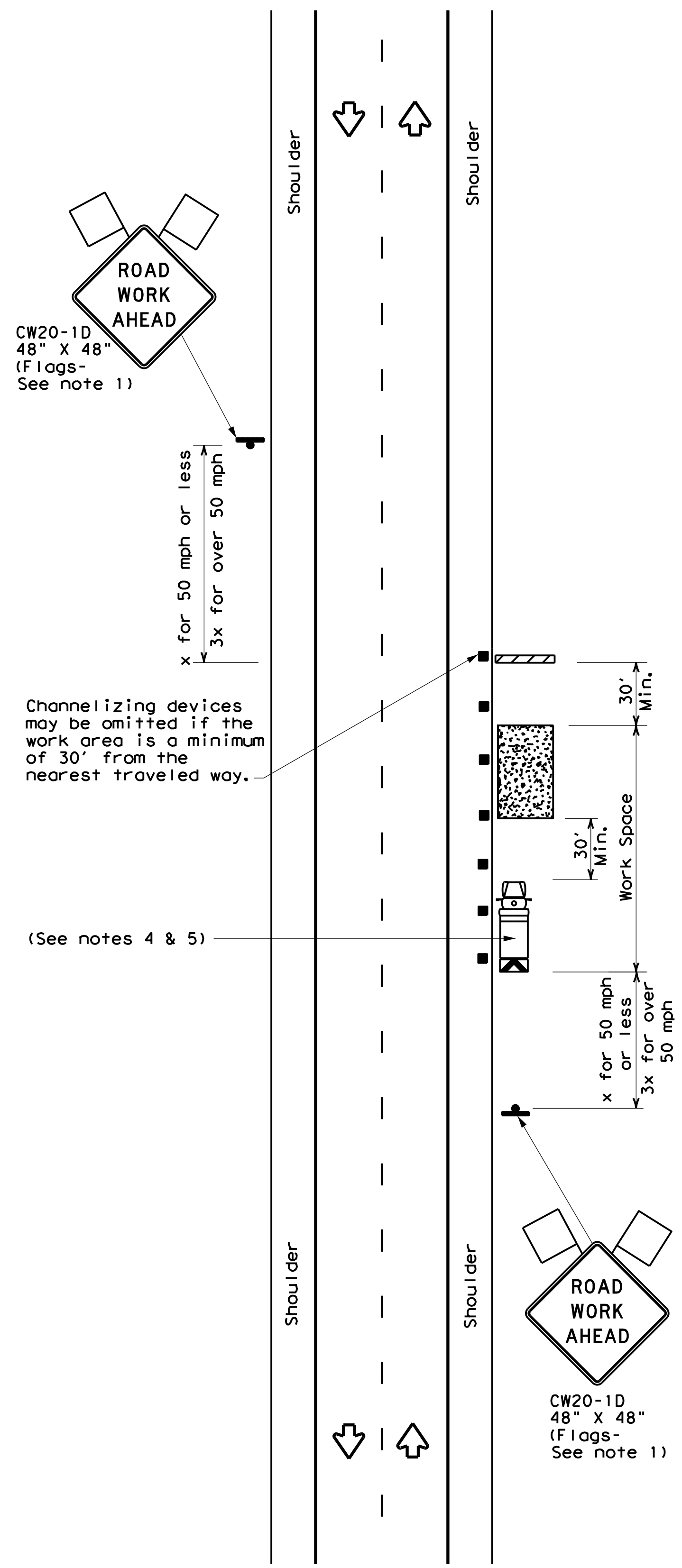
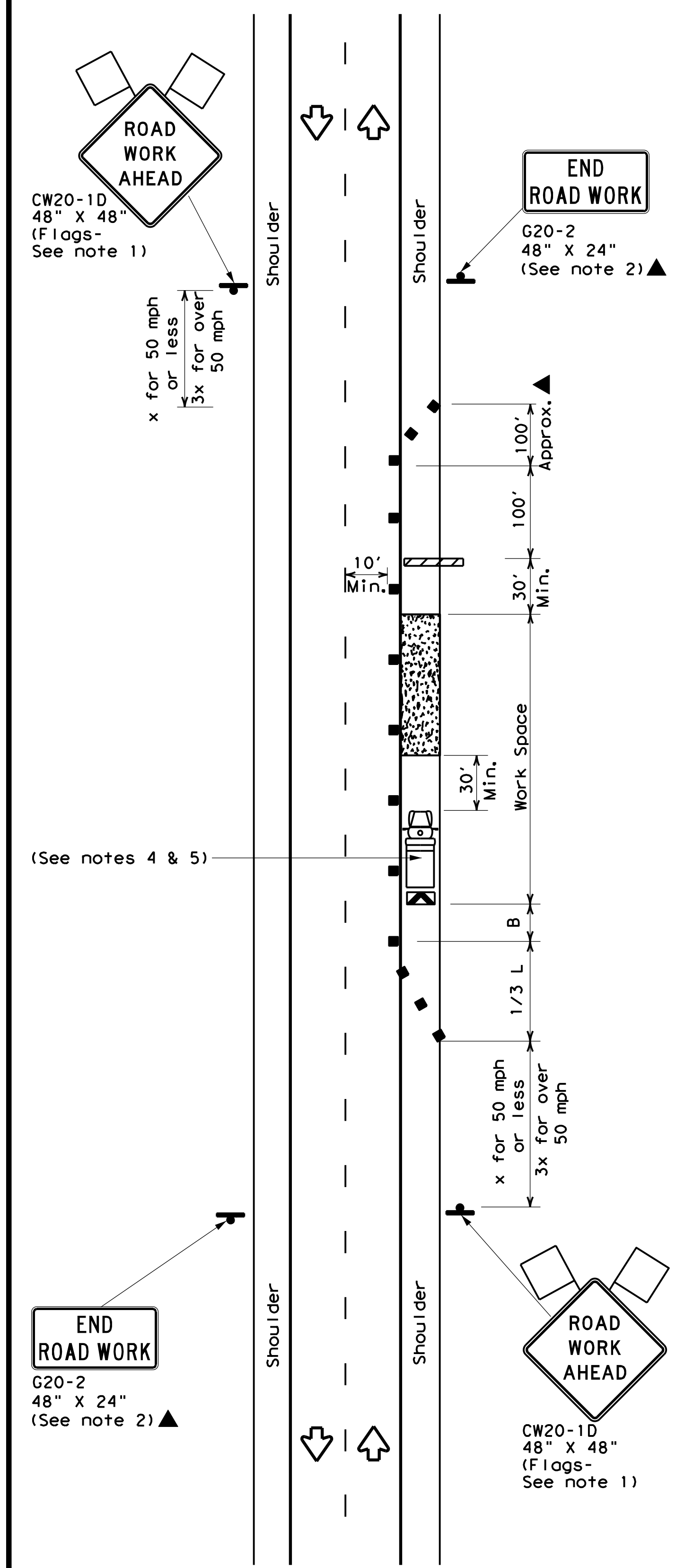


TCP (2-1a)

WORK SPACE NEAR SHOULDER

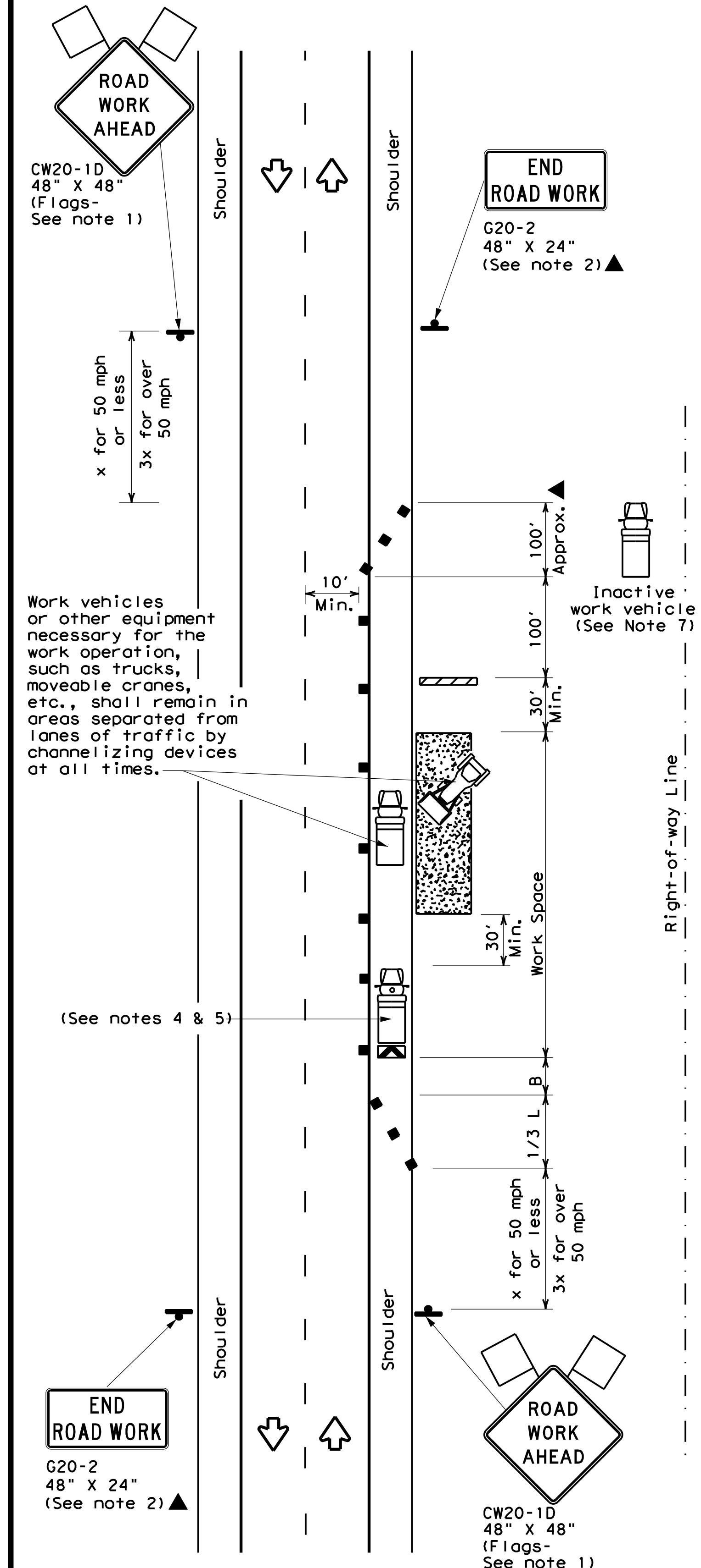
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn		DN:	CK:	DW:	CK:
© TxDOT December 1985		CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18		0284	02	027	SH 79
		DIST		COUNTY	SHEET NO.
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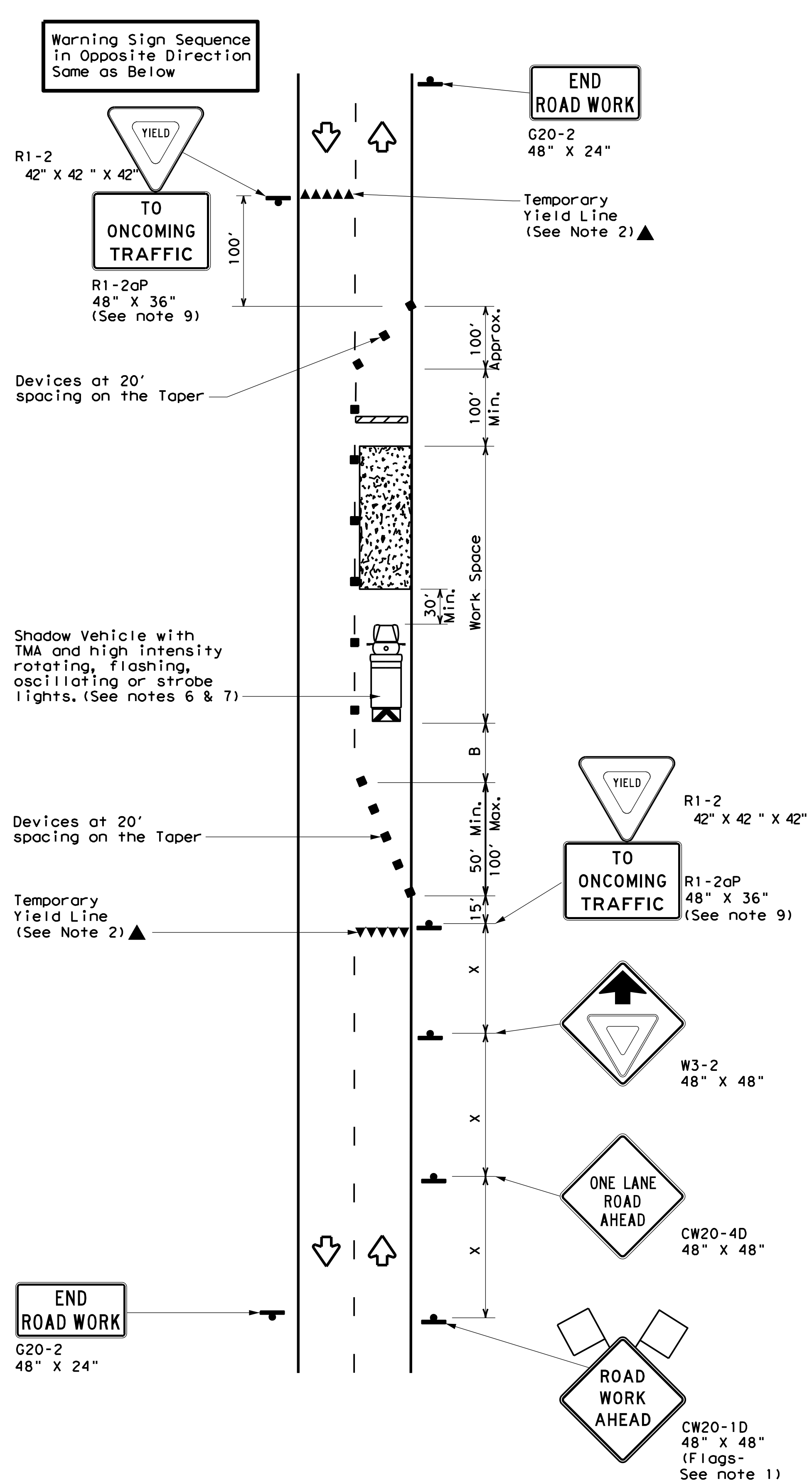
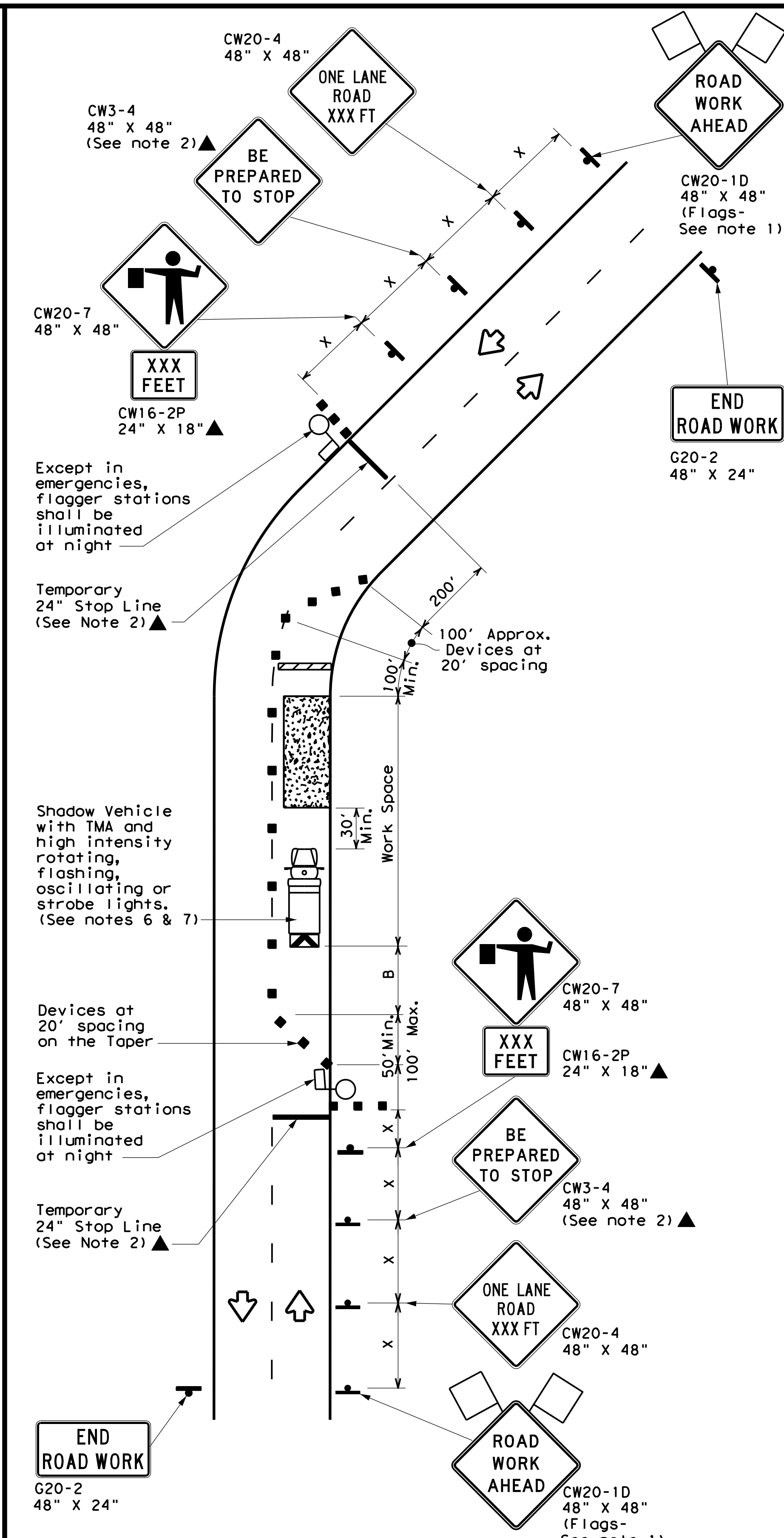


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0284	02	027	SH 79
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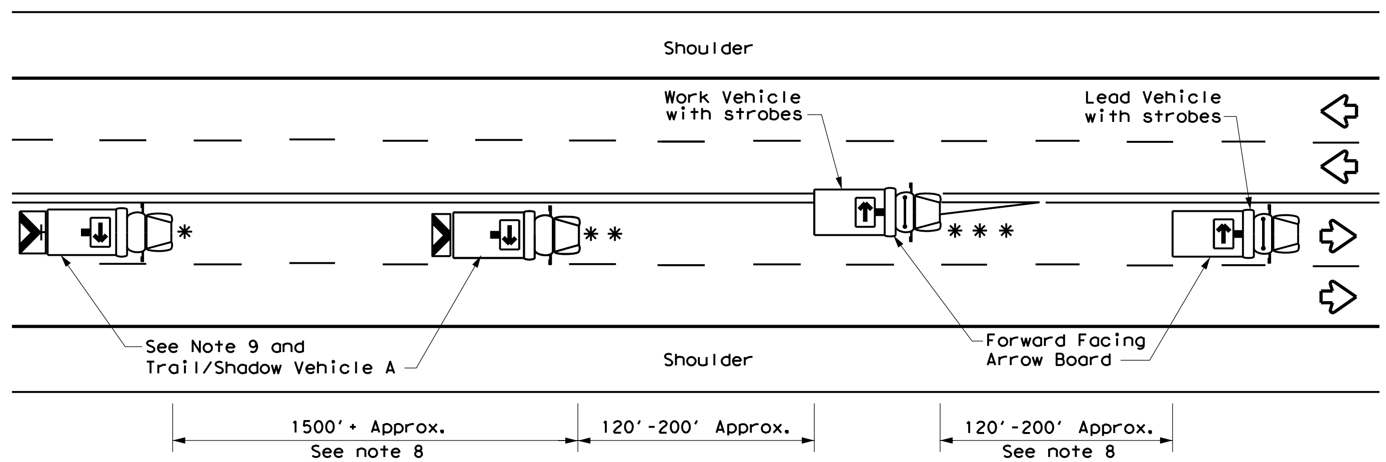
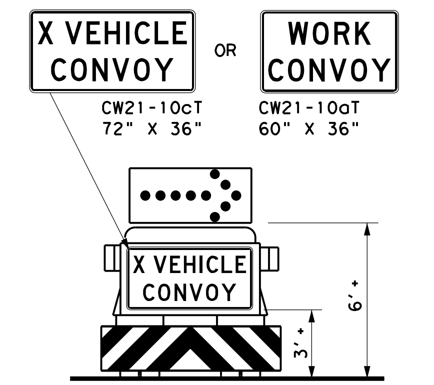
	WFS		Throckmorton	30



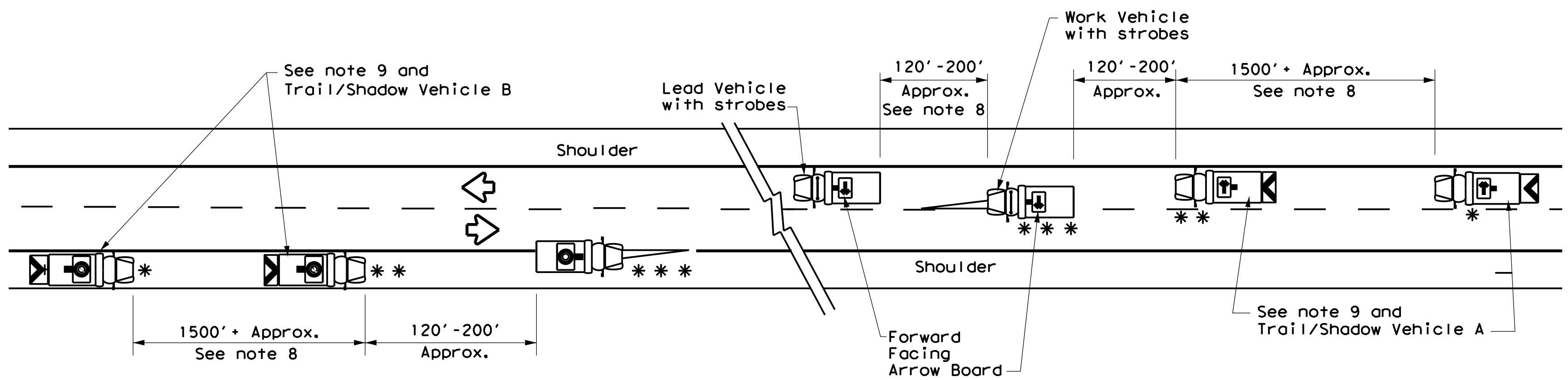
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

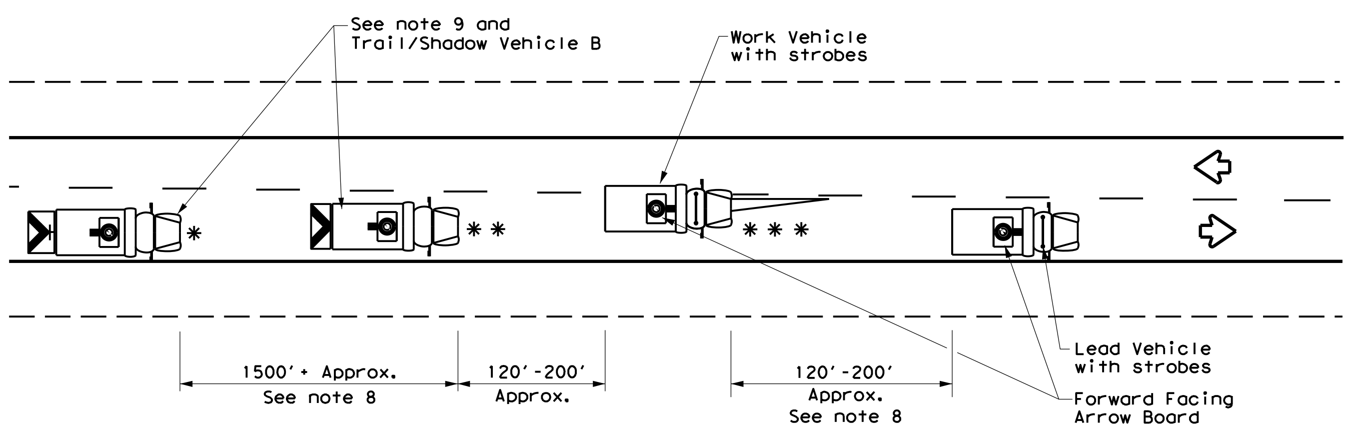


WORK ON SHOULDER

WORK ON TRAVEL LANE

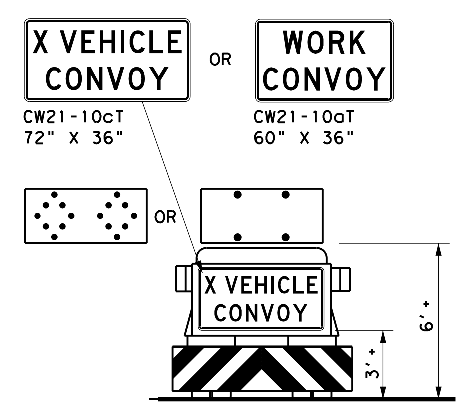
TCP (3-1b)

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

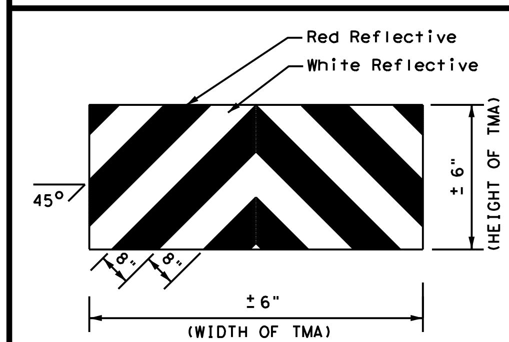
LEGEND

Symbol	Description	Symbol	ARROW BOARD DISPLAY
*	Trail Vehicle		
**	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.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0284	02	027	SH 79
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	WFS		Throckmorton	31

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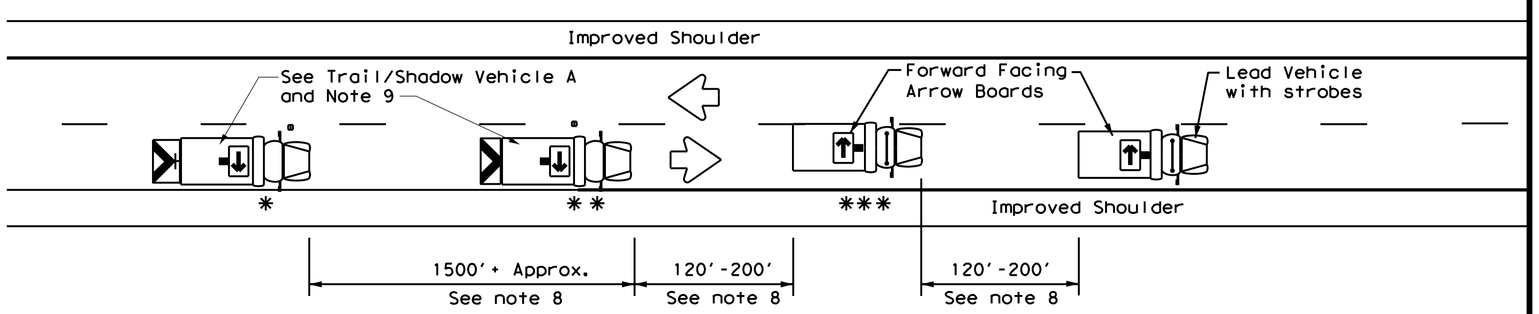
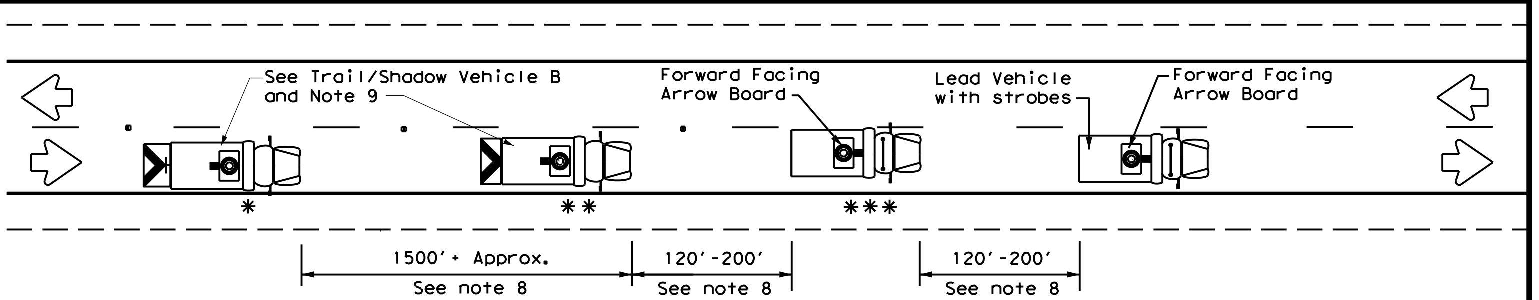


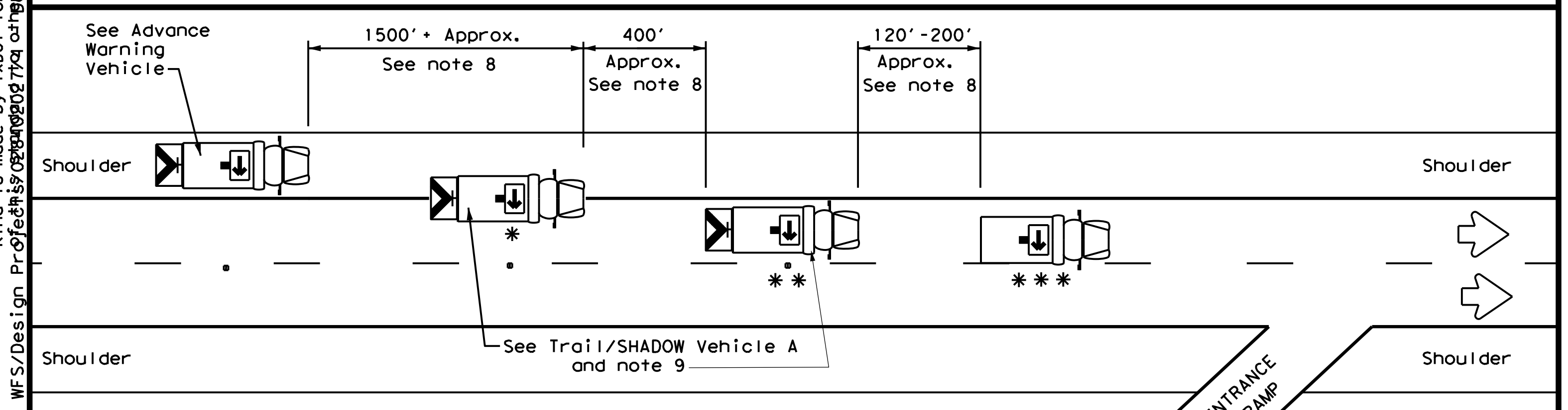
TCP (3-3a)

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



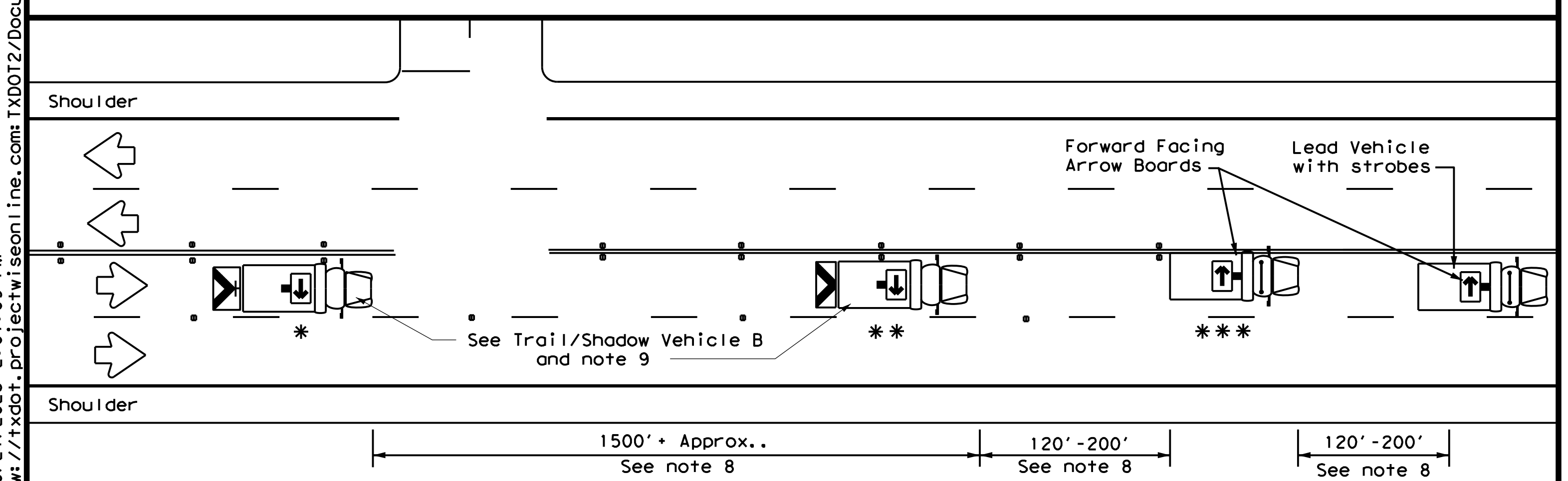
TCP (3-3b)

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



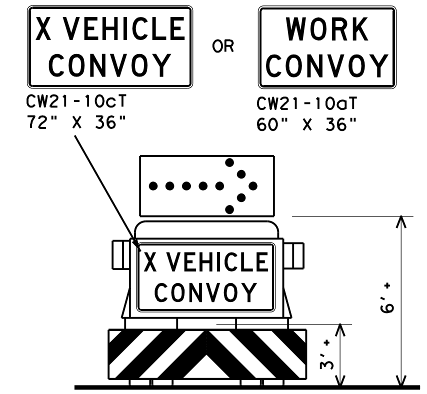
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



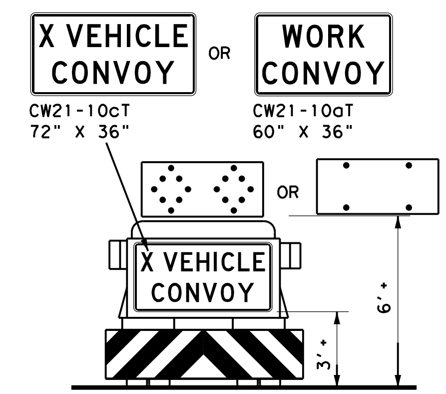
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



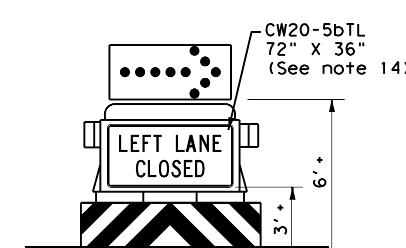
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

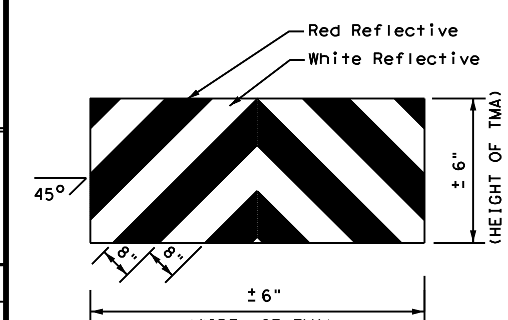


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND

Symbol	Description	Arrow Board Display	
*	Trail Vehicle		RIGHT Directional
**	Shadow Vehicle		LEFT Directional
***	Work Vehicle		Double Arrow
	Heavy Work Vehicle		CAUTION (Alternating Diamond or 4 Corner Flash)
	Truck Mounted Attenuator (TMA)		
	Traffic Flow		

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

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	WFS	Throckmorton		32

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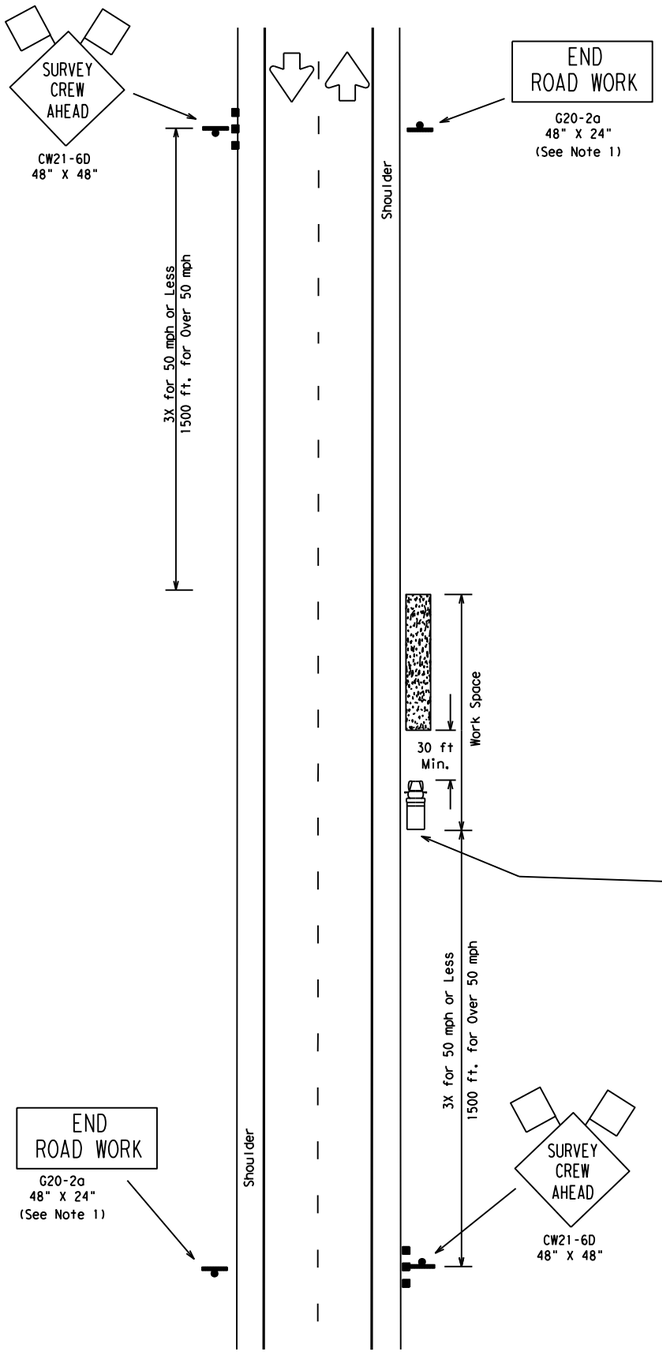
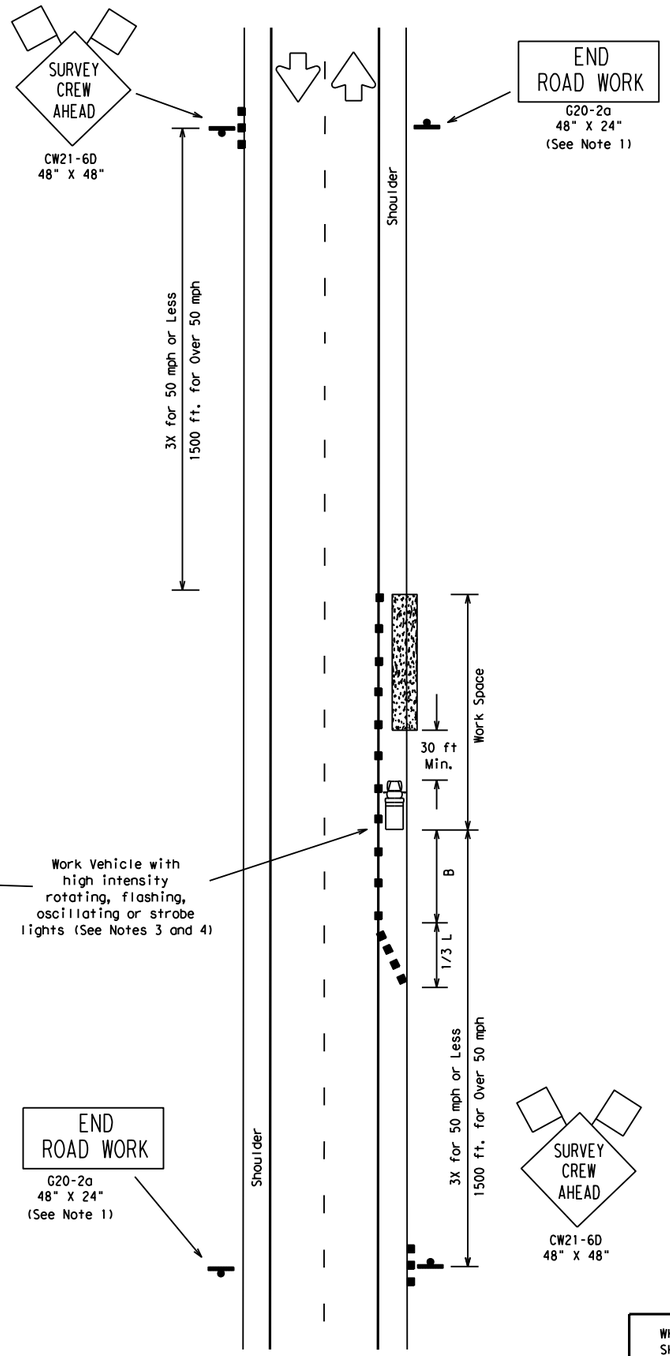


TCP (S-1a)
WORK OFF SHOULDER OR PAVED SURFACE



TCP (S-1b)
WORK ON SHOULDER

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel (M) Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Channelizing devices on the shoulder taper and tangent section may be omitted for short duration (less than 1 hour) work.
3. If line-of-sight requirements for surveying operations will preclude the placement of the Work Vehicle to protect workers, the channelizing devices mentioned in Note 2 are required.
⚠ 4. A Shadow Vehicle with a Truck Mounted Attenuator and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
5. The CW20-1D "ROAD WORK AHEAD" sign may be substituted for the CW21-6D "SURVEY CREW AHEAD" sign.
6. This plan may also be used for shoulder work or off shoulder work for multilane undivided roadways.
7. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-1a)

8. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
⚠ Corrected misspelling.

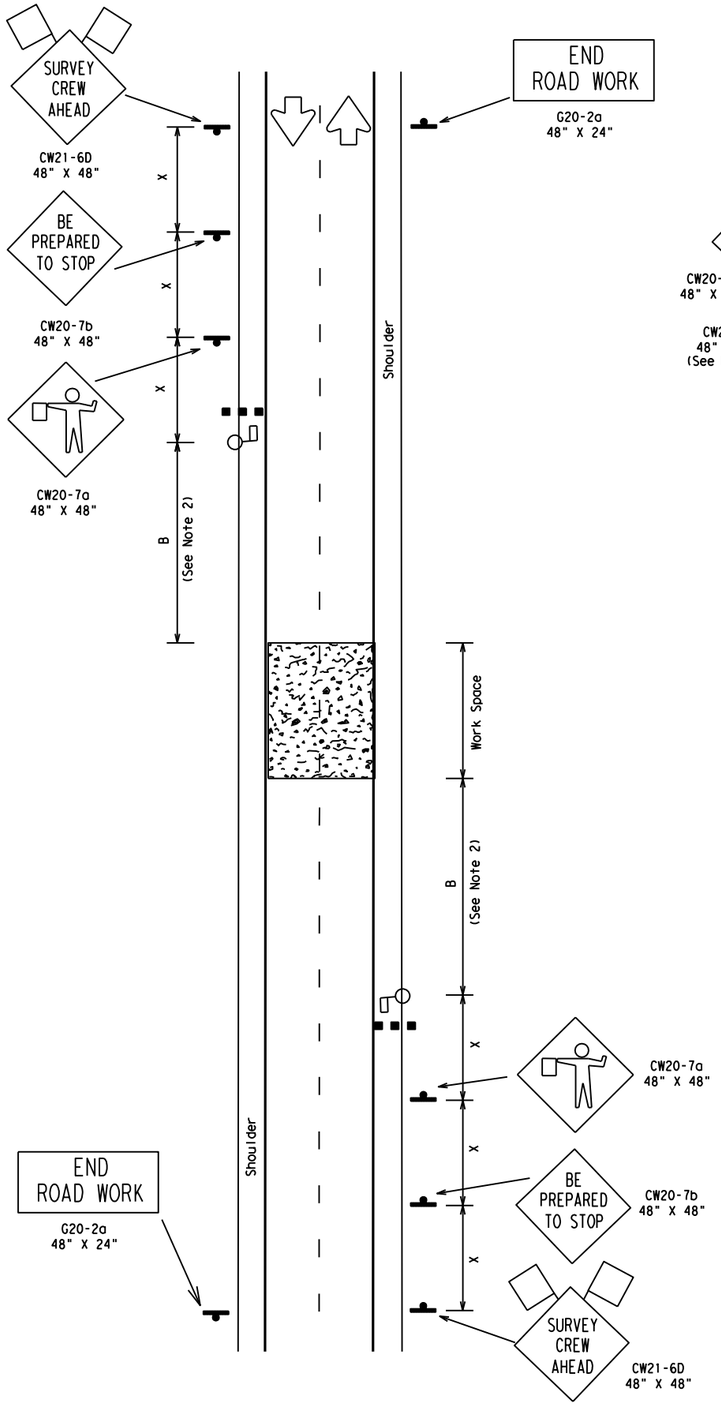
Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

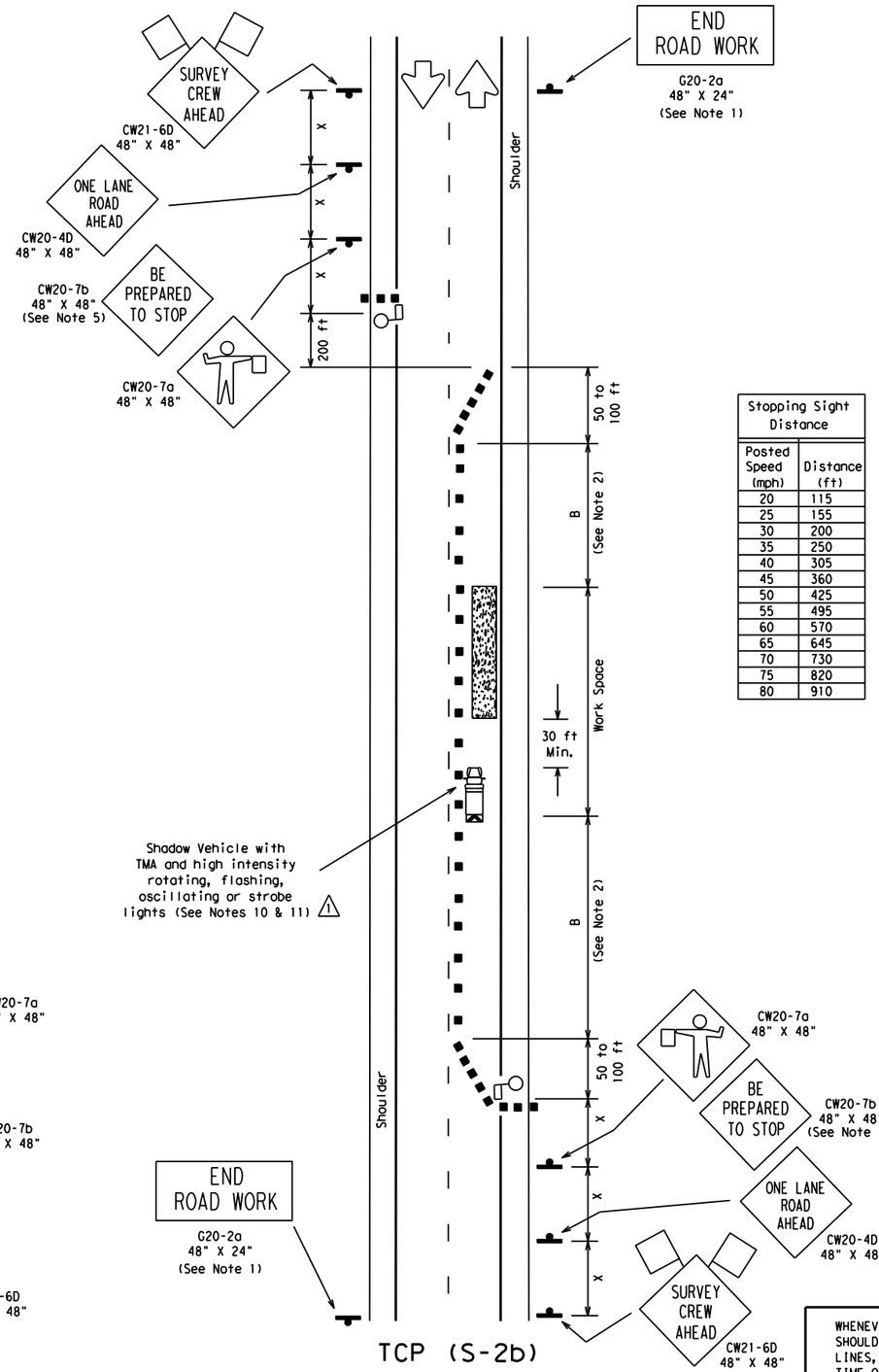
TCP(S-1)-08A

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
8-08	CONT	SECT	JOB	HIGHWAY
	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		33

DATE: 10/27/2023 2:07:16 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020027/4 - Design/Plan Set/8. Traffic/TCP(S-2)-08A.dgn



TCP (S-2a)
ROAD CLOSED FOR LESS THAN 20 MINUTES -
OFF PEAK TRAFFIC HOURS
WITH OR WITHOUT SHOULDERS



TCP (S-2b)
WORK IN ROADWAY
OFF PEAK TRAFFIC HOURS
WITH OR WITHOUT SHOULDERS

Stopping Sight Distance	
Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel
Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Adequate Stopping Sight Distance (see Stopping Sight Distance table) should be maintained from approaching traffic to the flagger or a queue of stopped vehicles. The Buffer Space "B" should be extended around curves or other obstacles, when necessary, to have adequate Stopping Sight Distance to the flagger station.
3. Flaggers should use two-way radios or other means of communication while flagging.
4. The length of the work space should be based on the ability of the flaggers to communicate.
5. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
6. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-2a)

7. Road closures shall be less than 20 minutes. Closures less than 5 minutes are desirable.
8. Sign spacing should be increased if traffic repeatedly queues past the CW20-7b "BE PREPARED TO STOP" sign.
9. The surveying instrument should not be located on the paved surface.

TCP (S-2B)

10. For short duration work the Shadow Vehicle with a TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
11. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
12. The CW20-7b "BE PREPARED TO STOP" sign is optional. When used, it should be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
1 Corrected referrence to notes.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-2)-08A

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

REVISIONS
8-08

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		34

DATE: 10/27/2023 2:07:19 PM
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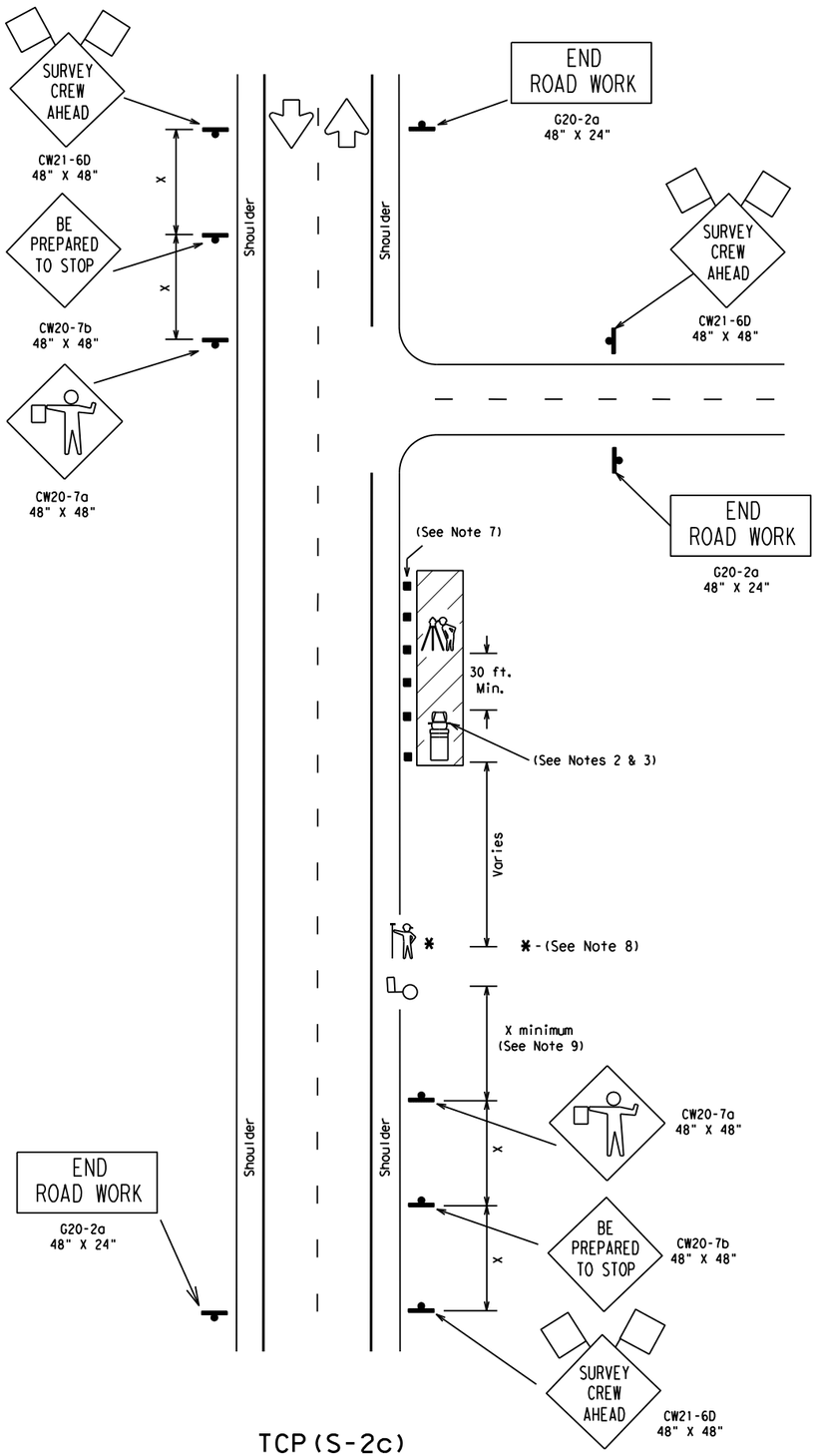

TCP(S-2c)

Stopping Sight Distance	
Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Work Vehicle Truck Mounted Attenuator (TMA)
Flagger Sign Post Survey Rodman Instrument Person

Posted Speed ⁎	Formula	Minimum Desirable Taper Lengths ⁎⁎ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:

MOBILE - work that moves continously or intermittently (stopping up to approximately 15 minutes).

SHORT DURATION - work that occupies a location up to 1 hour.

SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
2. Work Vehicle with high intensity rotating, flashing, oscillating or strobe lights should be used to protect work space.
3. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Heavy Work Vehicle.
4. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" SIGNS.
5. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads may be omitted when approved by the Engineer.
6. The Surveying Instrument shall not be located on the paved surface.
7. Cones at edge of pavement adjacent to instrument person may be omitted when approved by the Engineer.
8. Rodman may only enter roadway when accompanied by flagger and as traffic allows.
9. The distance between the advance warning signs and the work should not exceed a two mile maximum.
10. Flaggers and Survey Crew should use two-way radios or other means of communication.
11. Survey Crew and Flaggers shall wear high-visibility apparel meeting the ANSI 107-2007 standard performance for Class 2 or Class 3 risk exposure.
12. Additional traffic control devices may be required to address local site conditions.
13. Stopping Sight Distance shall be maintained from approaching traffic to the flagger. See "Stopping Sight Distance" table.

SURVEY PARTIES SHOULD AVOID ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

This TCP is to cover two lane rural type roadways as determined by the Engineer. All other type roadways will be covered by other established Survey TCP'S.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-2c)-10

REVISIONS

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

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		35

212A

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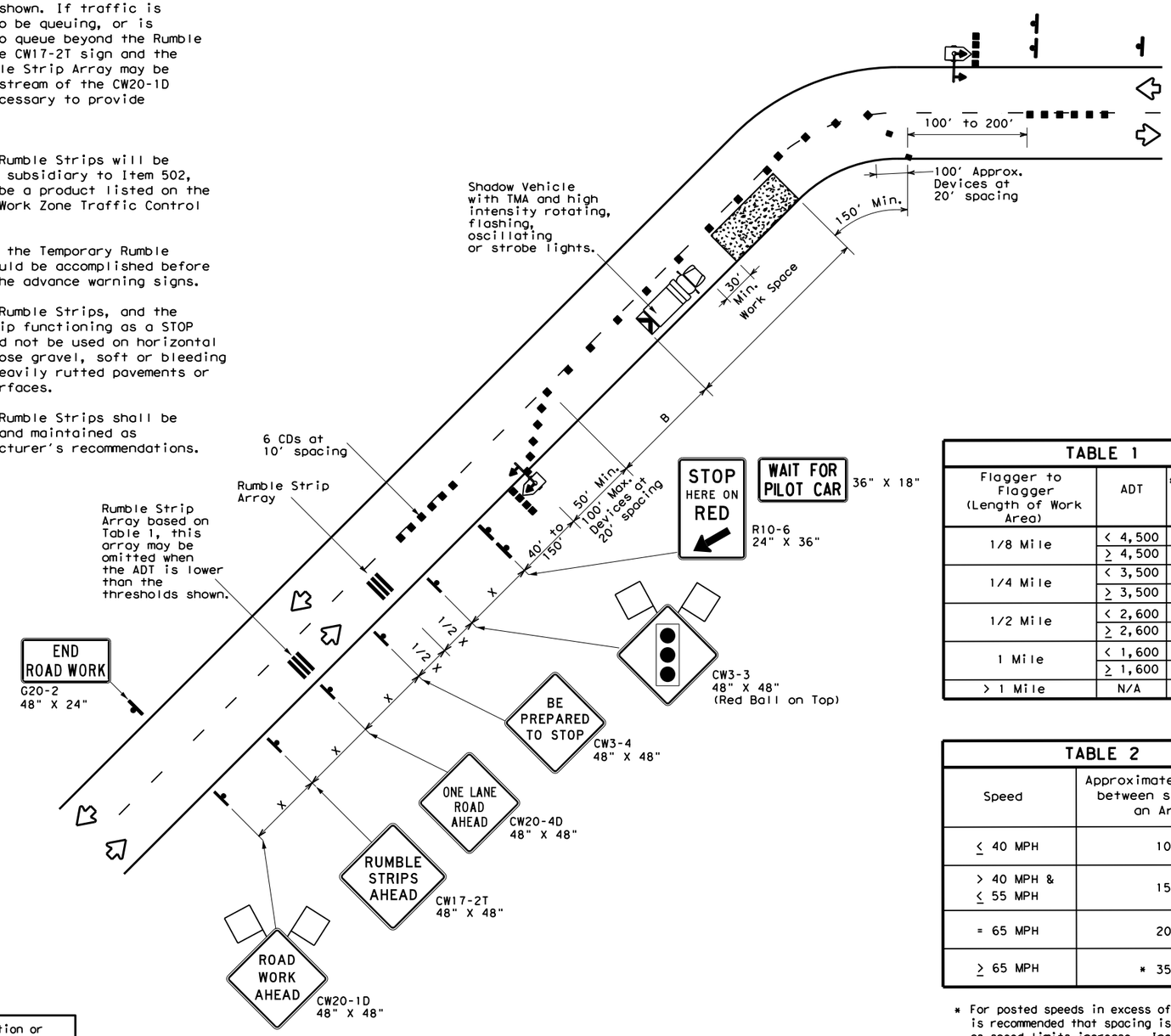
RUMBLE STRIP GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Removal of the Temporary Rumble Strips should be accomplished before removing the advance warning signs.
5. Temporary Rumble Strips, and the rumble strip functioning as a STOP bar, should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.

Warning sign and rumble strip sequence in opposite direction is same as below



For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

ONE LANE TWO-WAY CONTROL
WITH PORTABLE TRAFFIC SIGNAL & RUMBLE STRIPS

TABLE 1

Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2

TABLE 2

Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 65 MPH	20'
≥ 65 MPH	* 35' +

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

REVIEWED AND APPROVED BY DISTRICT SAFETY REVIEW TEAM 1-21-2022

LEGEND

	Type 3 Barricade	■ ■	Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Temporary or Portable Traffic Signal	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		

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
	✓	✓		

TCP GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. Portable traffic signals should be located to provide adequate stopping sight distance for approaching morotist (See table above).
3. 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.
4. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
5. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the Portable Traffic Signals.
6. Proper alignment of overhead signal with on-coming lane should be ensured.
7. For Short Duration and Short Term Stationary refer to WZ(RS)-22 for rumble strip placement and signs.
8. Use of a pilot car is optional, if a pilot car is used it may control the operation of the signal and the "WAIT FOR PILOT CAR" sign is to be used as shown.
9. If pilot car is used to guide vehicles through traffic control zone, vehicle shall have an identification name displayed and "PILOT CAR FOLLOW ME" (G20-4) sign or message board mounted in a conspicuous position on rear.
10. Channelizing devices on the center-line may be ommitted when a pilot car is leading traffic and approved by the Engineer.

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation
Wichita Falls District

TRAFFIC CONTROL PLAN
ONE LANE TWO-WAY CONTROL USING PORTABLE TRAFFIC SIGNAL & RUMBLE STRIPS

REVISIONS

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

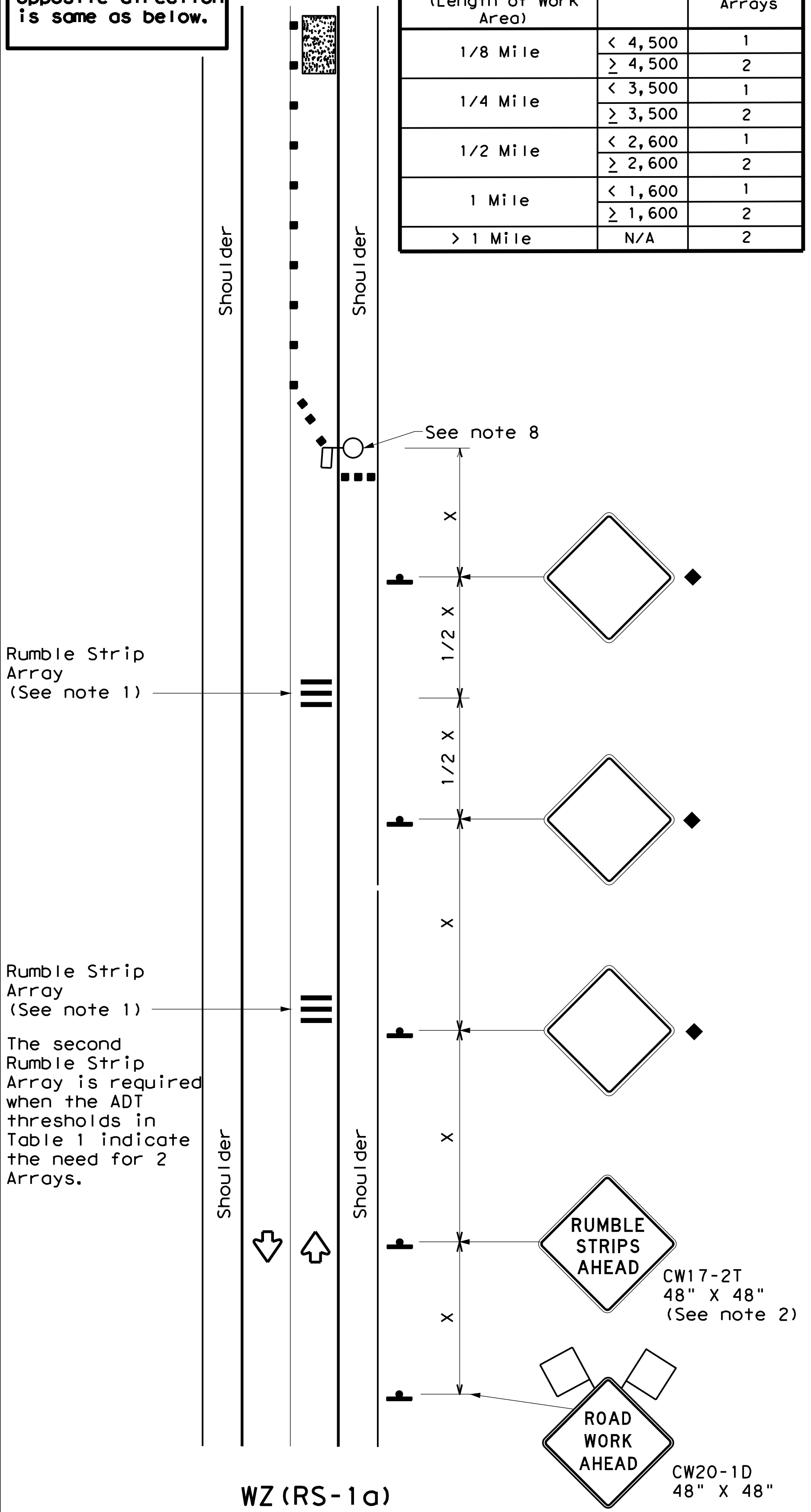
CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		36

DATE:
FILE:

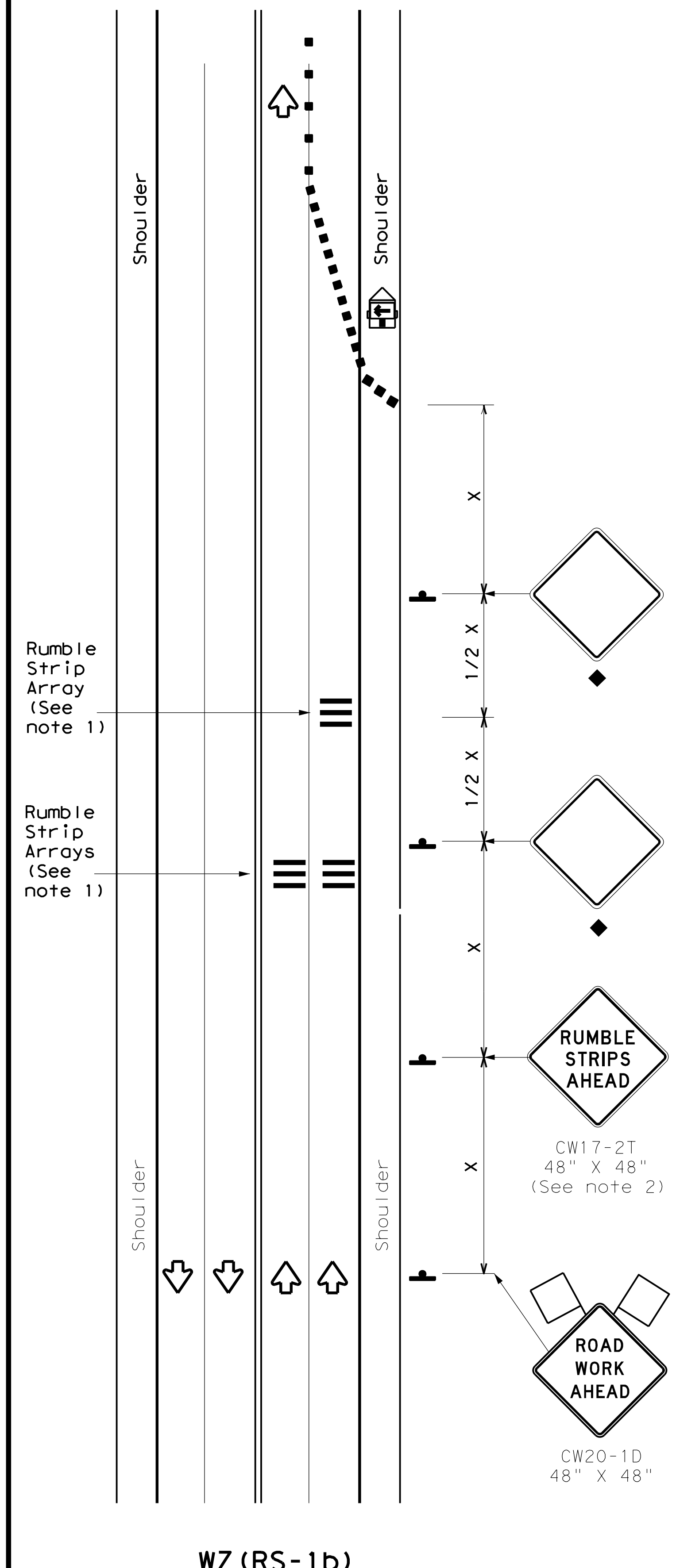
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1

Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

LEGEND

Symbol	Description	Symbol	Description
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel		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
	✓	✓		

◆ **Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.**

* **For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.**

TABLE 2

Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35'+

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

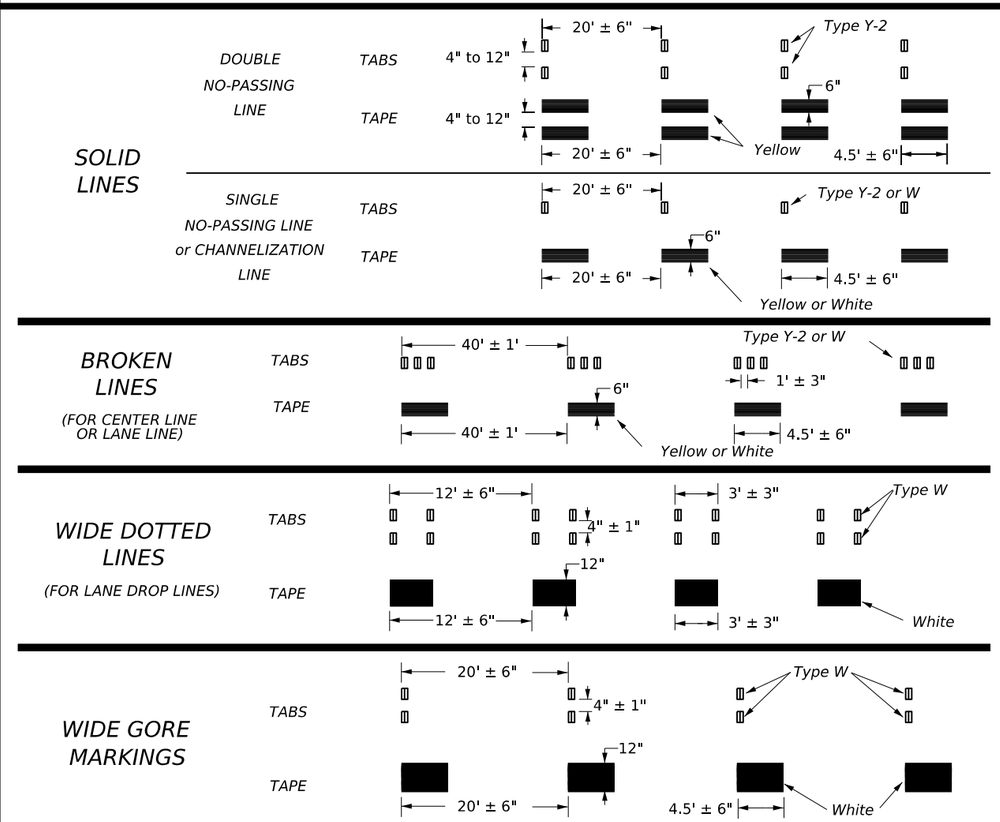
WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT 0284	SECT 02	JOB 027	HIGHWAY SH 79
REVISIONS 2-14 1-22 4-16	DIST WFS	COUNTY Throckmorton		SHEET NO. 37

117

DATE: 10/27/2023 2:07:29 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020027/4 - Design/Plan Set/8. Traffic/WZ(STPM)-23.dgn

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



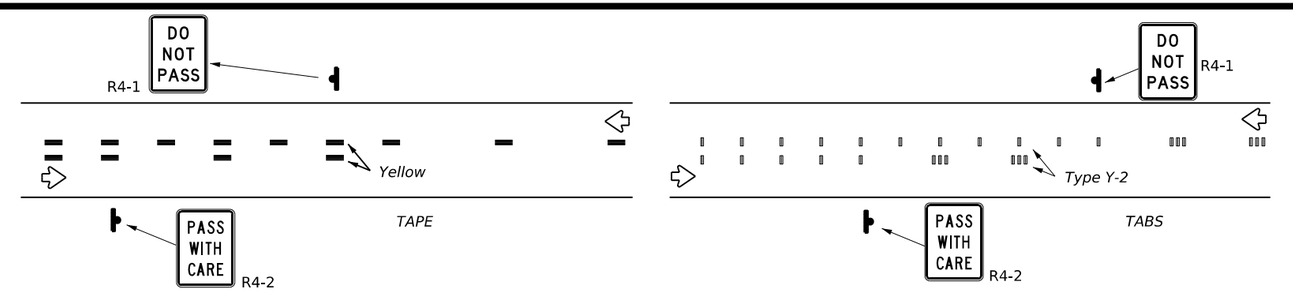
NOTES:

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.

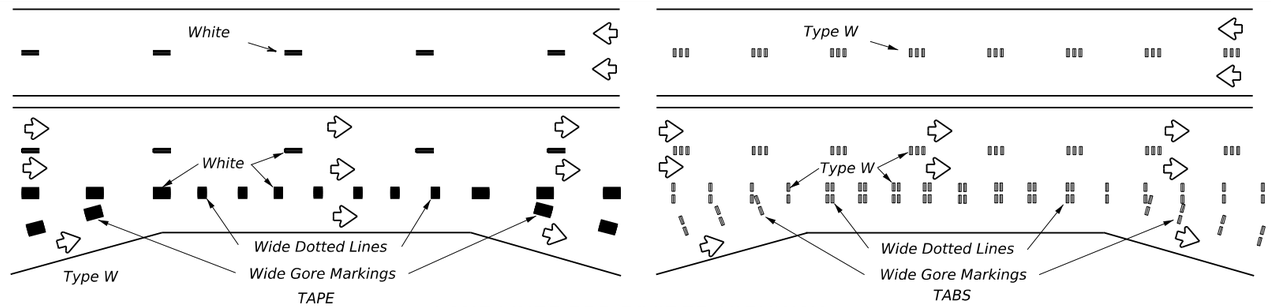
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

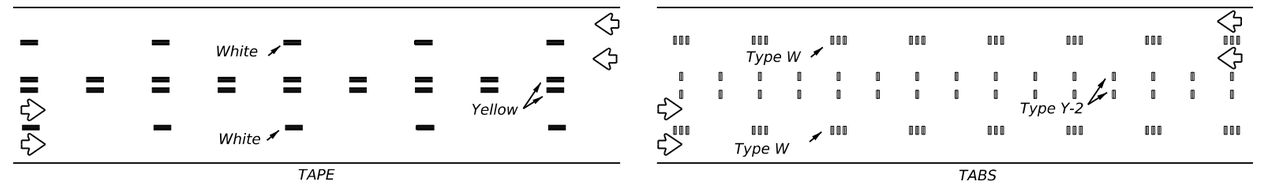
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



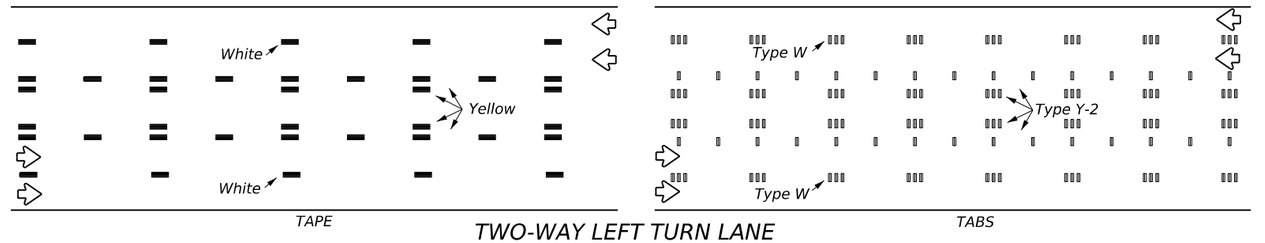
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



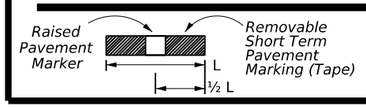
LANE LINES FOR DIVIDED HIGHWAY



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

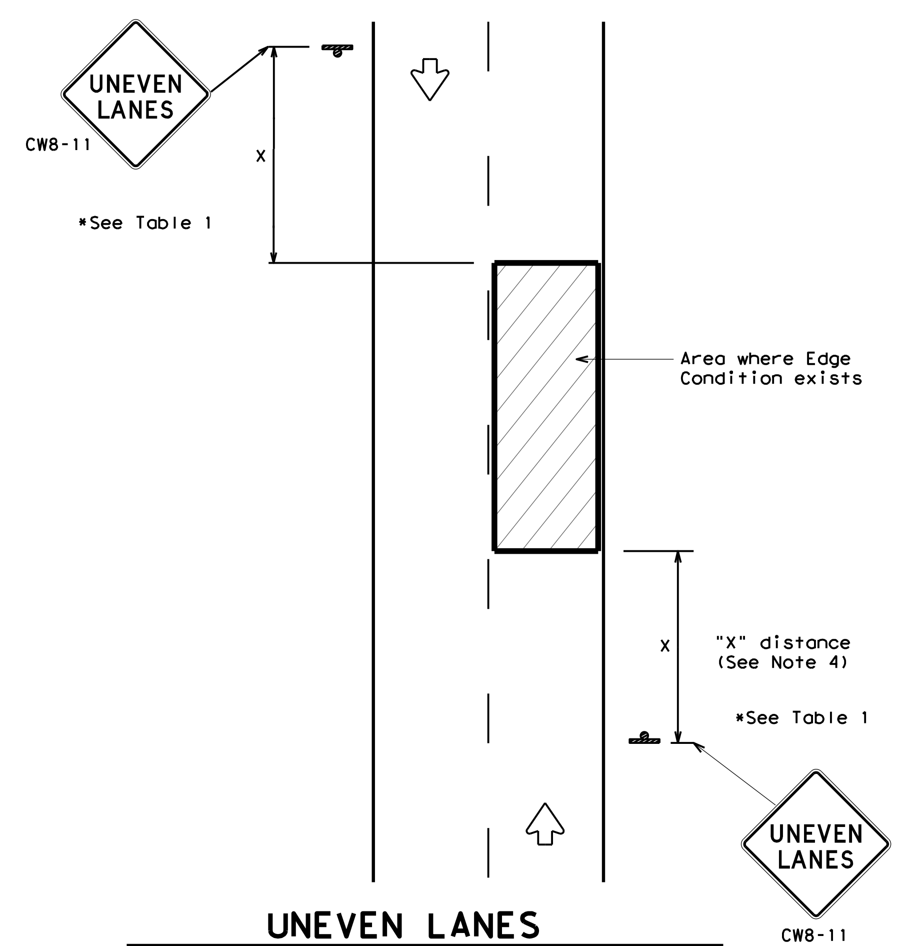
Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

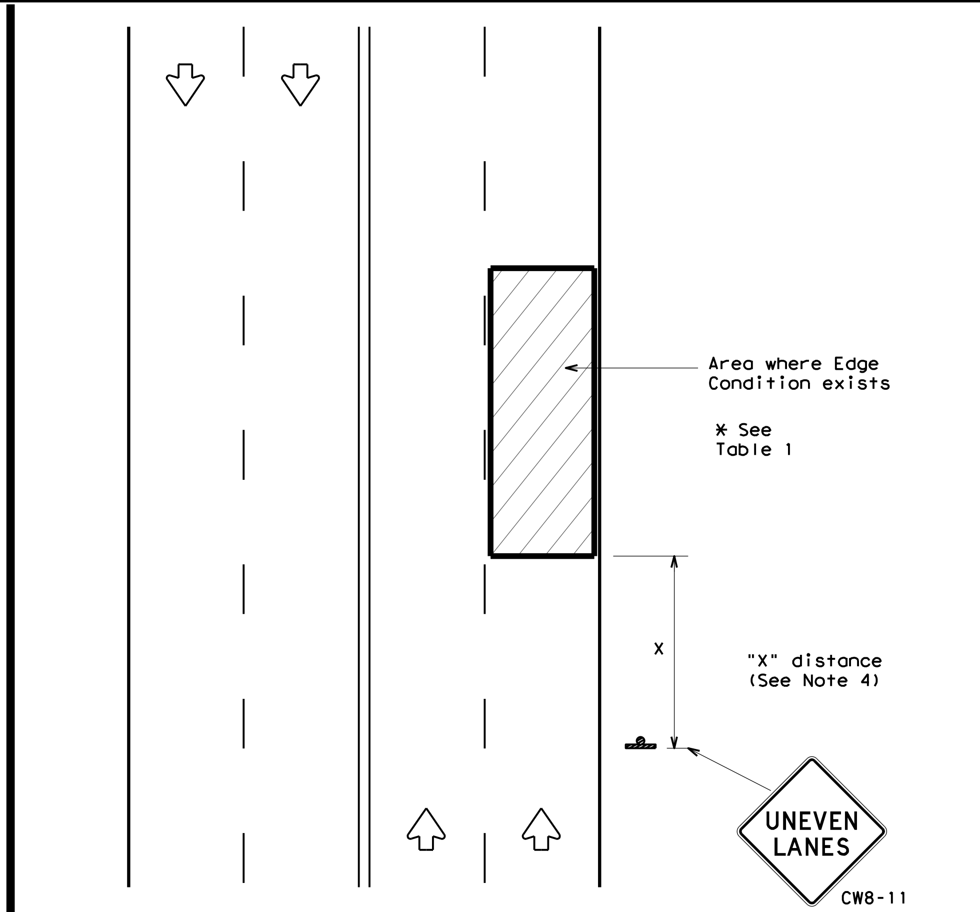
WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		38

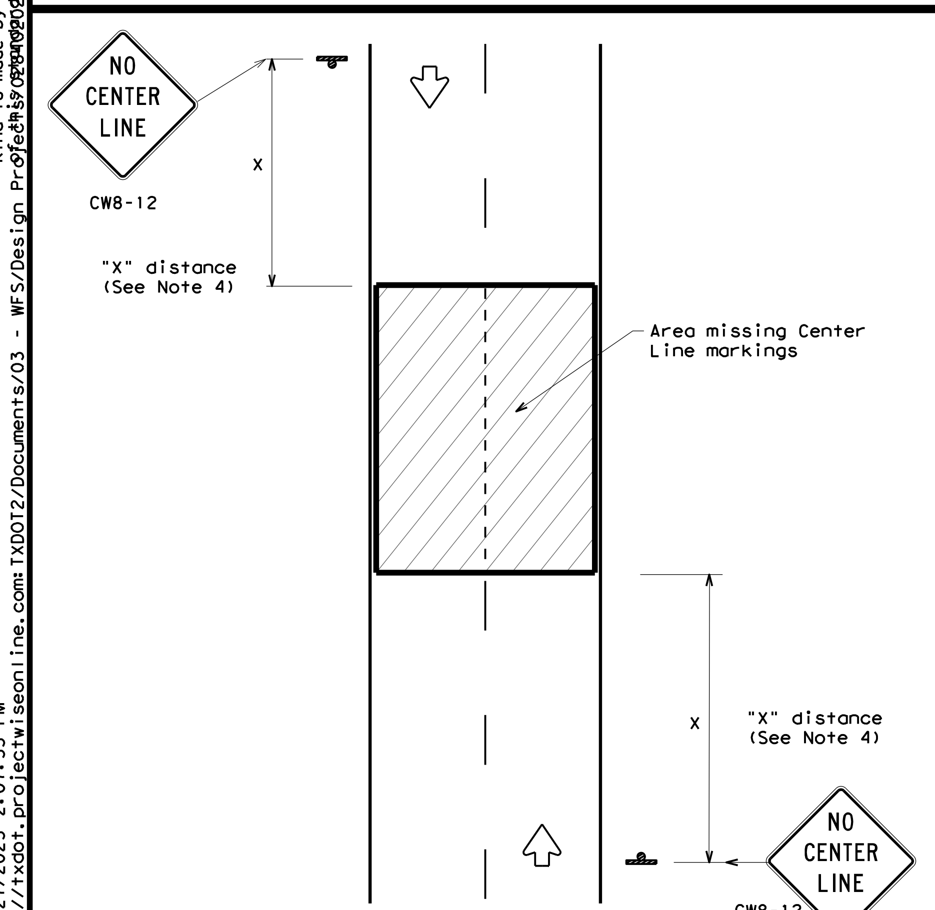
DATE: 10/27/2023 2:07:33 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/...



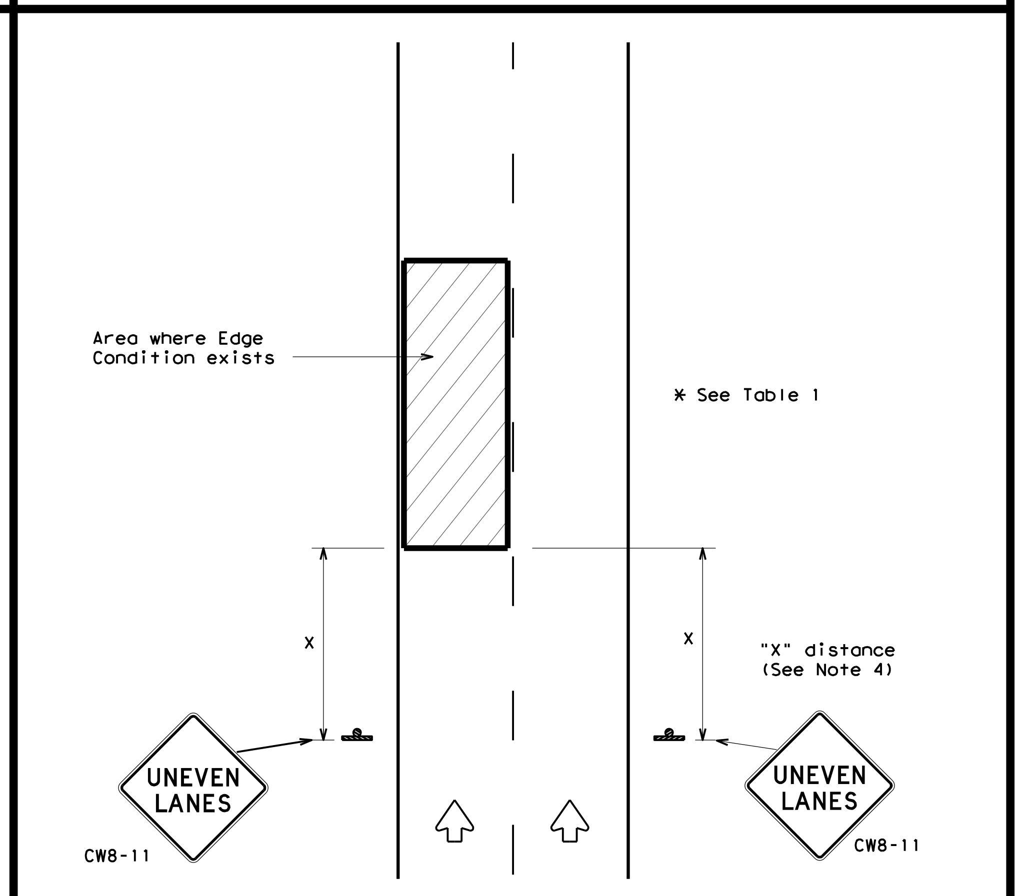
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

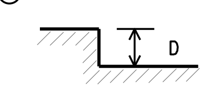
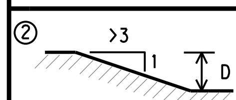
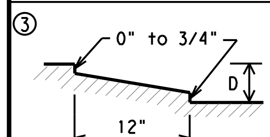
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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  D	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  >3 1 D	Less than or equal to 3"	Sign: CW8-11
③  0" to 3/4" D 12" 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

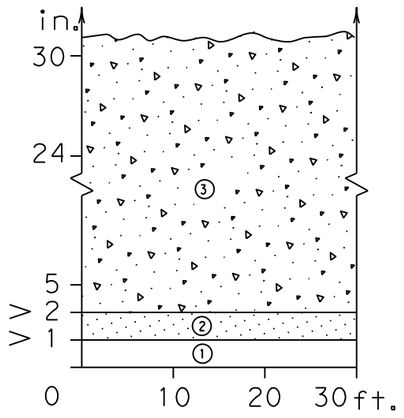
WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
8-95 2-98 7-13 1-97 3-03	DIST		COUNTY	SHEET NO.
	WFS		Throckmorton	39

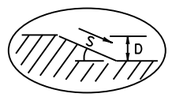
DATE:
FILE:

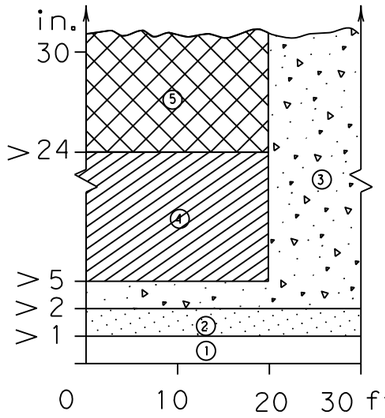
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

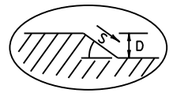


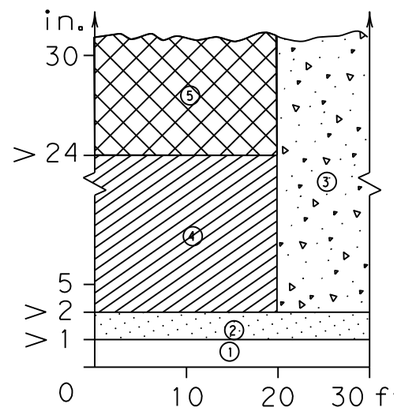
Edge Condition I
S = (3:1) (or flatter)



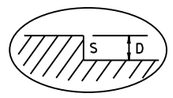


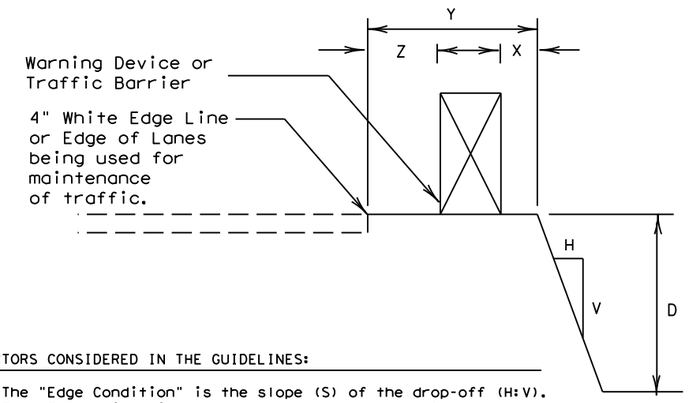
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

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

Edge Condition Notes:

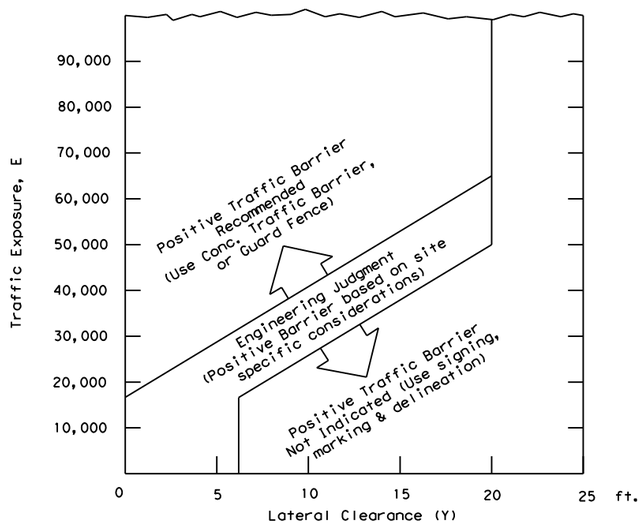
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material as directed by the Egineer, capable of supporting vehicles.

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

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

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

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



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

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

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

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

Engineer's Seal

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023
Date

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
03-01	0284	02	027	SH 79
08-01 correct typos	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		40

Alignment Name: SH 79 CL
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Circular				
PC	( )	0+00.000	7117324.55	1761339.54
PI	( )	3+32.979	7117644.35	1761432.28
CC	( )		7117057.58	1762260.08
PT	( )	6+40.954	7117837.77	1761703.33
Radius:		958.47		
Delta:		38.315° Right		
Degree of Curvature (Arc):		5.978°		
Length:		640.954		
Tangent:		332.979		
Chord:		629.077		
Middle Ordinate:		53.081		
External:		56.192		
Back Tangent Direction:		N16.172°E		
Back Radial Direction:		S73.828°E		
Chord Direction:		N35.330°E		
Ahead Radial Direction:		S35.512°E		
Ahead Tangent Direction:		N54.488°E		
Element: Linear				
PT	( )	6+40.954	7117837.77	1761703.33
PI	( )	15+01.350	7118332.94	1762406.95
Tangential Direction:		N54.864°E		
Tangential Length:		860.396		
Element: Linear				
PI	( )	15+01.350	7118332.94	1762406.95
PI	( )	18+58.029	7118538.58	1762698.38
Tangential Direction:		N54.793°E		
Tangential Length:		356.68		
Element: Linear				
PI	( )	18+58.029	7118538.58	1762698.38
PI	( )	20+15.574	7118629.01	1762827.39
Tangential Direction:		N54.969°E		
Tangential Length:		157.545		
Element: Linear				
PI	( )	20+15.574	7118629.01	1762827.38
PI	( )	23+24.385	7118806.19	1763080.31
Tangential Direction:		N54.989°E		
Tangential Length:		308.811		
Element: Linear				
PI	( )	23+24.385	7118806.19	1763080.31
PI	( )	26+18.861	7118975.13	1763321.50
Tangential Direction:		N54.990°E		
Tangential Length:		294.476		
Element: Linear				
PI	( )	26+18.861	7118975.13	1763321.50
PI	( )	28+69.150	7119118.94	1763526.35
Tangential Direction:		N54.930°E		
Tangential Length:		250.289		
Element: Linear				
PI	( )	28+69.150	7119118.94	1763526.35
PI	( )	31+23.377	7119265.75	1763733.91
Tangential Direction:		N54.727°E		
Tangential Length:		254.227		
Element: Linear				
PI	( )	31+23.377	7119265.75	1763733.91
PI	( )	33+32.635	7119385.88	1763905.25
Tangential Direction:		N54.967°E		
Tangential Length:		209.258		
Element: Linear				
PI	( )	33+32.635	7119385.88	1763905.25
PI	( )	35+39.775	7119504.72	1764074.90
Tangential Direction:		N54.988°E		
Tangential Length:		207.139		
Element: Linear				
PI	( )	35+39.775	7119504.72	1764074.90
PI	( )	38+71.232	7119694.81	1764346.44
Tangential Direction:		N55.006°E		
Tangential Length:		331.458		
Element: Linear				
PI	( )	38+71.232	7119694.81	1764346.44
PI	( )	46+87.275	7120163.74	1765014.29
Tangential Direction:		N54.925°E		
Tangential Length:		816.042		
Element: Linear				
PI	( )	46+87.275	7120163.74	1765014.29
PI	( )	49+67.722	7120325.01	1765243.73
Tangential Direction:		N54.899°E		
Tangential Length:		280.447		
Element: Linear				
PI	( )	49+67.722	7120325.00	1765243.73
PC	( )	52+25.649	7120472.97	1765454.99
Tangential Direction:		N54.994°E		
Tangential Length:		257.926		
Element: Circular				
PC	( )	52+25.649	7120472.98	1765455.01
PI	( )	54+35.027	7120590.95	1765627.99
CC	( )		7118000.26	1767141.35
PT	( )	56+43.725	7120683.68	1765815.71
Radius:		2993		
Delta:		8.003° Right		
Degree of Curvature (Arc):		1.914°		
Length:		418.077		
Tangent:		209.379		
Chord:		417.737		
Middle Ordinate:		7.297		
External:		7.315		
Back Tangent Direction:		N55.707°E		
Back Radial Direction:		S34.293°E		
Chord Direction:		N59.709°E		
Ahead Radial Direction:		S26.290°E		
Ahead Tangent Direction:		N63.710°E		
Element: Linear				
PT	( )	56+43.725	7120683.68	1765815.71
PI	( )	63+09.947	7120979.26	1766412.78
Tangential Direction:		N63.663°E		
Tangential Length:		666.221		
Element: Linear				
PI	( )	63+09.947	7120979.26	1766412.78
PI	( )	67+04.932	7121154.86	1766766.58
Tangential Direction:		N63.603°E		
Tangential Length:		394.986		
Element: Linear				
PI	( )	67+04.932	7121154.86	1766766.58
PI	( )	71+46.295	7121350.60	1767162.17
Tangential Direction:		N63.674°E		
Tangential Length:		441.362		
Element: Linear				
PI	( )	71+46.295	7121350.60	1767162.17
PI	( )	74+76.140	7121496.98	1767457.75
Tangential Direction:		N63.653°E		
Tangential Length:		329.845		
Element: Linear				
PI	( )	74+76.140	7121496.98	1767457.75
PI	( )	85+18.865	7121958.48	1768392.79
Tangential Direction:		N63.731°E		
Tangential Length:		1042.726		
Element: Linear				
PI	( )	85+18.865	7121958.48	1768392.79
PI	( )	93+47.719	7122327.80	1769134.81
Tangential Direction:		N63.539°E		
Tangential Length:		828.853		
Element: Linear				
PI	( )	93+47.719	7122327.80	1769134.81
PI	( )	115+70.22	7123312.65	1771127.21
Tangential Direction:		N63.697°E		
Tangential Length:		2222.51		
Element: Linear				
PI	( )	115+70.22	7123312.65	1771127.21
PI	( )	123+07.58	7123640.14	1771787.84
Tangential Direction:		N63.631°E		
Tangential Length:		737.354		
Element: Linear				
PI	( )	123+07.58	7123640.14	1771787.84
PI	( )	129+99.88	7123947.39	1772408.23
Tangential Direction:		N63.653°E		
Tangential Length:		692.306		
Element: Linear				
PI	( )	129+99.88	7123947.39	1772408.23
PI	( )	135+42.30	7124188.12	1772894.31
Tangential Direction:		N63.653°E		
Tangential Length:		542.418		
Element: Linear				
PI	( )	135+42.30	7124188.12	1772894.31
PI	( )	136+68.30	7124244.04	1773007.21
Tangential Direction:		N63.653°E		
Tangential Length:		125.994		
Element: Linear				
PI	( )	136+68.30	7124244.04	1773007.21
PI	( )	149+22.08	7124799.24	1774131.37
Tangential Direction:		N63.716°E		
Tangential Length:		1253.785		
Element: Linear				
PI	( )	149+22.08	7124799.24	1774131.37
PI	( )	155+19.08	7125064.88	1774666.02
Tangential Direction:		N63.580°E		
Tangential Length:		597.002		
Element: Linear				
PI	( )	155+19.08	7125064.88	1774666.02
PI	( )	159+99.23	7125276.81	1775096.86
Tangential Direction:		N63.807°E		
Tangential Length:		480.145		
Element: Linear				
PI	( )	159+99.23	7125276.81	1775096.86
PI	( )	162+01.28	7125367.21	1775277.56
Tangential Direction:		N63.423°E		
Tangential Length:		202.051		
Element: Linear				
PI	( )	162+01.28	7125367.21	1775277.56
PI	( )	173+35.75	7125869.12	1776294.96
Tangential Direction:		N63.742°E		
Tangential Length:		1134.472		
Element: Linear				
PI	( )	173+35.75	7125869.12	1776294.96
PI	( )	188+78.47	7126554.80	1777676.93
Tangential Direction:		N63.611°E		
Tangential Length:		1542.724		
Element: Linear				
PI	( )	188+78.47	7126554.80	1777676.93
PI	( )	205+20.22	7127281.97	1779148.85
Tangential Direction:		N63.710°E		
Tangential Length:		1641.746		
Element: Linear				
PI	( )	205+20.22	7127281.97	1779148.85
PI	( )	216+70.40	7127793.32	1780179.11
Tangential Direction:		N63.603°E		
Tangential Length:		1150.175		
Element: Linear				
PI	( )	216+70.40	7127793.32	1780179.11
PI	( )	223+30.62	7128085.01	1780771.40
Tangential Direction:		N63.781°E		
Tangential Length:		660.221		
Element: Linear				
PI	( )	223+30.62	7128085.01	1780771.40
PI	( )	226+90.36	7128244.45	1781093.88
Tangential Direction:		N63.690°E		
Tangential Length:		359.747		
Element: Linear				
PI	( )	226+90.36	7128244.45	1781093.88
PI	( )	232+05.30	7128473.00	1781555.32
Tangential Direction:		N63.651°E		
Tangential Length:		514.934		
Element: Linear				
PI	( )	232+05.30	7128473.00	1781555.32
PI	( )	236+88.34	7128686.33	1781988.69
Tangential Direction:		N63.791°E		
Tangential Length:		483.039		
Element: Linear				
PI	( )	236+88.34	7128686.33	1781988.69
PI	( )	242+88.34	7128952.48	1782526.44
Tangential Direction:		N63.667°E		
Tangential Length:		600		
Element: Linear				
PI	( )	242+88.34	7128952.48	1782526.44
PI	( )	258+62.68	7129649.10	1783938.28
Tangential Direction:		N63.738°E		
Tangential Length:		1574.348		
Element: Linear				
PI	( )	258+62.68	7129649.10	1783938.28
PI	( )	267+75.27	7130053.34	1784756.44
Tangential Direction:		N63.707°E		
Tangential Length:		912.582		
Element: Linear				
PI	( )	267+75.27	7130053.34	1784756.44
PI	( )	272+50.53	7130264.26	1785182.34
Tangential Direction:		N63.653°E		
Tangential Length:		475.266		
Element: Linear				
PI	( )	272+50.53	7130264.26	1785182.34
PI	( )	276+63.74	7130447.75	1785552.58
Tangential Direction:		N63.637°E		
Tangential Length:		413.212		
Element: Linear				
PI	( )	276+63.74	7130447.75	1785552.58
PI	( )	289+98.32	7131039.15	1786748.96
Tangential Direction:		N63.696°E		
Tangential Length:		1334.572		
Element: Linear				
PI	( )	289+98.32	7131039.15	1786748.96
PI	( )	301+31.07	7131540.11	1787764.92
Tangential Direction:		N63.753°E		
Tangential Length:		1132.757		
Element: Linear				
PI	( )	301+31.07	7131540.11	1787764.92
PI	( )	313+59.10	7132084.88	1788865.511
Tangential Direction:		N63.665°E		
Tangential Length:		1228.031		
Element: Linear				
PI	( )	313+59.10	7132084.88	1788865.511
PI	( )	317+18.61	7132243.81	1789187.97
Tangential Direction:		N63.762°E		
Tangential Length:		359.506		
Element: Linear				
PI	( )	317+18.61	7132243.81	1789187.97
PI	( )	321+11.98	7132417.24	1789541.05
Tangential Direction:		N63.840°E		
Tangential Length:		393.367		
Element: Linear				
PI	( )	321+11.98	7132417.24	1789541.05
PI	( )	329+90.30	7132806.70	1790328.30
Tangential Direction:		N63.678°E		
Tangential Length:		878.319		
Element: Linear				
PI	( )	329+90.30	7132806.70	1790328.30
PI	( )	335+59.40	7133059.07	1790838.39
Tangential Direction:		N63.675°E		
Tangential Length:		569.107		
Element: Linear				
PI	( )	335+59.40	7133059.07	1790838.39
PI	( )	339+72.43	7133241.92	1791208.74
Tangential Direction:		N63.724°E		
Tangential Length:		413.027		

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79 ALIGNMENT DATA

CONT	SECT	JOB	HIGHWAY
0284	02	026	SH 79
DIST	COUNTY		SHEET NO.
03	THROCKMORTON		41

DATE: 10/27/2023 2:07:41 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/3. Roadway/SH 79 ALIGNMENT DATA (0284-02-027)

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DATE: 10/27/2023 2:07:46 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284022074 - Design/Plan Set/3. Roadway/SH 79 ALIGNMENT DATA (0284-02-027)

Element: Linear
PI ( ) 339+72.43 7133241.92 1791208.74
PI ( ) 342+03.80 7133343.66 1791416.53
Tangential Direction: N63.912°E
Tangential Length: 231.368

Element: Linear
PI ( ) 342+03.80 7133343.66 1791416.53
PI ( ) 344+99.29 7133474.67 1791681.39
Tangential Direction: N63.682°E
Tangential Length: 295.493

Element: Linear
PI ( ) 344+99.29 7133474.67 1791681.39
PI ( ) 354+75.28 7133907.56 1792556.14
Tangential Direction: N63.671°E
Tangential Length: 975.992

Element: Linear
PI ( ) 354+75.28 7133907.56 1792556.14
PI ( ) 359+25.57 7134106.07 1792960.30
Tangential Direction: N63.840°E
Tangential Length: 450.283

Element: Linear
PI ( ) 359+25.57 7134106.07 1792960.30
PI ( ) 373+78.45 7134749.00 1794263.18
Tangential Direction: N63.736°E
Tangential Length: 1452.881

Element: Linear
PI ( ) 373+78.45 7134749.00 1794263.18
PI ( ) 377+05.78 7134895.18 1794556.07
Tangential Direction: N63.476°E
Tangential Length: 327.337

Element: Linear
PI ( ) 377+05.78 7134895.18 1794556.07
PI ( ) 378+66.90 7134967.23 1794700.17
Tangential Direction: N63.434°E
Tangential Length: 161.111

Element: Linear
PI ( ) 378+66.90 7134967.23 1794700.17
PI ( ) 381+13.41 7135077.20 1794920.80
Tangential Direction: N63.507°E
Tangential Length: 246.517

Element: Linear
PI ( ) 381+13.41 7135077.20 1794920.80
PI ( ) 383+52.99 7135183.84 1795135.33
Tangential Direction: N63.569°E
Tangential Length: 239.573

Element: Linear
PI ( ) 383+52.99 7135183.84 1795135.33
PI ( ) 385+86.20 7135286.49 1795344.73
Tangential Direction: N63.884°E
Tangential Length: 233.211

Element: Linear
PI ( ) 385+86.20 7135286.49 1795344.73
PI ( ) 391+76.74 7135546.90 1795874.75
Tangential Direction: N63.835°E
Tangential Length: 590.54

Element: Linear
PI ( ) 391+76.74 7135546.90 1795874.75
PI ( ) 398+71.31 7135854.13 1796497.69
Tangential Direction: N63.747°E
Tangential Length: 694.576

Element: Linear
PI ( ) 398+71.31 7135854.13 1796497.69
PC ( ) 400+77.28 7135946.32 1796681.87
Tangential Direction: N63.411°E
Tangential Length: 205.967

Element: Circular
PC ( ) 400+77.28 7135946.32 1796681.87
PI ( ) 406+29.42 7136195.17 1797174.75
CC ( ) 7138502.05 1795391.52
PT ( ) 411+68.16 7136609.46 1797539.74
Radius: 2863
Delta: 21.831° Left
Degree of Curvature (Arc): 2.001°
Length: 1090.883

Tangent: 552.138
Chord: 1084.296
Middle Ordinate: 51.8
External: 52.755
Back Tangent Direction: N63.212°E
Back Radial Direction: S26.788°E
Chord Direction: N52.296°E
Ahead Radial Direction: S48.620°E
Ahead Tangent Direction: N41.380°E

Element: Linear
PT ( ) 411+68.16 7136609.46 1797539.74
PI ( ) 413+86.99 7136772.77 1797685.39
Tangential Direction: N41.728°E
Tangential Length: 218.824

Element: Linear
PI ( ) 413+86.99 7136772.77 1797685.39
PI ( ) 416+02.12 7136934.07 1797827.74
Tangential Direction: N41.429°E
Tangential Length: 215.133

Element: Linear
PI ( ) 416+02.12 7136934.07 1797827.74
PI ( ) 418+18.53 7137097.00 1797970.18
Tangential Direction: N41.161°E
Tangential Length: 216.411

Element: Linear
PI ( ) 418+18.53 7137097.00 1797970.18
PI ( ) 422+17.86 7137396.511 1798234.3
Tangential Direction: N41.407°E
Tangential Length: 399.327

Element: Linear
PI ( ) 422+17.86 7137396.511 1798234.3
PI ( ) 424+67.86 7137584.55 1798399.03
Tangential Direction: N41.219°E
Tangential Length: 250

Element: Linear
PI ( ) 424+67.86 7137584.55 1798399.03
PI ( ) 426+67.86 7137735.53 1798530.21
Tangential Direction: N40.986°E
Tangential Length: 200

Element: Linear
PI ( ) 426+67.86 7137735.53 1798530.21
PI ( ) 428+67.86 7137885.86 1798662.11
Tangential Direction: N41.264°E
Tangential Length: 199.997

Element: Linear
PI ( ) 428+67.86 7137885.86 1798662.11
PI ( ) 431+17.86 7138072.89 1798828.011
Tangential Direction: N41.574°E
Tangential Length: 250

Element: Linear
PI ( ) 431+17.86 7138072.89 1798828.011
PI ( ) 436+67.78 7138485.98 1799191.02
Tangential Direction: N41.308°E
Tangential Length: 549.929

Element: Linear
PI ( ) 436+67.78 7138485.98 1799191.02
PI ( ) 438+67.78 7138636.24 1799323.01
Tangential Direction: N41.296°E
Tangential Length: 200

Element: Linear
PI ( ) 438+67.78 7138636.24 1799323.01
PC ( ) 441+17.78 7138824.711 1799487.26
Tangential Direction: N41.073°E
Tangential Length: 249.997

Element: Circular
PC ( ) 441+17.78 7138824.711 1799487.26
PI ( ) 447+40.59 7139301.75 1799887.66
CC ( ) 7136901.83 1801778.25
PT ( ) 453+45.85 7139579.33 1800445.19
Radius: 2991
Delta: 23.525° Right
Degree of Curvature (Arc): 1.916°
Length: 1228.071

Tangent: 622.81
Chord: 1219.463
Middle Ordinate: 62.808
External: 64.155
Back Tangent Direction: N40.007°E
Back Radial Direction: S49.993°E
Chord Direction: N51.770°E
Ahead Radial Direction: S26.468°E
Ahead Tangent Direction: N63.532°E

Element: Linear
PT ( ) 453+45.85 7139579.33 1800445.19
PI ( ) 455+53.22 7139676.57 1800628.35
Tangential Direction: N62.036°E
Tangential Length: 207.373

Element: Linear
PI ( ) 455+53.22 7139676.57 1800628.35
PI ( ) 459+75.08 7139872.60 1801001.89
Tangential Direction: N62.311°E
Tangential Length: 421.853

Element: Linear
PI ( ) 459+75.08 7139872.60 1801001.89
PI ( ) 462+01.05 7139977.13 1801202.23
Tangential Direction: N62.446°E
Tangential Length: 225.971

Element: Linear
PI ( ) 462+01.05 7139977.13 1801202.23
PI ( ) 465+13.86 7140121.88 1801479.54
Tangential Direction: N62.437°E
Tangential Length: 312.817

Element: Linear
PI ( ) 465+13.86 7140121.88 1801479.54
PI ( ) 467+47.79 7140230.25 1801686.85
Tangential Direction: N62.401°E
Tangential Length: 233.925

Element: Linear
PI ( ) 467+47.79 7140230.25 1801686.85
PI ( ) 470+42.53 7140367.08 1801947.90
Tangential Direction: N62.339°E
Tangential Length: 294.739

Element: Linear
PI ( ) 470+42.53 7140367.08 1801947.90
PI ( ) 472+85.26 7140479.32 1802163.13
Tangential Direction: N62.459°E
Tangential Length: 242.734

Element: Linear
PI ( ) 472+85.26 7140479.32 1802163.13
PC ( ) 474+91.95 7140575.36 1802346.15
Tangential Direction: N62.311°E
Tangential Length: 206.687

Element: Circular
PC ( ) 474+91.95 7140575.36 1802346.15
PI ( ) 479+27.57 7140782.24 1802729.51
CC ( ) 7142319.59 1801404.88
PT ( ) 483+49.55 7141130.80 1802990.79
Radius: 1982
Delta: 24.792° Left
Degree of Curvature (Arc): 2.891°
Length: 857.603

Tangent: 435.62
Chord: 850.929
Middle Ordinate: 46.205
External: 47.307
Back Tangent Direction: N61.647°E
Back Radial Direction: S28.353°E
Chord Direction: N49.251°E
Ahead Radial Direction: S53.145°E
Ahead Tangent Direction: N36.855°E

Element: Linear
PT ( ) 483+49.55 7141130.80 1802990.79
PI ( ) 486+10.97 7141335.18 1803153.80
Tangential Direction: N38.577°E
Tangential Length: 261.421

Element: Linear
PI ( ) 486+10.97 7141335.18 1803153.80
PI ( ) 488+67.05 7141535.95 1803312.75
Tangential Direction: N38.369°E
Tangential Length: 256.077

Element: Linear
PI ( ) 488+67.05 7141535.95 1803312.75
PI ( ) 490+67.05 7141692.86 1803436.76
Tangential Direction: N38.320°E
Tangential Length: 200

Element: Linear
PI ( ) 490+67.05 7141692.86 1803436.76
PI ( ) 492+67.05 7141849.77 1803560.77
Tangential Direction: N38.320°E
Tangential Length: 200

Element: Linear
PI ( ) 492+67.05 7141849.77 1803560.77
PC ( ) 496+85.58 7142176.91 1803821.82
Tangential Direction: N38.589°E
Tangential Length: 418.531

Element: Circular
PC ( ) 496+85.58 7142176.91 1803821.82
PI ( ) 502+10.36 7142575.17 1804163.57
CC ( ) 7141228.74 1804926.77
PT ( ) 506+92.94 7142663.82 1804680.81
Radius: 1456
Delta: 39.641° Right
Degree of Curvature (Arc): 3.935°
Length: 1007.355

Tangent: 524.78
Chord: 987.384
Middle Ordinate: 86.254
External: 91.685
Back Tangent Direction: N40.634°E
Back Radial Direction: S49.366°E
Chord Direction: N60.454°E
Ahead Radial Direction: S9.726°E
Ahead Tangent Direction: N80.274°E

Element: Linear
PT ( ) 506+92.94 7142663.82 1804680.81
PI ( ) 510+67.66 7142733.30 1805049.03
Tangential Direction: N79.314°E
Tangential Length: 374.723

Element: Linear
PI ( ) 510+67.66 7142733.30 1805049.03
PI ( ) 513+67.66 7142788.34 1805343.94
Tangential Direction: N79.429°E
Tangential Length: 299.999

Element: Linear
PI ( ) 513+67.66 7142788.34 1805343.94
PI ( ) 515+67.66 7142824.52 1805540.64
Tangential Direction: N79.578°E
Tangential Length: 200

Element: Linear
PI ( ) 515+67.66 7142824.52 1805540.64
PI ( ) 518+67.66 7142878.79 1805835.69
Tangential Direction: N79.578°E
Tangential Length: 300

Element: Linear
PI ( ) 518+67.66 7142878.79 1805835.69
PI ( ) 522+17.62 7142942.78 1806179.75
Tangential Direction: N79.463°E
Tangential Length: 349.965

Element: Linear
PI ( ) 522+17.62 7142942.78 1806179.75
PI ( ) 524+67.62 7142987.62 1806425.69
Tangential Direction: N79.669°E
Tangential Length: 249.993

Element: Linear
PI ( ) 524+67.62 7142987.62 1806425.69
PI ( ) 527+17.62 7143033.16 1806671.51
Tangential Direction: N79.503°E
Tangential Length: 250

STATE OF TEXAS
BRYSON P. LAWRENCE
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PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79 ALIGNMENT DATA

CONT	SECT	JOB	HIGHWAY
0284	02	026	SH 79
DIST	COUNTY		SHEET NO.
03	THROCKMORTON		42

Element: Linear				
PI	( )	527+17.62	7143033.16	1806671.51
PI	( )	531+17.61	7143107.12	1807064.61
Tangential Direction:	N79.345°E			
Tangential Length:	399.996			
Element: Linear				
PI	( )	531+17.61	7143107.12	1807064.61
PI	( )	536+66.20	7143206.61	1807604.10
Tangential Direction:	N79.551°E			
Tangential Length:	548.584			
Element: Linear				
PI	( )	536+66.20	7143206.61	1807604.10
PI	( )	538+66.20	7143242.73	1807800.81
Tangential Direction:	N79.594°E			
Tangential Length:	200			
Element: Linear				
PI	( )	538+66.20	7143242.73	1807800.81
PI	( )	541+16.19	7143289.05	1808046.47
Tangential Direction:	N79.324°E			
Tangential Length:	249.991			
Element: Linear				
PI	( )	541+16.19	7143289.05	1808046.47
PI	( )	543+66.57	7143335.59	1808292.49
Tangential Direction:	N79.287°E			
Tangential Length:	250.38			
Element: Linear				
PI	( )	543+66.57	7143335.59	1808292.49
PI	( )	545+66.20	7143371	1808488.95
Tangential Direction:	N79.784°E			
Tangential Length:	199.63			
Element: Linear				
PI	( )	545+66.20	7143371	1808488.95
PI	( )	549+16.20	7143433.94	1808833.24
Tangential Direction:	N79.639°E			
Tangential Length:	350			
Element: Linear				
PI	( )	549+16.20	7143433.94	1808833.24
PI	( )	554+16.20	7143523.87	1809325.09
Tangential Direction:	N79.639°E			
Tangential Length:	500			
Element: Linear				
PI	( )	554+16.20	7143523.87	1809325.09
PI	( )	567+16.21	7143760.76	1810603.34
Tangential Direction:	N79.501°E			
Tangential Length:	1300.016			
Element: Linear				
PI	( )	567+16.21	7143760.76	1810603.34
PC	( )	569+67.12	7143806.24	1810850.09
Tangential Direction:	N79.556°E			
Tangential Length:	250.909			
Element: Circular				
PC	( )	569+67.12	7143806.24	1810850.09
PI	( )	580+22.84	7143992.01	1811889.34
CC	( )		7132968.03	1812787.44
PT	( )	590+72.12	7143976.90	1812944.95
Radius:	11010			
Delta:	10.954° Right			
Degree of Curvature (Arc):	0.520°			
Length:	2105			
Tangent:	1055.718			
Chord:	2101.795			
Middle Ordinate:	50.269			
External:	50.499			
Back Tangent Direction:	N79.865°E			
Back Radial Direction:	S10.135°E			
Chord Direction:	N85.343°E			
Ahead Radial Direction:	S0.820°W			
Ahead Tangent Direction:	S89.180°E			
Element: Linear				
PT	( )	590+72.12	7143976.90	1812944.95
PI	( )	594+69.48	7143970.19	1813342.25
Tangential Direction:	S89.031°E			
Tangential Length:	397.36			
Element: Linear				
PI	( )	594+69.48	7143970.19	1813342.25
PI	( )	596+71.91	7143965.31	1813544.63
Tangential Direction:	S88.620°E			
Tangential Length:	202.431			
Element: Linear				
PI	( )	596+71.91	7143965.31	1813544.63
PI	( )	599+99.33	7143958.66	1813871.98
Tangential Direction:	S88.836°E			
Tangential Length:	327.419			
Element: Linear				
PI	( )	599+99.33	7143958.66	1813871.98
PI	( )	603+82.22	7143951.04	1814254.79
Tangential Direction:	S88.860°E			
Tangential Length:	382.884			
Element: Linear				
PI	( )	603+82.22	7143951.04	1814254.79
PI	( )	606+35.68	7143945.34	1814508.19
Tangential Direction:	S88.711°E			
Tangential Length:	253.464			
Element: Linear				
PI	( )	606+35.68	7143945.34	1814508.19
PI	( )	615+01.95	7143926.14	1815374.25
Tangential Direction:	S88.730°E			
Tangential Length:	866.273			
Element: Linear				
PI	( )	615+01.95	7143926.14	1815374.25
PI	( )	617+24.54	7143921.32	1815596.78
Tangential Direction:	S88.760°E			
Tangential Length:	222.586			
Element: Linear				
PI	( )	617+24.54	7143921.32	1815596.78
PI	( )	619+49.83	7143916.40	1815822.01
Tangential Direction:	S88.748°E			
Tangential Length:	225.286			
Element: Linear				
PI	( )	619+49.83	7143916.40	1815822.01
PI	( )	623+25.07	7143908.45	1816197.17
Tangential Direction:	S88.787°E			
Tangential Length:	375.238			
Element: Linear				
PI	( )	623+25.07	7143908.45	1816197.17
PI	( )	625+37.70	7143903.25	1816409.74
Tangential Direction:	S88.598°E			
Tangential Length:	212.634			
Element: Linear				
PI	( )	625+37.70	7143903.25	1816409.74
PI	( )	627+97.26	7143897.23	1816669.23
Tangential Direction:	S88.671°E			
Tangential Length:	259.565			
Element: Linear				
PI	( )	627+97.26	7143897.23	1816669.23
PI	( )	631+21.87	7143889.37	1816993.74
Tangential Direction:	S88.612°E			
Tangential Length:	324.605			
Element: Linear				
PI	( )	631+21.87	7143889.37	1816993.74
PI	( )	635+90.87	7143879.31	1817462.64
Tangential Direction:	S88.771°E			
Tangential Length:	469.004			
Element: Linear				
PI	( )	635+90.87	7143879.31	1817462.63
PC	( )	636+27.48	7143878.52	1817499.23
Tangential Direction:	S88.775°E			
Tangential Length:	36.606			
Element: Circular				
PC	( )	636+27.48	7143878.52	1817499.23
PI	( )	639+48.13	7143871.73	1817819.80
CC	( )		7155210.98	1817739.37
PT	( )	642+68.60	7143883.07	1818140.25
Radius:	11335			
Delta:	3.241° Left			
Degree of Curvature (Arc):	0.505°			
Length:	641.122			
Tangent:	320.647			
Chord:	641.037			
Middle Ordinate:	4.533			
External:	4.534			
Back Tangent Direction:	S88.786°E			
Back Radial Direction:	S1.214°W			
Chord Direction:	N89.594°E			
Ahead Radial Direction:	S2.027°E			
Ahead Tangent Direction:	N87.973°E			
Element: Linear				
PT	( )	642+68.60	7143883.07	1818140.25
PI	( )	646+10.67	7143898.36	1818481.98
Tangential Direction:	N87.438°E			
Tangential Length:	342.072			
Element: Linear				
PI	( )	646+10.67	7143898.36	1818481.98
PI	( )	649+09.39	7143913.99	1818780.28
Tangential Direction:	N87.001°E			
Tangential Length:	298.713			
Element: Linear				
PI	( )	649+09.39	7143913.99	1818780.28
PI	( )	653+31.11	7143936.97	1819201.38
Tangential Direction:	N86.877°E			
Tangential Length:	421.726			
Element: Linear				
PI	( )	653+31.11	7143936.97	1819201.38
PI	( )	656+00.97	7143951.94	1819470.83
Tangential Direction:	N86.819°E			
Tangential Length:	269.858			
Element: Linear				
PI	( )	656+00.97	7143951.94	1819470.83
PI	( )	658+50.70	7143964.93	1819720.22
Tangential Direction:	N87.018°E			
Tangential Length:	249.73			
Element: Linear				
PI	( )	658+50.70	7143964.93	1819720.22
PI	( )	662+75.95	7143986.63	1820144.92
Tangential Direction:	N87.075°E			
Tangential Length:	425.251			
Element: Linear				
PI	( )	662+75.95	7143986.63	1820144.92
PI	( )	670+00.94	7144025.50	1820868.86
Tangential Direction:	N86.927°E			
Tangential Length:	724.984			
Element: Linear				
PI	( )	670+00.94	7144025.50	1820868.86
PI	( )	672+73.66	7144039.32	1821141.23
Tangential Direction:	N87.094°E			
Tangential Length:	272.724			
Element: Linear				
PI	( )	672+73.66	7144039.32	1821141.23
PI	( )	675+39.78	7144052.79	1821407.01
Tangential Direction:	N87.099°E			
Tangential Length:	266.122			
Element: Linear				
PI	( )	675+39.78	7144052.79	1821407.01
PI	( )	684+86.22	7144102.33	1822352.16
Tangential Direction:	N87.000°E			
Tangential Length:	946.443			
Element: Linear				
PI	( )	684+86.22	7144102.33	1822352.16
PI	( )	688+09.67	7144120.52	1822675.09
Tangential Direction:	N86.776°E			
Tangential Length:	323.441			
Element: Linear				
PI	( )	688+09.67	7144120.52	1822675.09
PI	( )	691+75.99	7144139.66	1823040.91
Tangential Direction:	N87.005°E			
Tangential Length:	366.323			
Element: Linear				
PI	( )	691+75.99	7144139.66	1823040.91
PI	( )	696+77.31	7144166.09	1823541.53
Tangential Direction:	N86.977°E			
Tangential Length:	501.321			
Element: Linear				
PI	( )	696+77.31	7144166.09	1823541.53
PI	( )	706+28.13	7144216.49	1824491.02
Tangential Direction:	N86.962°E			
Tangential Length:	950.82			
Element: Linear				
PI	( )	706+28.13	7144216.49	1824491.02
PI	( )	709+28.12	7144232.34	1824790.59
Tangential Direction:	N86.972°E			
Tangential Length:	299.99			
Element: Linear				
PI	( )	709+28.12	7144232.34	1824790.59
PI	( )	720+52.11	7144289.35	1825913.13
Tangential Direction:	N87.093°E			
Tangential Length:	1123.99			
Element: Linear				
PI	( )	720+52.11	7144289.35	1825913.13
PI	( )	739+28.40	7144386.15	1827786.92
Tangential Direction:	N87.043°E			
Tangential Length:	1876.293			
Element: Linear				
PI	( )	739+28.40	7144386.15	1827786.92
PI	( )	741+78.20	7144399.40	1828036.37
Tangential Direction:	N86.959°E			
Tangential Length:	249.8			
Element: Linear				
PI	( )	741+78.20	7144399.40	1828036.37
PI	( )	743+95.64	7144411.14	1828253.49
Tangential Direction:	N86.904°E			
Tangential Length:	217.434			
Element: Linear				
PI	( )	743+95.64	7144411.14	1828253.49
PI	( )	747+52.55	7144428.89	1828609.96
Tangential Direction:	N87.149°E			
Tangential Length:	356.908			
Element: Linear				
PI	( )	747+52.55	7144428.89	1828609.96
PI	( )	749+77.67	7144440.96	1828834.76
Tangential Direction:	N86.928°E			
Tangential Length:	225.128			
Element: Linear				
PI	( )	749+77.67	7144440.96	1828834.76
PI	( )	753+02.52	7144458.63	1829159.13
Tangential Direction:	N86.882°E			
Tangential Length:	324.847			
Element: Linear				
PI	( )	753+02.52	7144458.63	1829159.13
PI	( )	758+77.29	7144489.46	1829733.06
Tangential Direction:	N86.925°E			
Tangential Length:	574.764			
Element: Linear				
PI	( )	758+77.29	7144489.46	1829733.06
PI	( )	761+76.96	7144505.16	1830032.33
Tangential Direction:	N86.997°E			
Tangential Length:	299.678			
Element: Linear				
PI	( )	761+76.96	7144505.16	1830032.33
PI	( )	764+76.88	7144521.34	1830331.81
Tangential Direction:	N86.909°E			
Tangential Length:	299.921			
Element: Linear				
PI	( )	764+76.88	7144521.34	1830331.81
PI	( )	769+01.60	7144543.58	1830755.94
Tangential Direction:	N86.997°E			
Tangential Length:	424.711			
Element: Linear				
PI	( )	769+01.60	7144543.58	1830755.94
POT	( )	770+99.08	7144554.14	1830953.14
Tangential Direction:	N86.937°E			
Tangential Length:	197.48			

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SH 79 ALIGNMENT DATA

CONT	SECT	JOB	HIGHWAY
0284	02	026	SH 79
DIST	COUNTY		SHEET NO.
03	THROCKMORTON		43

CK
DW
CK
DW

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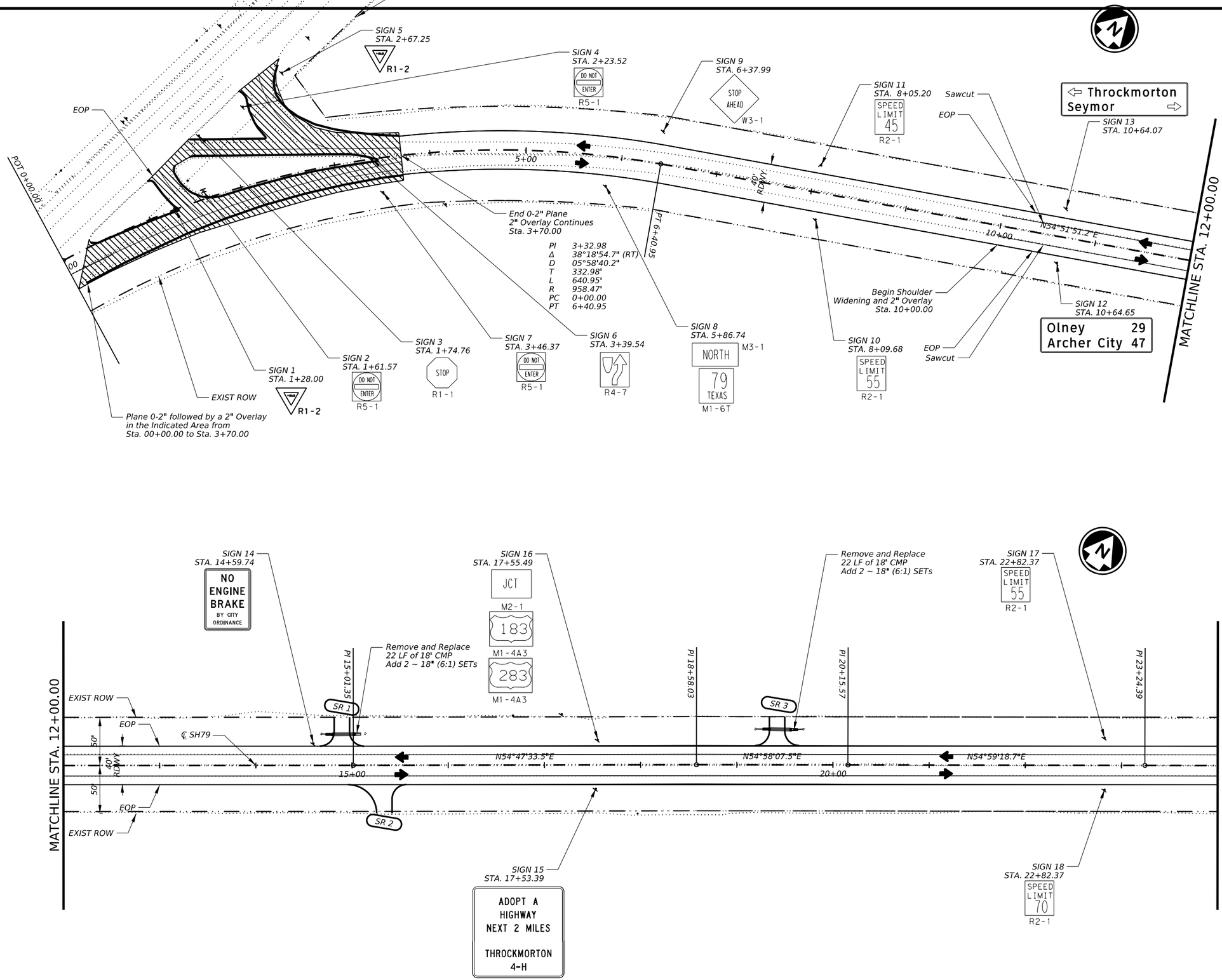

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SH 79

PLAN LAYOUT

SHEET 1 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		44

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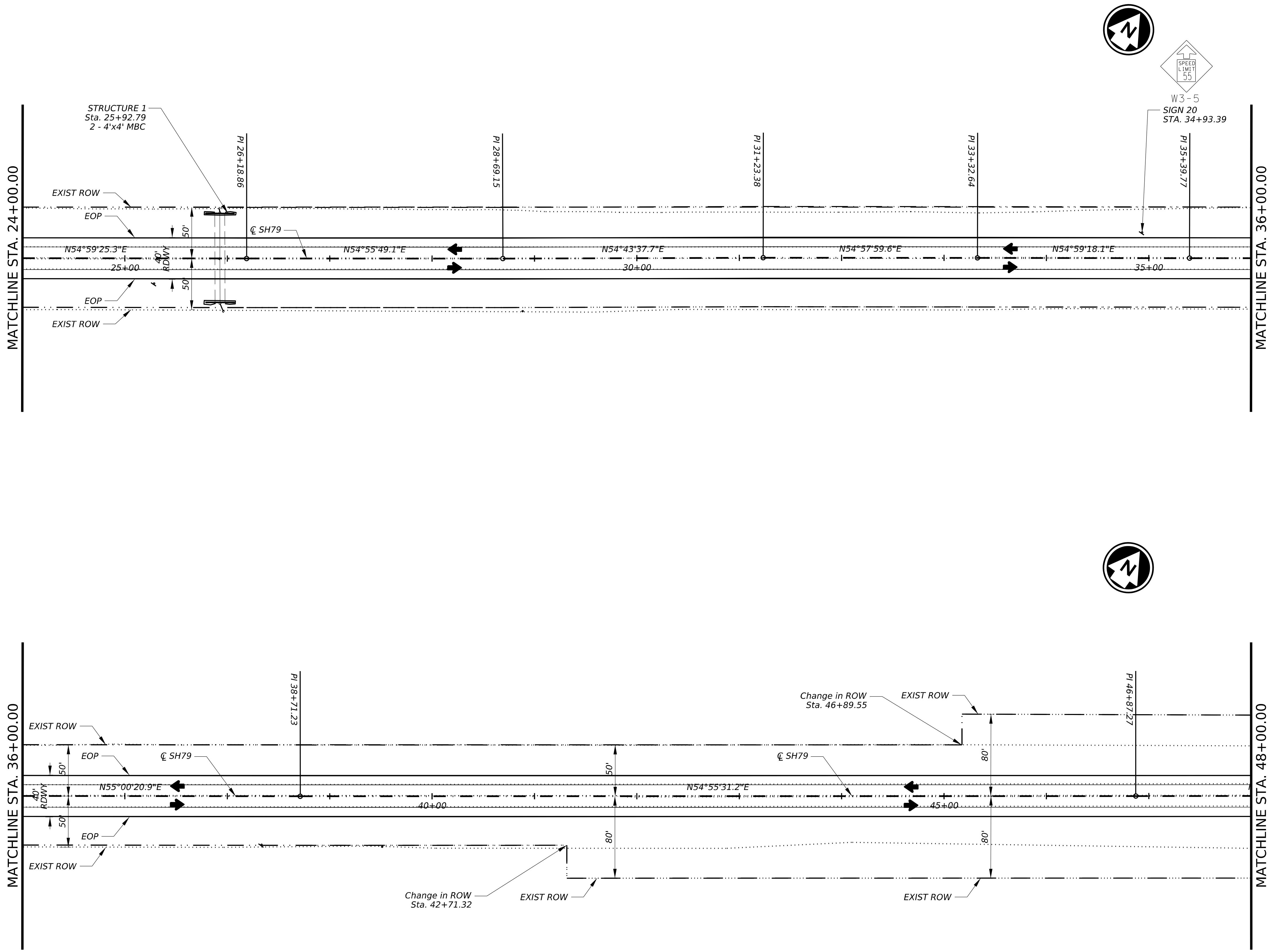

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SH 79

PLAN LAYOUT

SHEET 2 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		45

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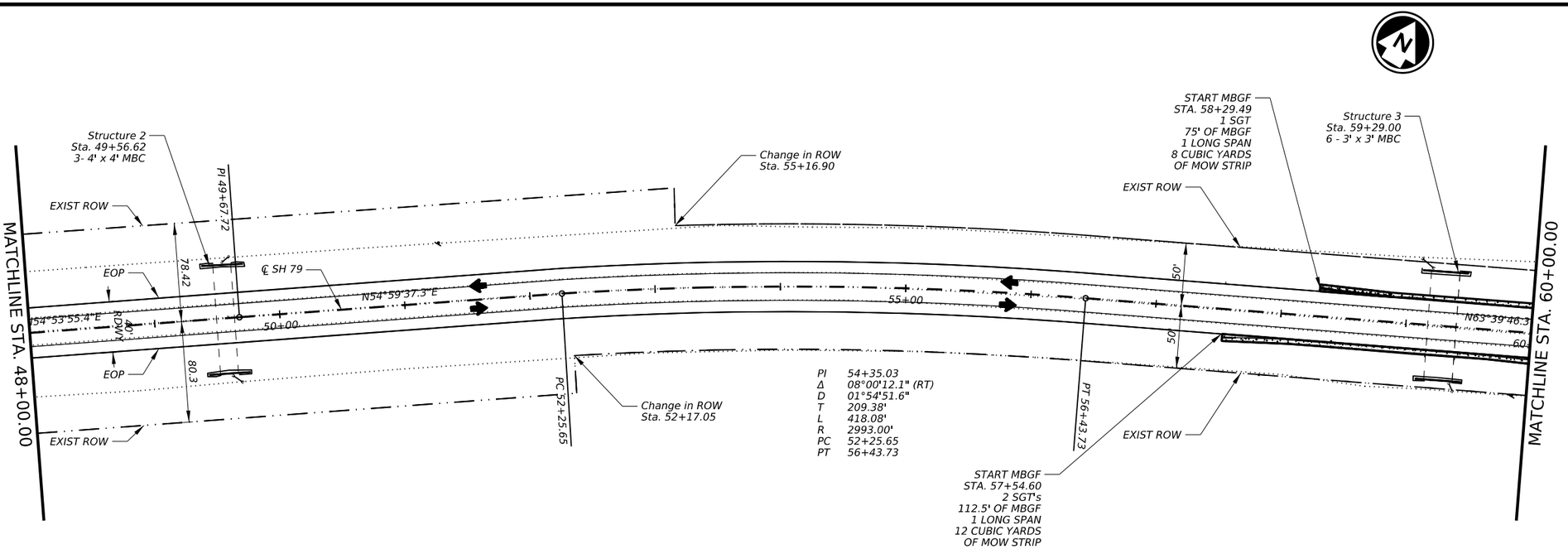

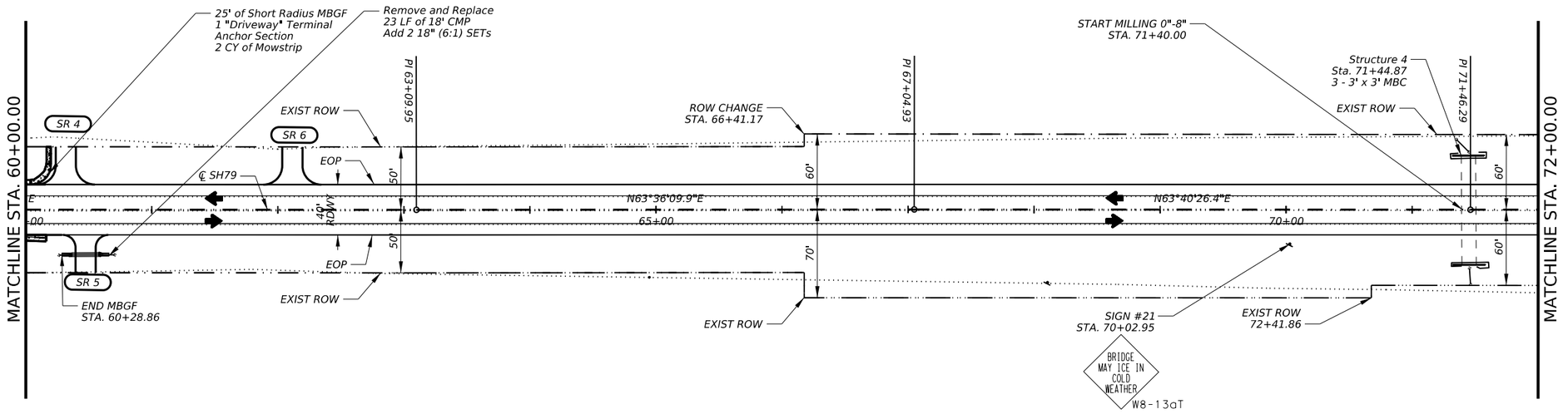

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SH 79

PLAN LAYOUT

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		46

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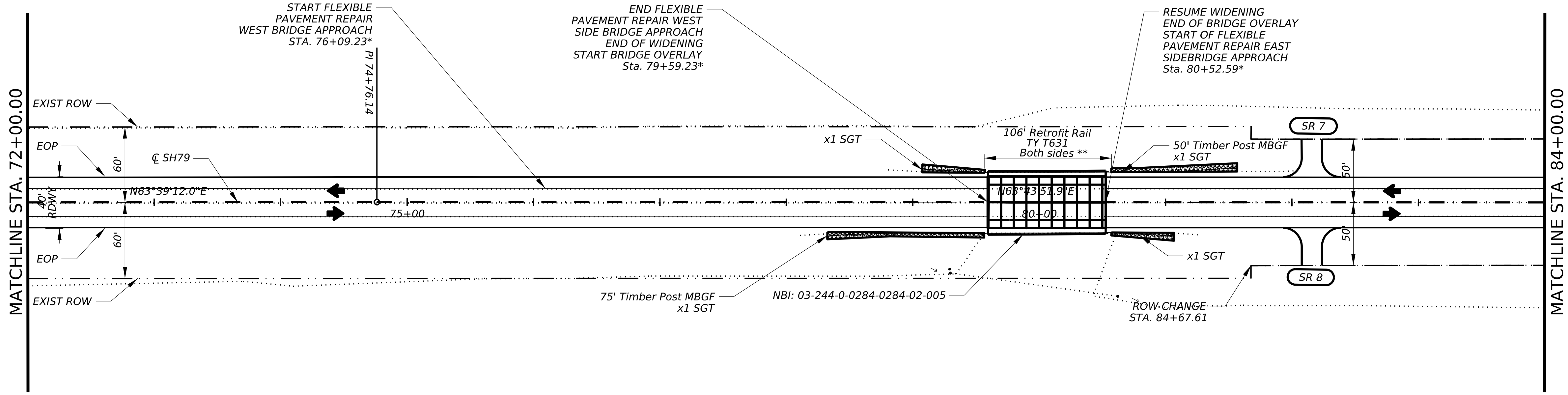
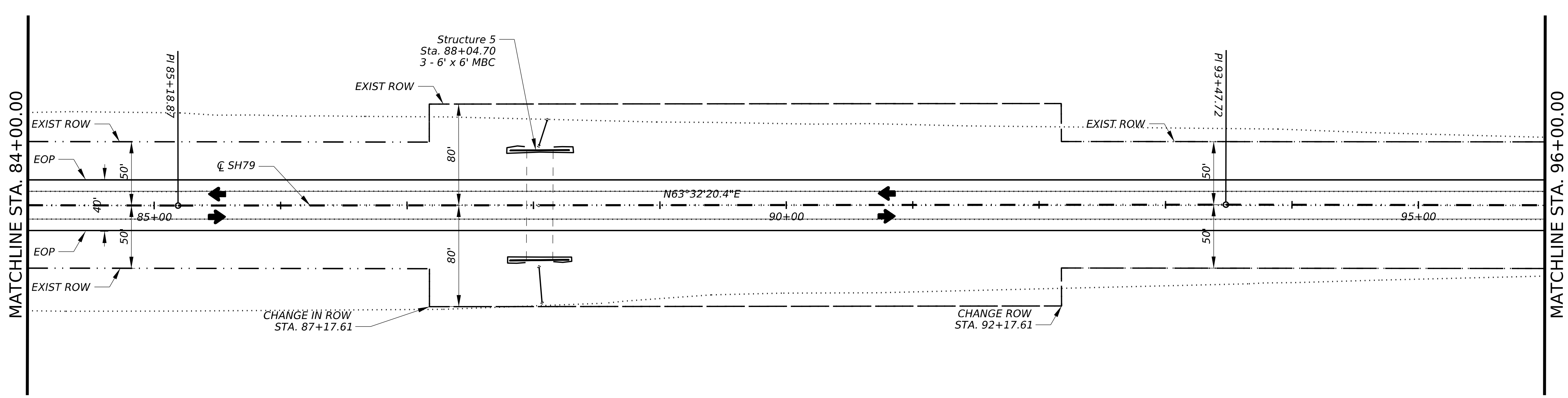


*See MISC Details Sheet
**See Bridge Layout



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SH 79

PLAN LAYOUT

SHEET 4 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		47

DATE: 10/30/2023
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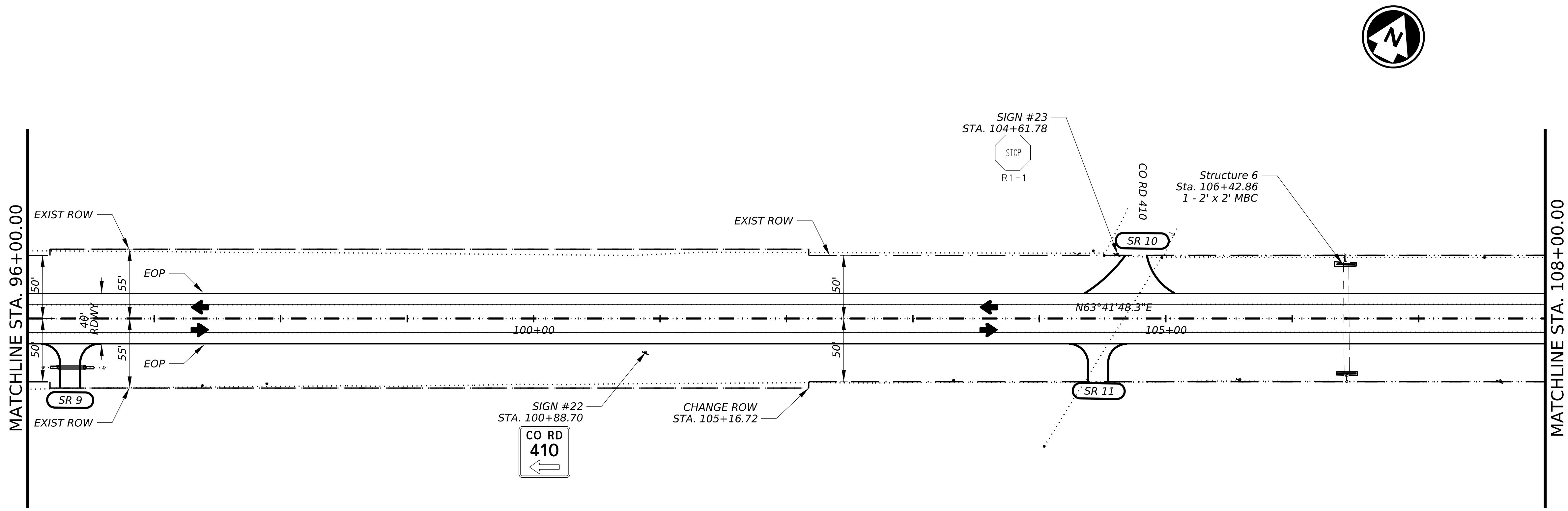

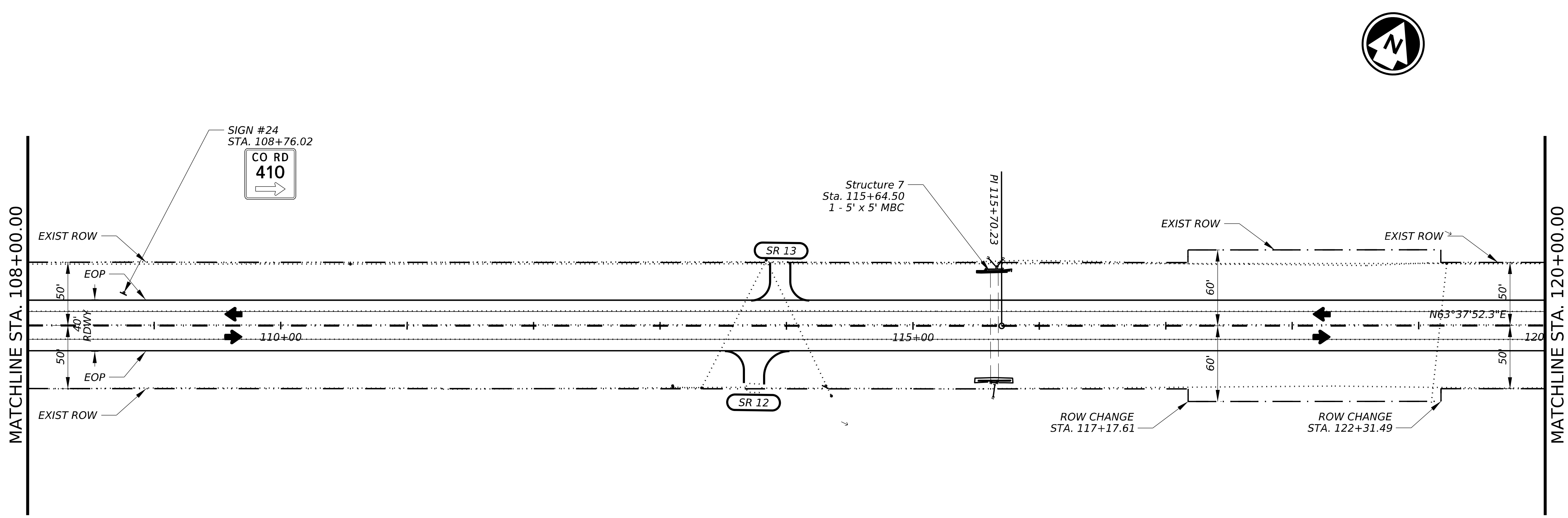

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SH 79

PLAN LAYOUT

SHEET 5 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		48

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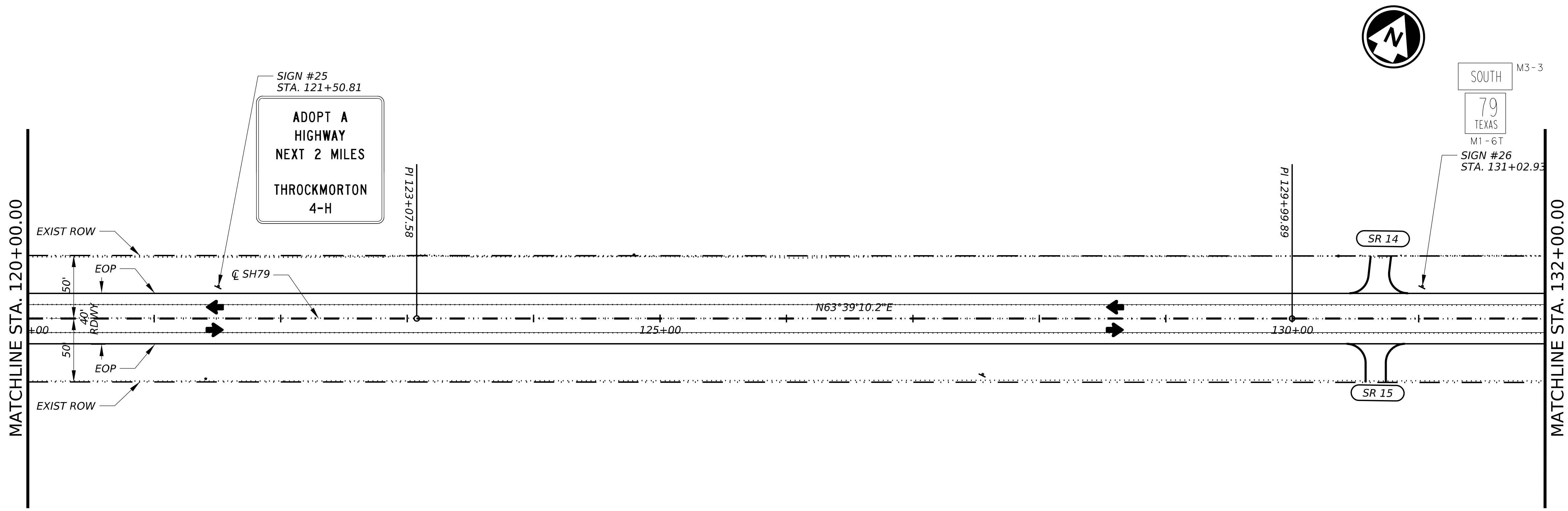

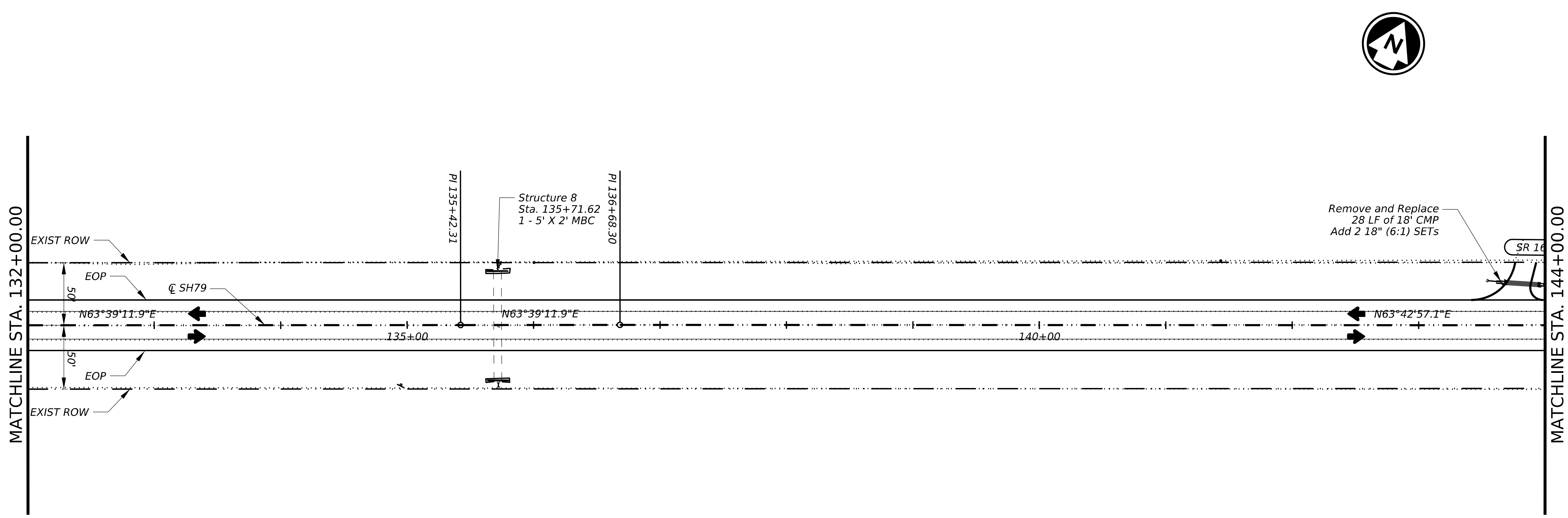

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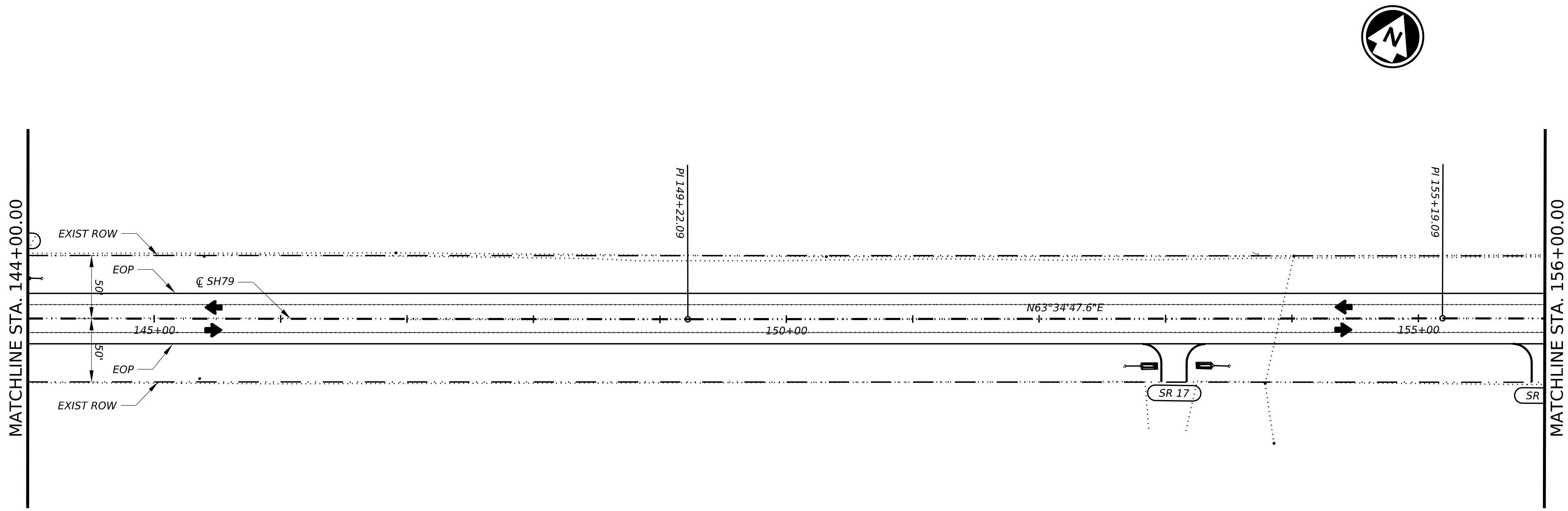
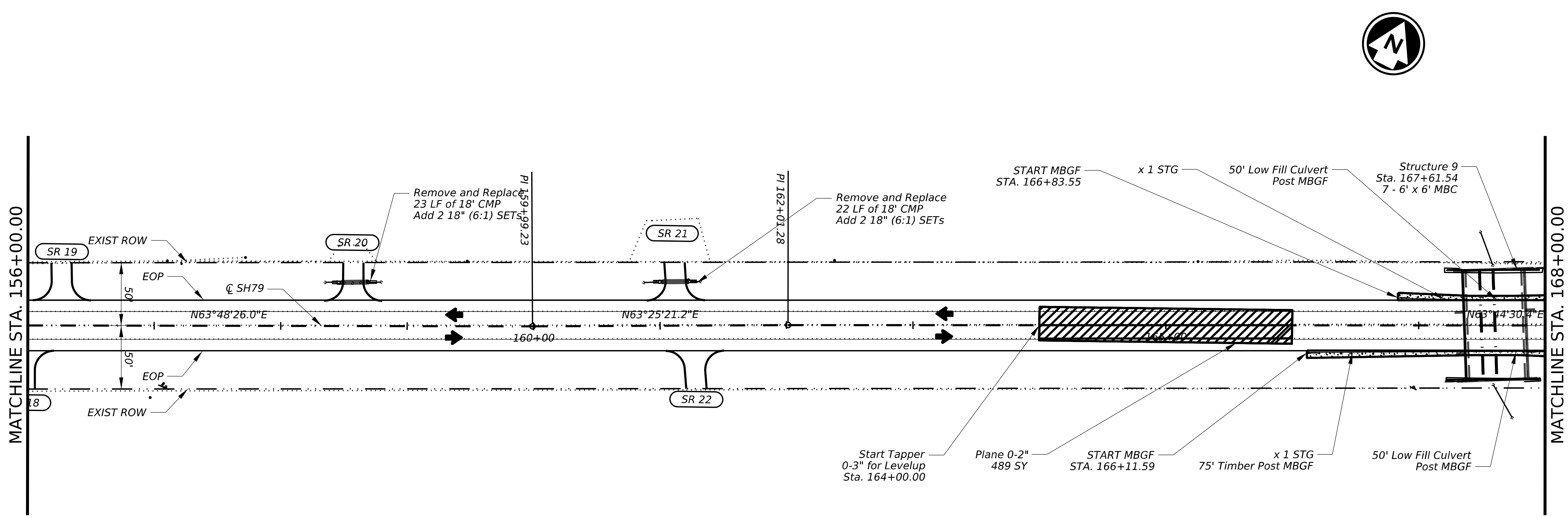
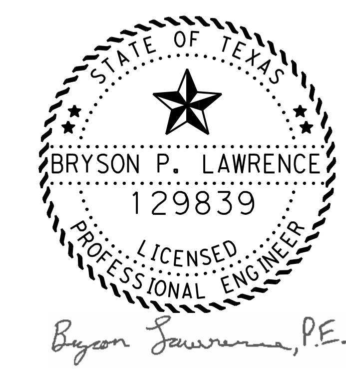
PLAN LAYOUT

SHEET 6 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		49







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PLAN LAYOUT

SHEET 7 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		50

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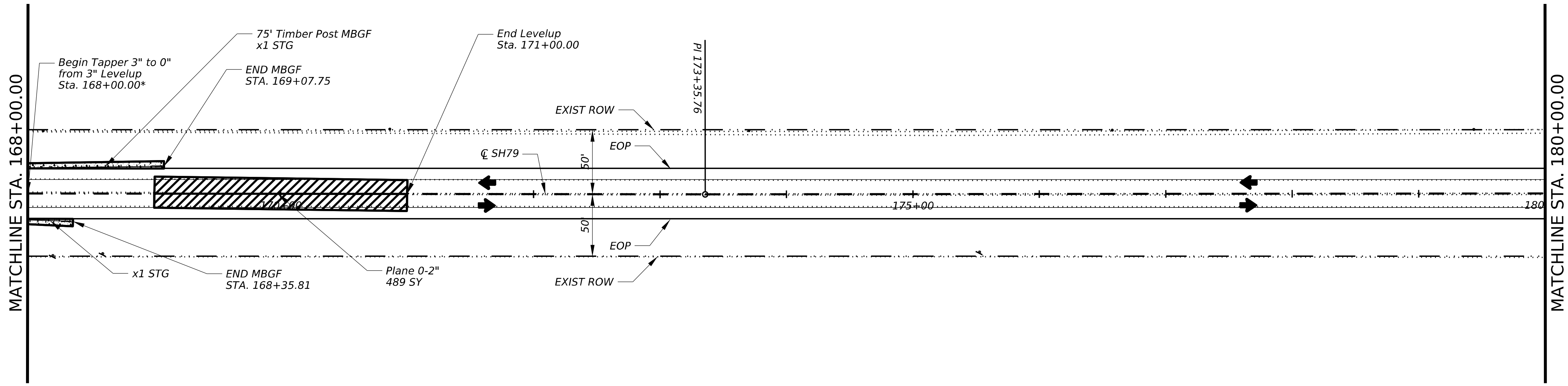

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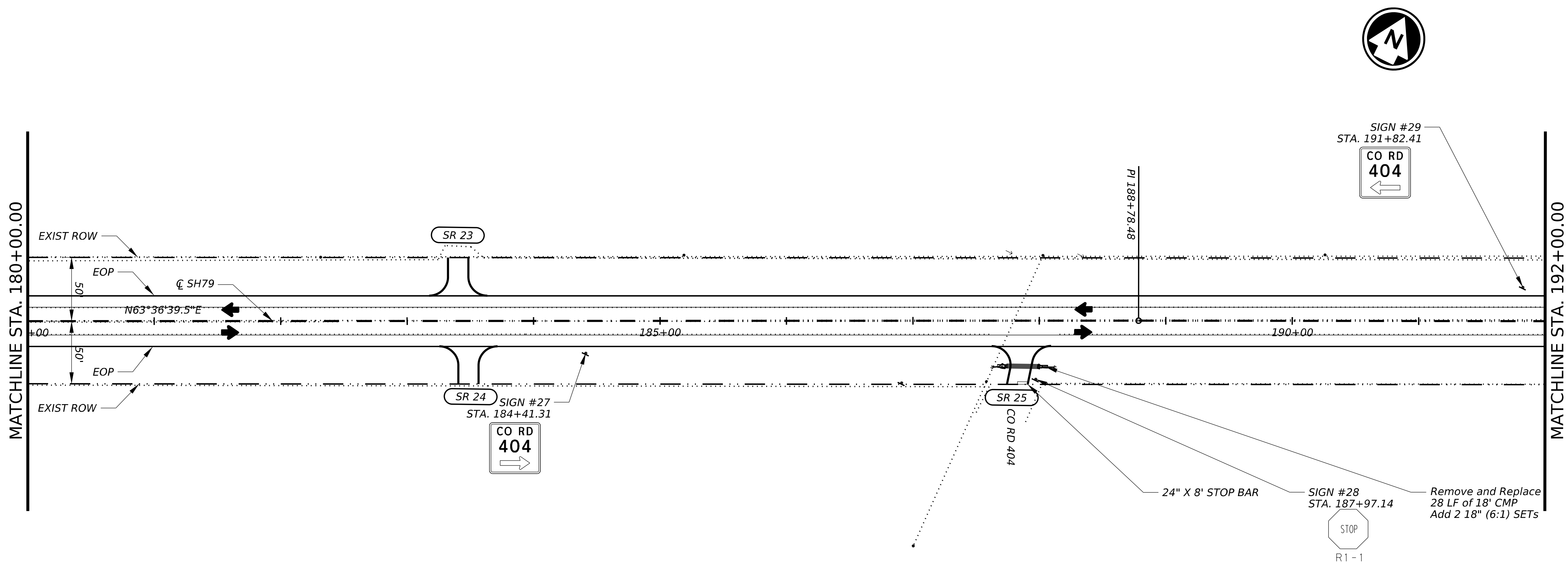

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PLAN LAYOUT

SHEET 8 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		51

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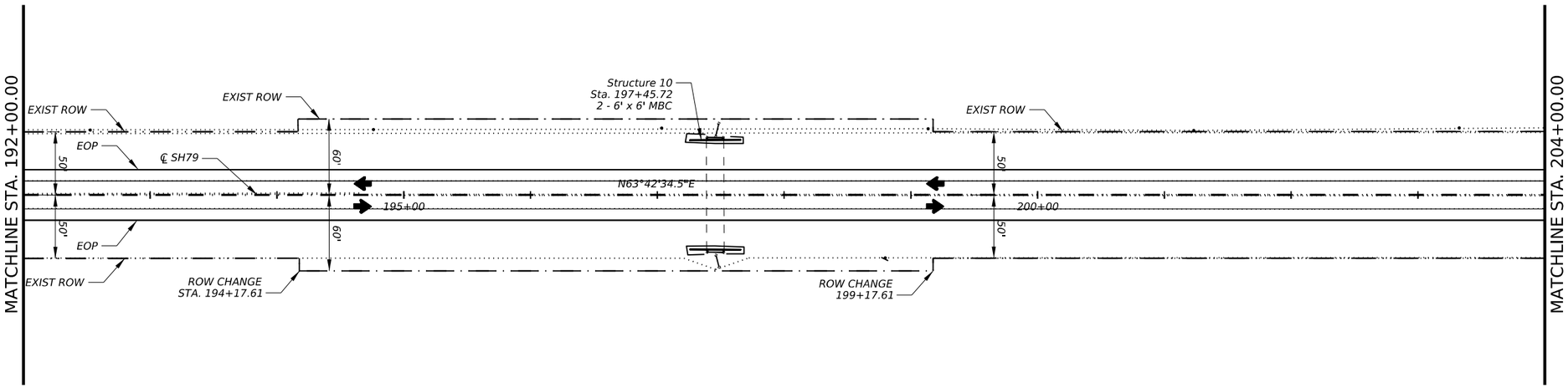

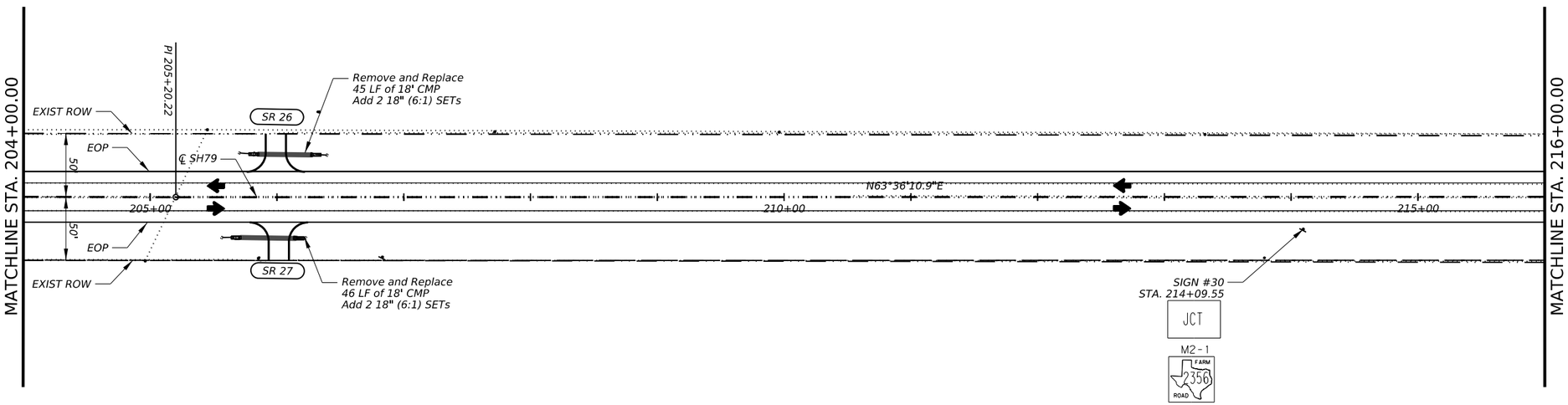

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PLAN LAYOUT

SHEET 9 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		52

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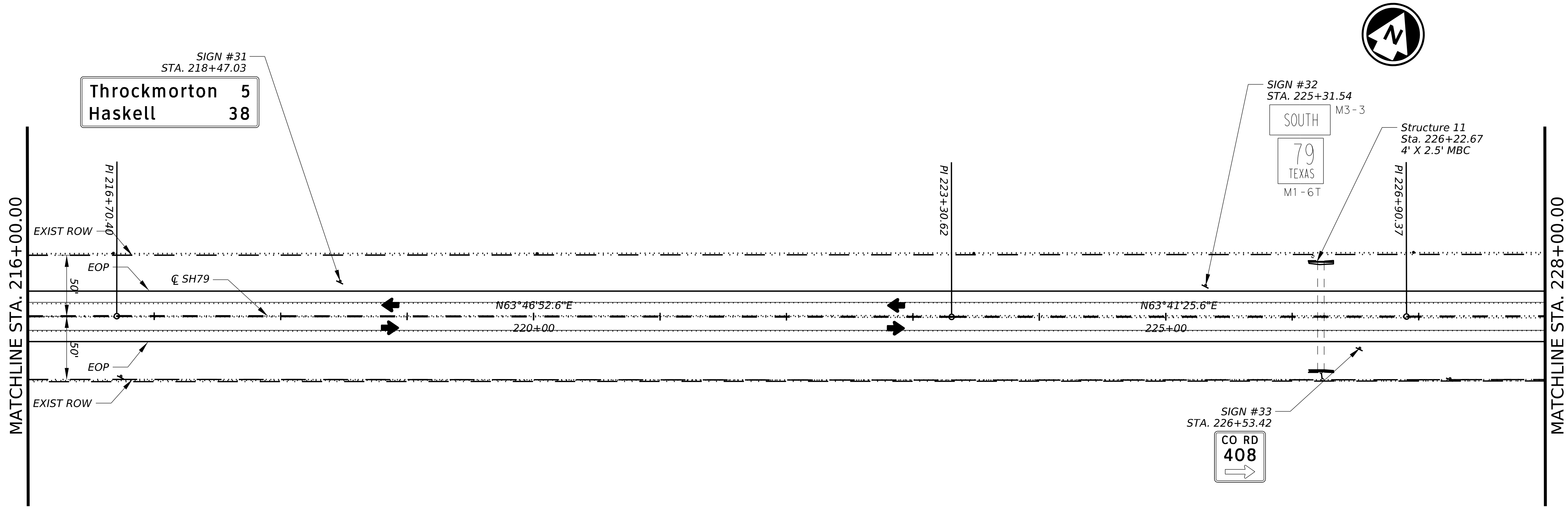

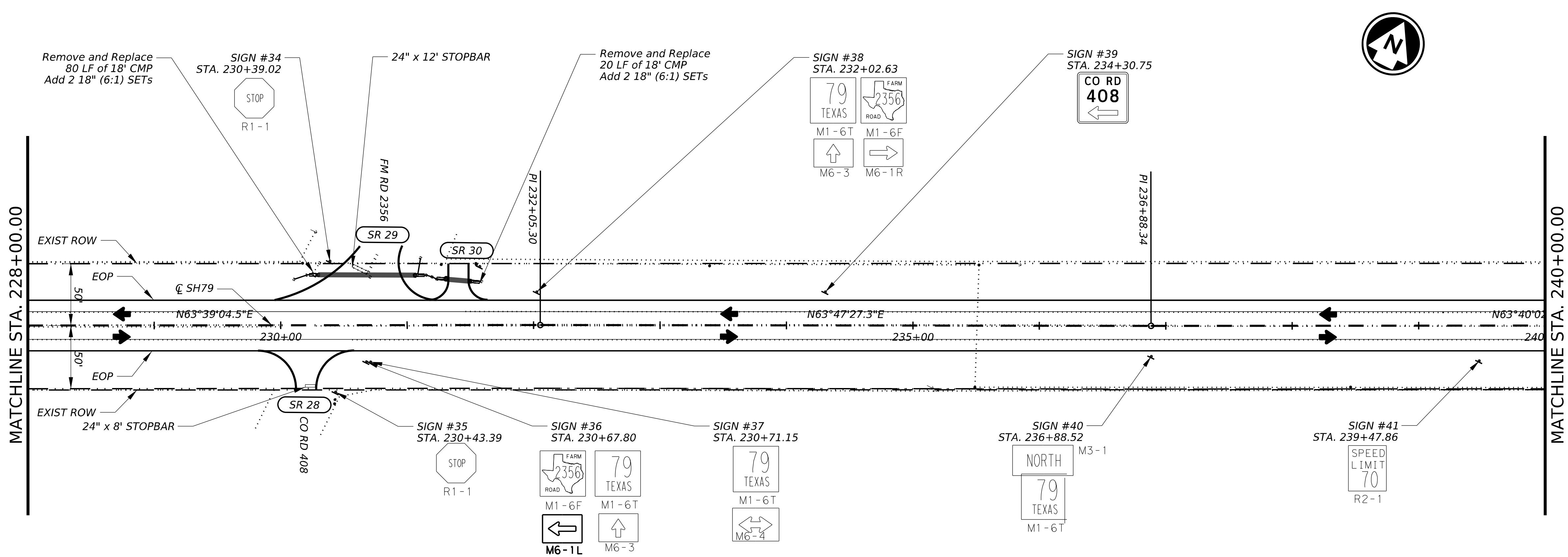

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PLAN LAYOUT

SHEET 10 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		53

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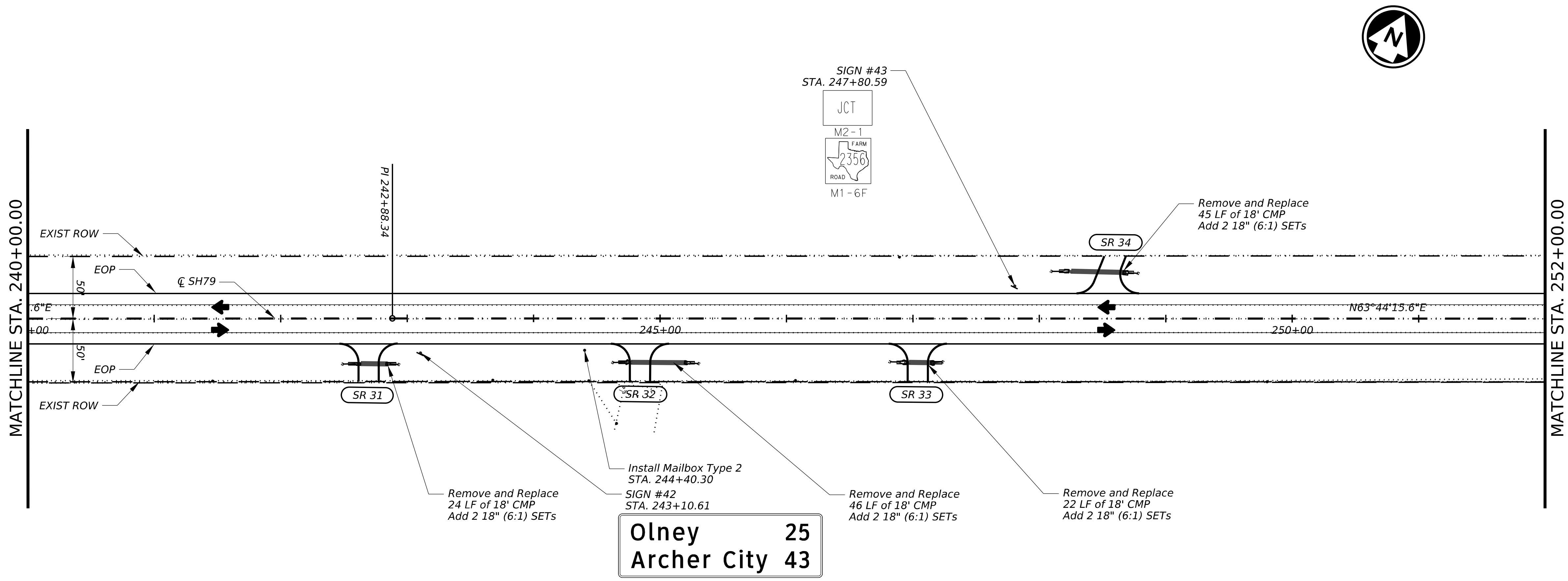

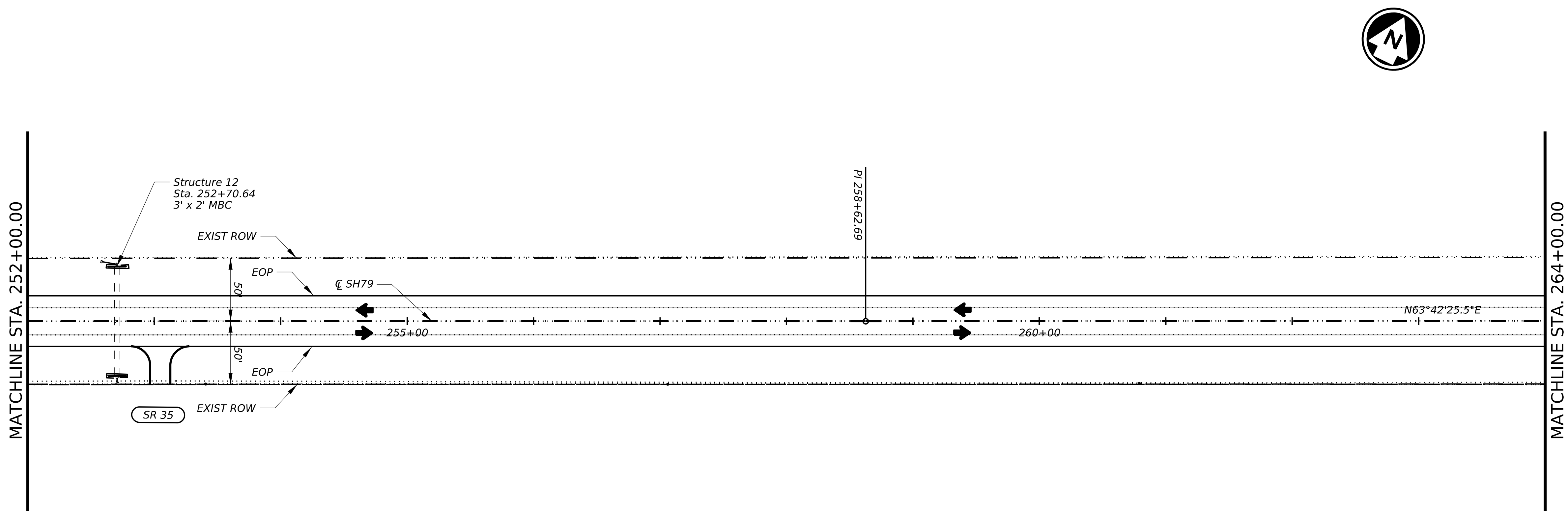

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PLAN LAYOUT

SHEET 11 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		54

DATE:
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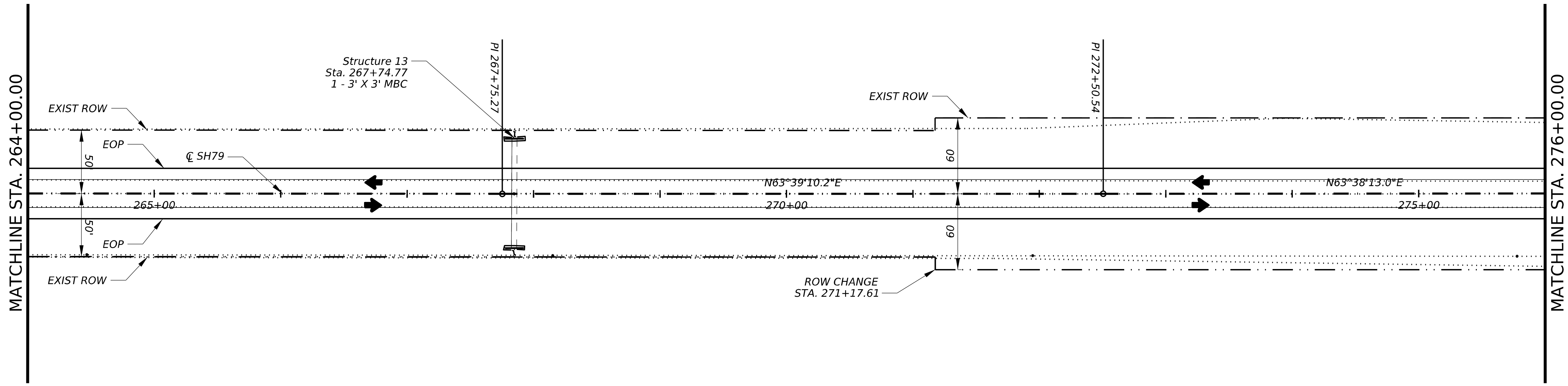

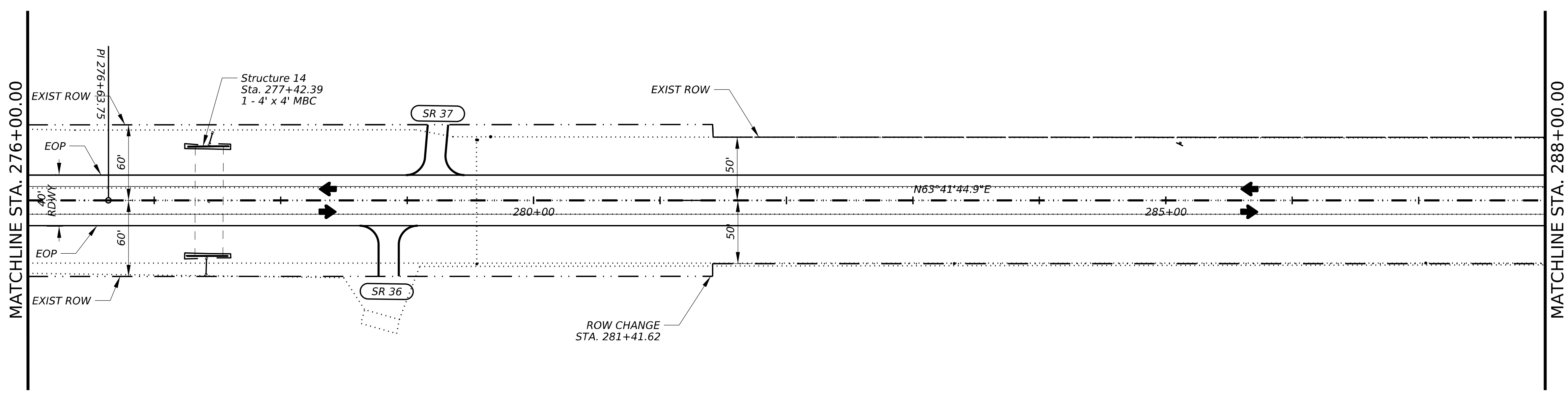

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Texas Department of Transportation

SH 79

PLAN LAYOUT

SHEET 12 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		55

DATE: 10/26/2023 03:08:18 PM
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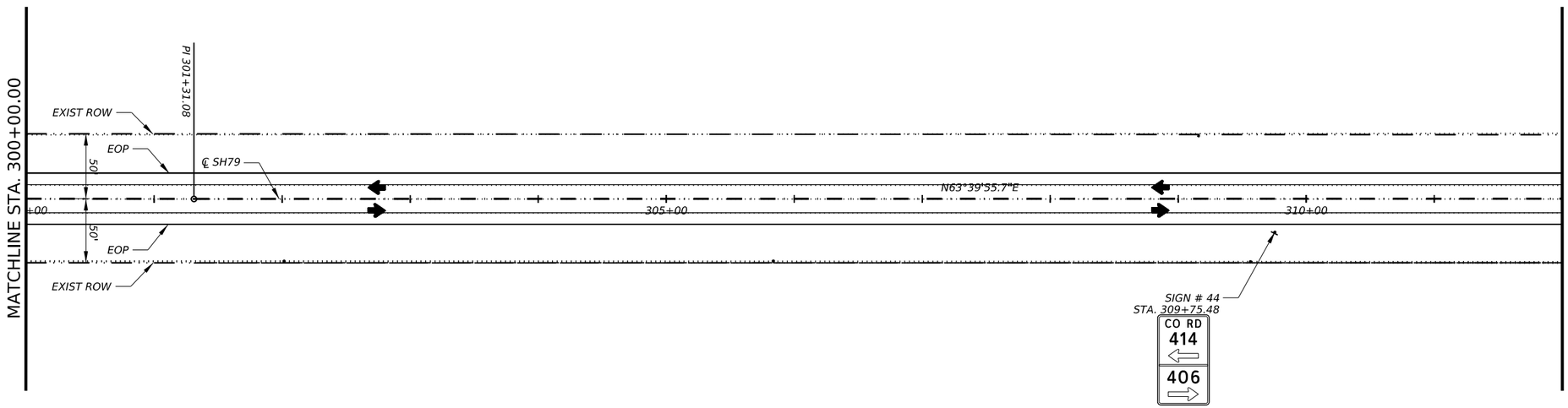

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SH 79

PLAN LAYOUT

SHEET 13 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		56

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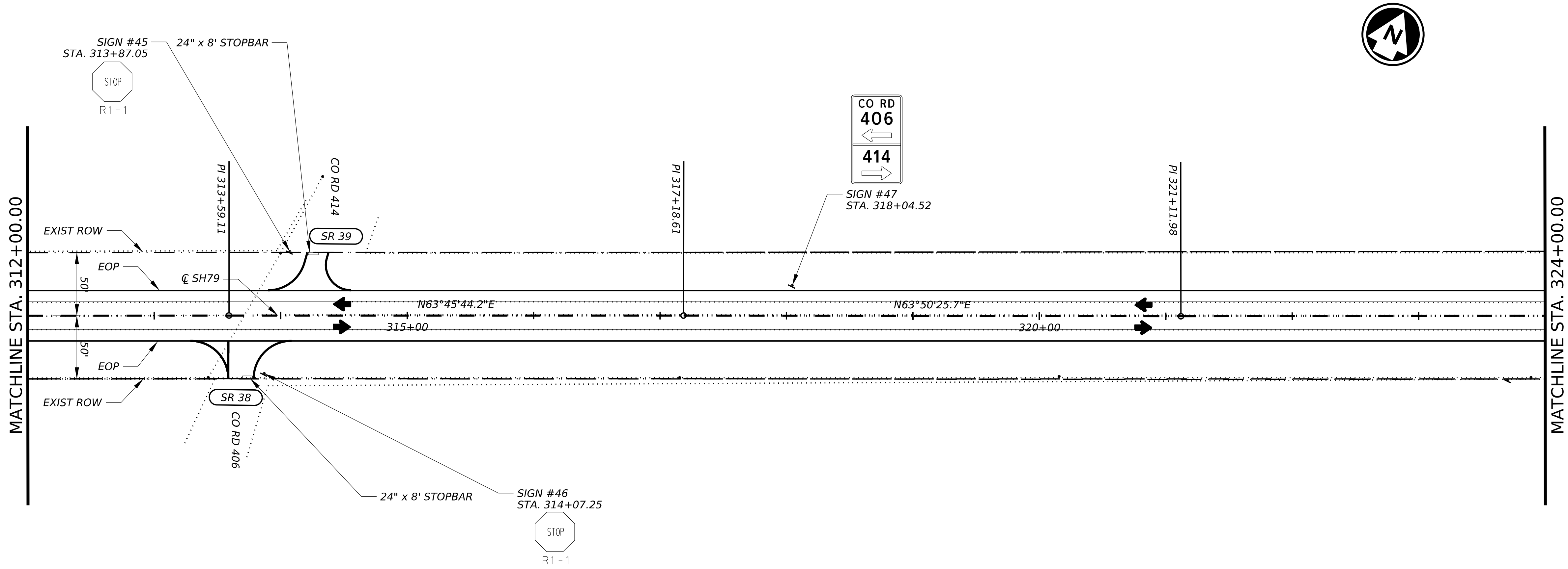
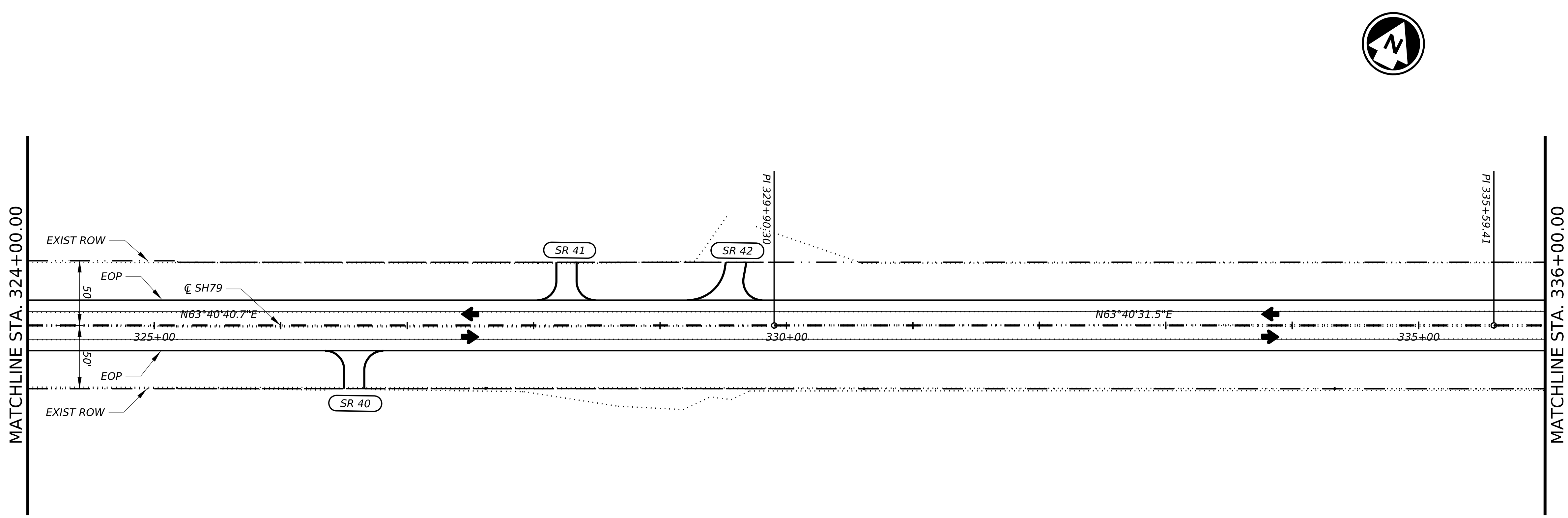
DW | CK | DW | CK





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SH 79

PLAN LAYOUT

SHEET 14 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		57

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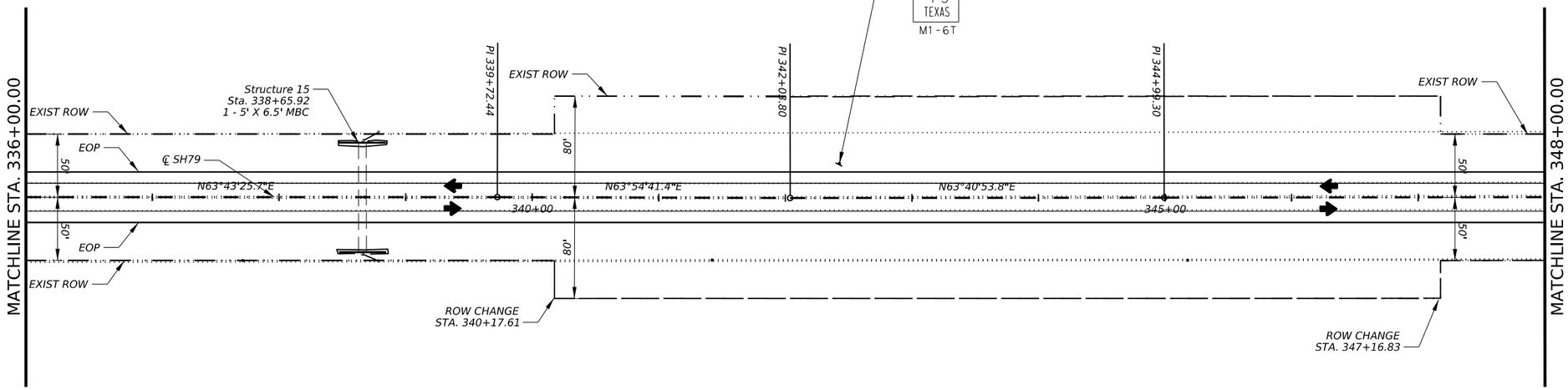

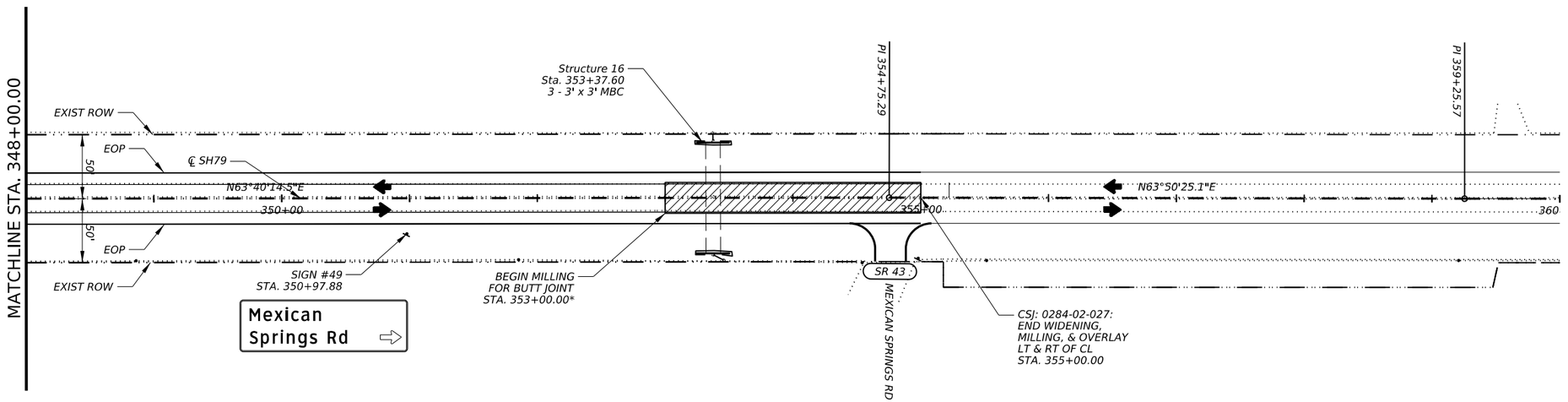

*SEE MISC DETAILS FOR MORE INFORMATION

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PLAN LAYOUT

SHEET 15 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		58

DATE: 10/27/2023 12:38:38 PM
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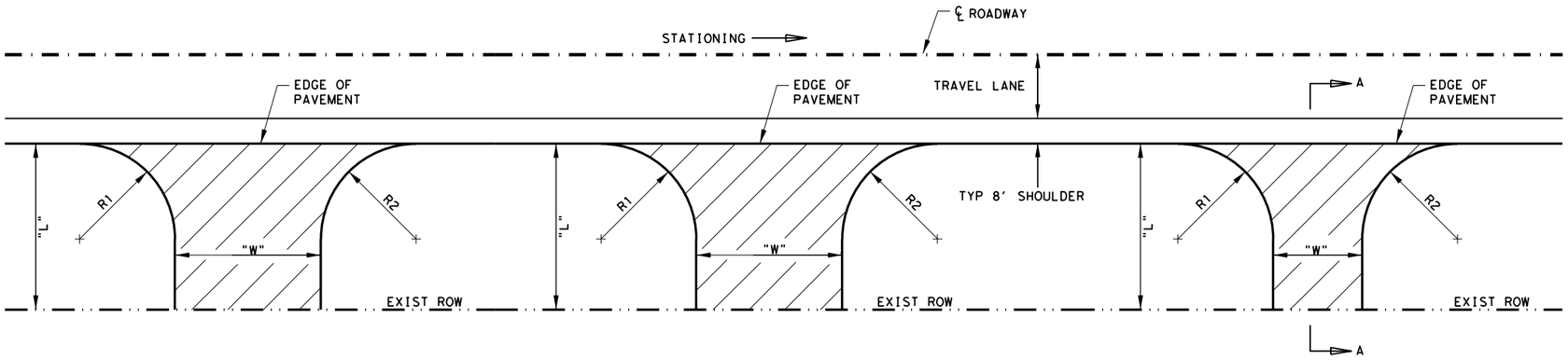
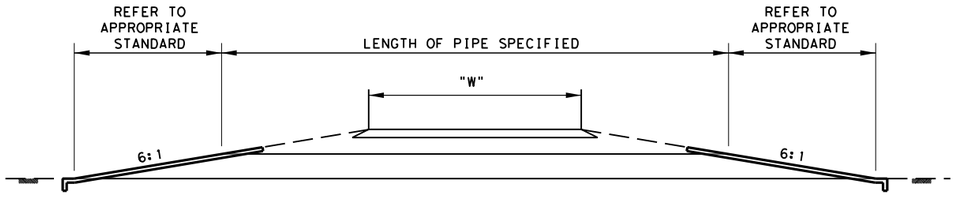


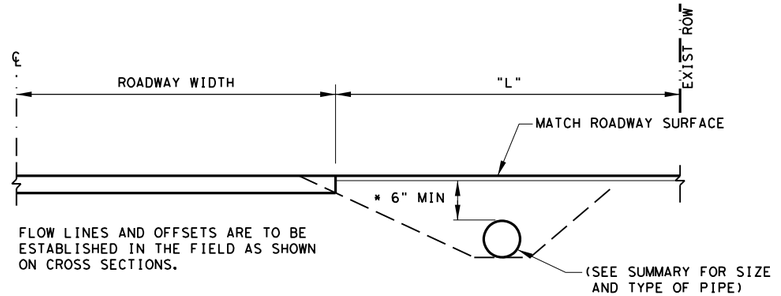
PLAN OF TYPICAL FM ROAD INTERSECTION DETAIL

PLAN OF TYPICAL COUNTY ROAD

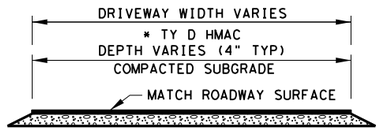
PLAN OF TYPICAL PRIVATE DRIVEWAY



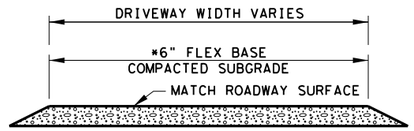
DETAIL SHOWING MEASUREMENT OF SIDEROAD PIPE



SECTION A-A SIDEROAD W/ PIPE



ACP SIDEROAD TYPICAL SECTION



BASE SIDEROAD TYPICAL SECTION

* FOR CONTRACTORS INFORMATION ONLY.
SUBSIDIARY TO ITEM 530

ALL COUNTY ROAD AND FARM ROAD INTERSECTIONS WILL BE PAVED ACP (ITEM 530) FOLLOWING THESE DETAILS UNLESS OTHERWISE NOTED IN PLAN LAYOUT SHEETS OR DESIGNATED BY ENGINEER

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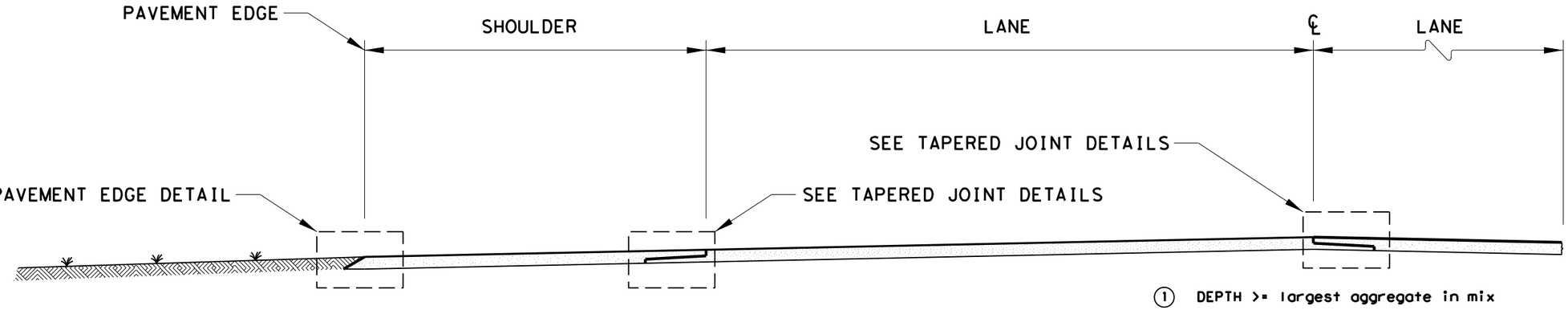
SH 79 SIDEROAD DETAILS

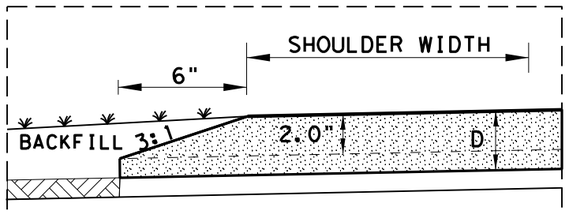
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0284	02	026	SH 79
DIST	COUNTY		SHEET NO.
03	THROCKMORTON		59

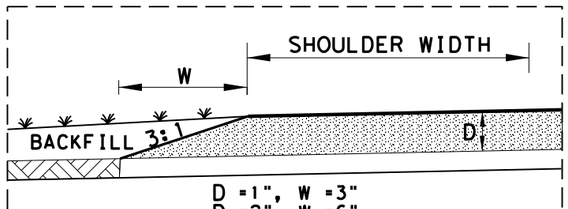
DATE: 10/27/2023 2:08:32 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/3. Roadway/SH 79 SIDEROAD DETAILS(0284-02-027).dgn



① DEPTH >= largest aggregate in mix

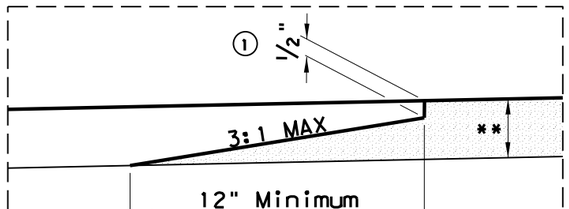


TAPERED PAVEMENT EDGE DETAIL"SAFETY EDGE" WHEN D IS > 2.0"

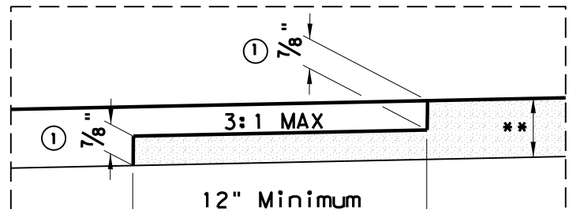


D =1", W =3"
D =2", W =6"

TAPERED PAVEMENT EDGE DETAIL"SAFETY EDGE" WHEN D IS 2.0" OR LESS



TAPERED JOINT DETAIL HMA LIFT THICKNESS LESS THAN 2"



TAPERED JOINT DETAIL HMA LIFT THICKNESS MORE THAN 2"

** SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.

NOTES:

LONGITUDINAL JOINTS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED SCREED ATTACHMENT WHICH WILL PRODUCE THE DESIRED SHAPE WITH THE MAIN SCREED. USE OF AN EXTERNAL STRIKE-OFF DEVICE TO MODIFY THE MAT SHAPE AFTER PASSING OF THE SCREED WILL NOT BE ALLOWED. TACK COAT SHALL BE APPLIED TO THE IN-PLACE TAPER BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED.

PAVEMENT EDGES SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL BE PLACED WITHIN THE NORMAL LANE WIDTH UNLESS OTHERWISE SHOWN ON THE PLANS. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED SCREED ATTACHMENT WHICH WILL PRODUCE THE DESIRED SHAPE WITH THE MAIN SCREED. USE OF AN EXTERNAL STRIKE-OFF DEVICE TO MODIFY THE MAT SHAPE AFTER PASSING OF THE SCREED WILL NOT BE ALLOWED. COMPACTION OF THE PAVEMENT EDGE TAPER WILL BE REQUIRED TO AS NEAR TO FINAL DENSITY AS POSSIBLE.

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10/30/2023

SH 79
HOT MIX
LONGITUDINAL
JOINT DETAILS

Texas Department of Transportation
SHEET 1 OF 1

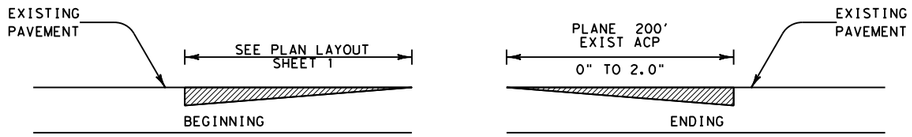
CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		60

DATE: 10/27/2023 2:08:36 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020027/4 - Design/Plan Set/3. Roadway/SH 79 HOT MIX LONGITUDINAL JOINT DETAILS.dgn

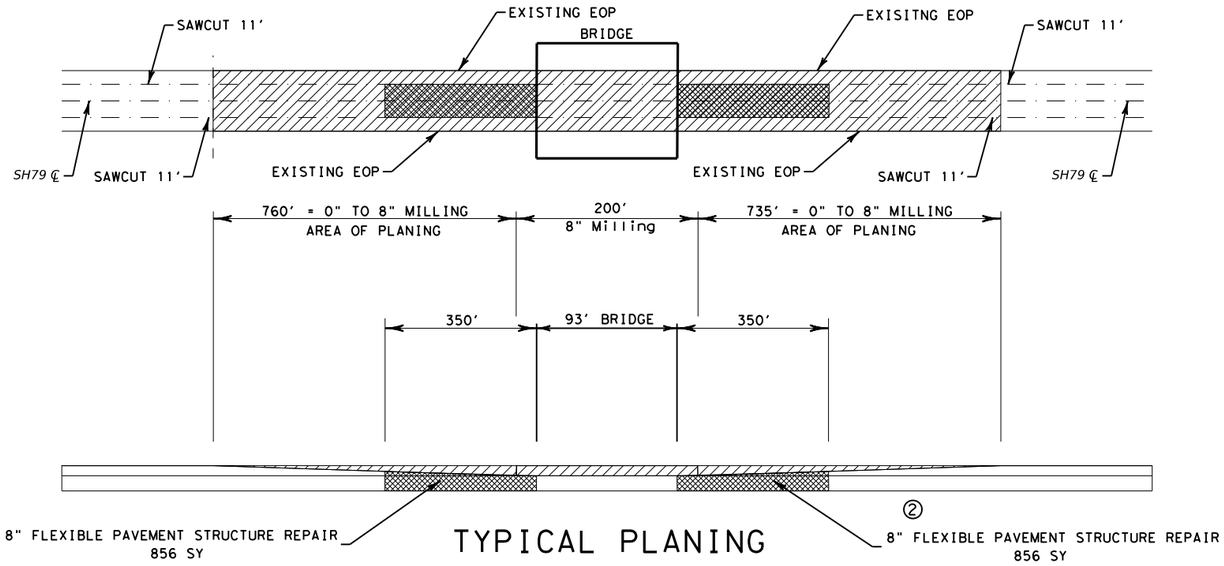
NOTES:

1. THIS DETAIL SHALL BE USED FOR CONSTRUCTING BUTT JOINTS AT ALL BEGINNING/ENDING PROJECT LOCATIONS AND SHALL BE TAPERED AS SHOWN OR AS DIRECTED BY THE ENGINEER.

2. FLEXIBLE PAVEMENT STRUCTURE REPAIR WILL INCLUDE REMOVAL OF EXISTING ACP/BASE MATERIAL AND PLACEMENT OF TY B ACP PG64-22.



TYPICAL PLANING & OVERLAY @ BEGINNING AND ENDING OF PROJECT DETAIL ①



TYPICAL PLANING @ BRIDGE DECK DETAIL

PLANE AND PAVEMENT REPAIR
CSJ: 0284-01-027
NORTH ELM CREEK BRIDGE: NBI# 03-224-0-0284-02-005
STA 71+40.00 TO 88+35.00

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SH 79

MISCELLANEOUS DETAILS

NOT TO SCALE

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0284	02	027	FM 79
DIST	COUNTY		SHEET NO.
03	THROCKMORTON		61

DATE: 10/27/2023 2:08:40 PM
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JR

DATE: 10/27/2023
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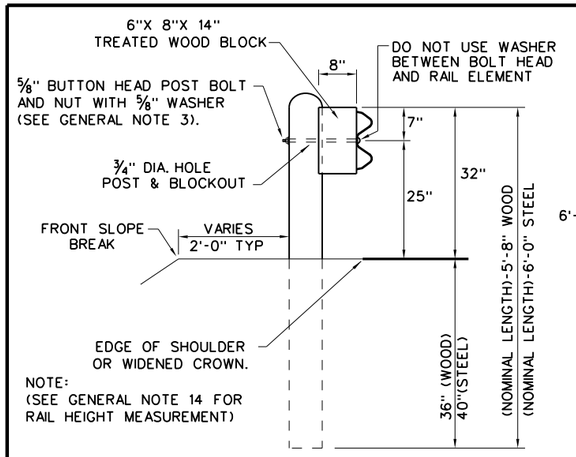
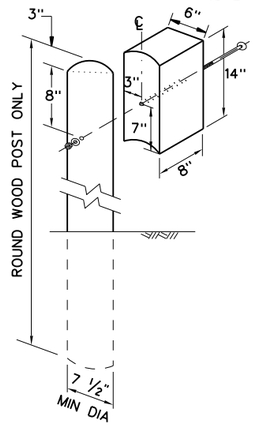
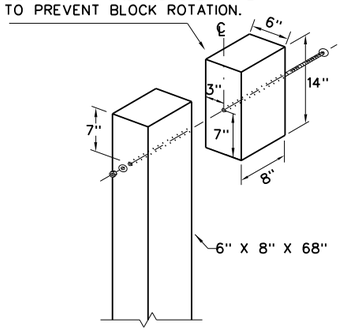


TYPICAL POST PLACEMENT

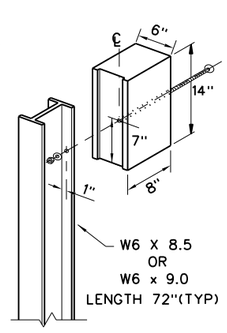


WOOD BLOCK TO ROUND WOOD POST

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

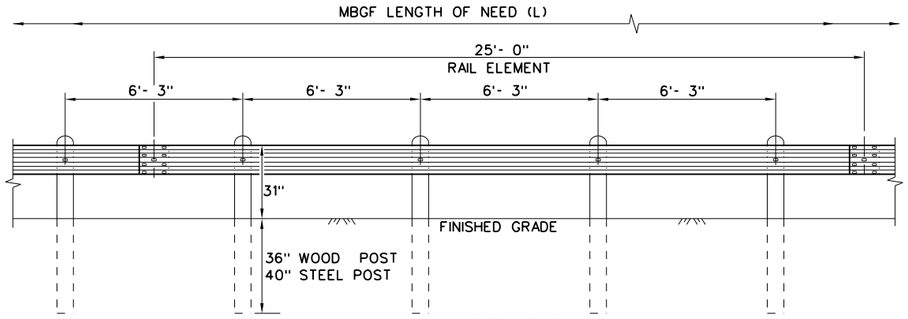


WOOD BLOCK TO RECTANGULAR WOOD POST



ROUTED WOOD BLOCK TO I-BEAM STEEL POST

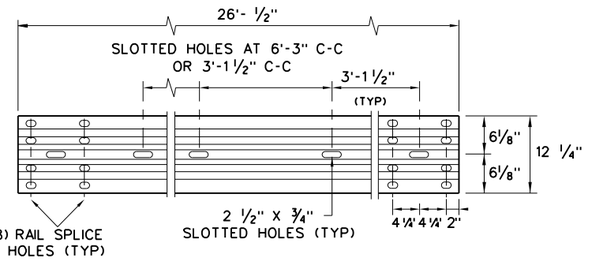
NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



DIRECTION OF TRAFFIC

ELEVATION MID-SPAN RAIL SPLICE

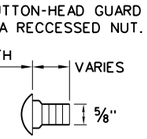
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

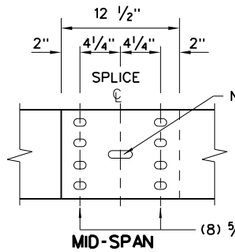
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



BUTTON HEAD BOLT

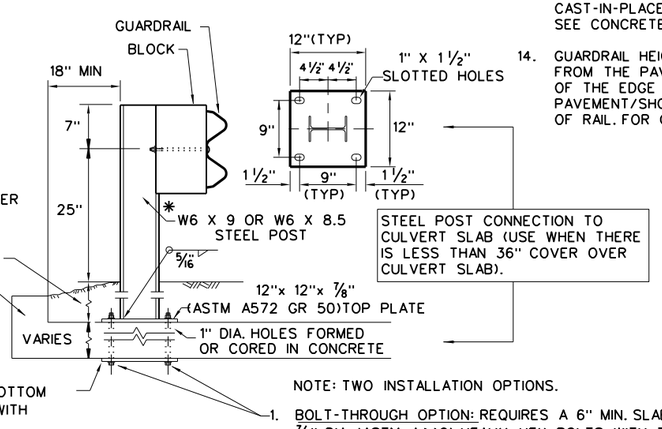
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



DIRECTION OF TRAFFIC

MID-SPAN RAIL SPLICE DETAIL

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



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

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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTIHIT 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 HILTIHIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

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

GENERAL NOTES

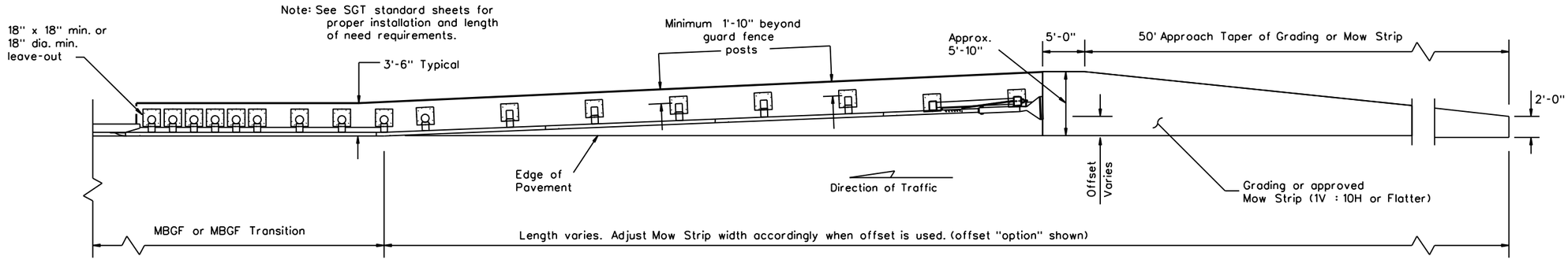
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS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

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		62

DATE: 10/27/2023
FILE: T:\WFSDESGN\Warren M\SH79\Roadway Standards DGN\GF(31)MS-19.dgn

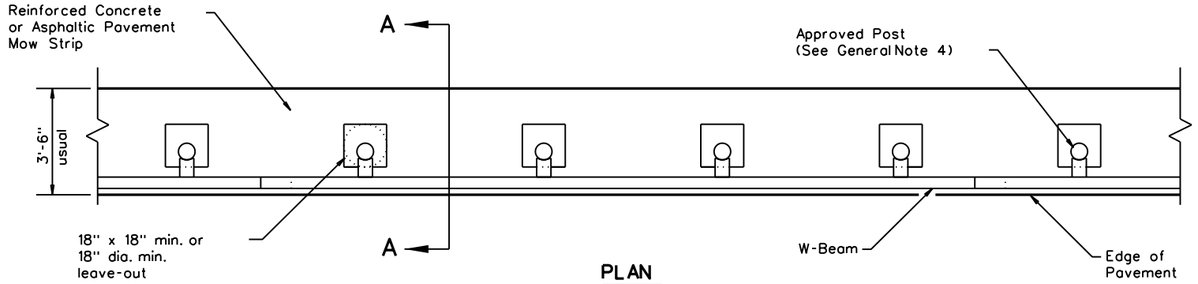


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

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.



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)

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

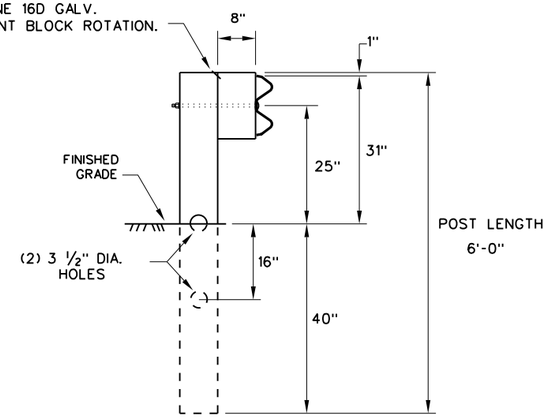
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		63

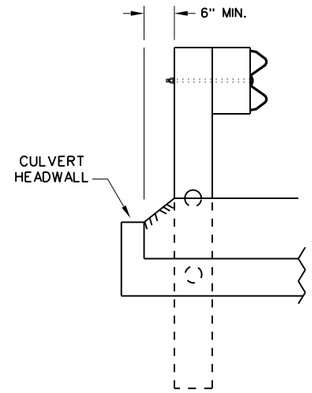
DATE: 10/27/2023
FILE: T:\WFSDESIGN\Warren M\SH79\Roadway Standards DGN\GF(31)LS-19.dgn

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



RECTANGULAR CRT POST (6"X 8" X 6' LONG)

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS



LATERAL OFFSET BETWEEN THE GUARDRAIL AND THE CULVERT HEADWALL

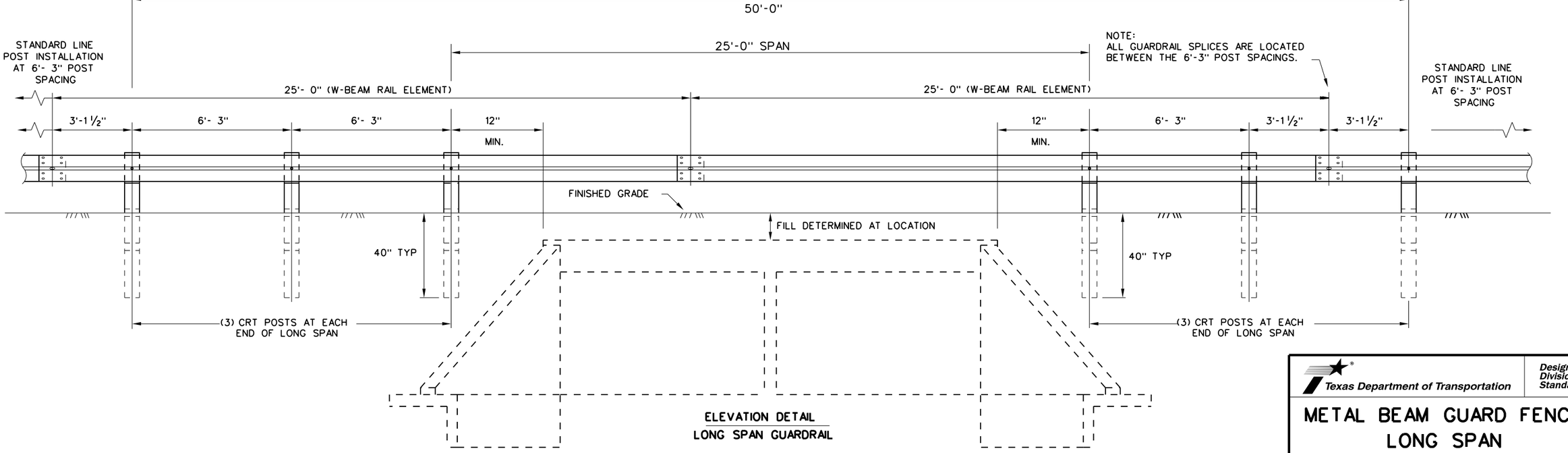
GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS 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 ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12'- 6" OR 25'- 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3'- 1 ½" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
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 NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF(31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

DIRECTION OF TRAFFIC

NOTE: SEE GF(31) STANDARD FOR STANDARD LINE POSTS.

GF(31) - LONG SPAN SYSTEM (PAID FOR BY THE EACH)



ELEVATION DETAIL
LONG SPAN GUARDRAIL

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE LONG SPAN TL-3 MASH COMPLIANT

GF(31)LS-19

FILE: gf31ls19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		64

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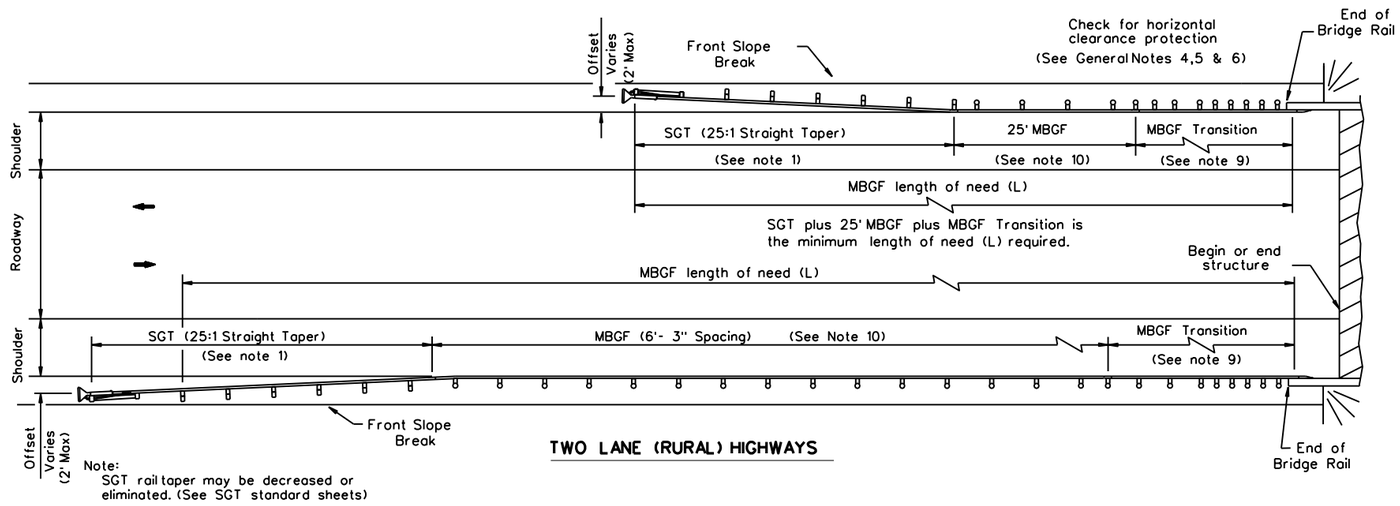
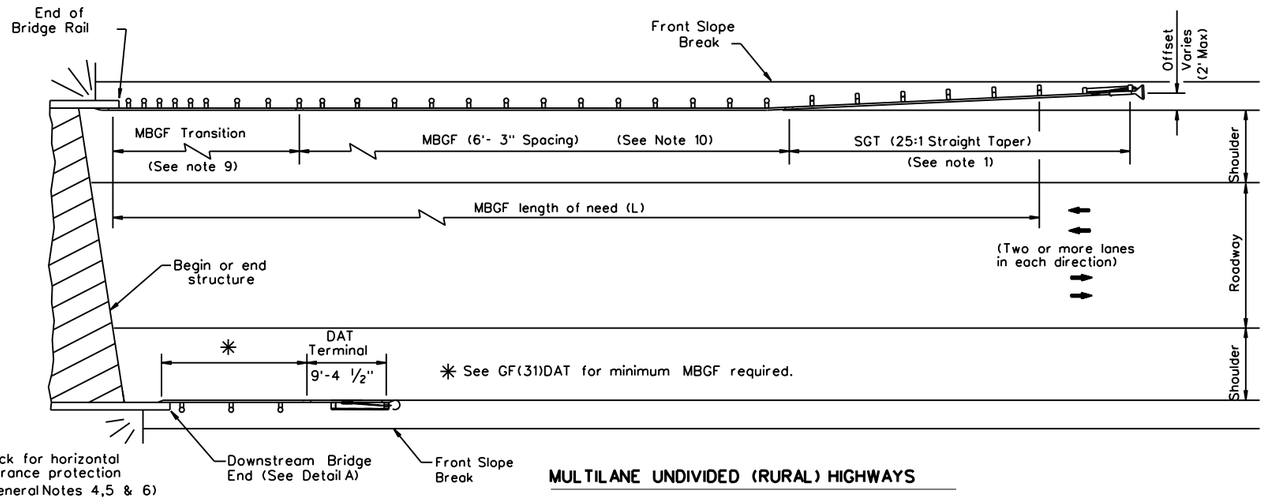
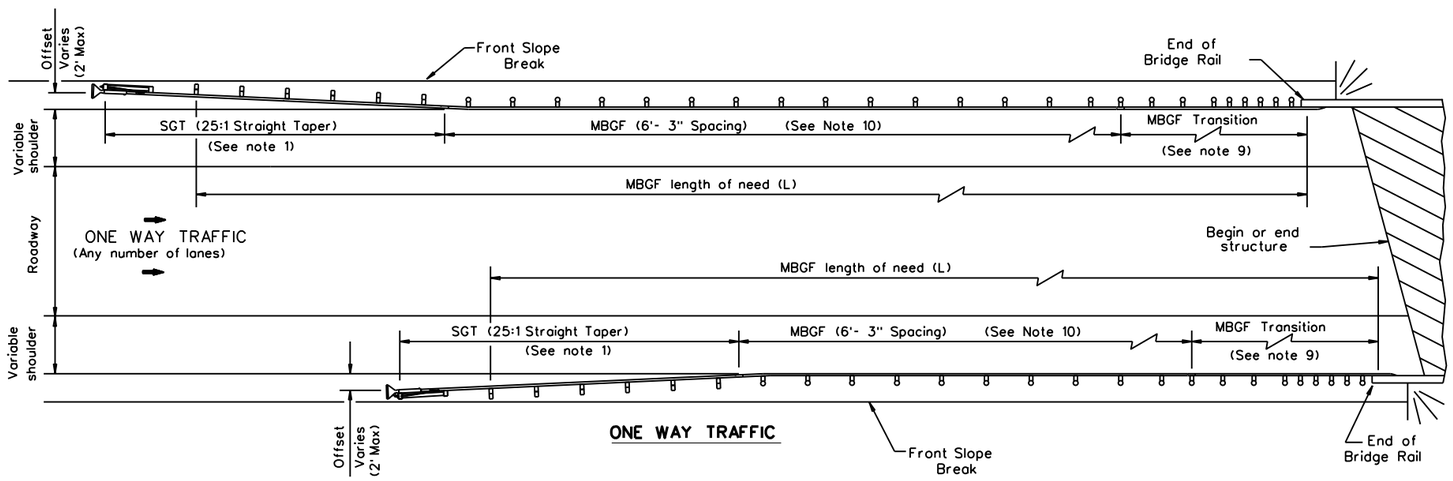


Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)

TWO LANE (RURAL) HIGHWAYS



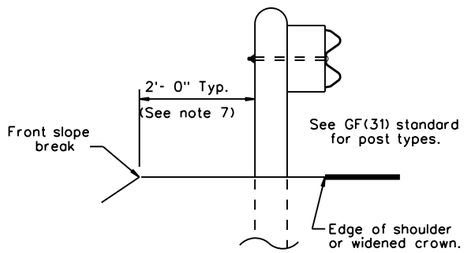
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



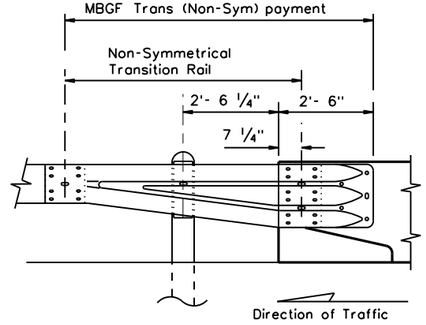
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

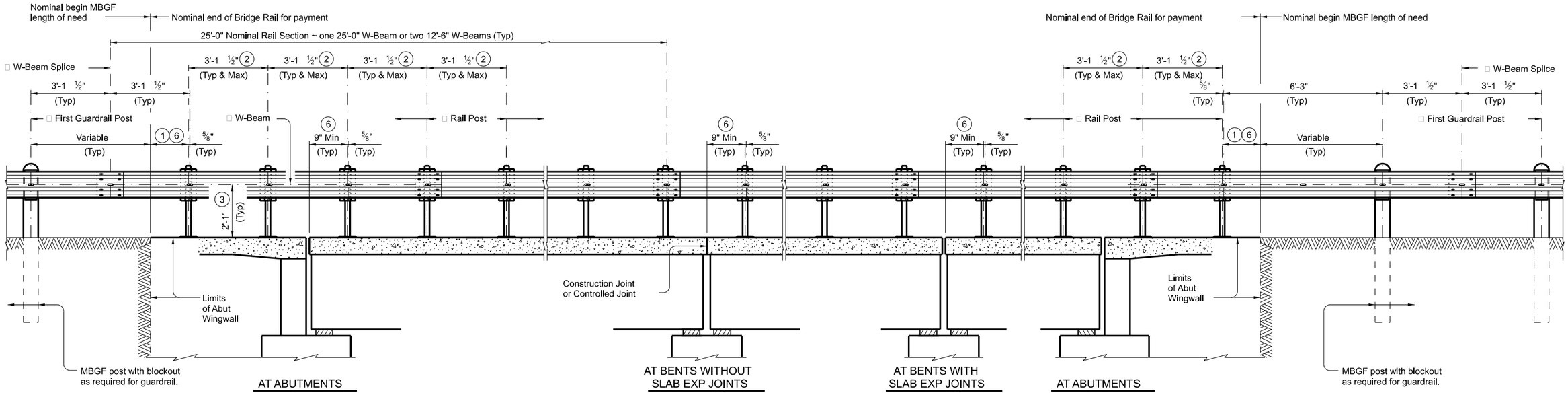
Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

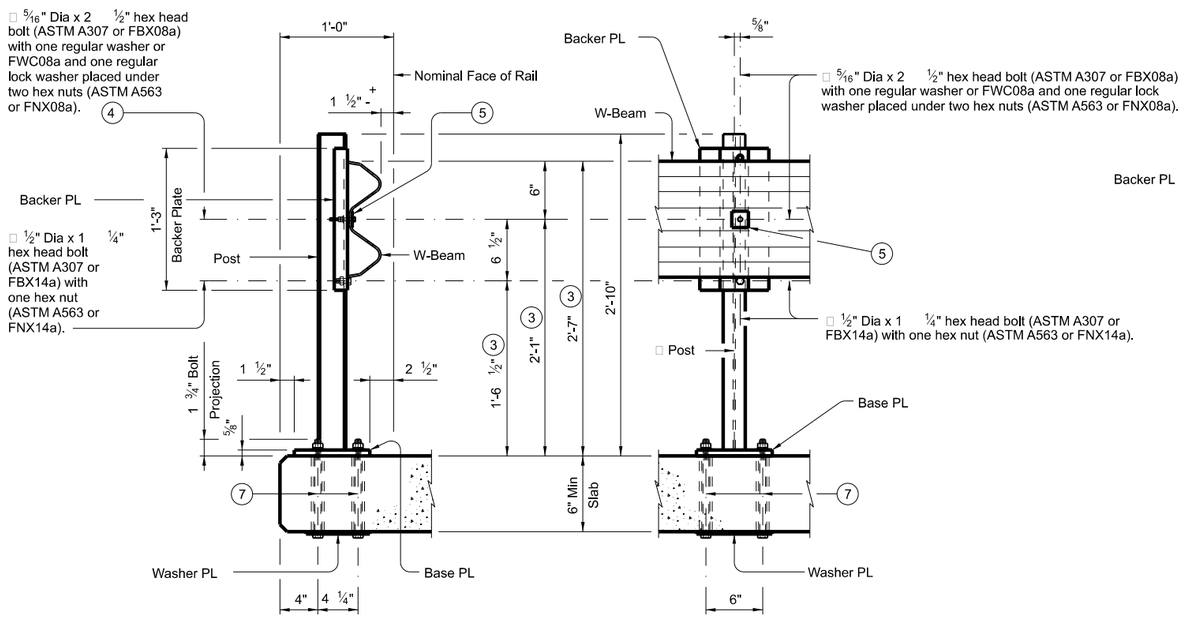
BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		65



ROADWAY ELEVATION OF RAIL

Showing without overlay.

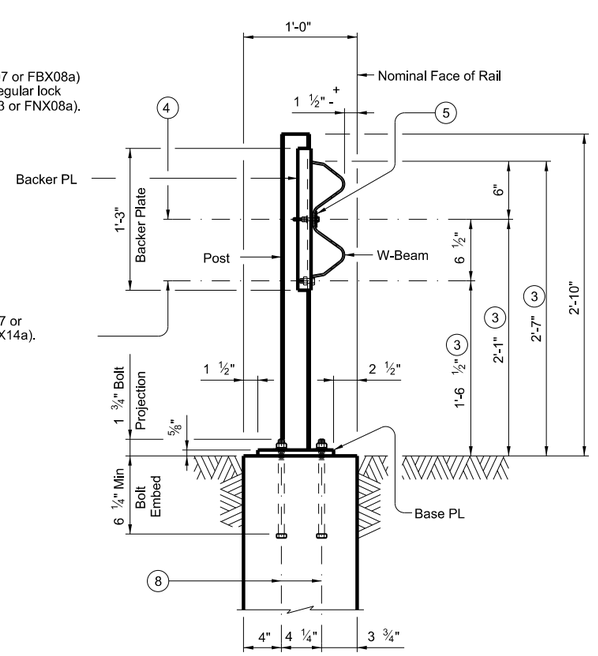


RAIL SECTION

TRAFFIC SIDE RAIL VIEW

RAIL DETAILS ON BRIDGE SLAB

Showing without overlay.



RAIL SECTION ON ABUTMENT WINGWALL

Showing without overlay.

(1) 9" Min, 5'-9" Max

(2) Maintain 3'-1 ½" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.

(3) Increase 2" for structures with overlay.

(4) Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.

(5) PL ⅛ x 1 ¾ x 1 ¾ with ⅜ Dia Hole centered in PL (ASTM A36). Square Guardrail Washer (FWR01).

(6) The post nearest to a slab joint or end of structure may be shifted up to 9" in order to satisfy the minimum offset dimension. Drill a new ¾" Dia hole on the centerline of W-beam for shifted post. Paint hole with two coats of zinc-rich paint conforming to the Item "Galvanizing". All other posts must remain on the typical spacing.

(7) ⅞" Dia formed holes for ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".

(8) ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE:	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
07/2020: Allowing 9'-4 ½" or 6'-3" W-Beam sections.	DIST	COUNTY		SHEET NO.
03/2023: MBGF Notes.	WFS	Throckmorton		66

DATE: 10/27/2023 2:08:55 PM
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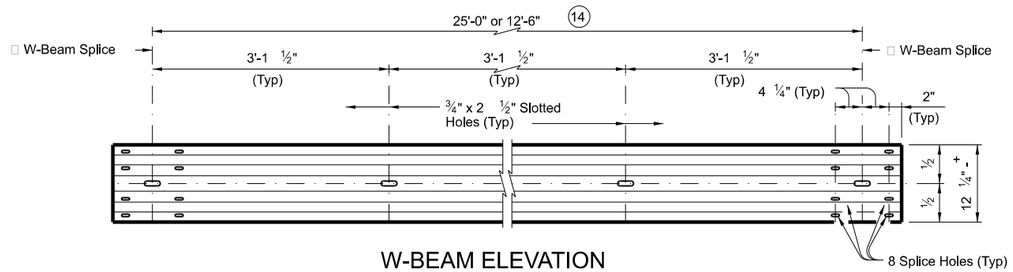
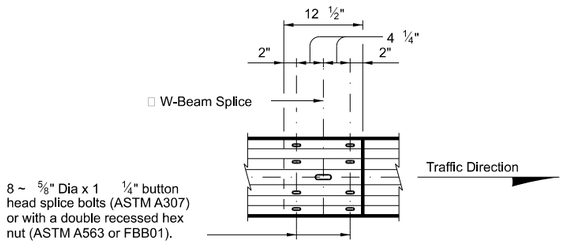
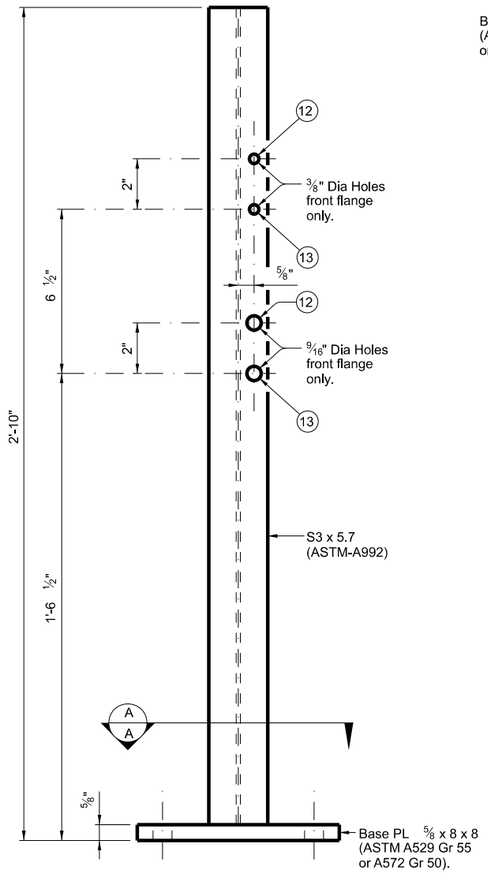


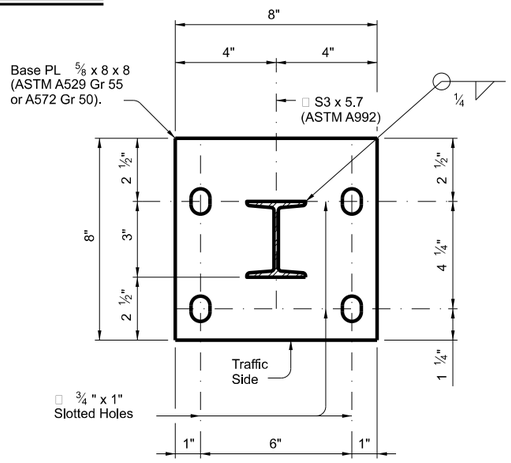
W-BEAM ELEVATION



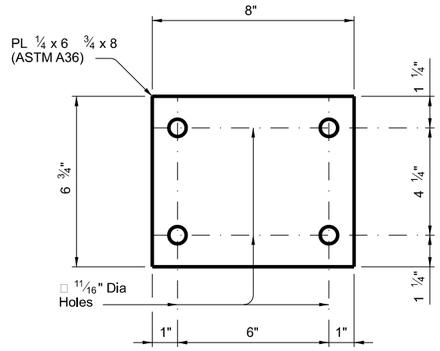
W-BEAM SPLICE ELEVATION



POST ELEVATION

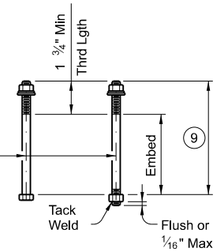


SECTION A-A



WASHER PLATE DETAIL

⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS (10)

(9) See "Rail Details On Bridge Slab" and/or "Rail Section On Abutment Wingwall".

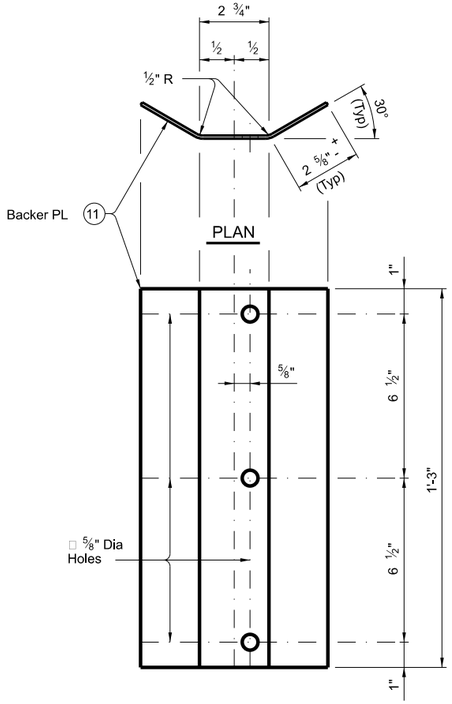
(10) See "Material Notes" for anchor bolt information.

(11) Backer PL ⅛ x 8 x 1'-3" (ASTM A1011 CS or SS Gr 33, or A1008 CS or SS Gr 33 (11 Gage acceptable)).

(12) Used for structures with overlay.

(13) Used for structures without overlay.

(14) At the nominal end of the bridge rail for payment, one 9'-4 ½" or 6'-3" W-beam section is permitted in order to achieve the required W-Beam splice location on the MBGF.



ELEVATION

BACKER PLATE

MBGF AND END TREATMENT NOTES:

This traffic railing must be anchored by metal beam guard fence (MBGF) and guard fence end treatments. Determine MBGF length of need in accordance with the Roadway Design Manual, unless otherwise specified. The minimum MBGF length of need required for anchoring the railing is 25' of MBGF plus the appropriate end treatment installed tangent to the primary roadway.

CONSTRUCTION NOTES:

Face of rail post must be plumb unless otherwise approved by the Engineer. Post must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Fully anchored guardrail must be attached to each end of rail. A metal beam guard fence transition is not used with this rail.

At the Contractor's option anchor bolts may be an adhesive anchor system. See "Material Notes".

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.

It is recommended to show a Rail Layout with rail posts and W-beam splices. Fabricator must submit erection drawings to the Engineer for approval.

Round or chamfer exposed edges of rail post and backer plate to approximately 1/16" by grinding.

Shop drawings are not required for this rail.

MATERIAL NOTES:

Galvanize all steel components.

Anchor bolts for base plate must be ⅝" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

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

W-beam must 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" (Nominal) lengths and a single rail element of 9'-4 ½" or 6'-3" (Nominal) length. W-Beam must have slotted holes at 3'-1 ½".

Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

GENERAL NOTES:

This railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This railing can be used for speeds of 50 mph and greater.

This rail is designed to deflect approximately 4' to 4'-6" as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.

Repairs to impact-damaged post and base plate unit are not permitted. Replace all impact-damaged posts with a new post and base plate unit.

Average weight of railing with no overlay: 20 plf total.

Texas Department of Transportation — Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE:	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
07/2020: Allowing 9'-4 ½" or 6'-3" W-Beam sections. 03/2023: MBGF Notes.	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		67

DATE: 10/27/2023
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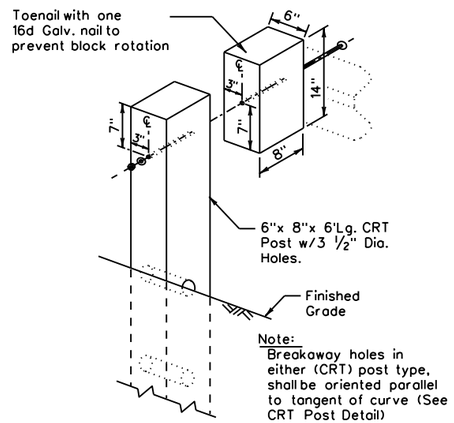
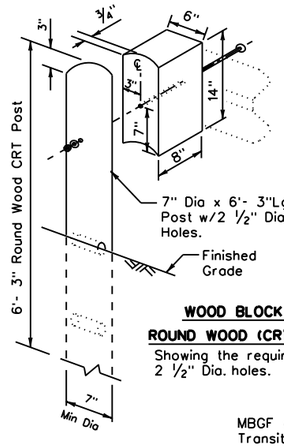


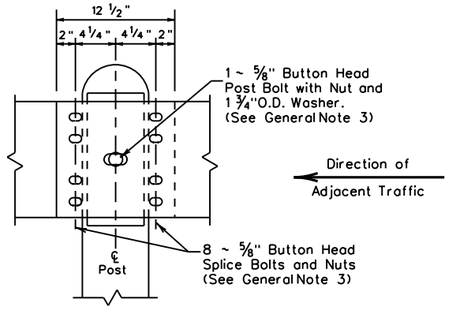
WOOD BLOCK TO RECTANGULAR WOOD (CRT) POST

Showing the required 3 ½" Dia. holes.

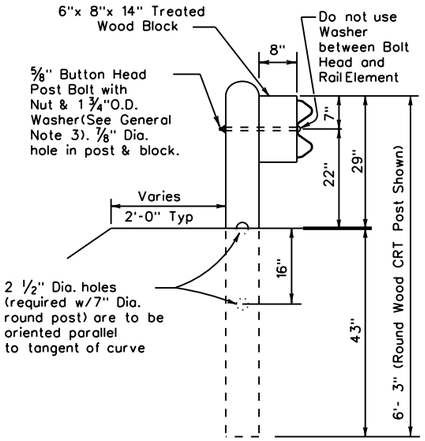


WOOD BLOCK TO ROUND WOOD (CRT) POST

Showing the required 2 ½" Dia. holes.

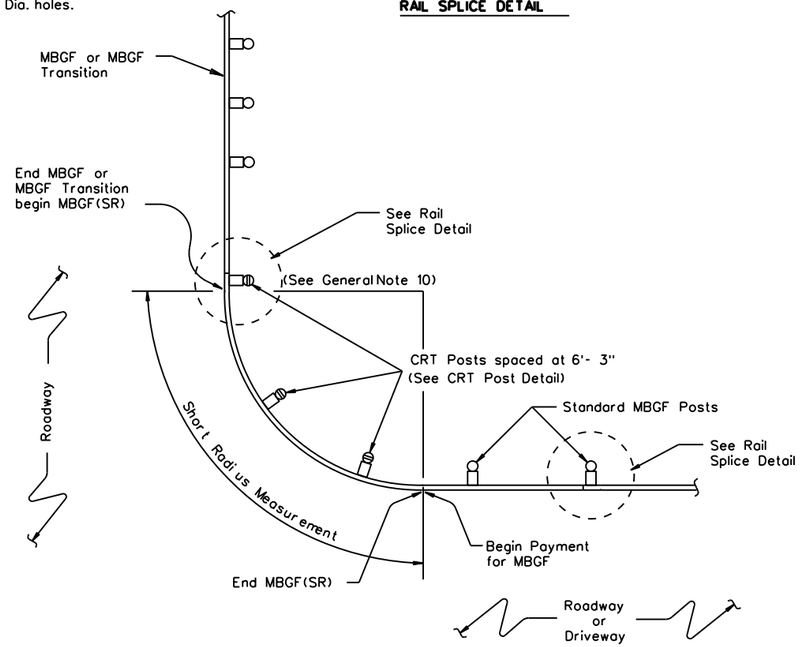


RAIL SPLICE DETAIL



(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

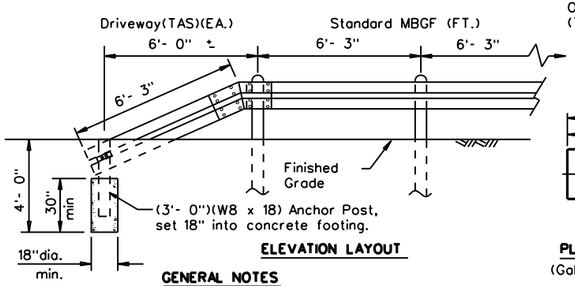
The required radius is shown elsewhere on the plans.

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

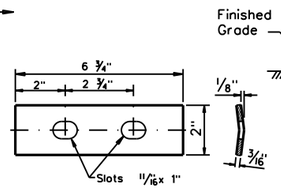
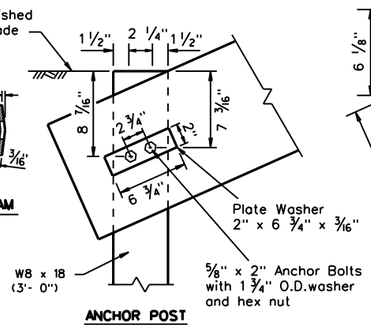
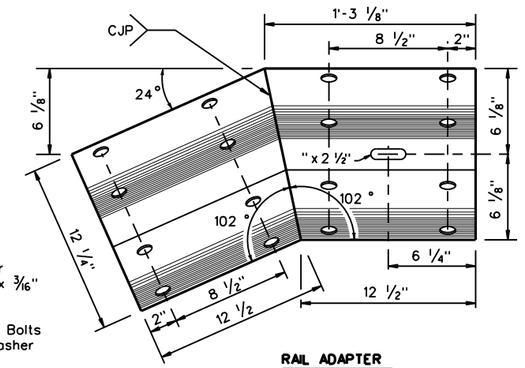


PLATE WASHER FOR METAL BEAM
(Galvanized after fabrication)



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

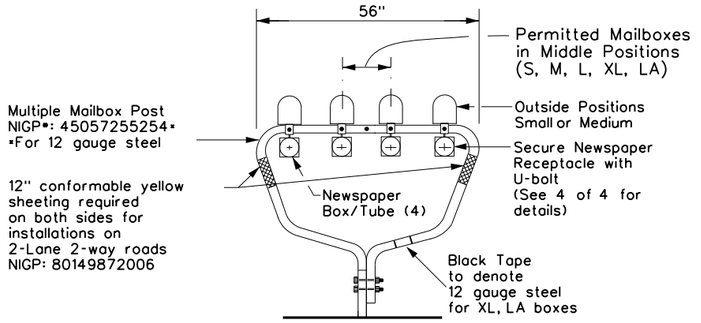
Design Division Standard

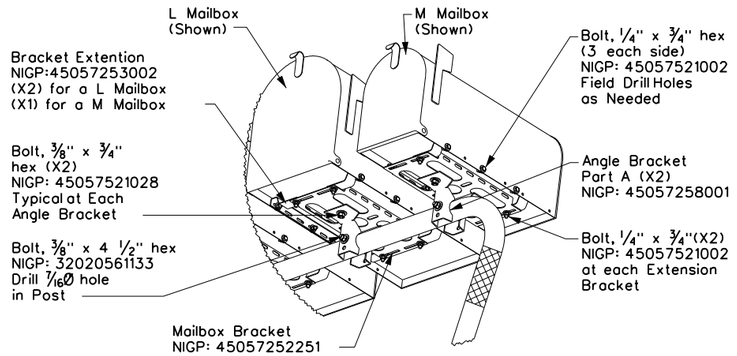
METAL BEAM GUARD FENCE
(SHORT RADIUS)
MBGF(SR)-19

FILE: mbgfsr19.dgn	DN: TxDOT	CK: KM	DW: BD	CK: VP
©TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		68

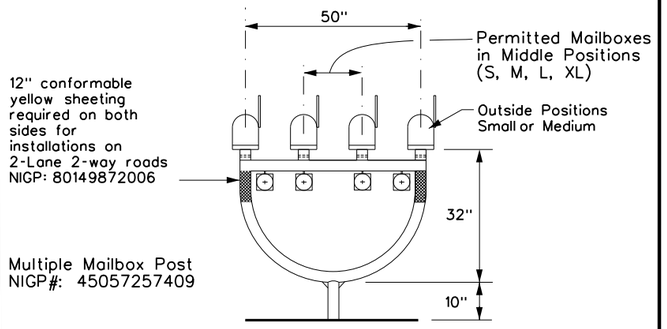
DATE: 10/27/2023 2:08:57 PM
FILE: T:\WFSDESGN\Warren M\PDC SH79 0284-02-027\mb-21(1).dgn

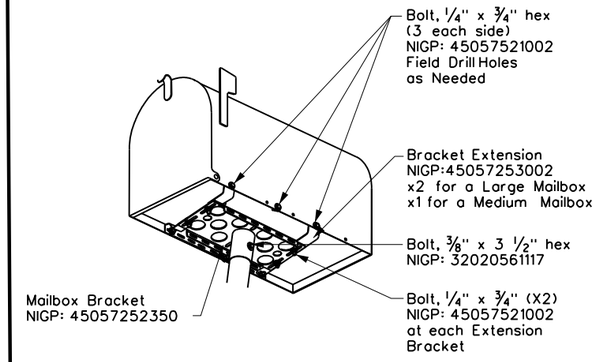
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

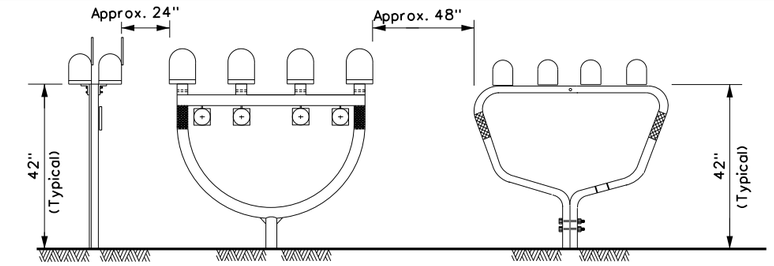
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX ** WEIGHT
	LENGTH	WIDTH	HEIGHT	
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

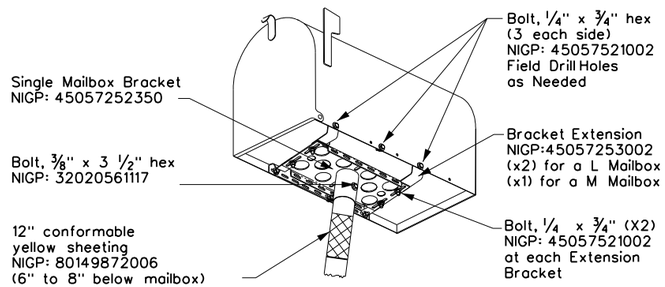
TYPICAL INSTALLATION MEASUREMENTS

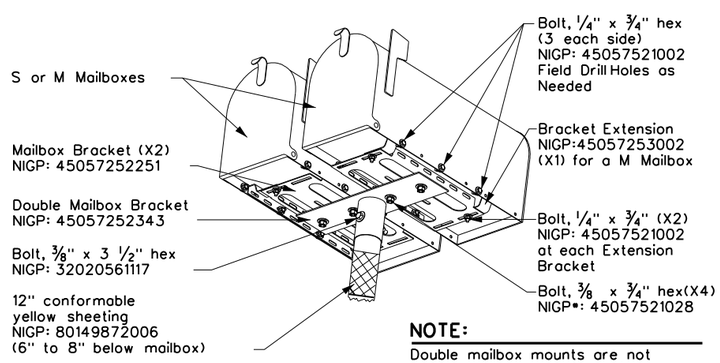


NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

TYPE 2 and 4 - SINGLE/DOUBLE

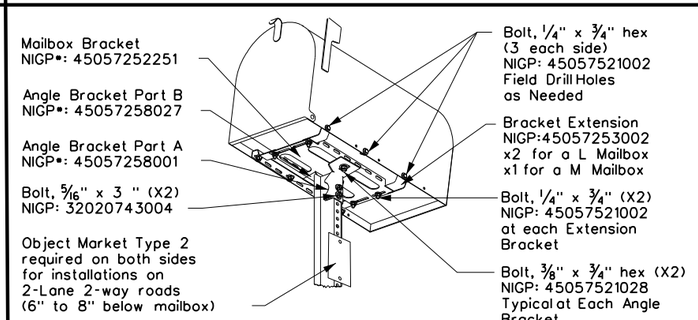


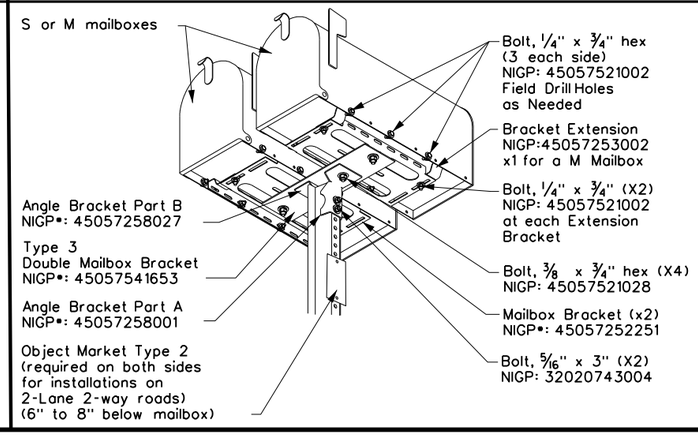


NOTE:

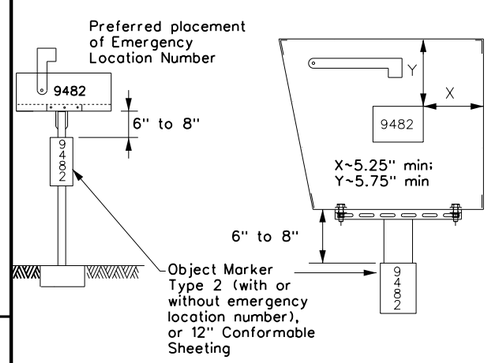
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

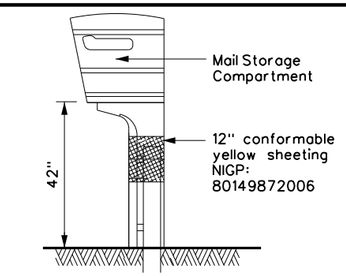


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

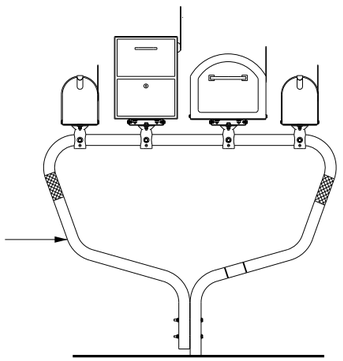
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

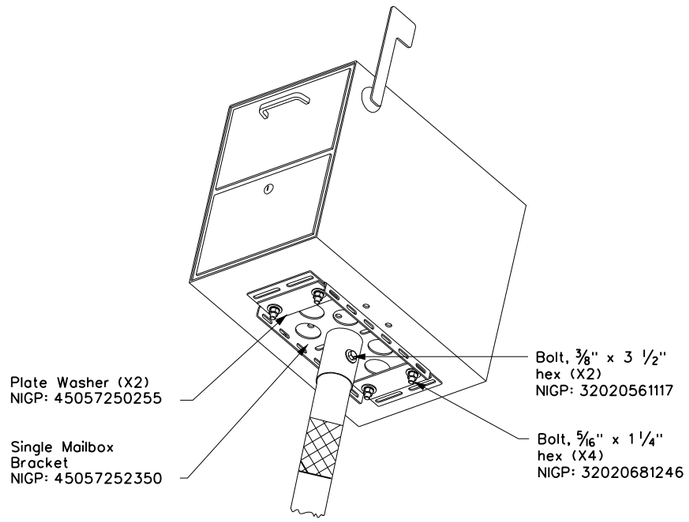
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		69

DATE: 10/27/2023 2:08:58 PM
FILE: T:\WFSDESGN\Warren_MX\PDC_SH79_0284-02-027\mb-21(1).dgn

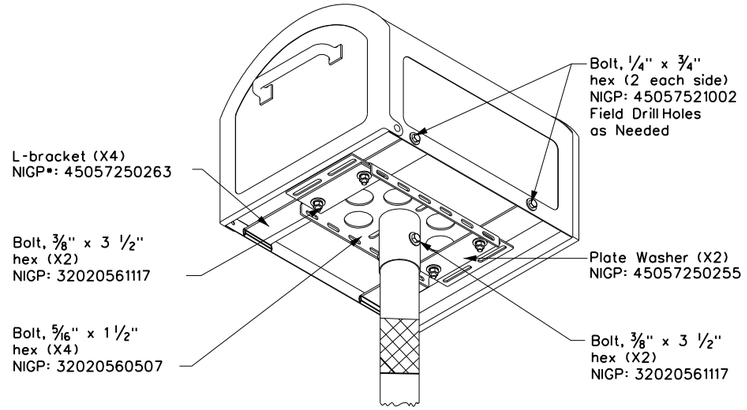
TYPE 1 - MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

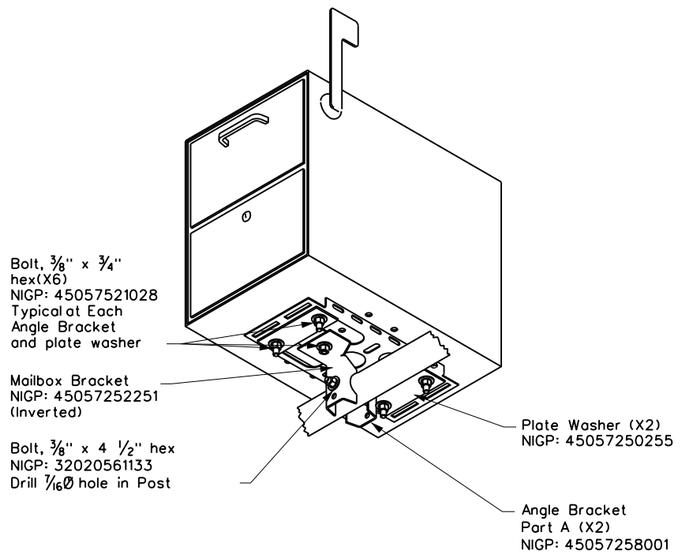


TYPE 2/4 - SINGLE XL MAILBOX

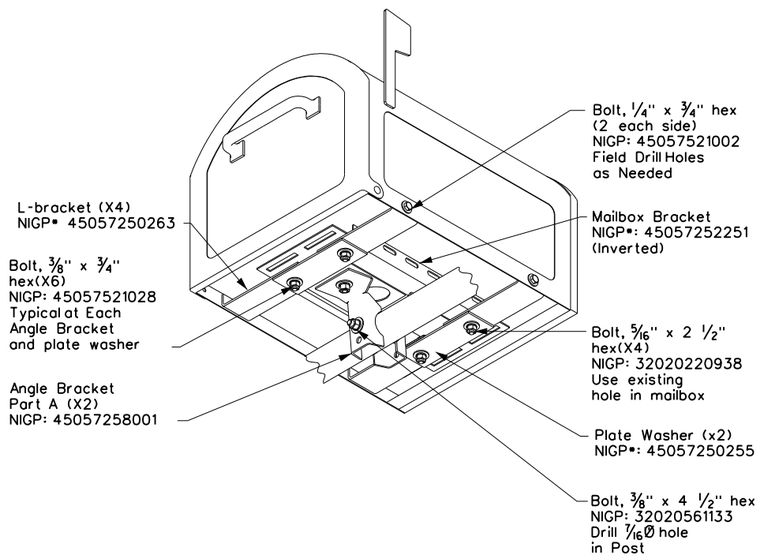


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multipost.

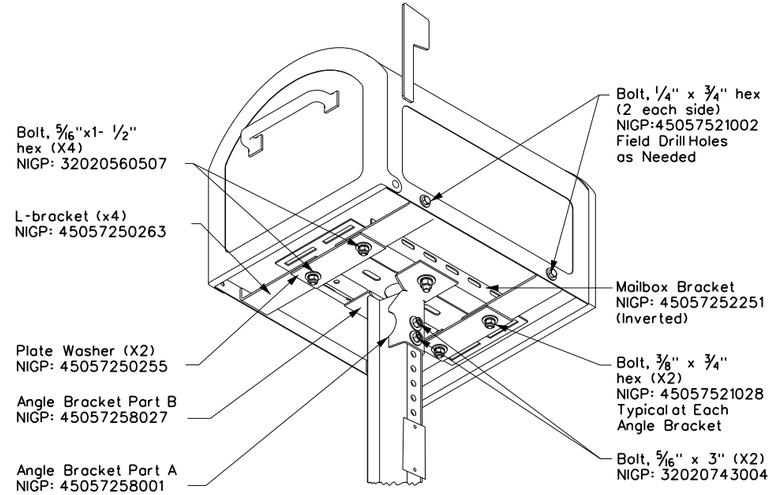
TYPE 1 MULTI - LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI - XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation — Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

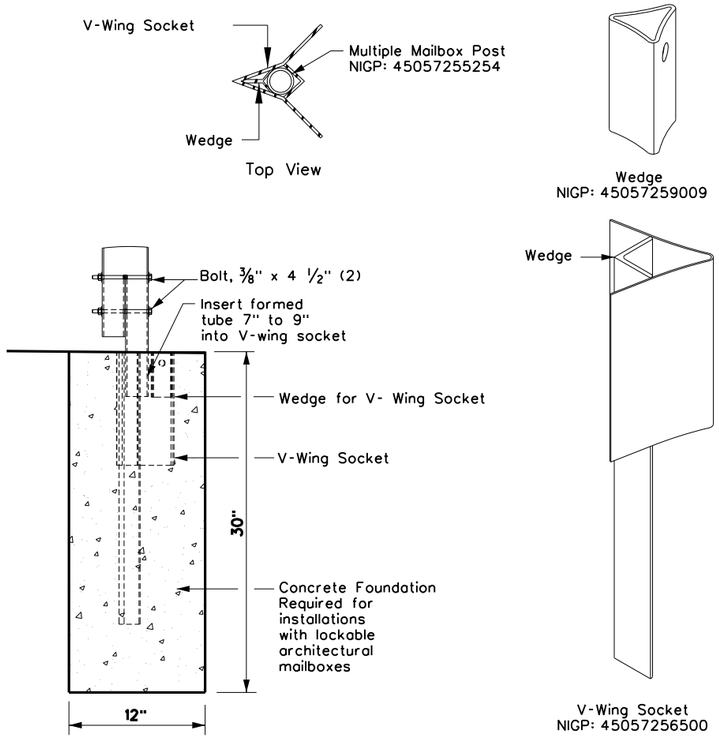
MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		70

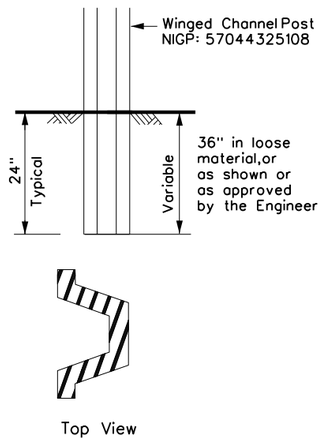
DATE: 10/27/2023 2:08:58 PM
FILE: I:\MF\DESIGN\Warren\MAINTDIV SHT\79 0284-02-027\mb-21(1).dgn

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



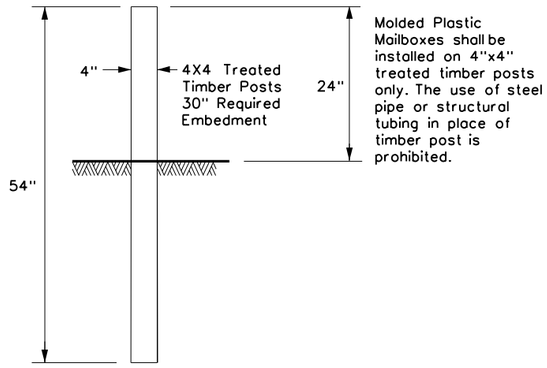
TYPE 3 - SUPPORT/FOUNDATION



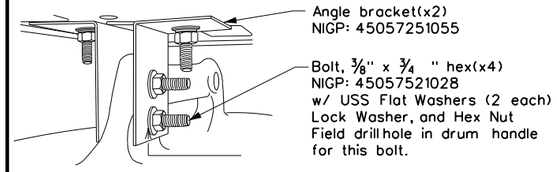
NOTES:

1. Attach Object Marker(OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

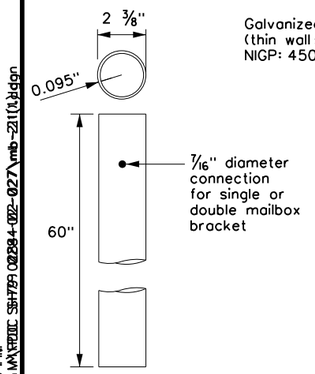
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:

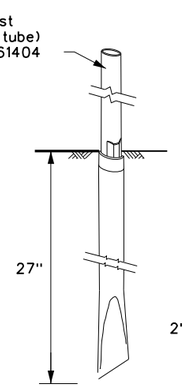
1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System

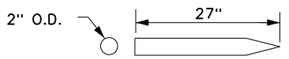


MAILBOX POST



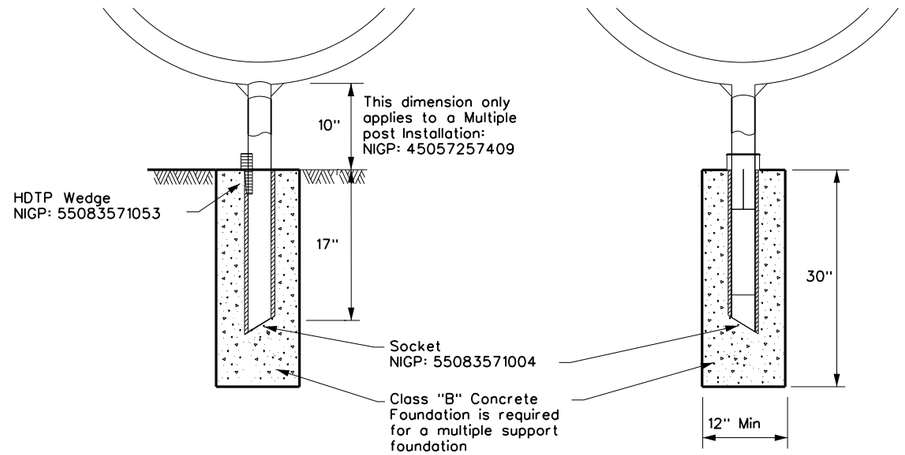
WEDGE ANCHOR
NIGP: 80130238407

WEDGE
NIGP: 80130598701



TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

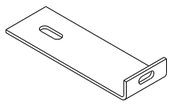
Texas Department of Transportation | Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

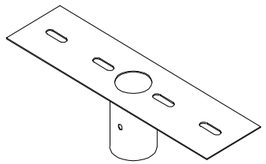
MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		71

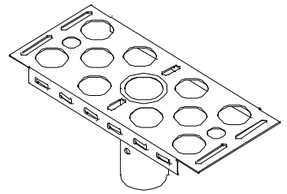
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



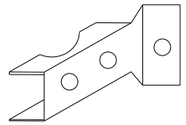
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



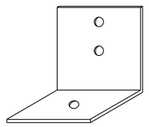
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



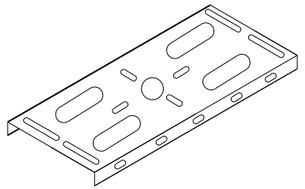
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



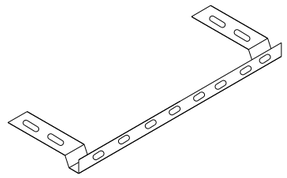
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



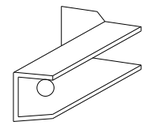
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



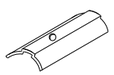
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



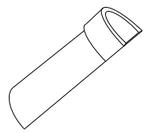
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



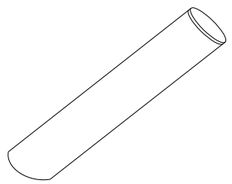
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

NIGP: 45057541653
Type 3 double mailbox bracket

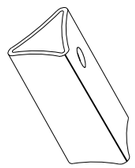


NIGP: 55083571053
Type 4 Mailbox Wedge

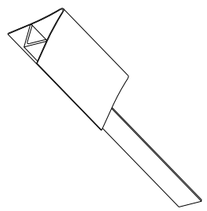


NIGP: 55083571004
Type 4 Mailbox Socket

NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S - Single
- D - Double
- M - Multiple
- MP - Molded Plastic

Type of Post
- WC - Winged Channel Post
- RR - Recycled Rubber
- TWW - Thin Walled White Tubing
- TWG - Thin Walled Galvanized Tubing
- TIM - Timber

Type of Foundation
- Ty 1 - V-Loc
- Ty 2 - Wedge Anchor Steel System
- Ty 3 - Winged Channel post
- Ty 4 - Wedge Anchor Plastic System
- Ty 5 - 4 X 4 Post

DATE: 10/27/2023 2:08:59 PM
FILE: T:\WFSDESGN\Warren M\PDC SH79 0284-02-027\mb-21(1).dgn

SHEET 4 OF 4

Texas Department of Transportation | Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		72

DATE: 10/27/2023
FILE: T:\WFSDESIGN\Warren M\SH79\Roadway Standards DGN\SGT(10S)31-16.dgn

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)

ANGLE STRUT PN:15202G

ANCHOR PADDLE PN:15204A

16"

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

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

POST(1)

POST(0)

TRAFFIC FLOW

PLAN VIEW

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

BEGIN LENGTH OF NEED

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

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1½" 6'-3" 6'-3"

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

MIDDLE SLOT CUTOUT
(1) 1¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT
(2)½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE:B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

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

SoftStop ANCHOR RAIL (12GA) PN:15215G

3'-1½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

SEE NOTE:C

ANCHOR PADDLE PN:15204A

END OF ANCHOR RAIL PN:15215G

SEE NOTE: A

POST 32" HEIGHT

31" RAIL HEIGHT

RAIL 25'-0" PN:61G

RAIL 25'-0" PN:15215G

31" RAIL HEIGHT

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

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

POST 40" DEPTH (TYP 1-8)

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

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

ELEVATION VIEW

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

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

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1
SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN:105286

(2) ⅝" ROUND WASHERS PN:3240G

DETAIL 2
SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN:15207G

ANCHOR PLATE WASHER ½" THICK PN:15206G

1" ROUND WASHER F463 PN:4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN:105285G

(2) ⅝" ROUND WASHER (WIDE) PN:3240G

1" NUT PN:3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN:3245G

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'- 1⅜" 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

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN:6777B

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

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

8" 6" 14"

⅝" HGR NUT PN:3340G

⅝" X 10" HGR POST BOLT PN:3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

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

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN:3500G

⅝" HGR NUT PN:3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

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

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN:3500G

⅝" HGR NUT PN:3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

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

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

POST HEIGHT 17"- ½"

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.

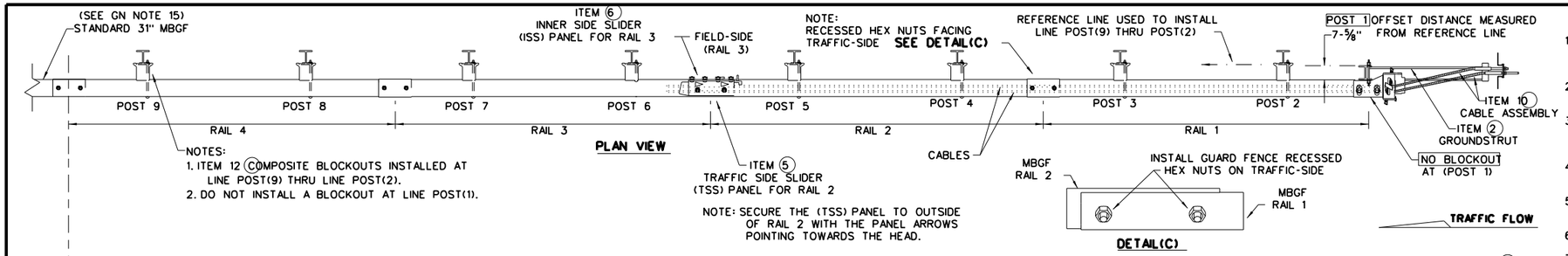
Texas Department of Transportation

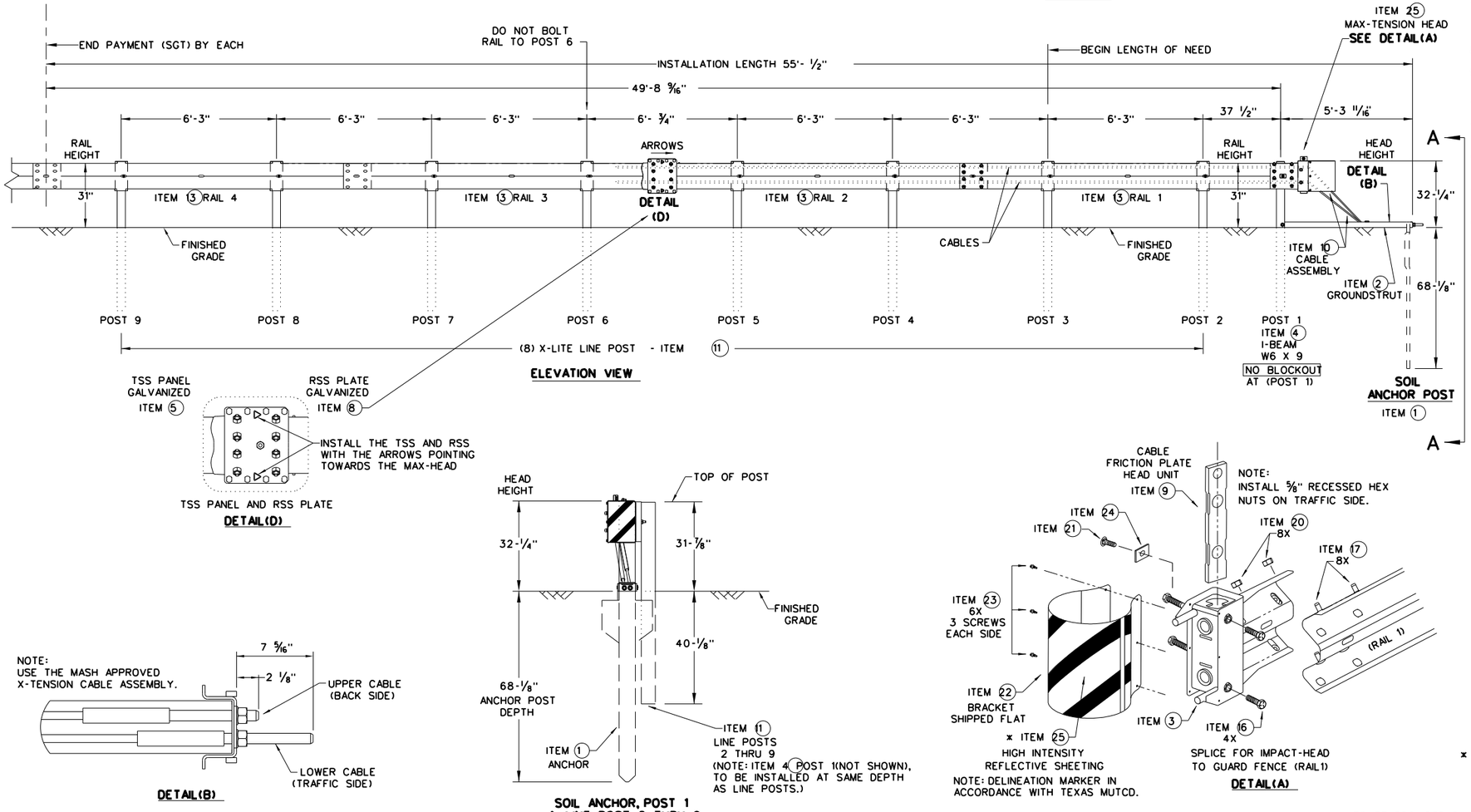
Design Division Standard

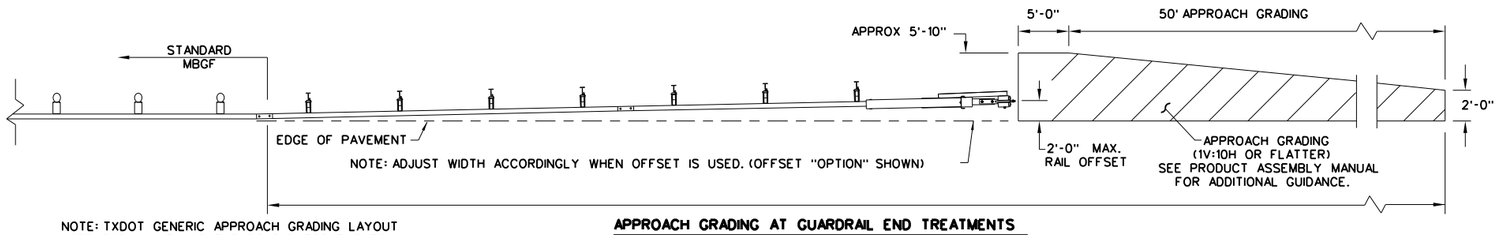
TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		73

DATE: 10/27/2023
FILE: T:\WFSDESGN\Warren M\SH79\Roadway Standards DGN\SGT(11S)31-18.dgn







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
x 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
x x 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
x x 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

x TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

x x 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.

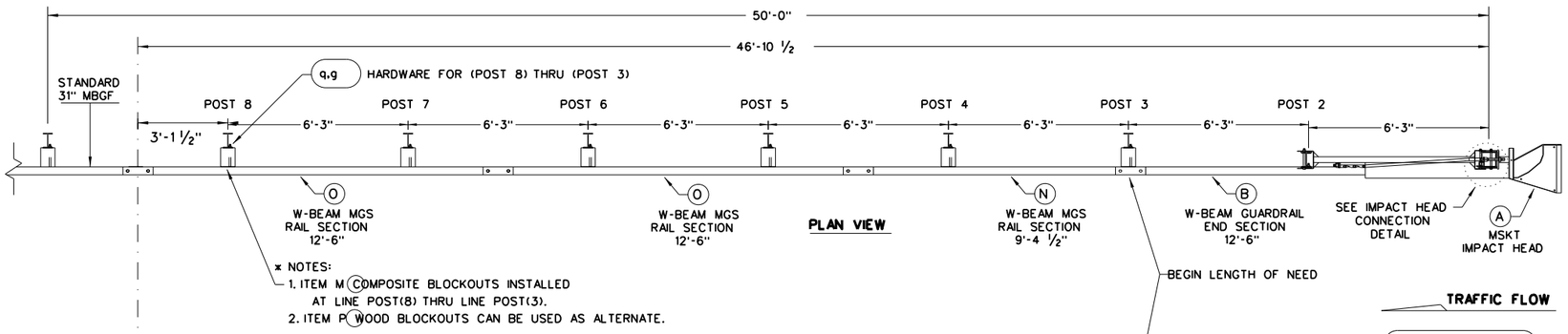
Texas Department of Transportation

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	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		74

DATE: 10/27/2023
FILE: I:\WFSDESGN\Warren M\SH79\Roadway Standards DGN\SGT(12S)31-18.dgn



* NOTES:
1. ITEM M (C) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(8) THRU LINE POST(3).
2. ITEM P (W) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

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

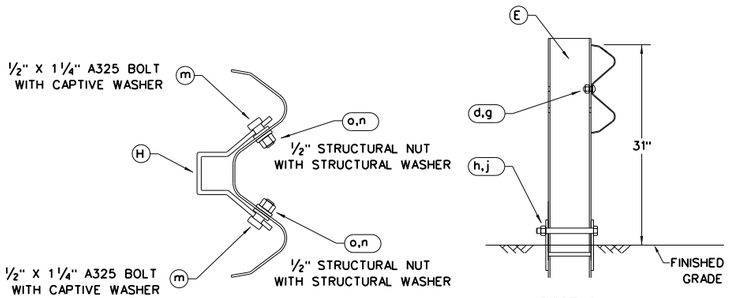
GENERAL NOTES

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

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

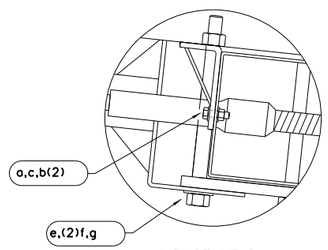
SEE NOTES: *

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

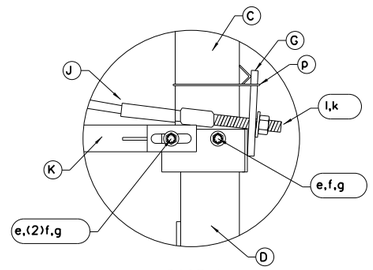


SECTION B-B
ANCHOR BRACKET

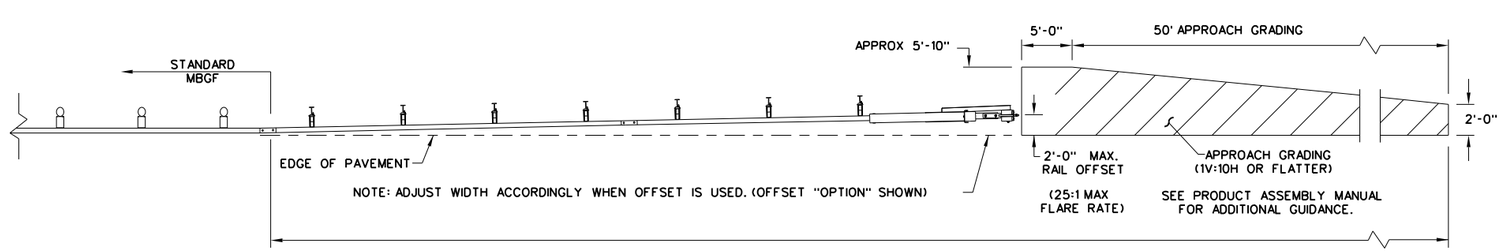
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation — Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP		CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0284	02	027	SH 79	
	DIST	COUNTY		SHEET NO.	
	WFS	Throckmorton		75	

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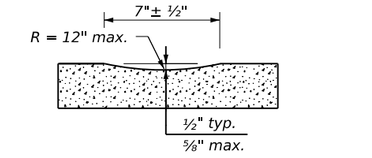
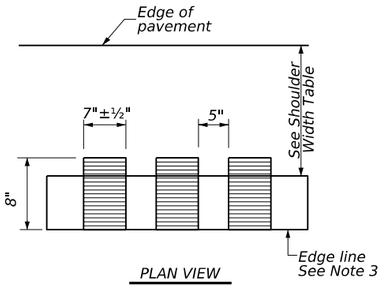
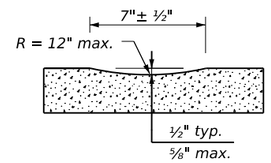


PROFILE VIEW
OPTION 1

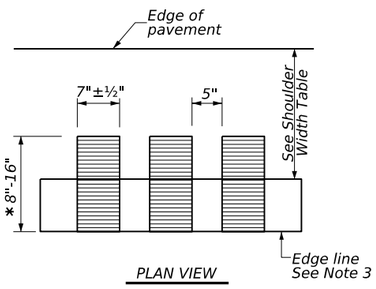


PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



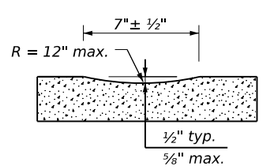
PROFILE VIEW
OPTION 2



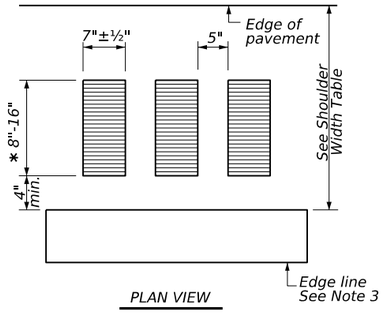
PLAN VIEW

∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



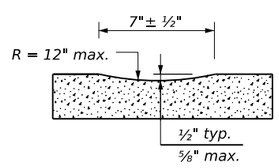
PROFILE VIEW
OPTION 3



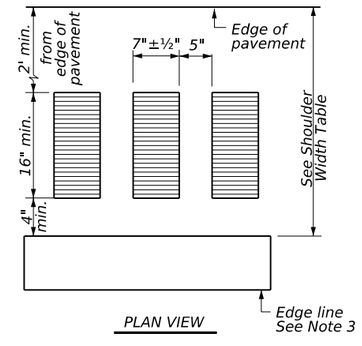
PLAN VIEW

∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

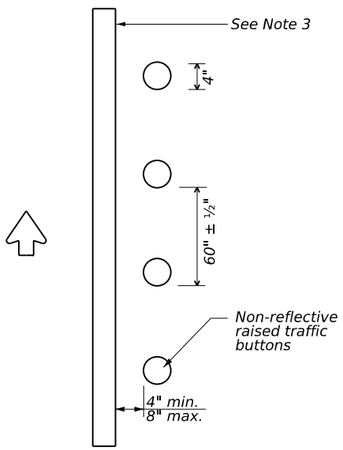


PROFILE VIEW
OPTION 4



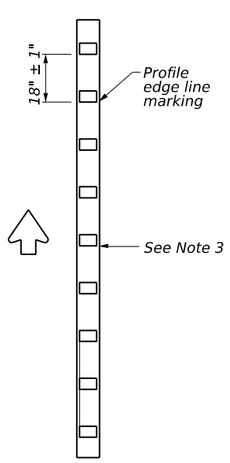
PLAN VIEW

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



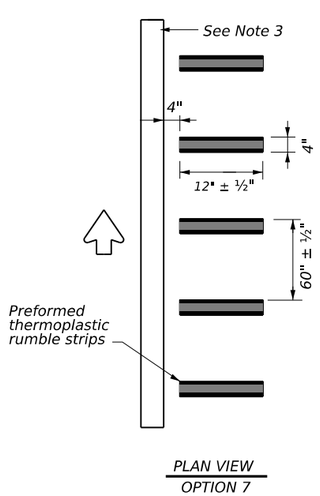
PLAN VIEW
OPTION 5

RAISED EDGE LINE (Rumble Strips)



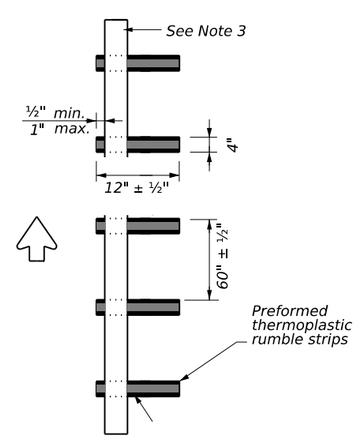
PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS (Rumble Strips)



PLAN VIEW
OPTION 7

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



PLAN VIEW
OPTION 8

PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 6 or 8	Option 1, 2, 3 5, 6 or 7	Option 2, 4, 5 6 or 7

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edgeline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble strip.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

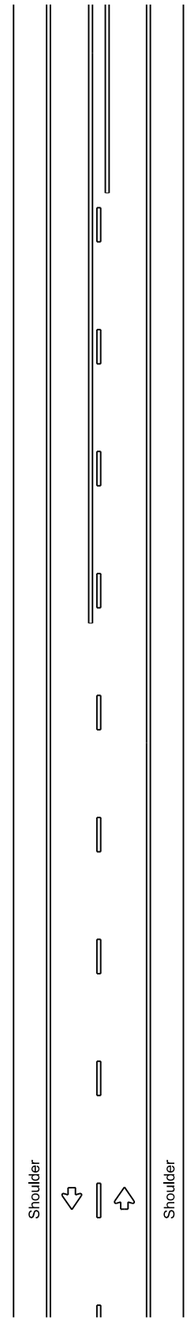
Texas Department of Transportation

Traffic Safety Division Standard

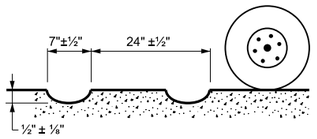
EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(2)-23

FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
10-13 1-23	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		76

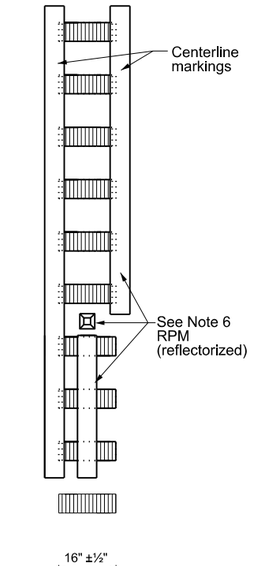
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

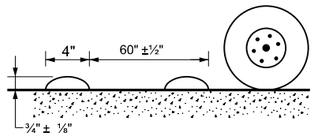


PROFILE VIEW

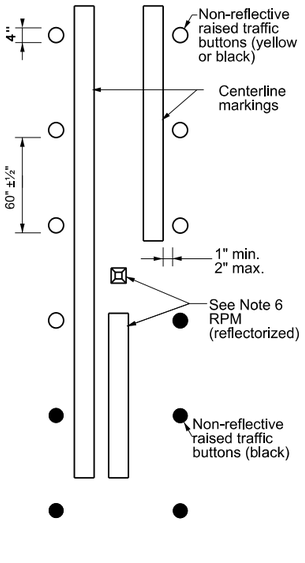


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

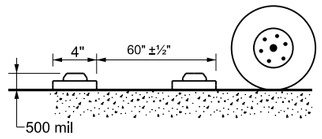


PROFILE VIEW

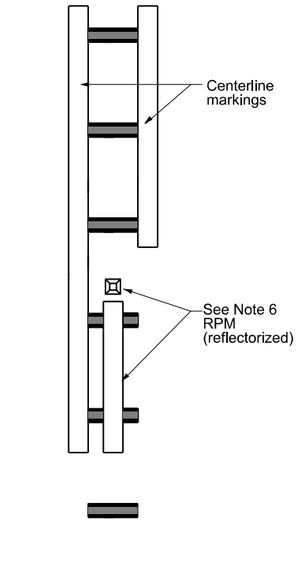


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

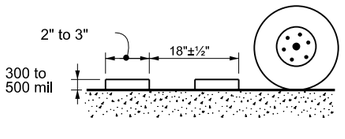


PROFILE VIEW

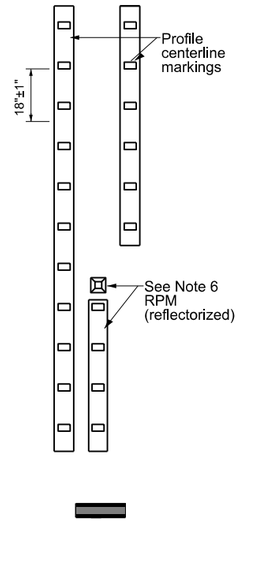


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC RUMBLE STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edge line rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections or driveways with high usage of large trucks.
6. Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
12. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

13. See standard sheet RS(2).

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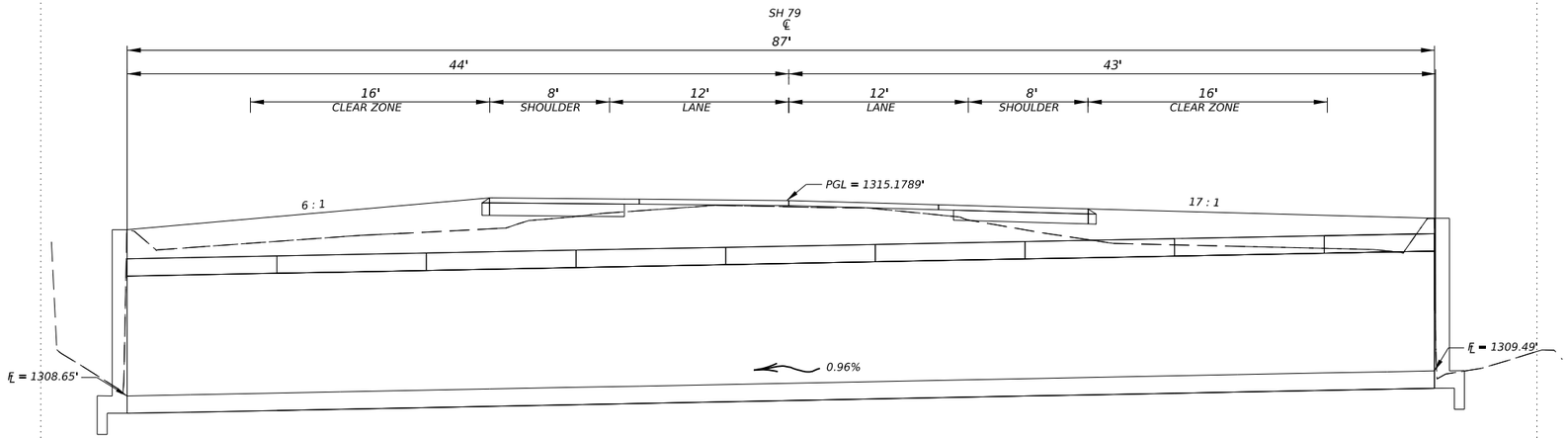
Texas Department of Transportation

Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS RS(4)-23

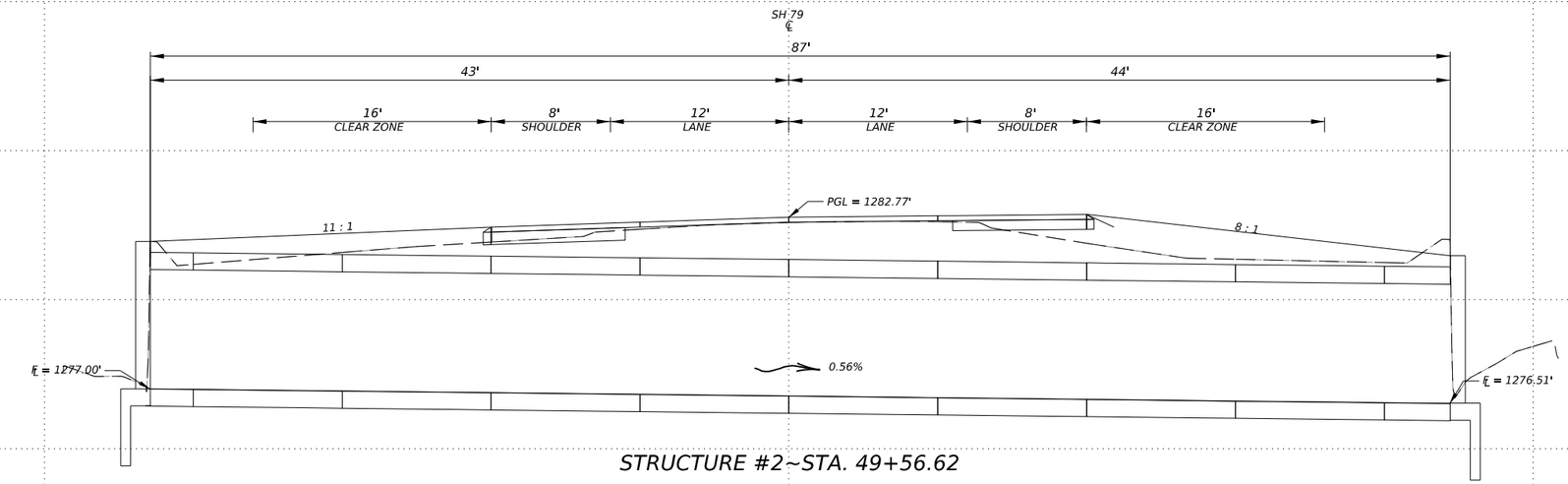
FILE: rs(4)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
10-13	DIST	COUNTY		SHEET NO.
1-23	WFS	Throckmorton		77



STRUCTURE #1~STA. 25+92.79

EXISTING 1 - 4' X 4' PW (4:1)

NO WORK PROPOSED



STRUCTURE #2~STA. 49+56.62

EXISTING 3 - 4' X 4' PW (4:1)

ITEM	DESC	QTY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY

0 20 40
VERTICAL SCALE IN FEET

0 10 20
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER
Bryson Lawrence, P.E.

10/31/2023
Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		78

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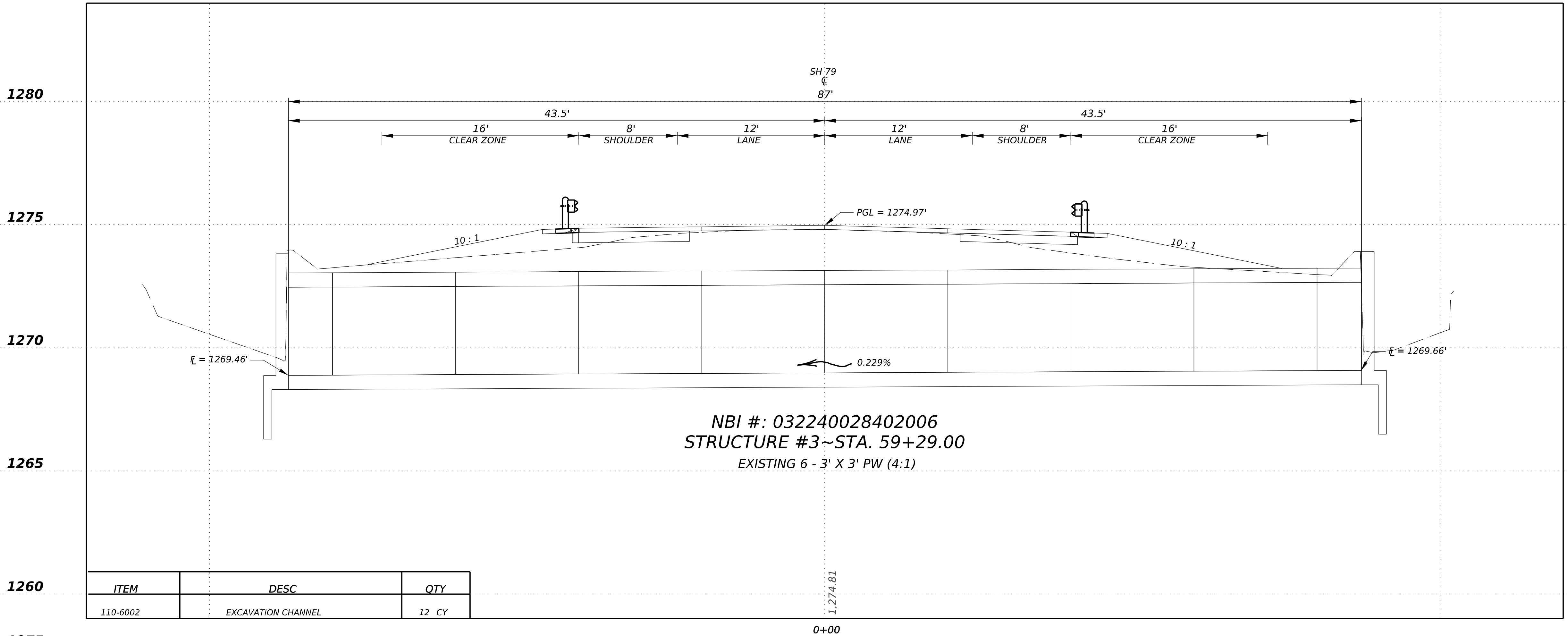
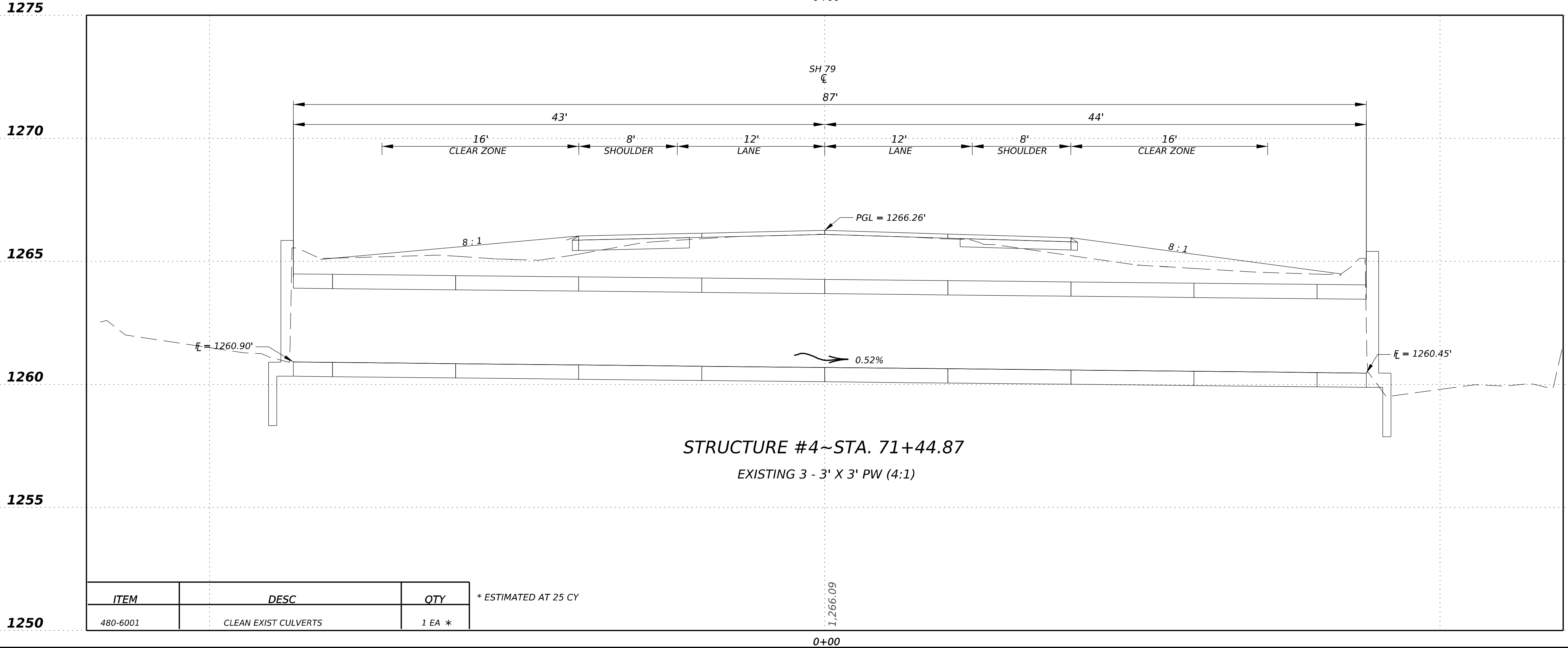


NBI #: 032240028402006
STRUCTURE #3~STA. 59+29.00
EXISTING 6 - 3' X 3' PW (4:1)

ITEM	DESC	QTY
110-6002	EXCAVATION CHANNEL	12 CY



STRUCTURE #4~STA. 71+44.87
EXISTING 3 - 3' X 3' PW (4:1)

ITEM	DESC	QTY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY

0 20 40
VERTICAL SCALE IN FEET

0 10 20
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		79

DATE: 10/30/2023 04:42:04 PM
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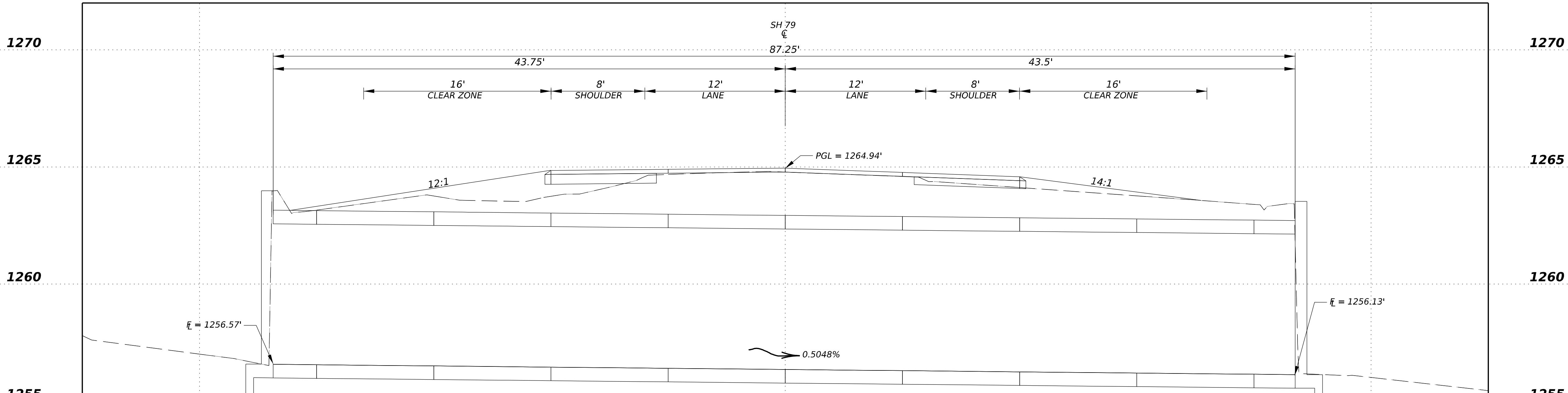
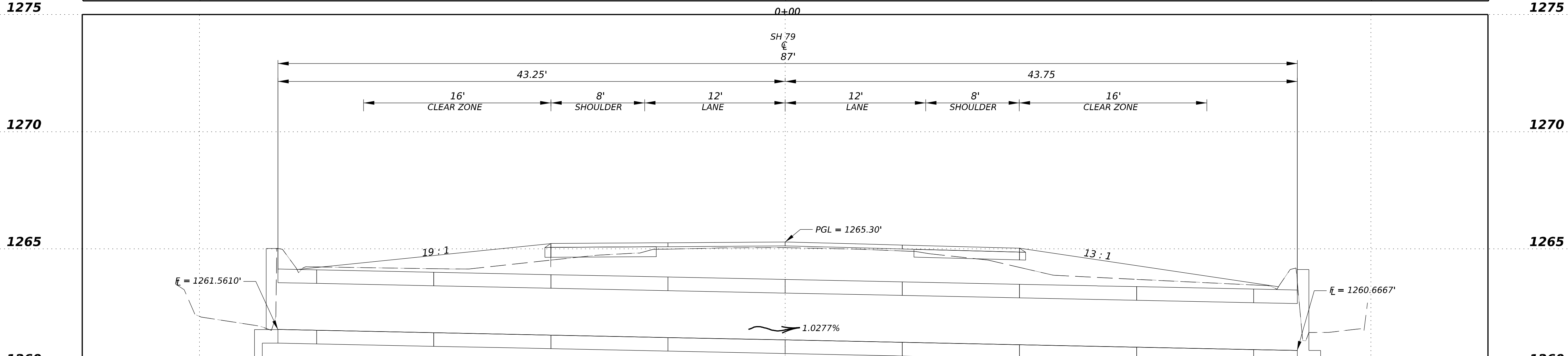


STRUCTURE #5~STA. 88+04.70

EXISTING 3 - 6' X 6' PW (4:1)

NO WORK PROPOSED

0+00



STRUCTURE #6~STA. 106+42.86

EXISTING 1 - 2' X 2' PW (4:1)

ITEM	DESC	QTY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY

0+00

VERTICAL SCALE IN FEET (0, 20, 40)

HORIZONTAL SCALE IN FEET (0, 10, 20)

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		80

DATE: 10/31/2023 04:32:45 PM
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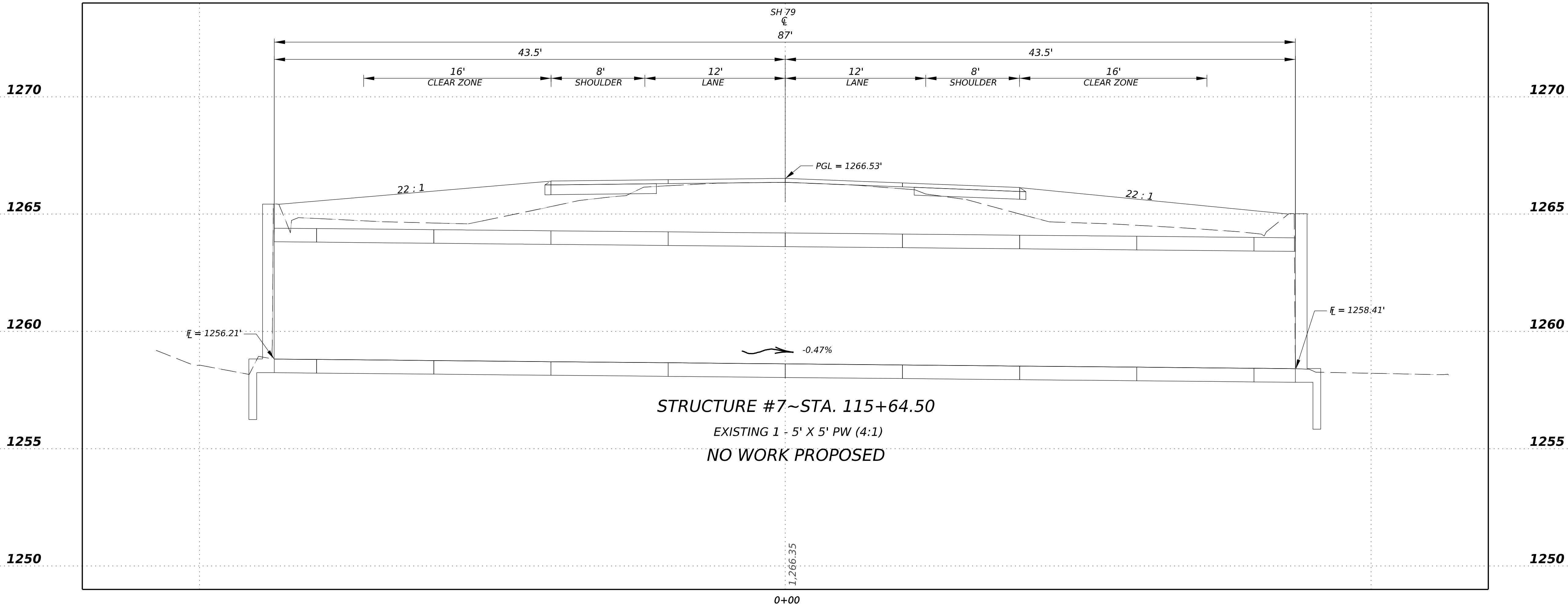
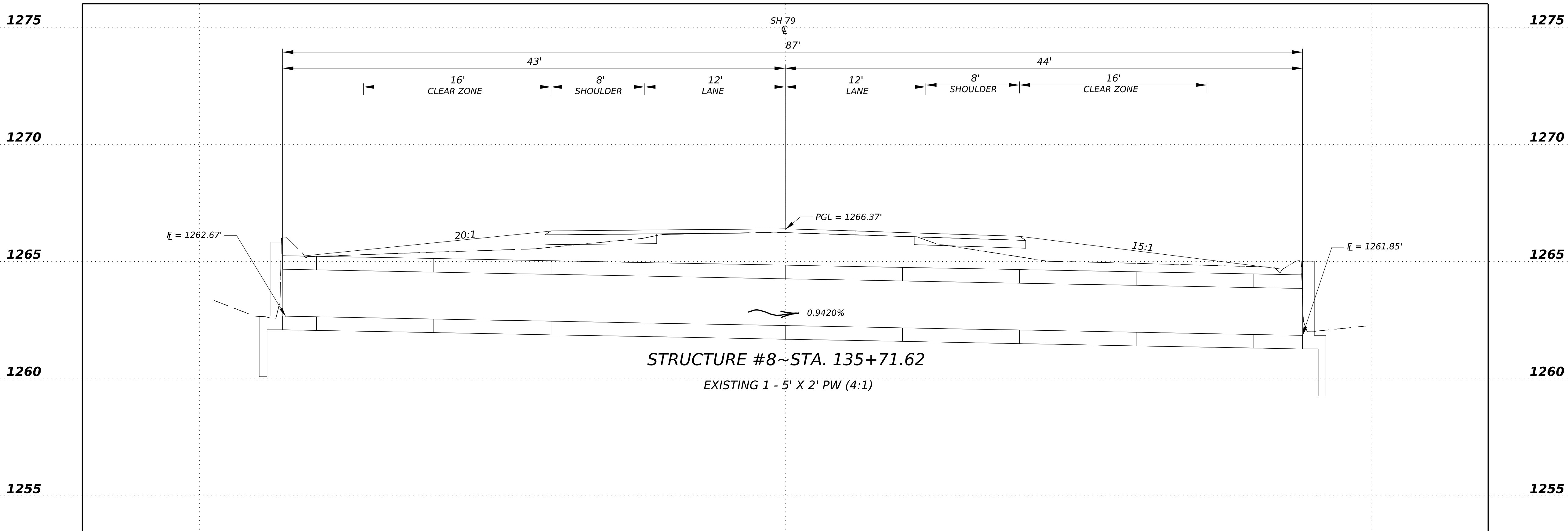
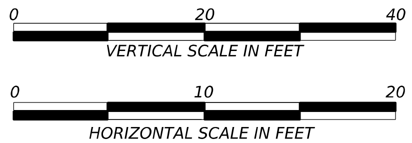
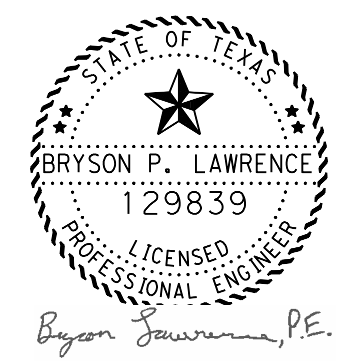




ITEM	DESC	QTY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY





10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		81

DATE: 10/30/2023 04:35:30 PM
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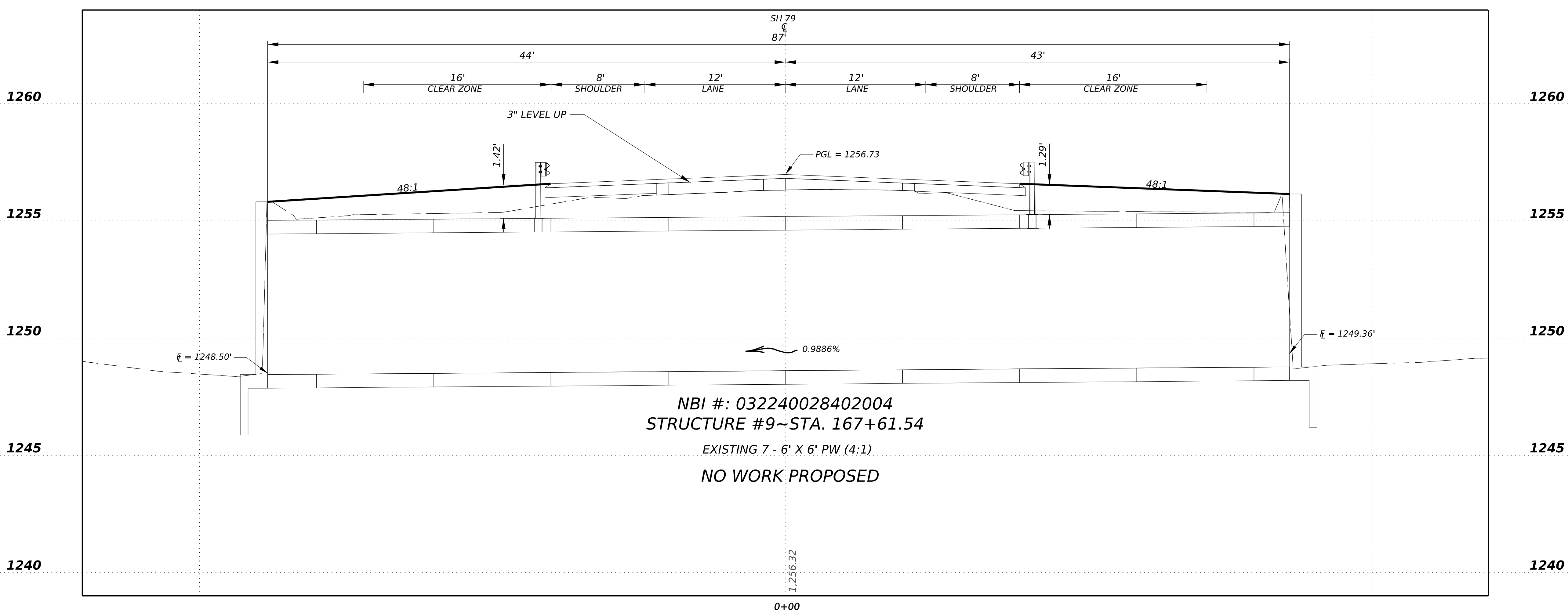
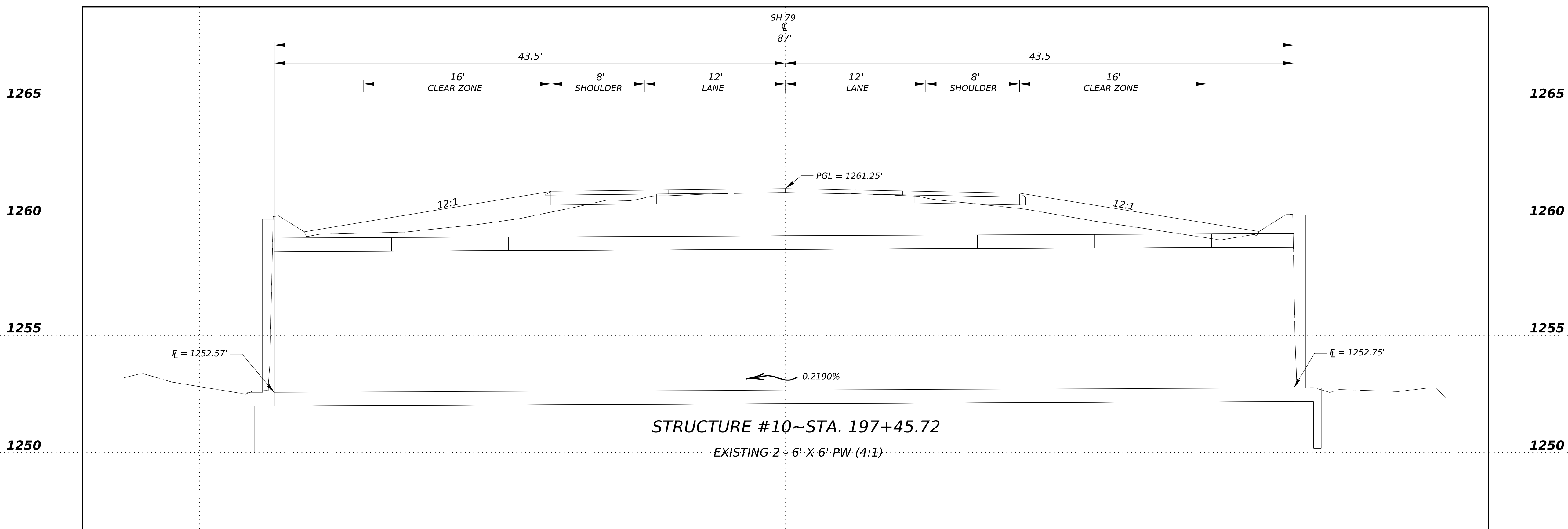
DW:
CK:
DN:



NBI #: 032240028402004
STRUCTURE #9~STA. 167+61.54
EXISTING 7 - 6' X 6' PW (4:1)
NO WORK PROPOSED



STRUCTURE #10~STA. 197+45.72
EXISTING 2 - 6' X 6' PW (4:1)

ITEM	DESC	QTY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY

VERTICAL SCALE IN FEET: 0 20 40
HORIZONTAL SCALE IN FEET: 0 10 20

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER
Bryson Lawrence, P.E.
10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		82

DATE: 10/31/2023 04:37 PM
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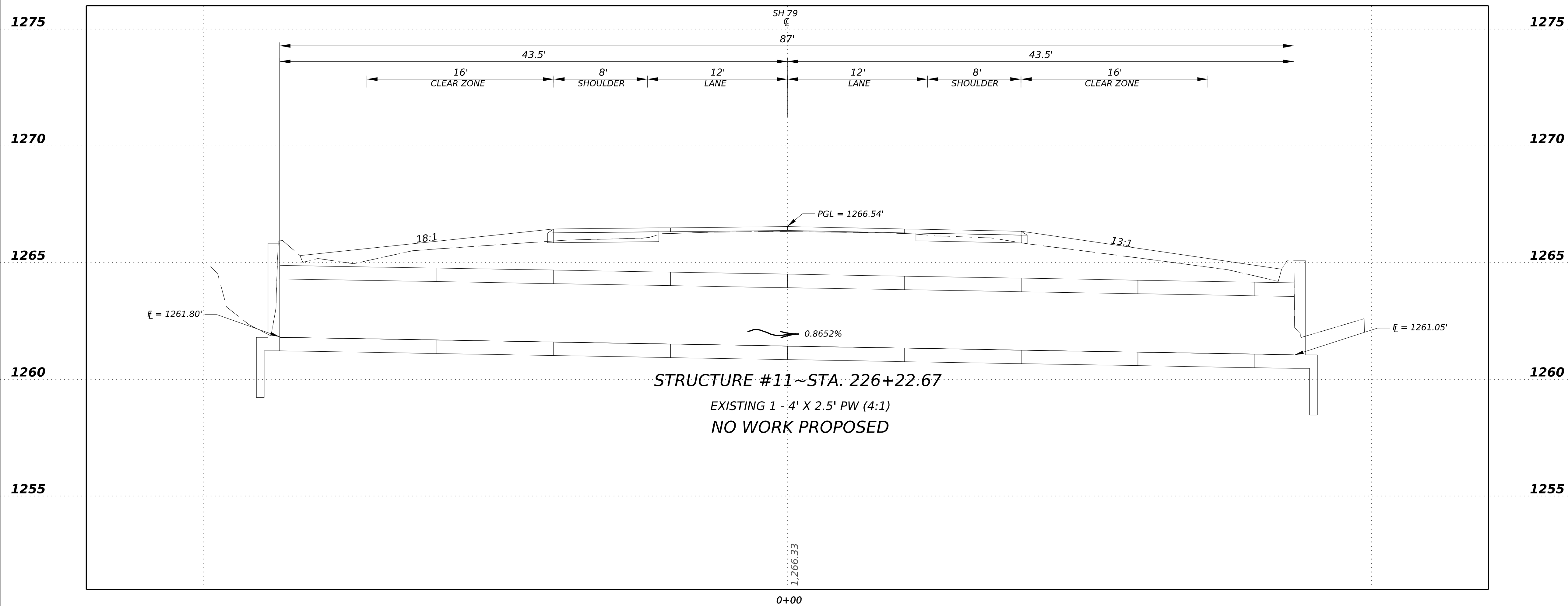

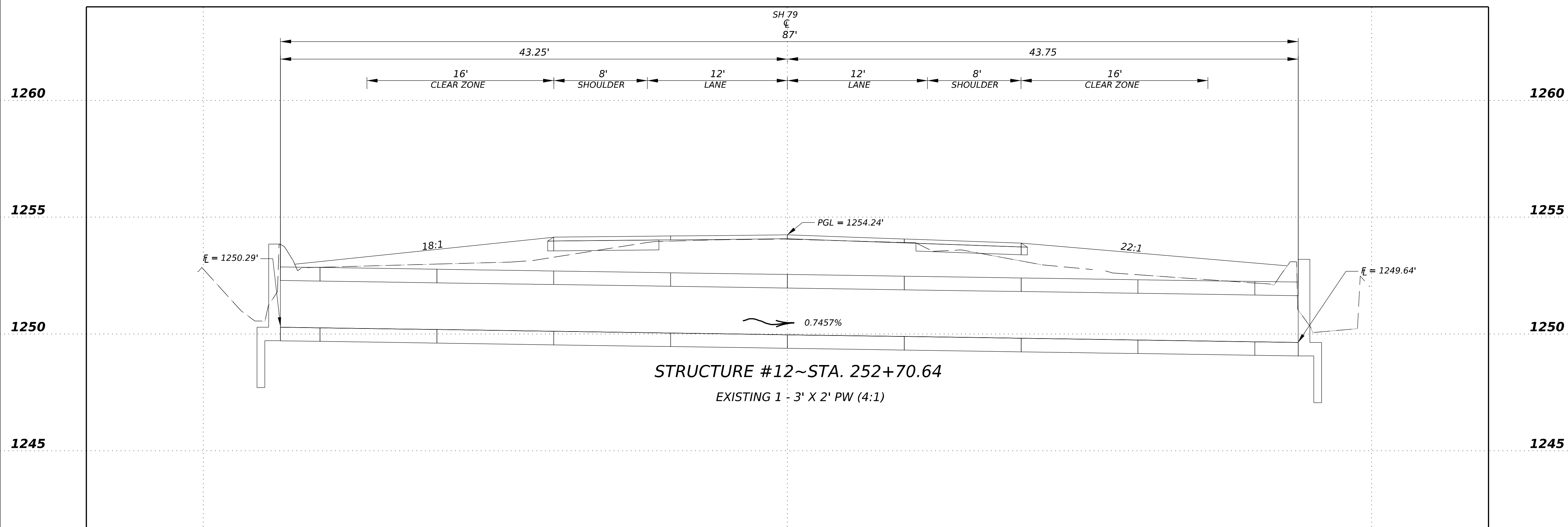

ITEM	DESC	QTY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY

VERTICAL SCALE IN FEET (0, 20, 40)

HORIZONTAL SCALE IN FEET (0, 10, 20)

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		83

DATE: 10/31/2023 04:37 PM
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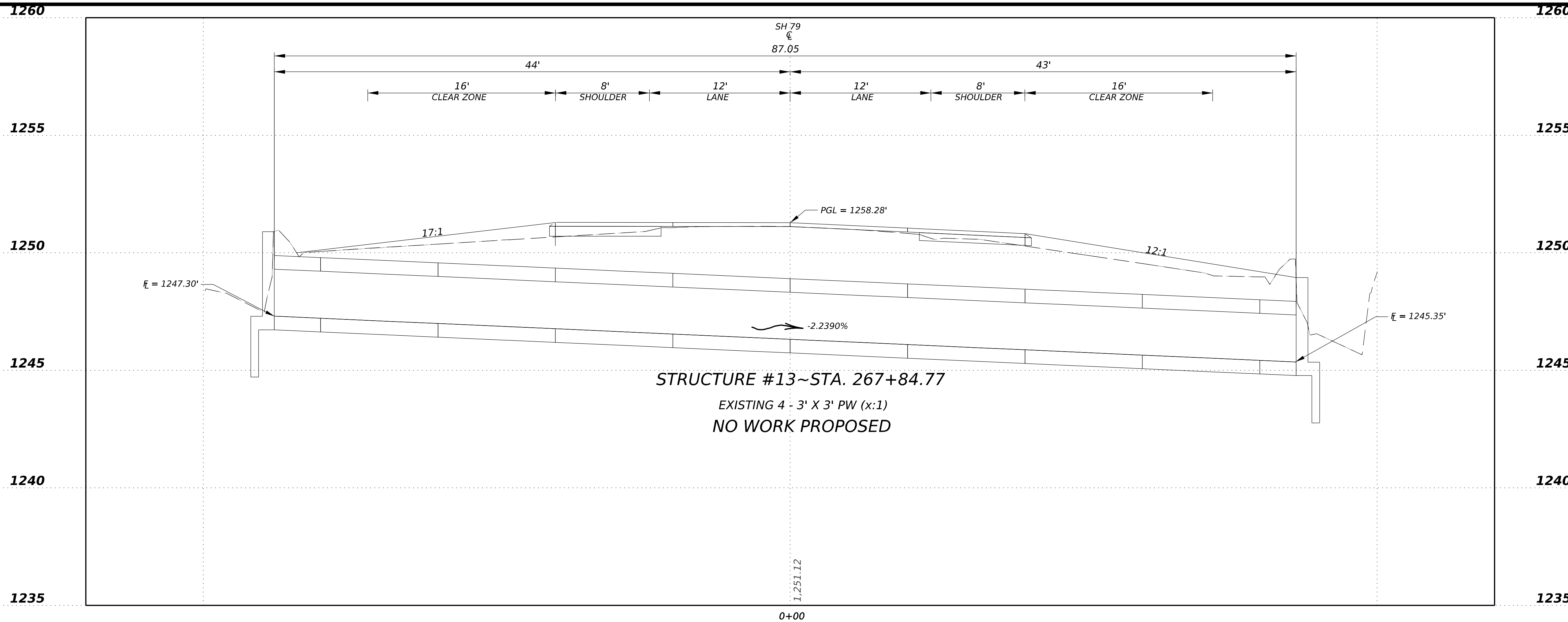
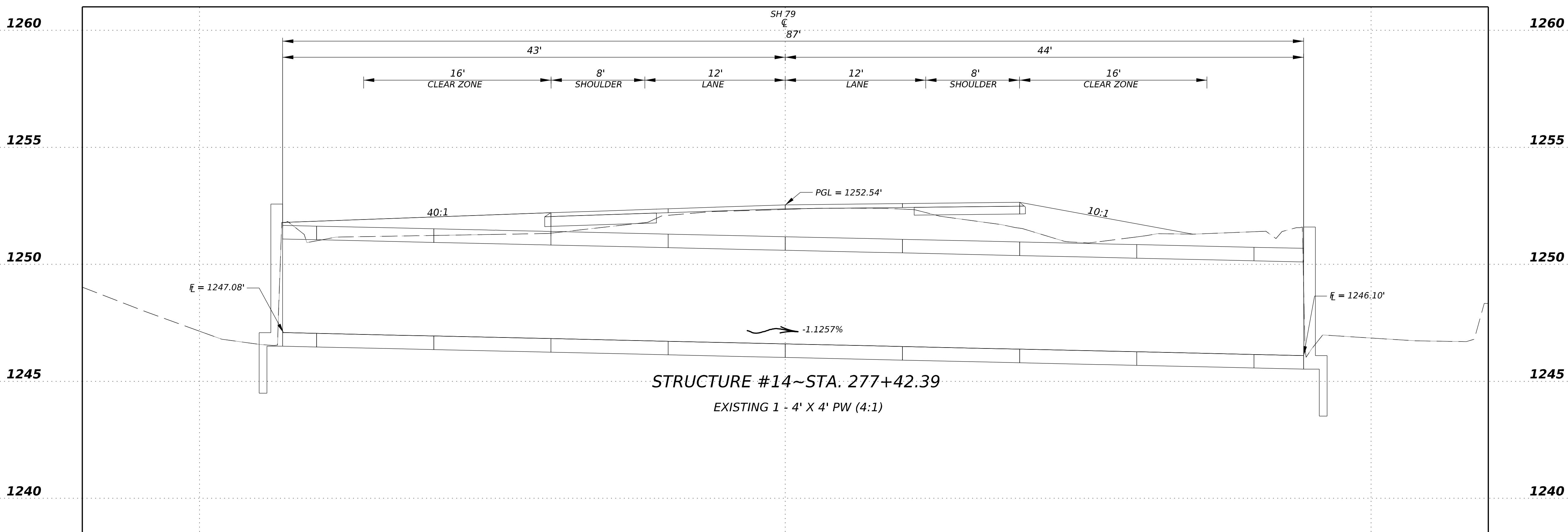


STRUCTURE #13~STA. 267+84.77

EXISTING 4 - 3' X 3' PW (x:1)

NO WORK PROPOSED



STRUCTURE #14~STA. 277+42.39

EXISTING 1 - 4' X 4' PW (4:1)

ITEM	DESC	QTY
110-6002	EXCAVATION CHANNEL	12 CY

0 20 40 VERTICAL SCALE IN FEET

0 10 20 HORIZONTAL SCALE IN FEET

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		84

DATE: 10/31/2023 03:53:35 PM
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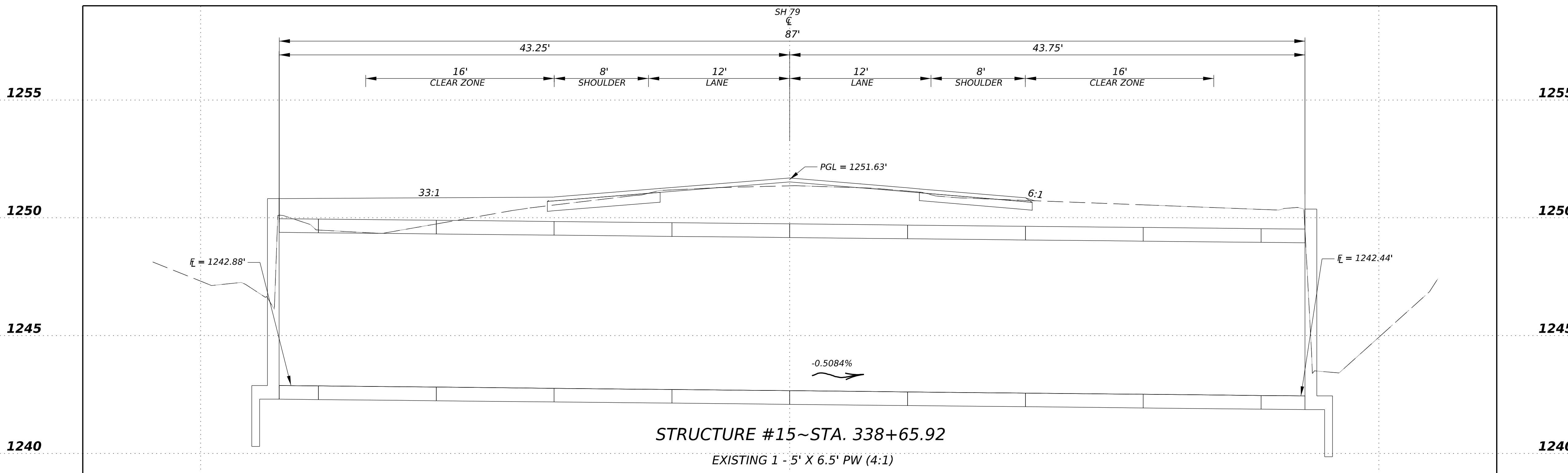
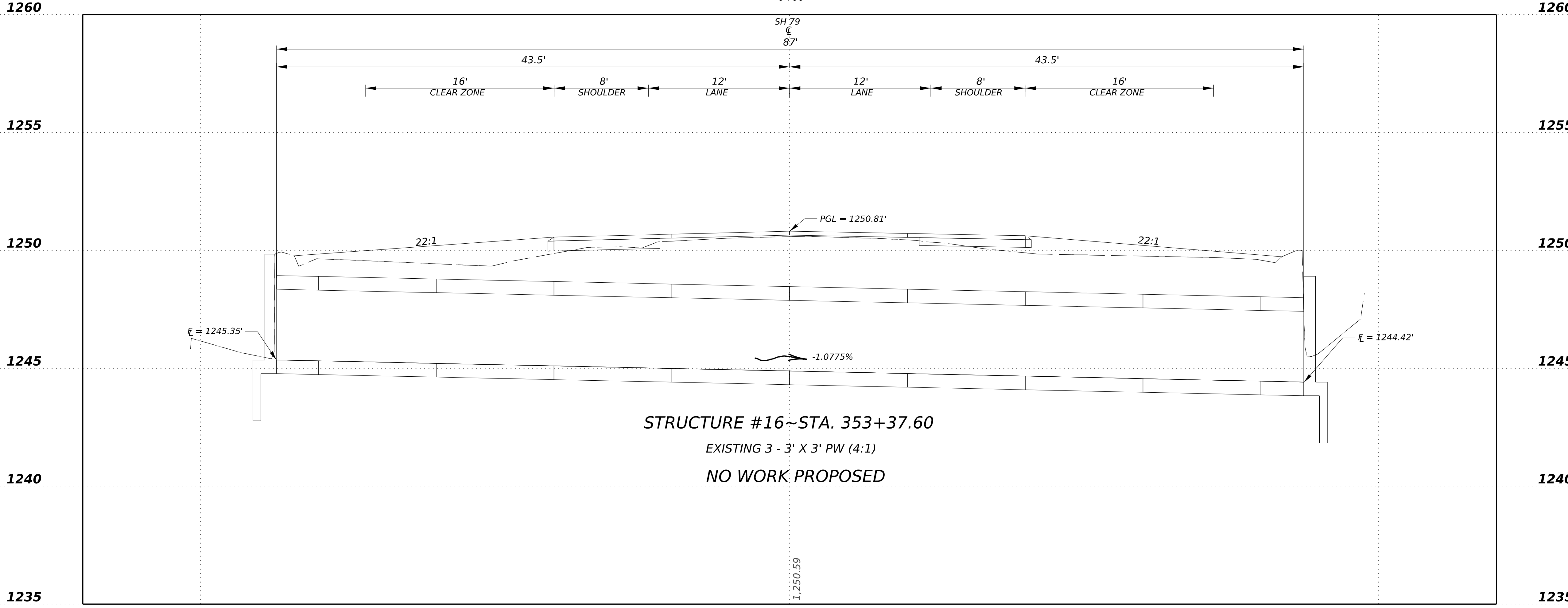


STRUCTURE #15~STA. 338+65.92

EXISTING 1 - 5' X 6.5' PW (4:1)

ITEM	DESC	QTY
110-6002	EXCAVATION CHANNEL	12 CY
480-6001	CLEAN EXIST CULVERTS	1 EA *

* ESTIMATED AT 25 CY



STRUCTURE #16~STA. 353+37.60

EXISTING 3 - 3' X 3' PW (4:1)

NO WORK PROPOSED

0 20 40
VERTICAL SCALE IN FEET

0 10 20
HORIZONTAL SCALE IN FEET

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/31/2023

Texas Department of Transportation

SH 79

CULVERT PROFILES

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		85

DATE: 10/31/2023 04:33:22 PM
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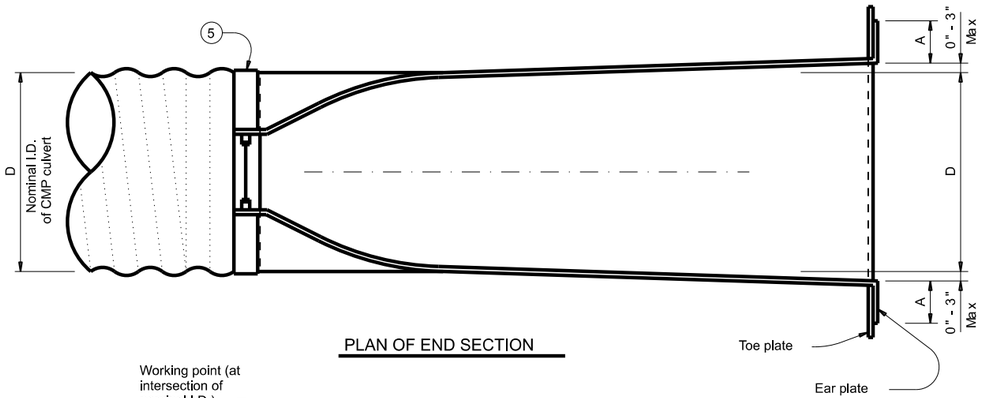
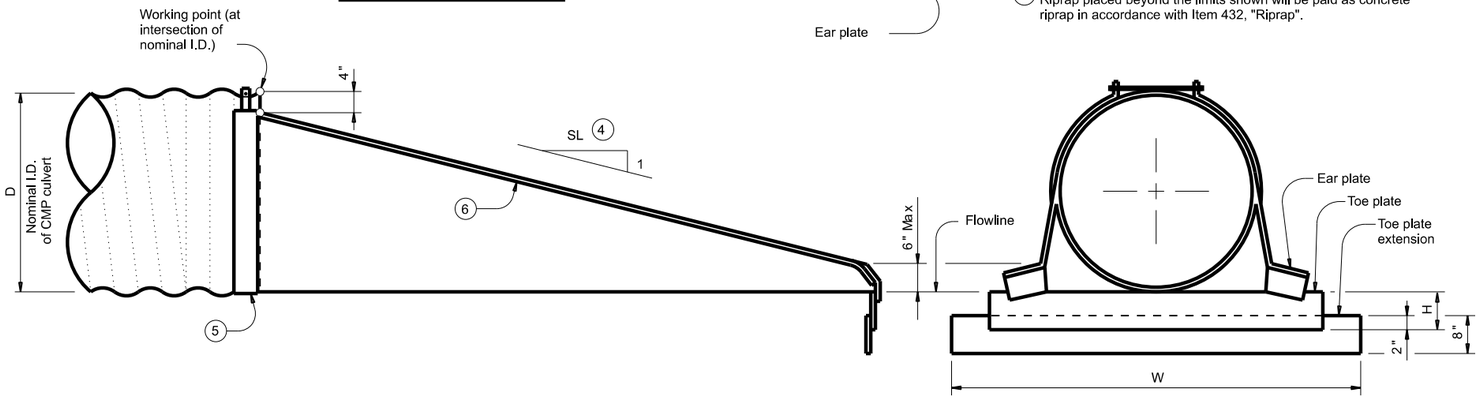


PLAN OF END SECTION



SIDE ELEVATION OF END SECTION

END ELEVATION OF END SECTION

1. Provide size of pipe runner as shown in the tables. Cross pipe is the same size as the pipe runner. Cross pipe stub out and bottom anchor pipe are the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Length table.
2. Values shown are minimum requirements.
3. Provide all 3-piece apron sections with 12 gage sides and 10 gage center panels.
4. Recommended values of slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.
5. Connection between corrugated metal pipe (CMP) culvert and galvanized prefabricated end section may be with strap and bolt as shown or other combinations of threaded rods and/or coupling bands.
6. Reinforce upper edge of prefabricated end section with minimum $\frac{3}{8}$" dia smooth or deformed bar (pre-galvanized).
7. Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap".

CROSS PIPE LENGTHS, PIPE RUNNER LENGTHS, AND REQUIRED PIPE SIZES (1)

D (Nominal) (Culvert I.D.)	Cross Pipe Length	3:1 Side Slope		4:1 Side Slope		6:1 Side Slope	
		Pipe Runner Length	Pipe Runner Size	Pipe Runner Length	Pipe Runner Size	Pipe Runner Length	Pipe Runner Size
≤ 24"	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30"	3' - 11"	5' - 0"	3.500 x 0.216	7' - 1"	3.500 x 0.216	11' - 3"	4.500 x 0.237
36"	4' - 5"	6' - 7"	3.500 x 0.216	9' - 2"	3.500 x 0.216	14' - 4"	4.500 x 0.237
42"	4' - 11"	8' - 2"	3.500 x 0.216	11' - 2"	4.500 x 0.237	17' - 4"	4.500 x 0.237
48"	5' - 5"	9' - 9"	3.500 x 0.216	13' - 3"	4.500 x 0.237	20' - 4"	5.563 x 0.258
54"	5' - 11"	11' - 3"	4.500 x 0.237	15' - 4"	4.500 x 0.237	23' - 5"	5.563 x 0.258
60"	6' - 5"	12' - 10"	4.500 x 0.237	17' - 4"	4.500 x 0.237	26' - 5"	5.563 x 0.258

PREFABRICATED END SECTION INFORMATION

D (Nominal) (Culvert I.D.)	Pipe Runner Required	H (2)	A (2)	W (2)	Gage (2)
≤ 24"	No	6"	9"	D + 24"	16
30"	Skew > 15°	9"	12"	D + 32"	14
36"	All skews	9"	12"	D + 32"	14
≥ 42	All skews	12"	16"	D + 40"	12/10 (3)

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTH (1)

HSS Size	STD Size	Max Pipe Runner Length
2.375 x 0.154	2"	N/A
3.500 x 0.216	3"	10' - 0"
4.500 x 0.237	4"	19' - 8"
5.563 x 0.258	5"	34' - 2"

MATERIAL NOTES:

Provide pipe runners, cross pipes, and anchor pipes conforming to ASTM A1085, A500 Gr B, A53 (Type E or S, Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except reinforcement, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specification.

Toe plate extensions are required only when shown elsewhere in the plans.

Concrete riprap is required only when pipe runners are required, unless otherwise shown in the plans. Provide concrete riprap in accordance with Item 432, "Riprap". Use Bottom Anchor Toewall Option B1 when an alternate end section with pre-attached pipe runners is supplied.

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

GENERAL NOTES:

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

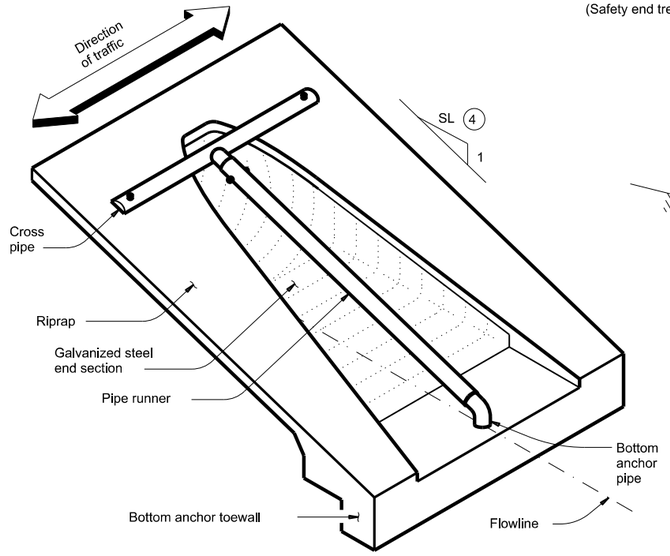
Alternate styles of end sections, including those with pre-attached pipe runners, may be supplied. Alternate styles must meet all of the following: design values shown in tables for pipe runner size; H, A, W, and gage for end section; and material requirements noted.

All pipe runners, calculations, and dimensions are based on the End Section shown on this standard. Alternate styles of end sections will require that appropriate adjustments be made to the values presented on this standard.

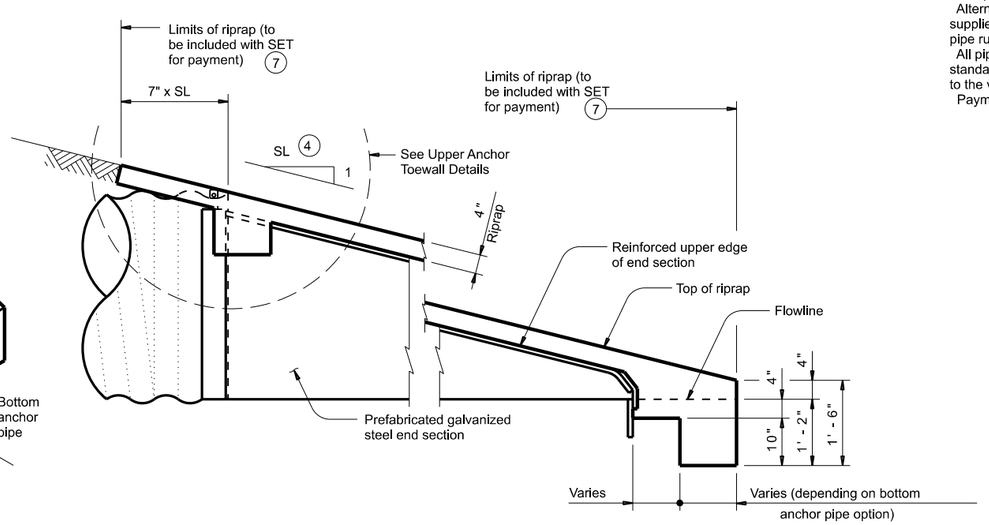
Payment for riprap and toewall is included in price bid for each safety end treatment.

PREFABRICATED GALVANIZED STEEL END SECTION DETAILS

(Safety end treatment and riprap not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Pipe runners are not shown for clarity.)

SHEET 1 OF 2

Texas Department of Transportation

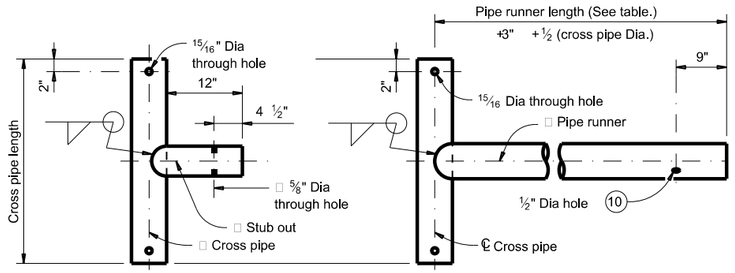
Bridge Division Standard

PREFABRICATED GALVANIZED STEEL END SECTION SAFETY END TREATMENT

FOR 12" TO 60" DIA CMP CULVERTS
TYPE II ~ CROSS DRAINAGE

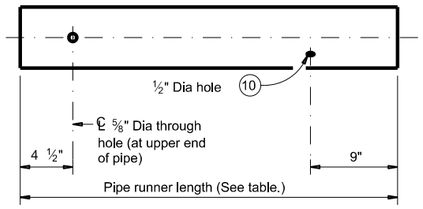
GS-ES-CD

FILE: gsescdse-20.dgn	DN: TxDOT	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		86

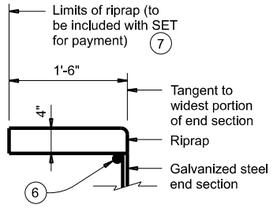


OPTION A1 OPTION A2

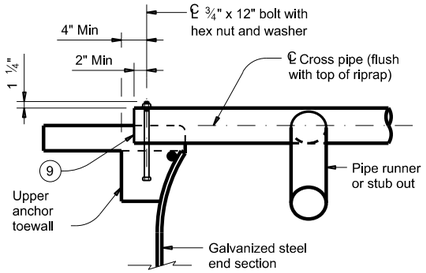
CROSS PIPE AND CONNECTIONS DETAILS



PIPE RUNNER DETAILS

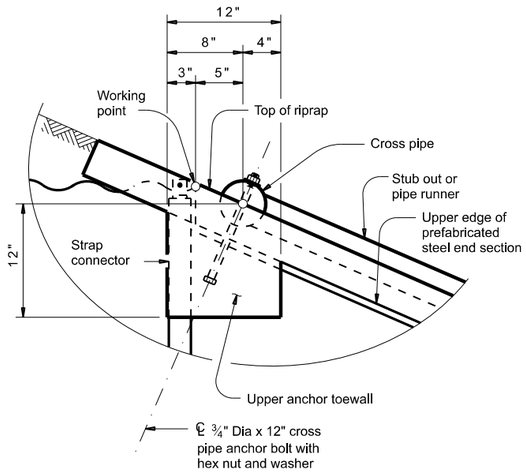


SHOWING TYPICAL RIPRAP



SHOWING CROSS PIPE AND UPPER ANCHOR TOEWALL

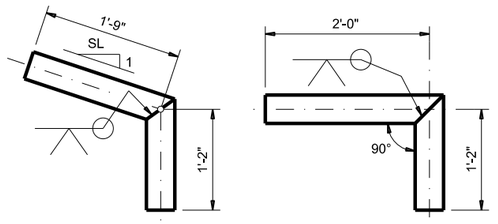
SECTION A-A



UPPER ANCHOR TOEWALL DETAILS

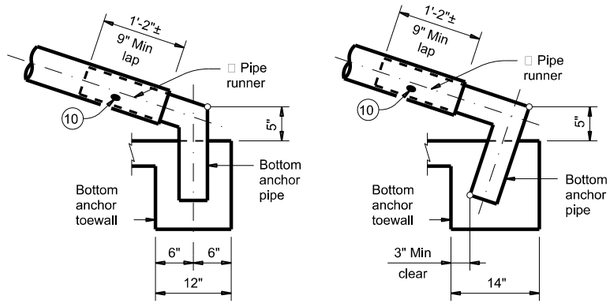
ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (12)

Nominal Culvert I.D.	3:1 Side Slope	4:1 Side Slope	6:1 Side Slope
12"	0.5	0.6	0.9
15"	0.6	0.7	1.0
18"	0.6	0.8	1.1
21"	0.7	0.8	1.2
24"	0.7	0.9	1.3
27"	0.8	1.0	1.4
30"	0.9	1.1	1.5
33"	0.9	1.1	1.6
36"	1.0	1.2	1.7
42"	1.1	1.4	1.9
48"	1.2	1.5	2.1
54"	1.3	1.7	2.3
60"	1.5	1.8	2.6



OPTION B1 OPTION B2

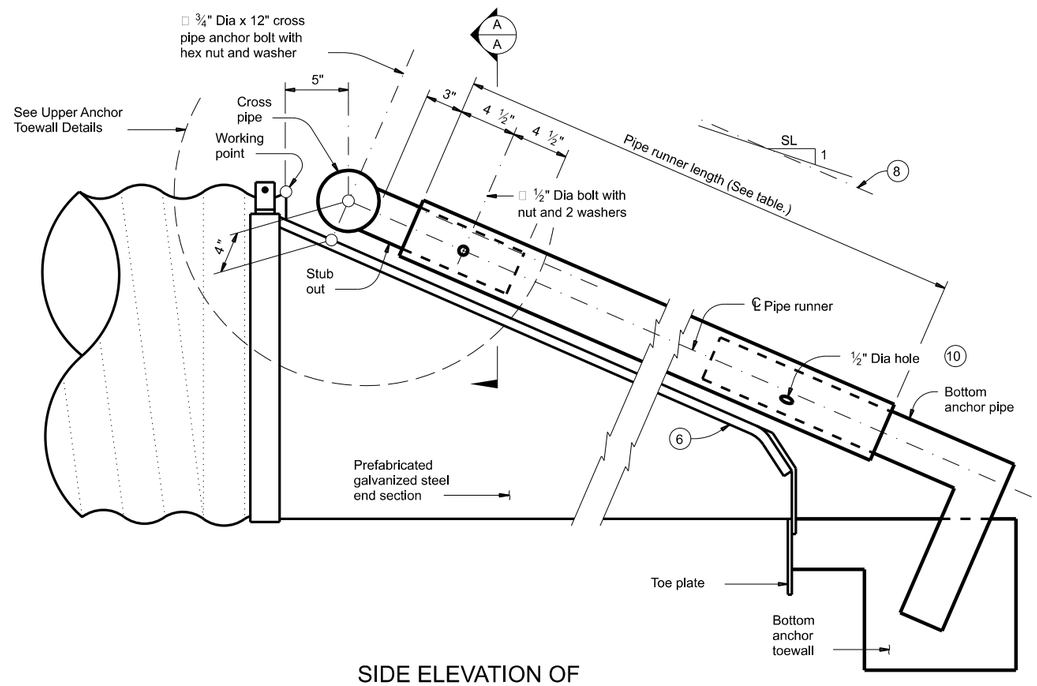
BOTTOM ANCHOR PIPE DETAILS (11)



OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(End section and riprap are not shown for clarity.)



SIDE ELEVATION OF PIPE RUNNER INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Pipe Option B2. Riprap not shown for clarity.)

(6) Reinforce upper edge of prefabricated end section with minimum ⅜" dia smooth or deformed bar (pre-galvanized).

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

(8) Note that actual slope of pipe runner may vary slightly from side slope of riprap and upper edge of prefabricated end section.

(9) Take care of ensure that riprap concrete does not flow into the crosspipe so as to permit disassembly of the bolted connection to allow cleanout access.

(10) After installation, inspect the ⅜" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(11) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

(12) Quantities shown are for one end of one corrugated metal pipe (CMP) culvert . For multiple pipe culverts quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

DATE: 10/27/2023 2:10:24 PM
FILE: I:\WFSDESGN\Warren_MYSH79\Drainage DGN\Added\GS-ES-CD.dgn

SHEET 2 OF 2

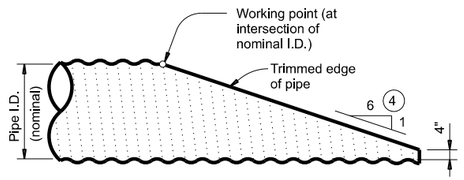
Texas Department of Transportation — Bridge Division Standard

PREFABRICATED GALVANIZED STEEL END SECTION SAFETY END TREATMENT

FOR 12" TO 60" DIA CMP CULVERTS
TYPE II ~ CROSS DRAINAGE

GS-ES-CD

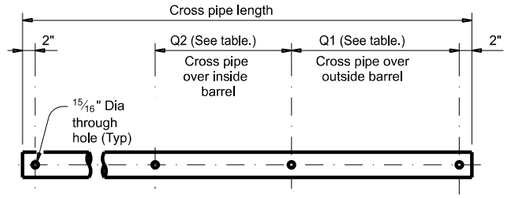
FILE: gsescdse-20.dgn	DN: TxDOT	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		87



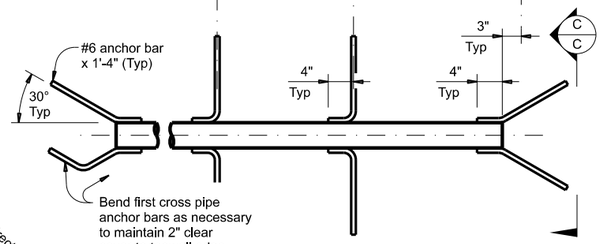
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

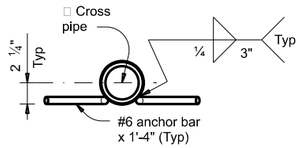
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

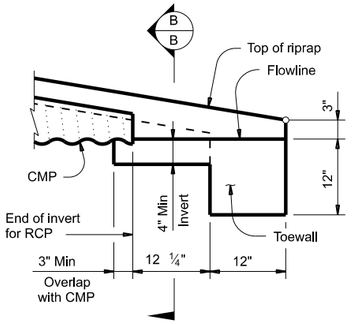


PIPE WITH ANCHOR BARS



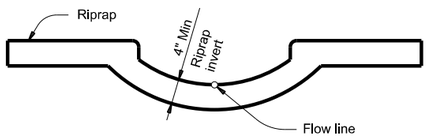
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

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

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

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

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

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

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

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

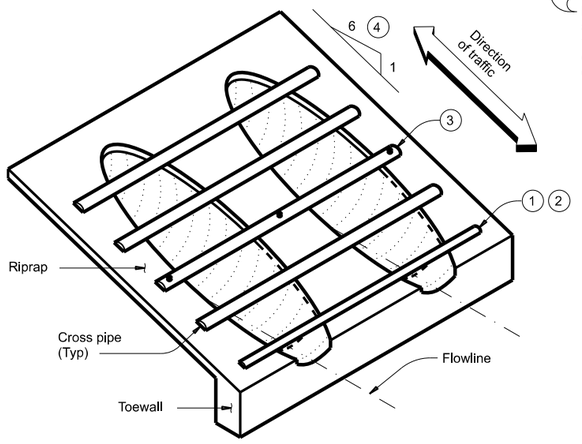
GENERAL NOTES:

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

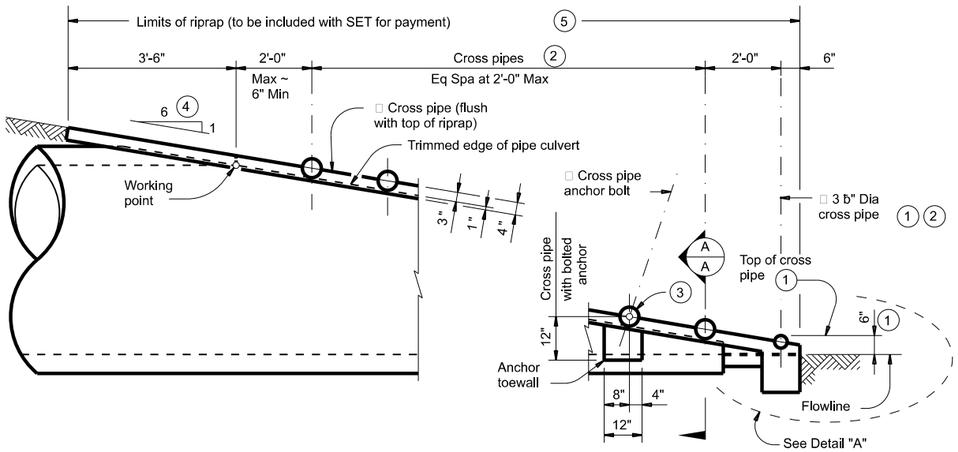
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

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

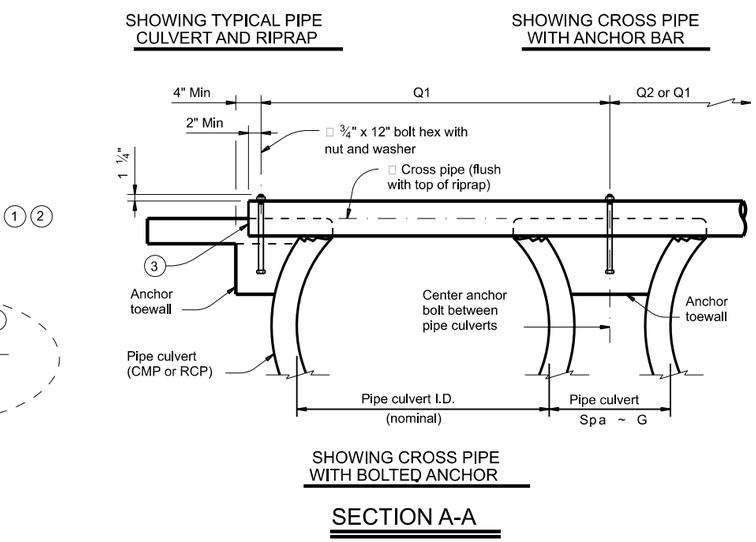


ISOMETRIC VIEW OF TYPICAL INSTALLATION



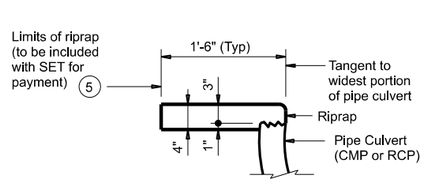
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)

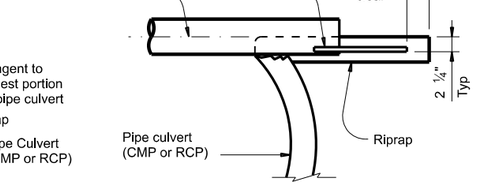


SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH ANCHOR BAR

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

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

SETP-PD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	WFS	Throckmorton		88

DATE: 10/27/2023 2:10:25 PM
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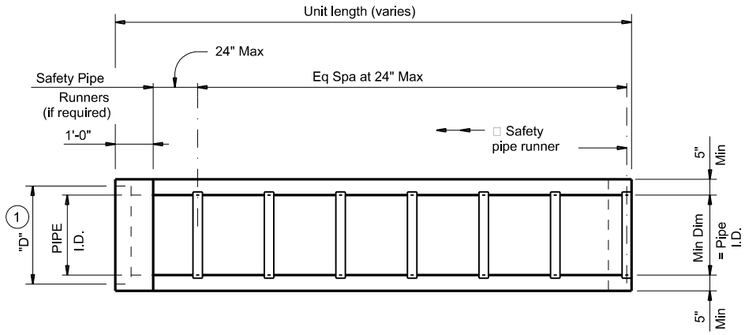
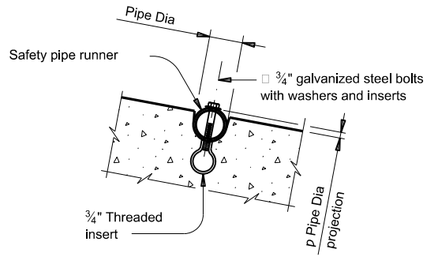


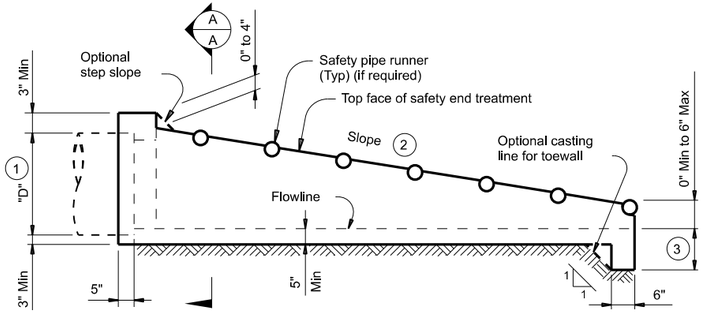
PLAN

(Showing bell end connection.)



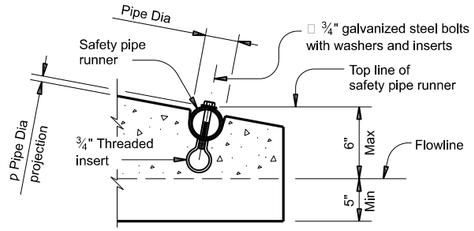
INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

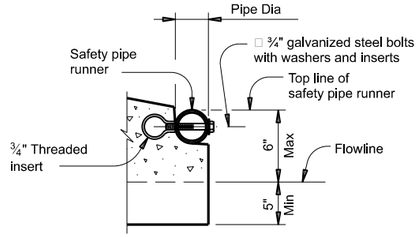


LONGITUDINAL ELEVATION

(Showing bell end connection.)



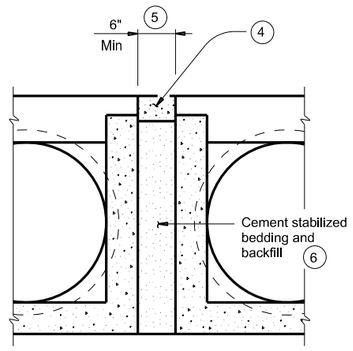
OPTION A



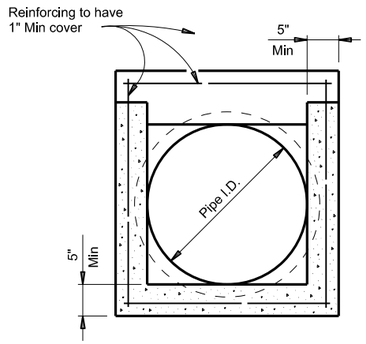
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

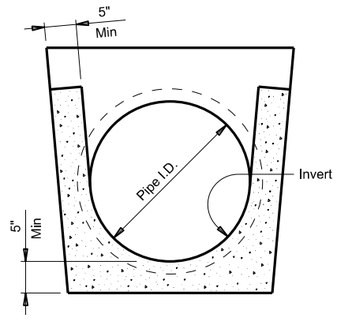
(If required)



MULTIPLE PIPE INSTALLATION

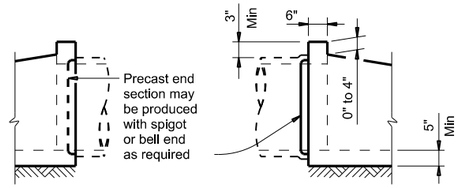


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (7)	"D" (1)	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' - 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	1.30"	20.50"	6:1	6' - 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	1.60"	24.00"	6:1	8' - 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' - 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	2.65"	38.50"	6:1	14' - 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' - 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	2.7"	52.50"	6:1	21' - 2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

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

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(7) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

PSET-SP

FILE: psetspss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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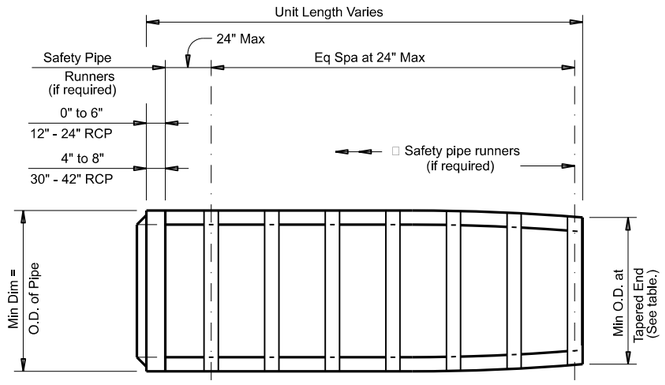
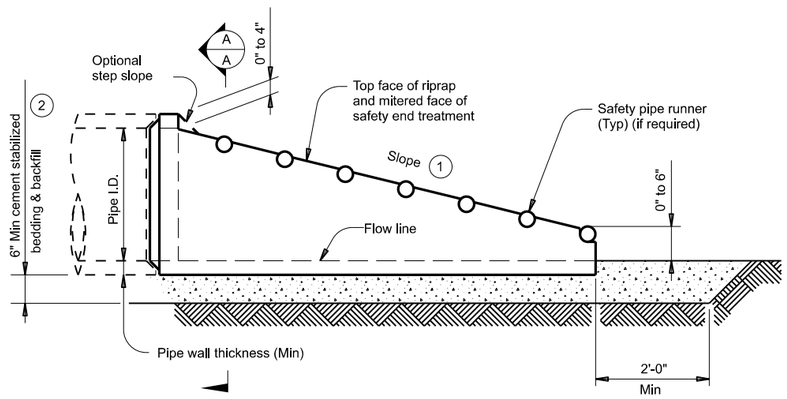
	WFS	Throckmorton		89



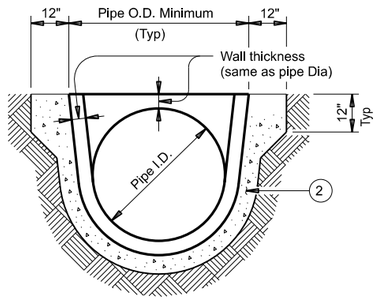
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

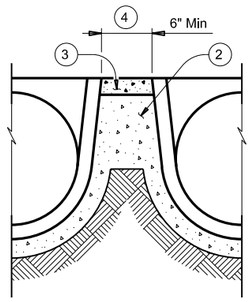


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)

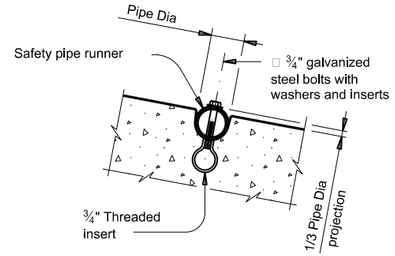


SECTION A-A



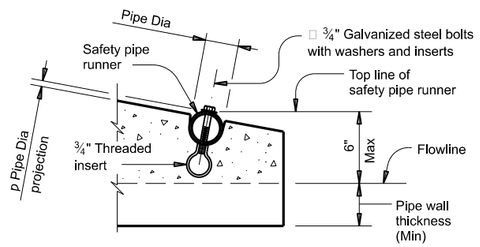
MULTIPLE PIPE INSTALLATION

1. Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
2. Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
5. Safety pipe runners are required for multiple pipe culverts with more than two pipes.

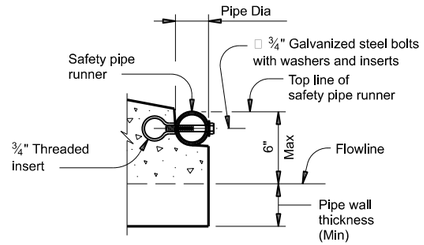


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	(5)	3" STD	3.500"	3.068"
15"	2 ¼"	19 ½"	19"	0.07 Circ.	6:1	5' - 8"	No	(5)	3" STD	3.500"	3.068"
18"	2 ½"	23"	21 ½"	0.07 Circ.	6:1	7' - 3"	No	(5)	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	(5)	3" STD	3.500"	3.068"
30"	3 ½"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	51"	41 ½"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

MATERIAL NOTES:

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

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

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

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Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

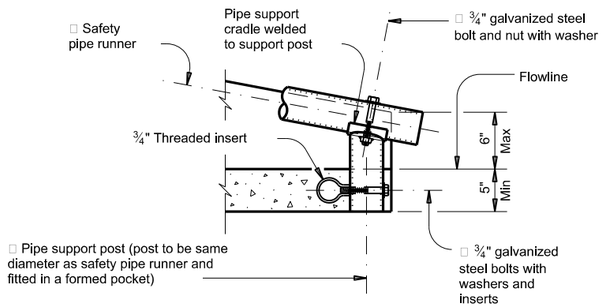
TYPE II ~ PARALLEL DRAINAGE

PSET-RP

FILE: psetrpss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		90

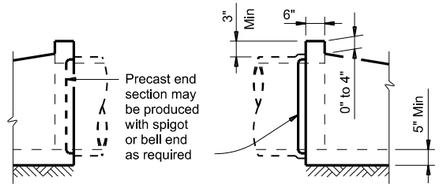
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe		Multiple Pipes	
						Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' - 11"	≤ 45°	No	≤ 45°	No
				4:1	3' - 6"				
				6:1	4' - 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' - 6"	≤ 45°	No	≤ 45°	No
				4:1	5' - 8"				
				6:1	8' - 0"				
24"	3"	1.95"	31.00"	3:1	6' - 2"	≤ 45°	No	= 30°	No
				4:1	7' - 10"			> 30°	Yes
				6:1	11' - 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"	> 15°	Yes	> 15°	Yes
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"	> 0°	Yes		
				6:1	17' - 11"				
42"	4 ½"	2.7"	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				



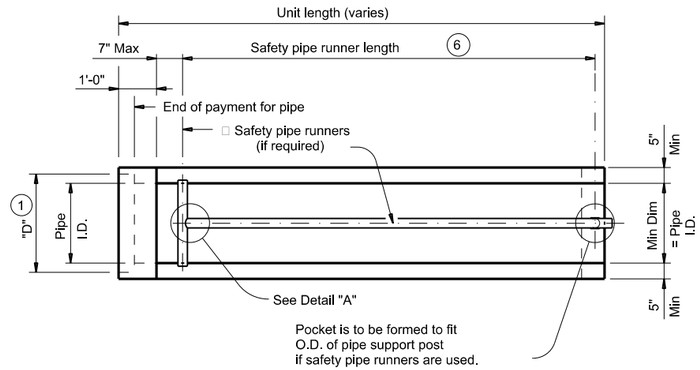
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



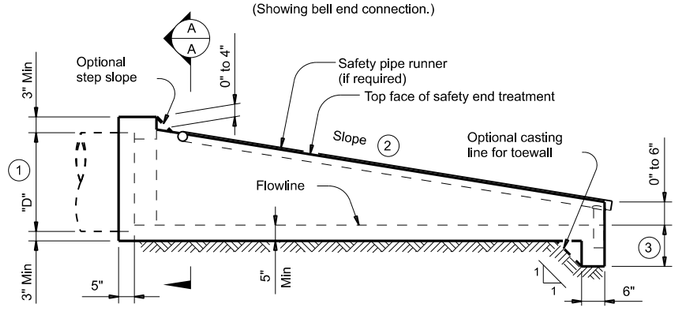
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



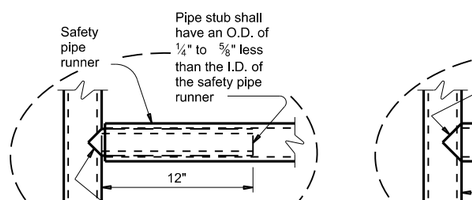
PLAN

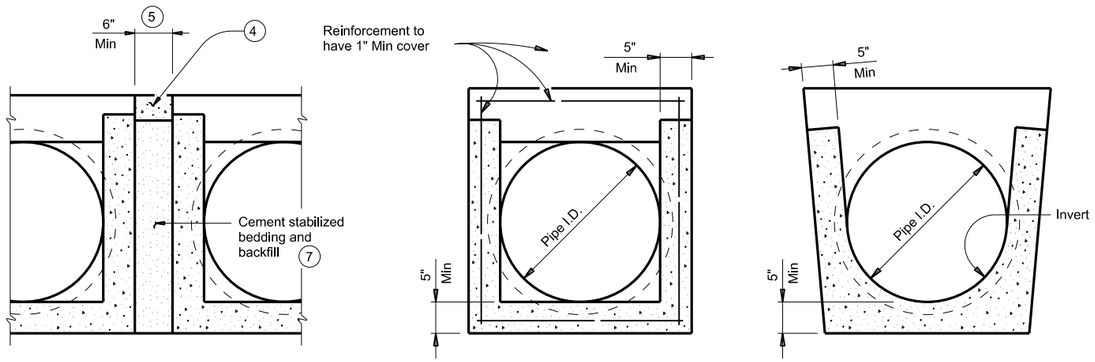
(Showing bell end connection.)



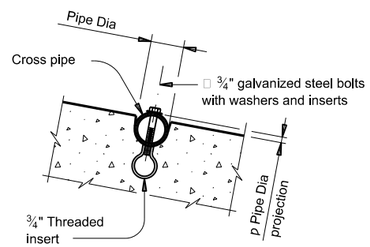
LONGITUDINAL ELEVATION

(Showing bell end connection.)





SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

FILE: psetscss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		91

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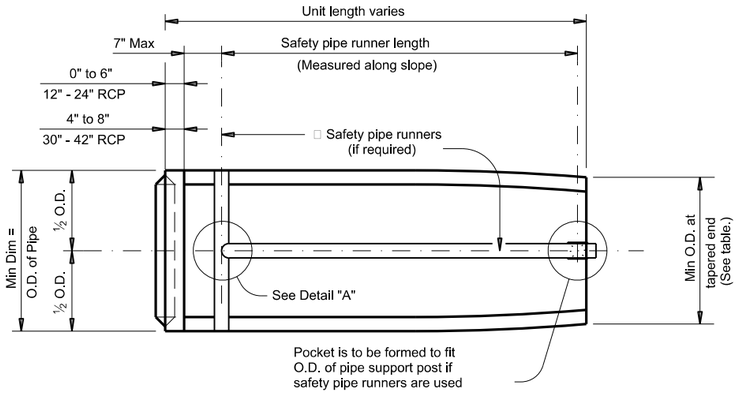
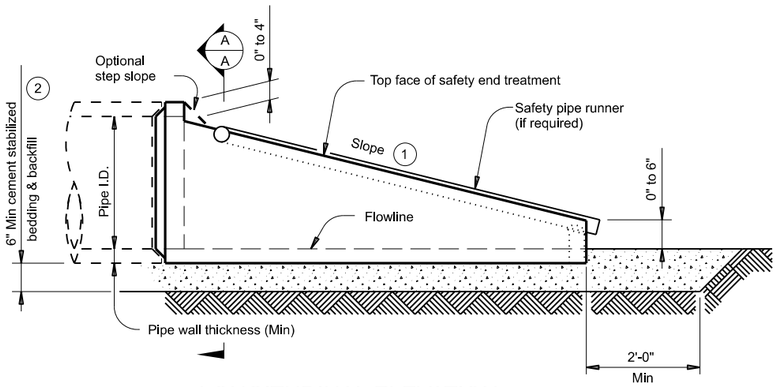


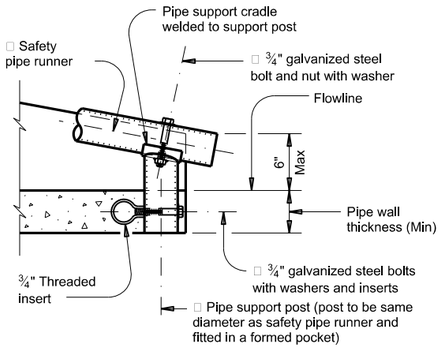
PLAN VIEW

(Showing spigot end connection.)



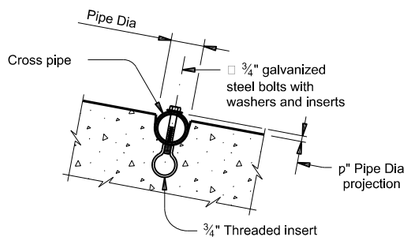
LONGITUDINAL ELEVATION

(Showing spigot end connection.)



END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES

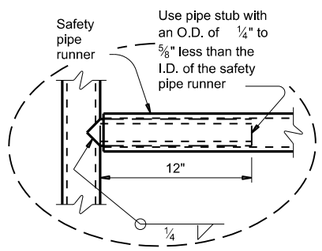
Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

(1) Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.

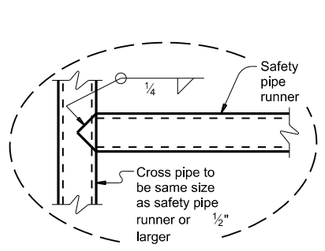
(2) Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(3) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap be considered subsidiary to the Item "Safety End Treatment".

(4) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

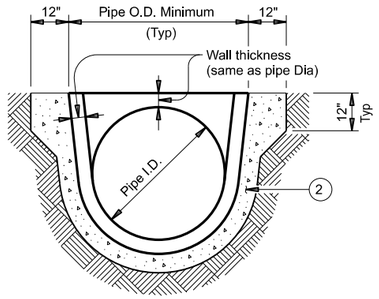


OPTION A

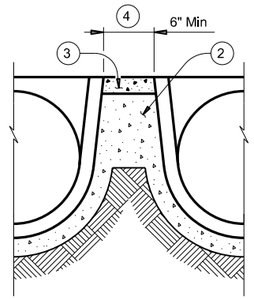


OPTION B

DETAIL A



SECTION A-A



MULTIPLE PIPE INSTALLATION

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. / ft. of pipe)	Slope	Minimum Length of Unit	Single Pipe		Multiple Pipe	
							Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	16"	16"	0.07 Circ.	3:1	2' - 0"	≤ 45°	No	≤ 45°	No
					4:1	2' - 8"				
					6:1	4' - 0"				
15"	2 ¼"	19 ½"	19"	0.07 Circ.	3:1	2' - 10"	≤ 45°	No	≤ 45°	No
					4:1	3' - 9"				
					6:1	5' - 8"				
18"	2 ½"	23"	21 ½"	0.07 Circ.	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
					4:1	4' - 10"				
					6:1	7' - 3"				
24"	3"	30"	27"	0.07 Circ.	3:1	5' - 3"	≤ 45°	No	≤ 30°	No
					4:1	7' - 0"			> 30°	Yes
					6:1	10' - 6"				
30"	3 ½"	37"	31"	0.18 Circ.	3:1	6' - 3"	≤ 15°	No	≤ 15°	No
					4:1	8' - 2"	> 15°	Yes	> 15°	Yes
					6:1	12' - 1"				
36"	4"	44"	36"	0.19 Ellip.	3:1	7' - 10"	= 0°	No	≥ 0 °	Yes
					4:1	10' - 4"	> 0°	Yes		
					6:1	15' - 4"				
42"	4 ½"	51"	41 ½"	0.23 Ellip.	3:1	9' - 6"	≥ 0 °	Yes	≥ 0 °	Yes
					4:1	12' - 6"				
					6:1	18' - 7"				

MATERIAL NOTES:

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

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (CRP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading, and installation.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Texas Department of Transportation

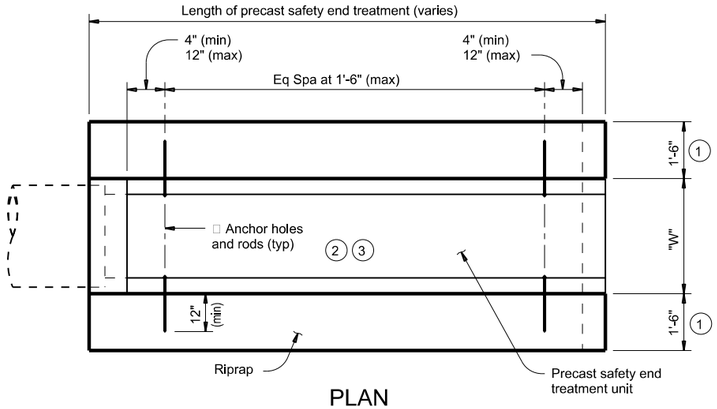
Bridge Division Standard

PRECAST SAFETY END TREATMENT

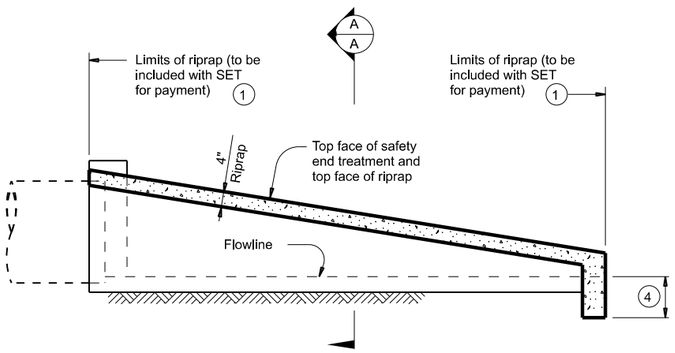
TYPE II ~ CROSS DRAINAGE

PSET-RC

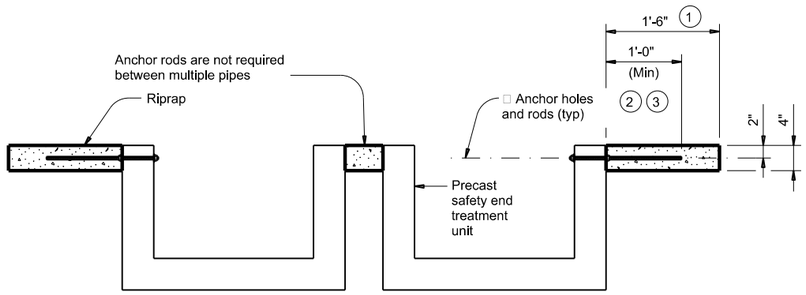
FILE: psetrcss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		92



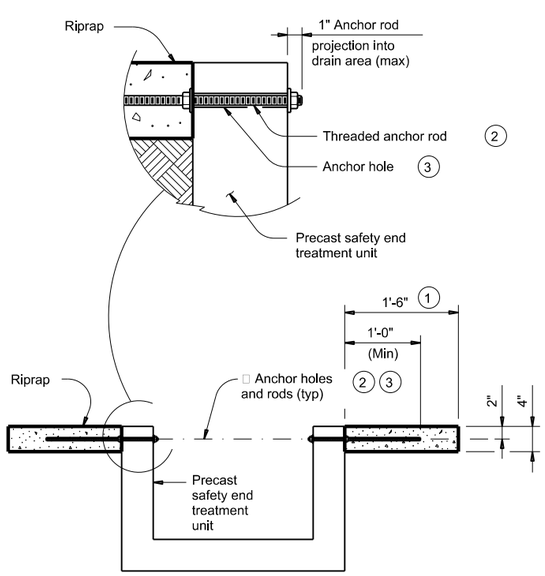
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)

5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.
For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.
Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		93

DATE: 10/27/2023 2:10:30 PM
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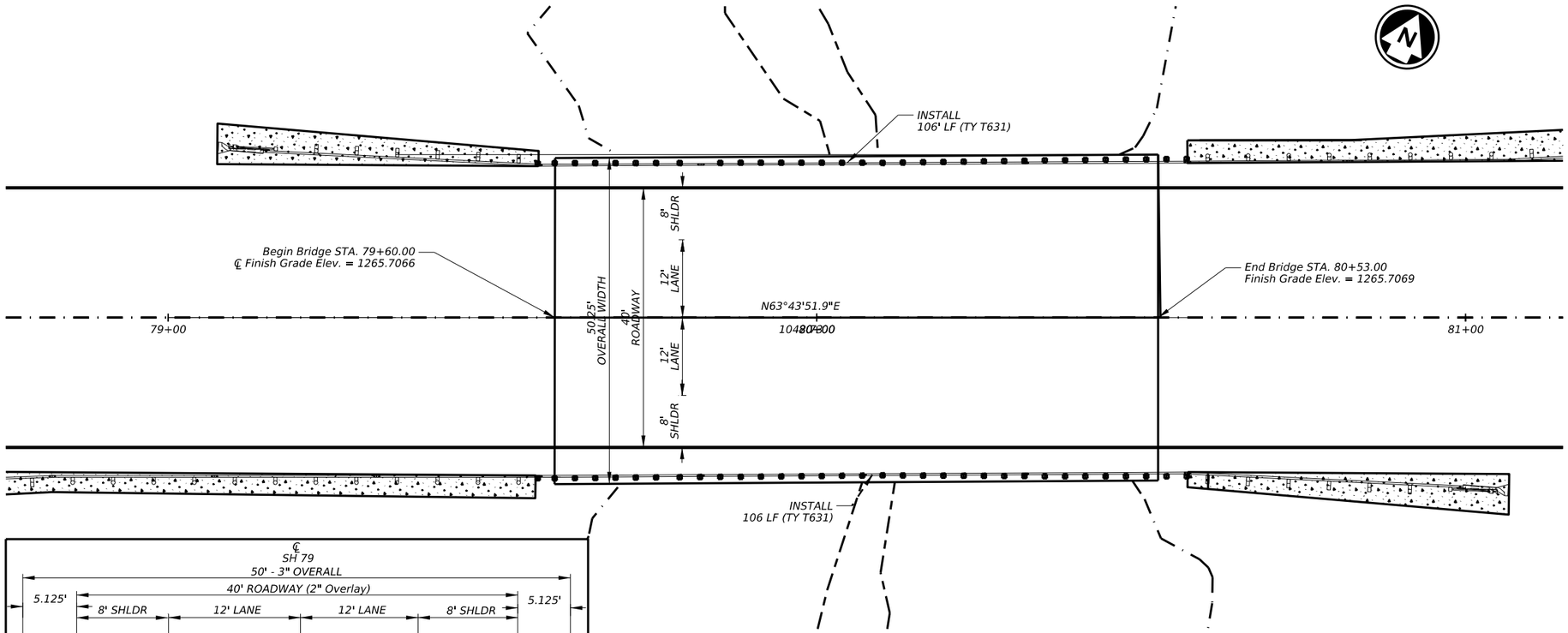
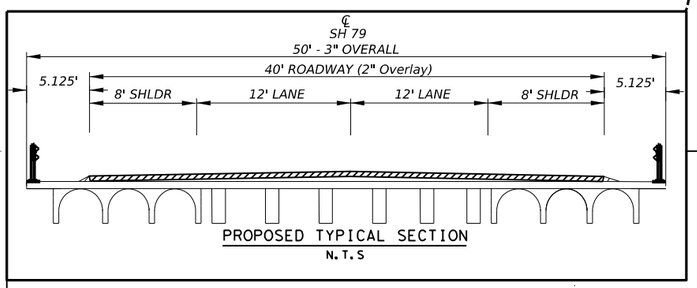
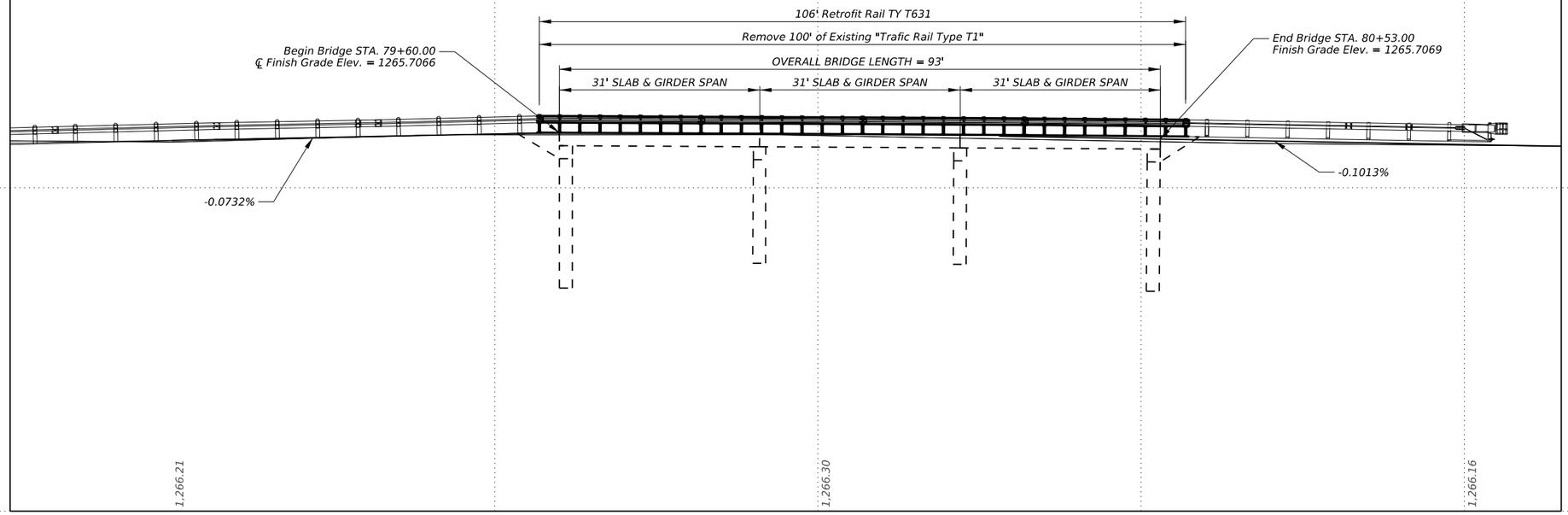






0 10 20
SCALE IN FEET

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

NORTH ELM CREEK BRIDGE LAYOUT
NHI NO. 03-224-0-0284-02-005

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		94

DATE: 10/30/2023 03:43:39 PM
FILE: pw://txdot.bentleyconnect.bentleyonline.com:TXDOT2/Documents/03 - WFS/Design Projects/02840202714 - Design/Plan Set/7. Bridge/SH 79 BRIDGE LAYOUT.dgn

Location			Double Solid	Solid Left Broken Right	Solid Right Broken Left	Broken
Sta	to	Sta				
0+00.00	to	3+60.11				
3+60.11	to	10+36.19	x			
10+36.19	to	20+60.54		x		
20+60.54	to	29+38.14			x	
29+38.14	to	33+07.62				x
33+07.62	to	41+62.14		x		
41+62.14	to	52+03.60			x	
52+03.60	to	56+14.10				x
56+14.10	to	69+38.10		x		
69+38.10	to	146+70.00				x
146+70.00	to	154+71.31			x	
154+71.31	to	160+27.09				x
160+27.09	to	169+00.00		x		
169+00.00	to	170+71.09				x
170+71.09	to	182+24.32			x	
182+24.32	to	185+22.10				x
185+22.10	to	194+44.62		x		
194+44.62	to	210+31.40			x	
210+31.40	to	214+20.88	x			
214+20.88	to	222+15.87		x		
222+15.87	to	229+78.36	x			
229+78.36	to	231+00.00				x
231+00.00	to	236+84.83		x		
236+84.83	to	300+26.30				x
300+26.30	to	310+48.19			x	
310+48.19	to	313+60.00				x
313+60.00	to	322+27.21		x		
322+27.21	to	323+46.51				x
323+46.51	to	333+57.19			x	
333+57.19	to	355+00.00	x			

Texas Department of Transportation

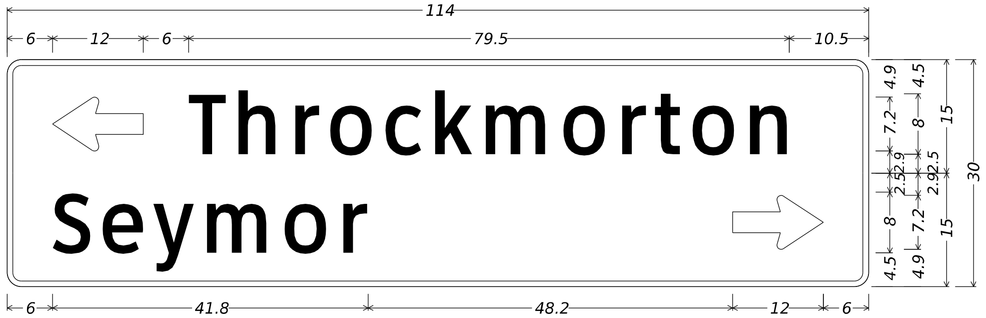
SH 79

PAVMENT MARKING TABLE

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		95

DATE: 10/27/2023 2:11:05 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/8. Traffic/SH 79 Pavement Marking Table (0284-02-027)

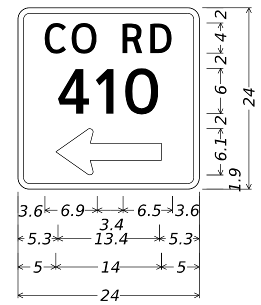
DW | CK | DW | CK



D1-2 8in LT-RT;

1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 12.0" X 7.1" 180⅙₄ ; "Throckmorton", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on Green;
"Seymor", ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0⅙₄ ;

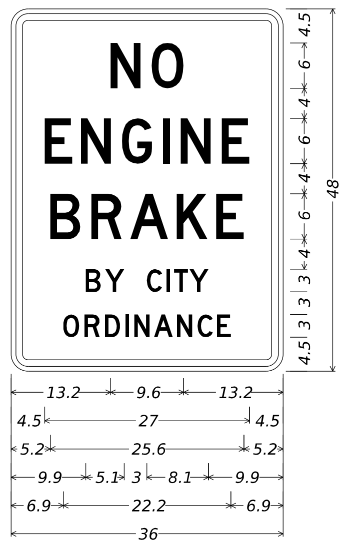


D20-1TL*24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"410", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180⅙₄ ;

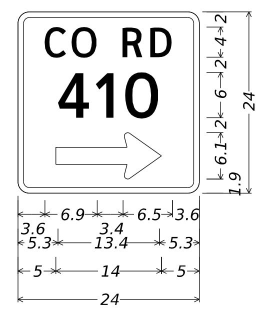
D2-2 6in;

1.5" Radius, 0.8" Border, White on Green;
"Throckmorton", ClearviewHwy-3-W; "13", ClearviewHwy-3-W;

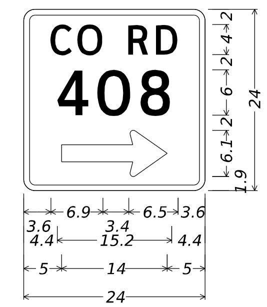
1.5" Radius, 0.8" Border, White on Green;
"Haskell", ClearviewHwy-3-W; "46", ClearviewHwy-3-W;



R5-4aT*36x48;
2.3" Radius, 0.9" Border, 0.6" Indent, Black on White;
"NO", D; "ENGINE", D;
"BRAKE", D; "BY CITY", D;
"ORDINANCE", D;



D20-1TR*24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"410", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0⅙₄ ;

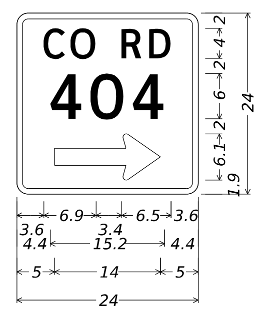


D20-1TR*24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"408", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0⅙₄ ;

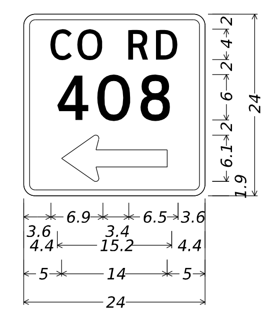
D14-4T-2*48x48;

3.0" Radius, 1.0" Border, White on Blue;
"ADOPT A", C; "HIGHWAY", C; "NEXT 2 MILES", C;

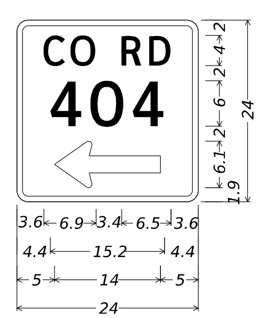
3.0" Radius, 1.0" Border, White on Blue;
"THROCKMORTON", C; "4-H", C;



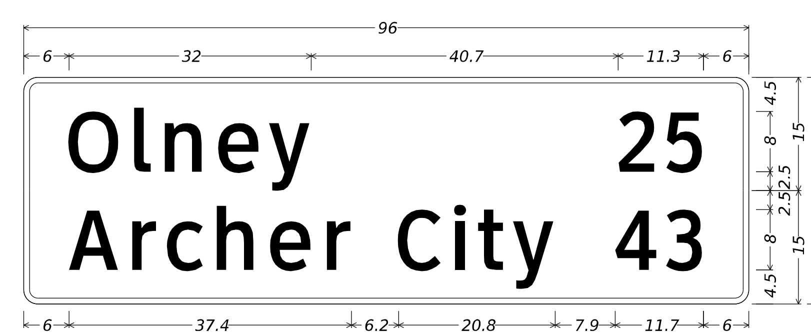
D20-1TR*24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"404", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0⅙₄ ;



D20-1TL*24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"408", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180⅙₄ ;



D20-1TL*24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"404", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180⅙₄ ;



D2-2 8in;

1.9" Radius, 0.8" Border, White on Green;
"Olney", ClearviewHwy-3-W; "25", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on Green;
"Archer City", ClearviewHwy-3-W; "43", ClearviewHwy-3-W;

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SMALL SIGN
DETAILS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
284	2	27	SH 79
DIST		COUNTY	SHEET NO.
WFS		Throckmorton	96

DATE: 10/31/2023 12:02:09 PM
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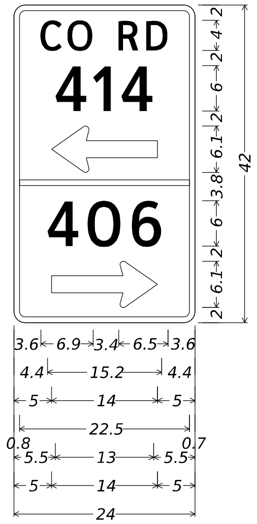
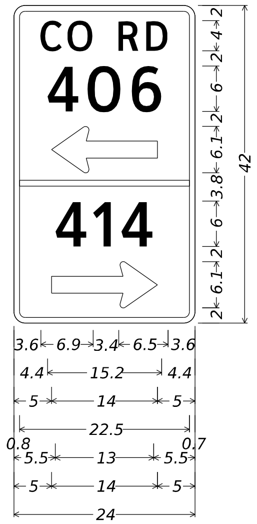
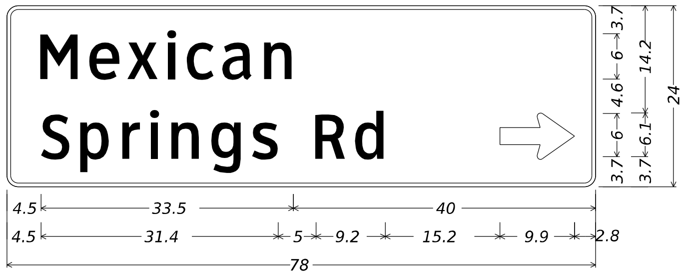


D20-5T*24x42;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"414", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180$^{31}/_{64}$;
"406", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0$^{31}/_{64}$;



D20-5T*24x42;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"406", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180$^{31}/_{64}$;
"414", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0$^{31}/_{64}$;



D21-1aTR*VARx24;
1.5" Radius, 0.5" Border, White on Green;
"Mexican", ClearviewHwy-3-W; "Springs Rd", ClearviewHwy-3-W;
Standard Arrow Custom 9.9" X 6.1" 0$^{31}/_{64}$;

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SMALL SIGN DETAILS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
284	2	27	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		97

DATE: 10/30/2023 08:48:48 PM
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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)	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
1	1	R1-2	YIELD	48 x 48 x 48	x		10BWG	1	WS	P		
1	2	R5-1	DO NOT ENTER	36 x 36	x		TWT	1	WS	P		
1	3	R1-1	STOP	36 x 36	x		TWT	1	WS	P		
1	4	R5-1	DO NOT ENTER	36 x 36	x		TWT	1	WS	P		
1	5	R1-2	YIELD	48 x 48 x 48	x		10BWG	1	WS	P		
1	6	R4-7	<SYMBOL - KEEP RIGHT OF FEATURE>	24 x 30	x		TWT	1	WS	P		
1	7	R5-1	DO NOT ENTER	36 x 36	x		TWT	1	WS	P		
1	8	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	x		TWT	1	WS	P		
		M1-6T	(ROUTE #) TEXAS	24 x 24								
1	9	w3-1	SYMBOL - STOP AHEAD	30 x 30	x		TWT	1	WS	P		
1	10	r2-1	SPEED LIMIT (SPEED)	30 x 36	x		TWT	1	WS	P		
1	11	r2-1	SPEED LIMIT (SPEED)	30 x 36	x		TWT	1	WS	P		
1	12	d2-2	Olney 17, Archer City 35	78 x 24	x		10BWG	1	SA	T		
1	13	d1-2	<-- Throckmorton Seymour -->	114 x 30	x		10BWG	1	SA	U		
1	14	R5-4aT	No Engine Break	36 x 48	x		10BWG	1	SA	P		
1	15	D14-4t	Adopt a Highway	60 x 60	x		10BWG	1	SA	U		
1	16	M2-1	JCT <AUXILIARY SIGN>	21 x 15	x		10BWG	1	SA	P		
1		M1-4A3	US 183	24 x 24								
1		M1-4A3	US 283	24 x 24								
1	17	r2-1	SPEED LIMIT (SPEED)	30 x 36	x		TWT	1	WS	P		
1	18	r2-1	SPEED LIMIT (SPEED)	30 x 36	x		TWT	1	WS	P		
2	19	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	x		TWT	1	WS	P		
		M1-6T	(ROUTE #) TEXAS	24 x 24								
2	20	w3-5	<SYMBOL - REDUCED SPEED AHD> (SPEED)	36 x 36	x		TWT	1	WS	P		
2	21	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	x		TWT	1	WS	P		
5	22	d20-1t	CO RD 410	24 x 24	x		TWT	1	WS	P		
5	23	r1-1	STOP	36 x 36	x		TWT	1	WS	P		
5	24	d20-1t	CO RD 410	24 x 24	x		TWT	1	WS	P		
6	25	D14-4t	Adopt a Highway	48 x 48	x		10BWG	1	SA	U		
6	26	m3-3	SOUTH <AUXILIARY SIGN>	24 x 12	x		TWT	1	WS	P		
		M1-6t	(ROUTE #) TEXAS	24 x 24	x							
	27	d20-1t	CO RD 404	24 x 24	x		TWT	1	WS	P		
	28	R1-1	STOP	36 x 36	x		TWT	1	WS	P		
	29	d20-1t	CO RD 404	24 x 24	x		TWT	1	WS	P		
9	30	M2-1	JCT <AUXILIARY SIGN>	21 x 15	x		TWT	1	WS	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24								
10	31	D2-2	THROCKMORTON 5, HASKELL 38	84 x 24	x		10BWG	1	SA	U		
10	32	m3-3	SOUTH <AUXILIARY SIGN>	24 x 12	x		TWT	1	WS	P		
		M1-6t	(ROUTE #) TEXAS	24 x 24								
10	33	d20-1t	CO RD 408	24 x 24	x		TWT	1	WS	P		
10	34	R1-1	STOP	36 x 36	x		TWT	1	WS	P		
10	35	R1-1	STOP	36 x 36	x		TWT	1	WS	P		
10	36	M6-3	<ARROW - VERTICAL STRGHT> <AUX. SIGN>	21 x 15	x		10BWG	1	SA	U		
			<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15								
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24								
		m1-6T	(ROUTE #) TEXAS	24 x 24								
10	37	M1-6t	(ROUTE #) TEXAS	24 x 24	x		TWT	1	WS	P		
		M6-4	<ARROW - DUAL LEFT & RIGHT> <AUX. SIGN>	21 x 15								
10	38	M6-3	<ARROW - VERTICAL STRGHT> <AUX. SIGN>	21 x 15	x		10BWG	1	SA	U		
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15								
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24								
		m1-6T	(ROUTE #) TEXAS	24 x 24								
10	39	d20-1t	CO RD 408	24 x 24	x		TWT	1	WS	P		
10	40	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	x		TWT	1	WS	P		
		M1-6T	(ROUTE #) TEXAS	24 x 24								
10	41	r2-1	SPEED LIMIT (SPEED)	30 x 36	x		TWT	1	WS	P		
11	42	d2-2	Olney 25, Archer City 43	78 x 24	x		10BWG	1	SA	T		
11	43	M2-1	JCT <AUXILIARY SIGN>	21 x 15	x		TWT	1	WS	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24								
13	44	d20-7t	CO RD 406 --> <-- 414	24 x 42	x		TWT	1	WS	P		

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

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).

SHEET 1 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79

REVISIONS: 4-16, 8-16

DIST	COUNTY	SHEET NO.
WFS	Throckmorton	98

DATE: 10/27/2023 2:11:13 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/...

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
14	45	r1-1	STOP	36 x 36		x	TWT	1	WS	P		
14	46	r1-1	STOP	36 x 36		x	TWT	1	WS	P		
14	47	d20-7t	CO RD 406 <-- 414 -->	24 x 42		x	TWT	1	WS	P		
14	48	M1-6T	(ROUTE #) TEXAS	24 X 24		x	TWT	1	WS	P		
			SOUTH <AUXILIARY SIGN>	24 X 12								
15	49	D21-1aT	Mexican Springs Rd -->	78 X 24		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).

SHEET 2 OF 2

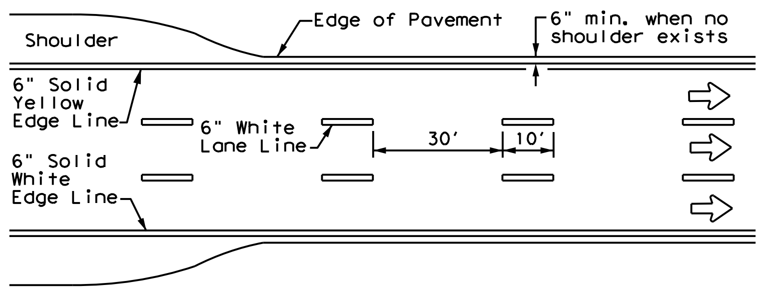
Texas Department of Transportation

Traffic Operations Division Standard

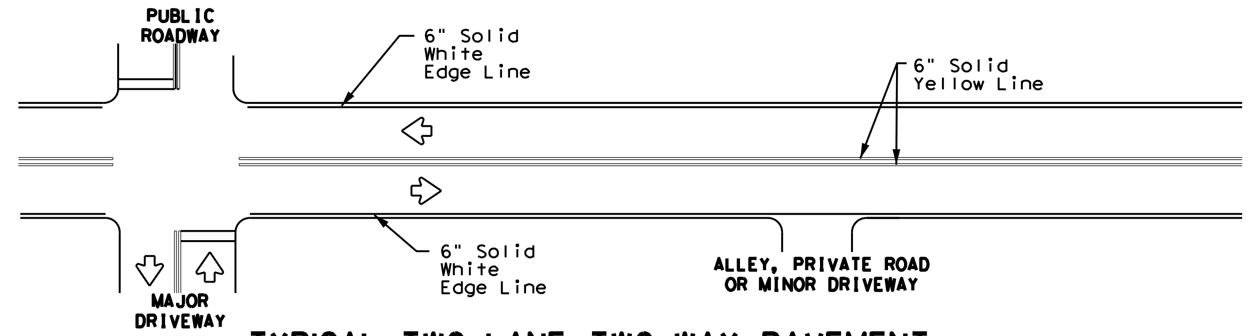
SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-16 8-16	0284	02	027	SH 79
	DIST		COUNTY	SHEET NO.
	WFS		Throckmorton	99



EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

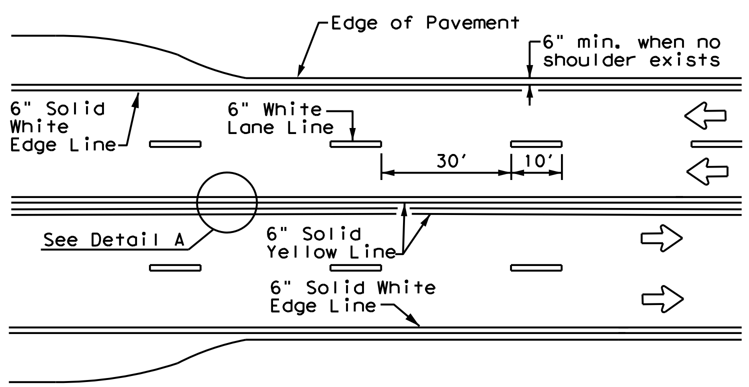
GENERAL NOTES

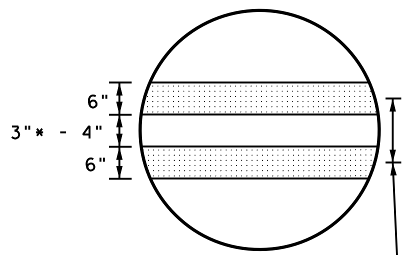
1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.

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.





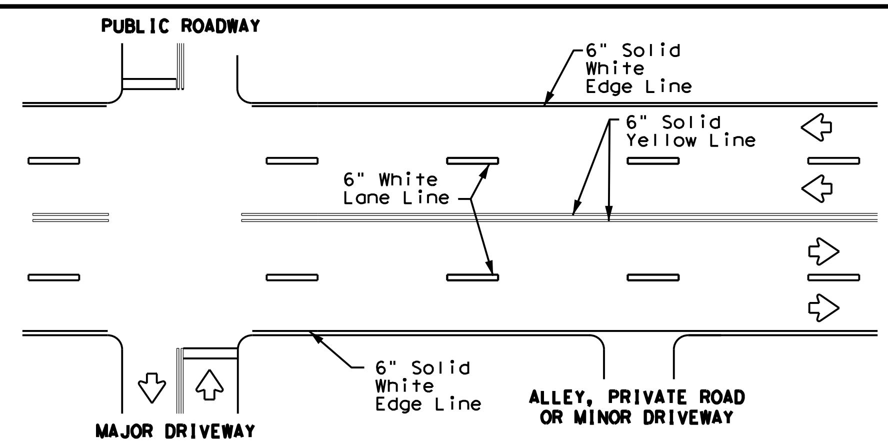
DETAIL "A"

9"** min. - 10" typ. (18" max. for traveled way greater than 48' only)

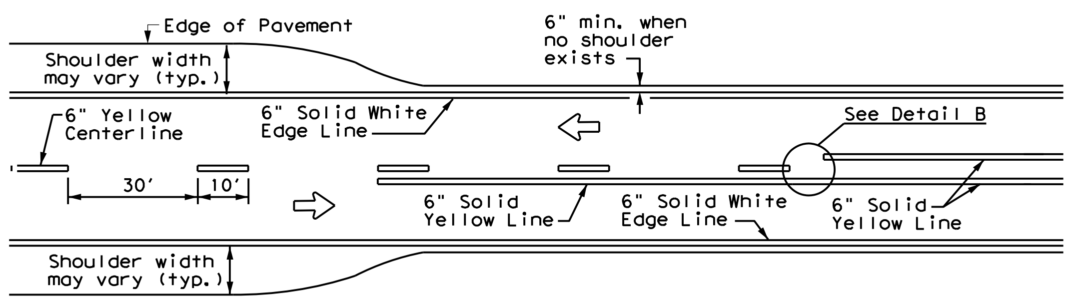
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

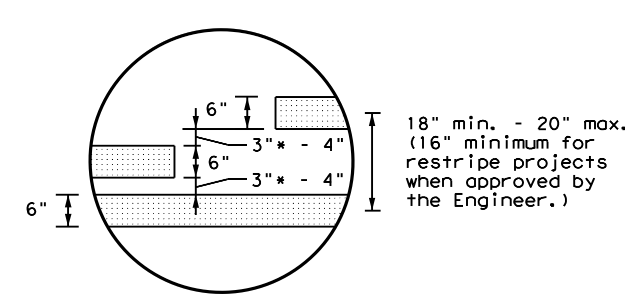
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

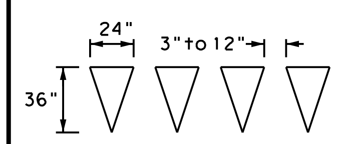


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



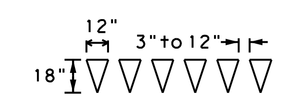
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

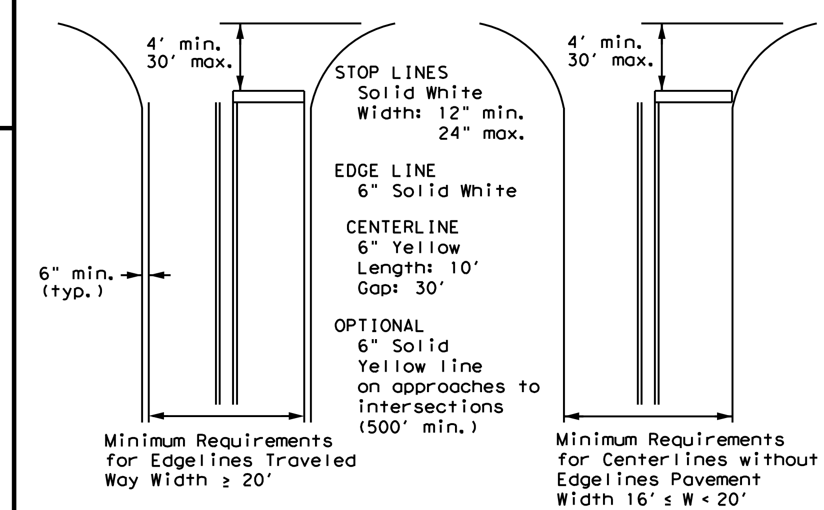


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



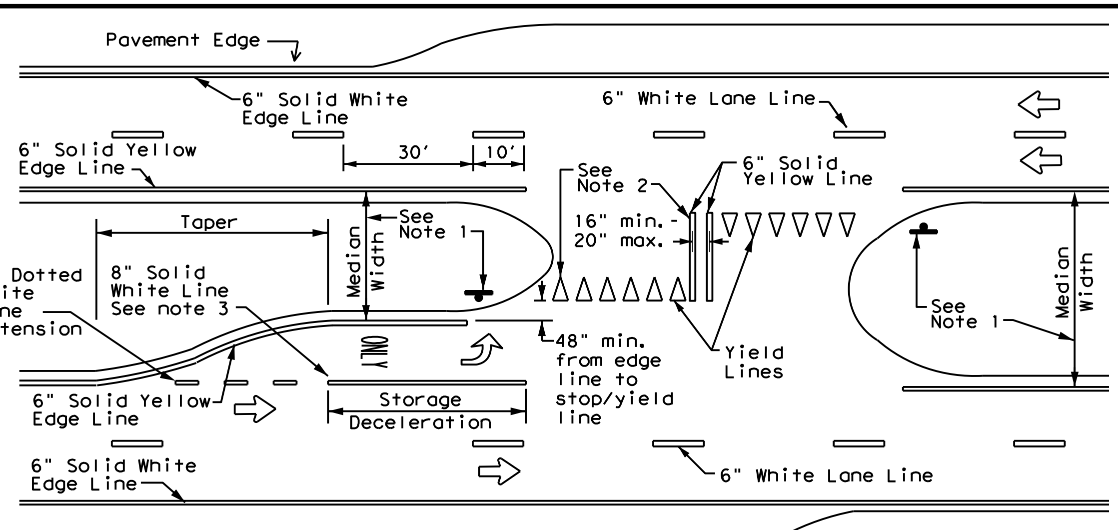
For posted speed on road being marked equal to or less than 40 MPH.



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



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.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

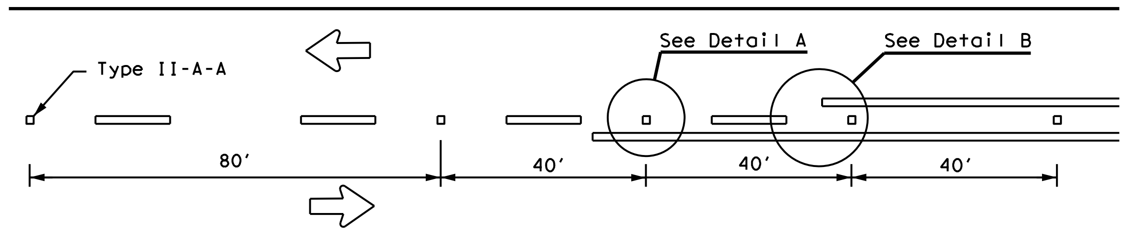
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	0284	02	027	SH 79
	DIST		COUNTY	SHEET NO.
	WFS		Throckmorton	100

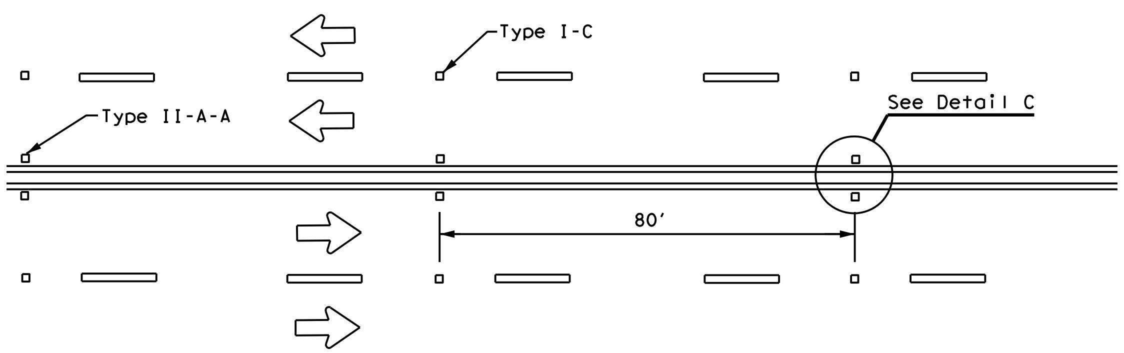
22A

DATE: 10/27/2023 2:11:17 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/...

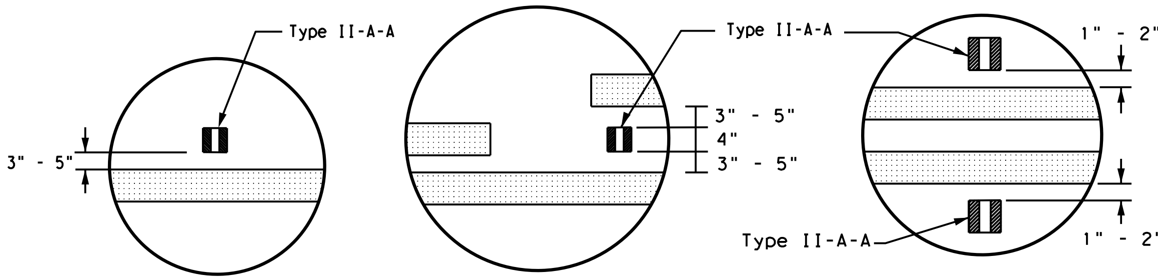
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



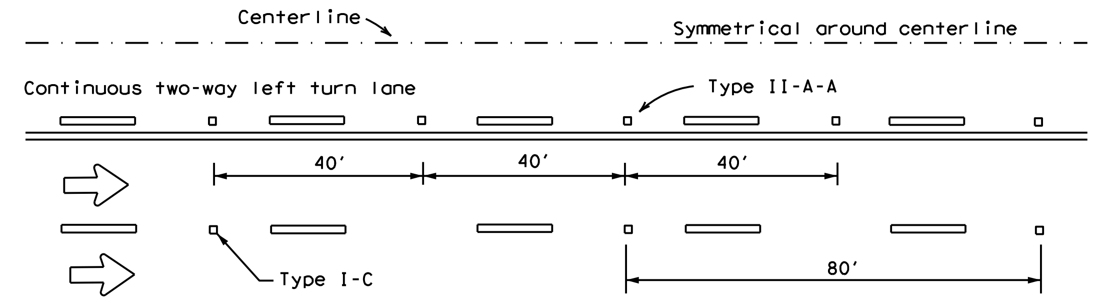
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



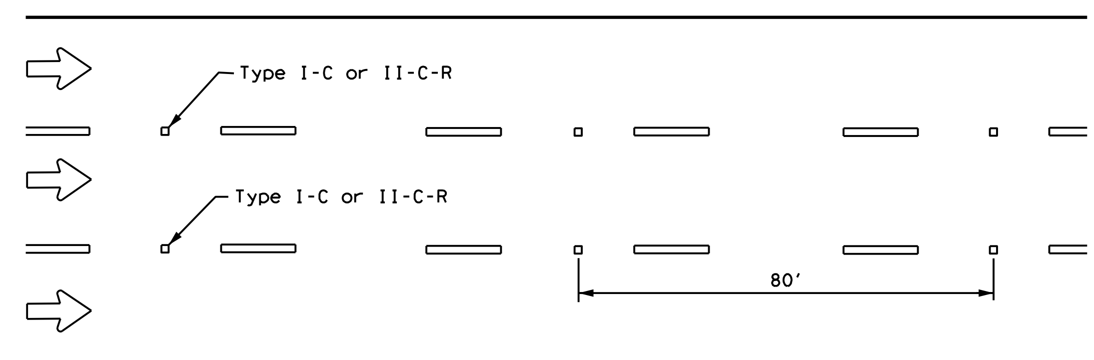
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



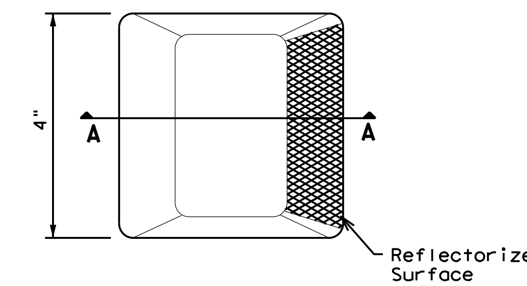
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

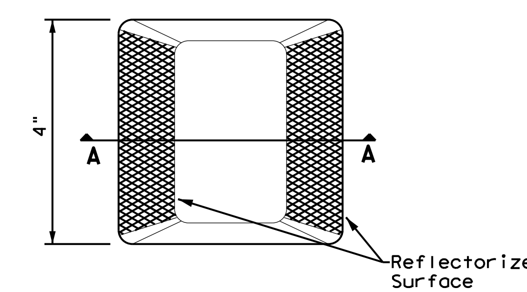
See Note 3.

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

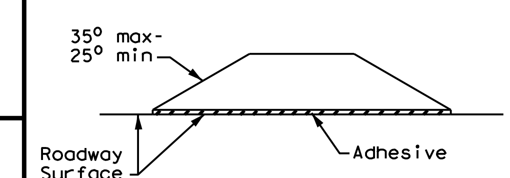
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

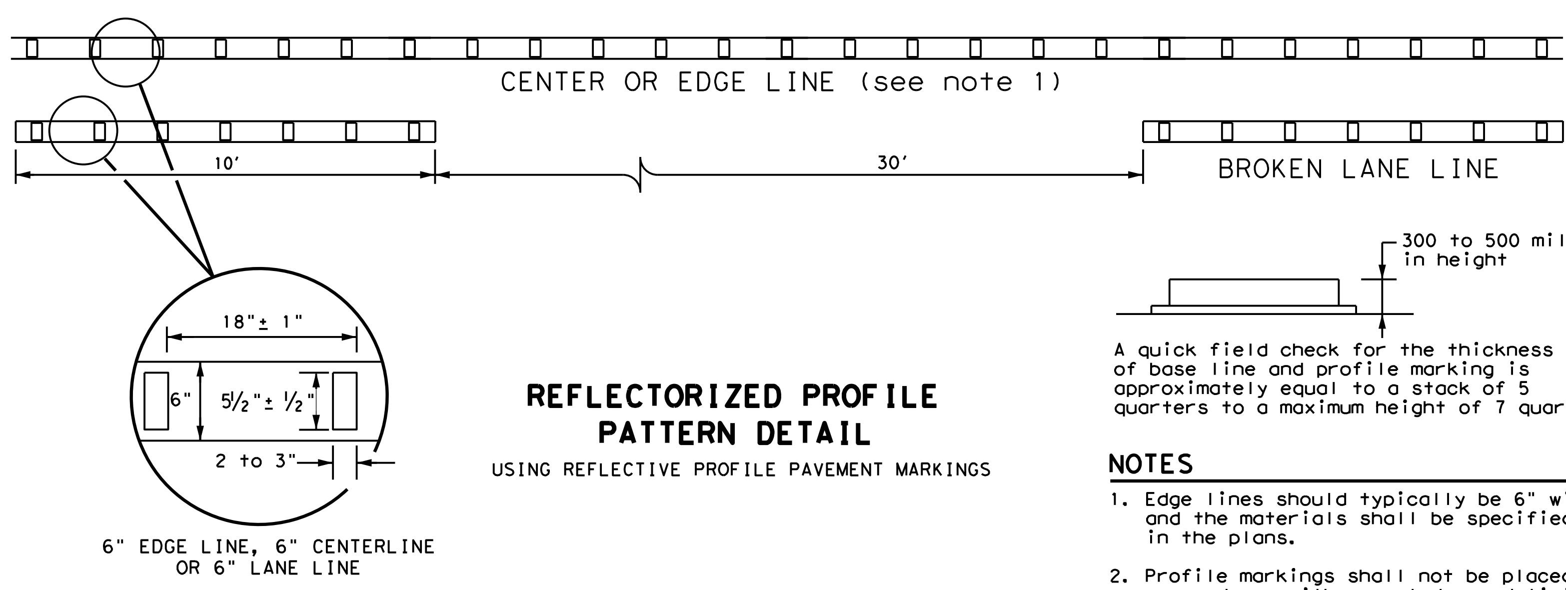


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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.

DATE: 10/27/2023 2:11:20 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/...

Texas Department of Transportation

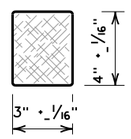
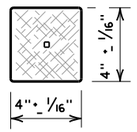
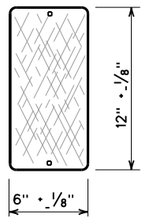
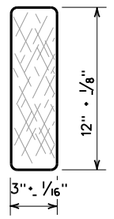
Traffic Safety Division Standard

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 4-77 8-00 6-20; 4-92 2-10 12-22; 5-00 2-12	0284	02	027	SH 79
	DIST		COUNTY	SHEET NO.
	WFS		Throckmorton	101

22B

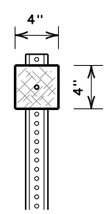
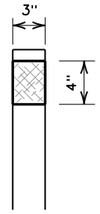
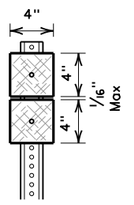
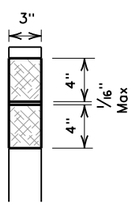
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	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

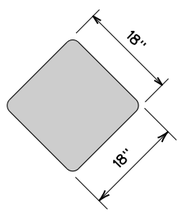
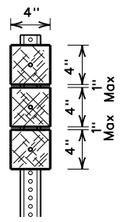
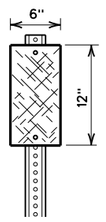
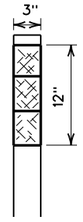
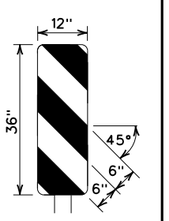
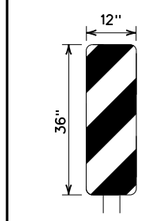
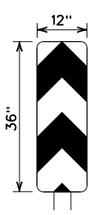
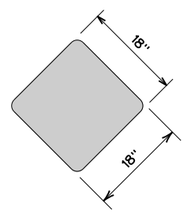
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker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

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

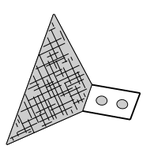
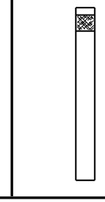
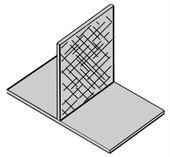
TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

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 or C Sheeting (FL)	Yellow - Type B or C Sheeting (FL)			Alternating acrylic black and retroflective yellow - Type B or C Sheeting (FL)			Red -Type B or C Sheeting (FL)
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

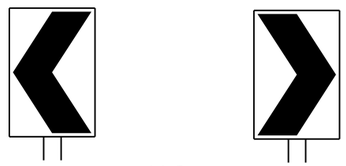
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			

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

SHEETING	Yellow, White, Red
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

CHEVRONS

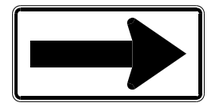
DEVICE  W1-8

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"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WFS	Throckmorton		102

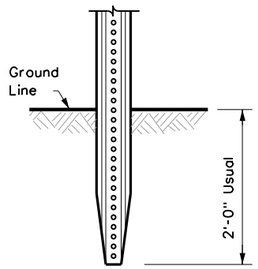
20A

DATE: 10/27/2023 2:11:31 PM
FILE: T:\WFSDESGN\Warren M\SH79\SIGNS DGN\D&OM(1)-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

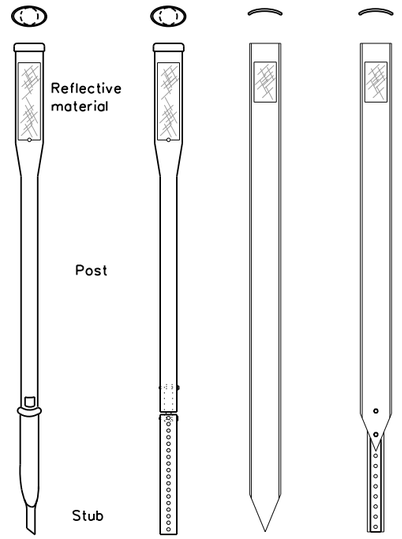


NOTES

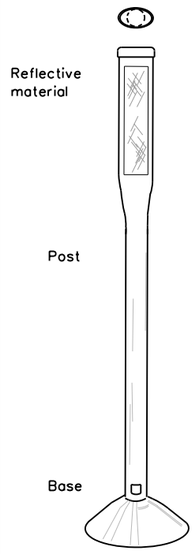
1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF



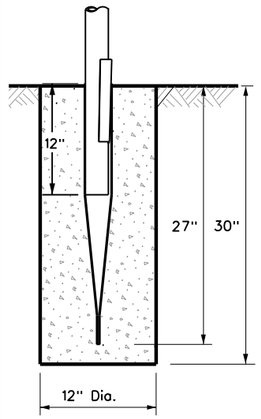
EMBEDDED | SURFACE MOUNT

NOTES

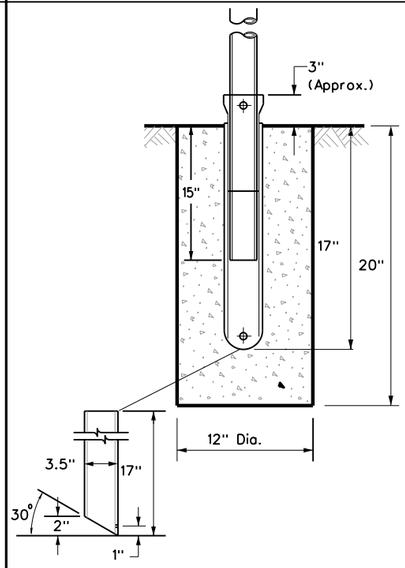
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline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

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

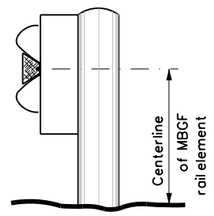
NOTE

1. Install per manufacturer's recommendations.

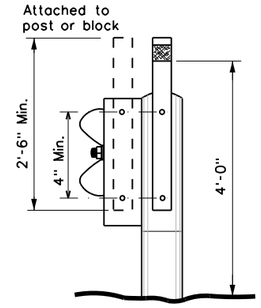
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

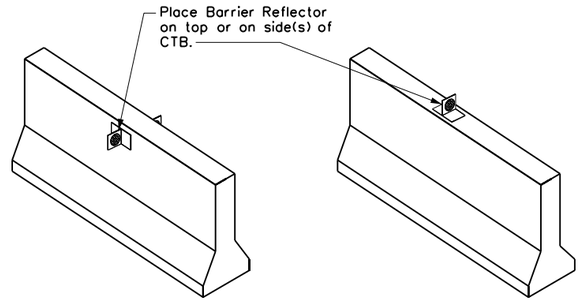
GF1



GF2



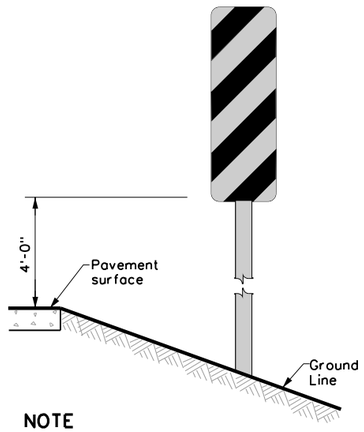
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

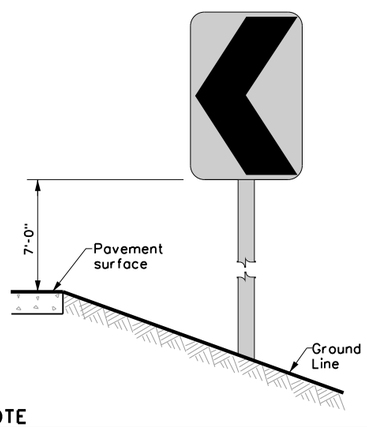
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

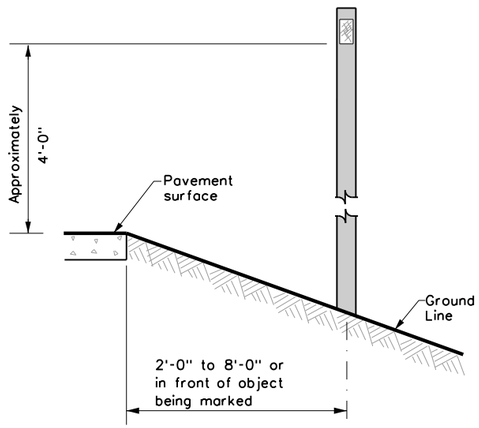
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WFS	Throckmorton		103

208

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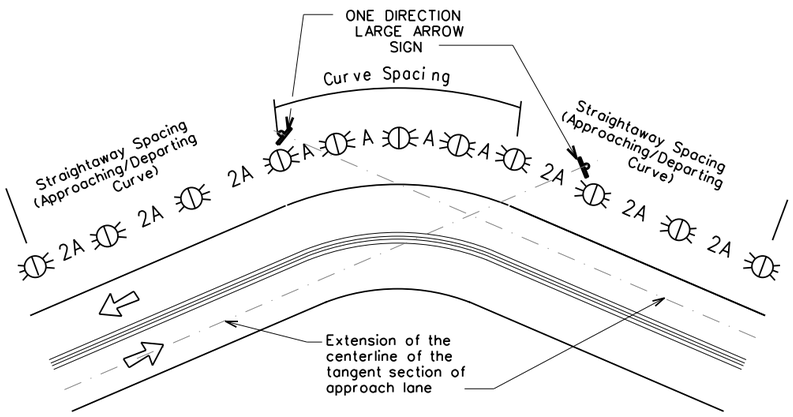
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

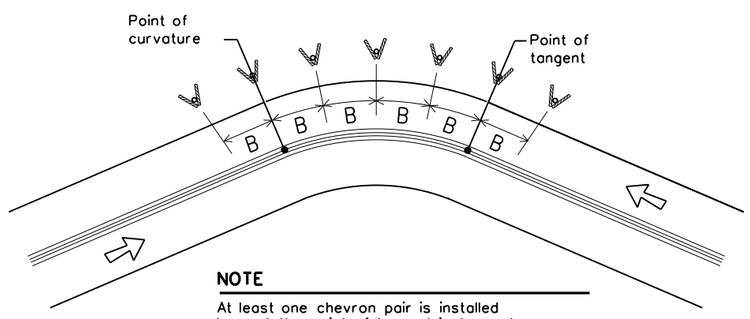
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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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REVISIONS	0284	02	027	SH 79
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	WFS	Throckmorton		104

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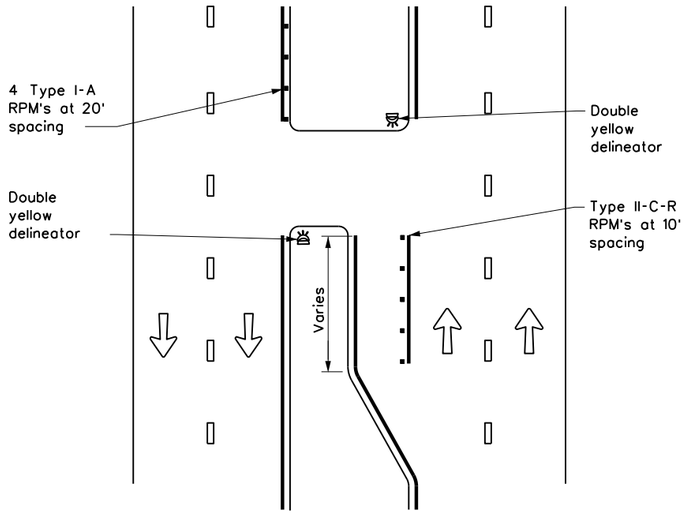
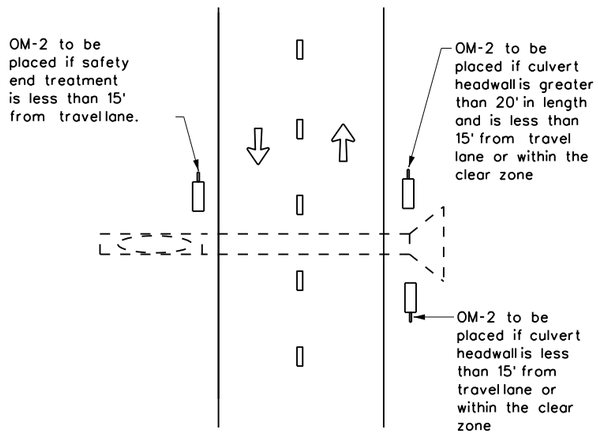
CROSSOVERS



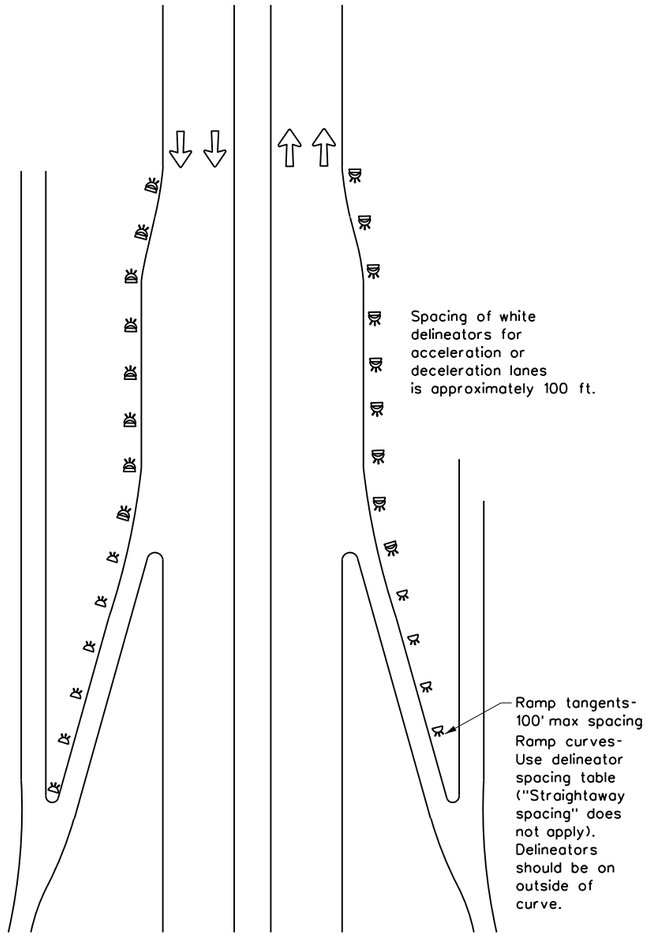
DETAIL 1

FOR CULVERTS WITHOUT MBGF



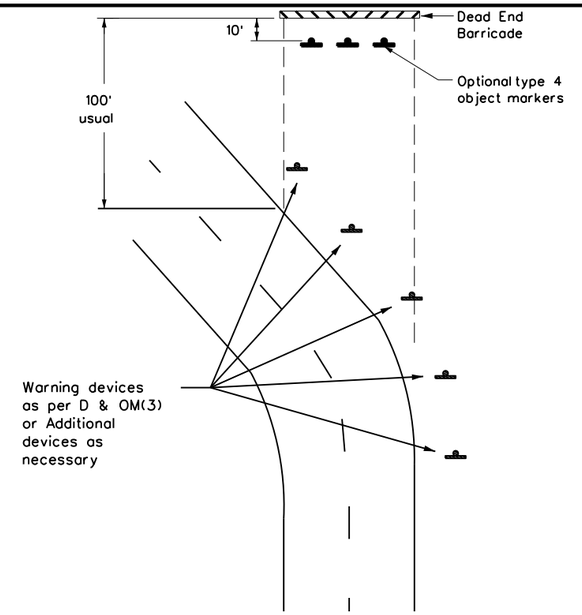
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



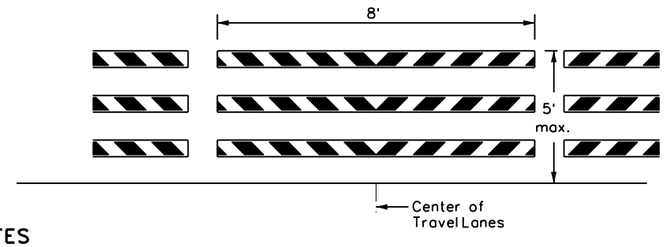
DETAIL 3

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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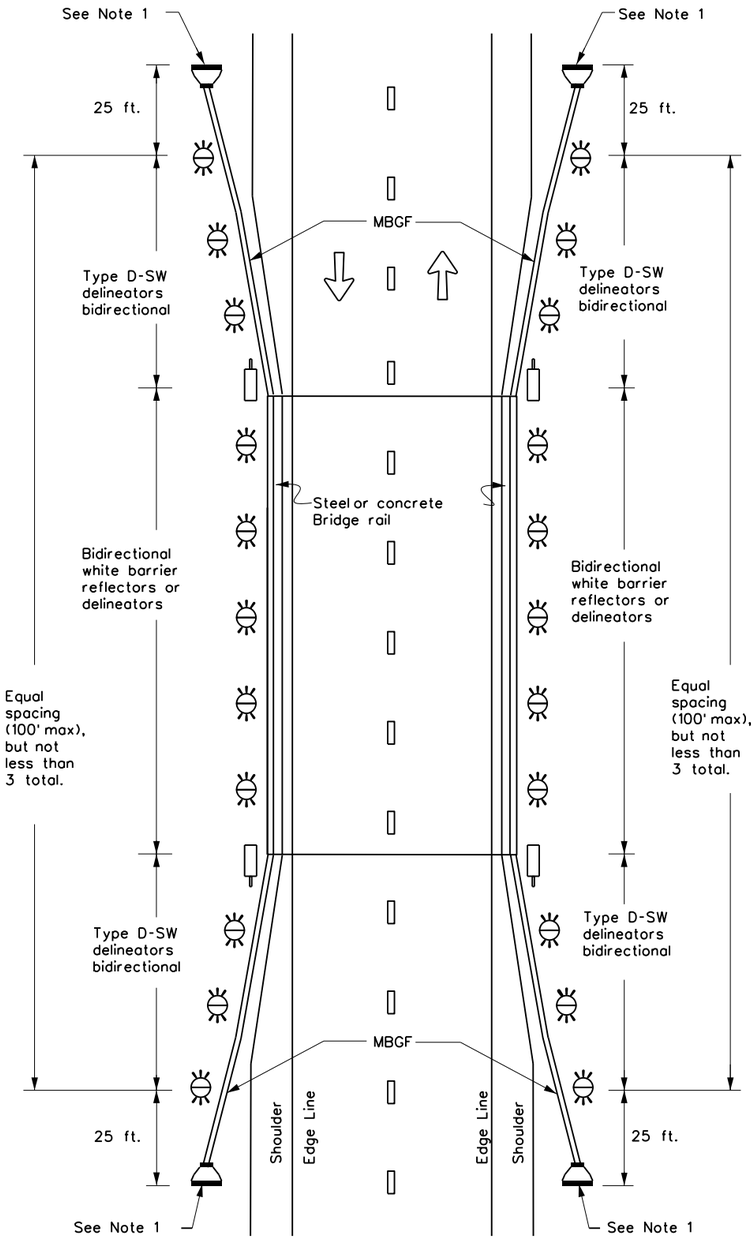
REVISIONS	0284	02	027	SH 79
3-15	DIST	COUNTY		SHEET NO.
7-20	WFS	Throckmorton		105

20D

DATE: DATE TIME
FILE: DOCUMENT NAME

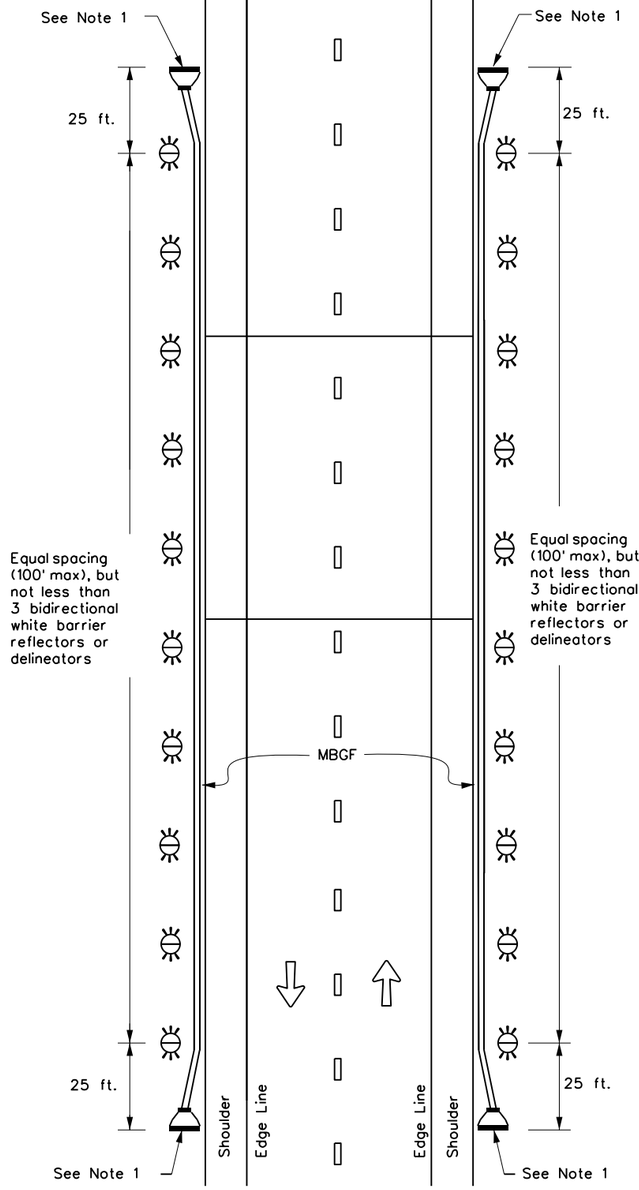
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

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

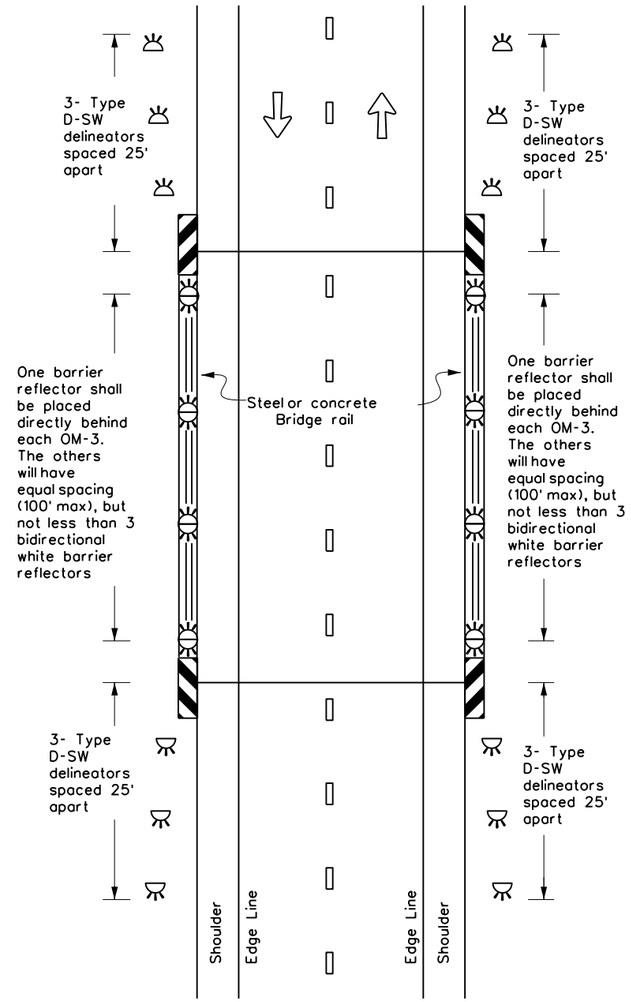
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

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

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



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT			
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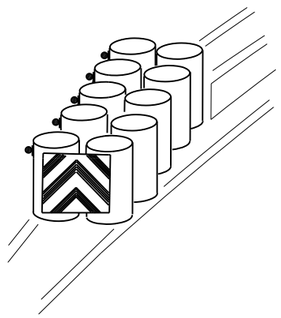
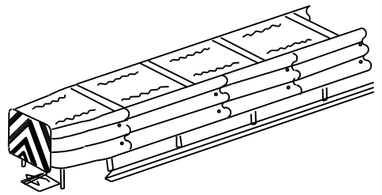
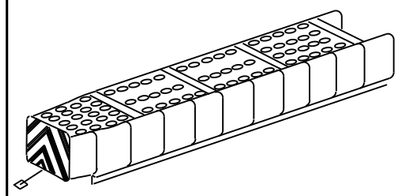
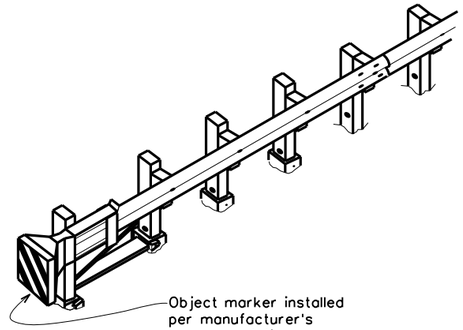
7-20	DIST	COUNTY		SHEET NO.			
	WFS	Throckmorton		106			

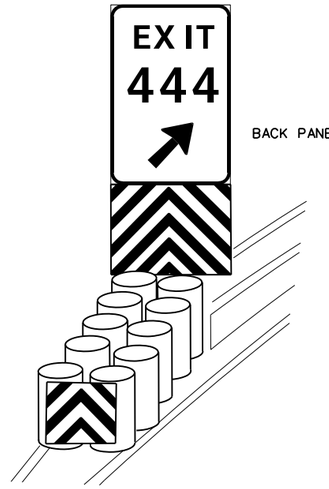
20E

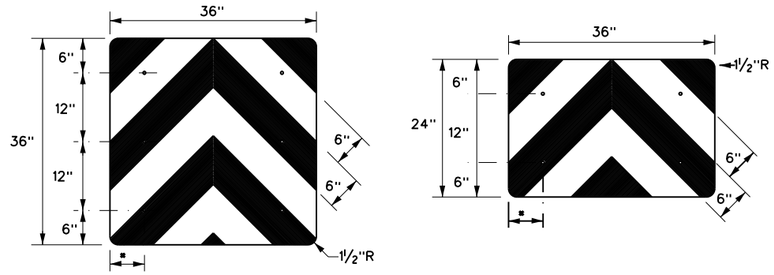


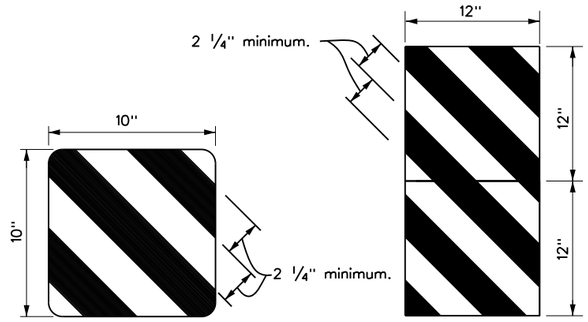




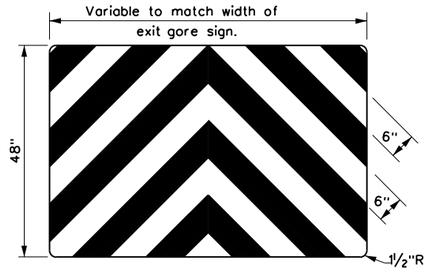


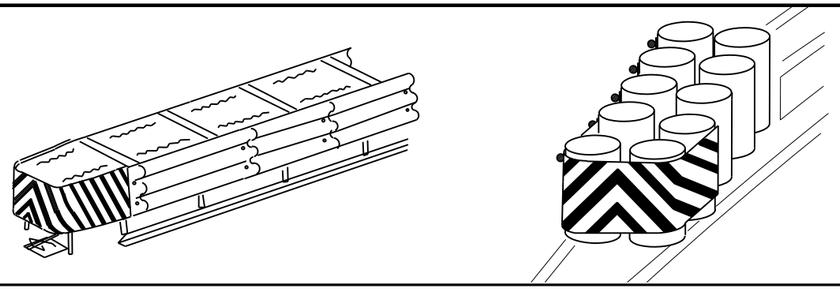


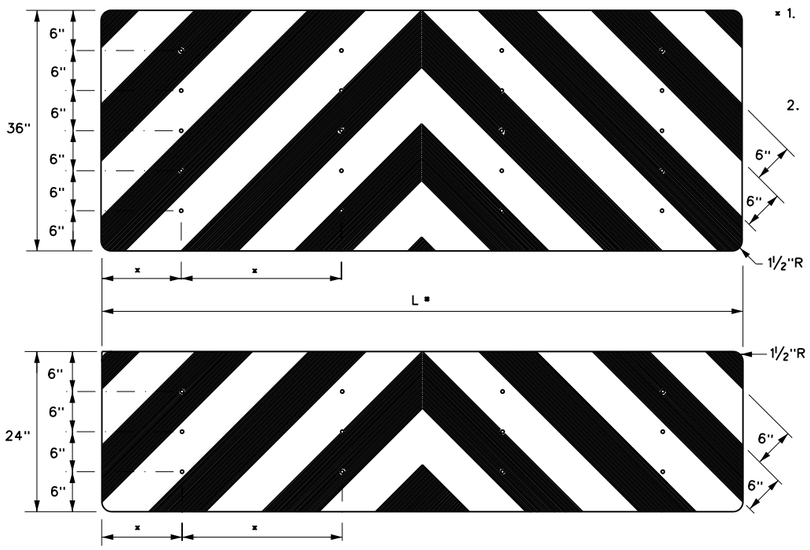




OBJECT MARKERS SMALLER THAN 3 FT^2







NOTES

* 1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	WFS	Throckmorton		107
4-98 7-20				

20G

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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)

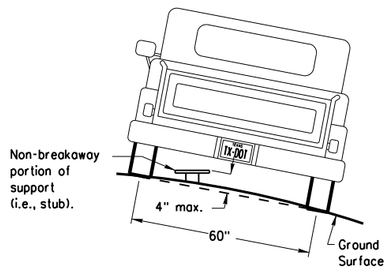
Anchor Type

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-3))

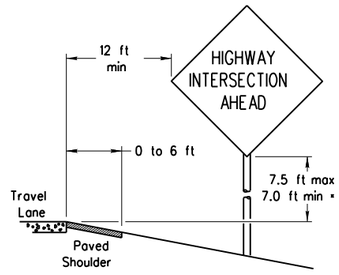
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

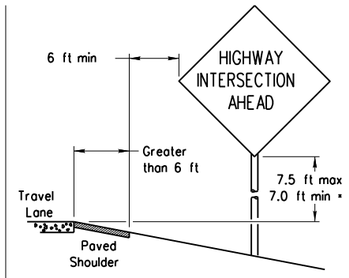
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

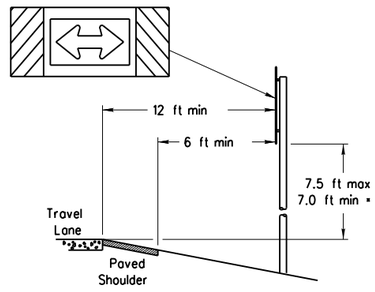
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



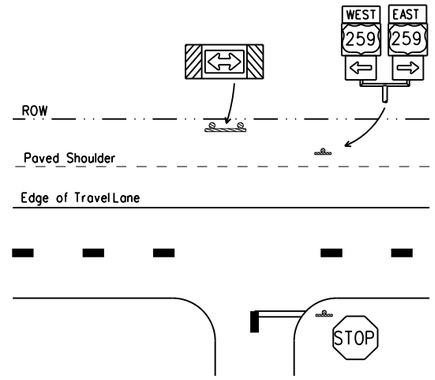
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

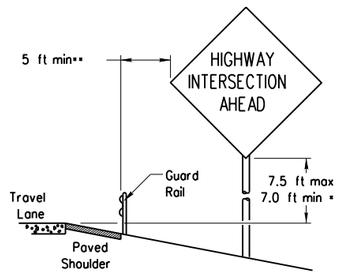
T-INTERSECTION



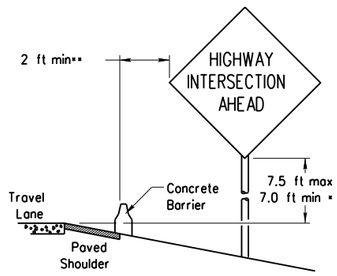
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

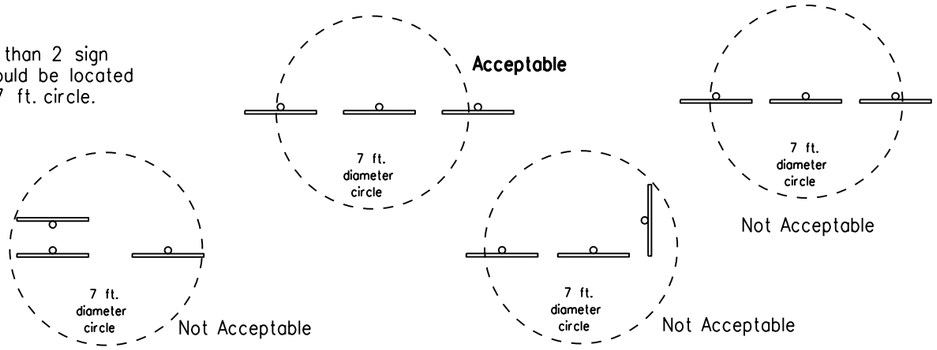
- Signs shall be mounted using the following condition that results in the greatest sign elevation:
  (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
  (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the 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.

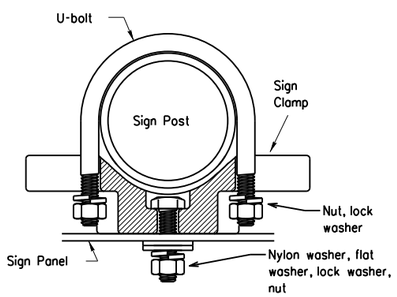
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

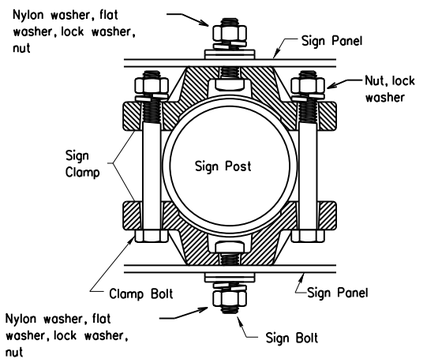


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

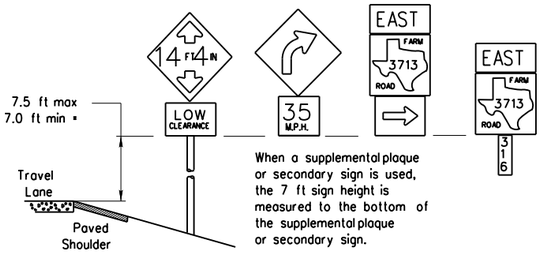
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



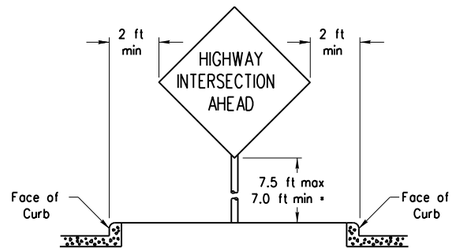
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



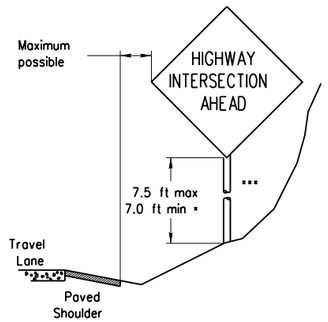
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

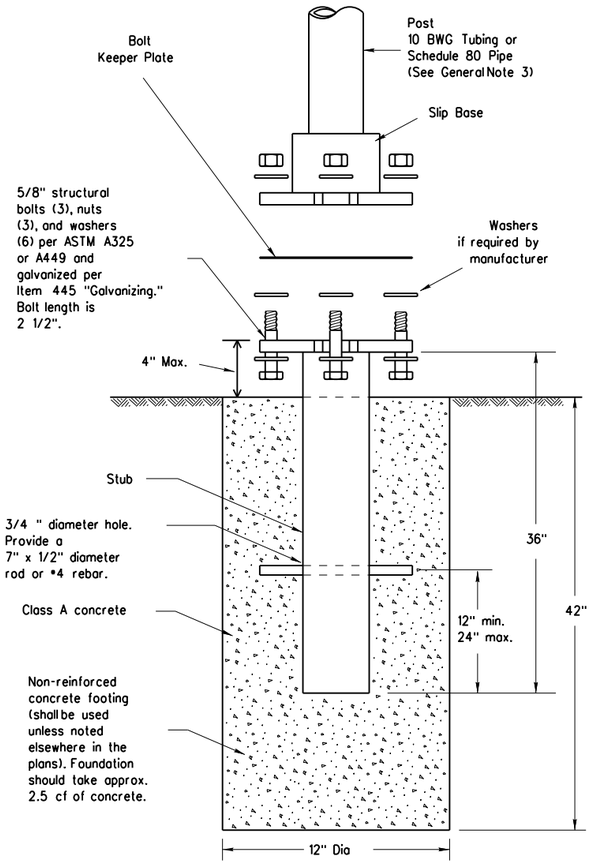
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

© TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		108

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

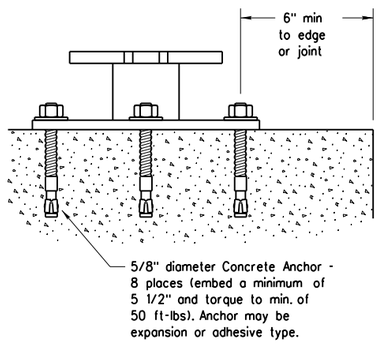
Foundation

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
0284	02	027	SH 79

DIST	COUNTY	SHEET NO.
WFS	Throckmorton	109

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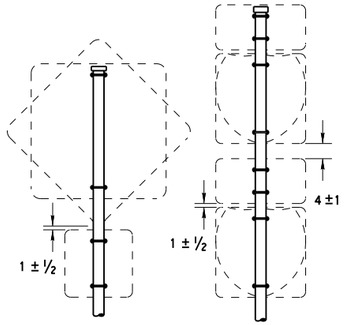
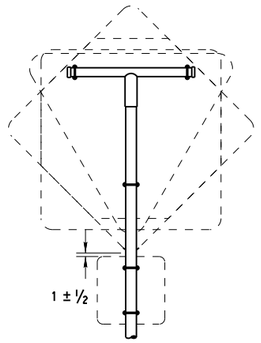


SM RD SGN ASSM TY XXXXX(1)XX(P)



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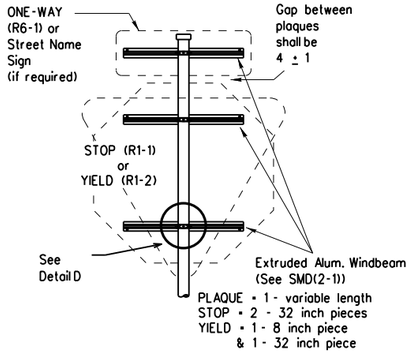

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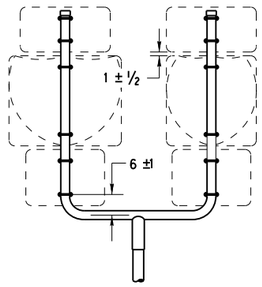

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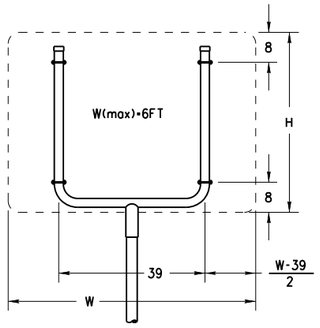

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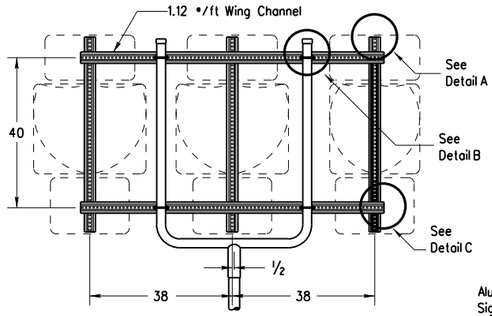

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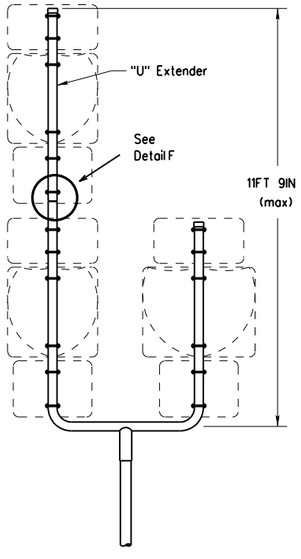
(See Note 11)



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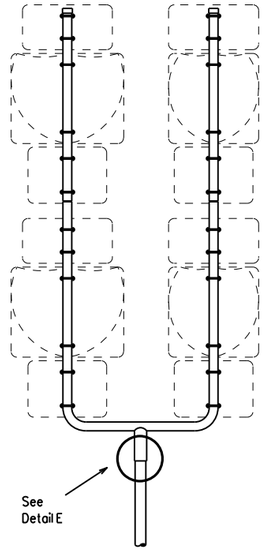

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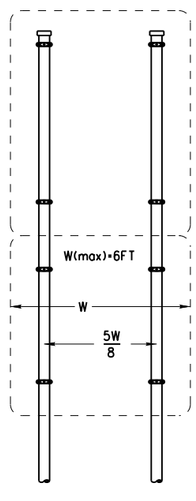

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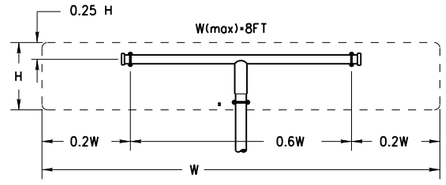
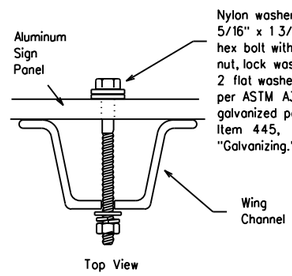
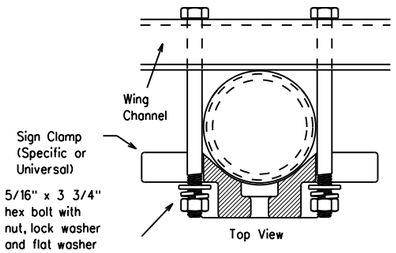


All dimensions are in english unless detailed otherwise.

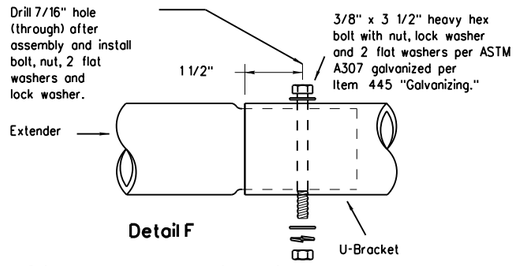
SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)



Detail A

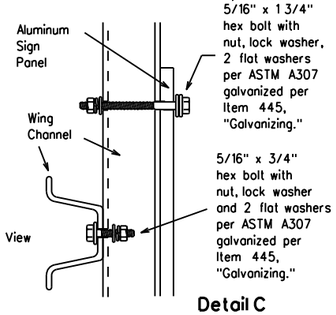


Detail B

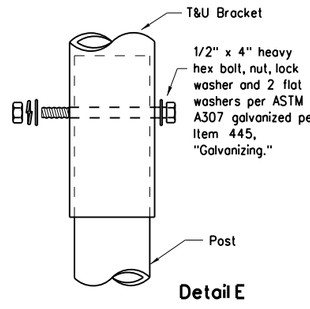


Detail F

Splices shall only be allowed behind the sign substrate.

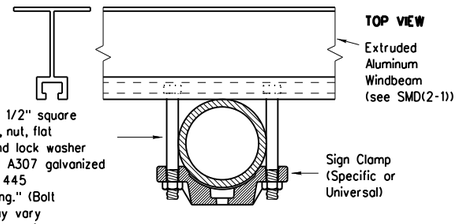


Detail C

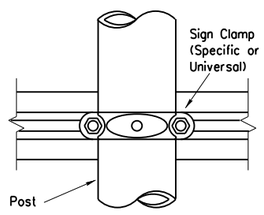


Detail E

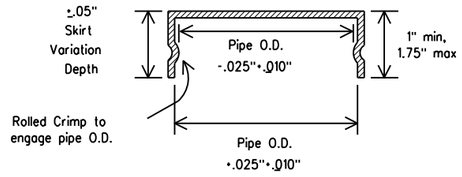
SIDE VIEW



Detail D



FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

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. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
10. 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.
11. Post open ends shall be fitted with Friction Caps.
12. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		110

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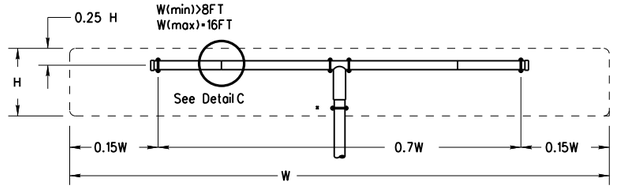
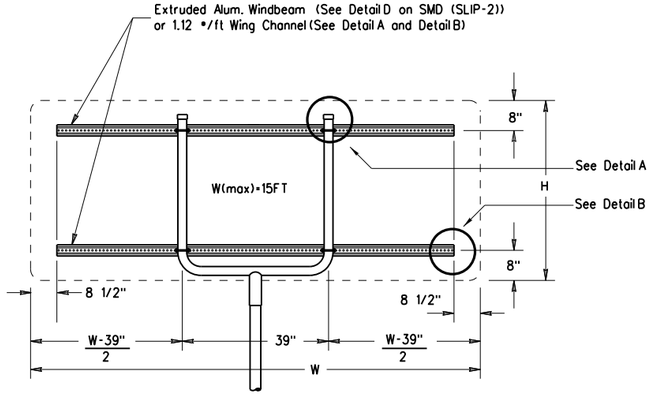


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



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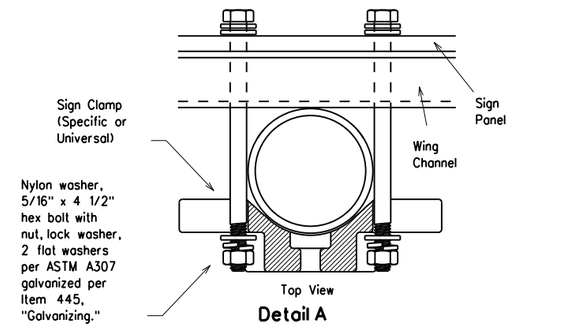
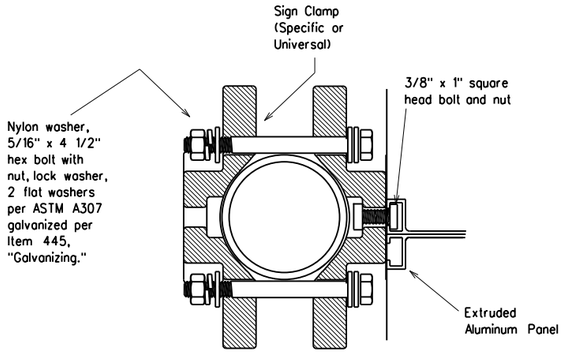
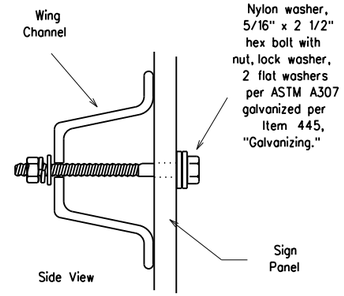


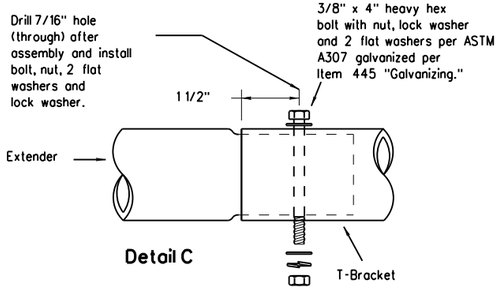
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

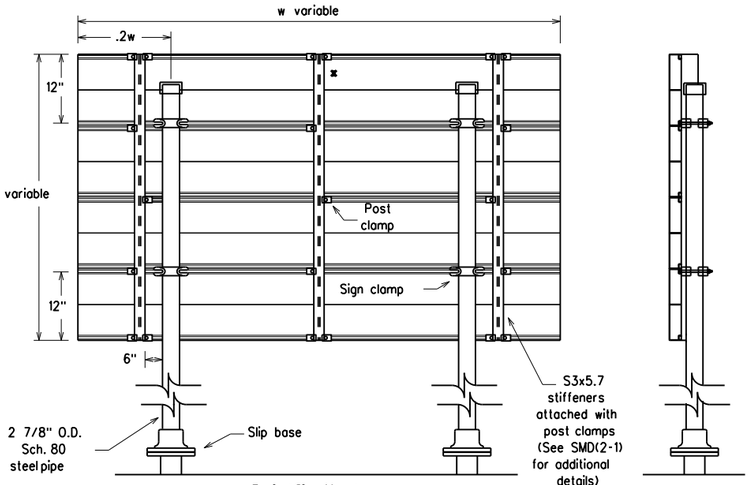


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

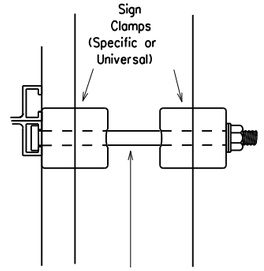


Typical Sign Mount

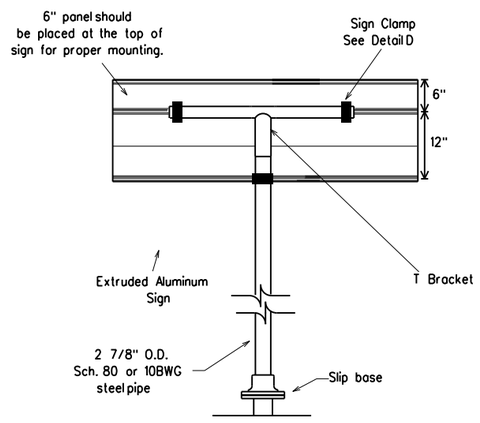
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

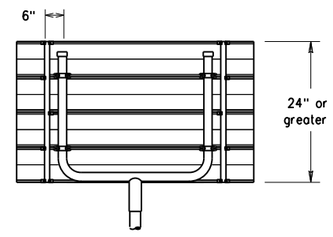
See Detail E
for clamp installation



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

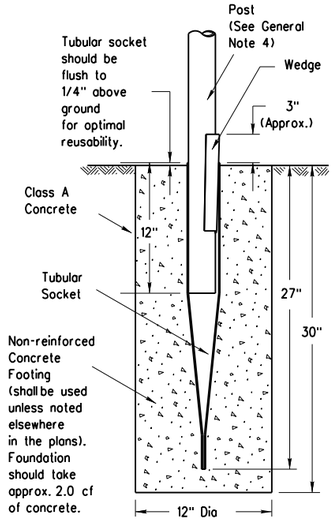
REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79

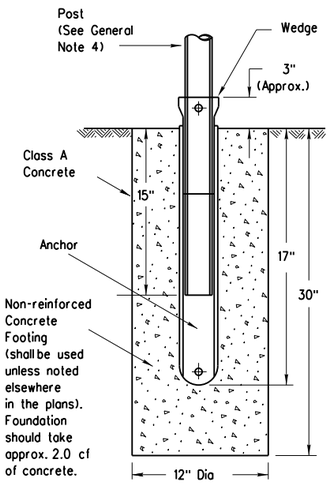
DIST	COUNTY	SHEET NO.
WFS	Throckmorton	111

Wedge Anchor Steel System



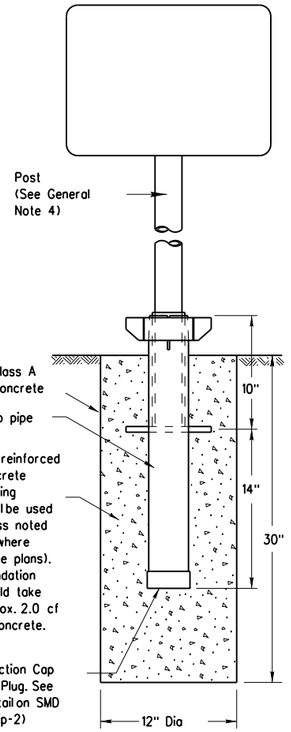
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

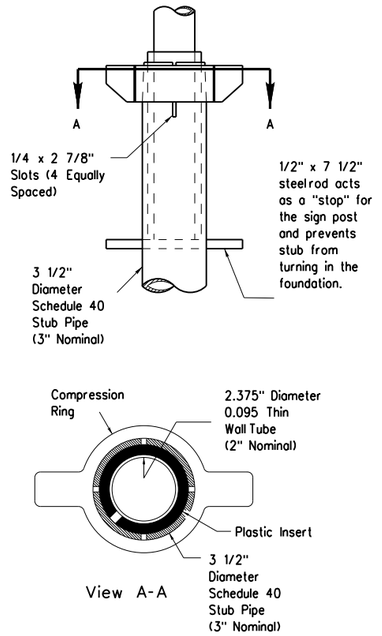


SMD RD SGN ASSM TY TWT(X)WP(X)

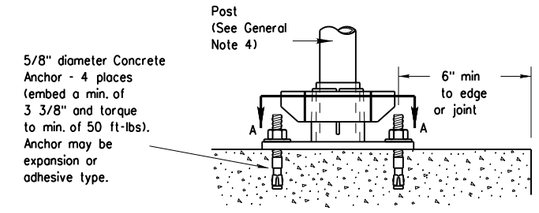
Universal Anchor System with Thin-Walled Tubing Post



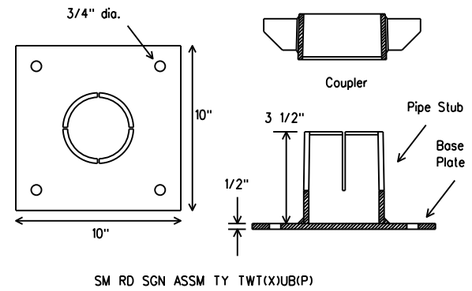
SM RD SGN ASSM TY TWT(X)UA(P)



Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

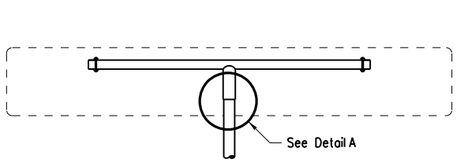


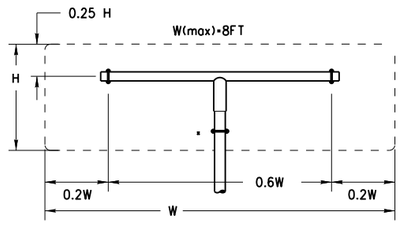
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.



SM RD SGN ASSM TY TWT(X)UB(P)

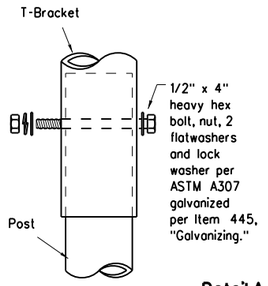
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)

(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   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
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

REVISIONS 9-08

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79

DIST	COUNTY	SHEET NO.
WFS	Throckmorton	112

26E

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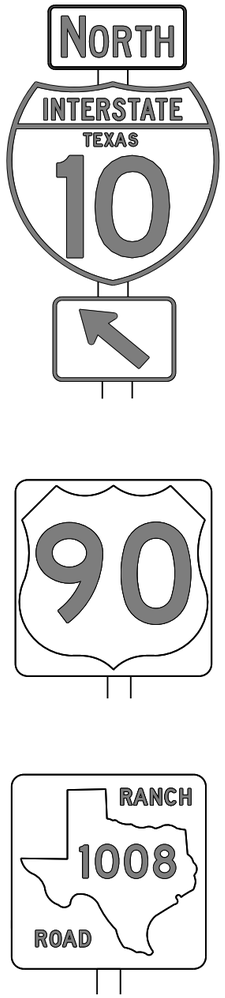
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

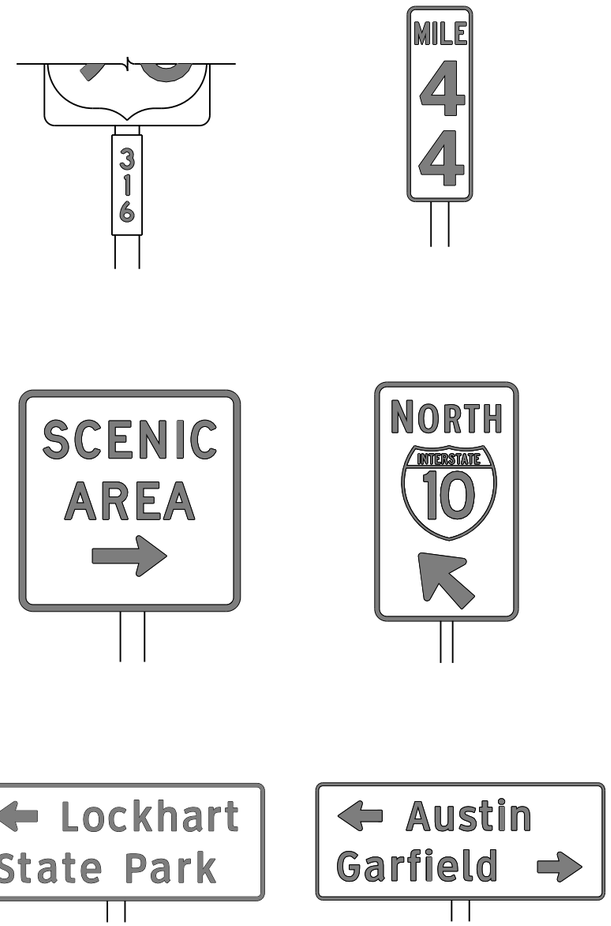
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

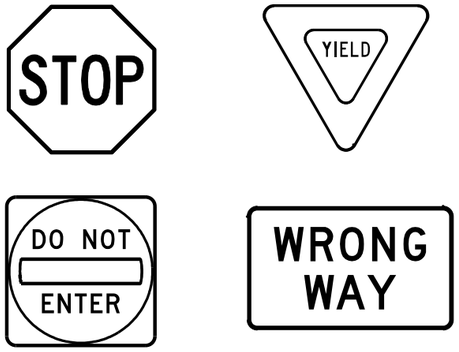
TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	WFS	Throckmorton		113

DATE: 10/27/2023 2:11:40 PM
FILE: T:\WFSDESGN\Warren M\SH79\SIGNS DGN\TSR(4)-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

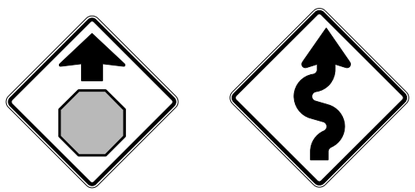
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

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	0284	02	027	SH 79
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		114

DATE: 10/27/2023 2:11:41 PM
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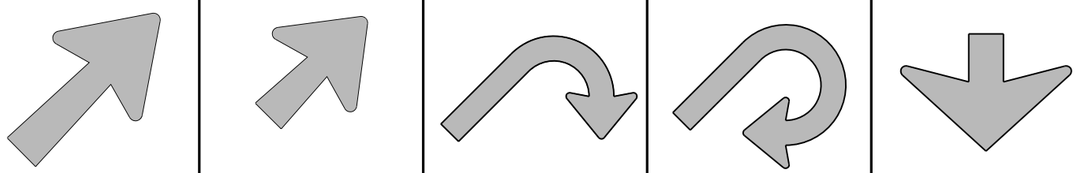
ARROW DETAILS

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

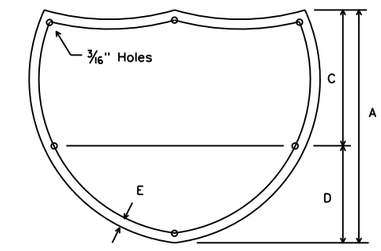
NOTE

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.

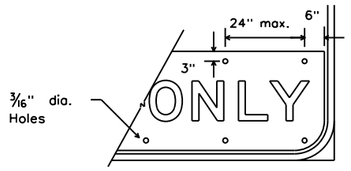
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

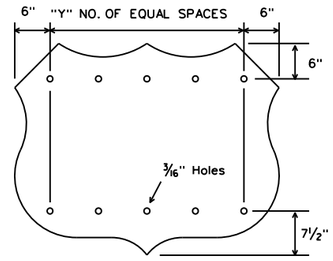


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1½
48	28	20	1¾

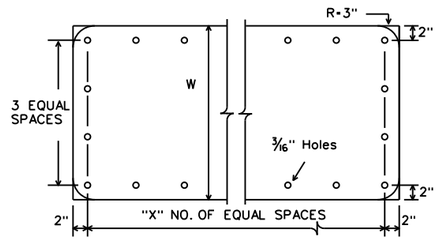


EXIT ONLY PANEL



U.S. ROUTE MARKERS

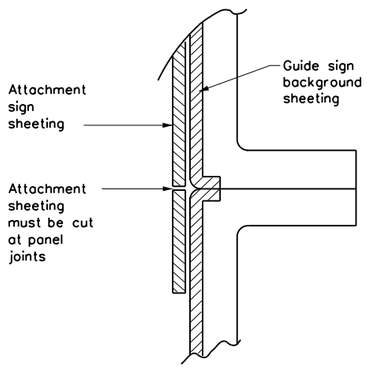
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



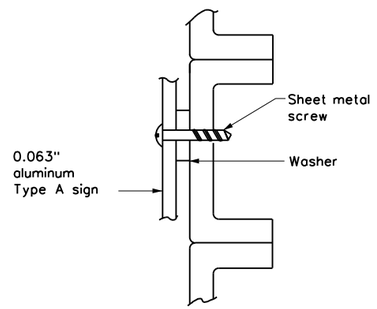
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

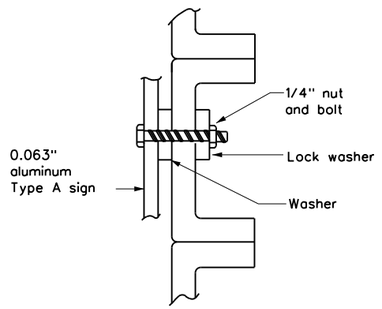
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

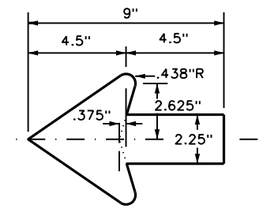
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

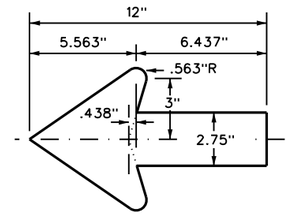
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

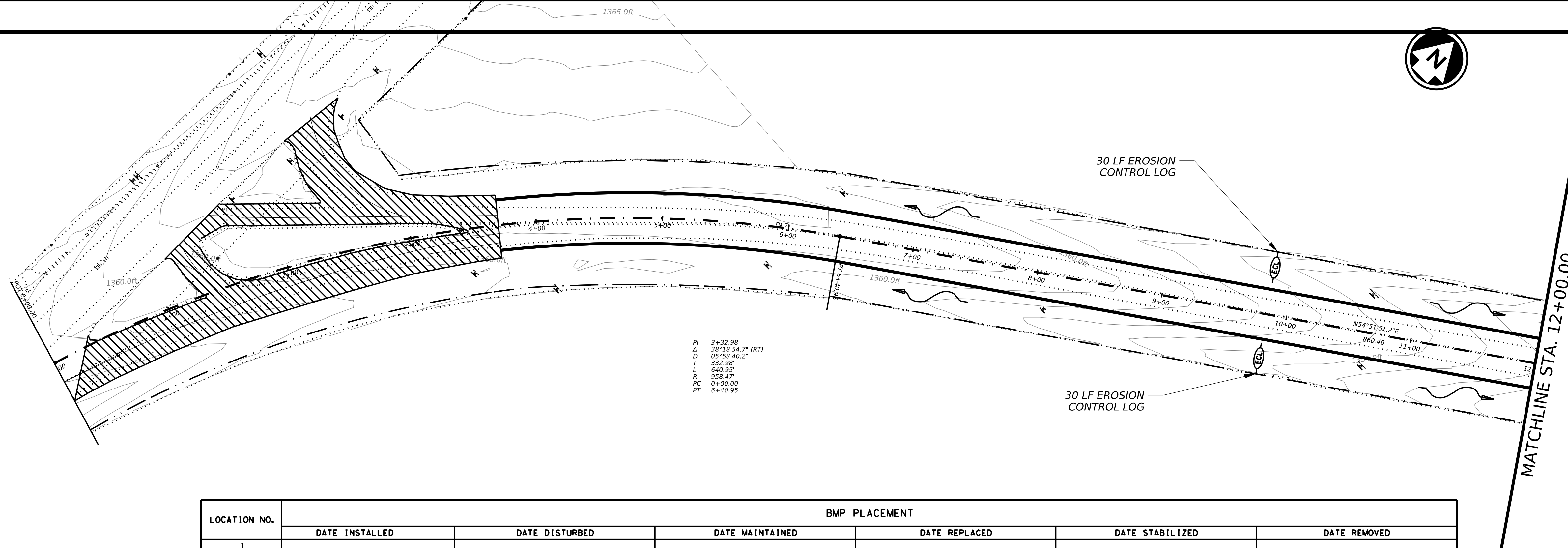
TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	WFS	Throckmorton		115

LEGEND

Symbol	Description
Runoff Flow Arrow symbol	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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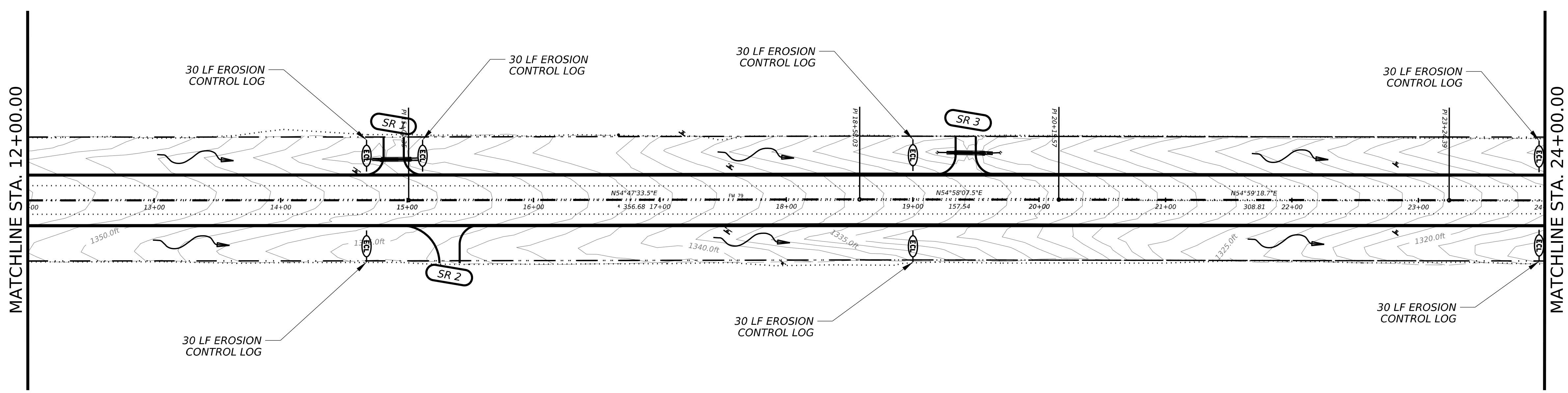

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129839
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PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

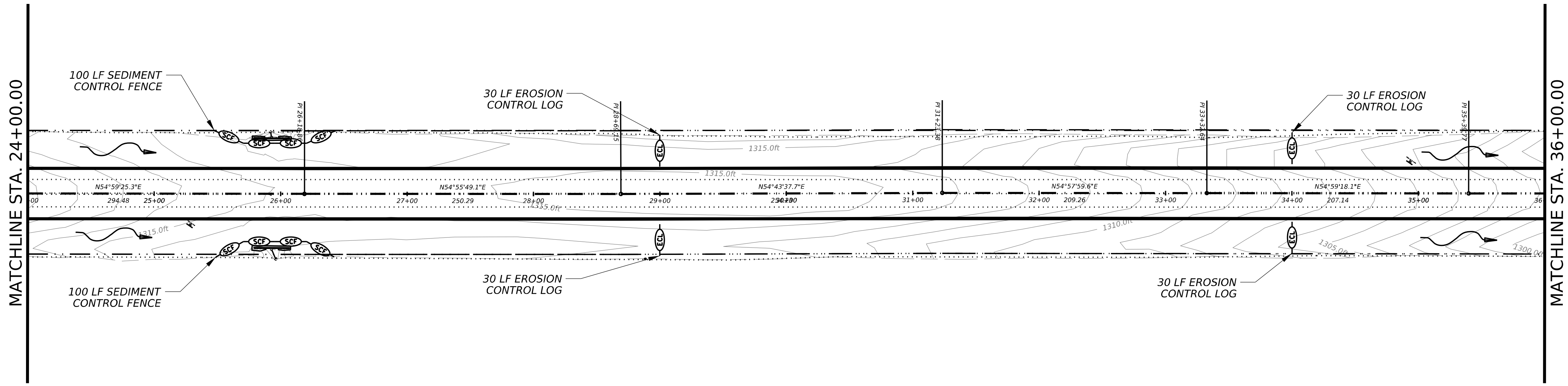
SW3P LAYOUT

SHEET 1 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		116

DATE: 10/24/2023 12:32:47 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/9. Environmental/SW3P Sheets.dgn

LEGEND	
(symbol)	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



LOCATION NO.	BMP PLACEMENT					
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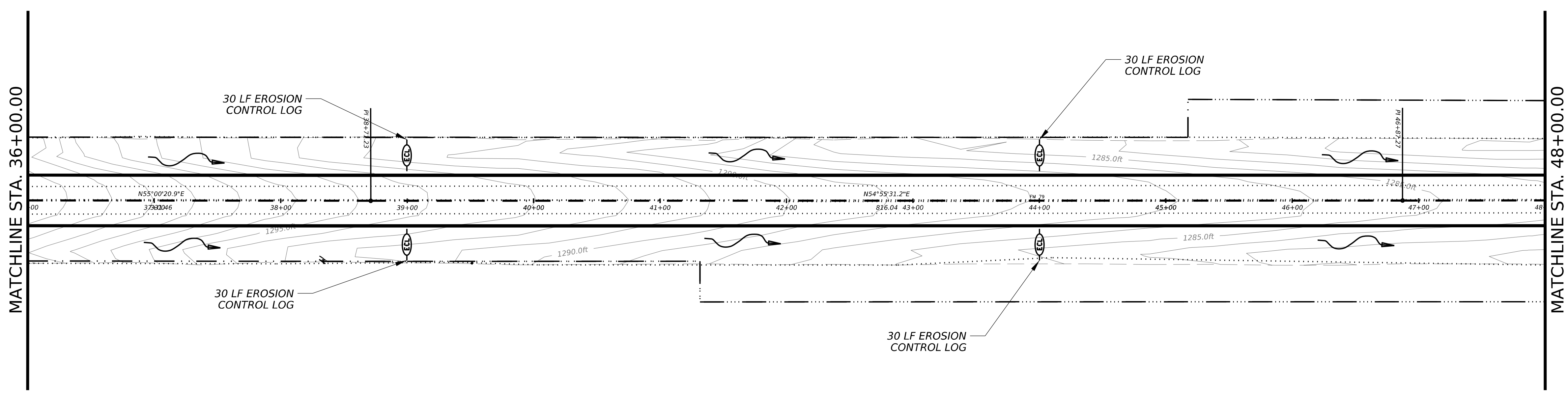

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Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 2 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		117

DATE: 10/30/2023 03:52:08 PM
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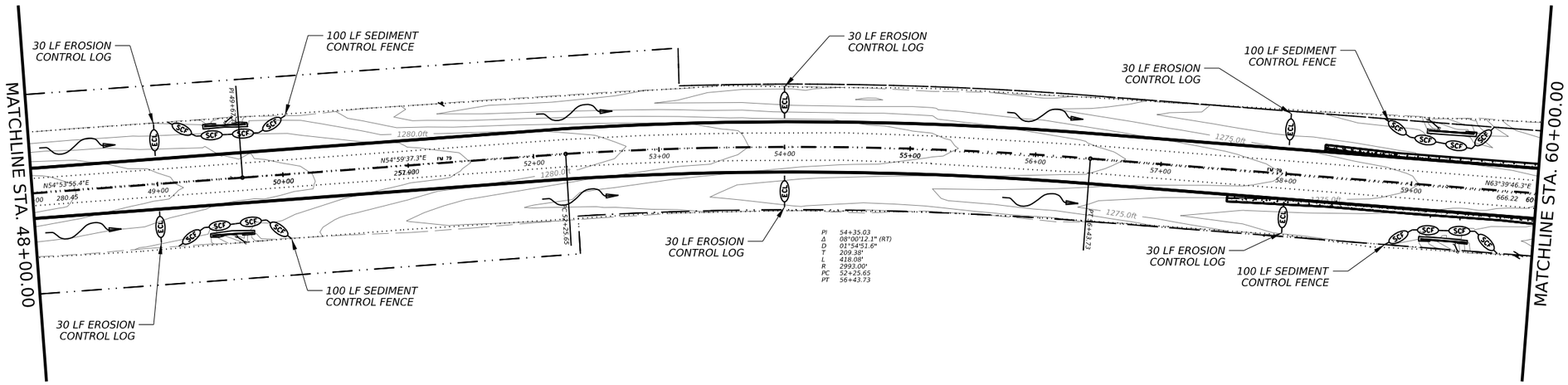

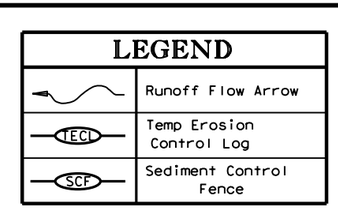

LOCATION NO.	BMP PLACEMENT					
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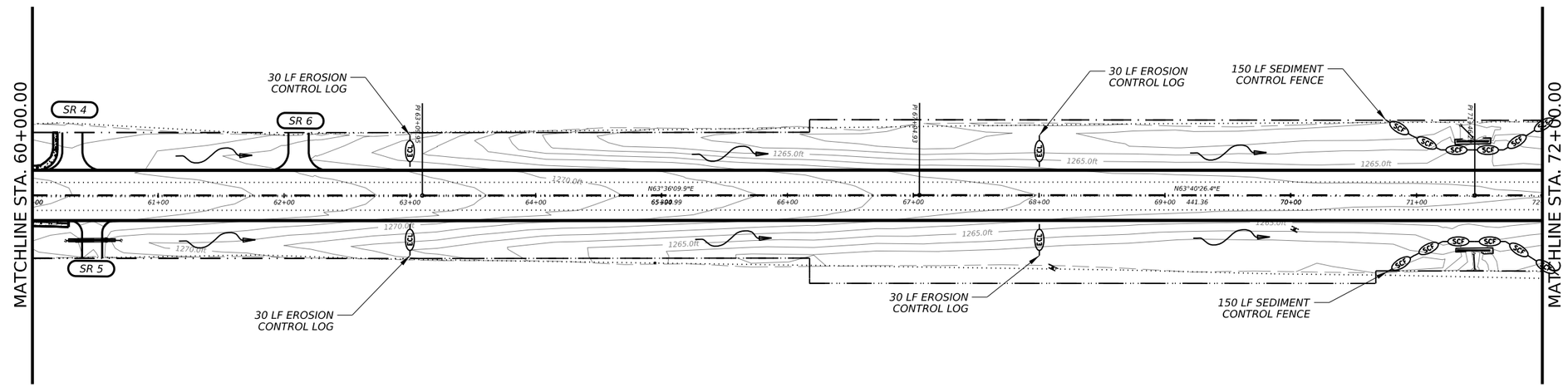
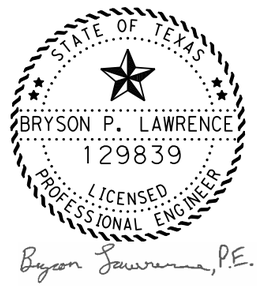




Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

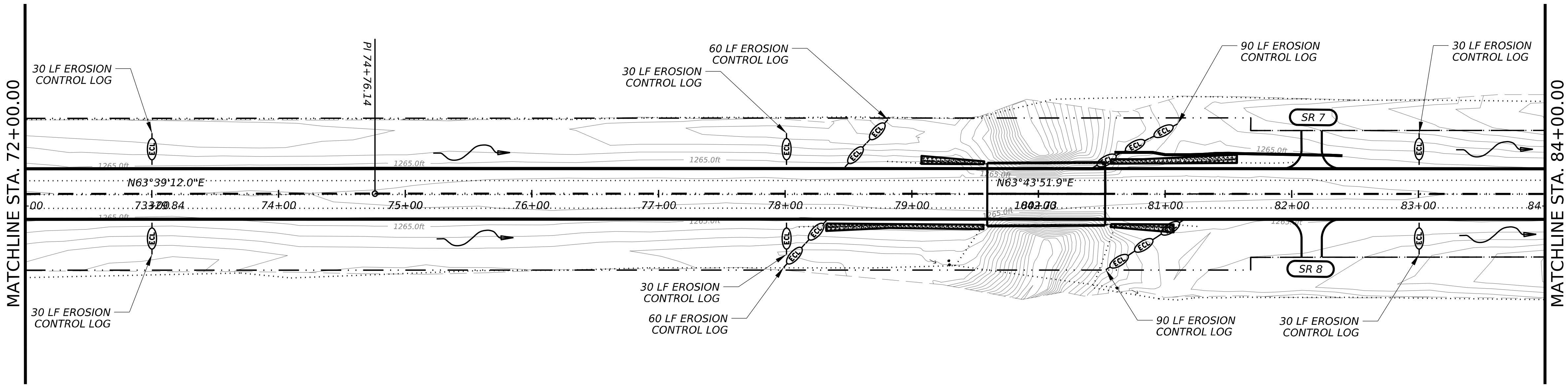
SHEET 3 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		118

DATE: 10/27/2023 3:25:08 PM
FILE: pc:\documents\projects\0284027\4 - design\plan set\9. environmental\sw3p sheets.dgn

LEGEND

(symbol)	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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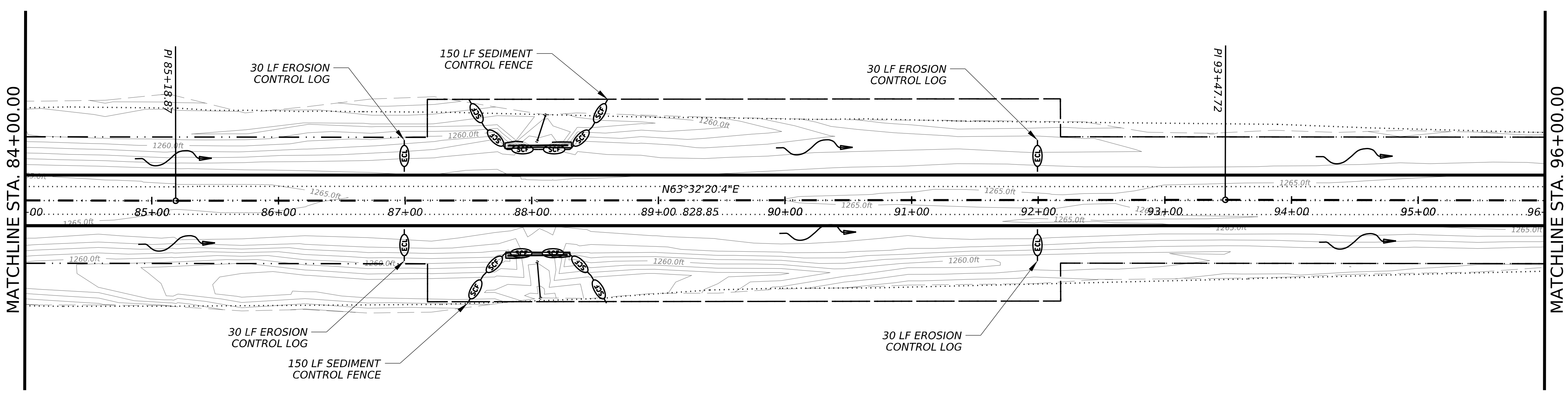

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10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

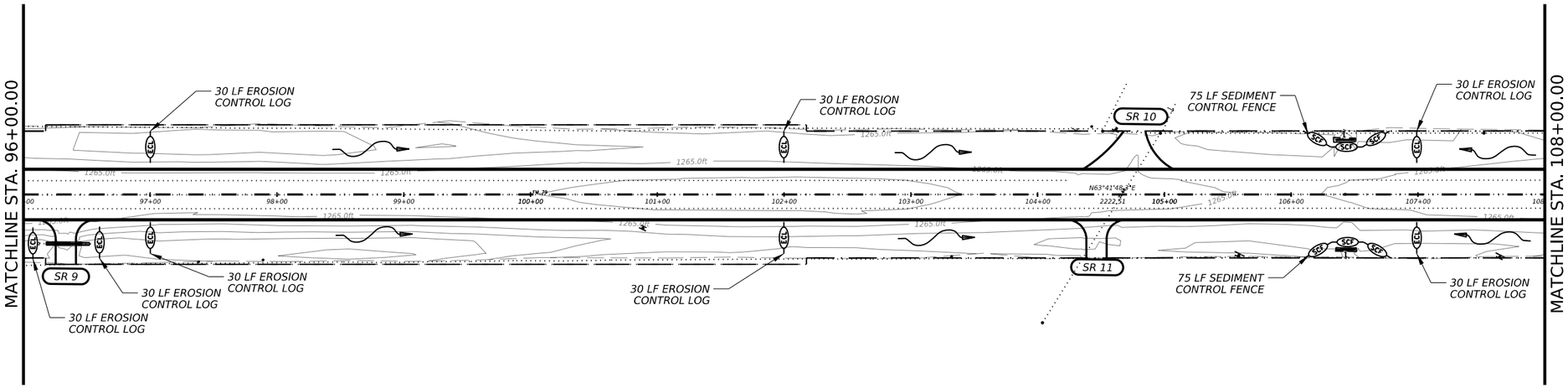
SHEET 4 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		119

DATE: 10/30/2023
FILE: pw://TxDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/9. Environmental/SW3P Sheets.dgn

LEGEND

Runoff Flow Arrow	
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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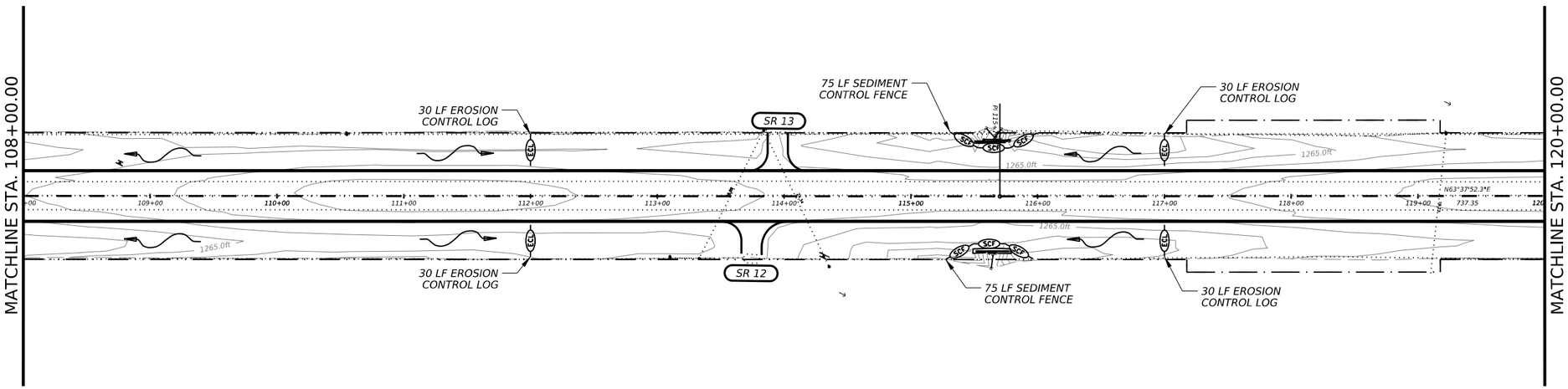

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SH 79

SW3P LAYOUT

SHEET 5 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		120

DATE: 10/27/2023 05:12:10 PM
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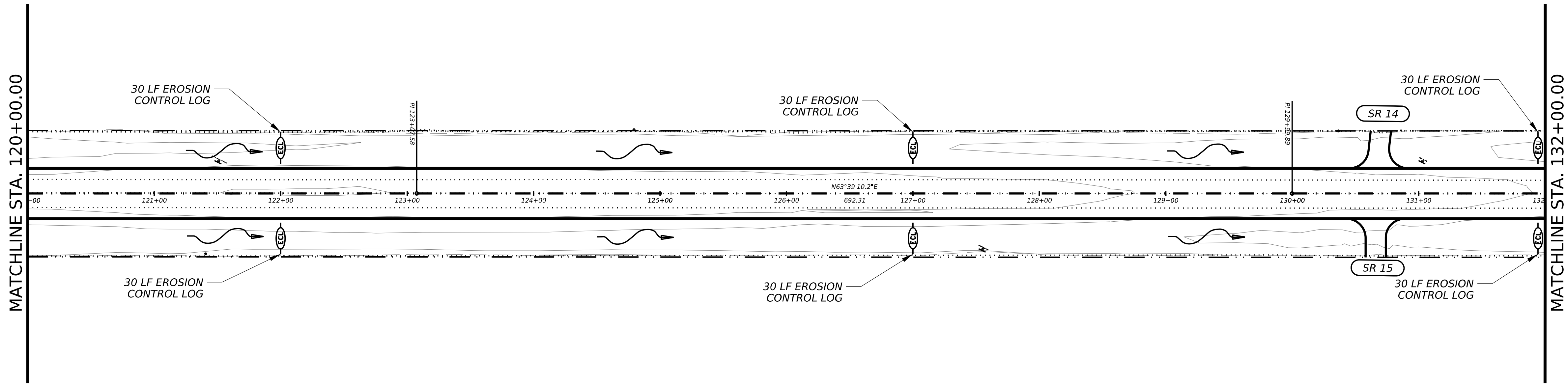
LEGEND

Symbol	Description
(arrow)	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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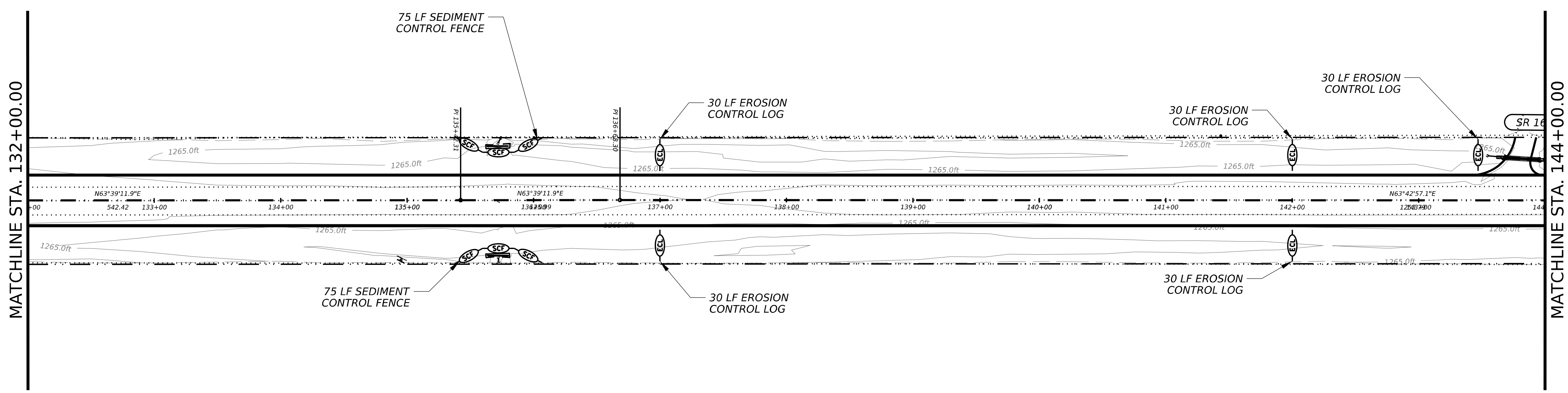

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10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 6 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		121

DATE: 10/30/2023 05:12:22 PM
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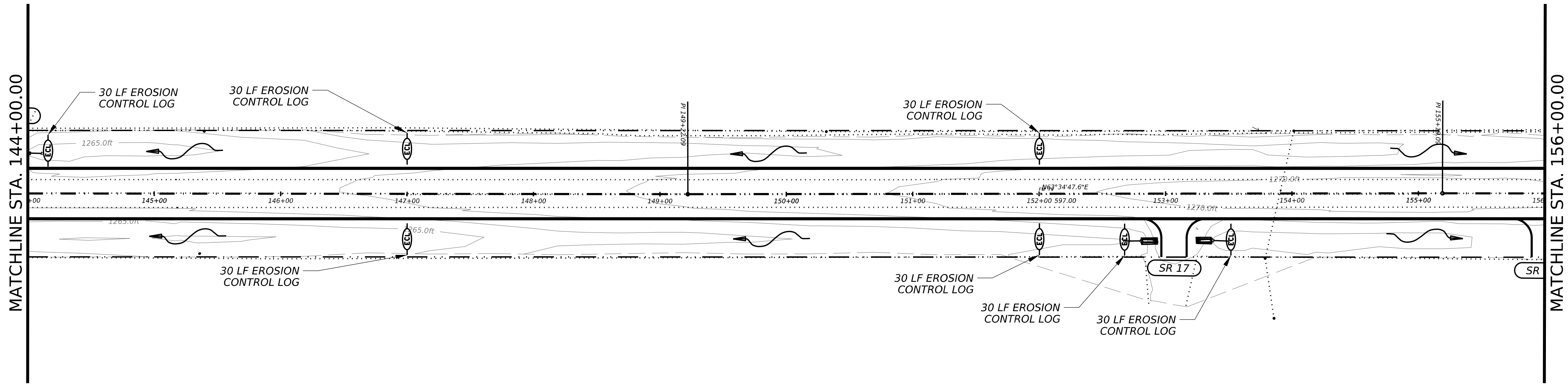
LEGEND

(symbol)	Runoff Flow Arrow
(TECL)	Temp Erosion Control Log
(SCF)	Sediment Control Fence



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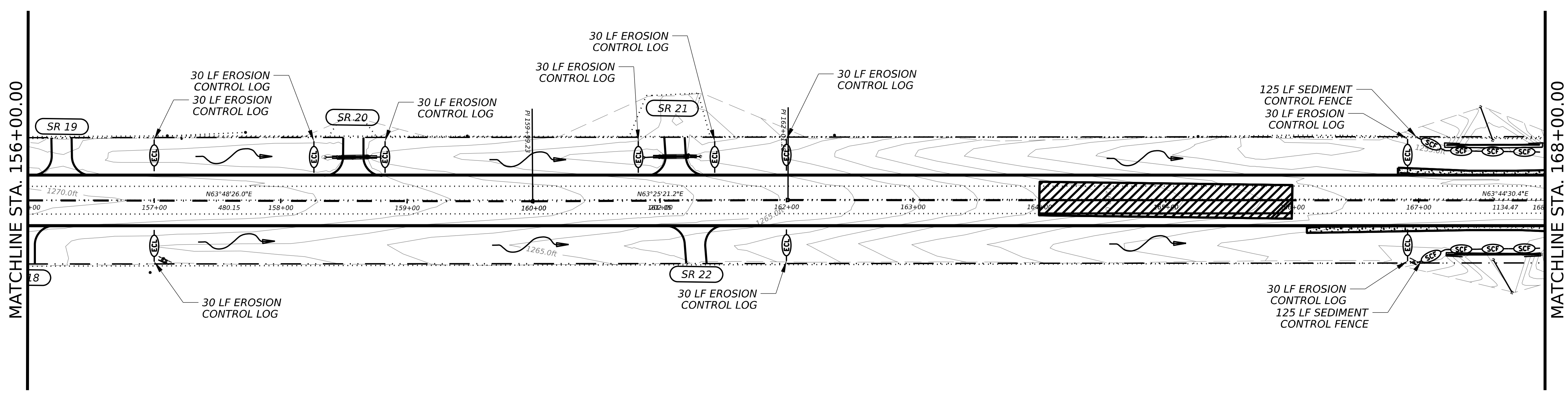

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10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 7 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		122

DATE: 10/31/2023 05:12:21 PM
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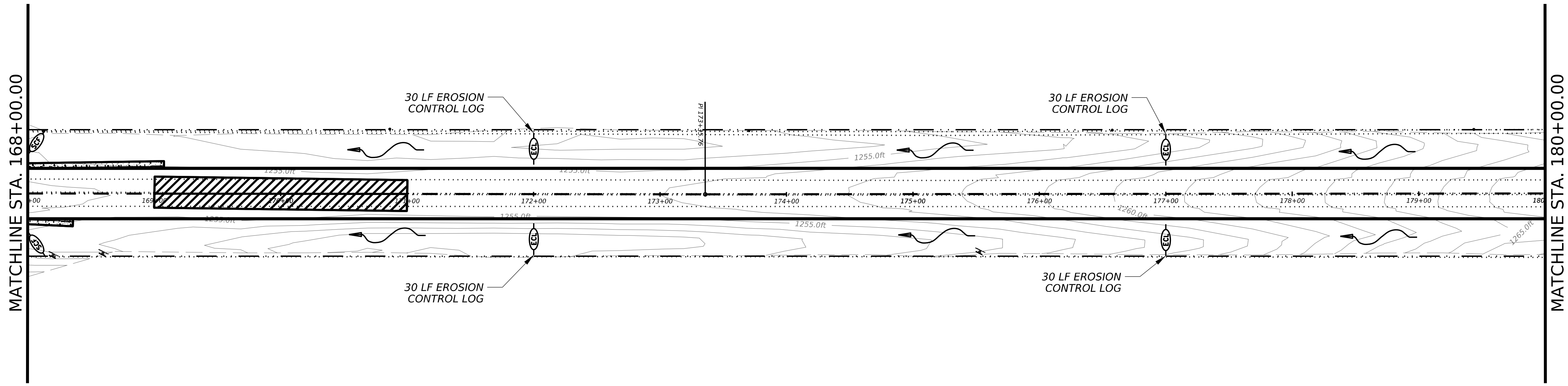
LEGEND

Symbol	Description
(arrow)	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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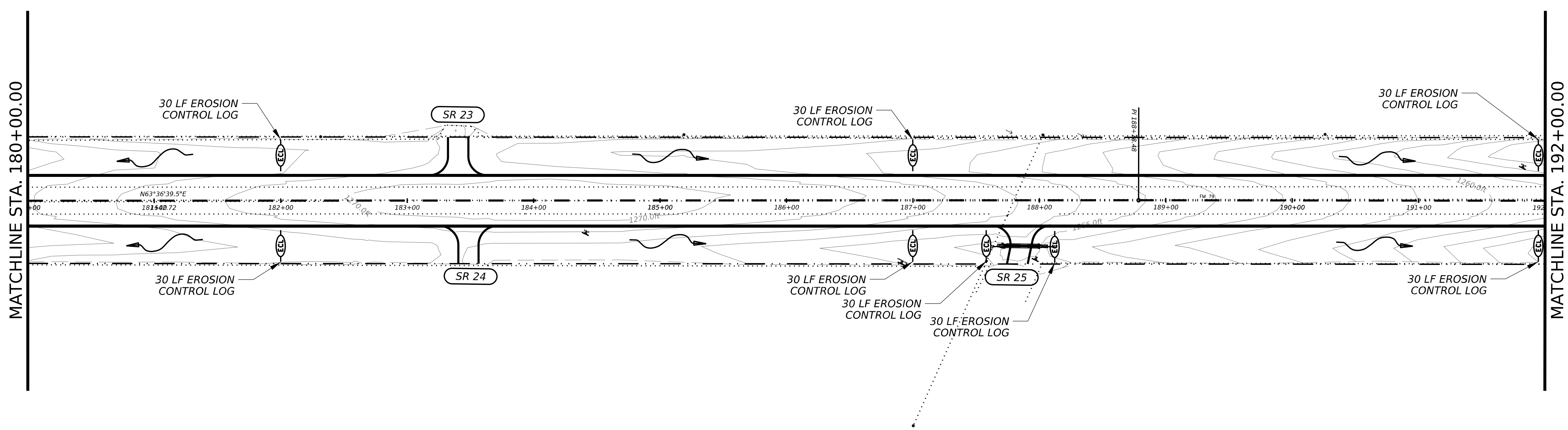

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10/30/2023

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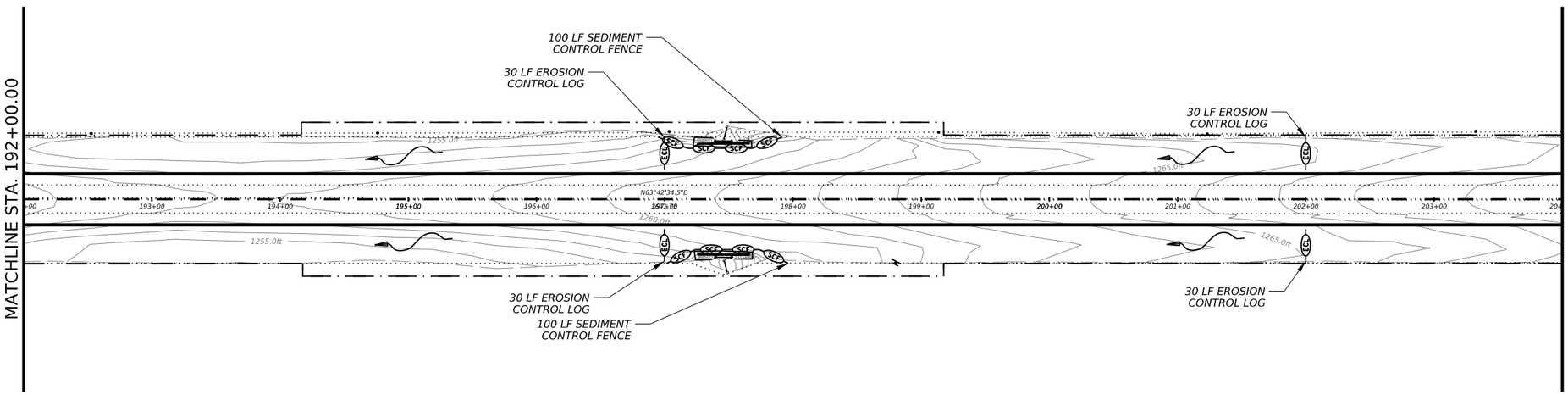
SH 79

SW3P LAYOUT

SHEET 8 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		123



LEGEND

	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence

LOCATION NO.	BMP PLACEMENT					
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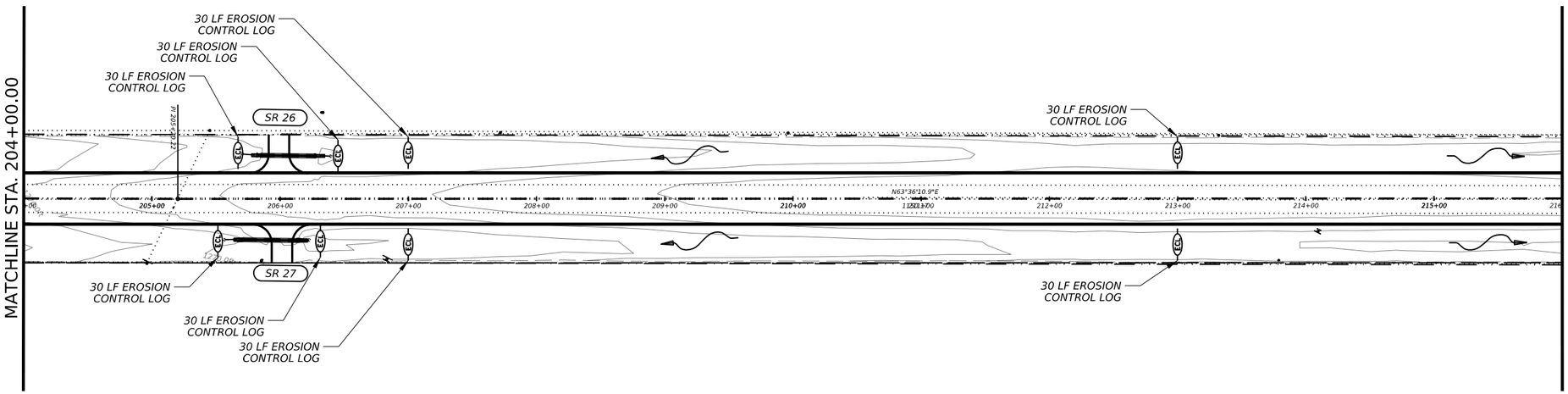

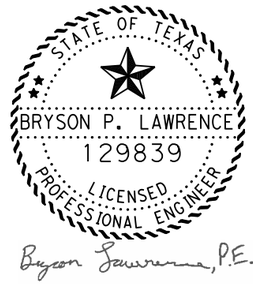

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 9 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		124

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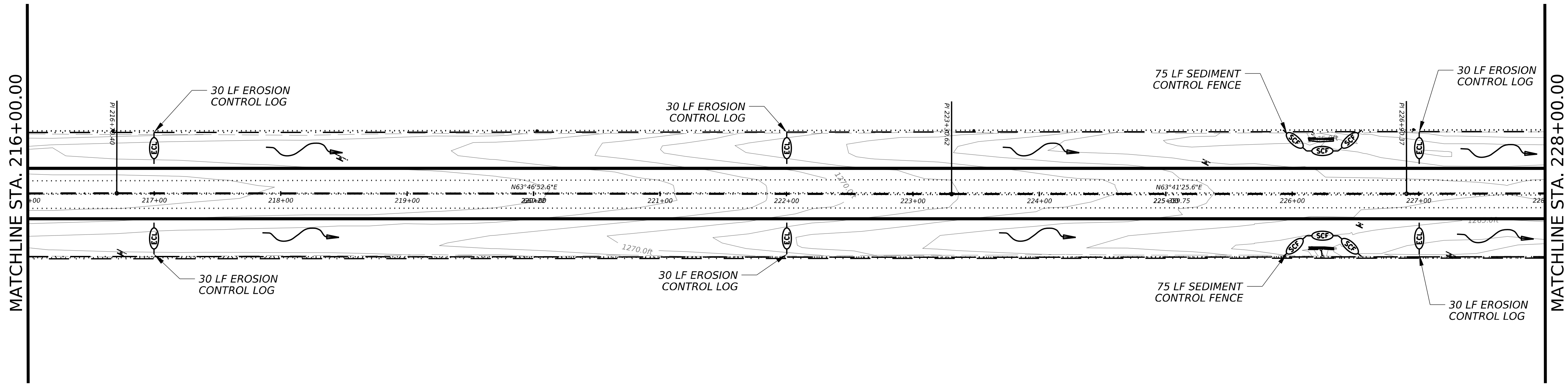
LEGEND

Symbol	Description
(arrow)	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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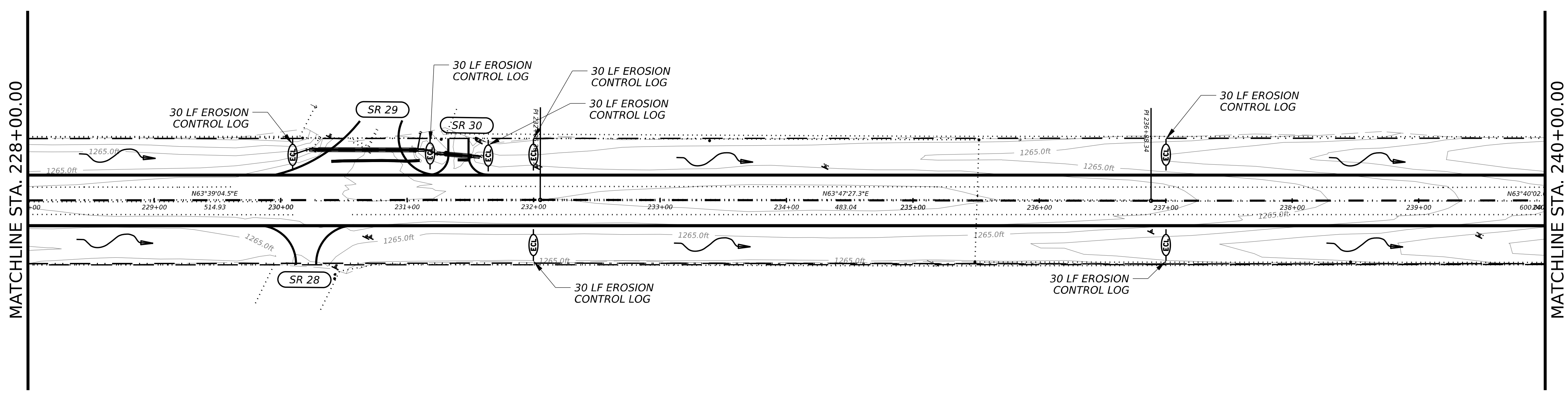

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Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 10 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79

DIST	COUNTY	SHEET NO.
WFS	Throckmorton	125

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LEGEND

Symbol	Description
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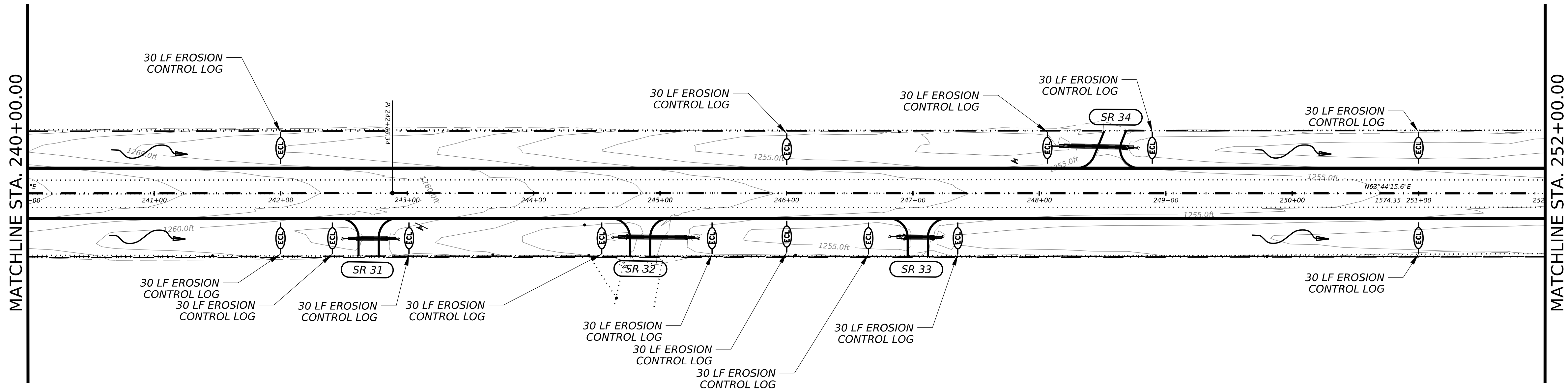
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



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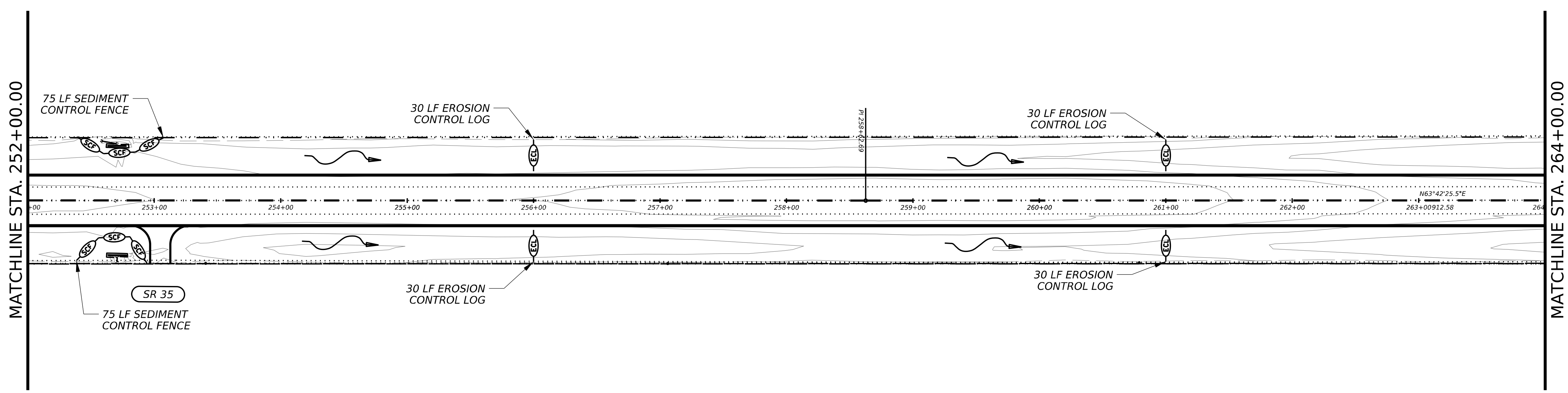

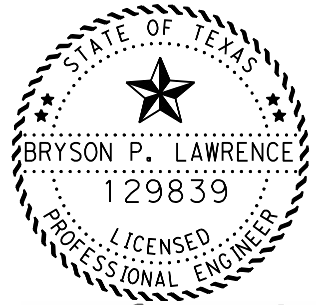

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 11 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		126

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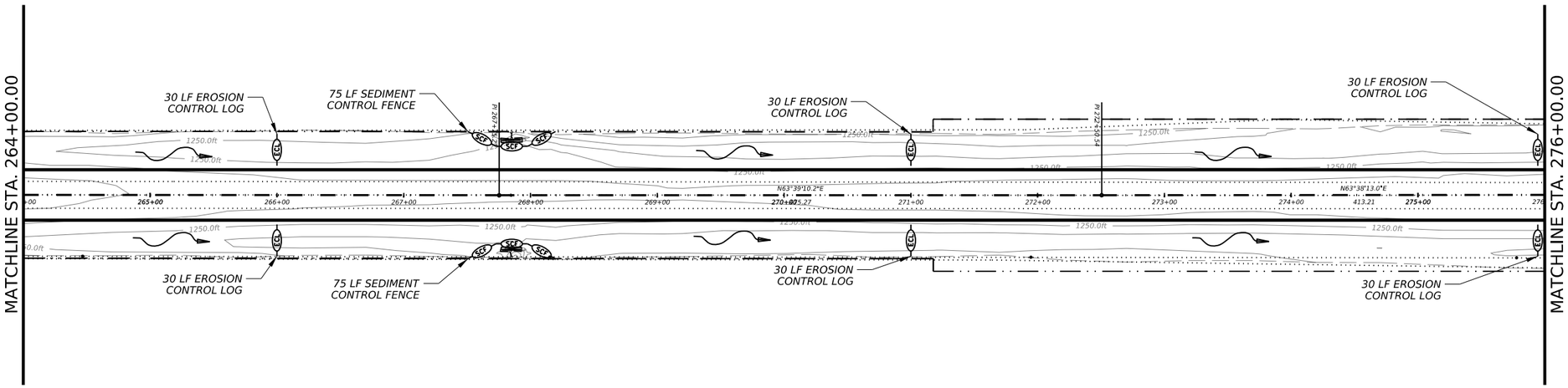

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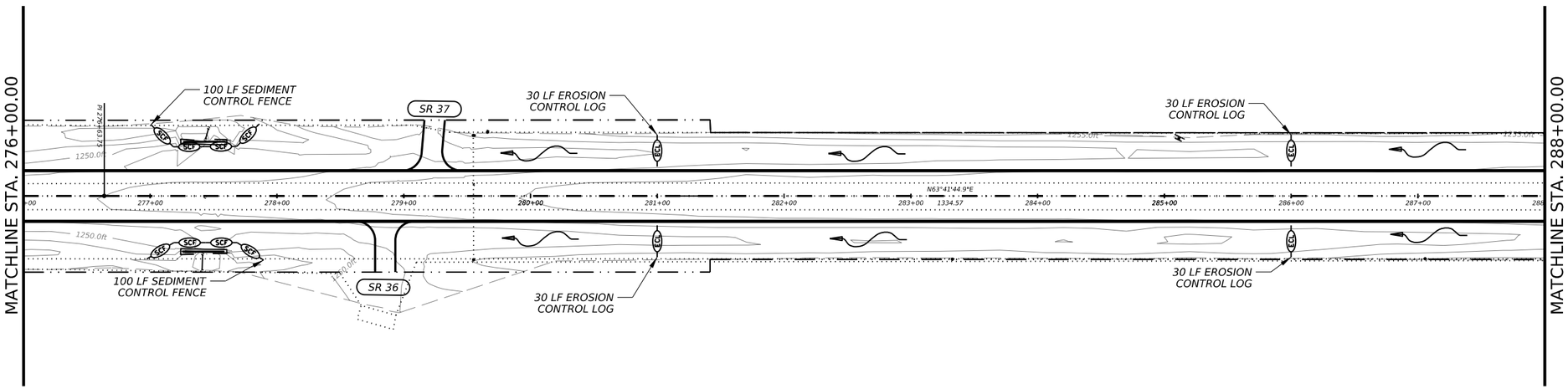

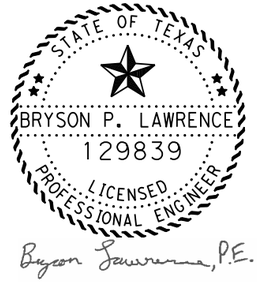

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 12 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		127

DATE: 10/31/2023 03:11:12 PM
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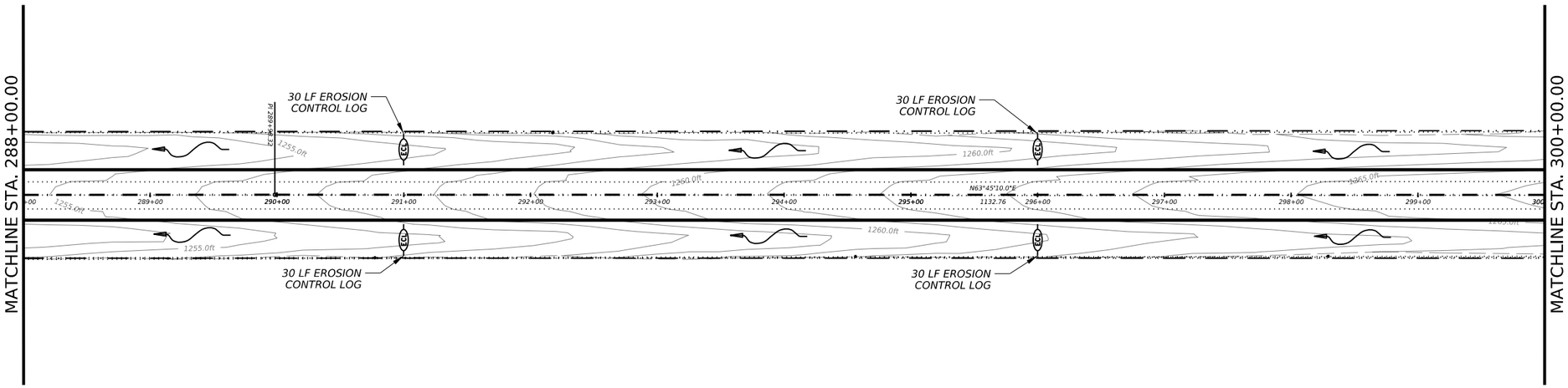

LEGEND

	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence

LOCATION NO.	BMP PLACEMENT					
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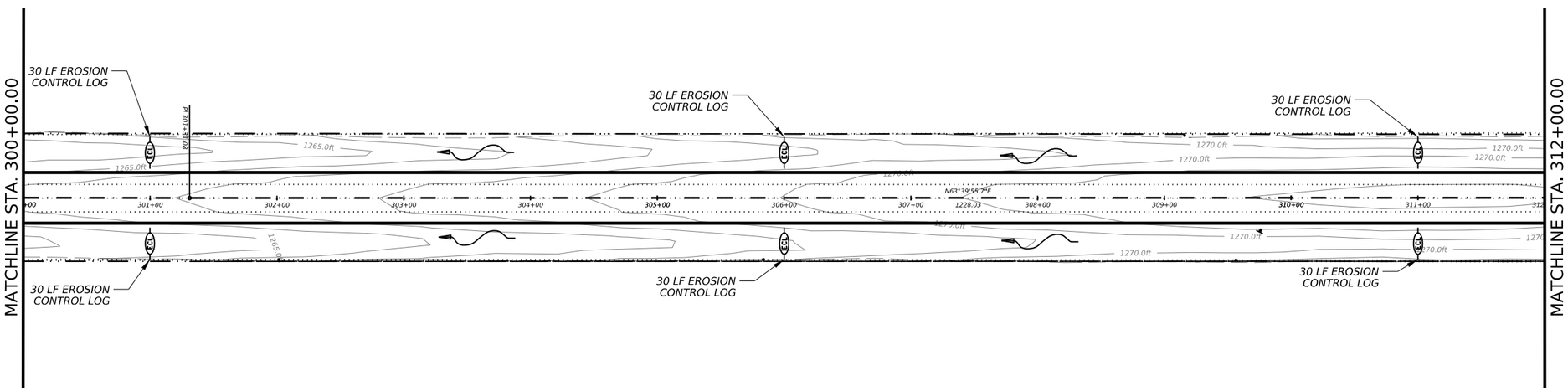

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 13 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		128

DATE: 10/27/2023 05:11:12 PM
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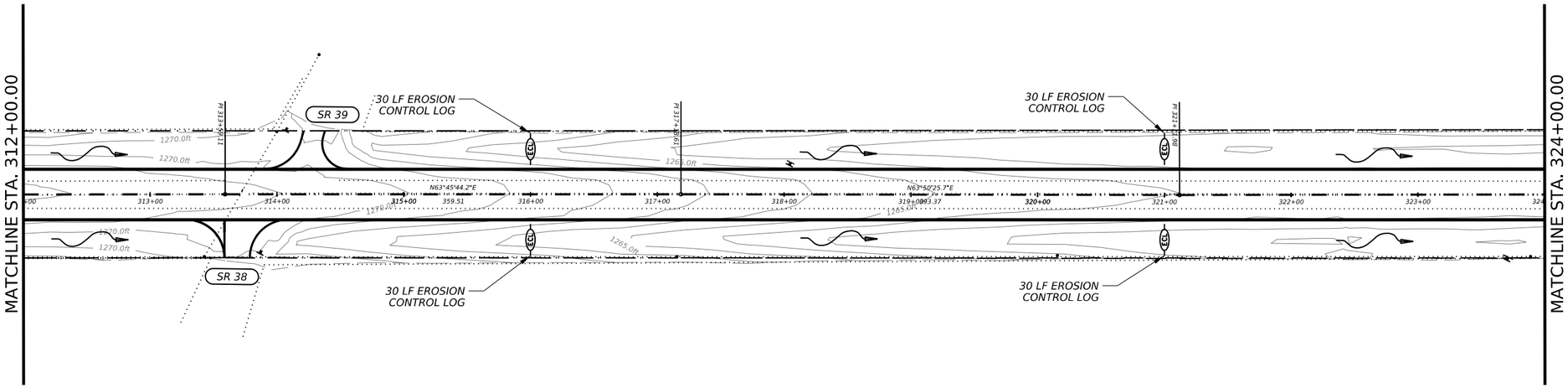

LOCATION NO.	BMP PLACEMENT					
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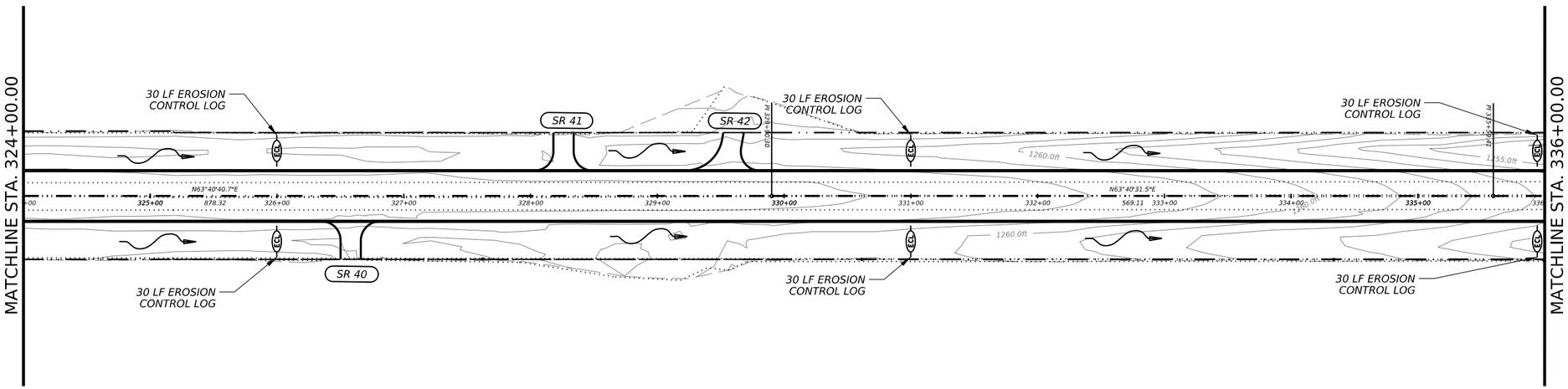
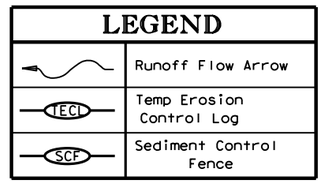
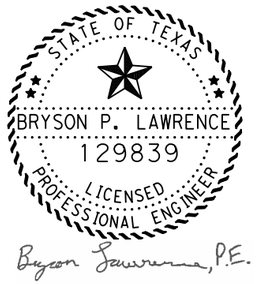






10/30/2023

Texas Department of Transportation

SH 79

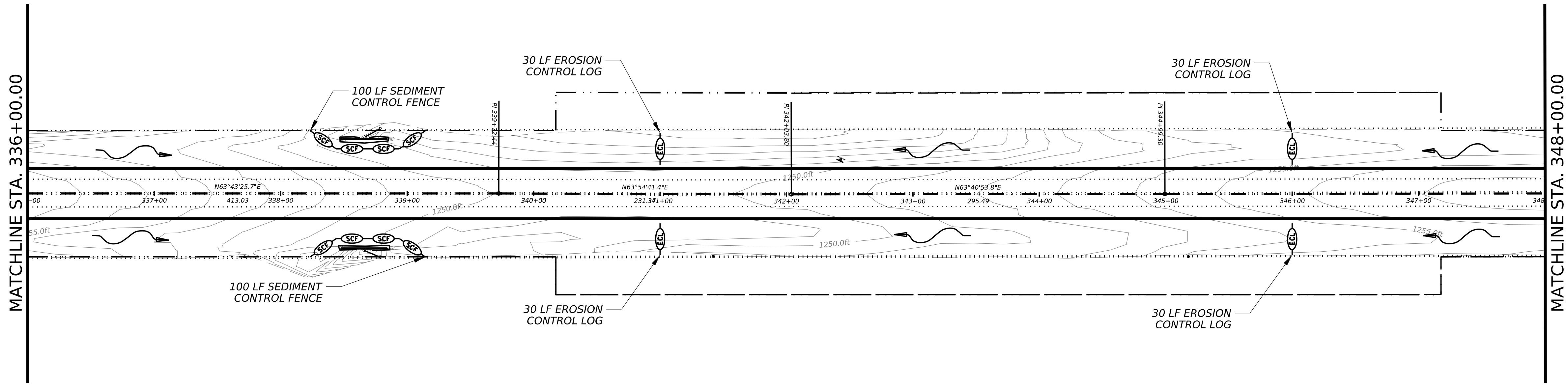
SW3P LAYOUT

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		129

DATE: 10/27/2023 12:32:06 PM
FILE: pw://txdot.bentleyconnect.bentleyonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/9. Environmental/SW3P Sheets.dgn

LEGEND

Symbol	Description
(arrow)	Runoff Flow Arrow
TECL	Temp Erosion Control Log
SCF	Sediment Control Fence



LOCATION NO.	BMP PLACEMENT					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
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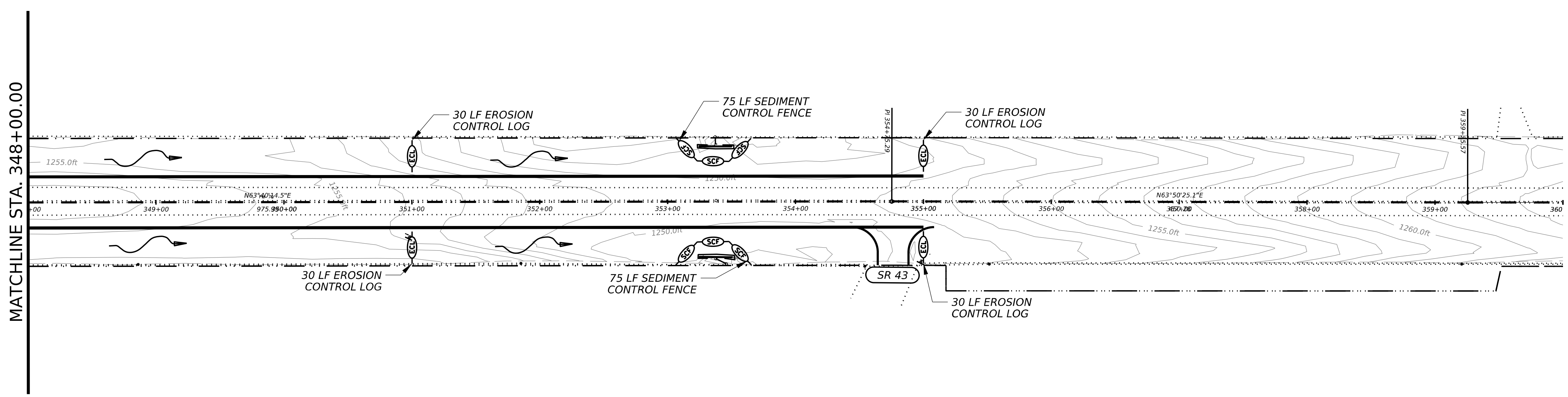

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
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Bryson Lawrence, P.E.

10/30/2023

Texas Department of Transportation

SH 79

SW3P LAYOUT

SHEET 15 OF 15

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		130

DATE: 10/31/2023 05:12:26 PM
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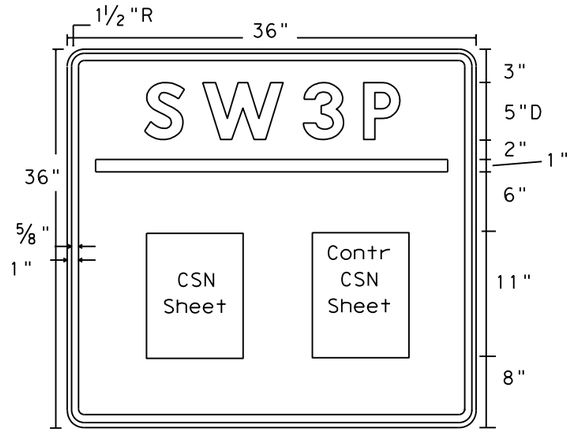


Sign Dimensions

36" X 36"

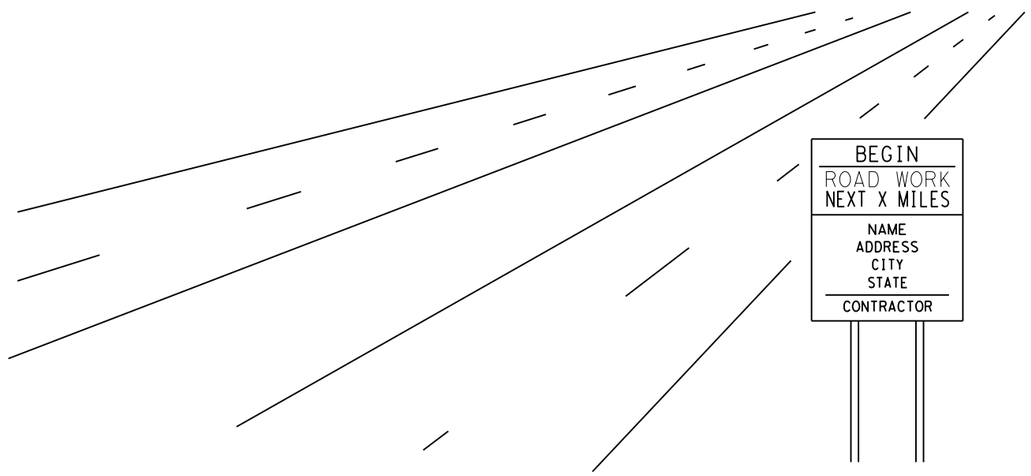
Letters - White
Numbers - White
Border - White
Background - Blue

GENERAL NOTES:

1. The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
2. Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
3. CSN & CCSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
4. Signs should be placed just inside the right of way line at the project limits at a readable height. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. If placed outside the clear zone, SW3P sign may be placed perpedicular or parallel to ROW line.
5. Final location of the signs will be approved by the Engineer.

SW3P SIGN

TxDOT Large or Small Construction
Site Notice (CSN) &
Contractor Large or Small Construction
Site Notice (CCSN)



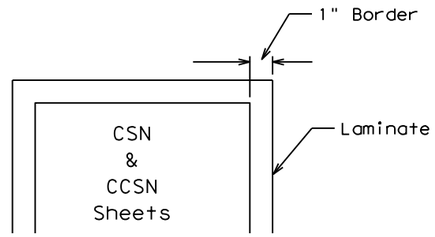
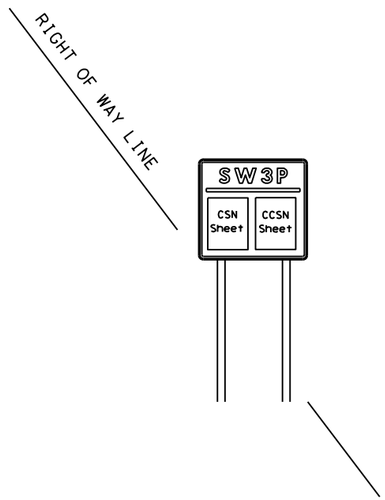


Figure 1



DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

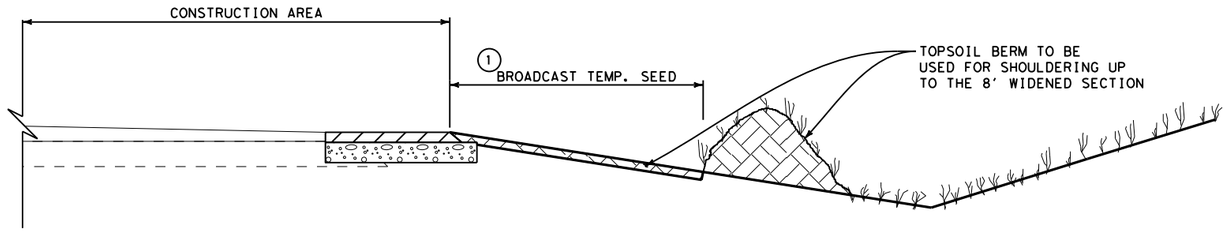
Texas Department of Transportation
WICHITA FALLS DISTRICT STANDARD

SH 79

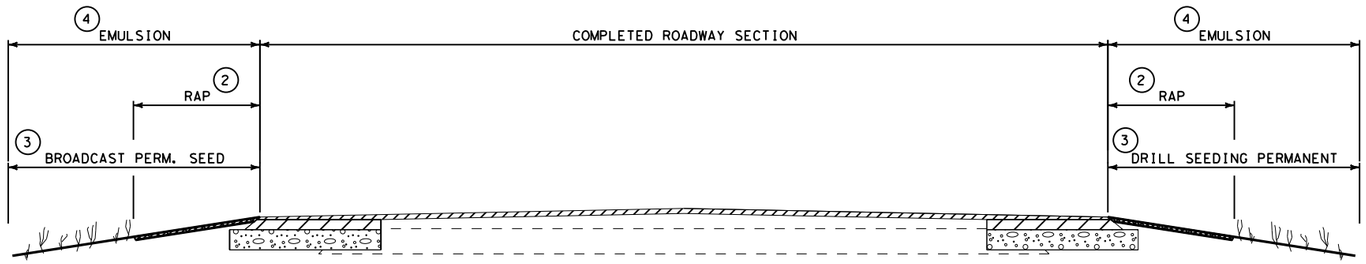
SW3P SIGN

FILE:	DN: TxDOT	CK:	DW:	CK:
©TxDOT 2024	DISTRICT	FEDERAL AID PROJECT		HIGHWAY
	WFS	SEE TITLE SHEET		SH 79
REVISION DATE: 5/12/17	COUNTY	CONTROL	SECT	JOB	SHEET
	Throckmorton	0284	02	027	131

LEVELS DISPLAYED
PATH:



PROPOSED TEMPORARY
SEEDING TYPICAL



PROPOSED PERMANENT
SEEDING TYPICAL

NOTES:

1. BROADCAST TEMPORARY SEED ESTIMATED @ 15' ONCE THE NATIVE TOP SOIL BERM HAS BEEN SHOULDERED UP TO THE WIDENED SECTION. REFER TO THE WFS-TA-VES PLAN SHEET FOR SEEDING MIXTURES.
2. REFER TO THE GENERAL NOTES FOR THE LOCATION OF THE RECYCLED ASPHALT PAVEMENT. PLACEMENT DISTANCE IS TO BE A MINIMUM OF 4' OR AS NEEDED TO ACHIEVE SMOOTH TIE IN TO EXISTING FRONT SLOPE. REFER TO BMP#15 ON WFS-TA-BMP PLAN SHEET. (USE TOP SOIL BERM IF THERE IS NO RAP AVAILABLE)
3. DRILL SEEDING PERMANENT SEED ESTIMATED @ 15' ONCE ALL DISTURBANCE ACTIVITIES HAVE BEEN COMPLETED. REFER TO THE VEGETATIVE ESTABLISHMENT PLAN SHEET FOR SEEDING MIXTURES.
4. EMULSION HAS BEEN ESTIMATED AT A MINIMUM OF 5' REFER TO THE BASIS OF ESTIMATES FOR THE APPLICATION RATE.

MULTIPLE MOBILIZATIONS WILL BE REQUIRED DURING THE TEMPORARY SEEDING OPERATIONS. THE CONTRACTOR WILL NEED TO ADJUST WIDENING OPERATIONS DURING THIS PHASE OF CONSTRUCTION IN ORDER TO ESTABLISH VEGETATION AS ROAD IS BEING WIDENED. VEGETATION ESTABLISHMENT SHALL BE ONGOING AS ROAD WORK PROGRESSES.

N. T. S.

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SH 79
VEGETATIVE ESTABLISHMENT DETAIL

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0284	02	027	SH 79
DIST	COUNTY		SHEET NO.
WFS	Throckmorton		132

DATE: 10/30/2023 2:58:57 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/0284020274 - Design/Plan Set/9. Environmental/VEGETATIVE ESTABLISHMENT DETAIL.dgn

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

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0802-02-078

1.2 PROJECT LIMITS:
From: BU 287 J

To: Wichita River

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 33.2382606 ,(Long) -99.0754401

END: (Lat) 33.1925161 ,(Long) -99.1773049

1.4 TOTAL PROJECT AREA (Acres): 71.12

1.5 TOTAL AREA TO BE DISTURBED (Acres): 35

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Grading, excavation, culvert and channel cleaning, ditch grading, embankment erosion, sediment controls, and seeding.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Leeray Clay	0-1% grades, Covered with 90-100% grass and 10-15% trees with a few gravel county roads and driveways.

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
Unnamed	Red River

* 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

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	F 2023(922)		133
STATE	STATE DIST.	COUNTY	
TEXAS	03	THROCKMORTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0284	02	026	SH 79

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [x] [ ] Protection of Existing Vegetation
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [x] [ ] Temporary Seeding
- [ ] [x] Permanent Planting, Sodding or Seeding
- [x] [ ] Biodegradable Erosion Control Logs
- [x] [ ] 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

- [x] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [x] [ ] Inlet Protection
- [x] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [x] [ ] 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

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [x] Excess dirt/mud on road removed daily
- [x] Haul roads dampened for dust control
- [x] Loaded haul trucks to be covered with tarpaulin
- [x] Stabilized construction exit
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [ ] Chemical Management
- [x] Concrete and Materials Waste Management
- [x] Debris and Trash Management
- [ ] Dust Control
- [x] 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

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [x] Fire hydrant flushings
- [x] Irrigation drainage
- [x] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [x] Potable water sources
- [x] Springs
- [x] Uncontaminated groundwater
- [x] Water used to wash vehicles or control dust
- [x] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 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.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	F 2023(922)		134
STATE	STATE DIST.	COUNTY	
TEXAS	03	THROCKMORTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0284	02	026	SH 79

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. None

☐ No Action Required ☑ Required Action

Action No.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☑ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP#______

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

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. If burial remains and/or artifacts are discovered cease work and contact the WFS District Environmental Coordinator. If discovered, tribes request immediate notification by TxDOT.

2. No impacts off right-of-way are permitted without coordinating with the DEQC and/or EC.

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. Impacts to vegetation should be kept to the minimum necessary. Associated impacts will be the minimum necessary to perform the work.

2. Trees shall be trimmed rather than removed when feasible.

3. Disturbed areas would be re-vegetated according to TxDOT's standard practices for rural areas, which to the extent practicable, is in compliance with Executive Memorandum on Beneficial Landscaping, if applicable.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☑ Required Action

Action No.

Bird BMPs: Migratory birds may arrive in the project area to breed during construction of the proposed project. Per the Migratory Bird Treaty Act (MBTA), measures would be taken to avoid disturbing or killing of migratory birds. Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season, March through August. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests prior to nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

Alternative Bat BMP: In all instances, avoid harm or death to bats. If bats are encountered during construction stop work in the area and contact district environmental coordinator (Nellie Bennett) at 940 720 7733. Bats should only be handled as a last resort and after communication with TPWD.

Mammal BMPs: Contractor will be advised of the potential occurrence of the long-tailed weasel, eastern spotted skunk, mountain lion, to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.

Terrestrial Reptile BMPs: Visually inspect excavation areas for trapped wildlife prior to backfilling. Inform contractors that if reptiles are found on project site allow species to safely leave the project area.

Amphibian and Aquatic Reptile BMPs: Contractors will be advised of potential occurrence of the Woodhouse's Toad in the project area, and to avoid harming them if encountered. Project specific locations (PSLs) within state-owned ROW should be located in uplands away from aquatic features.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☑ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☑ Required Action

If sheen or other contamination is visible in the waters of the U.S., or on the project site, the site shall be immediately cleaned up in accordance with local, state and federal regulations.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☐ No Action Required ☑ Required Action

Action No.

1. Keep noise to a minimum. Reduce idling of vehicles and equipment.

2. Maintain project site. Minimize dust and airborne particles to the maximum extent practical.

3. Collect sanitary waste in accordance with local regulations by a sanitary waste collector. Portable units shall not be placed in or near a waterway or drainage area.

4. TxDOT EMS Policy Statement (English & Spanish) should be displayed at the construction site.

5. Collect all waste materials, trash, and debris from the construction site daily and deposit into a metal dumpster having a secure cover.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: 12-12-2011 (DS); 05-07-14 ADDED NOTE SECTION IV.; 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0284	02	027	SH 79
	DIST		COUNTY	SHEET NO.
	WFS		Throckmorton	135

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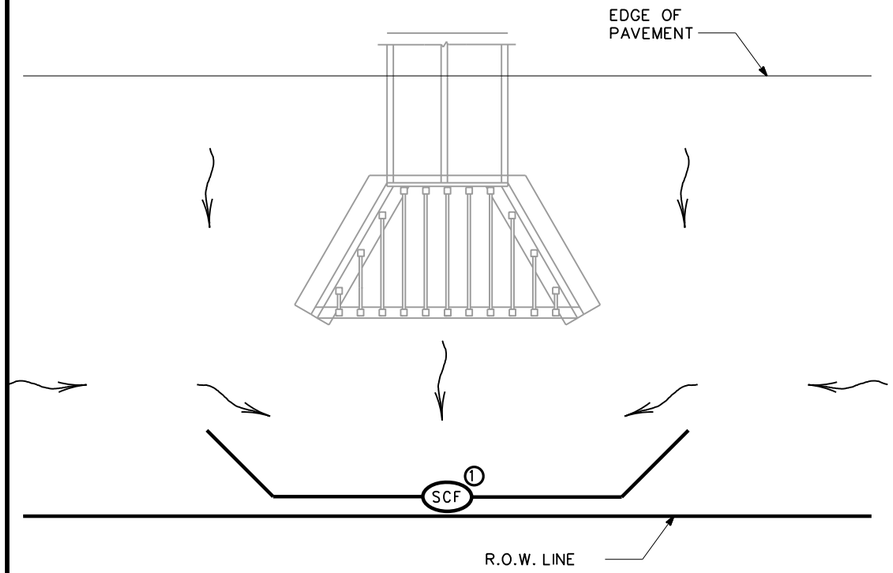
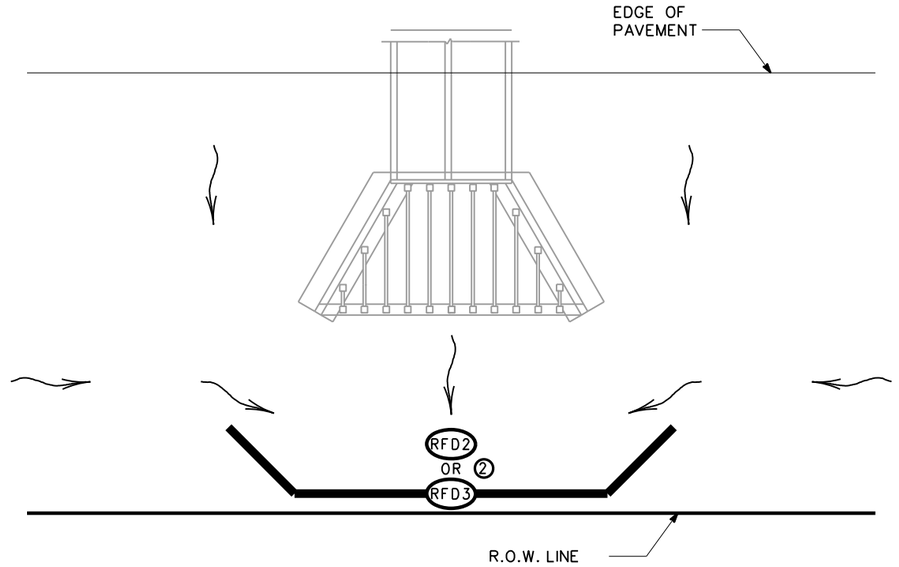


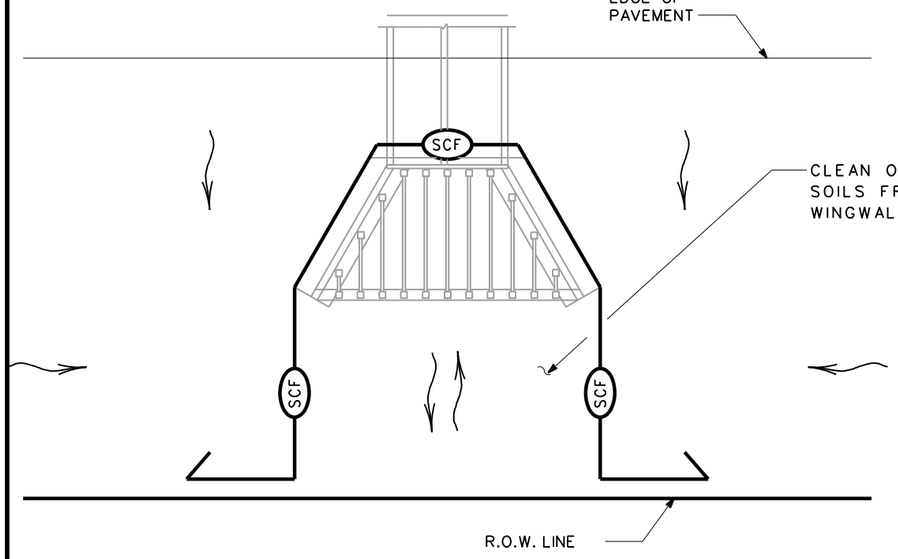
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



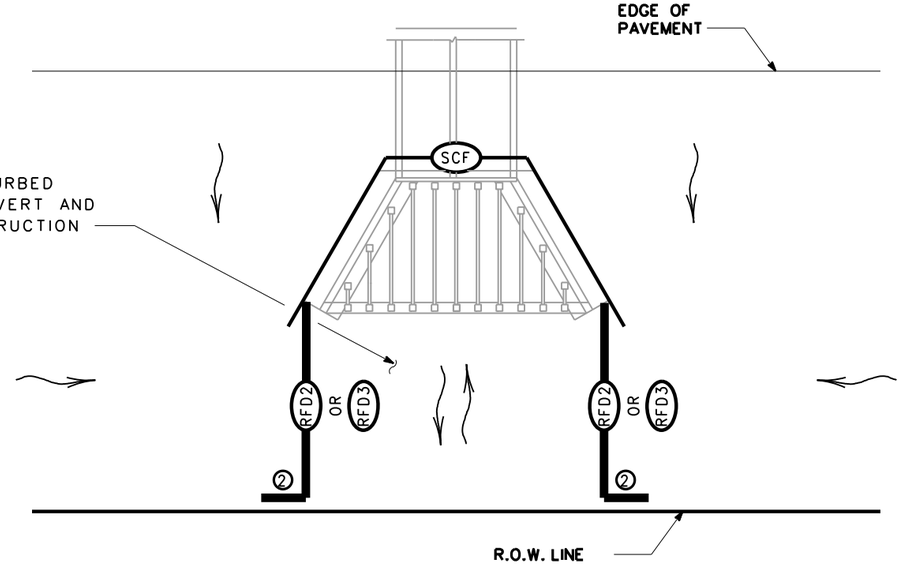
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.

2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SCALE = NTS SHEET 1 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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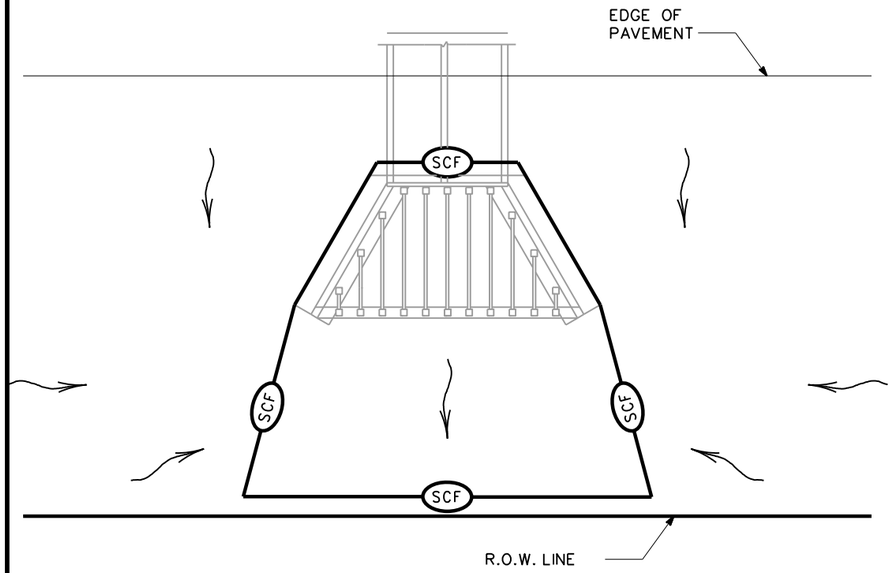
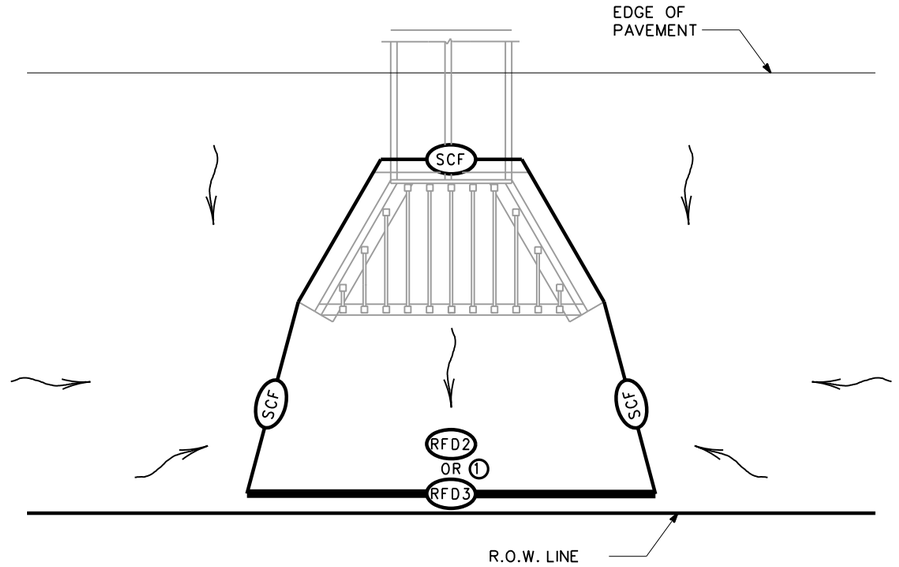
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		136



BEST MANAGEMENT PRACTICE (BMP) •5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) •6

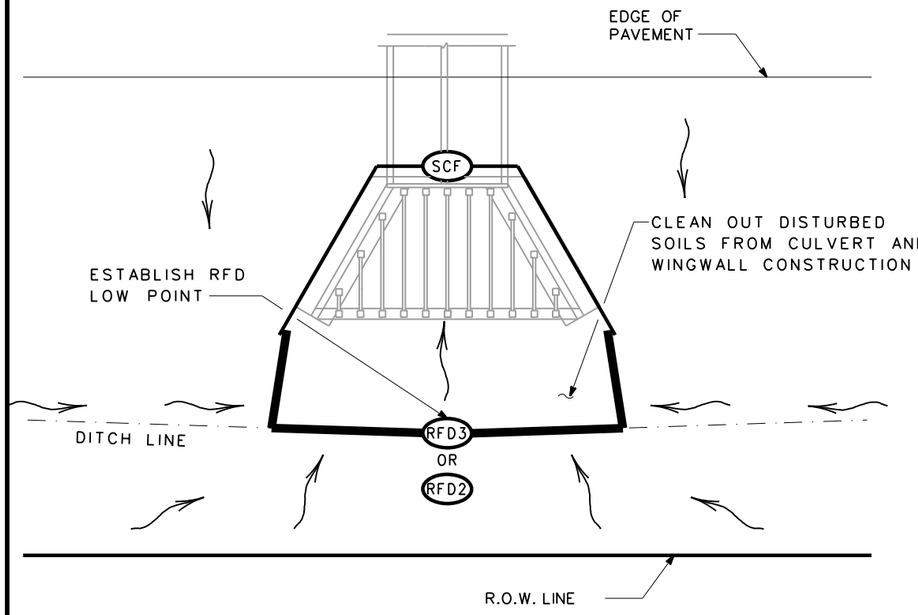
FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

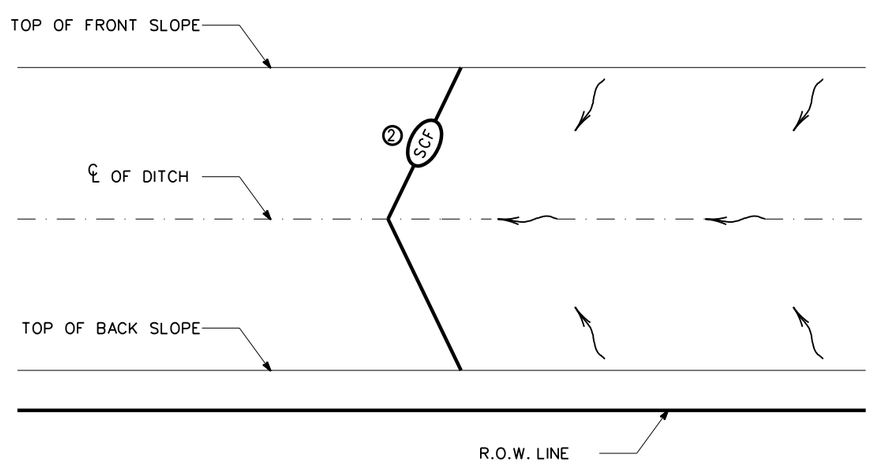
(1) PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

(2) ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.



BEST MANAGEMENT PRACTICE (BMP) •7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) •8

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE

STATE OF TEXAS
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129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

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SCALE • NTS SHEET 2 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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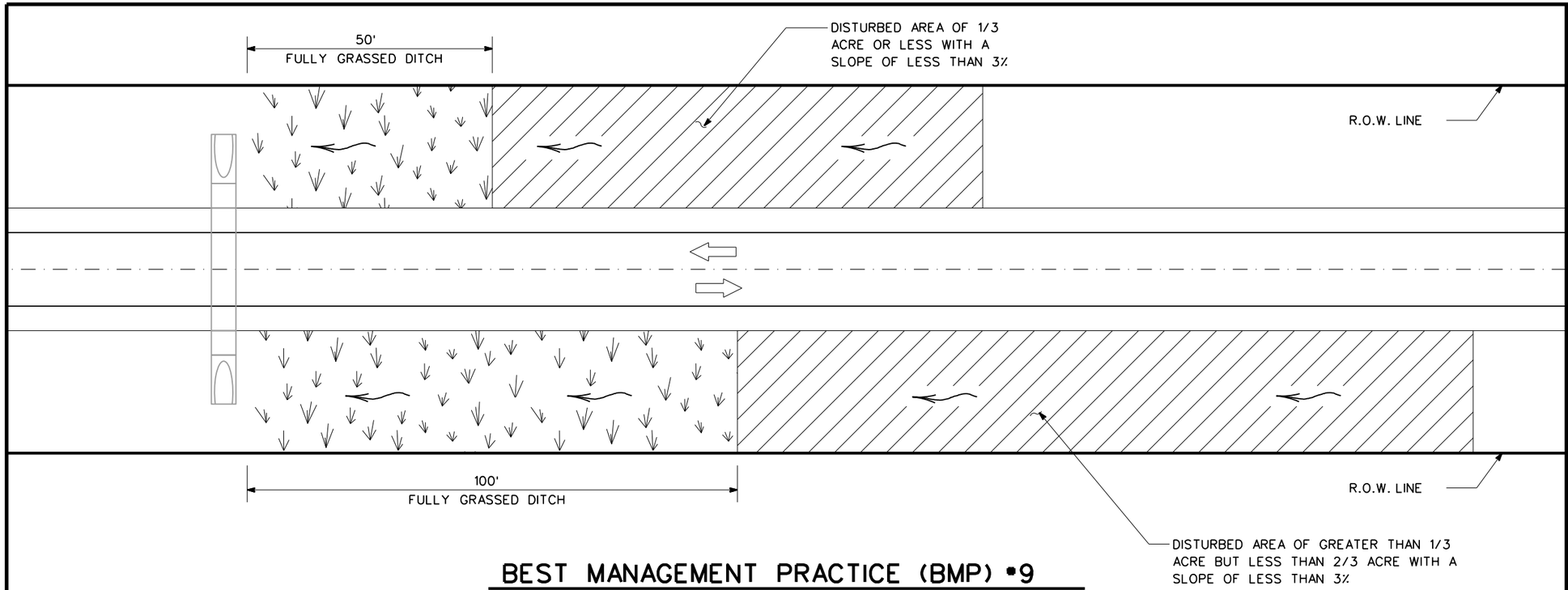
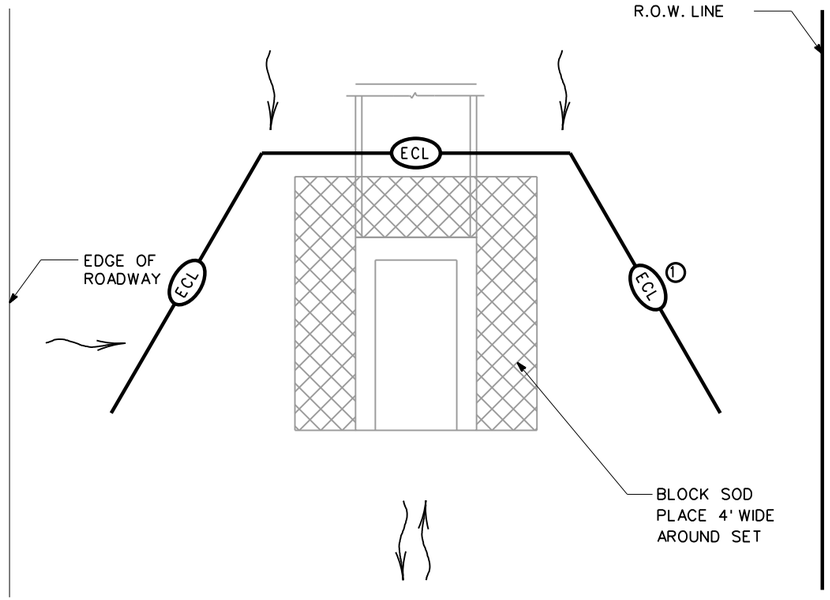


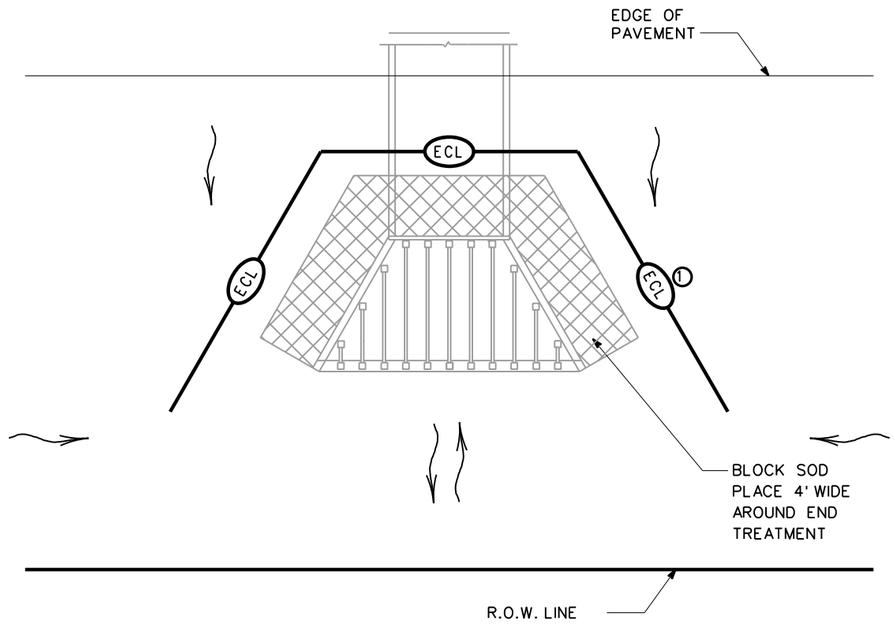
BEST MANAGEMENT PRACTICE (BMP) #9

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS



BEST MANAGEMENT PRACTICE (BMP) #10

SEDIMENT CONTROL AT
PARALLEL DRAINAGE STRUCTURE ENTRANCE/EXIT



BEST MANAGEMENT PRACTICE (BMP) #11

SEDIMENT CONTROL AT
CROSS DRAINAGE STRUCTURE ENTRANCE/EXIT

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
ECL	EROSION CONTROL LOG
	SOD

NOTES:

1. SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
BRYSON P. LAWRENCE
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LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SCALE = NTS SHEET 3 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
WHITE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

SIGN GENERAL NOTES:

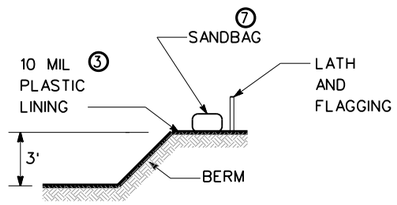
A. THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", (TMUTCD) LATEST EDITION, AND THE "COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST". LATERAL SPACING OF TEXT SHALL PROVIDE A BALANCED APPEARANCE. ALL MATERIALS SHALL CONFORM TO DEPARTMENT SPECIFICATIONS.

B. LEGEND AND BORDER MAY BE APPLIED BY REVERSE SCREENING PROCESS WITH TRANSPARENT COLORED INK, CUT-OUT WHITE REFLECTIVE SHEETING APPLIED TO COLORED BACKGROUND OR COMBINATION THEREOF. BACKGROUND SHALL BE REFLECTIVE SHEETING TYPE C.

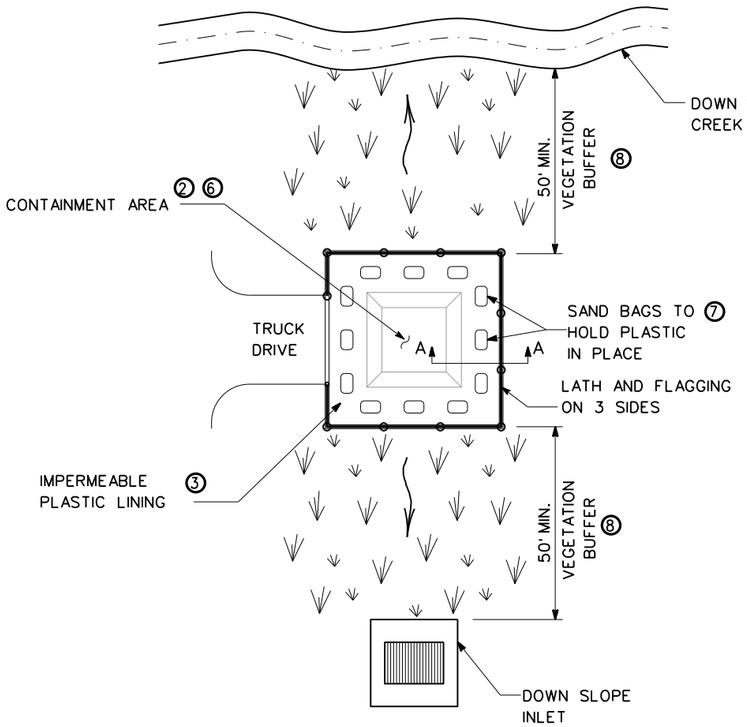
C. FINAL SIGN LOCATION SHALL BE AS APPROVED BY THE ENGINEER. IF THE SIGN CANNOT BE PLACED OUTSIDE THE CLEAR ZONE, IT MUST ADHERE TO THE TMUTCD. IF PLACED OUTSIDE THE CLEAR ZONE, SIGN MAY BE PLACED PERPENDICULAR OR PARALLEL TO ROW LINE.

D. SIGN DIMENSION IS 42" WIDE X 24" TALL WITH 5" BLACK LETTERS.

CONCRETE WASHOUT SIGN DETAIL (10)

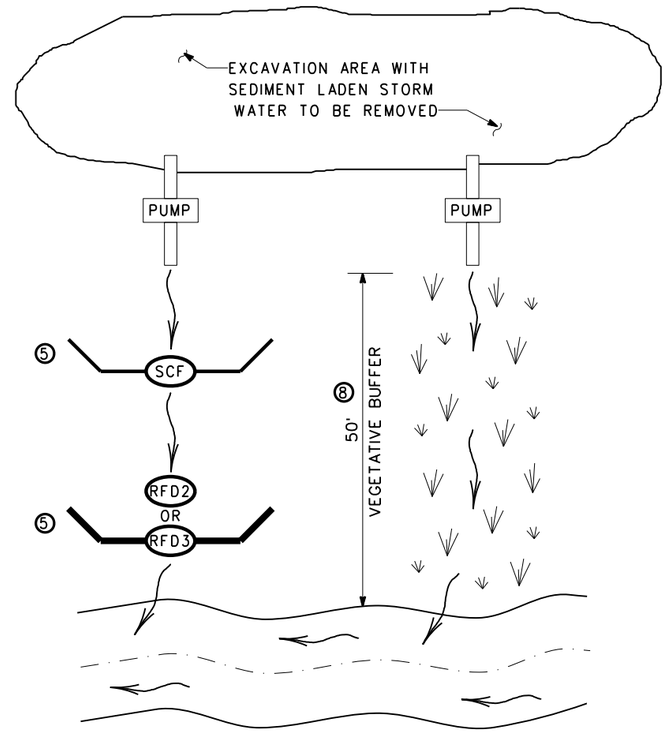


SECTION A-A



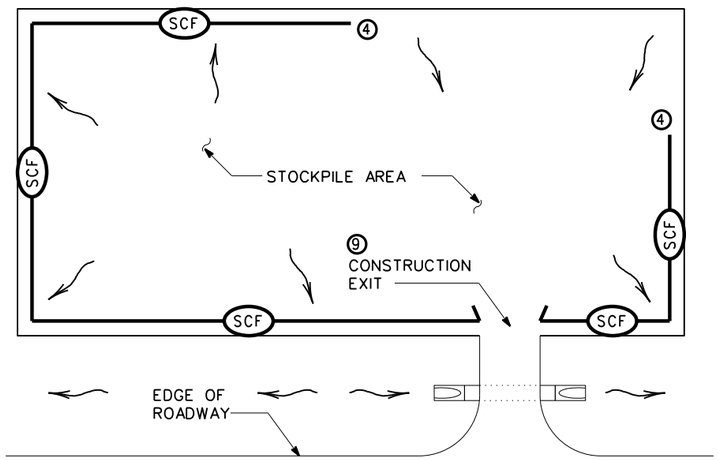
BEST MANAGEMENT PRACTICE (BMP) •12

CONCRETE TRUCK WASHOUT AREA (10)



BEST MANAGEMENT PRACTICE (BMP) •13

PUMPED STORM WATER SEDIMENT CONTROLS (1)



BEST MANAGEMENT PRACTICE (BMP) •14

STOCKPILE SEDIMENT CONTROL

	VEGETATIVE BUFFER
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

NOTES:

1. PUMPED STORM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS.
2. WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.
3. EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING. USE 10 MIL PLASTIC LINING MINIMUM.
4. START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
5. ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED.
6. ACTUAL SIZE,LAYOUT, & LOCATION WILL BE DETERMINED IN THE FIELD.
7. AN EARTHEN BERM MAY BE USED IN LIEU OF SANDBAGS.
8. VEGETATIVE BUFFER SHOULD HAVE AT A MINIMUM 70% VEGETATIVE COVERAGE
9. PLACEMENT OF DEVICES FOR OFFSITE TRACKING AS APPLICABLE AND/OR DIRECTED BY THE ENGINEER.
10. ALL ITEMS REQUIRED FOR CONCRETE WASHOUT AND SIGN SHALL BE SUBSIDIARY TO ITEM 506.

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10/30/2023

SCALE - NTS SHEET 4 OF 5

Texas Department of Transportation
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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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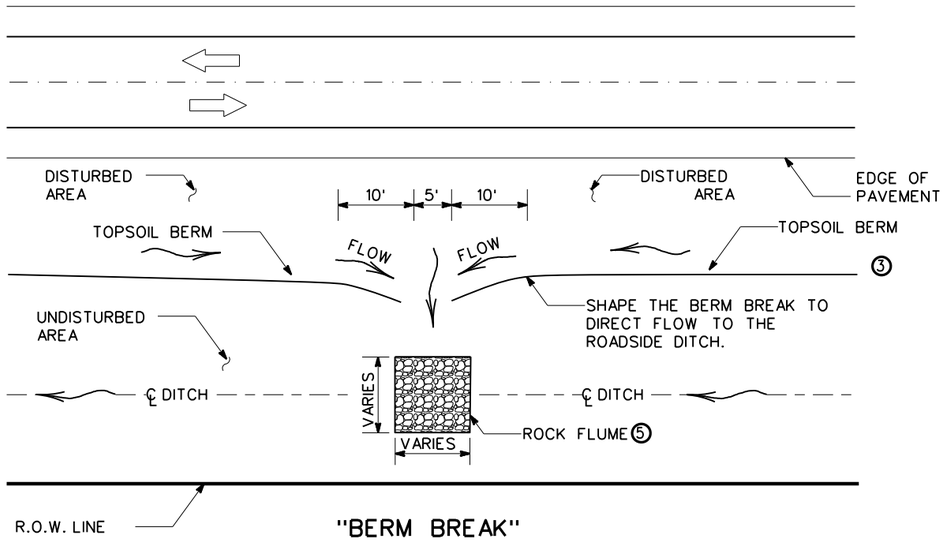
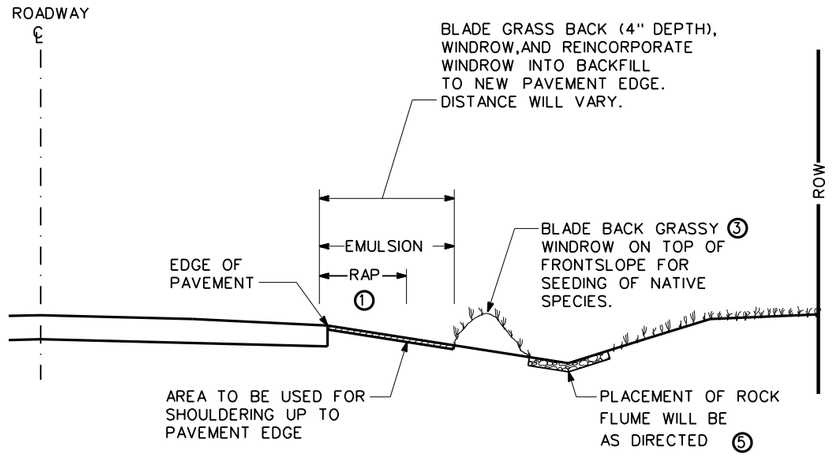


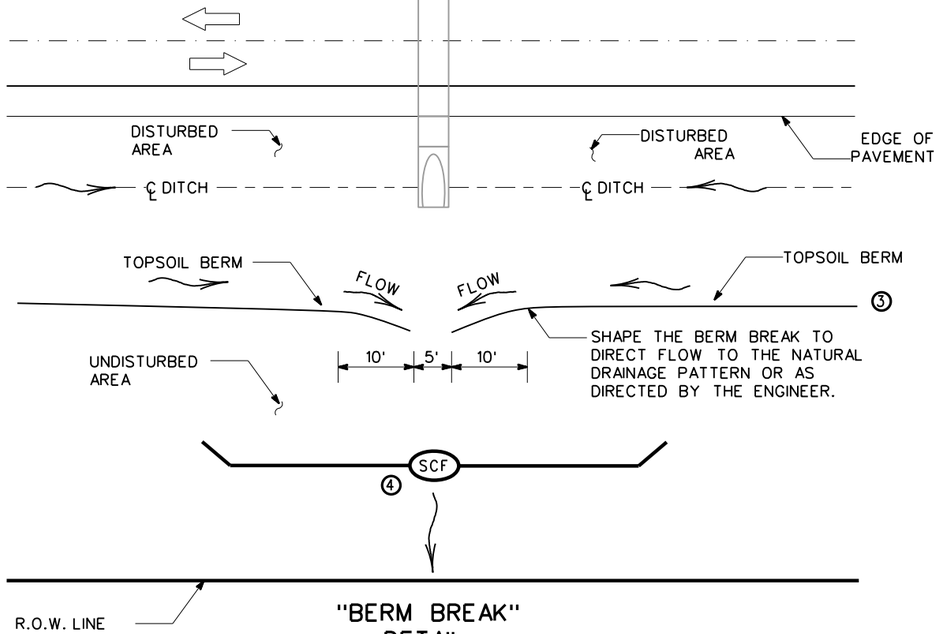
"BERM BREAK" DETAIL PLAN VIEW ②



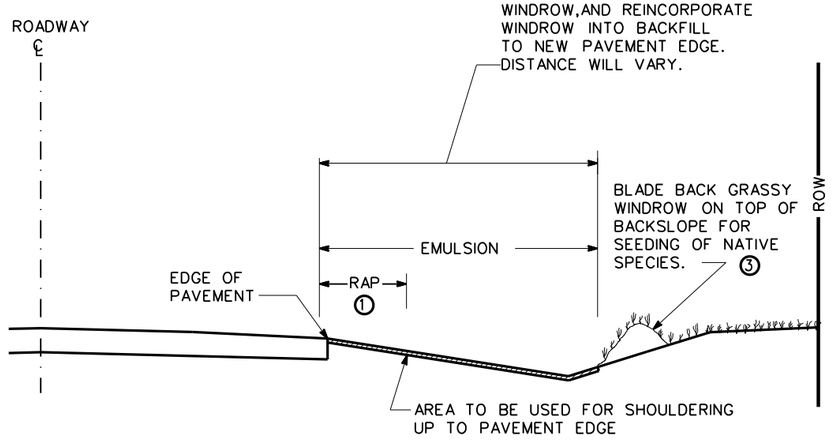
TYPICAL DITCH SECTION SHOWING BERM/WINDROW OF TOPSOIL

BEST MANAGEMENT PRACTICE (BMP) #15

SEDIMENT CONTROL AND BERM DETAIL WITH BERM ON FRONTSLOPE



"BERM BREAK" DETAIL PLAN VIEW ②



TYPICAL DITCH SECTION SHOWING BERM/WINDROW OF TOPSOIL

BEST MANAGEMENT PRACTICE (BMP) #16

SEDIMENT CONTROL AND BERM DETAIL AT CROSS DRAINAGE STRUCTURE WITH BERM ON BACKSLOPE

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
	ROCK FLUME~ENERGY DISSAPATOR
	BERM

NOTES:

1. AS DIRECTED PLACE RAP ADJACENT TO EDGE OF PAVEMENT AS A BACKFILL MATERIAL. PLACEMENT DISTANCE IS TO BE A MINIMUM OF 4' OR AS NEEDED TO ACHIEVE SMOOTH TIE IN TO EXISTING FRONT SLOPE.

2. BREAK BERM SO THAT MAXIMUM FLOW LENGTH ALONG THE BERM IS LESS THAN 1000'. BREAK BERM IN LOW AREAS WHERE FLOW MAY OVERTOP THE BERM. DO NOT BREAK BERM ON HILLTOPS OR WHERE RUNOFF AND SEDIMENT FLOW DIRECTLY OFF THE ROW.

3. LOCATION OF BERM WILL VARY. BERM COULD BE PLACED ON FRONTSLOPE OR BACKSLOPE DEPENDING ON FIELD CONDITIONS. SEE SPECIFIC SW3P LAYOUT SHEET FOR MORE DETAILS ON LOCATION OF BERM.

4. ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, EROSION CONTROL LOGS, ROCK FLUME, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED. DEVICE MAY NOT BE NEEDED IN ALL LOCATIONS. SEE SPECIFIC SW3P LAYOUT SHEET FOR MORE DETAILS ON LOCATION OF DEVICES.

5. PLACE ROCK FLUME DISSAPATOR AS DIRECTED BY THE ENGINEER. SIZE AND LOCATIONS OF ROCK FLUME WILL VARY. PROVIDE ROCK OR RUBBLE WITH A 3" TO 6" AGGREGATE. SECURE ROCK WITH 20-GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMTER HEXAGONAL OPENINGS. ROCK SHOULD BE PLACED ON THE MESH AND MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE ROCK AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES. PAYMENT WILL BE MADE BY ITEM TEMP PAVED FLUME (INSTALL).

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SCALE - NTS SHEET 5 OF 5

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		140

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (URBAN) (SAND or CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: BUFFALO GRASS (Texoka) COMMON BERMUDA GRASS (HULLED) BLUE GRAMA (NATIVE)	4.0 LBS PLS / ACRE 5.0 LBS PLS / ACRE 1.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) WARM SEASON SEEDING

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) FOXTAIL MILLET	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP SIDEOATS GRAMA BUFFALOGRASS BERMUDA GRASS BLACKWELL SWITCHGRASS ILLINOIS BUNDLEFLOWER	1.5 LBS PLS / ACRE 1.5 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 0.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) WARM SEASON SEEDING

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP FOXTAIL MILLET	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 20. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (SANDY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP BERMUDA GRASS SAND LOVEGRASS SAND DROPSEED WEEPING LOVEGRASS BLUE GRAMA PARTRIDGE PEAS (COMANCHE)	1.5 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. SEE NOTES ON TA-VES SHEET 2 OF 2 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SCALE = NTS SHEET 1 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		141

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) TALL FESCUE ANNUAL RYE GRASS	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP WESTERN WHEATGRASS CANADA WILD RYE GRASS ELBON RYE GRASS	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. ALL SEED MIXTURE TYPES SHALL BE PURCHASED IN PRE- MIXED BAGS, "BY TYPE" BLENDED BY THE GROWER SHIPPER.
2. SOILS THAT ARE COMPACTED, HAVE CLODS, SHALL BE REWORKED UNTIL READY FOR SEEDING. AS DIRECTED.
3. ALL SOIL SURFACES SHALL BE LEVEL WITH NATURAL FLOWING SMOOTH GRADES. NO TIRE RUTS OR FURTHER TRAFFIC ALLOWED.
4. SOIL SURFACE SHALL BE FIRM BUT NOT COMPACTED, ALLOWING 1/4" DEPRESSION UNDER NORMAL FOOT TRAFFIC.
5. SEED 100% OF THE BED AREA. NO SKIPS OR VOID AREAS ALLOWED. EXAMPLE:AREAS AROUND SIGN POSTS AND INLETS.
6. SEED UP TO THE FIRST 6" OF THE EDGE OF PAVEMENT. AS DIRECTED, HAND RAKE ISOLATED SEEDED AREAS.
7. WEIGH ALL CALIBRATED SEED SAMPLES FOR ACCURACY AND PRESENT DOCUMENTATION TO ENGINEER.

FOR DRILL SEEDING

8. USE ONLY PROFESSIONAL NATIVE GRASS OR TURF GRASS (MULTI- 3 BIN) DRILL SEEDERS. NO DROP SEEDERS ALLOWED. OTHER TYPES OF SEEDERS AS APPROVED BY THE ENGINEER.
9. CALIBRATE DRILL SEEDER FOR SPECIFIED (PLS) PER ACRE BEFORE DRILL SEEDING.
10. DRILL SEEDER MUST BE EQUIPPED WITH THE LARGE FRONT CUTTING COULTERS DURING THE INSPECTION OF DRILL SEEDER.

FOR BROADCAST SEEDING

11. USE ONLY COMMERCIAL TYPE CYCLONE TYPE SPREADERS.
12. CALIBRATE CYCLONE SPREADER FOR 1000 Sq. Ft. (PLS) PER ACRE BEFORE SEEDING.
13. TO PREVENT SEED SEPARATION IN SPREADERS, SPREAD ALL SEED TYPES INDEPENDENTLY IN A SEPARATE APPLICATION.
14. IMMEDIATELY AFTER SEEDING, IN ONE OR TWO OPERATIONS, CULTI-PACK THE SEEDED SOILS AND FIRM SEED INTO SURFACE.
15. DISCONTINUE SEEDING IF WIND EXCEEDS 10 MPH.

ITEM 314 EMULSIFIED ASPHALT TREATMENT

TIME SCHEDULE	FUNCTIONAL USE:
IMMEDIATELY AFTER: SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.	SOIL EROSION CONTROL,OR MOISTURE RETENTION BARRIER.

NOTES:

1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.
2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.
3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.
4. USE MATERIALS AS SPECIFIED FOR EROSION CONTROL ON TABLE 18 IN ITEM 300 ASPHALTS, OILS, AND EMULSIONS, AT A RATE OF 0.25 GAL/SY.

ITEM 166 FERTILIZER

TIME SCHEDULE	FUNCTIONAL USE:
AFTER TOPSOIL PLOWING PREPARATIONS ARE COMPLETED, FERTILIZE ROW SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.	PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.

FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 100 LBS OF NITROGEN PER ACRE.
THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM.
ANALYSIS OF THE (NPK) IS: 3:1:1 OR AS DIRECTED BY THE AREA ENGINEER.

ITEM 166 NOTES:

1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.

2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE A EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.

3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED,DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT AREA ENGINEER.

STATE OF TEXAS
BRYSON P. LAWRENCE
129839
LICENSED
PROFESSIONAL ENGINEER

Bryson Lawrence, P.E.

10/30/2023

SCALE = NTS SHEET 2 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		142

DATE: 10/25/2023
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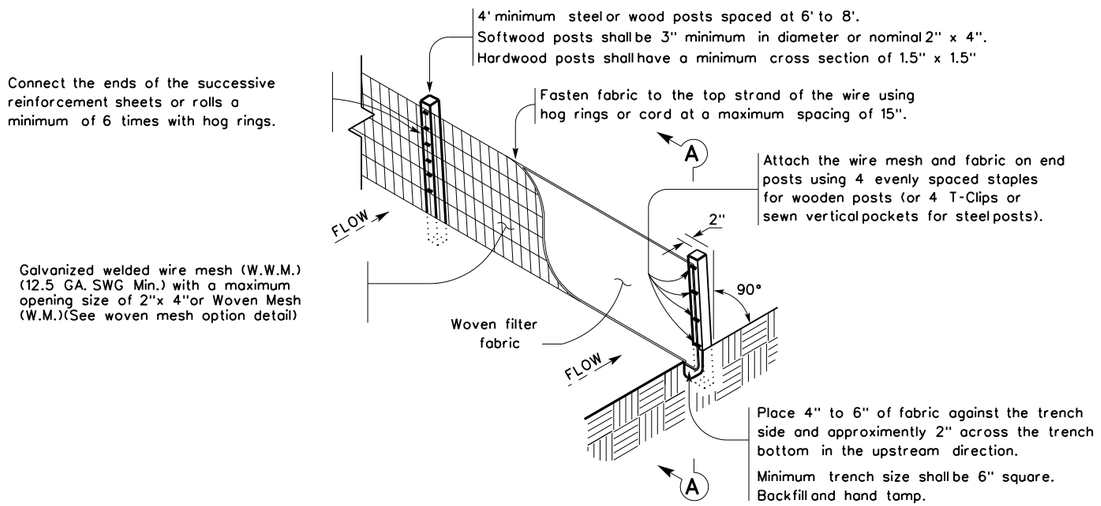
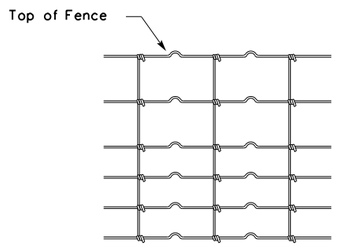
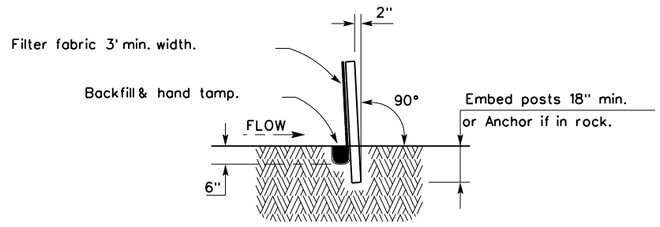


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT ^{2}. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

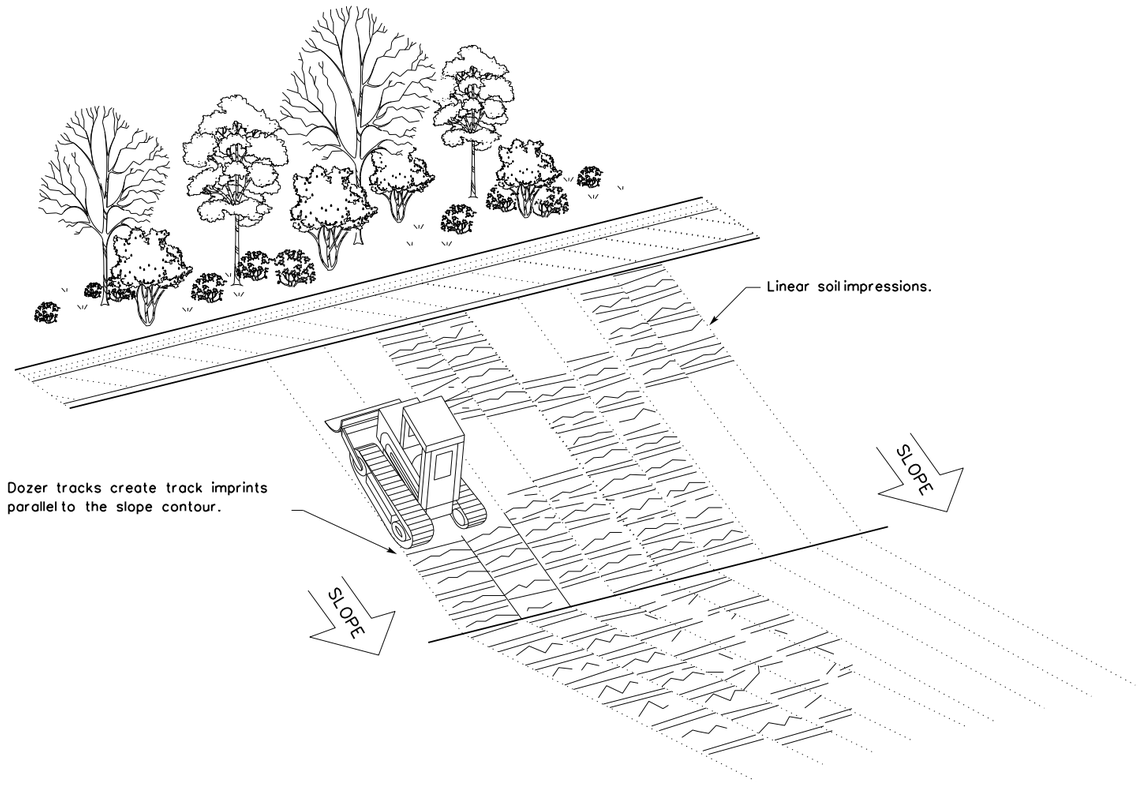
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		143

DATE: 10/27/2023
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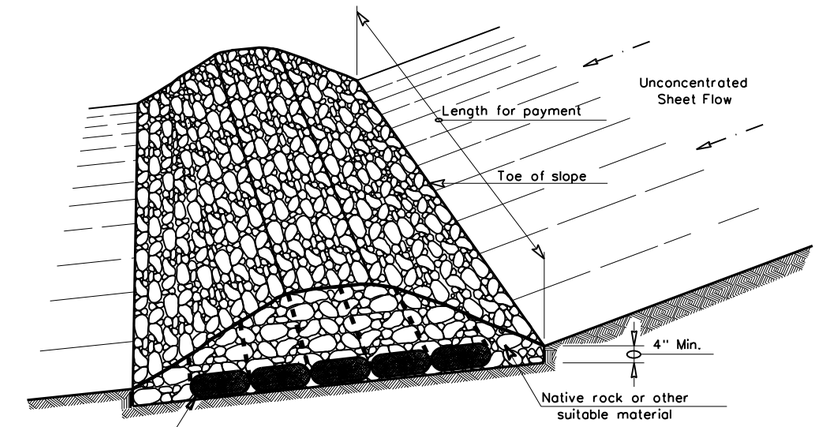
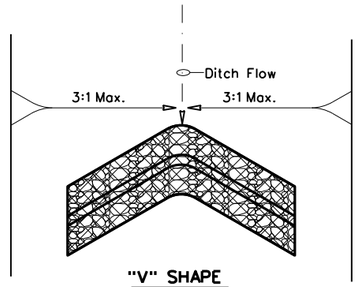
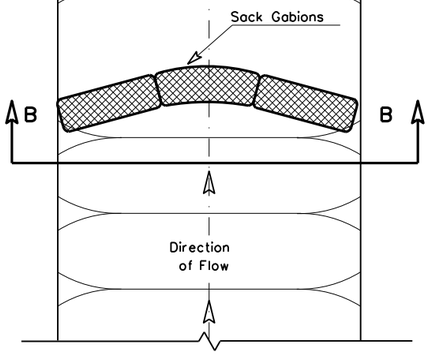


FILTER DAM AT TOE OF SLOPE

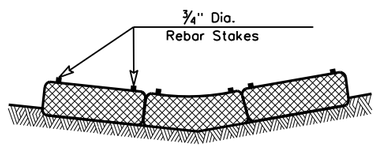
RFD1



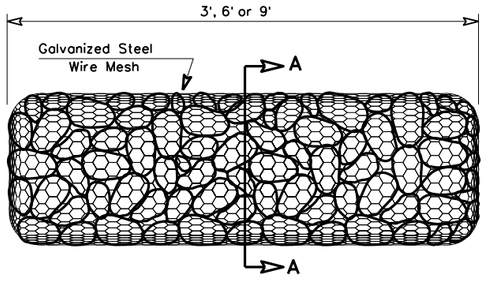
"V" SHAPE
PLAN VIEW



PLAN VIEW

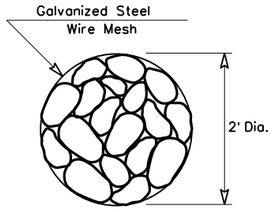


SECTION B-B

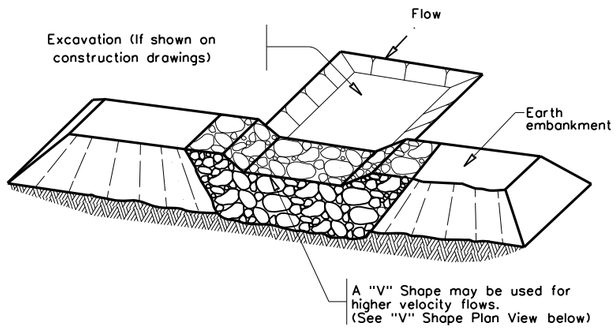


TYPE 4 (SACK GABIONS)

RFD4

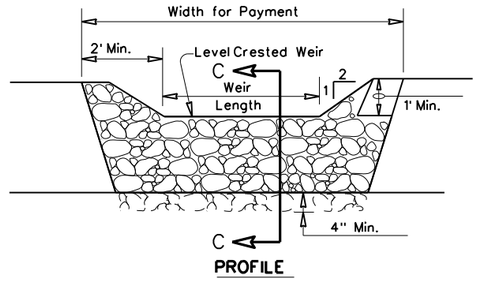


SECTION A-A

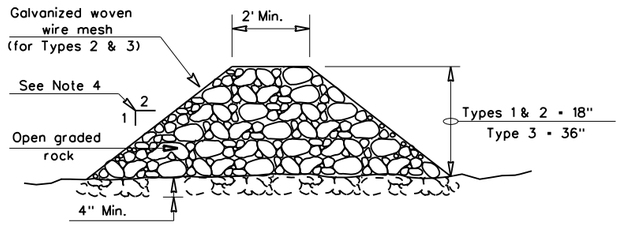


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

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.

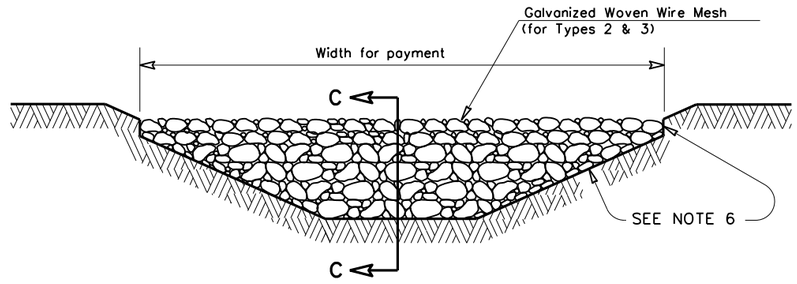
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

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		
	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0284	02	027	SH 79		
	DIST	COUNTY		SHEET NO.		
	WFS	Throckmorton		144		

DATE: 10/27/2023
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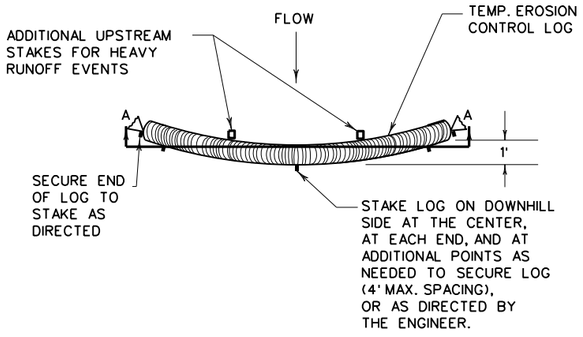
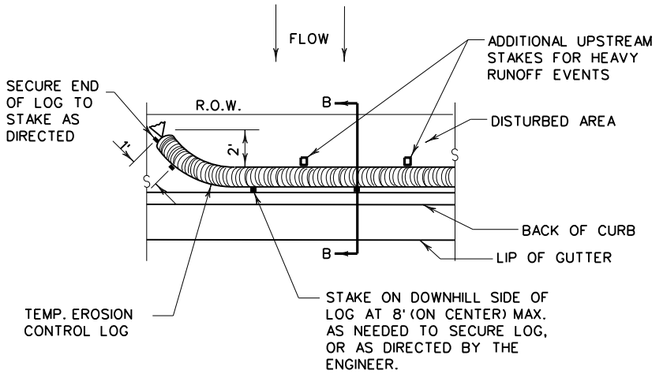
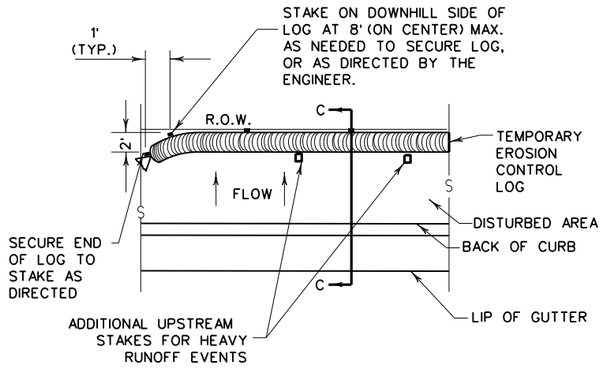


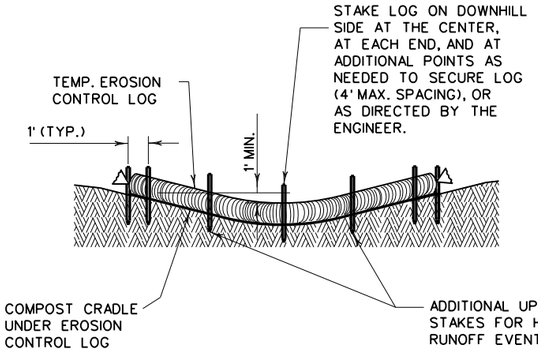
PLAN VIEW



PLAN VIEW



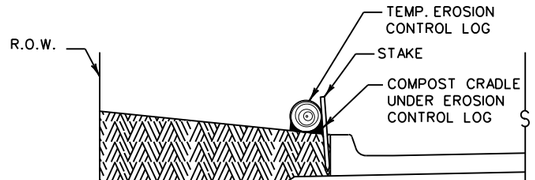
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

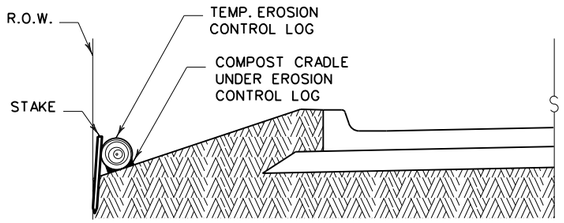
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



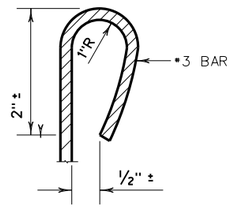
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

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



REBAR STAKE DETAIL

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.

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.

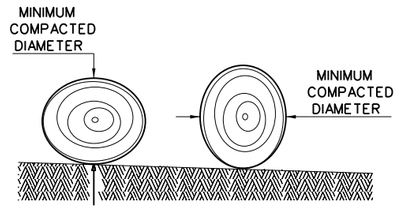
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

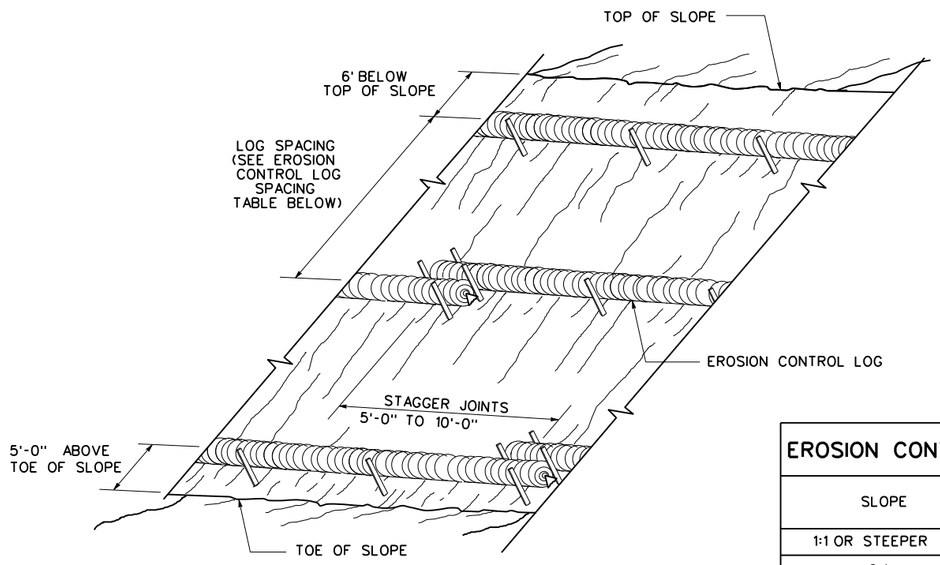
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

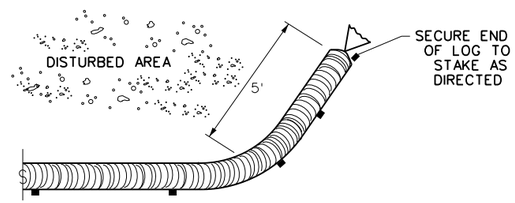
FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0284	02	027		SH 79	
	DIST	COUNTY			SHEET NO.	
	WFS	Throckmorton			145	

DATE: 10/27/2023
FILE: T:\WFSDESIGN\Warren M\SH79\Roadway Standards DGN\EC(9)-16.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

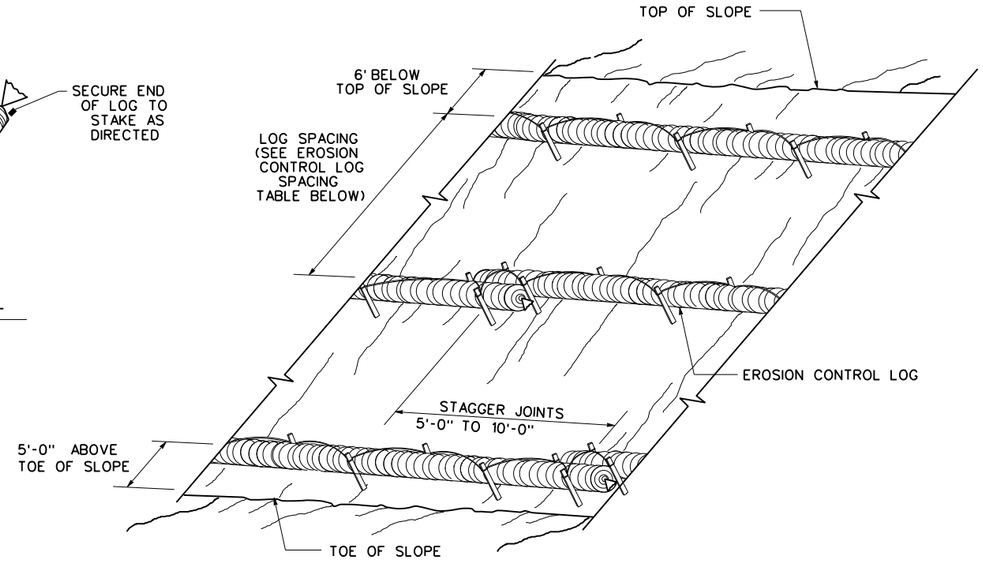
CL-SST



END SECTION RAP DETAIL

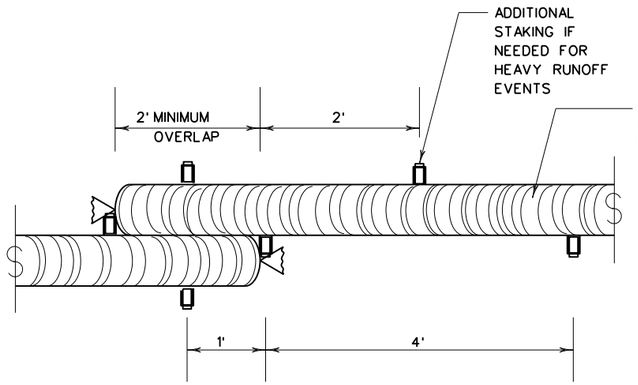
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

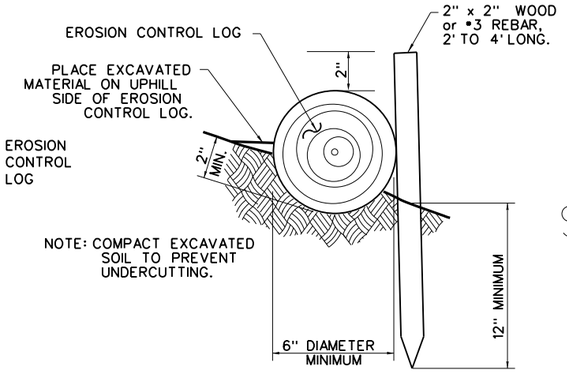
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

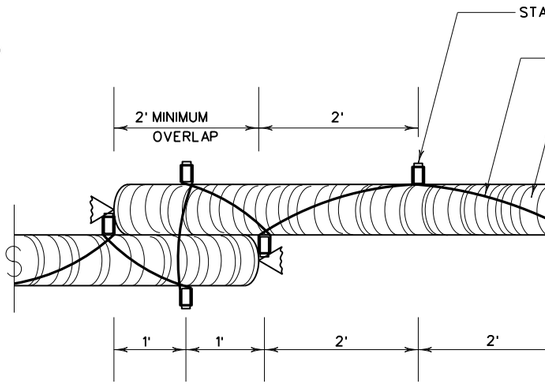


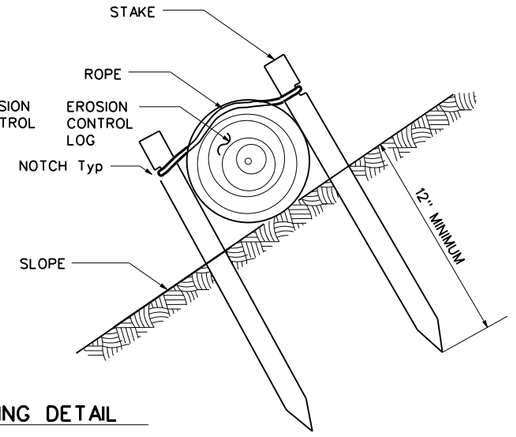


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

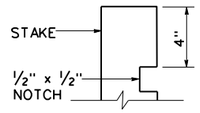
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		146

DATE: 10/27/2023
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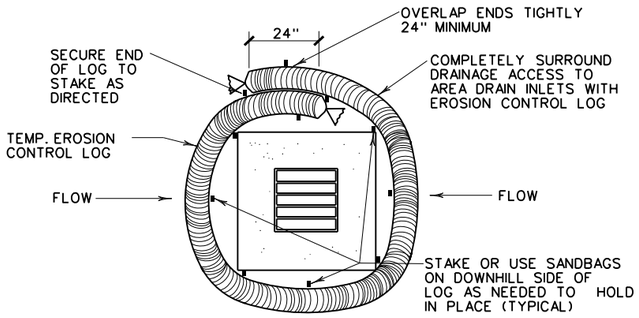
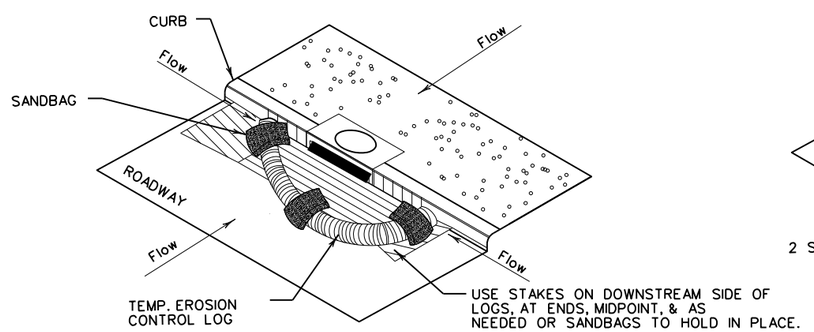


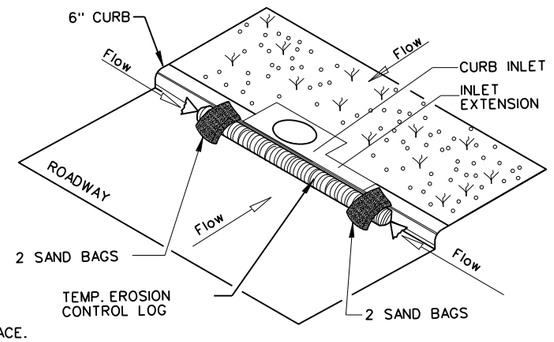
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

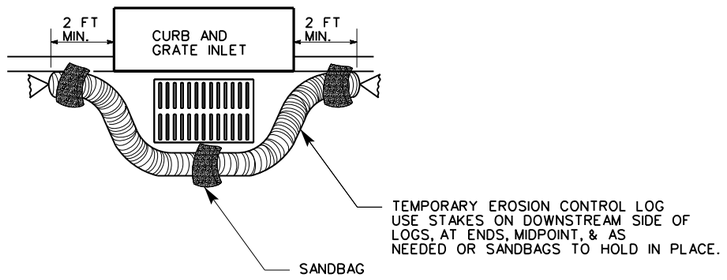
CL-CI



EROSION CONTROL LOG AT CURB INLET

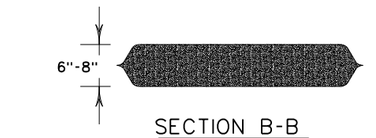
CL-CI

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.

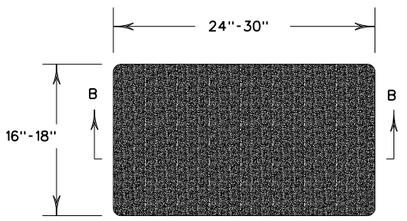


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

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	0284	02	027	SH 79
	DIST	COUNTY		SHEET NO.
	WFS	Throckmorton		147